

**United States Department of the Interior
Bureau of Land Management
Royal Gorge Field Office
3028 E. Main Street
Cañon City, CO 81212**

Environmental Assessment

Vegetation Manipulation Management: Chaffee and Lake County Planning

DOI-BLM-CO-200-2013-0050 EA

August, 2013



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CHAPTER 1 - INTRODUCTION

1.1 IDENTIFYING INFORMATION

CASEFILE/PROJECT NUMBER (optional):

PROJECT TITLE: Vegetation Manipulation Management: Chaffee and Lake County Planning

PLANNING UNIT: Arkansas River #1, Collegiate/Sangre #2

LEGAL DESCRIPTION: Chaffee and Lake County, see attached map

APPLICANT: BLM

1.2 INTRODUCTION AND BACKGROUND

BACKGROUND:

Colorado's forests are disturbance driven; they are dependent upon change for maintenance and renewal. Fires, insect and disease outbreaks, and forest management can add diversity and resiliency to forest stands or bring about entirely new forests from old ones (SCFS 2006). Historically, fires have occurred naturally throughout the Rocky Mountain West and have played an important ecological role in maintaining the function and pattern of the vegetation on the landscape. Fires have played a role in reducing natural fuel build-ups, along with maintaining forest health and wildlife habitats. During the settlement of the area most of the larger trees were removed for railroad transportation, building infrastructure, and to provide heat. However, these actions created a relatively even-aged forest throughout the planning area with a majority of old growth trees removed. Over time fire suppression and grazing have interrupted the natural frequency and intensity of fires, allowing forests to become over-populated with smaller trees. Smaller trees are generally less fire resistant and provide a ladder for fire to move into the canopy. A canopy or crown fire is the most destructive and difficult to control.

The high canopy cover and multistoried stand structure found in late stages of succession certainly improves big game thermal and security cover (Gruell 1980). However, the dense canopies also shade out early seral shrubs and grasses that usually have high forage value for many ungulates. Production of palatable shrub forage in old, fire excluded stands may be less than 1 percent of that found in young post-fire communities. Moreover, ungulates may find dense late seral stands difficult to traverse because of the abundance of downed logs and thick understory (Gruell 1979; Lonner and Pac 1990). Carrying capacity for elk can be diminished by removing disturbance from the ecosystem due to reduction in quality browse plant species (Gruell 1979). Furthermore, the lack of disturbance reduces winter range and forage quantity and quality, eventually reducing deer populations (Habeck 1985).

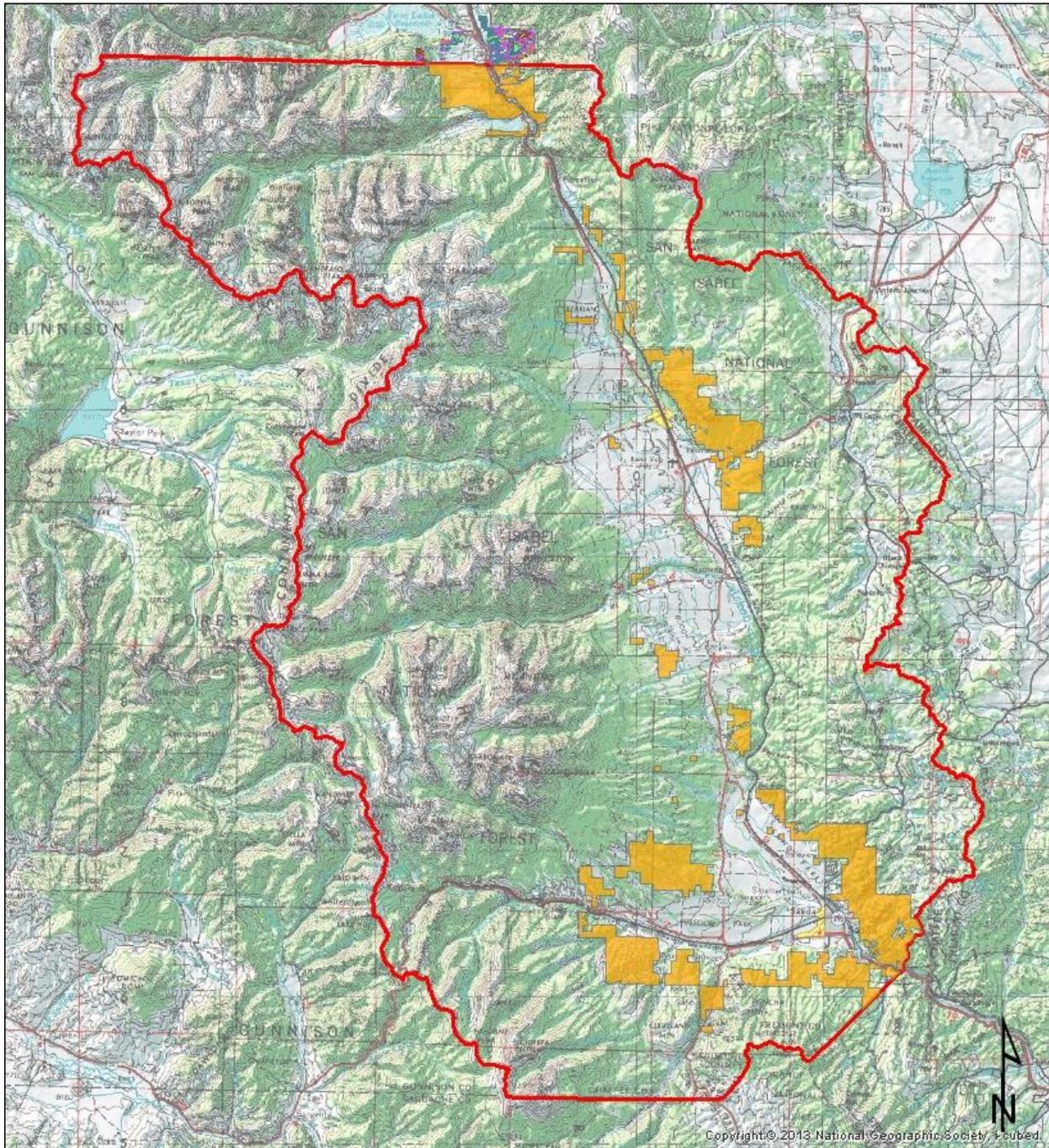
Landscapes with intact fire regimes have high variability in patch size, shape, and type, which is extremely beneficial for the existence of many avian species. This can also be said for many insect and rodent species (Higgins and others 1991). Finch and others (1997) mention that fire exclusion in Southwestern forests tends to favor generalist bird species that can utilize all stages of succession rather than specialist bird species found primarily on heterogeneous landscapes, open forests, burns, snags, or a combination of all. Small mammal populations may increase with the number of down logs as fuels accumulate during succession, but many mice, shrews, and gophers are found mostly in those early seral communities that directly follow fire. Moreover, the diverse mosaic of stand structures and composition created by an intact fire regime greatly correlate with higher numbers of small mammal individuals and species (Ream and Gruell 1980).

Fire research indicates that physical setting, weather, and fuels combine to determine wildfire intensity and severity. Fuels are the lone factor that may be manipulated by land managers (Graham 2004). Vegetation manipulation projects can reintroduce a disturbance regime mimicking historical disturbances once caused by fire. The results of such actions may lessen the intensities at which a wildfire burns, and give firefighters an improved chance at intercepting and slowing the fire before it reaches private property and/or develops into a catastrophic wildfire, and improve wildlife and range conditions by providing a mosaic of vegetative successional stages. Vegetation manipulation projects are accomplished by forest thinning, clearing, and prescribed burning under ideal conditions; removing combustible materials that increase fire intensity while creating a diverse and healthy forest. Thinning treatments also reduce the risk of large scale tree mortality from bark beetle epidemics and other forest pests improving the health and resiliency of forests.

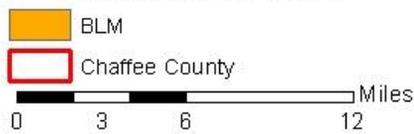
This is a joint umbrella environmental assessment between Bureau of Land Management-Royal Gorge Field Office (RGFO) and San Isabel National Forest (FS) that will cover a range of vegetation treatment methods within the analysis area while viewing the planning area as a contiguous landscape. The benefit of an umbrella assessment is that treatment affects will be analyzed at a landscape level, rather than individual pieces. The Bureau of Land Management-Royal Gorge Field Office completed a similar document titled "Fuels Management - Western Fremont County Fuels Planning" (DOI-CO-200-2005-0021 EA) in 2005. The Western Fremont County document has been a valuable tool for the RGFO resource staff to manage fuels, range, forestry, and wildlife projects at a landscape level within that spatial region (e.g. McCoy Gulch, Falls Gulch, Upper Kerr Gulch, Sand Wash). Its successfulness is the primary reason to extend this type of programmatic evaluation to additional lands managed by the RGFO.

The analysis area is RGFO managed land located within Chaffee County (Figure 1) and Lake County (Figure 2) and FS managed lands located within a two mile buffer of RGFO managed lands within Lake and Chaffee Counties (Figure 3). The Bureau of Land Management-Royal Gorge Field Office manages nearly 150,000 acres of surface lands in Chaffee County and more than 25,000 acres of surface lands in Lake County, Colorado. The analysis area encompasses a variety of vegetation types; however, the dominant classifications include lodgepole pine, piñon/juniper, mixed conifer forest and ponderosa pine. In regards to RGFO, projects tied to this document will be designed to thin dense forest stands and create openings to fulfill the objectives of renewable resource programs of the RFGO.

Figure 1. Bureau of Land Management-Royal Gorge Field Office managed land located within Chaffee County, Colorado. 2013.

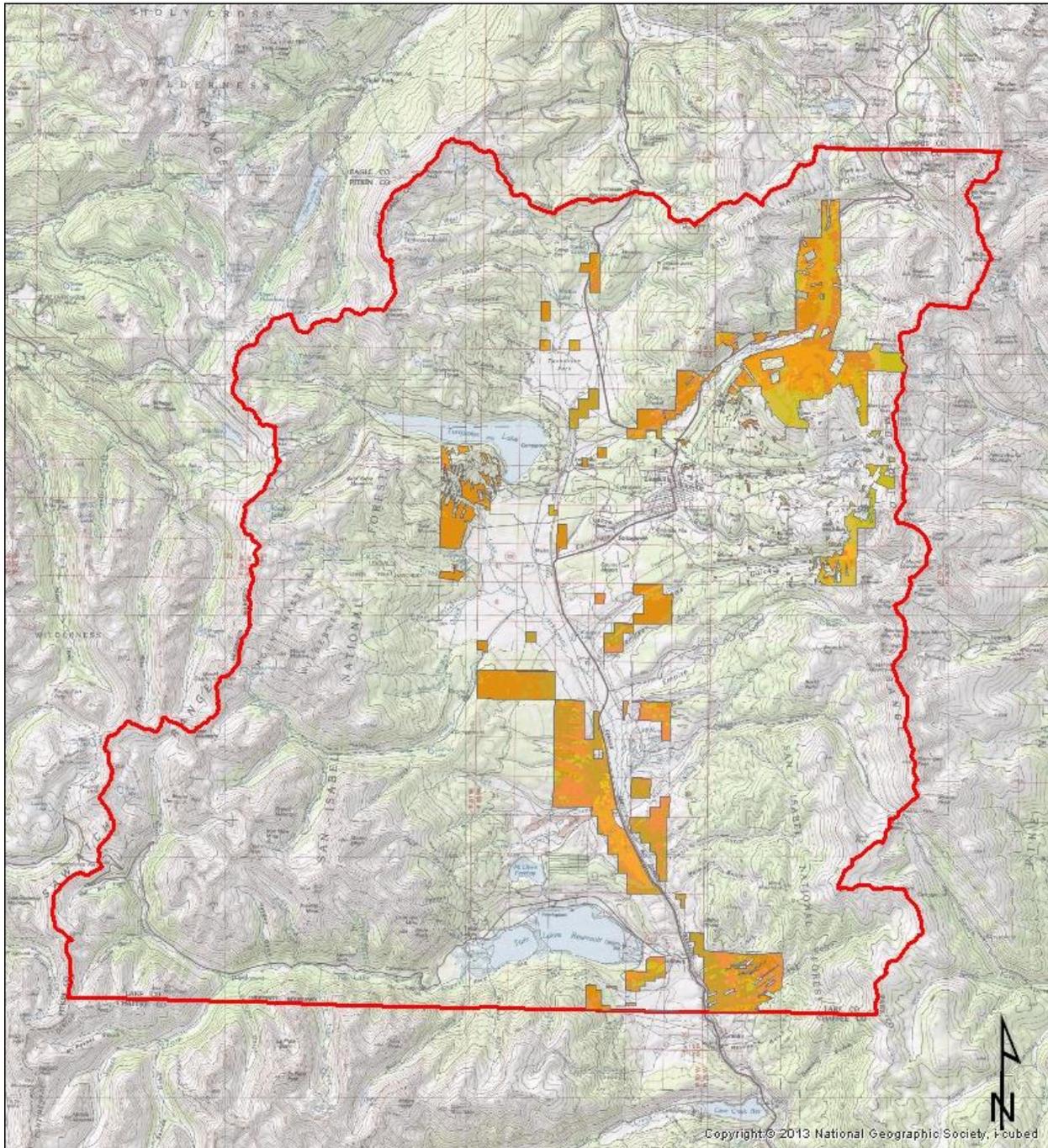


**VEGETATION MANIPULATION PLANNING
CHAFFEE COUNTY**
DOI-BLM-CO-200-2013-0050



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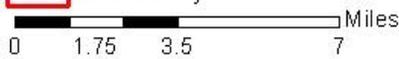
Figure 2. Bureau of Land Management-Royal Gorge Field Office managed land located within Lake County, Colorado. 2013.



**VEGETATION MANIPULATION PLANNING
LAKE COUNTY**

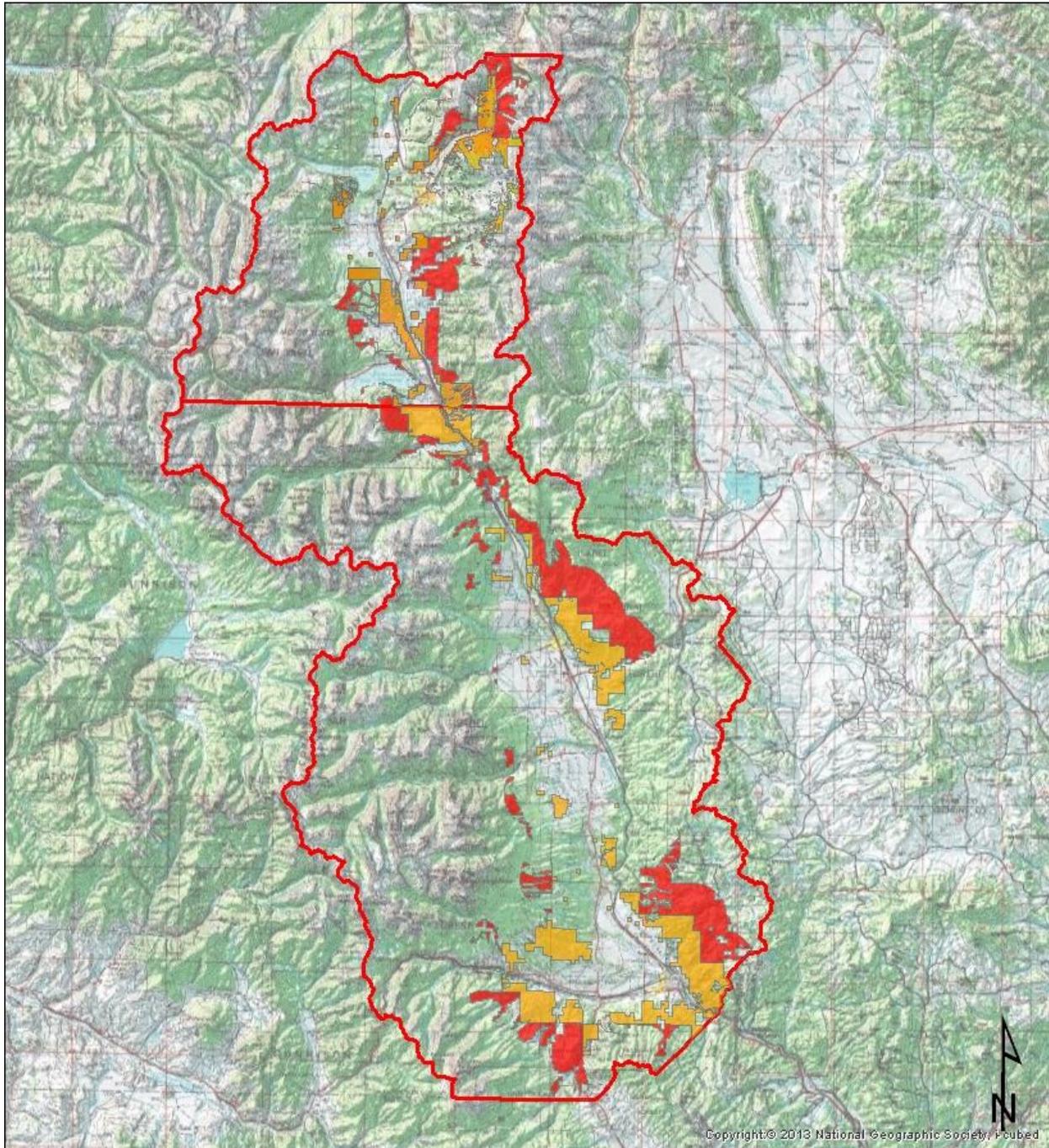
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- BLM
- Lake County



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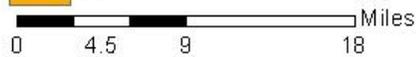
Figure 3. Forest Service managed lands located within two miles of Bureau of Land Management-Royal Gorge Field Office managed land within Chaffee and Lake Counties,



**VEGETATION MANIPULATION PLANNING
FOREST SERVICE ANALYSIS AREA**

DOI-BLM-CO-200-2013-0050

- Forest_Service_Analysis_Area_080713
- BLM



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1.3 PURPOSE AND NEED

The purpose of the proposed action is to provide a tool that ensures optimum population and a natural abundance and diversity of all natural resources on public lands. Projects completed through this multi-program approach will cumulatively restore, maintain, and enhance vegetative conditions through actions integrated with other uses of public lands, through coordination with other programs, the States, and through direct habitat improvement projects.

Wildlife: Vegetative disturbance within the planning area has been reduced by fire suppression. Dense forest canopies have shaded out early seral shrubs and grasses that provide browse and forage for many ungulates. As a result, vigor of quality browse and forage plant species has been reduced, lowering carrying capacities of wild ungulates. Vegetation treatment projects have occurred within the analysis area, but are limited in size and scope. The lack of disturbance has reduced winter range browse and forage quantity and quality, negatively impacting ungulate populations. Projects will be designed to diversify forest habitat for macro-vertebrates by reducing forest canopy while increasing the quantity, quality, and vigor of forage and browse vegetative species. Bureau of Land Management Manual 6500 instructs that it is BLM policy to manage habitat with emphasis on ecosystems to ensure self-sustaining populations and a natural abundance and diversity of wildlife, fish, and plant resources on public lands. The Sikes Act of 1960 provided a congressional mandate for BLM to plan, develop, maintain and coordinate programs for the conservation and rehabilitation of wildlife, fish and game.

Fuels/Forestry: The forests in the planning area are considered overstocked, leading to poor health and risk to bark beetle epidemics or catastrophic wildlife. The desired future conditions are healthy, disturbance resilient forests with varied densities and a mosaic of successional stages. In December 2003, Congress passed the Healthy Forests Restoration Act. This act provides special statutory processes for the types of treatments outlined in this document, as well as providing other authorities and direction to restore healthy forest conditions on lands of all ownerships. The intent of this Act is to speed up work needed to address overgrown and overstocked forests, bark beetle epidemics, and reduce the potential for catastrophic wildfire. The Healthy Forests Restoration Act specifically prescribes commercial logging as a tool to use in thinning overgrown forests.

Range: In January 1997, the Colorado State Office of the BLM approved the Standards for Public Land Health and amended all RMPs in the State. Standards describe the conditions needed to sustain public land health and apply to all uses of public lands. Many of the allotments within the action area do not meet public health standards due to a lack of plant species diversity, overstocked forest stands, and excessive soil erosion.

1.4 DECISION TO BE MADE

The BLM will decide whether to implement the proposed Vegetation Manipulation Management: Chaffee and Lake County Planning project based on the analysis contained in this Environmental Assessment (EA). This EA will analyze the impact of vegetation

manipulation projects on BLM managed lands in Chaffee and Lake County. The BLM may choose to: a) implement the project as proposed, b) implement the project with modifications/mitigation, c) implement an alternative to the proposed action, or d) not implement the project at this time.

1.5 PLAN CONFORMANCE REVIEW

PLAN CONFORMANCE REVIEW: The Proposed Action is subject to and has been reviewed for conformance with the following plan (43 CFR 1610.5, BLM 1617.3):

Name of Plan: Royal Gorge Resource Management Plan

Date Approved: 05/16/1996

Decision Number: 1-1, 1-14, 1-15, 2-1, 2-13, 2-14, C-25

Decision Language:

- Vegetation will be managed to accomplish other BLM initiatives i.e., riparian, wildlife, etc.
- Improved forage conditions will be distributed through cooperative efforts i.e., Colorado Habitat Partnership Program.
- Management of forest lands will be for enhancement of other values.
- Productive forested lands will be managed for sustained yield.
- A portion of the forested lands will be available for intensive management.
- Prescribed fire could be used as a management tool to enhance other resources.

In January 1997, the Colorado State Office of the BLM approved the Standards for Public Land Health and amended all RMPs in the State. Standards describe the conditions needed to sustain public land health and apply to all uses of public lands.

Standard 1: Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, land form, and geologic processes.

Standard 2: Riparian systems associated with both running and standing water function properly and have the ability to recover from major disturbance such as fire, severe grazing, or 100-year floods.

Standard 3: Healthy, productive plant and animal communities of native and other desirable species are maintained at viable population levels commensurate with the species and habitat's potential.

Standard 4: Special status, threatened and endangered species (federal and state), and other plants and animals officially designated by the BLM, and their habitats are maintained or enhanced by sustaining healthy, native plant and animal communities.

Standard 5: The water quality of all water bodies, including ground water where applicable, located on or influenced by BLM lands will achieve or exceed the Water Quality Standards established by the State of Colorado.

Because standards exist for each of these five categories, a finding must be made for each of them in an environmental analysis. These findings are located in Chapter 3 of this document.

1.6 SCOPING, PUBLIC INVOLVEMENT AND ISSUES

1.5.1 Scoping: NEPA regulations (40 CFR §1500-1508) require that the BLM use a scoping process to identify potential significant issues in preparation for impact analysis. The principal goals of scoping are to allow public participation to identify issues, concerns, and potential impacts that require detailed analysis.

Persons/Public/Agencies Consulted: Scoping was conducted by issuing a press release and by posting this project on the Royal Gorge Field Office website to initially identify issues. In addition, the Colorado Parks and Wildlife and the United States Forest Service were consulted. No comments or issues were received.

Issues Identified: No comments received nor issues identified by the public during the scoping process.

CHAPTER 2 - PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

The purpose of this chapter is to provide information on the Proposed Action and Alternatives. Alternatives considered but not analyzed in detail are also discussed.

The project is designed to benefit resources managed by the wildlife, range, forestry and fuels programs managed by RGFO and FS. Therefore, each program has specific objectives to achieve while planning projects based on the proposed action. While projects are designed to benefit the lead program, many of the objectives achieved will benefit multiple programs.

Wildlife management objectives are to create a mosaic of seral stages that will support healthy big game population within their seasonal ranges. Many different treatment prescriptions may be used depending on target species benefit. When planning vegetation treatments, an important characteristic of mule deer to consider is they tend to be dispersed across the landscape, expressing less gregarious behavior, and have high site fidelity to seasonal ranges. Therefore, for deer, the goal is to create a high edge habitat to open meadow habitat ratio by treating numerous small patch sizes (~3-12 acres) over large areas, and to maintain security cover for wildlife near roads and developed areas. Deer are reluctant to move to new areas for foraging or security until major changes have occurred. Elk, on the other hand, will readily change their behavior to take advantage of foraging opportunities and/or avoid disturbance from humans or predators. Elk are a more gregarious, herding species with more flexible site behavior. A beneficial strategy for elk may be to treat larger, less numerous areas given their different behavioral tendencies. Other considerations for treatment strategies to benefit wildlife include the desired vegetation response, benefits to grazers versus browsers, the need for invasive plant species control, and potential for natural or assisted reestablishment of vegetation (seeding).

The primary range management objective is to promote forage production, both quality and quantity, that will distribute permitted livestock more evenly across the range, minimizing over utilization and concentration areas. Secondly, objectives are to promote herbaceous plant diversity and reduce soil erosion, enhance forest health and diversity, and reduce wildlife conflicts on adjacent private land.

Forestry management objectives for this proposal are to improve forest health by reducing tree densities in overstocked stands and removing unhealthy trees. Improve forest or stand resiliency to natural disturbances by reducing stand densities and favoring healthy trees for retention. Increase forest age class diversity in all forest types by applying group selection or patch cutting treatments, and promote species diversity by favoring uncommon tree species for retention in treatment areas. Reduce bark beetle risk in overstocked stand by reducing stand densities. Finally, to support the local forest product industry by providing a continual supply of desired forest products.

Throughout the United States it is more and more common to see homes and other types of structures being built in wildland environments. This trend is creating an expansion of the wildland/urban interface where structures are located next to dense forests with high natural fuel accumulations. Because of their location, these structures are extremely vulnerable to fire should an unplanned wildfire occur in the surrounding forests. During the last decade, thousands of people have moved to the mountain areas of Colorado. Many of these people have moved into areas that are at significant risk of wildfire. Numerous ranches of substantial acreages have been sold and subdivided into small lots increasing the complexity of forest management, fuels reduction and wildfire suppression. The subdivisions immediately within the proposed project area are a classic example of the wildland-urban interface. Many of the lots in these subdivisions are less than five acres in size and have a variety of structures built on them. The risk of fire to the subdivisions has been recognized for many years but became very apparent during the summer of 2002 and 2012. Under the current conditions, vegetation is very susceptible to catastrophic fire and is classified as condition class 2 and 3. Congress has directed BLM to reduce wildfire hazards in the wildland-urban interface.

The main objectives of fuels treatments are to reduce ladder and ground fuels and to create breaks in the continuous canopy. This reduces the chance of a fire getting into the crowns of the trees. Crown fires are difficult to control. These thinned areas can give fire fighters a better chance to safely employ suppression tactics, or to manage a wildfire with minimal loss or damage to property, habitat, or critical infrastructure. The ultimate goal of the mechanical treatment is to create a fuel arrangement and amount on the landscape to be able to return fire back to the ecosystem with the use of prescribed fire in the future. Congress passed the Healthy Forests Restoration Act (HFRA) and the Healthy Forests Initiative (HFI) that provides special statutory processes for hazardous fuels reduction projects, and it also presents other authorities and direction to help reduce hazardous fuels and to restore healthy forest conditions on lands of all ownership's. This Environmental Assessment is being completed using HFRA/HFI authorities for projects with a primary objective of fuels reduction. Fuels reduction projects typically differ from other vegetation treatment projects in that vegetation patterns, densities and slash disposal are focused more on altering fire behavior. Secondary benefits to these treatments include wildlife habitat enhancement, improved forage quantity and quality for wildlife and

cattle, and improved forest health. To the casual observer projects designed to meet these objectives may not look much different and treatment methods are similar.

Riparian management objectives could be to enhance photosynthesis (e.g. enhance production at a wooded toad habitat location, fishery rearing area, and open areas around artificial water impoundments that have become forested). Other program objectives are to sustain aspen or other favored trees along suitable riparian habitats where encroachment is occurring by evergreen trees, to create large woody debris that is available for in-stream habitat (e.g. beaver pond habitat expansion) and to promote enhanced understory that may reduce overland flow and sediment entering aquatic habitat. Finally, a program objective would be to maintain a Potential Conservation Areas ecological condition as defined by the Colorado Natural Heritage Program where unique vegetation communities may be impaired by heavy evergreen encroachment moving a community far from its ecological range of variability.

2.2 ALTERNATIVES ANALYZED IN DETAIL

2.2.1 Proposed Action

The proposed action is to complete an umbrella environmental assessment that will cover a wide range of vegetation treatment types within the planning area. Treatments will not occur within Wilderness Study Areas, Areas of Critical Environmental Concern, or lands managed by the Arkansas Headwater Recreation Area. This assessment will remain valid for a maximum of 10 years past signature date. Treatment methods include the use of mechanical and hand tools, and prescribed fire (pile burning, broadcast burning, etc.). Any single project may not exceed 1000 treated acres per year, and cumulatively, projects may not exceed 2500 treated acres per year within the planning area. However, unplanned vegetation disturbance (e.g. wild-/natural fire, blow downs) will not be incorporated into the 2500 acres ceiling. Projects proposed in Areas of Critical Environmental Concern, state park managed lands (i.e. Arkansas Headwaters Recreational Areas), Wilderness Study Areas or areas found to have wilderness characteristics may require additional analysis.

The commercial/personal use of the trees to be removed will be encouraged. Spruce, Douglas-fir, ponderosa pine, lodgepole pine and aspen are all considered commercial species with value as various forest products depending on size and form. Trees classified as saw timber designated for removal would be utilized for lumber or house logs under commercial timber sales. Smaller trees may have value as fuel wood, posts or poles. Areas may be opened for Special Forest Product (SFP) harvesting. Local demand for SFP includes transplants, post and poles, Christmas trees, and fuel wood. Removing the vegetative materials to be used as biomass would be beneficial for the treatment areas, reduce prescribed burning costs, and provide the community with a renewable energy source. The harvesting of SFP requires a permit and special mitigations to protect roads and land resources.

Through the Healthy Forest Initiative, the BLM has the authority to enter into stewardship contracts to reduce wildland fire hazard and improve forest health. Stewardship contracts are long-term (up to 10 years) and may be used to fulfill a number of program objectives. Contracts may be designed to improve, maintain or restore forest or rangeland health, restore or maintain water quality, improve fish and wildlife habitat, and reduce hazardous fuels that pose risks to community and ecosystem values. Commercial harvesting of trees (e.g. saw timber, biomass,

fuel wood, transplants) through stewardship contracts could reduce treatment costs and create local jobs. The new authority allows contractors, community groups, and others to retain removed forest product as full or partial payment for services depending on the value of wood and services performed. Without further appropriation, the BLM can apply gained credit to the project site or any other stewardship project site. Stewardship contracts foster public and private partnership and provide contractors with an incentive to invest in equipment and facilities needed to conduct projects on BLM lands.

This project would be a long term investment in vegetation management and would require monitoring and periodic maintenance to retain its effectiveness. Monitoring will consist of measuring pre-treatment and post-treatment vegetative characteristics to ensure the desired outcome had been obtained. Periodic maintenance or enhancement of past vegetation manipulation would also be authorized to retain effectiveness of projects. Maintenance would be accomplished through any of the actions described above, i.e., hand removal/thinning work, Christmas tree cutting, transplant harvesting, hydro-mulching, or by prescribed burning with a low to moderate intensity surface fire. Enhancement projects would occur adjacent to past treatment areas, managing for age class diversity while creating a mosaic pattern on the landscape. Projects of this nature will temporarily delay succession, maintaining resistance to catastrophic fire and allow additional time for grass, forb, and shrub establishment.

If needed, existing roads used to remove forest products will be maintained and improved. No new permanent roads will be created by specific projects. All temporary roads created for access and forest product removal will be closed upon completion of the treatment. Road closures will be done with natural surrounding materials such as large rocks or logs, tank traps, and buck and rail fences where appropriate. Roads will then be posted as closed to vehicle access. All road closures will be coordinated with current and future travel management plans. No private roads will be used for removing forest products unless approved by the owner. Treatments and hauling of forest products will be done when the ground is either frozen or dry to prevent soil and road damage. Operators will be required to stop work during the wet periods.

When vegetative conditions warrant, seeding of treated areas will be considered to expedite the establishment of vegetation (Table 1). Seed mixture and rate will be determined on a site by site basis and selected based on project objectives. The species selected would be adapted to the site and consist of a mixture of cool and warm season vegetation species. Where artificial seeding is required emphasis will be placed on using native plant species. However, seeding of non-native species will be considered based on project objectives and native seed availability. The use of non-native species would be limited to less than 10% by weight of the total seed mix composition and consist of species that have a low persistence. All seed would be certified for content, viability and meet the BLM standard for weed free.

Table 1. Plant species available for seed mixtures, Bureau of Land Management-Royal Gorge Field Office and San Isabel National Forest, 2013.¹

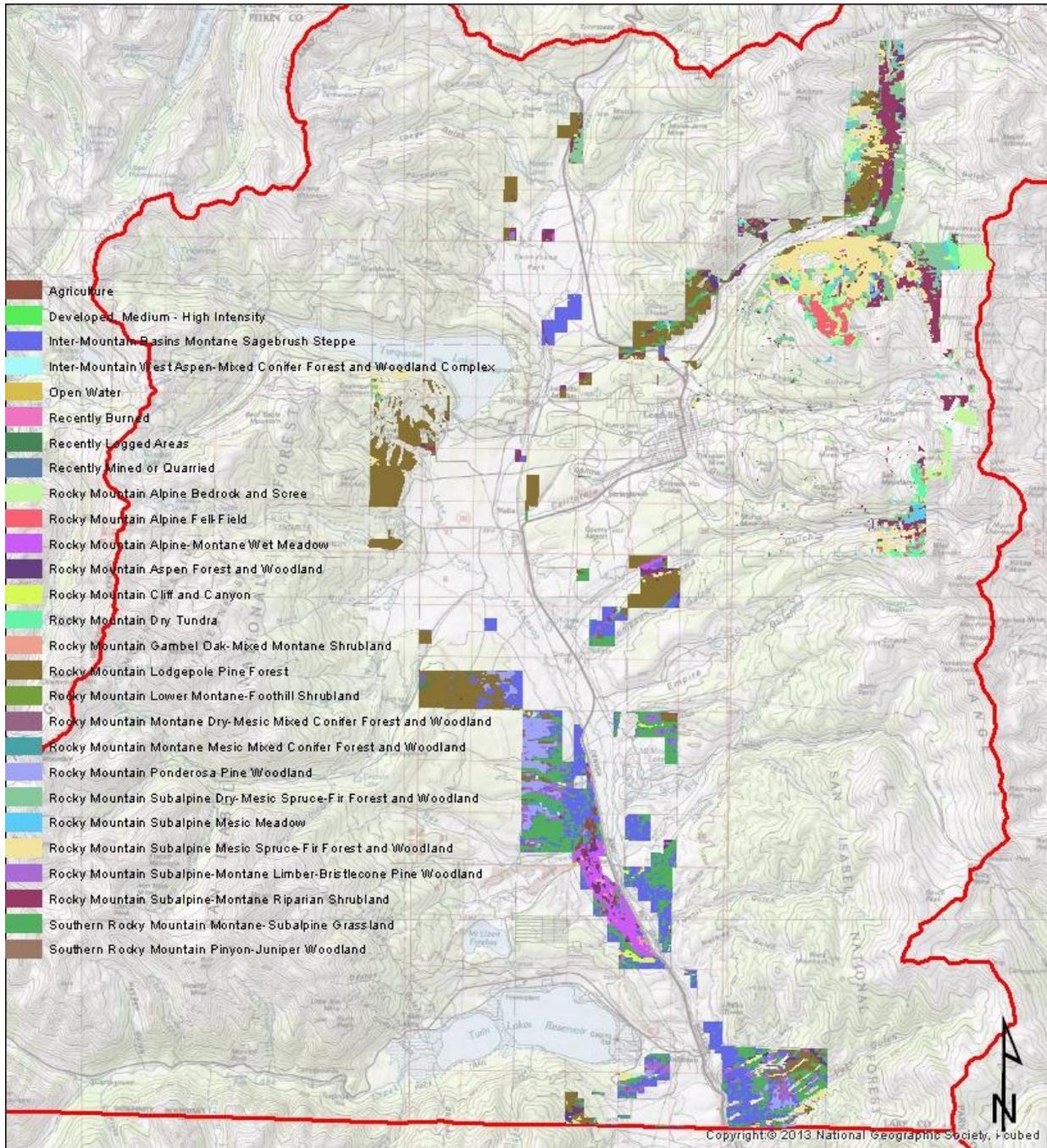
Native			
Common Name	Scientific Name	Common Name	Scientific Name
Indian Rice Grass	<i>Oryzopsis hymenoides</i>	Squirrel Tail	<i>Elymus elymoides</i>
Western Wheat Grass	<i>Pascopyrum smithii</i>	Arizona Fescue	<i>Festuca arizonica</i>
Sand Dropseed	<i>Sporobolus cryptandrus</i>	Blue Grama	<i>Bouteloua gracilis</i>
Pine Dropseed	<i>Blepharoneuron tricholepis</i>	Sideoats Grama	<i>Bouteloua curtipendula</i>
Prairie Junegrass	<i>Koeleria macrantha</i>	Mountain Mahogany	<i>Cercocarpus montanus</i>
Wax Current	<i>Ribes cereum</i>	Winterfat	<i>Krascheninnikovia lanata</i>
Four Wing Saltbrush	<i>Atriplex canescens</i>	Buckwheat	<i>Fagopyrum esculentum</i>
Parry Oatgrass	<i>Danthonia parryi</i>	Thurber's Fescue	<i>Festuca Thurberi</i>
Mountain Brome	<i>Bromus marginatus</i>	Slender Wheatgrass	<i>Agropyron trachycaulum</i>
Canada Wildrye	<i>Elymus canadensis</i>	-	-

Non-native	
Common Name	Scientific Name
Ladak Alfalfa	<i>Medicago Sativa</i>
Small Burnett	<i>Sanguisorba minor</i>

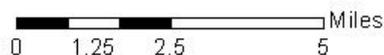
¹Species used in seed mixtures are subject to change.

In general, the treatment size and types used would be dictated by the vegetation classification, terrain, and project objectives. The BLM managed lands within the planning area encompasses a variety of vegetation types; however, the dominant classifications include piñon/juniper, mixed conifer forest and ponderosa pine (Figures 4-6, Tables 2,3). The Forest Service managed lands contain a variety of vegetation types, but primarily consist of grasslands, piñon/juniper woodlands, ponderosa pine forests and lodgepole pine (Figures 7-9, Table 4).

Figure 4. Vegetation classification of Bureau of Land Management-Royal Gorge Field Office managed lands, Lake County, Colorado, 2013. Vegetation data was modeled from 1999-2001 satellite imagery in conjunction with digital elevation model datasets.

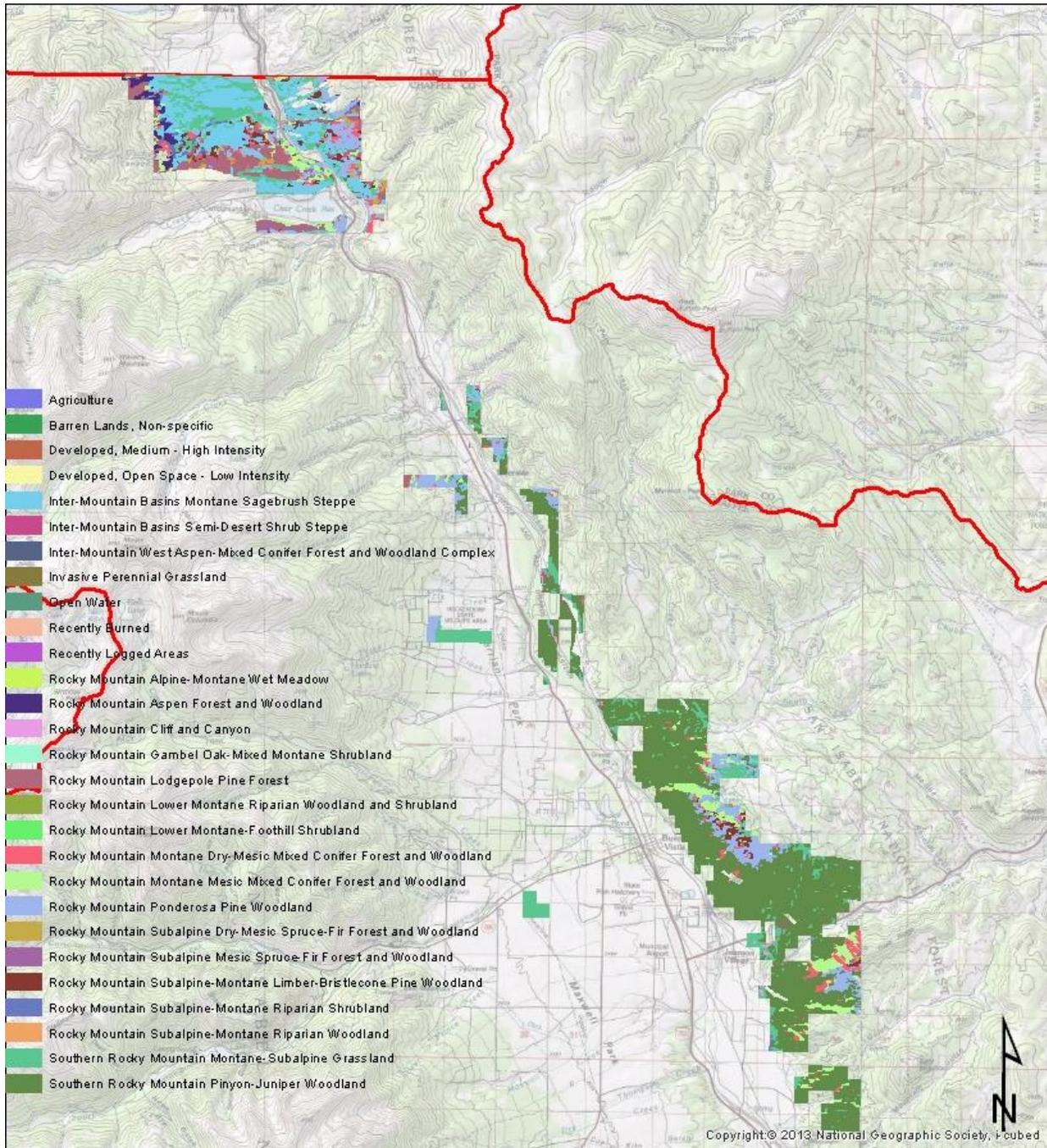


**VEGETATION CLASSIFICATION ON BLM
LAKE COUNTY**
DOI-BLM-CO-200-2013-0050

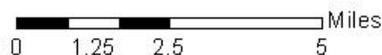


NOTE TO MAP USERS
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Figure 5. Vegetation classification of Bureau of Land Management-Royal Gorge Field Office managed lands, north half Chaffee County, Colorado, 2013. Vegetation data was modeled from 1999-2001 satellite imagery in conjunction with digital elevation model datasets.

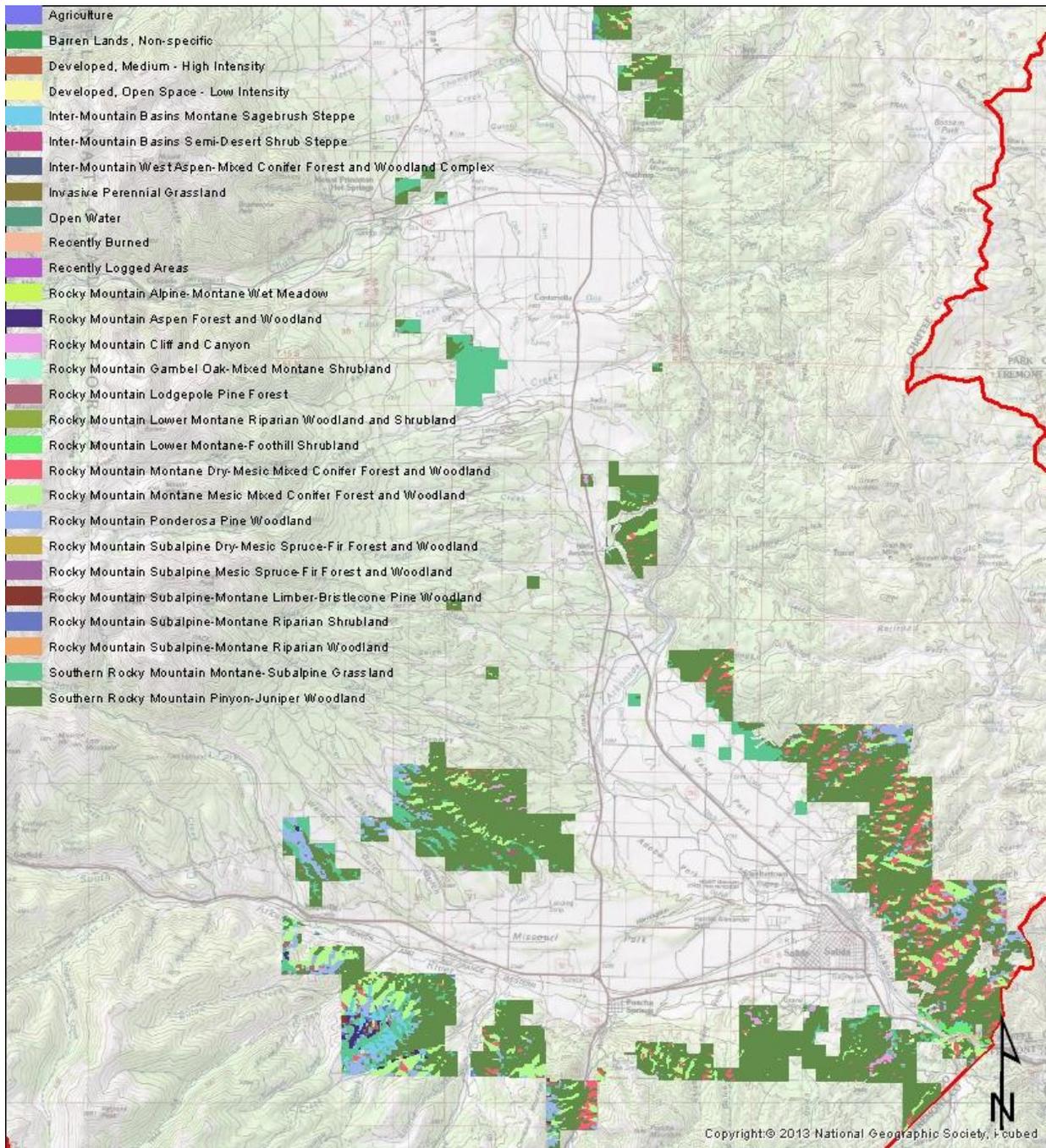


**VEGETATION CLASSIFICATION ON BLM
CHAFFEE COUNTY - NORTH**
DOI-BLM-CO-200-2013-0050

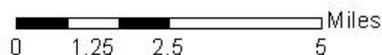


NOTE TO MAP USERS
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Figure 6. Vegetation classification of Bureau of Land Management-Royal Gorge Field Office managed lands, south half Chaffee County, Colorado, 2013. Vegetation data was modeled from 1999-2001 satellite imagery in conjunction with digital elevation model datasets.



**VEGETATION CLASSIFICATION ON BLM
CHAFFEE COUNTY - SOUTH**
DOI-BLM-CO-200-2013-0050



NOTE TO MAP USERS
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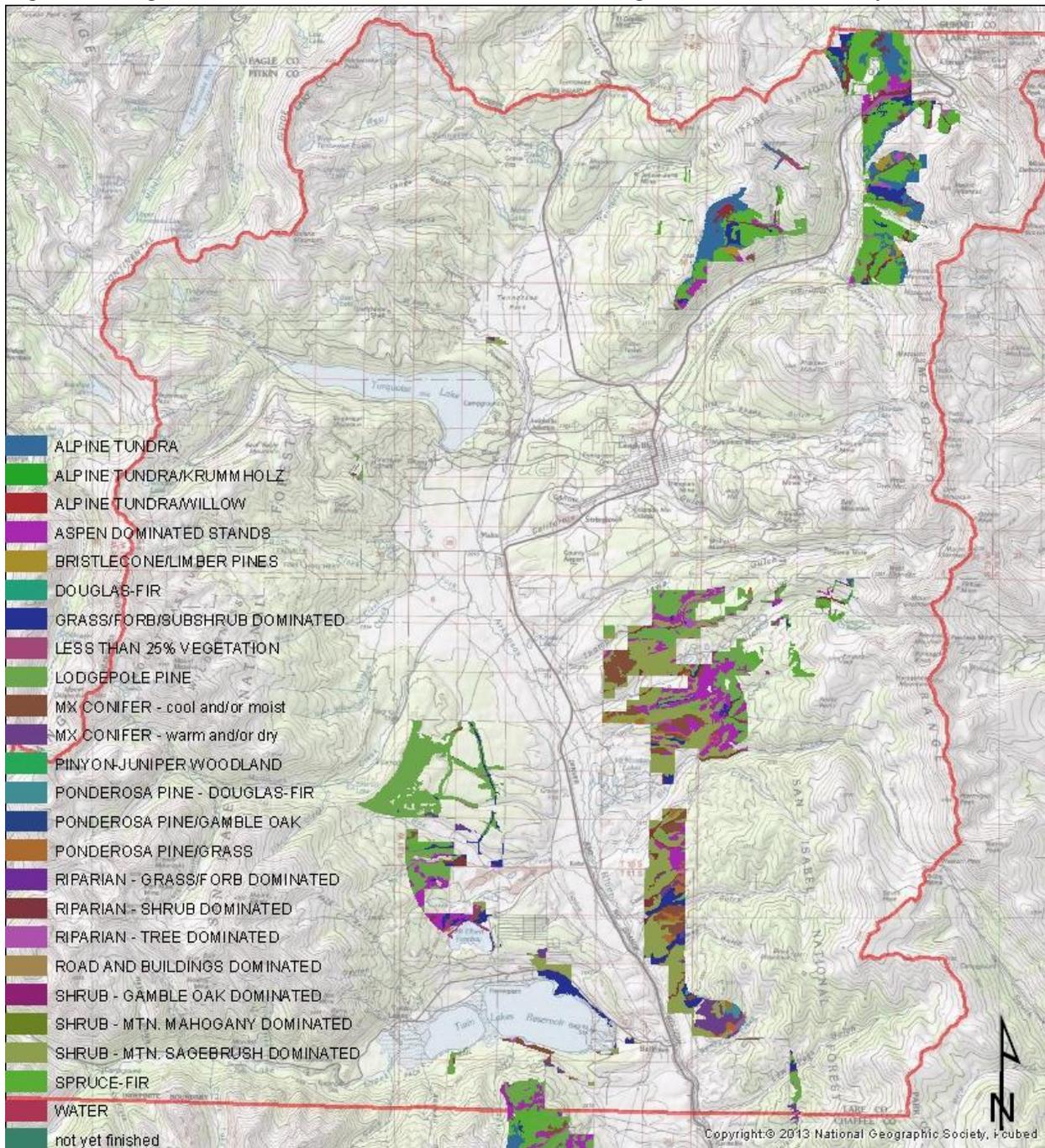
Table 2. Vegetation classification of land managed by Bureau of Land Management-Royal Gorge Field Office in Lake County, Colorado. Vegetation data was modeled from 1999-2001 satellite imagery in conjunction with digital elevation model datasets.

Vegetation Description	Acres
Rocky Mountain Lodgepole Pine Forest	3700.21
Inter-Mountain Basins Montane Sagebrush Steppe	2686.88
Southern Rocky Mountain Montane-Subalpine Grassland	2376.34
Rocky Mountain Alpine Bedrock and Scree	1903.62
Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland	1631.61
Rocky Mountain Subalpine-Montane Riparian Shrubland	1576.07
Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	1387.64
Rocky Mountain Dry Tundra	591.20
Rocky Mountain Ponderosa Pine Woodland	584.71
Rocky Mountain Alpine-Montane Wet Meadow	541.42
Rocky Mountain Subalpine-Montane Limber-Bristlecone Pine Woodland	450.62
Rocky Mountain Alpine Fell-Field	325.12
Rocky Mountain Aspen Forest and Woodland	293.16
Rocky Mountain Subalpine Mesic Meadow	283.09
Rocky Mountain Cliff and Canyon	167.42
Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland	119.49
Agriculture	97.51
Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland	97.22
Rocky Mountain Gambel Oak-Mixed Montane Shrubland	36.03
Recently Logged Areas	28.08
Inter-Mountain West Aspen-Mixed Conifer Forest and Woodland Complex	17.13
Recently Mined or Quarried	12.75
Developed, Medium - High Intensity	5.85
Recently Burned	5.00
Open Water	3.75
Southern Rocky Mountain Pinyon-Juniper Woodland	1.02
Rocky Mountain Lower Montane-Foothill Shrubland	0.96
Grand Total	18923.92

Table 3. Vegetation classification of land managed by Bureau of Land Management-Royal Gorge Field Office in Chaffee County, Colorado. Vegetation data was modeled from 1999-2001 satellite imagery in conjunction with digital elevation model datasets.

Description	Acres
Southern Rocky Mountain Pinyon-Juniper Woodland	33492.21
Southern Rocky Mountain Montane-Subalpine Grassland	4483.93
Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland	3251.11
Rocky Mountain Ponderosa Pine Woodland	2791.32
Inter-Mountain Basins Montane Sagebrush Steppe	2478.52
Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland	2084.08
Rocky Mountain Lodgepole Pine Forest	850.95
Rocky Mountain Subalpine-Montane Limber-Bristlecone Pine Woodland	373.44
Rocky Mountain Aspen Forest and Woodland	279.12
Rocky Mountain Cliff and Canyon	247.02
Rocky Mountain Lower Montane-Foothill Shrubland	158.22
Rocky Mountain Subalpine-Montane Riparian Shrubland	143.44
Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	113.48
Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland	105.78
Inter-Mountain Basins Semi-Desert Shrub Steppe	49.40
Recently Burned	36.62
Open Water	30.37
Agriculture	27.35
Inter-Mountain West Aspen-Mixed Conifer Forest and Woodland Complex	24.34
Developed, Medium - High Intensity	23.62
Rocky Mountain Gambel Oak-Mixed Montane Shrubland	16.50
Developed, Open Space - Low Intensity	10.12
Barren Lands, Non-specific	7.66
Rocky Mountain Lower Montane Riparian Woodland and Shrubland	6.42
Rocky Mountain Subalpine-Montane Riparian Woodland	5.91
Recently Logged Areas	4.99
Rocky Mountain Alpine-Montane Wet Meadow	1.85
Invasive Perennial Grassland	0.08
Grand Total	51097.84

Figure 7. Vegetation classification of Forest Service managed lands, Lake County, Colorado,



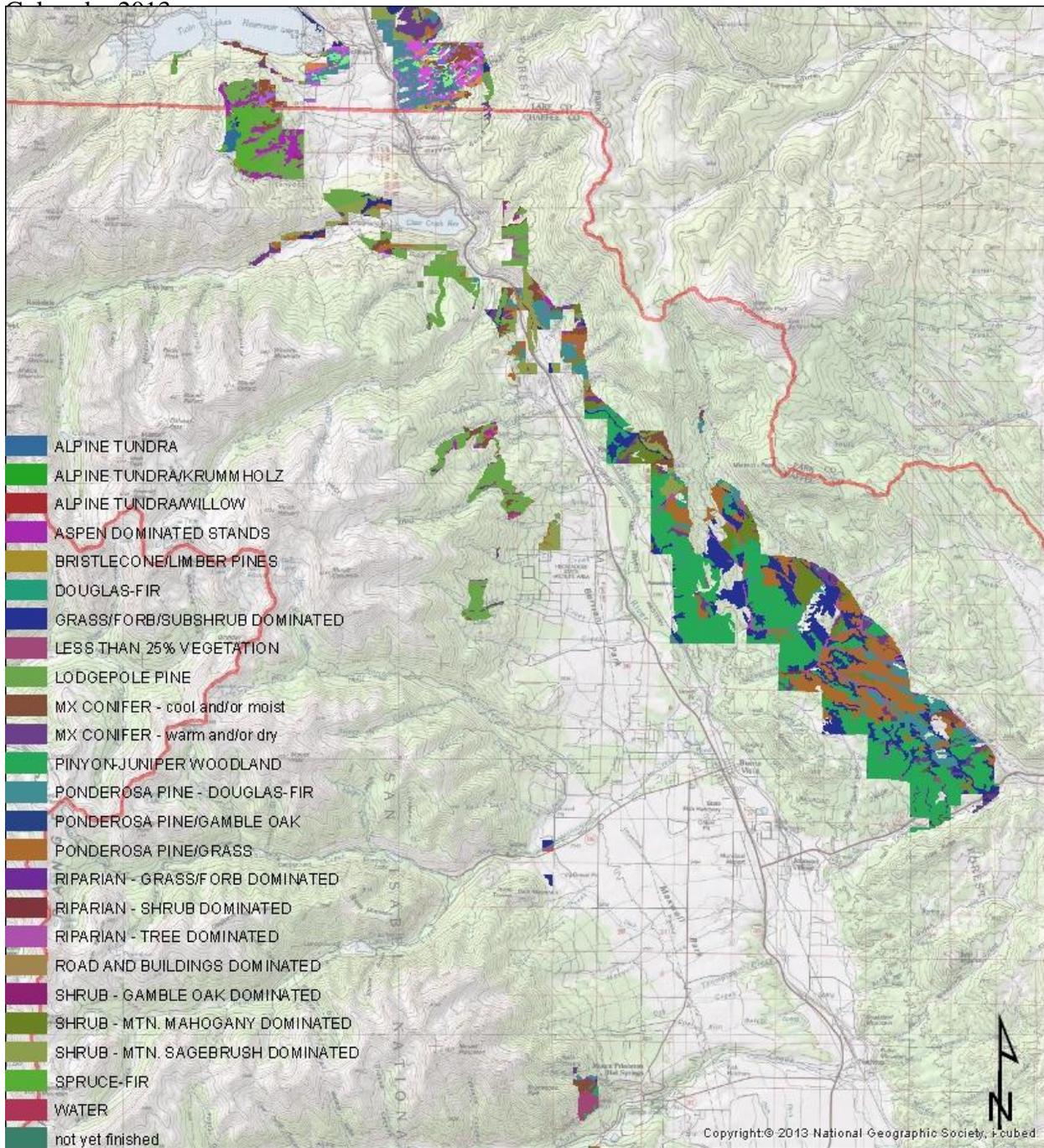
VEGETATION CLASSIFICATION ON FOREST SERVICE LAKE COUNTY

DOI-BLM-CO-200-2013-0050

0 1.25 2.5 5 Miles

NOTE TO MAP USERS
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Figure 8. Vegetation classification of Forest Service managed lands, north half Chaffee County, Colorado, 2013

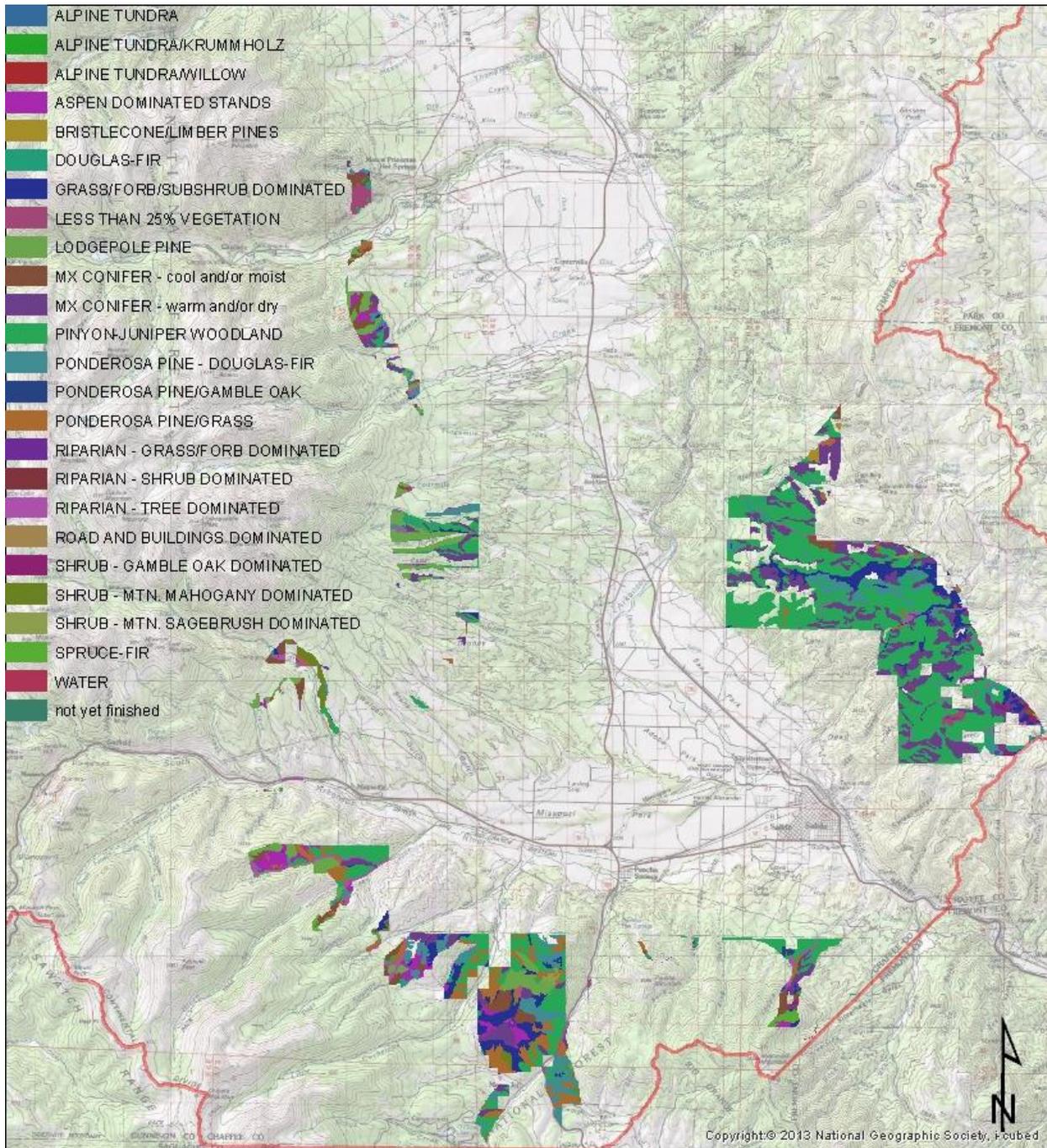


**VEGETATION CLASSIFICATION ON FOREST SERVICE
CHAFFEE COUNTY - NORTH**
DOI-BLM-CO-200-2013-0050

0 1.5 3 6 Miles

NOTE TO MAP USERS
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Figure 9. Vegetation classification of Forest Service managed lands, south half Chaffee County, Colorado, 2013.



**VEGETATION CLASSIFICATION ON FOREST SERVICE
CHAFFEE COUNTY - SOUTH**
DOI-BLM-CO-200-2013-0050

NOTE TO MAP USERS
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Table 4. Vegetation classification of land managed by the Forest Service in Chaffee and Lake County, Colorado.

Description	Acres
Pinyon-Juniper Woodland	15080.32
Lodgepole Pine	10882.64
Grass/Forb/Subshrub Dominated	5367.20
Mixed Conifer - warm and/or dry	5256.69
Spruce-Fire	5133.58
Ponderosa Pine/Grass	4550.19
Shrub – Mountain Sagebrush Dominated	4058.55
Ponderosa Pine-Douglas Fir	3275.13
Aspen Dominated Stands	3024.00
Mixed Conifer - cool and/or moist	2610.57
Alpine Tundra	1940.04
Riparian – Tree Dominated	1600.23
Shrub – Mountain Mahogany Dominated	1240.31
Riparian – Shrub Dominated	961.29
Less Than 25% Vegetation	729.75
Douglas Fir	583.34
Bristlecone/Limber Pine	222.82
Riparian – Grass/Forb Dominated	129.03
Ponderosa Pine/Gamble Oak	96.13
Shrub-Gamble Oak Dominated	86.50
Alpine Tundra/Krummholz	58.85
Road and Buildings Dominated	36.05
Water	29.11
Alpine Tundra/Willow	5.39
Grand Total	66957.69

Treatment Methods: These are the most common forest treatment methods currently utilized by the RFGO vegetation management specialists. Treatments may be accomplished by mechanical or hand actions and prescribed fire.

Prescribed fire: Prescribed burning could take place in mechanically treated areas and possibly areas that are too difficult to treat by mechanical methods. The prescribed burning of natural and treatment fuels will reduce the size, intensity, severity, and effects of future wildfires. The re-introduction of prescribed fire also aids in forest regeneration by releasing nutrients to all plants, currently tied up in dead material. Site specific burning prescriptions will be designed to accomplish the stated resource management objectives for the project area. Fire intensities will be variable; however a low to moderate intensity fire is most desirable for first-entry burns aimed at reintroducing fire into these forests and raising canopy base heights. Prescribed burning will utilize existing control features such as roads and creeks, and construct new features as needed.

Where appropriate shaded fuel breaks, between BLM managed public lands and private lands, will be created. Shaded fuel breaks are strips of land where trees are thinned, lower branches are pruned, and dead and downed trees and brush are removed. Fuel breaks create a park-like appearance that alters wildland fire behavior by keeping it on the forest floor where it is the easiest to control. Fuel breaks, unlike firebreaks that are intended to stop a fire with clear-cuts, simply slow the fire down enough to give firefighters a reasonable opportunity of control. The average width of the fuel break will vary depending on terrain, timber types, and proximity to private land. Shaded fuel breaks also provide excellent anchor points and control features for future prescribed burns. Through prescribed burning and pruning, crown base heights can be increased to reduce surface-to-crown fire transition. Shaded fuel breaks serve a multitude of uses; such as protecting adjoining private property, providing fire control features, and slowing the progression of a wildfire.

Mechanical treatments: Mechanical treatments are likely to include tree spades, feller-bunchers, skidders, mowers, dixie harrow and/or similar equipment (Figure 10). The machines used in mechanical treatments are typically limited to slopes of less than 35%. The type of machine used will be determined based on the proposed action and the final desired outcome.

Commercial forest product removal consists of a number of types of operations, including logging, post and pole and firewood cutting (Appendix A). These tools may be used in lieu of other treatment methods if it meets the project objectives, is feasible, economical and provides local economic benefit. A wide range of situations may exist for use of this tool depending on the condition of the forest product market at the time the project is desired. Development of new sustainable harvesting methods will be an important restoration tool.

The hydro-axe is a large articulated tractor with a 6-8 foot wide, hydraulically controlled mower/mulcher head mounted on the front. The machine has rubber, flotation-type tires which result in minimal ground disturbance. The machine has the capability of being highly selective and can meander through a stand of trees removing selected trees, or patches to create a desired mosaic. The machine chops and mulches the plant material into the desired size, which can range from fist-size to 3-4 foot long sections or larger. Stump height can be controlled, and may vary from below ground level to any desired heights. It can operate on most ground surface conditions, including rather large sized rocks. The Hydro-axe head is lifted above the tree or shrub top and lowered quickly, usually completely chopping the plant in less than 15 seconds. The Hydro-axe is used in most vegetative types including mountain shrub, and pinyon/juniper stands with stem diameters up to 15-18 inches.

Roller chopping provides moderate brush control through the crushing and cutting action of the drum and blades. Most species of brush that have re-sprout capabilities will readily initiate new growth from the base. These shoots are often valuable browse forage to wildlife and livestock until the stems and leaves become unpalatable. The chopper provides canopy removal and temporary release of understory grasses from brush competition. The cutting action of the blades into the soil often increases infiltration of water and provides a better seedbed than shredding. The relatively lower cost of roller chopping can provide a more economical maintenance practice.

The brush hog is a large rotary mower pulled behind an 80-100 hp tractor equipped with a P.T.O. Use would be limited to sagebrush and other small shrubs in areas with fairly gentle terrain and with no large rocks or down trees. Best results occur in brush stands where good residual herbaceous vegetation is present. Because ground disturbance is minimal, seeding success is usually not good. The height to which the target species is cut may range from ground level to 12-15 inches high. The degree of brush mortality and re-growth can be controlled by the height above ground level the plants are cut. Cutting to less than 4 inches will probably result in 85-100% mortality. Leaving greater than a 10 inch height may result in a kill of only 40-60%. The mobility of this tool will facilitate ease in creating a complex treatment design.

The “Dixie Harrow” consists of a large spike tooth harrow pulled by a 4-wheel drive rubber tired tractor equipped with a three-point hitch. The Dixie harrow can be used in sagebrush or other small shrub stands and offers a high degree of control with results similar to fire. Factors such as the pattern of treatment, residual density of shrubs, seeding, and timing all can be controlled. In most cases, a once over treatment will reduce shrubs by 50-60%, and a twice over treatment will result in a 90-95% reduction.

Figure 10. Photos of potential mechanical treatment methods available to the Bureau of Land Management-Royal Gorge Field Office and San Isabel National Forest, 2013. However, mechanical treatments will not be limited to listed equipment.



Hydro-mulcher



Roller Chopper



Brush Hog



Mower



Dixie Harrow



Skidder



Feller Buncher



Dozer

Hand Treatments

Hand treatments are likely to occur where mechanized equipment cannot access primarily due to slope and topography, although other circumstances may arise. Hand treatments includes the use of any hand (human powered) tools and chainsaws.

Design Features

The following measures will be common to all projects:

1. Locate, flag, and protect any property survey monuments including brass cap monuments, bearing trees, fences, or other infrastructure that may exist in the project area.
2. All machinery will be washed prior to being brought on site. The disturbed areas will be inspected and treated as needed for noxious weeds for two growing seasons after the project is completed.
3. Large machinery for mechanical treatment will stay more than 50 feet from riparian and wetland areas and not work off road when ground conditions are saturated. When possible, work by large machinery will be conducted when the ground is frozen. When treatments occur within SMZs, slash will be kept out of the SMZ and directional falling of trees away from the SMZ will be required.
4. Fueling of machinery will be conducted at designated fueling sites. No more fuel than is necessary for daily operations will be stored on site. If fuel volumes in excess of 25 gallons are released to the environment in a spill, the BLM project administrator will be notified and appropriate cleanup measures taken.
5. Determine public and private boundaries of the treatment areas prior to project implementation.
6. Minimize off-road travel while performing and supervising the operations. New vehicular travel routes will be rehabilitated and closed, especially where they connect to the existing roads and trails. Existing roads and trails will be used as much as possible by agency and contractor personnel to eliminate development of new routes and trails.
7. Projects will be designed to blend with topographic forms and existing vegetation patterns to screen the project as much as possible.
8. Slash piles will not exceed 20 feet in diameter by 15 feet in height, and will be located where they can be burned effectively in suitable weather conditions while not threatening the crown of reserve vegetation.

9. Manipulation of green vegetation will be avoided from May 15th thru July 15th to avoid the taking of migratory birds.
10. In ponderosa pine and mixed conifer habitats, surveys will be completed to detect raptor nests and roosts and migratory bird cavity nest sites. Raptor nests and roosts will be protected from harvest and damage during project implementation. Trees that contain cavity nests will be retained.
11. The RGFO will reserve the right to impose additional timing restrictions based on concerns related to bark beetle infestations. When possible, work in piñon/juniper forest type will take place between September 1st and April 1st to avoid the Ips bark beetle flight period, avoiding increased beetle activity within and adjacent to treatment areas.
12. Mechanical treatments will not take place on slopes greater than 35%.
13. Smoke from prescribed fire use will be monitored. All burn plans will contain a monitoring plan. Monitoring may consist of visually tracking smoke plumes by persons on the ground or in aircraft and by installing PM10/2.5 particulate monitors at sensitive receptors.
14. Surveys will be conducted to locate occurrences of Royal Gorge stickleaf, Brandegee wild buckwheat, dwarf milkweed, and golden blazing star if suitable habitat exists. If possible, areas where these plants are located will be avoided.
15. Local research will be conducted to locate private survey records that apply to the project area.
16. Surveys for goshawk and Townsend's big-eared bat will be completed before project implementation if suitable habitat exists.
17. Wildlife trees (snags, roosts, etc.) will be protected from damage and retained for wildlife use.
18. Contract stipulations addressing fences and gates will be addressed for range allotment management purposes.
19. If needed, consultation with Colorado Parks and Wildlife will occur for recently treated areas regarding the allocation of additional forage and/or application of temporary grazing restrictions.

Currently, funding is limited for project implementation. The RFGO and FS are actively seeking outside funding sources such as the Rocky Mountain Elk Foundation, National Wild Turkey Federation, Bighorn Sheep Society, Mule Deer Foundation, Colorado Parks and Wildlife, and

Colorado State Council of Habitat Partnership Program. Priority projects will be ranked and completed as funding is made available.

2.2.2 No Action Alternative

Under this alternative forest health, fuels reduction, or wildlife habitat treatments will not occur. Forest health will continue to decline with trees dying due to competition with neighboring trees for limited soil moisture. The bark beetle risk in all coniferous forest types is expected to increase as tree densities increase, forests age, and with the occurrence of drought. Aspen will continue to be replaced by conifers throughout the area, a phenomenon seen throughout Colorado. Fire adapted species such as ponderosa pine and aspen will continue to be replaced by shade tolerant and fire intolerant species. The dead and/or dying trees will add to fuel loads, increasing the potential for a catastrophic wildfire threatening life, private property, and infrastructure.

The No Action Alternative does not contribute to the sustainability of the forests within the project area, nor does it meet the purpose and need of this project. Rather, the no action alternative maintains the status quo. Unfortunately, the status quo is characterized by high stand densities existing with limited soil moisture and an increasing number of fire intolerant and shade tolerant species and a continued reduction in wildlife habitat quality and diversity. These conditions are atypical in forests with a history of low and mixed severity fires, and favor the buildup of litter, duff, and ladder fuels. The result is an increased probability of catastrophic crown fires that replace entire forest stands. Therefore, the no action alternative could contribute to a potentially dangerous situation whereby wildfire could denude the landscape and damage adjoining private property.

There are negative economic impacts associated with a major landscape disturbance, such as a catastrophic crown fire. Tourism, a major industry in Colorado, is directly affected by the loss of vistas and aesthetically pleasing places to recreate. For example, large areas in and near the San Juan National Forest were closed in response to the Missionary Ridge Fire near Durango, Colorado. The summer tourist season dependent businesses lost nearly an entire year of business. While the financial implications of the mountain pine beetle epidemic in Grand County, Colorado has yet to be determined, the visual impacts caused by this infestation are staggering. This is a perfect example of what can occur when insects take advantage of even-aged forests that are stressed by competition and sustained drought.

Wildfire, a potential result of the no action alternative, affects the entire forest ecosystem. For example, soils that experience extreme heat become hydrophobic. Hydrophobic soils reduce moisture infiltration, which limits vegetative establishment, in turn contributing to increased runoff and stream sedimentation. The smoke created by wildfires degrades air quality. Rangeland or livestock grazing infrastructure such as fences and improvements can be destroyed and grazing may have to be deferred for several years.

The no action alternative fails to consider the need to protect adjacent land owners, protect the area from potential beetle infestations, promote the growth of declining aspen stands, improve habitat for wildlife species and work towards a healthier forest.

CHAPTER 3 - AFFECTED ENVIRONMENT AND EFFECTS

3.1 INTRODUCTION

This section provides a description of the human and natural environmental resources that could be affected by the Proposed Action and presents comparative analyses of the direct, indirect and cumulative effects on the affected environment stemming from the implementation of the actions under the Proposed Action and other alternatives analyzed.

3.1.1 Interdisciplinary Team Review

The following table is provided as a mechanism for resource staff review, to identify those resource values with issues or potential impacts from the proposed action and/or alternatives. Those resources identified in the table as impacted or potentially impacted will be brought forward for analysis.

<u>Resource</u>	<u>Initial and date</u>	<u>Comment or Reason for Dismissal from Analysis</u>
<u>Air Quality</u> <i>Ty Webb, Chad Meister, Melissa Hovey</i>	mw for TW, 8/26	See following analysis
<u>Geology/Minerals</u> <i>Stephanie Carter, Melissa Smeins</i>	SSC, 7/17/13	Analyzed Below.
<u>Soils</u> <i>John Smeins</i>	JS, 6/2013	Analyzed below
<u>Water Quality</u> <u>Surface and Ground</u> <i>John Smeins</i>	JS, 6/20/13	Analyzed below
<u>Invasive Plants</u> <i>John Lamman</i>	JL, 06/15/2013	While the ecological sites involved in the proposed action are prone to invasion by non-native species if soil disturbance occurs, the proposed mitigation is adequate to control invasive plants.
<u>T&E and Sensitive Species</u> <i>Matt Rustand</i>	MR 6/20/2013	See affected environment.
<u>Vegetation</u> <i>Jeff Williams, Chris Cloninger, John Lamman</i>	JW 7/1/2013	Analyzed below
<u>Wetlands and Riparian</u> <i>Dave Gilbert</i>	DG 6/21/2013	Analyzed below
<u>Wildlife Aquatic</u> <i>Dave Gilbert</i>	DG 6/21/2013	Analyzed below

<u>Resource</u>	<u>Initial and date</u>	<u>Comment or Reason for Dismissal from Analysis</u>
<u>Wildlife Terrestrial</u> <i>Matt Rustand</i>	MR, 6/20/2013	See affected environment.
<u>Migratory Birds</u> <i>Matt Rustand</i>	MR, 6/20/2013	See affected environment.
<u>Cultural Resources</u> <i>Monica Weimer, Michael Troyer</i>	MDT 6/18/2013	Analyzed below
<u>Native American Religious Concerns</u> <i>Monica Weimer, Michael Troyer</i>	MDT 6/18/2013	Analyzed below
<u>Economics</u> <i>Dave Epstein, Martin Weimer</i>	mw, 8/26/13	Impacts to economics would be considered minor and would be difficult to determine with this planning level EA. The individual treatment projects might possibly contribute in a small way to the economy by employing contractors for the mechanical treatment elements of the action.
<u>Paleontology</u> <i>Melissa Smeins, Stephanie Carter</i>	MJS, 07/22/2013	Analyzed below, Paleontological resources will need to be considered at the project level when a more detailed description of the activity is available.
<u>Visual Resources</u> <i>Kalem Lenard</i>	KL, 6/5/2013	Analyzed below
<u>Environmental Justice</u> <i>Martin Weimer</i>	mw, 8/26/13	Being a planning level action the proposed action and its alternatives will have no direct effect on minority or low-income populations. Indirect effects could result from implementation decisions in the future that were a result of this decision. Those actions would be analyzed at the time of their proposal and evaluated for their effects.
<u>Wastes Hazardous or Solid</u> <i>Stephanie Carter</i>	SSC, 7/17/13	Analyzed Below.
<u>Recreation</u> <i>Kalem Lenard</i>	KL, 6/5/2013	Analyzed below
<u>Farmlands Prime and Unique</u> <i>Jeff Williams, Chris Cloninger, John Lamman</i>	JW 7/1/2013	Not present
<u>Lands and Realty</u> <i>Steven Craddock, Vera Matthews</i>	SRC, 6/24/2013 VAM 7/1/2013	Analyzed below
<u>Wilderness, WSAs, ACECs, Wild & Scenic Rivers</u> <i>Kalem Lenard</i>	KL, 6/5/2013	Analyzed below
<u>Wilderness Characteristics</u> <i>Kalem Lenard</i>	KL, 6/5/2013	Analyzed below

<u>Resource</u>	<u>Initial and date</u>	<u>Comment or Reason for Dismissal from Analysis</u>
<u>Range Management</u> <i>Jeff Williams, Chris Cloninger, John Lamman</i>	JW 7/1/2013	Analyzed below
<u>Forest Management</u> <i>Ken Reed</i>	KR 8/23/13	Analyzed below
<u>Cadastral Survey</u> <i>Jeff Covington</i>	7/8/2013	Not affected at this time.
<u>Noise</u> <i>Martin Weimer</i>	mw, 8/23/13	Only minor impacts would occur from noise due to the temporary nature of the various treatment methods in any given area. Sources could range from additional traffic noise to heavy equipment and chainsaw noise. This might have the effect of humans and wildlife avoiding the treatment area during treatment activities, but wildlife should return post treatment.
<u>Fire</u> <i>Bob Hurley</i>	BH 7/21/2013	Analyzed below. Fire effects are analyzed under Forest Management.
<u>Law Enforcement</u> <i>Steve Cunningham</i>	mw for SC 7/28	There are no law enforcement issues associated with this action.

The affected resources brought forward for analysis include:

- Air Quality and Climate
- Geologic and Mineral Resources
- Soils
- Water Quality
- Threatened, Endangered, and Sensitive Species
- Vegetation
- Wetlands and Riparian
- Aquatic Wildlife
- Terrestrial Wildlife
- Migratory Birds
- Cultural Resources
- Native American Religious Concerns
- Paleontological Resources
- Visual Resources
- Wastes, Hazardous or Solid
- Recreation
- Lands and Realty

- Wilderness, Wilderness Study Areas, Areas of Critical Environmental Concern, Wild and Scenic Rivers
- Wilderness Characteristics
- Range Management
- Forestry
- Lands and Realty
- Forest Management

3.2 PHYSICAL RESOURCES

3.2.1 AIR QUALITY AND CLIMATE

Affected Environment: Air quality in the planning area is, generally, good to excellent. Fugitive dust from vehicle traffic on un-surfaced or gravel surfaced roads is a major contributor to regional haze in the area. Wood smoke, vehicle exhaust and residential and industrial activity in the area also contribute.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Wildland fires (both prescribed fire and wildfire) are a potentially significant source of air pollutant emissions due to combustion processes which burn various ages, sizes, and types of vegetation. The amount of emissions depends on the size and intensity of the fire (determined by meteorological conditions such as temperatures and wind speed and direction); the fuel type and moisture content (including age class, size and mixture of vegetation types); and the available fuel loading (the total mass of combustible material, typically reported in tons of fuel per acre).

Key Points related to Air Quality:

Prescribed fires are planned and implemented to meet specific resource management objectives. The specific location, timing, and method of ignition are prescribed to meet those objectives and are included in the Prescribed Fire Plan used by federal agencies. The site specific burning conditions will dictate how a prescribed fire may be ignited and held (managed) as a prescribed fire. Smoke management concerns are also identified such as meteorology and fuel moisture, which can be factored into the timing of ignitions to ensure compliance with federal, state, and local smoke management regulations.

Dry fuels (such as dead/down or dry vegetation) are consumed first in the beginning stages of burning. As fire progresses, green/live vegetation is dried through heat convection and then consumed as well. Under extreme conditions, this process may result in a large, uncontrollable crown fire.

The most effective means of controlling air pollutant emissions from wildfire is to inhibit large, catastrophic fires through vegetation treatments that break up heavy, continuous fuels. The fuels treatment methods described in the alternative would improve the vegetation regime and reduce hazardous fuel loadings. Depending on conditions, managed ignitions (prescribed fires) can be effective methods to reduce heavy fuels and to create vegetation mosaics. However, any fire, either Wildland Fire Use, or a prescribed fire, must be continually monitored to assure that the burning conditions remain within the previously determined prescriptions for desired fire behavior and smoke management. When properly executed, a prescribed fire would be expected to result in fewer air quality impacts in both the short term and the long term.

Specifically, prescribed fires are normally much smaller than uncontrolled wildfires and involve less combustion, since they can only be used when the fuel type and fuel loading meet preset management prescriptions for conducting the burns, and under weather conditions that enhance efficient fuel consumption and smoke dispersal.

The Proposed Action and prescribed burns implemented under it could cause temporary degradation of air quality resulting from prescribed burns, pile burning, and road dust. The total acres that would be burned in any one day and the conditions for smoke dispersal are determined through an application for open burning under prescribed fire projects and are required to meet state air quality guidelines. Generally, the location of the burn area relative to occupied homes and types of fuel being burned determine a maximum number of acres that may be burned under various smoke dispersal ratings for Excellent, Very Good, Good and Fair. No burning is permitted under Poor smoke dispersal ratings.

Prescribed fire treatments in the Proposed Action would be effective for reducing fuel loadings, with generally lower fire intensity producing lower emissions than would be produced under wildfire conditions. Use of these treatments would reduce the potential for future, higher emission wildfires. The proposed action may increase slightly the dust generated from vehicular traffic and on-site work by men and machinery but only for the short term. In the long term, prescribed burning should be beneficial for air quality. Fuels reduction actions reduce the volumes of fuels available for large scale wildfire where air quality is rapidly reduced to the point that vehicle traffic must be stopped or controlled and some residents may be forced to leave the area for a time.

Mechanical treatments in the Proposed Action would not only contribute to habitat and forest health but could also reduce future wildland fire emissions. Mechanical treatments change the fuel profile and very often must be accompanied with fuel removed by commercial methods if there is an available market or by prescribed fire. Mechanical treatments reduce fire emissions in two ways. The first is that this is a non-fire treatment, saving emissions that could have been produced using fire. Secondly, this treatment is reducing the potential for future, high emission wildfires. Minor impacts would occur from vehicle and equipment exhaust from mechanical and hand tool methods employed, but are expected to be temporary in nature.

Protective/Mitigation Measures: All prescribed fire use would be coordinated with the Colorado Department of Public Health and Environment's Division of Air Quality. There would be strict adherence to the State Smoke Permit issued for the project to insure protection of the

State Standard for Air Quality. Smoke mitigation techniques used for this Proposed Action are found in the Smoke Permit, and referenced in the Smoke Management Guide for Prescribed and Wildland Fire. A non-exclusive list smoke management options are: burning when fuel moisture is high in large woody fuels, rapid mop-up, utilizing favorable meteorological conditions to avoid sensitive areas and burning piles to increase combustion efficiency. Alternatives to prescribed fire use would be analyzed and used where appropriate.

Fuels activities that involve burning of waste or residue will be done with the appropriate open burning permit with monitoring for smoke dispersal conditions as stated in the mitigation section of this document. The result should be a very large reduction in the volumes of smoke from wildfire over the long term. Surface fuels in all size classes will be reduced as determined by the specific burn prescriptions designed to achieve the objectives of each burn project, and future fire behavior would also be lessened. A desired goal would be to have less active or passive crown fire and more mixed severity and or low intensity surface fire behavior.

Cumulative Impacts: The proposed treatment methods are expected to have a positive influence on the impacts to air, as treatments will reduce the potential for catastrophic wildfire, which would produce greater emissions than the preventative prescribed fire regimes.

No Action Alternative

Direct and Indirect Impacts: No burning or mechanical treatment activities would occur in the No Action Alternative. Without any burning treatments, there would be no impact on air quality or human health in the short term but there would continue to be fuel loadings that are considered hazardous, and support both active or passive crown fire, that is difficult and dangerous to control. Without fuels treatments on some acres, there would be an increase in the potential for future wildfires and smoke.

Under the No Action alternative fire would not be returned to stands or used to restore or maintain species composition and stand structure in a controlled manner. Without prescribed fire, individual stands would continue to change as species less adapted to fire (such as Douglas-fir) increase. In this alternative, ladder fuels would increase in understory environments. Standing fuels would continue to present a fire hazard on the short-and long-term and increased fuel accumulations could cause an increase in the rate of spread, resistance to control, and result in uncharacteristic fire behavior and severe stand replacement fires. Fuels would increase and change the fire behavior and intensity, also affecting the cost of fire suppression. A lack of fire hazard reduction could make extreme fire behavior more common, with added risk of property loss, and difficulty of suppression.

Protective/Mitigation Measures: Under this alternative mitigations would not be in place to help prevent catastrophic wildfire, the largest contributor to impacts to air.

Cumulative Impacts: Fuel loading would continue to occur, contributing to the potential for wildfire and greater cumulative impacts to air.

3.2.2 GEOLOGIC AND MINERAL RESOURCES

Affected Environment: The upper Arkansas Valley, through which the Arkansas River flows, is a north-tapering, sharply defined valley that extends from Salida to the continental divide near Leadville and is located between the Sawatch and Mosquito Mountain Ranges. The area has witnessed three periods of mountain building, subsidence, and regional uplift to the west and to the east - as exhibited in the Sawatch Range and the Mosquito Mountain Range respectively. The Ranges consist of pre - Cambrian crystalline rock overlain by sedimentary rock with many of the peaks in these Ranges exceeding heights of 14,000 feet. The upper Arkansas River Valley floor extends in width from 3 to 10 miles and lies approximately 4,600 feet below the tops of the Sawatch and Mosquito ranges. During the Pleistocene age, glaciers covered the uppermost areas of the mountains and throughout the upper valley examples of glacial valleys, moraines, and outwash are exhibited along the highway and river. The valley is the northernmost valley in the chain of valleys that comprise the Rio Grande Rift system. This rift extends from Texas through New Mexico and appears to terminate near the town of Leadville and the Continental Divide.

Known mineral and geologic commodities in the project area include Gold, Silver, Lead, Zinc, Sand and Gravel, Molybdenum, Gemstones and Geothermal resources.

Minerals within the proposed project area are open to entry and development under regulations codified at 43 CFR 3809. In addition, mineral material disposal sites (quarries) and geothermal lease areas occur throughout Chaffee and Lake Counties.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: The federal minerals in the proposed project area are mostly open to the public mining laws and therefore coordination between surface uses may be required, depending on the identified locations for project implementation within Chaffee and Lake counties.

Protective/Mitigation Measures: There are many unpatented mining claims that are active in the proposed project location. Any associated claim markers encountered during project implementation cannot be disturbed, as they are private property. Minerals within the proposed project area are open to entry and development under regulations codified at 43 CFR 3809. If work on active claims is required, the project proponent will need to coordinate with the claimant regarding potentially restricted access, disturbance to the mineral resource, mining operations and reclamation of disturbed areas.

Cumulative Impacts: None

No Action Alternative

Direct and Indirect Impacts: None

Protective/Mitigation Measures: None

3.2.3 SOILS (includes a finding on standard 1)

Affected Environment: The planning area consists of many different soil types; in general, most can be described as shallow with moderate to rapid permeability and high erosion potential. The

topography of the area is very broken and rocky, limiting opportunities for mechanical treatment. Along valley bottoms the soils tend to be deeper and more productive, while the uplands tend to have shallower, less productive soils. Currently, the soils within the project area are in good condition with the exception of some eroded areas due to historic management activities and travel management issues.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: The Proposed Action would have varying degrees of impact to the soils. The largest impact would come from the large mechanical equipment working on steeper slopes. These types of equipment tend to generate a large amount of ground disturbance and can compact the soil. Soil compaction is a function of soil texture, soil moisture, the compactive force, and the number of passes made by heavy equipment. If a soil is compacted, pore spaces are reduced, and the bulk density of soil increases. Indirect effects include lower infiltration rates and increased runoff, increased erosion and sediment potential, and reduced soil productivity for the duration of compaction. The natural high surface rock content of soils in much of the planning area should reduce the potential for soil compaction caused by skidding. Designation of temporary roads, skid trails and landings also limits the amount of detrimental compaction within the activity areas. The Proposed Action has mitigation included in it that would minimize these effects, and overall effects to the soils would be minimal. All the other non-fire treatment types proposed would have lesser degrees of impact to the soils than large machinery. The prescribed fire portion of the proposed project would have some minor effects on the soils, especially the pile burning. Conditions under which prescribed fires are set maintain a low to moderate intensity fire that tends to reduce heat that decreases soil sterilization. This type of burning releases nutrients back into the soil for vegetation to use, essentially speeding up the nutrient cycling process. Pile burning can generate large amounts of heat in one spot that can sterilize the soil to the point where vegetation does not regrow for several years. The Proposed Action contains mitigation to keep the piles small so that this is minimized. Typically with the size of piles proposed, vegetation will begin to grow back within one or two growing seasons. Overall, for the worst case scenario, the Proposed Action would have moderate amounts of negative soil impact in the short term and little long term negative impacts with some positive impacts.

Protective/Mitigation Measures: No additional mitigation other than what is contained in the Proposed Action would be required. No long term residual impacts would be expected.

Cumulative Impacts: Within the 6th level watersheds of the planning area, there are currently many activities that affect soils including grazing, mining, residential development, forest health and recreation. The addition of the proposed treatments would have a minor positive additional impact to the watersheds overall soil resources in the future; however the amount would be immeasurable at the watershed scale.

No Action Alternative

Direct and Indirect Impacts: The No Action Alternative would have no impact to soils in the long or short term, unless a catastrophic fire was to occur. If a fire was to occur it would be

more likely to be catastrophic. This could cause serious impacts to the soils by removing large amounts of vegetation at very high temperatures. When this happens the soil is exposed to very high erosion potential and vegetation is slow to return.

Protective/Mitigation Measures: There would be no additional impacts to soil resources at the watershed scale if no action is taken. This would result in no new impacts being introduced by this action.

Finding on the Public Land Health Standard for Upland Soils: Currently, soils in the project area are meeting standards and would continue to do so if the Proposed Action is implemented.

3.2.4 WATER (SURFACE AND GROUNDWATER, FLOODPLAINS) (includes a finding on standard 5)

Affected Environment: The planning area lies in the Arkansas River watershed and generally receives 8 to 25 inches of precipitation annually resulting in 0 to 5 inches of runoff depending on elevation. In general, water quality in the planning area is good. The Arkansas River and some tributaries however, are on the Colorado 303 (d) list as being impaired by zinc and other heavy metals. These impairments are due to historic mining activities, mainly in the Leadville area. Waters tributary to the Arkansas River in this area are classified as having the following beneficial uses: Aquatic Life Cold 2, Recreation 2, and Agriculture

Environmental Effects

Proposed Action

Direct and Indirect Impacts: The Proposed Action would have varying degrees of impact on the water quality in the area, mainly in the form of increased sediment. All of the treatment methods proposed would result in some form of ground disturbance varying from very little for hand work to relatively high amounts for a feller-buncher/skidder work on steeper slopes. Anytime there is ground disturbance, surface runoff is potentially increased, raising the erosion risk. For the mechanical treatments, mitigation is built into the Proposed Action that would decrease the amount of ground disturbance and ultimately the amount of sediment reaching water ways. Prescribed burning releases nutrients and makes them more mobile, resulting in potentially higher nutrient loads in adjacent waterways. The prescribed burning would take place under conditions that would result in a mosaic of burning intensities. This would create buffers that would capture nutrients as they migrate towards the valley bottoms resulting in very little impact to surface water in the area. Overall, the Proposed Action would have little effect on the project area's water quality.

Protective/Mitigation Measures: No addition mitigation other than what is contained in the Proposed Action would be required.

Cumulative Impacts: Within the 6th level watersheds of the planning area, there are currently many activities that affect water quality including grazing, mining, residential development, and recreation. The addition of the proposed treatments would have an additional

impact to the watersheds overall water quality in the future; however the amount would be immeasurable at the watershed scale.

No Action Alternative

Direct and Indirect Impacts: The No Action alternative would have no effect on water quality if a catastrophic wildland fire does not happen. If an unplanned fire does happen, it would be more likely to be catastrophic and result in possibly high amounts of sediments and nutrients to enter the areas waterways.

Protective/Mitigation Measures: No mitigation would be required

Cumulative Impacts: There would be no additional impact to water quality at the watershed scale if no action is taken. This would result in no new impacts being introduced by this action.

Finding on the Public Land Health Standard for Water Quality: Currently, waters in the area are meeting standards and implementation of the Proposed Action would not have an effect on the Land Health Standard.

3.3 BIOLOGICAL RESOURCES

3.3.1 THREATENED, ENDANGERED AND SENSITIVE SPECIES

Affected Environment: Greenback cutthroat trout (*Oncorhynchus clarki stomias*) are listed as Threatened under the Endangered Species Act and are included in the United States Fish and Wildlife Service Threatened, Endangered, Proposed, and Candidate species list for Lake County. The historic range of greenback cutthroat trout included the South Platte and Arkansas River basins in Colorado and a few tributaries of the South Platte River in Wyoming. Greenback populations are managed by hydrological units that are scattered throughout the Bureau of Land Management-Royal gorge Field Office (BLM). However, BLM does not manage any stream segment that currently has Greenback populations. The greenback cutthroat trout is one of three subspecies of cutthroat that currently reside in Colorado, inhabiting cold water streams and lakes. Greenbacks primarily feed on aquatic and terrestrial insects.

This summary of lynx habitat is derived from information compiled in the Canada Lynx Conservation Assessment and Strategy (Ruediger et al. 2000). Lynx occur in mesic coniferous forests that have cold, snowy winters and provide a prey base of snowshoe hare. Lynx occupy boreal, sub-boreal, and western montane forests. In the western United States, they are associated with lodgepole pine, subalpine fir, Engelmann spruce, and aspen cover types on subalpine fir habitat types. Snowshoe hare are the primary prey of lynx, but red squirrels are an important alternative prey species. Primary lynx habitat in the Southern Rocky Mountain region is found in the subalpine and upper montane forest zone, roughly between 8,000 and 12,000 feet elevation. Lower montane forests are likely to be important for movement and dispersal. Foraging habitat for lynx in the Southern Rocky Mountain region include subalpine fir,

lodgepole pine, and Engelmann spruce cover types with abundant prey species. Densely regenerating conifer forests typically produce the highest densities of snowshoe hares. Conifer-aspen forests with dense regeneration or with an extensive shrub and woody debris understory may be important for snowshoe hare or other prey species. Extensive stands of pure aspen likely are poor lynx foraging habitat, unless intermixed with spruce-fir or young lodgepole pine stands. Regenerating burns are often quite productive for prey species due to the mixed deciduous/conifer forests, multiple age classes, shrub layer, dense herbaceous layer, and creation or maintenance of extensive downed woody debris. Sagebrush communities at higher elevations and in proximity to subalpine and upper montane forests may be important foraging areas for lynx due to high prey abundance. Sagebrush communities also serve as movement corridors for lynx. Other habitats that may be important for foraging include large and medium willow carrs, beaver pond complexes, and shrub dominated riparian communities. The common component of den sites appears to be large woody debris, either downed logs or root wads. Stand structure appears to be more important than forest cover type. Denning habitat in the southern Rockies is likely to occur in late-successional spruce-fir forests with substantial amounts of large woody debris, primarily on north aspects. For denning habitat to be functional, it must be in close proximity to large acres of foraging habitat. The Canada lynx is a federally threatened species. Recent reintroductions of lynx in Colorado have been relatively successful and lynx are forming home ranges in suitable habitats. A great majority of the BLM land administered by the BLM is not considered suitable lynx habitat. Very few areas contain the preferred habitat: high elevation conifer and aspen communities with mature Engelmann spruce, sub-alpine fir, Douglas-fir, blue spruce and aspen. Some small areas of lynx habitat are mapped for BLM lands along the Sangre de Cristo range within the fuels planning area.

Bald eagles (*Haliaeetus leucocephalus*) are considered a BLM “Sensitive Species” are found along the entire length of the Arkansas River from Canon City to Leadville during the winter months. Most use occurs on private lands where the canyon opens into wider valley bottoms such as areas near Coaldale, Howard and Swissvale. These areas contain the large cottonwood galleries that provide ideal perch and roost sites.

Peregrine falcon habitat includes nesting and hunting sites, as well as migration and wintering areas. Typical nesting sites are cliffs more than 200 feet high that overlook water and permit extensive views of the surrounding area. Prey abundance and diversity provided by these situations are major factors in eyrie (nest) selection. Peregrines may travel up to 17 miles from nesting cliffs to hunting areas. Preferred hunting habitats include cropland, meadows, river bottoms, marshes and lakes that provide an abundance of avian prey. Birds are occasionally reported in Colorado during the winter but most peregrines migrate to Central and South America. Peregrine falcons in the area are found in the roughest, most rugged, inaccessible areas BLM manages. Large canyon complexes with extensive rock are typically used during the breeding season. Despite the fact that peregrines have reoccupied many cliffs throughout Colorado and have done extremely well, there are no known nest eyries in the fuels planning area. Recovery goals for nesting peregrines were exceeded several years ago. Colorado documents over 100 nesting pairs of peregrines each year. The peregrine was delisted from a federal threatened species to a state listed species of special concern as recovery progressed. The BLM considers the peregrine falcon a sensitive species.

Northern goshawks are associated with coniferous and mixed forests through much of the Northern hemisphere. Studies of nesting habitat show that goshawks nest in older-aged forests with variable tree species. The most consistent vegetative characteristic of goshawk nest sites is high percent canopy closure. Studies on habitat characteristics at goshawk sites have reported average canopy closure measurements ranging from 60% in eastern Oregon, 77% in northern California and 94% in northwestern California. Stand structure ranges from dense multi-layered stands in Oregon to open park-like understories in Colorado and California. Average tree size is just as variable with mean tree diameters ranging from 8-20 inches in Colorado, and 20 inches in Oregon. Goshawks appear to prefer north to east aspects for nest sites as stands on these aspects are typically denser and more suitable. Slope also appears important as nests are usually placed on flat to moderately sloped land where trees are able to grow larger and at a higher density (1-39%). The importance of the proximity of the nest area to water is not known. Knowledge of the foraging habitat is poor. The goshawk is a height zone generalist, taking prey from the ground-shrub, shrub-canopy, and canopy layers and they have a preference for woodlands with large, mature trees. Meadows, streams, and aspen stands may be important to prey species on which the goshawk feeds. Goshawks, however, forage in a variety of habitats probably along edge as well as in deep forests, provided that there is available prey and the vegetation is not too dense to prevent flight. Prey plucking sites within the nesting territory is also a habitat characteristic related to foraging. Prey plucking sites usually consist of stumps, fallen logs, snags, arched trees, rocks, or horizontal tree limbs below the canopy. Available evidence suggests that two important resources, food and nest habitat, are the principle mechanisms limiting goshawk densities. Specifically, populations may be limited by shortage of nest sites; and where nest sites are readily available, densities may be limited by food abundance and availability. Very little goshawk habitat is managed by BLM. Public lands are generally lower elevation forests consisting primarily of pinyon-juniper vegetation. Only small areas within the fuels planning boundaries would be considered suitable habitat for goshawk.

The Townsend's big-eared bat (*Corynorhinus townsendii*) occurs throughout the west and in Colorado. Habitat associations include: coniferous forests, deserts, native prairies, riparian communities, and agricultural areas. Its distribution is strongly correlated with the availability of caves and cave-like roosting habitat, with population centers occurring in areas dominated by exposed, cavity forming rock and/or historic mining districts. Its habit of roosting on open surfaces makes it readily detectable, and it is often the species most frequently observed (commonly in low numbers) in caves and abandoned mines throughout its range. It has also been reported to utilize buildings, bridges, rock crevices and hollow trees as roost sites. Foraging associations include: edge habitats along streams, adjacent to and within a variety of wooded habitats. It often travels large distances while foraging, including movements of over 10 miles during a single evening. It is a moth specialist with over 90% of its diet composed of lepidopterans. The primary threat to the species is almost certainly disturbance or destruction of roost sites (e.g., recreational caving, mine reclamation, renewed mining in historic districts). This species is very sensitive to disturbance events and has been documented to abandon roost sites after human visitation. Both roosting and foraging habitat may be impacted by timber harvest practices. Pesticide spraying in forested and agricultural areas may affect the prey base.

The Brandegee wild buckwheat (*Eriogonum brandegei*) is listed as a BLM sensitive species. It is found in the valley of the upper Arkansas River in Chaffee and Fremont Counties, Colorado.

It occurs on barren clay-loam soil in the Morrison formation. The Colorado Natural Areas Program, in cooperation with The Nature Conservancy, designated a site in Chaffee County as the Droney Gulch State Natural Area. The Droney Gulch site represents the best known occurrence in the world for this species.

Royal Gorge stickleaf (*Mentzelia densa*) is a BLM sensitive species that is found in the lower rocky drainages of the project area. It is found in washes, naturally disturbed sites, and steep rocky slopes, often with pinyon-juniper. Stickleaf habitat is confined to areas that are not good areas for fuels treatment projects. Good stickleaf habitat contains rocky drainages and the vegetation (pinyon-juniper) is usually widely spaced and open.

The golden blazing star (*Mentzelia chrysantha*) is a BLM sensitive species that is endemic in Fremont and Pueblo counties in the Arkansas River valley between Canon City and Pueblo. This species is found along barren slopes of limestone, shale and clay.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Currently, the BLM-RGFO does not manage a stream segment known to contain a population of Greenback Cutthroat trout within the planning area.

Lynx Analysis Units (LAUs) have been developed for the San Isabel National Forest and adjoining BLM lands. Potential lynx habitat has been modeled based on vegetation type, precipitation, winter precipitation, topography, and snowshoe hare habitat. Vegetation types representative of suitable habitat include dense spruce-fir and mixed conifer with spruce, Douglas-fir, early seral lodgepole pine, mature lodgepole pine with developing understory of spruce-fir and aspen. Dry forest types (ponderosa pine) were excluded and not mapped as lynx habitat. Potential habitat is defined as having the capability to provide necessary habitat components. Existing condition of suitable habitat may or may not meet the needs of a lynx for denning or winter foraging. Changes in condition of suitable habitat can occur from disturbances such as fire, wind events, harvesting or the lack of disturbances.

The analysis area lies within the Tennessee Pass, Cottonwood Pass, Buffalo Peaks, and Monarch Pass LAUs. Projects developed within Lynx LAUs and that contain potential lynx habitat, will be required to complete the Endangered Species Act section 7 consultation with the United States Fish and Wildlife Service.

Bald eagles will not be directly impacted by the vegetation treatments. There is some suitable habitat for bald eagles within the analysis area; however, treatments sites would avoid known nest sites. The vegetation manipulation projects will have no effect on numbers, distribution or reproduction of the species and there is no potential for short term impacts. The treatment areas will not involve foraging areas, winter roost sites or areas where eagle use has been documented.

Peregrine falcons occupy rocky canyon habitats that are not found in the area of the proposed fuels treatments. Large, extensive cliff complexes are needed by peregrine falcons for breeding sites. There are BLM and Colorado Parks and Wildlife records of nesting peregrine falcons in

the project area. Conditions of approval will be designed and implemented on a project by project basis.

The analysis area contains very little suitable habitat for northern goshawk. Any projects proposed for areas containing suitable habitat will be surveyed to determine presence/absence of this species. If found, conditions of approval will be designed and implemented on a project by project basis

Townsend's big-eared bat habitat consists primarily of old abandoned mine shafts and caves. Habitat (mine/adits) is rare, and if located, they will be avoided during project implementation.

Royal Gorge stickleaf is found primarily on the lower slopes of the Arkansas River valley in rocky soils along drainages. These sites are normally less desirable sites for fuels treatment projects due to the nature of the topography. Sites that are planned for projects within the treatment areas are outside of habitat for this species. As treatments are planned, however, surveys will be completed to determine if Royal Gorge stickleaf is present and if it is-these sites will be avoided.

Brandege wild buckwheat and golden blazing star have not been documented as occurring within the planning area. As treatments are planned, however, surveys will be completed to determine if any of these species area present and these sites will be avoided.

Protective/Mitigation Measures: The Canada lynx and Greenback cutthroat trout are federally listed species. If a project is designed in potential listed species habitat, Endangered Species Act Section 7 consultation will be required. Protective measures developed during this process must be imposed in accordance to federal law.

For bald eagles, avoid clear cutting or removal of overstory trees within 330 feet of the nest at any time. Avoid vegetation manipulation operations, including road construction and chain saw and yarding operations, during the breeding season within 660 feet of the nest. The distance may be decreased to 330 feet around alternate nests within a particular territory, including nests that were attended during the current breeding season but not used to raise young, after eggs laid in another nest within the territory have hatched. Selective thinning and other silviculture management practices designed to conserve or enhance habitat, including prescribed burning close to the nest tree, should be undertaken outside the breeding season.

Surveys for peregrine falcons nest will be conducted if suitable habitat is located within one half mile of a project area and if work is to occur from March 16 to July 31. The purpose of the mitigation is to protect peregrine cliff nesting complexes. An exception may be granted once the nest is abandoned.

Where habitat exists, surveys for Northern Goshawks will be conducted. Exclude from all management activities, those portions of any stand to be treated within 0.125 miles of any known northern goshawk nest tree. Maintain a minimum stand average of 75% canopy closure on stands to be treated within 0.5 miles of any known northern goshawk nest tree.

A survey for Townsend's big-eared bat habitat (mines/adits) will be conducted prior to project work. If habitat is located, a buffer of 250 feet around adits with potential bat habitat should protect the colony from disturbance without the additional requirement of a seasonal restriction.

Surveys for BLM sensitive plant species will be completed prior to projects if potential habitat is present.

Cumulative Impacts: Numerous vegetation projects have occurred in recent years on BLM managed lands: Four Elk Prescribed burn (2010, 58 acres), Cache Creek mountain pine beetle suppression and salvage (2011, 246 acres), Clear Creek Reservoir salvage and restoration thinning (2008, 47 acres), East Fork thinning and mistletoe sanitation project (2010, 62 acres). However, considering the scale of the proposed action, the completed projects represent less one percent (0.2%) of BLM lands within the analysis area. The treatment schedule is projected to occur over several years and in many different areas within the planning area. If treatments are small and widely distributed over the landscape, cumulative impacts will be minimal.

No Action Alternative

Direct and Indirect Impacts: Under this alternative, forest health would remain unchanged resulting in no change to the quality of threatened, endangered, or sensitive species habitat.

Cumulative Impacts: None

Protective/Mitigation Measures: None

Finding on the Public Land Health Standard for Threatened & Endangered species: The proposed action will have no impacts on the public land health standard for T&E species.

3.3.2 VEGETATION (includes a finding on standard 3)

Affected Environment: The analysis area includes BLM lands in both Chaffee and Lake Counties encompassing areas from approximately 7,000 to 12,000 feet in elevation. Climate records for Chaffee County indicate the average annual precipitation is 11 inches with a frost free period of 107 days. Lake County receives 18 inches of average precipitation annually with an average frost free period of 79 days.

The vegetation within this planning area encompasses a wide variety of plant communities. The vegetation description is based on the range site description for this area that is derived from the Natural Resource Conservation Service, 1995. A range site is a distinct association of vegetation that has its own combination of environmental conditions to produce a potential plant community. The present plant communities found on these sites may not reflect the potential natural plant communities expected due to ecological succession or retrogression. Current activities on a given site may promote changes that would deviate from the potential plant community such as continuous overgrazing by ungulates or invasion of woodland trees into an open grassland park.

Pinyon-Juniper

The pinyon-juniper range site is the dominant site throughout the analysis area. As you increase in elevation though the juniper species becomes a secondary woodland type occurring intermittently if at all. The potential plant community typically consists of a grass, forb and shrub understory made up of mountain mahogany, wax current, fringed sagebrush, rabbitbrush, yucca, blue grama, side oats grama, mountain muhly, needle and thread, and Indian rice grass. The potential forage production could vary from 50 to 200 pounds per acre of total annual production. Overtime many of these areas have seen increased densities of pinyon pine and juniper where the tree species have created a closed canopy. Under these conditions the understory component such as the grasses, forbs and shrubs are void of the site resulting in lack of species diversity and soil stability. At this time the total annual forage production becomes very limited.

Dry Mountain Outwash

The Dry Mountain Outwash site occurs below 8,500 feet in elevation and is typically surrounded by the pinyon-juniper range site. The potential natural plant community is typically an open grassland dominated site with intermittent forbs and shrubs. It includes western wheatgrass, junegrass, Indian rice grass, needle and thread, blue grama, sand dropseed, squirrel tail, muhly, fringed sage, mountain mahogany, wax current, and buckwheat. The potential annual forage production consists of 400 to 600 pounds per acre. These sites are prone to invasion or encroachment of pinyon pine and juniper tree species. As this occurs overtime, the grasses, forbs, and shrubs are out-competed and total annual production is reduced.

Mountain Outwash

The Mountain Outwash site typically occurs above 8,500 feet in elevation. The potential plant community is dominated by grasses with intermittent shrubs. The plant community consists of Arizona fescue, mountain muhly, various wheatgrasses and bluegrasses, junegrass, Indian rice grass, squirrel tail, sedges, blue grama, fringed sage, and cinquefoils. Under the potential plant community Big Sagebrush would occur as minor component (less than 3% composition). The total potential annual forage production consists of 600 to 1,000 pounds per acre per year. These sites are prone to invasion of big sagebrush. Some areas between Granite and Leadville are seeing a decline in annual grass production and plant diversity due to the encroachment of sagebrush in the area.

Boulder Flats

The range site occurs on flatter slopes along the Arkansas River in the Buena Vista area. The potential plant community is a grass-dominated site with intermittent shrubs and trees. The potential vegetation consists of Indian rice grass, needle and thread, western wheatgrass, junegrass, mountain muhly, Arizona fescue, sand dropseed, squirrel tail, wax current, fringed sage, and intermittent pinyon and ponderosa pine. The total potential annual forage production is 800 to 1,200 pounds per acre per year. Similar to the Dry Mountain Outwash site, these areas occur adjacent to pinyon-juniper sites and are prone to invasion by pinyon pine. As this occurs the area demonstrates lack in species diversity, forage production and poor soil stability.

Sandy Bench

The range site occurs on the valley floor typically between Salida and Buena Vista. It is a grassland dominated site with shrubs and forbs occurring as a minor component. The potential plant community is Indian Rice grass, needle and thread, sand dropseed, blue grama, squirrel tail, four wing salt bush, winter fat, snakeweed, and rabbit brush. The total potential annual forage production is 800 to 1,200 pounds per acre per year. These sites are also prone to invasion by pinyon pine. As this occurs the area demonstrates lack in species diversity, forage production and poor soil stability.

Ponderosa Pine

The ponderosa pine woodland occurs at elevations between 7,800 and 8,500 feet and is sometimes associated with Douglas-fir on north aspects. Understory vegetation composition and productivity is dependent on aspect, canopy coverage and litter density. Open ponderosa woodlands typically consist of June grass, Arizona fescue, mountain muhly, fringe sage, western wheatgrass, and mountain mahogany.

Lodgepole Pine

The Lodgepole Pine forest occurs at an elevation between 8,200 and 10,000 feet. The understory vegetation is typically limited where there is full canopy closure. Vegetation typically associated with this forest type include Thurber fescue, native blue grasses, parry oatgrass, nodding brome, American vetch, sedges, big sagebrush, snowberry, and cinquefoil.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: The Proposed Action would have a positive and beneficial impact to herbaceous vegetation especially in areas where invasion of woodland trees and shrubs are occurring and displacing the herbaceous vegetation. Opening the canopy and reducing competition for light and water will promote an environment that favors the growth of grasses, forbs and shrubs. The treated areas will promote plant diversity, enhance forest health, and increase forage production. Depending on pre-treatment conditions and existing natural seed sources, some areas may require artificial seeding. The seed mixtures listed in the proposed action are adapted to the analysis area and promotes active growing vegetation throughout the growing season. Seeding of native species is emphasized under this analysis; however non-native species are available depending on project objectives. The two non-native species listed are highly desirable and nutritious to elk, deer and other wildlife species and widely used on areas for erosion control as it establishes easily under a variety of conditions. Due to its desirability and heavy utilization by wildlife these plants typically do not compete well with the native vegetation and would not dominate the site.

The vegetation treatments would promote healthy environments and help meet Standards for Public Land Health.

Protective/Mitigation Measures: Mitigation measures described in the Proposed Action are sufficient.

Cumulative Impacts: Several vegetation treatments similar to what is proposed have occurred throughout the analysis area over the last twelve years. For the most part these projects have been small in scale and scattered over this time period and area. The proposed action limits the amount of treatable acres per year and treatment locations would be spread throughout the analysis area. Therefore the cumulative impacts would be negligible.

No Action Alternative

Direct and Indirect Impacts: Not implementing the vegetation treatments would maintain existing conditions and promote further deterioration. Grassland communities would continue to become overstocked with woodland species resulting in poor plant diversity and reduced forage production. In time areas would be in jeopardy of not meeting Standards for Public Land Health.

Protective/Mitigation Measures: None.

Finding on the Public Land Health Standard for Plant and Animal Communities: A majority of the BLM lands within this planning area have been assessed for public land health standards. Some of the issues identified during the assessments include encroachment of woodland species into areas that would be classified as more open grassland parks with vegetative diversity. These areas did not display the potential plant communities that would be expected. Instead these areas were exhibiting lack of ground cover, species diversity and poor plant production. The Proposed Action would reverse this trend and promote meeting standards for public land health.

3.3.3 WETLANDS & RIPARIAN ZONES (includes a finding on standard 2)

Affected Environment: The planning area consists of numerous watersheds with riparian areas and wetland environments ranging in elevation from approximately 6900 to over 12,000 feet. Annual precipitation rates range from approximately 10 inches at lower elevations near Salida to over 35 inches at the higher elevations surrounding Leadville. As such, there is wide variation in the probability of wetlands occurring in the vicinity of a project, the post-treatment vegetation response and the season of work a potential project could occur.

Major perennial streams tributary to the Arkansas River within the planning area include, the East Fork of the Arkansas River, Tennessee Creek, Lake Fork Creek, Lake Creek, Clear Creek, Cottonwood Creek, Trout Creek, Chalk Creek, and the South Arkansas River. Additionally, many smaller streams flow to either these main tributaries or to the Arkansas River directly. Project lands are on both sides of the Arkansas River. In addition to perennial stream riparian resources, standing water wetlands can be present throughout, but are more predominant in the higher elevations. Private lands in the region generally have more wetlands than public lands as the character of public lands is rugged, but key wetlands are present. The riparian areas are in varying degrees of condition but generally improving. Historic impacts from railroads, roads, mining, livestock, timber hauling and general early settlement had most resources disturbed, but now most are in early stages of recovery. In general wetland and riparian areas in the planning area on public lands are in properly functioning condition, however evergreen encroachment, or

typically upland trees invading into wetland areas is common. Plant communities in the project area along riparian/wetland resources continuously transition down gradient from generally short willow wetlands to cottonwood lined riverbanks along the Arkansas River. Numerous plant associations have been identified along this descending continuum of riparian by the Colorado Natural Heritage Area (CNHP).

Environmental Effects

Proposed Action

Direct and Indirect Impacts:

Treatment work described in the Proposed Action has the potential to alter runoff and sediment reaching drainages and into the associated wetland and riparian areas. This could lead to channel instability and a deterioration of conditions if work is completed without precautions. The Proposed Action however has mitigation that would protect riparian resources through limiting heavy equipment work outside of riparian areas and limiting the times (avoiding when saturated) work is proposed. Avoiding steep slopes during the treatments protects hill-slopes preventing erodible situations from developing. Short-term impacts to stream banks where streams may be crossed would be minor because crossings would not be repetitive. Wetlands areas would be avoided by heavy equipment unless frozen and only hand work would be incorporated to eliminate rutting. RGFO has completed many similar projects as described in other areas and experience has shown that replacement vegetation quickly recolonizes and change to adjacent wetlands has been negligible. As discussed in the background, benefits to understory grasses and deciduous plant growth can be remarkable at the small scale of typical project. Projects are not of the size to alter water yield or regional runoff patterns so that any slight change in flow delivered to a wetland or through a riparian area is within the range of natural variation.

Protective/Mitigation Measures: Mitigation measures given above are sufficient to protect these resources.

Cumulative Impacts: These projects are cumulative to other disturbances in the upper basin of the Arkansas River. By themselves all treatments however are small, with only short term, nearly immeasurable impacts.

No Action Alternative

Direct and Indirect Impacts:

Protective/Mitigation Measures: The No Action Alternative would have no direct impact to riparian resources in the short term. Catastrophic fire risk remains elevated, but at the scale of most projects the change would be negligible to riparian areas as they are not targeted for treatment except in isolated cases with most work planned to occur in upland environments. If fire occurs under a No Action it would be more likely to be catastrophic, but it may be many years before the risk differential becomes apparent when substantial acreage has been treated. Large fires can result in impacts to riparian areas from altered hydrology in the uplands creating excessive runoff and sediment delivery rates. Evergreen encroachment into deciduous forests along riparian and wetland environments continues with certainty under this alternative resulting generally in less beaver ponded habitat and less open wet meadow area.

Protective/Mitigation Measures: None Required

Cumulative Impacts: None

Finding on the Public Land Health Standard for Riparian Systems: The Proposed Action would not cause the riparian systems in the area to change from their current conditions or will not result in any long term impact or degradation.

3.3.4 WILDLIFE AQUATIC (includes a finding on standard 3)

Affected Environment: Aquatic habitats in the proposed treatment area are widespread, seasonably variable and diverse along the Arkansas River and its tributaries. Fisheries are common throughout and aquatic/wetland habitat supports other regionally known aquatic wildlife (boreal and woodhouse's toads, western chorus frogs, tiger salamanders, northern leopard frogs, and western garter snake (Hammerson, 1999)). Field visits to evaluate riparian/stream conditions have been made into most areas under the proposed work in anticipation of fuels reduction activities or other ongoing BLM administrative activities over time. In nearly every area of the planned action forested uplands adjacent to stream corridors had been logged prior to the turn of the last century or later and in some instances logged again, but regrew robustly in the absence of fires. In some of the floodplains there are old stumps and adjacent old skid road evident in the stream corridor. Timber activity adjacent to stream has occurred often. The risk of large fires is as discussed earlier and is no different near the streams. Streams and wetlands in the planned work area vary in type, condition, resiliency, as well as the ability to treat adjacent to the riparian area because of topography (see also riparian and wetland section). Vegetation communities supporting aquatic habitat vary depending upon soils, aspect, basin discharge, and elevation among other variables. Post treatment evaluations have been fairly extensive related to previous fuel thinning work and concerns affecting aquatic wildlife are not arising. Fuels reduction work is a recent agency priority and therefore monitoring has been important.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: The primary risk to the aquatic environment from fuels work is the potential to spread aquatic nuisance species or introduce hazardous substances through chemical spills. Nuisance species could include pathogen hosts or exotic plants \ nuisance weed species. This risk is continual with many land use activities but can be minimized by using only washed equipment and avoiding working close to water. Risk is minimally changed from what recreation and other administrative uses induce. Outside the short term impacts of working when conditions are wet, which would be avoided, the treatments areas as outlined in the maps presented should have no long-term impact to the aquatic habitat or wildlife in this region. Long-term route proliferation can be a concern if roads are not properly closed after treatment. In most instances watershed conditions change by partially opening forest canopy resulting in a vegetation conversion favoring the hydrologic cycle, (infiltration/runoff, etc. as discussed Soils and Water Quality sections) and improving watershed conditions result that benefit aquatic environments. Reduced catastrophic fire risk through treatment can also benefit streams by keeping wildfire sizes more reasonable should fires start as stated in background information, but the relative risk change is likely years away after substantial area would be treated. RGFO has specific condition information for the streams in the planned work area that is not presented, but

generally stream conditions on the public lands in this area are good or improving. The Royal Gorge Field Office has completed numerous similar projects to date. Generally the work is far removed from the stream bottoms (stated as a stipulation elsewhere) in the uplands and the change in runoff down in the aquatic environment during the short time of actual disturbance is not measurable at a short distance from the site. There is high annual and seasonal variation of flow coming from the watersheds naturally and treatment inputs into this variation is masked by small relative size of projects and the distance from the floodplains of work; especially when viewed over the long term. Treatments may happen during either low or high precipitation periods but halting them when local conditions are wet as stipulated is a good protection for aquatic environments.

Protective/Mitigation Measures: No additional mitigation is necessary for the protection of aquatic habitat.

Cumulative Impacts: These projects are cumulative to other disturbances in the upper basin of the Arkansas River. By themselves all treatments however are small, with only short term, nearly immeasurable impacts.

No Action Alternative

Direct and Indirect Impacts: The No Action Alternative would have no direct impact to aquatic resources in the short term. Catastrophic fire risk remains elevated, but at the scale of most projects, change would be negligible to riparian areas, streams and wetlands as they are not targeted for treatment except in isolated cases with most work planned to occur in upland environments. If fire occurs under a No Action it would be more likely to be catastrophic, but it may be many years before the risk differential becomes apparent when substantial acreage has been treated. Large fires can result in serious impacts to aquatic habitat areas from altered hydrology in the uplands creating excessive runoff and sediment delivery rates. Evergreen encroachment into deciduous forests along riparian and wetland environments continues with certainty under this alternative resulting generally in less beaver ponded habitat and less open wet meadow area.

Protective/Mitigation Measures: None required.

Cumulative Impacts: None

Finding on the Public Land Health Standard for Plant and Animal Communities: (partial, see also Vegetation and Wildlife, Terrestrial): Potentially, work involving upland vegetation including the temporary road construction and some other fuels reduction \ habitat improvement related activities can affect aquatic wildlife habitat, both long-term and short-term if precautions are ignored. Cumulatively, several projects could occur in the Arkansas River corridor at one time. The main variable to change due to fuels treatment work is vegetation conversion with slight water and sediment delivery into floodplains for a short time possible; however no single project would affect much area in any single watershed. The proposed work should not disrupt functions of any aquatic wildlife population or substantially alter any aquatic habitat.

3.3.5 WILDLIFE TERRESTRIAL (includes a finding on standard 3)

Affected Environment: The action area occurs over a wide swath of habitat types. Riparian habitat consists of foothills riparian forests, providing habitat for turkey, bald eagles, a variety of raptor and song bird species, and big game. The foothills riparian forests are distributed along stream systems in the foothills, lower mountains and mountain parks from 5,500-10,000 feet in elevation. In some areas the riparian forest is dominated by a deciduous component, especially narrow leaf cottonwood, a variety of willow species, box elder, mountain alder and river birch. In other areas Colorado blue spruce and other coniferous trees dominate, and conifers often form a mixture with cottonwoods. The understory of these systems is typically rich and diverse, with a wide variety of shrubs and herbaceous plants. Riparian areas represent a transition zone between the aquatic ecosystem and the drier uplands. The riparian zones are well defined, unique, and highly productive areas that are sensitive to disturbance.

Mountain shrubland is typically found in the transition zone between semi-arid pinyon-juniper woodlands and the forest above. Mountain shrubland in the planning area consists primarily of Gambel oak and other associated shrubs, including serviceberry, mountain mahogany, chokecherry, and snowberry. This area provides important wintering grounds to big game animals. Gambel oak is a large shrub or small tree and is probably the best known of the mountain shrubs. Gambel oak has been described as a climax indicator in a number of habitat types. It reproduces by suckering, and very large areas can be populated by clones. Gambel oak is extremely fire tolerant, vigorously re-sprouting from stem bases or from underground tubers and rhizomes following fire. It can recover to original heights from a fire in 30 to 40 years. A healthy stand of Gambel oak contains shrubs of varying heights and has robust native bunchgrasses and forbs growing between them and relatively little bare ground. Mountain mahogany is the most common shrub species associated with Gambel oak in the planning area. It grows with and adjacent to oak but on dryer sites. Chokecherry is a large shrub common to mountain shrublands but it rarely dominates large areas. Snowberry is a lower stature species that often grow with Gambel oak. Other shrubs occurring in mountain shrubland communities (e.g., squaw currant, curl-leaf mountain mahogany, and mountain spray) do not become widespread dominants.

Pinyon-juniper habitat extends over large areas in the planning area. The pinyon-juniper habitat type is evergreen woodland situated above desert or grassland vegetation and below mountain shrub. Elevations range from 4,500-7,500 feet. Colorado pinyon pine is the predominate pinyon species in the area and Rocky Mountain juniper is also dominate. Proportions of juniper and pinyon within this habitat type vary greatly, and pure stands of either tree may occur. Typically, as elevation increases pinyon dominance increases, juniper density decreases, total tree density increases, and trees become larger. Pinyon pines drop out completely at the lowest elevations. Depending on site variables, pinyon-juniper may range from an openly spaced savanna to a closed forest. Pinyon-juniper understories vary from completely open to quite dense, the densest understories occurring in open canopy woodland/oak communities. Soils underlying pinyon-juniper often are shallow, rocky and low in fertility. Pinyon-juniper habitats in the planning area are generally mixed with shrub species such as Gambel oak and mountain mahogany and therefore provide browse for mule deer, elk and bighorn sheep.

The mixed conifer forest type is found at elevations of 5,600-10,000 feet, where it is transitional between ponderosa pine and spruce-fir forests providing habitat to species such as deer, elk, raptors (i.e. goshawk), and dusky grouse. At lower elevations, ponderosa pines are common, with Douglas-fir on north-facing slopes and in drainages. Mixed conifer gives way to spruce-fir at higher elevations. Aspen stands are an important component, and so pervasive as to be considered an integral part of the mixed conifer forest. Other tree species present include blue spruce, and white fir. The stand- and landscape-level structure of mixed conifer forests is shaped by fire, blow down, and insect infestations (western spruce budworm, Douglas-fir bark beetle, and Douglas-fir tussock moth).

In Colorado, ponderosa pine is found at 5,600-9,000 feet. It is a very dry and warm forest, with less than 25 inches of precipitation annually. Mature ponderosa pine forests on dry sites are open, mature trees achieve wide separation as they compete for limited soil moisture, and a grassy ground cover is maintained by frequent low-intensity fires. Species such as deer, elk, and turkey utilize this vegetation type. On more mesic sites, typical of the ponderosa pine habitat of the planning area, ponderosa stands are dense, and closed-canopy stands are common. Tree species sometimes found mixed with ponderosa pine are junipers, pinyon pine, aspen, white fir, and Douglas-fir. Ponderosa pine distribution at local scales is influenced by soil moisture and fire. Ponderosa forests are shaped primarily by fire, affecting species composition and forest structure. Ponderosa forests evolved with frequent, low-intensity fires that cleared understory vegetation and other tree species with lower fire tolerance but left unharmed the large ponderosa pines with their thick bark. Another natural disturbance agent shaping ponderosa pine forests is the mountain pine beetle, killing many ponderosa pines. Large expanses of pure old growth ponderosa pine forest are rare in the planning area. Past logging activity for the mining and railroad industries removed many older trees. Most ponderosa forests in the planning area are young in age.

Spruce-fir forest is present at 9,000–12,000 feet in elevation. Engelmann spruce and subalpine fir are the dominant tree species. Engelmann spruce is found without subalpine fir at the lower elevations, but only on cool, sheltered sites. Lodgepole pine and aspen are often mixed in at lower and middle elevations, and limber pine and bristlecone pine are present at middle and higher elevations. At the highest elevations, where spruce-fir gives way to alpine tundra, the harsh climate restricts these trees to a small, contorted, often ground-hugging growth form known as “krummholz.” Most precipitation is in the form of snow, which remains on the ground well into spring. Because spruce-fir forests are cooler and wetter than other forests, fire is comparatively uncommon, with perhaps several hundred years passing between fires at a given location. As a result, these forests produce large trees, with mature specimens reaching 3 feet diameter at breast height and 120 feet tall. Understory vegetation can vary from sparse to quite dense, perhaps the densest of the conifer forests in this region with the exception of dense Gambel oak under ponderosa pine. Blueberry, shrubby cinquefoil, and Colorado currant are common components. The primary disturbance agents are blow down and insect infestations (Engelmann spruce beetle and western spruce budworm). When fires do occur, they are often stand-replacement fires, fed by the dense trees and understory, although moisture and other factors result in patchy dispersal across the landscape. Recovery from disturbance is slow due to the cold winters and a short, cool growing season. Summer populations of deer and elk, snowshoe hare, and black bear, among others are species that commonly utilize this habitat type.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Although temporary and short-term, terrestrial wildlife would be displaced from the project site due to the use of heavy machinery. In the long-term, wildlife would benefit from vegetation manipulation projects. Implementation of forest management projects in the planning area are intended to manage for healthy forests, reduce fuel loadings on public lands, create openings in the forest canopy, and improve wildlife habitat. Projects that reduce tree density tend to increase grass and shrub species causing an increase in available browse and forage for wild ungulates. These treatments are designed to increase edge effect, improving habitat diversity. Forest treatments increase the potential for the presence of mountain muhly, elk sedge, mountain mahogany, currant and snowberry.

Wildlife management objectives incorporated into projects are to create a mosaic of seral stages that will support healthy big game population within wildlife seasonal ranges. Many different treatment prescriptions may be used depending on target species benefit. For example, when planning vegetation treatments, an important characteristic of mule deer to consider is they tend to be dispersed across the landscape, expressing less gregarious behavior, and have high site fidelity to seasonal ranges. Therefore, for deer, the goal is to create a high edge to open ratio by treating numerous small patch sizes (~3-12 acres) over large areas, and to maintain security cover near roads and anthropogenic development. Deer are reluctant to move to new areas for foraging or security until major changes have occurred. Elk, on the other hand, will readily change their behavior to take advantage of foraging opportunities and/or avoid disturbance from humans or predators. Elk are a more gregarious, herding species with more "plastic" site behavior. A beneficial strategy for elk may be to treat larger, less numerous areas given their different behavioral tendencies. Other considerations for treatment strategies to benefit wildlife include the desired vegetation response, benefits to grazers versus browsers, the need for invasive control, and potential for natural or assisted reestablishment of vegetation (seeding). Bighorn sheep are generally reluctant to use areas of dense vegetation due to risk of predation and lack of escape cover. Projects designed specifically for bighorn sheep should increase visual distances to enhance predator detection; additionally, projects should be located near escape terrain to further decrease the risk of predation.

Protective/Mitigation Measures: No temporary haul roads needed to remove forest products should be retained for unlimited public use. Seasonal restrictions may be necessary to protect the birthing periods of big game species (generally April 1 to July 15) if the projects are developed within historically used birthing areas as delineated by Colorado Parks and Wildlife. Partial exceptions to the seasonal restriction may be granted if circumstances warrant. Exceptions will be limited to the first two weeks and last two weeks of the restriction period. Furthermore, seasonal restrictions may be necessary to protect big game use of seasonal winter ranges (December 1 to April 30). An exception may be granted based on climatic conditions or if the winter range habitat is unsuitable or unoccupied during winter months.

Raptor nest surveys will be completed prior to project activities. If nests are located, a seasonal no activity restriction will be enforced until nest has become vacated.

Cumulative Impacts: Numerous vegetation projects have occurred in recent years on BLM managed lands: Four Elk Prescribed burn (2010, 58 acres), Cache Creek mountain pine beetle suppression and salvage (2011, 246 acres), Clear Creek Reservoir salvage and restoration thinning (2008, 47 acres), East Fork thinning and mistletoe sanitation project (2010, 62 acres). However, considering the scale of the proposed action, the completed projects represent less one percent (0.2%) of BLM lands within the analysis area. The treatment schedule is projected to occur over several years and in many different areas within the planning area. If treatments are small and widely distributed over the landscape, cumulative impacts will be minimal.

No Action Alternative

Direct and Indirect Impacts: Under this alternative, forest health would remain unchanged resulting in no change to the quality of terrestrial wildlife habitat.

Cumulative Impacts: None

Protective/Mitigation Measures: None

Finding on the Public Land Health Standard for Plant and Animal Communities: Implementation of the proposed action will improve the health standard for plant and animal communities.

3.3.6 MIGRATORY BIRDS

Affected Environment: Several habitat types are found within the area covered by this EA. At lower elevations the habitat types are primarily pinyon pine and juniper. Open areas of mountain grassland are interspersed throughout the area and mountain shrubs such as currant and mountain mahogany are abundant, especially on south slopes. Pinyon-juniper habitat supports the largest nesting bird species list of any upland vegetation type in the West. The richness of the pinyon-juniper vegetation type, however, is important due to its middle elevation. Survey tallies in pinyon-juniper are similar in species diversity to the best riparian. Several species are found in the pinyon-juniper habitat and include: black-chinned hummingbird, gray flycatcher, Cassin's kingbird, gray vireo, pinyon jay, juniper titmouse, black-throated gray warbler, Scott's oriole, ash-throated flycatcher, Bewick's wren, mountain chickadee, white-breasted nuthatch, and chipping sparrow.

Ponderosa pine, mixed conifer and mountain shrubland habitats are found at higher elevations in the project area. In Chaffee and Lake Counties these sites are very dry and warm areas, with less than 25 inches of precipitation annually. Mature ponderosa pine forests on dry sites are open, with mature trees achieving wide separation as they compete for limited soil moisture. Grassy ground cover is maintained by frequent low-intensity fires. Ponderosa pines are the largest conifers in Colorado and Gambel oak is a common component of the understory, typically in a shrubby form. Other common understory shrubs include mountain mahogany and wax currant. Tree species some-times found mixed with ponderosa pine are junipers, pinyon pine, aspen, white fir, and Douglas-fir. Birds typical of these habitat types include Merriam's turkey, Williamson's sapsucker, pygmy nuthatch, western bluebird, band-tailed pigeon, Mexican spotted owl, Grace's warbler, flammulated owl, red-breasted nuthatch, violet-green swallow, western tanager, and chipping sparrow.

Foothills riparian forests are distributed along stream systems in the foothills, lower mountains and mountain parks. In some areas the riparian forest is dominated by a deciduous component, especially narrowleaf cottonwood, a variety of willow species, box elder, mountain alder and river birch. The understory of these systems is typically rich, with a wide variety of shrubs and herbaceous plants. The Colorado Breeding Bird Atlas reported that foothills riparian forests dominated by deciduous trees comprised nearly 85% of all foothills riparian forests, while conifer-dominated systems comprised just over 15%. These two systems also exhibited somewhat different avian communities. Riparian areas represent a transition zone between the aquatic ecosystem and the drier uplands. The riparian zones are well defined, unique, and highly productive areas which are sensitive to disturbance. In most western riparian systems, however, 75% of the bird species use riparian areas during some part of their life cycle. In deciduous foothills riparian systems, yellow warbler is the species most frequently detected, followed by American robin, northern flicker, house wren, warbling vireo, song sparrow, western wood-pewee, and broad-tailed hummingbird.

The following birds are listed on the US Fish and Wildlife Service Birds of Conservation Concern (BCC) – 2008 List for BCR 16-Southern Rockies/Colorado Plateau. These species have been identified as species that may be found in the project area, have declining populations and should be protected from habitat alterations.

The golden eagle is a bird of grasslands, shrublands, pinyon-juniper woodlands, and ponderosa pine forests, may occur in most other habitats occasionally, especially in winter. Nests are placed on cliffs and sometimes in trees in rugged areas, and breeding birds range widely over surrounding habitats.

Flammulated owls prefer old-growth or mature ponderosa pine, due to the presence of large broken-top and lightning-damaged snags and trees for nesting cavities, large cavities excavated by northern flickers and other woodpeckers, open structure of trees and understory for foraging, and high prey availability. They will utilize other habitats with similar structure, such as open mixed-conifer and aspen forests. Key habitat features seem to be the presence of large trees and snags, scattered clusters of shrubs or saplings, clearings, and a high abundance of nocturnal arthropod prey.

Prairie falcons nest in scattered locations throughout the state where they inhabit the grassland and cliff/rock habitat types. These falcons breed on cliffs and rock outcrops, and their diet during the breeding season is a mix of passerines and small mammals.

Gray vireos nest along the western tier of counties, with centers of abundance in Mesa, Montrose, and Montezuma counties. They also nest on the Eastern Slope in Las Animas County. Gray Vireos are pinyon-juniper woodland obligates. Gray vireos usually inhabit stands dominated by juniper or thin stands of pure juniper. They construct nests of dry grasses, plant fibers, stems, and hair, often camouflaging them with sagebrush leaves.

Pinyon jays range the semiarid lands of the West. The Colorado Breeding Bird Atlas map shows them south of a diagonal line drawn from the northwest corner to the southeast corner of the state. Pinyon jays are pinyon and juniper obligates in Colorado and nest commonly at the lower

elevations of pinyon-juniper woodlands, often where junipers dominate. A few nest in ponderosa pine. They prefer extensive stands far from high human activity.

Grace's warblers breed from southwestern Colorado and southern Utah, south through central Arizona, western New Mexico, and into north-central Mexico. Grace's warblers inhabit open ponderosa pine forests with pines 16 feet tall, especially with a shrubby understory, usually Gambel oak.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Vegetation treatments generally are completed with the goal of thinning forest stand density, to recreate historical stand structure that was altered by fire suppression. However, more recently, forest ecologists have emphasized the lack of knowledge regarding historical stand structure and disturbance regimes. Likely, some forest stands are dense with near closed canopies, while others are savanna-like that are being invaded by tree species. The diversity of the forest bird community throughout the range of the project area is likely tied to this diversity in structure of forests. Further, bird communities (species assemblages) are likely reflecting these variations in stand structure. A shift in vegetation structure and composition from vegetation treatments potentially will alter the species composition and abundance of birds within treated areas.

For example, breeding ecology of birds using piñon-juniper woodlands has received less research attention than for most habitat types in North America (Francis et al. 2011). Research on habitat relationships of birds in piñon-juniper woodlands suggests that habitat structure may dramatically alter bird communities and that these bird communities show high variation geographically (Crow and Van Riper III 2010). Habitat structure was a key component to avian habitat use in juniper ecosystems and a diverse mix of seral stages were important in providing adequate habitat for the suite of birds potentially using juniper woodlands (Pavlacky and Anderson 2004). In New Mexico, 86% of all bird nests in piñon-juniper woodland were located in juniper trees, suggesting the relative value of juniper to birds in this mixed forest habitat (Francis et al. 2011). Few studies have documented the effect of mechanical manipulations on piñon-juniper bird communities. In Utah, piñon-juniper obligate bird species (e.g., gray vireo) were most negatively impacted by mechanical thinning (removal of 92% of live trees), whereas sagebrush obligates and habitat generalists increased in relative abundance following treatments (Crow and Van Riper III 2010). In southern Colorado, species richness did not change significantly on treated and untreated piñon-juniper habitats and density was only different for two bird species (Williamson 2008). Any vegetation manipulation project will benefit some species while having deleterious effects on others. This general statement of impact regarding species richness and density could be stated for all forest and habitat types.

Noise and equipment operating may cause birds to avoid the area during project implementation and although some may become habituated. The mitigation measures will ensure minimal disruption to migratory bird habitat during the peak of the breeding and brood rearing time period. However, in general, vegetation manipulation projects will cause a site specific

reduction in populations of species that prefer a closed canopy while increasing populations that prefer an open canopy.

Cumulative Impacts: Numerous vegetation projects have occurred in recent years on BLM managed lands: Four Elk Prescribed burn (2010, 58 acres), Cache Creek mountain pine beetle suppression and salvage (2011, 246 acres), Clear Creek Reservoir salvage and restoration thinning (2008, 47 acres), East Fork thinning and mistletoe sanitation project (2010, 62 acres). However, considering the scale of the proposed action, the completed projects represent less one percent (0.2%) of BLM lands within the analysis area. The treatment schedule is projected to occur over several years and in many different areas within the planning area. If treatments are small and widely distributed over the landscape, cumulative impacts will be minimal.

Protective/Mitigation Measures: Mitigating measures will be implemented for this project to protect migratory birds. Trees that are used for nesting, roosting and foraging will be marked as leave trees and will include snags, dead top and/or broken top trees and trees that exhibit signs of foraging for insects by birds. To be in compliance with the Migratory Bird Treaty Act (MBTA) and the Memorandum of Understanding between BLM and USFWS required by Executive Order 13186, BLM must avoid actions, where possible, that result in a “take” of migratory birds. Pursuant to BLM Instruction Memorandum 2008-050, to reduce impacts to Birds of Conservation Concern (BCC), no habitat disturbance (removal of vegetation such as timber, brush, or grass) is allowed during the periods of May 15 - July 15, the breeding and brood rearing season for most Colorado migratory birds. The provision will not apply to completion activities in disturbed areas that were initiated prior to May 15 and continue into the 60-day period.

An exception to this timing limitation will be granted if nesting surveys conducted no more than one week prior to vegetation-disturbing activities indicate no nesting within 30 meters (100 feet) of the area to be disturbed. Surveys shall be conducted by a qualified breeding bird surveyor between sunrise and 10:00 a.m. under favorable conditions.

No Action Alternative

Direct and Indirect Impacts: Under this alternative, forest health would remain unchanged resulting in no change to the quality of migratory bird habitat.

Cumulative Impacts: None

Protective/Mitigation Measures: None

3.4 HERITAGE RESOURCES AND HUMAN ENVIRONMENT

3.4.1 CULTURAL RESOURCES

Affected Environment:

Cultural resources on BLM land administered by the RGFO include a diverse array of prehistoric and historic archaeological sites that make up a unique cultural landscape. Prehistoric site types include open lithic sites, open camp sites, open and sheltered architectural sites, and rock art.

Historic site types include homesteads, town sites, mining and milling complexes, prospecting and mining sites, and historic roads and trails.

Site density is generally high on BLM-administered land, which includes a foothills ecotone known for its diversity of plant and animal species desirable in ancient and historic subsistence regimes. Within the analysis area, there are a high number of sites listed on the National Register of Historic Places (NRHP).

Environmental Effects:

Historic fire suppression regimes have disrupted the timing of natural fire cycles and have resulted in densely vegetated areas with an abundance of smaller trees and shrubs which provide ladder fuels for fire to move into a forest canopy, producing crown fires. Crown fires tend to be stand-replacing and significantly alter the ecological character of forests. Stand-replacing crown fires can be extremely destructive and frequently threaten cultural resources. Aside from direct impacts, high-intensity fires increase the potential for soil erosion, potentially resulting in the long-term degradation and destruction of these resources. Vegetative treatment has the potential to contribute to the restoration and maintenance of historic and ethnographic cultural landscapes (USDI National Park Service 2003), and minimize threats to cultural resources resulting from fire and firefighting activities.

The effect of vegetative treatment and thinning on cultural resources depends on the method and specific equipment used. Referring to the three broad impact categories (mechanical thinning, hand thinning, and prescribed fire) there are individual and cumulative impacts that need consideration. Mechanical and manual treatments have the potential to create ground disturbance resulting in vegetation removal and compaction that could undermine the cultural contexts of prehistoric and historic sites. Heavy equipment and ATVs used off roads and trails can have the greatest impacts. Ground disturbance can also result in the unintended effect of the loss of vegetation cover and subsequent soil movement that can result in the erosion of buried cultural deposits. The temporary or permanent relocation of removed material must also be considered. Though likely to be impacted to a lesser degree than directly thinned areas, concentrations of thinned material have the potential to alter local geomorphological processes. Such alterations include accelerating or decelerating the rate of soil erosion and/or accumulation, changing soil moisture, and ultimately altering the chemical composition of the sedimentary matrix, potentially resulting in changes in the preservation potential of those soils and sediments.

Additionally, the use of prescribed fire to treat areas where mechanical or hand thinning is impractical or too costly, and to reduce accumulation of removed/thinned vegetative materials, can have significant direct and indirect impacts. Aside from the obvious concerns associated with fire damage to historic properties and structures (homesteads, town sites, mining and milling complexes, prospecting and mining sites, and historic roads and trails) and subsequent changes in soil movement, aboriginal resources can also be significantly impacted by fire, prescribed or otherwise. Aboriginal resources may be impacted by exposure to heat, the deposition of fire byproducts (ash, soot), and changes in the potential for discovery, which may lead to increased vandalism.

Moreover, fire can damage prehistoric artifacts and features in variable ways and compromise the informational value of these items. For example, rock art panels may spall or become covered in the byproducts of combustion; rock art panels are frequently located on easily carved or otherwise manipulated rock surfaces (sandstone, limestone), and these rock types are particularly susceptible to spalling and degradation. Physical damage to ceramic artifacts includes degradations such as spalling and crumbling, and changes in surface color, texture, and design. High temperatures may also alter the paste characteristics and give a false manufacture and firing signature (ceramics are fired in either an oxidation or reduction atmosphere which produces distinctive manufacture characteristics). Damage to aboriginal lithic artifacts includes spalling and fracturing of chipped and ground stone tools, and may also give a false indication of anthropogenic use of fire, thereby complicating, or creating spurious interpretations. Surface fires can also complicate radiometric, dendrochronological, and archaeomagnetic dating, via the introduction of modern charcoal, destruction of living or dead-standing trees with the potential to contribute to a dendrochronological sequence, and thermal reorganization/realignment of ferrous molecules, creating a false archaeomagnetic signature that does not correspond to the position of the north pole at the time of aboriginal use and occupation.

Proposed Action

Direct and Indirect Impacts: The treatments proposed have potential for direct and indirect effects to cultural resources. However, until specific areas are identified for treatment, effects on historic properties cannot be definitively assessed.

Recommended Mitigation Measures: Because no cultural resources inventories have been completed and historic properties have not yet been found, it is not possible to identify specific mitigation measures. However, BLM has developed the following process for evaluation of impacts:

1. BLM will conduct Class II (sample) inventories for all proposed *mechanical* vegetation treatment requests in order to identify historic properties that might be affected. If the Class II inventory indicates that historic properties are located within the area of potential effect, and likely to be impacted by the proposed action, a Class III (100 percent) intensive pedestrian inventory will be conducted.
2. BLM will conduct Class III (100 percent) inventories for all proposed *prescribed burn* vegetation treatment requests in order to identify historic properties that might be affected.
3. If previously-recorded historic properties are located in the area of potential effect, BLM will analyze the impact of the undertaking on the historic properties, including a field visit if necessary.
4. If historic properties in the area of potential effect cannot be avoided, BLM will prepare a plan to mitigate the effects of the vegetation treatment. SHPO concurrence with BLM's mitigation plan will be required before the weed treatment commences. The range of possible mitigation activities possible is quite large, but a non-exhaustive list includes avoidance (always the first choice), testing, excavation (salvage, partial, or total) and data recovery in the form of archival recording (for standing structures and other historic-era phenomena).

The negative effect of prescribed fire can be minimized through proper planning. Following the Prescribed Fire Management Recommendations outlined in General Technical Report RMRS-GTR-42 - Wildland Fire in Ecosystems, Vol. 3: Effects of Fire on Cultural Resources and Archaeology, BLM-RGFO proposes the following prescribed fire measures:

Cultural Resource Specialists will:

- Work with vegetation/fire management and planners to determine the type and loading of fuels in order to obtain estimates of potential fuel consumption and surface and subsurface temperatures and determine how these combinations could affect cultural materials.

Vegetation Treatment/Fire Managers will:

- Avoid burning heavy fuel accumulations in the vicinity of sensitive sites and/or areas.
- Hand remove standing, dead fuels to prevent tip-up and tree fall, and minimize or prevent the burning of stumps, shrubs, and brush in the vicinity of sensitive sites and/or areas.

Cumulative Impacts: As with mitigation, cumulative effects on historic properties cannot be specifically identified until cultural resources inventories are completed and historic properties have been identified.

3.4.2 NATIVE AMERICAN RELIGIOUS CONCERNS

Affected Environment:

BLM's cultural resources program requires ongoing consultation with Native American tribal governments for the maintenance, preservation, and promotion of native cultural heritage and resources, including plant and animal subsistence resources and the use of vegetation for religious and ceremonial purposes. There are no known traditional plant collecting areas within or adjacent to the area of potential effect. However, ethnographic sources indicate that traditional plants used by the Native American populations in Colorado include, but are not limited to, goosefoot, chokecherry, prickly pear cactus, cholla cactus, sage, and piñon pine. Such plants are present in the area of potential effect, and so were most likely exploited by Native American populations in the past.

Environmental Effects:

BLM consulted with 17 tribes regarding the proposed vegetation treatment program, including the Apache Tribe of Oklahoma, Cheyenne and Arapaho Tribes of Oklahoma, Cheyenne River Lakota Tribe, Comanche Tribe of Oklahoma, Crow Creek Sioux, Jicarilla Apache Nation, Kiowa Tribe of Oklahoma, Northern Arapaho Tribe, Northern Cheyenne Tribe, Oglala Sioux Tribe, Pawnee Nation of Oklahoma, Rosebud Sioux Tribe, Eastern Shoshone Tribe, Southern Ute Tribe, Standing Rock Sioux Tribe, Ute Tribe, and the Ute Mountain Ute Tribe. BLM sent a letter and map packet to all tribes that might be directly affected by vegetation treatment activities, and requested information on how the proposed activities might impact Native American interests, including the use of vegetation and wildlife for subsistence, religious, and ceremonial purposes. No tribe indicated any concerns.

Proposed Action

Direct and Indirect Impacts: None at present.

Cumulative Impacts: None at present.

Mitigation/Residual Effects: None.

No Action

Direct and Indirect Impacts: Same as Proposed Action.

Cumulative Impacts: Same as Proposed Action.

Mitigation/Residual Effects: Same as Proposed Action.

3.4.3 PALEONTOLOGICAL RESOURCES

Affected Environment: Occurrences of paleontological resources are closely tied to the geologic units that contain them. The probability for finding paleontologic resources can be broadly predicted from the geologic units present at or near the surface. Using the Potential Fossil Yield Classification (PFYC) system, geologic units are classified based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts (WO IM 2008-009).

The proposed project area contains geologic formation ranging from 1.7 billion year old granitic and metamorphic rocks that do not contain fossils (PFYC 1) to tertiary gravel deposits that are rich in vertebrate fossils (PFYC 5). Class 3 geologic formations contain either moderate amounts of vertebrate fossils, or the potential to find fossils may be unknown. In general, soil and vegetative cover provide a protective layer for these geologic rock formations that may contain paleontologic resources. Based on the description and pictures in this proposal, areas treated by hand or mechanically would not be considered as ground disturbing activity that would affect paleontologic resources because they do not penetrate the soil cover. However, temporary road building techniques do have the potential to penetrate the protective soil cover and those actions involving road construction will require additional review to ensure that paleontologic resources are protected.

Due to the broad range of paleontologic resources present in the proposed project area, paleontological resources will need to be considered at the project level when a more detailed description of the activity is available.

References: WO IM 2008-009, Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands

Environmental Effects**Proposed Action**

Direct and Indirect Impacts: Potential impacts to fossil localities would be both direct and indirect. Direct impacts to or destruction of fossils would occur from unmitigated activities conducted on formations with high potential for important scientific fossil resources. Indirect impacts would involve damage or loss of fossil resources due to the unauthorized collection of

scientifically important fossils by workers or the public due to increased access to fossil localities in the Project Area. Adverse impacts to important fossil resources would be long-term and significant since fossils removed or destroyed would be lost to science. Adverse significant impacts to paleontological resources can be reduced to a negligible level through mitigation of ground disturbing activities. It is possible that the proposed project would have the beneficial impact that ground disturbance activities might result in the discovery of important fossil resources.

Protective/Mitigation Measures: Mitigation to protect paleontological resources will need to be considered at the project level when a more detailed description of the activity is available.

This stipulation should be applied to all contracts to protect paleontologic resources: The permittee must notify the BLM RGFO immediately if any vertebrate fossils or their traces are discovered during operations. Operations may continue as long as the fossil specimen would not be damaged or destroyed by the activity. Within 5 working days of notification, the BLM RGFO shall evaluate or have evaluated such discoveries and shall notify the operator what action shall be taken with respect to such discoveries.

Cumulative Impacts: Adverse significant impacts to paleontological resources can be reduced to a negligible level through mitigation of ground disturbing activities. It is possible that the proposed project would have the beneficial impact that ground disturbance activities might result in the discovery of important fossil resources.

No Action Alternative

Direct and Indirect Impacts: None

Protective/Mitigation Measures: None

3.4.4 VISUAL RESOURCES

Affected Environment: Visual Resource Management (VRM) classes along with the corresponding VRM Objectives were established in the Royal Gorge Field Office in 1996 with the approval of the Royal Gorge Resource Area Resource Management Plan (RMP). Visual Resource Management objectives corresponding to the various management classes provide standards for analyzing and evaluating proposed projects to determine their conformity with the management objectives for a given area. Projects are evaluated using the Contract Rating System to determine if it meets VRM objectives established by the RMP.

The VRM classes established for the project area includes Class II (52,000 acres), III (20,000 acres), and IV (1,600 acres) areas. The objective for these areas are as follows:

The objective of Class II is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

The objective of Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

The objective of Class IV is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

The project area is known for its dramatic scenery associated with the mountain ranges to the east and west looming over the Arkansas River Valley and can be characterized as vast and open. Towns, low density development, and agricultural lands are spread throughout the river valley along with developments typically associated with these such as roads, buildings, and utilities. As evident by the majority of the area classified as VRM Class II management visual resources play an important role within the area. Major key observation points in the area include highways, the river corridor, as well as towns and private residences.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Due to the relative small scale of each project as well as best management practices incorporated into the proposed action it is anticipated that impacts to visual resources would be minimal. During operations vehicles may be evident and would introduce contrasts in shape and texture. These impacts would be negligible and short term. Once the project is completed the casual observer may notice subtle differences in vegetation between treated and untreated areas. This would greatly be dependent upon the distance that the project is observed where a nearby homeowner differences would be much more noticeable than as viewed from a tourist traveling the highway corridor. The feathering of the edges of treatment areas greatly reduces this amount of contrast and generally these types of projects blend well with the existing environment and would meet all of the VRM class objectives for the area.

Protective/Mitigation Measures: None.

Cumulative Impacts: None.

No Action Alternative

Direct and Indirect Impacts: None.

Protective/Mitigation Measures: None.

Cumulative Impacts: None.

3.4.5 WASTES, HAZARDOUS OR SOLID

Affected Environment: It is typically assumed that conditions associated with the proposed project sites are currently clean and that no contamination is evident. However, as specific treatment areas are identified and proposed, further coordination will assist in determining the baseline conditions.

Environmental Effects

Proposed Action

Direct and Indirect Impacts:

Protective/Mitigation Measures: No hazardous material, as defined by 42 U.S.C. 9601 (which includes materials regulated under CERCLA, RCRA and the Atomic Energy Act, but does not include petroleum or natural gas), will be used, produced, transported or stored during project implementation.

If the project involves oil or fuel usage, transfer or storage, an adequate spill kit and shovels are required to be onsite during project implementation. The project proponent will be responsible for adhering to all applicable local, State and Federal regulations in the event of a spill, which includes following the proper notification procedures in BLM's Spill Contingency Plan.

Cumulative Impacts: None

No Action Alternative

Direct and Indirect Impacts: None

Protective/Mitigation Measures: None

3.5 LAND RESOURCES

3.5.1 RECREATION

Affected Environment: The project area has very high recreation value for both citizens and visitors to the area. The majority of the recreation use occurs along the Arkansas River and is associated with white water boating and fishing. Other important recreation areas include Fourmile, known for its extensive trail system to the east and south of Buena Vista, Browns Canyon Wilderness Study Area, known for its unique rock formations and opportunities for solitude, and the trail system outside of Salida. Other public lands in the area also play an important role for dispersed uses including hunting, fishing, camping general touring of scenic areas.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: During operations while crews and vehicles are in a project area there would be a change in social setting due to the increase in traffic and noise. The extent of this impact would be variable depending upon the exact project area in relation to recreation

use and the nature of the project. This could result in displaced recreation use during operations and a decrease in user satisfaction for that particular visit. This would generally be short term and spread throughout the project area. Once completed impacts to recreation would be minimal and most visitors would not be negatively impacted. As forage for wildlife species increases on public lands hunting opportunities would likely be improved.

Protective/Mitigation Measures: Public notice should be provided for projects occurring in high value recreation areas during high use seasons.

Cumulative Impacts: None.

No Action Alternative

Direct and Indirect Impacts: Through the no action alternative hunting recreation would not see improved hunting opportunities as realized through the proposed action.

Protective/Mitigation Measures: None.

Cumulative Impacts: None.

3.5.2 WILDERNESS, WILDERNESS STUDY AREAS, AREAS OF CRITICAL ENVIRONMENTAL CONCERN, WILD AND SCENIC RIVERS

Affected Environment: The Browns Canyon Wilderness Study Area is within the project area as well as the Browns Canyon and Mosquito Pass Areas of Critical Environmental Concern (ACEC).

Browns Canyon Wilderness Study Area is approximately 7,500 acres in size and is located to the east of the Arkansas River between Buena Vista and Salida and is known for its unique and dramatic rock formations as well as its exceptional white water recreation opportunities. Away from the river the rugged landscape offers outstanding opportunities for solitude in a natural setting. No projects will occur within the Browns Canyon WSA.

The Browns Canyon ACEC covers the same areas as the WSA but is slightly larger at nearly 12,000 acres covering both sides of the river including Hecla Junction a popular boat ramp and campground managed by Arkansas Headwaters Recreation Area. The ACEC was established to protect the scenic values of the area.

The 6,400 acre Mosquito Pass ACEC to the east of Leadville, Colorado was established to protect the scenic values of the 13,000' and 14,000' peaks that it encompasses.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Since the Mosquito Pass ACEC is located almost entirely above timber line projects would most likely not occur there and there would therefore be no impacts to this ACEC.

Projects occurring within the Browns Canyon ACEC would most likely impact opportunities for solitude during operations and the natural setting for a period of time following the project as treated vegetation decays and becomes less noticeable. Any project within the ACEC would require additional public scoping and may require additional analysis to ensure that important characteristics would not be significantly altered. Outside of the Browns Canyon WSA projects would have similar impacts as found in the recreation and visual resources section and there would be impact to protected values over the long term.

Protective/Mitigation Measures: None.
Cumulative Impacts: None.

No Action Alternative

Direct and Indirect Impacts: None.
Protective/Mitigation Measures: None.

3.5.3 WILDERNESS CHARACTERISTICS

Affected Environment: BLM Manual 6310 provides policy and guidance on updating the inventory of areas that have wilderness characteristics. This update has not been completed within the project area however there are 7 parcels that meet the basic requirements for consideration and require additional field verification due to their adjacency to USFS Wilderness, USFS Recommended Wilderness, or a Wilderness Study Area. Naturalness and outstanding opportunities for solitude and/or recreation are other considerations in determining if a parcel is considered to have wilderness characteristics.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Projects occurring in lands found to have wilderness characteristics would impact opportunities for solitude during operations but would be short term in duration. Although no permanent roads would be established through the proposed action there would be impacts to naturalness that would be longer term in duration as treated vegetation breaks down and evidence of treatments naturalize over time. Eventually natural appearing conditions would return and there would be no permanent impact to lands found to have wilderness characteristics. It is recommended that additional public outreach occur for projects proposed in areas found to have wilderness characteristics.

Protective/Mitigation Measures: Perform additional public outreach for projects proposed within areas with wilderness characteristics.

Cumulative Impacts: None.

No Action Alternative

Direct and Indirect Impacts: None.
Protective/Mitigation Measures: None.

3.5.4 RANGE MANAGEMENT

Affected Environment: There are 23 active grazing allotments located on BLM lands within Chaffee and Lake Counties. The season of livestock use on allotments in Lake County occurs during the summer months while use on allotments in Chaffee County vary between rotational summer grazing to fall/winter/spring use grazing.

One of the major issues on grazing allotments in this area is poor livestock distribution due to inconsistent forage production. Many of the lower elevation grazing allotments are experiencing pinyon-juniper encroachment into the open grassland parks and increasing densities of pinyon-juniper stands. The higher elevation allotments are experiencing similar conditions with big sagebrush. In these situations the quality livestock forage is displaced by the encroaching woody tree/shrub species. The result is declining livestock forage production on portions of or all of the allotment. Overall these conditions promote poor livestock distribution where cattle concentrate in areas with better feed and avoid the less productive areas that are being invaded by pinyon-juniper and sagebrush.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Implementing vegetation treatments on the pinyon-juniper and big sagebrush within these grazing allotments will promote forage production where it is currently declining. Grazing use patterns will improve on the allotments and reduce livestock concentration areas.

Protective/Mitigation Measures: Close coordination with the grazing permittees' where treatments occur.

Cumulative Impacts: None.

No Action Alternative

Direct and Indirect Impacts: Forage quantity and quality continue to decline resulting in further livestock distribution issues on the allotment. Livestock concentration areas will continue and worsen resulting in over utilized areas.

Protective/Mitigation Measures: None.

3.5.5 LANDS AND REALTY

Affected Environment: Numerous land use authorizations exist within the project area on both Forest Service and BLM-administered lands, as described in Table 5. Over 6,000 of the 25,000 acres of public land in Lake County, or nearly 25 percent, are subject to a current or pending land

use authorization. Likewise, 5,227 acres of the 150,000 acres of public land in Chaffee County, or 4 percent, are subject to a current or pending land use authorization.

Table 5. Current and pending land use authorizations in Lake and Chaffee County, Bureau of Land Management-Royal Gorge Field Office, 2013.

Type of Authorization/ROW	LAKE COUNTY		CHAFFEE COUNTY	
	Number	Acres	Number	Acres
Access Roads and Drives	12	19.76	38	85.98
Federal/State/County Roads	4	67.66	14	285.12
Federal/State Highways	5	173.88	11	49.73
County Roads (2477)	4	2.69	1	210.56
Railroad Grants	3	1129.20	3	1348.61

Table 5. continued . . .

Type of Authorization/ROW	LAKE COUNTY		CHAFFEE COUNTY	
	Number	Acres	Number	Acres
Electric Power Facilities	4	906.43	1	146.58
Power Transmission Lines	12	980.69	31	1402.51
Telecommunication Lines	8	58.66	11	44.08
Communication Sites	2	0.12	4	.910
Water Plants	3	160.15	5	9.89
Other Water Facilities (pipe)	6	2.86	5	285.9
Irrigation Facilities (ditches)	4	2239.01	8	111.52
Oil and Gas Pipelines	2	13.79	1	62.91
Other/Special Use Permits	3	7.43	5	1,167.34
FS ROW/Easements	8	327.50	12	15.46
Total Authorized Uses:	77	6089.83	150	5,227.10

Environmental Effects

Proposed Action

Direct and Indirect Impacts: The Proposed Action indirectly reduces threats to human health and safety as well as the threat of damage and destruction to structures and other improvements associated with wildfires.

Protective/Mitigation Measures: Site-specific mitigation for protection of authorized uses would be developed for individual treatment areas immediately prior to implementation, including identification of land use authorizations and mining claims within the treatment area and location of such on the ground. Additional mitigation measures to those identified below would be developed if appropriate and necessary.

Mechanical Treatments:

- 1) Prior to use of the “Dixie Harrow”, the agency conducting the operation would identify any underground utilities in the area and notify the ROW holder to determine if any additional precautions are needed to prevent damage to the authorized facilities or disruption of the authorized use.
- 2) Prior to issuing a contract for commercial harvesting and removal of forest products, the agency responsible for the contract would assess access and other needs to determine if additional rights-of-way or other authorizations to cross or use public land are required to conduct the activity.

Cumulative Impacts: None.

No Action Alternative

Direct and Indirect Impacts: No impacts from the no action alternative are anticipated.

Protective/Mitigation Measures: None.

3.5.6 FOREST MANAGEMENT

Affected Environment:

Background: The project area lies at the upper headwaters of the Arkansas River in Lake and Chaffee counties. Substantial changes have taken place in the forest condition in the project area since the late 1800’s when valuable minerals were discovered in the area. Past logging, grazing, mining and fire suppression have had a huge impact on the current forest condition and fuel loads within the project area. More recently, the establishment of small acre subdivisions in the project area is increasing the complexity of resource management in this area. Individually these historic actions are manageable however, when taken as a whole the management complexity multiplies. Therefore, by approaching these different historical issues with multiple tools; i.e. prescribed fire, thinning, commercial logging, the Bureau of Land Management (BLM) is able to attack all issues at once, rather than incrementally, thereby working towards a healthier forest in a more efficient manner.

Recent Treatments: The Royal Gorge Field Office (RGFO) forestry program has completed or is currently working on the following treatments in the project area.

Mayville & Shavano Salvage: In the early 2000s, there was a mountain pine beetle (MPB) epidemic in the ponderosa pine forests near Salida, Colorado. The RGFO partnered with the United States Forest Service (USFS) to salvage these dead and dying ponderosa pine trees. These sales were set up and administered by the USFS.

Box Creek Vegetation and Travel Management: In 2003, the BLM completed the Box Creek Environmental Assessment and Decision Notice which covers approximately 2520 acres of BLM lands. Numerous forestry projects have been completed since the Decision was approved and there are currently several on-going projects. A majority of these projects are commercial thinning to reduce tree densities and improve understory plant vigor. A 40 acre clear-cut was completed in 2009, this treatment worked towards increasing age class diversity. There is an on-going 22 acre fuelwood thinning which retains ponderosa pine for future natural ponderosa pine regeneration in the southern portion of Lodgepole Flats. This treatment is improving forest diversity by promoting future ponderosa pine in an area dominated by lodgepole pine. Several hundred acres have been thinned through post and pole sales and approximately 100 acres were precommercially thinned by the Buena Vista inmate crew on BLM lands.

4-Elk Mistletoe Sanitation: In 2005, 50 acres of second growth ponderosa pine heavily infested with dwarf mistletoe were commercially thinned near Buena Vista, Colorado. This project is situated between 3 and 4 Elk subdivisions and includes BLM lands in a portion of Heckendrof State Wildlife Area. Small groups of decadent aspen were also released from conifer competition and the last monitoring visit indicated a tremendous response in new aspen sprouts.

Cache Creek Salvage: In 2008, the MPB population increased significantly in the forests around Leadville. In 2009, the RGFO completed a 250 acre Categorical Exclusion to address this significant tree mortality in this area. Approximately 100 acres of the salvage of dead and dying lodgepole has been completed. There are currently 4 on-going small salvage projects in Cache Creek and these are expected to be completed in FY13.

Zion Salvage: In 2011 the RGFO completed a 250 acre Categorical Exclusion to address the significant tree mortality due to the MPB in this area. Twenty acres of dead and dying lodgepole was salvaged in FY12 and the MPB tree mortality has diminished in this area.

Clear Creek Stewardship: In 2009, the BLM completed a Categorical Exclusion to thin 50 acres on the south shore of Clear Creek Reservoir. A stewardship contract was the tool utilized to complete the project. Fire resilient species including aspen, ponderosa pine and Douglas-fir were favored for retention over the dominant lodgepole pine and over 30 trees under attack by MPB were removed from the project area.

Halfmoon & East Fork Thinning: In 2010 the RGFO completed a Categorical Exclusion to thin less than 70 acres to improve forest health and remove trees killed by MPB. Approximately 10 acres of thinning has been completed in the Halfmoon project area. An agreement for private access into the East Fork project is being developed.

Forest Types: There are a wide variety of forest types found throughout the project area (*Figures 4, 5 & 6- Forest Cover Type Maps*). On the whole, tree species found within the area are hardy, drought tolerant trees that are well suited to the landscape. Forest management recommendations to ensure optimum tree health include providing adequate space, water, and

avoid the wounding of trees. Generally an overcrowded forest is more susceptible to catastrophic wildfire, insect infestations, and disease.

The forests in Lake County are dominated by spruce and lodgepole pine. These forests lack forest age class diversity. These forests' ages are the result of historic timber harvests when minerals were discovered around Leadville, Colorado. Late seral closed canopy stands with very little understory dominate the area. There are very few early seral stands in the forests around Leadville. The forests in Chaffee County are dominated by pinyon pine, ponderosa pine and mixed conifer. The ponderosa pine can be found mixed with Douglas-fir and these forests are typically referred to as mixed conifer stands. These forests are all about the same age due to historic timber harvests when minerals were discovered in the region. The proposed treatments for projects in both counties, with focus on age class diversity and density reduction will create a healthier forest with greater resilience to disturbance.

Tree Species Characteristics:

Engelmann and Blue spruce are the dominant species in the highest elevations of the project area. These species generally grow in cool, humid climates with long cold winters and short cool summers. These trees are large, growing from 60 to 80 feet in height, and sometimes reaching up to 30 inches in diameter. Engelmann spruce usually dominates the drier sites, whereas blue spruce tends towards the wetter sites, along riparian corridors or near springs. They are both considered a shallow rooted species subjecting them to wind-throw along ridges or when stands have been heavily thinned. The historic spruce fire regime can be characterized as stand replacing with long term frequency of 100 to 400 years. Engelmann and blue spruce have thin bark, a characteristic of a fire intolerant species. Spruce is considered shade tolerant and tends to encroach upon aspen and shade intolerant conifers. These trees are considered long lived, living beyond 500 years of age.

There are several silviculture practices recommended to invigorate, protect and ensure the future of spruce stands. The first is group selection or small patch cutting which would mimic the natural fire regime of small stand replacing fires. Group selection is considered an uneven-aged regeneration method and patch cutting is considered an even-aged regeneration method. These treatments create small openings in the stand that provide partial shade favorable for the establishment of a new age class of trees. Intermediate treatments such as thinning, sanitation and salvage are commonly utilized in spruce stands. These are designed to enhance growth, quality, vigor, and composition of the stands between regeneration periods. Salvage is the recovery of dead or damaged trees. Salvage clears the forest of dead and downed trees, decreasing wildfire intensity. Sanitation is the removal of infected or infested trees, to minimize future loss. By targeting diseased trees, sanitation protects the existing and future forests from increased tree mortality. All treatments in spruce stands near ridges will consider the wind-throw potential of these species. By utilizing treatments outlined above, the result will be a healthier, less fire prone, diversified forest.

Quaking Aspen is found throughout all elevations of the project area. Aspen is portrayed as an excellent indicator of ecological integrity as well as landscape health (Kay 1991). This species generally grows in cool climates with moderate precipitation and long winters that are not

excessively cold. Aspen trees grow in clones, which are trees with the same genetics interconnected by the root system. These aspen clones can survive on a landscape for thousands of years. Aspen is known for coppice reproduction or sprouting from the roots, with very little reproduction from seed. Aspen is an early seral species, doing well after a wildfire, mechanized treatments or other forest disturbances. They have thin bark resulting in mortality of the bole or main stem from a wildfire. Aspen stands do not burn well but respond positively following a fire, as stated above, by sprouting prolifically. The historic aspen fire regime can be characterized as mixed severity fires with intermediate frequency of 30-100 years. This species is extremely shade intolerant and generally wind-firm. Aspen is considered a short lived species, with the upper stems beginning to naturally die around 200 years of age. Aspen-dominated sites are considered to be high in biodiversity – second only to riparian areas on western sites (Kay 1997). Aspen is extremely valuable for aesthetic reasons.

Foresters believe that the aspen die-off and decline seen throughout Colorado is related to drought, disease, age, browsing, conifer encroachment, and the lack of recent disturbance. Forest inventories completed by the RGFO forestry program reveal typical stocking rates of between 300 and 3000 trees per acre, which are contributing to the species decline. By mechanically treating these areas the BLM believes that the vigor and vitality of aspen stands can be maintained and increased.

Research completed by the USFS Rocky Mountain Research Station estimates a 49% decline in acres that were historically dominated by aspen within Colorado. Western aspen exist in primarily three different types: (1) Stable, (2) successional to conifers, and (3) decadent stand and are defined below:

Stable is considered to be “properly functioning” and replacing itself. In many instances, these clones exist with a “skirt” or “fairy ring” of young regeneration around the edge and numerous sized stems in the interior. The stems are of various ages that resulted from pulses of regeneration that occurred at various times in the past. Generally, an individual standing near a stable clone has difficulty seeing into or through it.

Succeeding to Conifer are aspen responding to natural forces. Aspen is considered a disturbance species perpetuated on site by fire, disease, or other such occurrences. Some of these forces (primarily fire) have been altered by human intervention, which has given shade-tolerant conifers a marked advantage. We see numerous situations where aspen are being replaced by less desirable vegetation subalpine fir or sagebrush. In turn, these conversions are modifying the sites dramatically. In most areas of the West, these modified aspen clones should be given top priority for restoration.

Decadent Stands are generally of a single age and are very open; mature trees are not being replaced as they die because successful regeneration is lacking. Most of the clones attempt to reproduce, but the new shoots are consumed primarily by wild or domestic ungulates. Clonal vigor is reduced as these regeneration events occur year after year. Fewer and fewer suckers are produced and in some areas the old clones are lost from the system (Bartos, 2001).

All three of the different types of aspen stands can be found in the project area. Treatments are likely to be concentrated in the aspen succeeding to conifer type. Decadent clones will not be treated and may be fenced to protect them from wild or domestic ungulates. Stable aspen will only be treated to improve age class diversity.

There are several consequences of conifers replacing aspen in the project area. First there is a considerable loss in forage production. Secondly there is a potential for a decrease in water yields. Harper et al. (1981) reported a decrease of 5% and Gifford et al. (1984) predicted a decrease of from 3 to 7 inches in water yields when conifer replaces aspen. Aspen stands also serve as shaded fuelbreaks, typically when a crown wildfire moves into an aspen stands it drops to the forest floor where it is easiest to control. Finally, important wildlife habitat will be lost.

Aspen is considered a keystone species, and aspen communities are critical for maintaining biodiversity in western landscapes. Restoration treatments were implemented in four aspen stands in 1999 using mechanical equipment to remove competing conifers to enhanced aspen growth. As a result of this effort, there was a significant increase in total aspen stem density and a marked improvement in two of three aspen regeneration size classes for treated stands compared to controls. The results demonstrate that mechanical removal of conifers is an effective treatment for restoring aspen (Jones et al. 2005). The Spruce Basin fuel break in the RGFO lies approximately 3 miles south of Jack Hall Mountain. This is another good example, adjacent to the proposed project site, of a successful mechanical treatment in a stand of aspen with mixed conifer where aspen was favored for retention and conifers were removed with little damage to the reserve trees. As a result of this treatment there are currently several thousand new aspen sprouts. The retention of aspen will also provide fuel breaks within the forest landscape.

Common Silviculture in aspen stands includes patch cutting which mimics the natural fire regime. This type of treatment involves the removal of all stems from a designated treatment area resulting in the sprouting of a new age class of trees from the root system. This treatment would create multiple age classes which improves diversity, edge environment, and early seral habitat. Some aspen stands would be subjected to restoration treatment whereby all conifers would be removed from aspen stands. This treatment would improve the health and vigor of the remaining aspen.

Figure 11. Conifer encroachment into aspen on Jack Hall Mountain, Bureau of Land Management-Royal Gorge Field Office, 2006.



Douglas-fir can be found in small pure stands, mixed with other conifer species, and sometimes with aspen in the mid elevations of the project area. This tree species is considered a large tree reaching 80 feet in height and up to 3 feet in diameter. It is a long-lived tree living up to 400 years. Douglas-fir is well adapted to wildfire with its thick bark and deep roots make it relatively resistant to wind-throw. The historic Douglas-fir fire regime can be characterized as mixed severity with intermediate frequency of 30-100 years and typically kept the percentage of this cover type at a lower level primarily confined to moist north-facing slopes that were typically home to low intensity fires. This tree species is considered to be moderately shade tolerant and reasonably drought tolerant. There are numerous stands in the RGFO where Douglas-fir is found mixed with ponderosa pine and other conifer species. In the project area a majority of these stands contain only Douglas-fir regeneration or other more shade tolerant species and very little

ponderosa pine regeneration. This is due to Douglas-fir's moderate shade tolerance and ponderosa pines' shade intolerance. A reduction in the forest canopy would favor ponderosa pine over the more shade tolerant Douglas-fir. Douglas-fir is considered to be the climax species in the absence of disturbance on the moister sites in the project area.

Silviculture treatments in Douglas-fir stands are likely to include restoration treatment which would mimic the natural fire regime. Restoration treatments involve thinning from below to reduce stand densities while protecting the largest, healthiest trees, and maintaining a representation of all sizes classes. Small dense patches within the treatment units would be reserved and activity groups and small openings would be created to maintain stand variability. Patch or seed tree harvests, 3 to 10 acres, may be implemented to increase age class diversity in this forest type.

Lodgepole pine is found in pure stands mixed with other conifer species or with aspen. This is considered a medium size tree reaching 75 feet in height and up to 20 inches in diameter. The historic lodgepole pine fire regime can be characterized as stand replacing with long term frequency of 100 to 400 years. This species has thin bark and usually will not survive a surface wildfire. Its wildfire adaptation is its serotinous cones, requiring the heat from a wildfire for the cone to open and disperse seed. It can live for up to 500 years and reaches maturity around 200 years. Lodgepole pine is considered shade intolerant and not very drought tolerant. This species is considered wind-firm on good sites, but often occupies shallow soils or high water tables where it is susceptible to wind-throw.

Common silviculture practices in Lodgepole pine stands include clear-cutting or patch cutting, which mimics the natural fire regime. Intermediate treatments include thinning, sanitation and salvage. Treatments in lodgepole stands near ridges will consider this species wind-throw potential.

Ponderosa pine is one of the most common tree species found throughout the project area. It is found in pure stands or mixed with other species including Douglas-fir, pinyon pine, and Rocky Mountain juniper. It is a large tree that can grow 3 feet in diameter and over 80 feet in height. Ponderosa pine trees can typically live for 300 to 600 years. Currently, the trees in the project area average around 100-120 years old, so these trees are relatively young. Ponderosa pine survives well on south facing slopes due to its drought tolerance and deep rooting characteristic. This tree species has many fire-resistant characteristics including thick bark, high crown base heights, thick bud scales, and the tendency for the meristems to be shielded by needles. The historic ponderosa pine fire regime can be characterized as a low intensity surface fire and mixed severity fire regime, with moderately frequent (0-35 year) fire return intervals. These frequent surface fires would have created openings in the forest canopy, maintained a variety of tree size and age classes, and kept tree densities low. Ponderosa pine is considered the climax species on droughty soils. Natural disturbances such as wildfire, insect infestations, and disease outbreaks often favor the shade intolerant ponderosa pine over more shade tolerant species such as Douglas-fir.

Common silviculture in ponderosa stands would include forest restoration treatment which would mimic the natural fire regime. Restoration treatments involve thinning from below to

reduce stand densities while protecting the largest, healthiest trees and maintaining a representation of all sizes classes. Small dense patches within the treatment units would be reserved as no activity groups and small openings would be created to maintain stand variability. Trees under attack or killed by MPB and dwarf mistletoe would be selected for removal, because these contribute to most of the ponderosa pine mortality within the RGFO.

Mixed conifer stands consist mainly of Douglas-fir, spruce, lodgepole pine, pinyon pine and Ponderosa pine. Many of the stands in the project area are considered mixed conifer forests. Treatments would involve small patch cutting and thinning to improve tree vigor and age class diversity. These treatments would maintain a representation of all species for diversity purposes but would favor the tree species most resilient to wildfire and other disturbances. Reserve tree retention density and species would vary by site conditions.

Pinyon pine and juniper woodlands are commonly referred to as pinyon-juniper or PJ woodlands. These tree species are hardy drought tolerant trees that are well suited to the landscape. It is believed that the pinyon-juniper woodlands were historically restricted to sites that did not readily burn, mainly the sites with shallow soils and rocky ridges. Today many of the more productive sites have become encroached and overgrown with small pinyon and juniper trees. This is due to the lack of disturbance, mainly through fire suppression, and dense growth habit of the pinyon/juniper woodlands. There are too many trees per acre competing for limited nutrients, water and sunlight. These dense pinyon-juniper stands are highly susceptible to an uncontrollable crown fire. There are probably a greater proportion of the pinyon and juniper trees found throughout much of the project area today than would have existed under historical disturbance regimes. The Pinyon Ips beetle is currently killing many mature pinyon in the RGFO. The Pinyon Ips beetle population is considered an epidemic at this time in the PJ woodlands around Canon City, Colorado. Pinyon and juniper woodland treatments include thinning and small patch cutting to improve woodland health.

Other Less Common Species found in the project area are limber pine, bristlecone pine, subalpine fir, and narrow leaf cottonwood. These species are less common than those listed above and typically would be reserved unless infested with dwarf mistletoe or under attack by bark beetles.

Insect and Disease: Although sometimes viewed by humans as catastrophic, outbreaks of native forest insects are natural events. Native insect outbreaks are only a problem when they conflict with values that humans have for an area (i.e. recreation, wildlife habitat, scenic beauty, wood production or property values). Bark beetle populations are on the rise in forested areas of the western U.S. The increase in beetle populations is caused by two factors present in Colorado, large areas with mature trees in dense stands and trees stressed by drought. High levels of forest insect activity will likely continue if current conditions do not improve (USFS, Forest Health Protection 2006).

Since Bark beetles typically attack the larger trees there are forest management activities that can be done to reduce the risk of bark beetle attack, however these management activities must be implemented before the beetles attack, because once a tree has been successfully attacked

nothing can be done to save the tree. More importantly, there is very little that can be done once bark beetle populations reach epidemic levels.

Mountain Pine Beetle (MPB) are one of the most destructive and active bark beetles in the State of Colorado. This beetle attacks lodgepole pine, ponderosa pine, and limber pine. They are known to inflict heavy damage to stagnated overstocked stands. MPB impacts are increasing in the higher elevation sites within Colorado, with mortality occurring as high as 10,000 feet. This expansion is likely due to recent warmer summers, winters, and possibly global warming (CSFS 2004). Silvicultural strategies to reduce tree losses from MPB attacks typically seek to reduce relative densities in order to increase tree resistance and vigor. The current MPB population in the project area is considered endemic.

The Douglas-fir bark beetle has been active, attacking individual and small clumps of trees, throughout the RGFO and project area. The Douglas-fir beetle typically attacks the mid to upper bole of the tree. Infestations often occur in larger trees damaged by wind-throw, fire scorch, or defoliating insects. Management of stands to prevent or minimize damage is the best methods of control. Therefore mature and over mature stands should be harvested and younger stands should be thinned to maintain vigorous growth and reduce moisture stress.

The spruce bark beetle has been active in many parts of the State of Colorado. Field reconnaissance indicates that the spruce beetle epidemic on the Rio Grande National Forest has moved into Chaffee and Fremont Counties. Typically the spruce beetle infests wind-throw or down trees but the current infestation is in standing green spruce. Endemic populations develop to epidemic proportions in wind-thrown trees and then spread to standing trees when sufficient wind-thrown trees are not available to absorb the subsequent population (Schmid and Frye, 1977). Spruce beetle may attack standing trees ranging from 4-inch to >30-inch Diameter Breast Height (DBH) but rarely attack a tree <4-inch DBH. This could prove catastrophic given the relative even aged stands present in the project area. If preventative silviculture activities are not conducted, then even age stands will become more conducive to spruce beetle epidemics (Schmid & Mata, 1996). Utah recently experienced a spruce beetle epidemic that killed 90% of the mature, relatively, even aged spruce stands in the state. Thinned stands with mixed aged classes will provide trees for the future whereas the even aged stands will show significant mortality. Therefore, thinning in areas with infrequent fire regimes provide a hedge against complete beetle destruction.

Pinyon Ips beetle has been extremely active in the forests around Canon City, Colorado. Since 2011 this bark beetle has progressively increased and currently small pockets of mortality can be found in nearly every drainage or mountain within the RGFO.

Dwarf Mistletoe is a native parasitic plant that attacks trees of all sizes and affects all conifer species. Impacts from mistletoe include the formation of witch's brooms in the crowns and branches, reduced tree growth and seed production, and increased susceptibility to insect attack, root disease and storm damage (CSFS, 2004). Clear-cutting is the most effective means of eradicating mistletoe from a stand. Thinning is likely to spread mistletoe unless all of the infected trees are removed.

Environmental Effects

Proposed Action

Implementation of forest management projects in the planning area are intended to manage for healthy forests, reduce fuel loadings, and improve wildlife habitat and range conditions on public lands. Most of the stands within the planning area have too many trees per acre to be sustainable for the long term. There are areas in the Mason Gulch, Iron Mountain, Missionary Ridge, and Hayman wildfires that were forested prior to these large wildfires that will not have forests for hundreds of years due to the distance to the nearest seed source for tree regeneration. Reducing tree densities, but protecting some of the larger and healthier trees will contribute towards creating healthy and resilient forests. Most of the planning area has stands of approximately the same age and by creating areas suitable for the establishment of new seedlings, age class diversity would be improved. The appropriate mitigations are included under the proposed action.

The proposed treatments will also aid in herbaceous ground cover production that will benefit wildlife and livestock grazing. In places where fire has been a fundamental feature over time, many plants and animals are adapted to and depend on fire's effects (USFS, 2005). An assessment of the project area showed moderately high herbaceous production where the sunlight reached the forest floor and low production where a high percentage of tree canopy closure had occurred. Currently, there is a moderate to heavy amount of dead-and-down wood and litter/duff layer present on the forest floor. Forest research clearly indicates a decrease in understory abundance and diversity with an increase in the forest canopy. Past treatment areas throughout the RGFO reveal a positive understory response to the reduction of forest canopy. Therefore, the creation of age class diversity and thinning of stands allows more sunlight to reach the canopy floor, which promotes the growth of herbaceous ground cover. The increase in herbaceous ground cover benefits the surrounding watersheds, by slowing down runoff, and increasing forage.

All pre-commercial thinning projects proposing to remove trees over 8 inches and greater will require an analysis documenting why commercial size wood is being cut and left on site.

Mitigation: The following are recommended mitigations for an area prior to or currently under bark beetle attack.

1. Remove all trees currently under bark beetle attack. Each tree under attack has the potential to release a new generation of beetles the following year that can kill an additional 4 to 5 trees.
2. Remove or burn all activity slash greater than 4 inches in diameter and any recent blow down.
3. Avoid damaging of trees by knocking bark off the bole with machinery.
4. Thin dense stands leaving the most healthy and vigorous trees.
5. Increase age and species diversity to enhance stand resistance and resiliency.

No Action Alternative

Forest health in the area will continue to decline as trees compete for limited nutrients and soil moisture. Bark beetle activity is expected to increase as forests mature, tree densities increase and drought intensifies. Fuels loads and chances of a catastrophic wildfire will continue to increase. Wildlife habitat will continue to decline as are those species that need open forest habitat. Wildlife within the Rocky Mountains evolved with disturbance, mainly wildfire, and the opportunity to create openings and improve forage will be lost under this alternative.

3.6 CUMULATIVE IMPACTS SUMMARY

The proposed treatment methods are expected to have a positive influence on the impacts to air, as treatments will reduce the potential for catastrophic wildfire, which would produce greater emissions than the preventative prescribed fire regimes.

Within the 6th level watersheds of the planning area, there are currently many activities that affect soils including grazing, mining, residential development, forest health and recreation. The addition of the proposed treatments would have a minor positive additional impact to the watersheds overall soil resources in the future; however the amount would be immeasurable at the watershed scale.

Numerous vegetation projects have occurred in recent years on BLM managed lands: Four Elk Prescribed burn (2010, 58 acres), Cache Creek mountain pine beetle suppression and salvage (2011, 246 acres), Clear Creek Reservoir salvage and restoration thinning (2008, 47 acres), East Fork thinning and mistletoe sanitation project (2010, 62 acres). However, considering the scale of the proposed action, the completed projects represent less one percent (0.2%) of BLM lands within the analysis area. The treatment schedule is projected to occur over several years and in many different areas within the planning area. If treatments are small and widely distributed over the landscape, cumulative impacts will be minimal.

There have been numerous small to large scale vegetation treatments on National Forest within Lake and Chaffee Counties (Salida and Leadville Ranger Districts) throughout the last ten years. Projects include mechanical treatments, commercial timber sales, prescribed broadcast burns and slash pile burning within primarily ponderosa pine and lodgepole pine forests. Some of these past projects areas overlap with the proposed area analyzed within this document. They include: Westside (2001, 12,000 ac), Box Creek (2005, 6,000 ac), North Trout ((2007, 15,000 ac), Cree Creek (2008, 1400 ac), Little Annie (2008, 1000 ac), Spruce Creek (2007, 900 ac), O'Haver (2006, 800 ac), and Longs Gulch (2002, 500 ac). This is not a complete list but indicates that thousands of acres on National Forest have been treated over the last ten + years.

Implementation of prescribed burning and forest thinning is still occurring within Westside, North Trout, Spruce Creek and O'Haver and several other sites have planning in process (Tennessee Creek, Poncha Loop, etc.). Over 50% of the National Forest adjacent to BLM Lands proposed for treatment with this Environment Analysis has had previous treatment or has plans for treatment in the future. These areas were removed from the project mapping efforts and will not be treated again.

Several vegetation treatments similar to what is proposed have occurred throughout the analysis area over the last twelve years. For the most part these projects have been small in scale and scattered over this time period and area. The proposed action limits the amount of treatable acres per year and treatment locations would be spread throughout the analysis area. Therefore the cumulative impacts would be negligible.

These projects are cumulative to other disturbances in the upper basin of the Arkansas River. By themselves all treatments however are small, with only short term, nearly immeasurable impacts.

Adverse significant impacts to paleontological resources can be reduced to a negligible level through mitigation of ground disturbing activities. It is possible that the proposed project would have the beneficial impact that ground disturbance activities might result in the discovery of important fossil resources.

CHAPTER 4 - CONSULTATION AND COORDINATION

4.1 LIST OF PREPARERS AND PARTICIPANTS

Please see Interdisciplinary Team Review list for BLM Participants

4.2 TRIBES, INDIVIDUALS, ORGANIZATIONS, OR AGENCIES CONSULTED

United States Forest Service-San Isabel National Forest
Salida Ranger District
Leadville Ranger District

Colorado Parks and Wildlife

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Finding Of No Significant Impact (FONSI)

DOI-BLM-CO-200-2013-0050 EA

Based on review of the EA and the supporting documents, I have determined that the project is not a major federal action and will not have a significant effect on the quality of the human environment, individually or cumulatively with other actions in the general area. No environmental effects from any alternative assessed or evaluated meet the definition of significance in context or intensity, as defined by 43 CFR 1508.27. Therefore, an environmental impact statement is not required. This finding is based on the context and intensity of the project as described below:

RATIONALE:

Context: Colorado's forests are disturbance driven; they are dependent upon change for maintenance and renewal. Fires, insect and disease outbreaks, and forest management can add diversity and resiliency to forest stands or bring about entirely new forests from old ones. Historically, fires have occurred naturally throughout the Rocky Mountain West and have played an important ecological role in maintaining the function and pattern of the vegetation on the landscape. Fires have played a role in reducing natural fuel build-ups, along with maintaining forest health and wildlife habitats. During the settlement of the area most of the larger trees were removed for railroad transportation, building infrastructure, and to provide heat. However, these actions created a relatively even-aged forest throughout the planning area with a majority of old growth trees removed. Over time, fire suppression and grazing have interrupted the natural frequency and intensity of fires, allowing forests to become over-populated with smaller trees. Smaller trees are generally less fire resistant and provide a ladder for fire to move into the canopy.

Additionally, while vegetation treatment projects have occurred within the analysis area, they are limited in size and scope. Dense forest canopies have shaded out early seral shrubs and grasses that provide browse and forage for many ungulates. As a result, vigor of quality browse and forage plant species has been reduced, lowering carrying capacities of wild ungulates on the landscape. The lack of disturbance has reduced winter range browse and forage quantity and quality, negatively impacting ungulate populations.

This is a joint umbrella environmental assessment between Bureau of Land Management-Royal Gorge Field Office (RGFO) and San Isabel National Forest (FS) that will cover a range of vegetation treatment methods within the analysis area while viewing the planning area as a contiguous landscape. The analysis area includes RGFO managed land located within Chaffee County and Lake County and FS managed lands located within a two mile buffer of RGFO managed lands in Lake and Chaffee Counties (special designated areas such as Areas of Critical Environmental Concern, state park managed lands (i.e. Arkansas Headwaters Recreational

Areas), Wilderness Study Areas or areas found to have wilderness characteristics were excluded from the proposed action).

The benefit of an umbrella assessment is that treatment effects will be analyzed at a landscape level, rather than individual pieces. The project is designed to benefit resources managed by the wildlife, range, forestry and fuels programs. Therefore, each program has specific objectives to achieve while planning projects based on the proposed action. While projects are designed to benefit the lead program, many of the objectives achieved will benefit multiple programs. Projects completed through this multi-program approach will cumulatively restore, maintain, and enhance vegetative conditions through actions integrated with other uses of public lands, through coordination with other programs, the States, and through direct habitat improvement projects.

Intensity:

I have considered the potential intensity/severity of the impacts anticipated from the Vegetation Manipulation Management: Chaffee and Lake County Planning Project decision relative to each of the ten areas suggested for consideration by the CEQ. With regard to each:

Impacts that may be beneficial and adverse:

The Proposed Action and prescribed burns implemented under it could cause temporary degradation of air quality resulting from prescribed burns, pile burning, and road dust. However, prescribed fire treatments in the Proposed Action would be effective for reducing fuel loadings, with generally lower fire intensity producing lower emissions than would be produced under wildfire conditions. Use of these treatments would reduce the potential for future, higher emission wildfires.

The Proposed Action would have varying degrees of impact to the soils. The largest impact would come from the large mechanical equipment working on steeper slopes. These types of equipment tend to generate a large amount of ground disturbance and can compact the soil. Soil compaction is a function of soil texture, soil moisture, the compaction force, and the number of passes made by heavy equipment. Conditions under which prescribed fires are set maintain a low to moderate intensity fire that tends to not be so hot that they sterilize the soil. This type of burning releases nutrients back into the soil for vegetation to use, essentially speeding up the nutrient cycling process. Pile burning can generate large amounts of heat in one spot that can sterilize the soil to the point where vegetation does not regrow for several years. The Proposed Action contains mitigation to keep the piles small so that this is minimized. Typically with the size of piles proposed, vegetation will begin to grow back within one or two growing seasons.

The Proposed Action would have a positive and beneficial impact to herbaceous vegetation especially in areas where invasion of woodland trees and shrubs are occurring and displacing the herbaceous vegetation. Opening the canopy and reducing competition for light and water will promote an environment that favors the growth of grasses, forbs and shrubs. The treated areas will promote plant diversity, enhance forest health, and increase forage production.

Treatment work described in the Proposed Action has the potential to alter runoff and sediment reaching drainages and into the associated wetland and riparian areas. This could lead to channel instability and a deterioration of conditions if work is completed without precautions. The Proposed Action however has mitigation that would protect riparian resources through limiting heavy equipment work outside of riparian areas and limiting the times (avoiding when saturated) work is proposed.

The primary risk to the aquatic environment from fuels work is the potential to spread aquatic nuisance species or introduce hazardous substances through chemical spills. Nuisance species could include pathogen hosts or exotic plants \ nuisance weed species. This risk is continual with many land use activities but can be minimized by using only washed equipment and avoiding working close to water. Risk is minimally changed from what recreation and other administrative uses induce. Outside the short term impacts of working when conditions are wet, which would be avoided, the treatments areas as outlined in the maps presented should have no long term impact to the aquatic habitat or wildlife in this region.

Although temporary and short-term, terrestrial wildlife would be displaced from the project sites due to the use of heavy machinery. In the long-term, wildlife would benefit from vegetation manipulation projects. Implementation of forest management projects in the planning area are intended to manage for healthy forests, reduce fuel loadings on public lands, create openings in the forest canopy, and improve wildlife habitat. Projects that reduce tree density tend to increase grass and shrub species causing an increase in available browse and forage for wild ungulates. These treatments are designed to increase edge effect, improving habitat diversity.

Vegetation treatments generally are completed with the goal of thinning forest stand density, to recreate historical stand structure that was altered by fire suppression. However, more recently, forest ecologists have emphasized the lack of knowledge regarding historical stand structure and disturbance regimes. Likely, some forest stands are dense with near closed canopies, while others are savanna-like that are being invaded by tree species. The diversity of the forest bird community throughout the range of the project area is likely tied to this diversity in forest structure. Furthermore, bird communities (species assemblages) are likely reflecting these variations in stand structure. A shift in vegetation structure and composition from vegetation treatments potentially will alter the species composition and abundance of birds within treated areas.

During operations while crews and vehicles are in a project area there would be a change in social setting due to the increase in traffic and noise. The extent of this impact would be variable depending upon the exact project area in relation to recreation use and the nature of the project. This could result in displaced recreation use during operations and a decrease in user satisfaction for that particular visit. This would generally be short term and spread throughout the project area. Once completed impacts to recreation would be minimal and most visitors would not be negatively impacted.

Projects occurring in lands found to have wilderness characteristics would impact opportunities for solitude during operations but would be short term in duration. Although no permanent roads would be established through the proposed action there would be impacts to naturalness that would be longer term in duration as treated vegetation breaks down and evidence of treatments naturalize over time. Eventually natural appearing conditions would return and there would be no permanent impact to lands found to have wilderness characteristics.

Implementing vegetation treatments on the pinyon-juniper and big sagebrush within grazing allotments will promote forage production where it is currently declining. Grazing use patterns will improve on the allotments and reduce livestock concentration areas.

Implementation of forest management projects in the planning area are intended to manage for healthy forests, reduce fuel loadings, improve wildlife habitat and range conditions on public lands. Past treatment areas throughout the RGFO reveal a positive understory response to the reduction of forest canopy. Therefore, the creation of age class diversity and thinning of stands allows more sunlight to reach the canopy floor, which promotes the growth of herbaceous ground cover. The increase in herbaceous ground cover benefits the surrounding watersheds, by slowing down runoff, and increasing forage.

Public health and safety:

The Proposed Action will reduce the amount of canopy fuels therefore improving firefighter safety and the potential to protect nearby residences from future wildfires.

Unique characteristics of the geographic area:

The environmental assessment evaluated the area of the proposed action and determined that no unique geographic characteristics such as: wild and scenic rivers, prime or unique farmlands, Areas of Critical Environmental Concern or designated wilderness areas or wilderness study areas will be affected.

Degree to which effects are likely to be highly controversial:

There is no potential for controversy with the effects of the proposed action or disagreement or controversy among ID team members or reviewers over the nature of the effects on the resource values on public land by the proposed action.

Degree to which effects are highly uncertain or involve unique or unknown risks:

The effects of the proposed action are not highly uncertain and do not involved unique or unknown risks. Vegetation treatments as described in the assessment have occurred commonly on Bureau of Land Management- Royal Gorge Field Office managed lands.

Consideration of whether the action may establish a precedent for future actions with significant impacts:

This decision is like one of many that have previously been made and will continue to be made by BLM responsible officials regarding vegetation management on public lands.

The decision is within the scope of the Resource Management Plan and is not expected to establish a precedent for future actions. The decision does not represent a decision in principle about a future consideration.

Consideration of whether the action is related to other actions with cumulatively significant impacts:

Several vegetation treatments similar to what is proposed have occurred throughout the analysis area in the past. For the most part these projects have been small in scale and scattered over this time period and area. The proposed action limits the amount of treatable acres per year and treatment locations would be spread throughout the analysis area. Therefore the cumulative impacts would be negligible.

Scientific, cultural or historical resources, including those listed in or eligible for listing in the National Register of Historic Places:

The proposed action will not have an impact on these resources. However, treatments tiered from this document will have potential for direct and indirect effects to cultural resources. The umbrella assessment does not outline specific project locations, but does require future analysis of cultural resources once locations are identified. Until specific areas are identified for treatment, effects on historic properties cannot be definitively assessed.

Threatened and endangered species and their critical habitat:

The proposed action will not have an impact on these resources. However, treatments tiered from this document will have potential for direct and indirect effects to threatened and endangered species resources. If a project is designed in threatened and endangered species habitat, Endangered Species Act Section 7 consultation will be required. Protective measures developed during this process must be imposed in accordance to federal law.

Any effects that threaten a violation of Federal, State or local law or requirements imposed for the protection of the environment: The proposed action conforms with the provisions of NEPA (U.S.C. 4321-4346) and FLPMA (43 U.S.C. 1701 et seq.) and is compliant with the Clean Water Act and The Clean Air Act, the National Historic Preservation Act, Migratory Bird Treaty Act (MBTA) and the Endangered Species Act.

NAME OF PREPARER: Matthew Rustand

SUPERVISORY REVIEW: Melissa K.S. Garcia

NAME OF ENVIRONMENTAL COORDINATOR: /s/ Martin Weimer

DATE: 3/31/14

SIGNATURE OF AUTHORIZED OFFICIAL: /s/ Jay M. Raiford
for Keith E. Berger, Field Manager

DATE SIGNED: 4/1/14

APPENDICES:
ATTACHMENTS:

**UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ROYAL GORGE FIELD OFFICE**

DECISION RECORD

**Vegetation Manipulation Management: Chaffee and Lake County Planning
DOI-BLM-CO-200-2013-0050-EA**

DECISION: It is my decision to authorize the Proposed Action as described in the attached EA. The planning and environmental analysis for this project was a joint effort between the Bureau of Land Management (BLM) and the United States Forest Service (USFS). Each agency is responsible for issuing the appropriate decision document. This decision record applies to the BLM portion of the project.

The proposed action is to complete an umbrella environmental assessment that will cover a wide range of vegetation treatment types on select Bureau of Land. The assessment is limited to the selected lands located in Lake and Chaffee Counties. This project would be a long term investment in vegetation management and would require monitoring and periodic maintenance to retain its effectiveness. Prescribed burning could take place in mechanically treated areas and possibly areas that are too difficult to treat by mechanical methods. Mechanical treatments are likely to include tree spades, feller-bunchers, skidders, mowers, dixie harrow and/or similar equipment. The machines used in mechanical treatments are typically limited to slopes of less than 35%. Hand treatments are likely to occur where mechanized equipment cannot access primarily due to slope and topography, although other circumstances may arise.

This is an umbrella environmental assessment that will cover a range of vegetation treatment methods within the analysis area while viewing the planning area as a contiguous landscape. The benefit of an umbrella assessment is that treatment affects will be analyzed at a landscape level, rather than individual pieces. The project is designed to benefit resources managed by the wildlife, range, forestry and fuels programs. Therefore, each program has specific objectives to achieve while planning projects based on the proposed action. While projects are designed to benefit the lead program, many of the objectives achieved will benefit multiple programs.

The United States Forest Service and Colorado Parks and Wildlife were involved in the development of the proposed action. A press release was issued May 1, 2013 describing the proposed action; however, no comments were received.

This office completed an Environmental Assessment and reached a Finding of No Significant Impact. However, this decision is contingent on meeting all mitigation measures and monitoring requirements listed below.

RATIONALE: The proposed action will provide a tool that ensures optimum population and a natural abundance and diversity of all natural resources on public lands. Projects completed through this multi-program approach will cumulatively restore, maintain, and enhance vegetative conditions through actions integrated with other uses of public lands, through coordination with other programs, the States, and through direct habitat improvement projects.

MITIGATION MEASURES\MONITORING: The following mitigation measures/monitoring provisions must be followed:

1. All machinery will be washed prior to being brought on site. The disturbed areas will be inspected and treated as needed for noxious weeds for two growing seasons after the project is completed.
2. Large machinery for mechanical treatment will stay more than 50 feet from riparian and wetland areas and not work off road when ground conditions are saturated. When possible, work by large machinery will be conducted when the ground is frozen. When treatments occur within SMZs, slash will be kept out of the SMZ and directional falling of trees away from the SMZ will be required.
3. Fueling of machinery will be conducted at designated fueling sites. No more fuel than is necessary for daily operations will be stored on site. If fuel volumes in excess of 25 gallons are released to the environment in a spill, the BLM project administrator will be notified and appropriate cleanup measures taken.
4. Mechanical treatments will not take place on slopes greater than 35%.
5. Minimize off-road travel while performing and supervising the operations. New vehicular travel routes will be rehabilitated and closed, especially where they connect to the existing roads and trails. Existing roads and trails will be used as much as possible by agency and contractor personnel to eliminate development of new routes and trails.
6. Slash piles will not exceed 20 feet in diameter by 15 feet in height, and will be located where they can be burned effectively in suitable weather conditions while not threatening the crown of reserve vegetation.
7. Projects will be designed to blend with topographic forms and existing vegetation patterns to screen the project as much as possible.
8. All prescribed fire use would be coordinated with the Colorado Department of Public Health and Environment's Division of Air Quality. There would be strict adherence to the State Smoke Permit issued for the project to insure protection of the State Standard for Air Quality. Smoke from prescribed fire use will be monitored. All burn plans will contain a monitoring plan. Monitoring may consist of visually tracking smoke plumes by persons on the ground or in aircraft and by installing PM10/2.5 particulate monitors at sensitive receptors.

9. Any associated claim markers encountered during project implementation cannot be disturbed, as they are private property. Minerals within the proposed project area are open to entry and development under regulations codified at 43 CFR 3809. If work on active claims is required, the project proponent will need to coordinate with the claimant regarding potentially restricted access, disturbance to the mineral resource, mining operations and reclamation of disturbed areas.
10. If a project is designed in threatened or endangered species habitat, Endangered Species Act Section 7 consultation will be required. Protective measures developed during this process must be imposed in accordance to federal law.
11. A survey for Townsend's big-eared bat habitat (mines/adits) will be conducted prior to project work. If habitat is located, a buffer of 250 feet around adits with potential bat habitat should protect the colony from disturbance without the additional requirement of a seasonal restriction.
12. Where habitat exists, surveys for Northern Goshawks will be conducted. Exclude from all management activities, those portions of any stand to be treated within 0.125 miles of any known northern goshawk nest tree. Maintain a minimum stand average of 75% canopy closure on stands to be treated within 0.5 miles of any known northern goshawk nest tree.
13. Surveys for peregrine falcons nest will be conducted if suitable habitat is located within one half mile of a project area and if work is to occur from March 16 to July 31. The purpose of the mitigation is to protect peregrine cliff nesting complexes. An exception may be granted once the nest is abandoned.
14. Surveys will be conducted to locate occurrences of Royal Gorge stickleaf, Brandegees wild buckwheat, dwarf milkweed, and golden blazing star if suitable habitat exists. If possible, areas where these plants are located will be avoided.
15. Seasonal restrictions may be necessary to protect the birthing periods of big game species (generally April 1 to July 15) if the projects are developed within historically used birthing areas as delineated by Colorado Parks and Wildlife. Partial exceptions to the seasonal restriction may be granted if circumstances warrant. Exceptions will be limited to the first two weeks and last two weeks of the restriction period.
16. If projects occur in areas delineated as big game winter range by Colorado Parks and Wildlife, seasonal restrictions will be necessary (December 1 to April 30). An exception may be granted based on climatic conditions or if the winter range habitat is unsuitable or unoccupied during winter months.
17. In ponderosa pine and mixed conifer habitats, surveys will be completed to detect raptor nests and roosts and migratory bird cavity nest sites. Raptor nests and roosts will be protected from harvest and damage during project implementation. Trees that contain cavity nests will be retained.

18. To be in compliance with the Migratory Bird Treaty Act (MBTA) and the Memorandum of Understanding between BLM and USFWS required by Executive Order 13186, BLM must avoid actions, where possible, that result in a “take” of migratory birds. Pursuant to BLM Instruction Memorandum 2008-050, to reduce impacts to Birds of Conservation Concern (BCC), no habitat disturbance (removal of vegetation such as timber, brush, or grass) is allowed during the periods of May 15 - July 15, the breeding and brood rearing season for most Colorado migratory birds. The provision will not apply to completion activities in disturbed areas that were initiated prior to May 15 and continue into the 60-day period. An exception to this timing limitation will be granted if nesting surveys conducted no more than one week prior to vegetation-disturbing activities indicate no nesting within 30 meters (100 feet) of the area to be disturbed. Surveys shall be conducted by a qualified breeding bird surveyor between sunrise and 10:00 a.m. under favorable conditions.
19. Because no cultural resources inventories have been completed and historic properties have not yet been found, it is not possible to identify specific mitigation measures. However, BLM has developed the following process for evaluation of impacts:
 1. BLM will conduct Class II (sample) inventories for all proposed mechanical vegetation treatment requests in order to identify historic properties that might be affected. If the Class II inventory indicates that historic properties are located within the area of potential effect, and likely to be impacted by the proposed action, a Class III (100 percent) intensive pedestrian inventory will be conducted.
 2. BLM will conduct Class III (100 percent) inventories for all proposed prescribed burn vegetation treatment requests in order to identify historic properties that might be affected.
 3. If previously-recorded historic properties are located in the area of potential effect, BLM will analyze the impact of the undertaking on the historic properties, including a field visit if necessary.
 4. If historic properties in the area of potential effect cannot be avoided, BLM will prepare a plan to mitigate the effects of the vegetation treatment. SHPO concurrence with BLM’s mitigation plan will be required before the weed treatment commences. The range of possible mitigation activities possible is quite large, but a non-exhaustive list includes avoidance (always the first choice), testing, excavation (salvage, partial, or total) and data recovery in the form of archival recording (for standing structures and other historic-era phenomena).
20. Cultural Resource Specialists will work with vegetation/fire management and planners to determine the type and loading of fuels in order to obtain estimates of potential fuel

consumption and surface and subsurface temperatures and determine how these combinations could affect cultural materials.

21. Vegetation Treatment/Fire Managers will avoid burning heavy fuel accumulations in the vicinity of culturally sensitive sites and/or areas and hand remove standing, dead fuels to prevent tip-up and tree fall, and minimize or prevent the burning of stumps, shrubs, and brush in the vicinity of culturally sensitive sites and/or areas.
22. The operator must notify the BLM RGFO immediately if any vertebrate fossils or their traces are discovered during operations. Operations may continue as long as the fossil specimen would not be damaged or destroyed by the activity. Within 5 working days of notification, the BLM RGFO shall evaluate or have evaluated such discoveries and shall notify the operator what action shall be taken with respect to such discoveries.
23. Public notice should be provided for projects occurring in high value recreation areas during high use seasons.
24. Prescribed fire projects will avoid and/or protect in advance constructed facilities and inhabited areas.
25. Prior to use of the “Dixie Harrow”, the agency conducting the operation will identify any underground utilities in the area and notify the ROW holder to determine if any additional precautions are needed to prevent damage to the authorized facilities or disruption of the authorized use.
26. Prior to issuing a contract for commercial harvesting and removal of forest products, the agency responsible for the contract would assess access and other needs to determine if additional rights-of-way or other authorizations to cross or use public land are required to conduct the activity.
27. Contract stipulations addressing fences and gates will be addressed for range allotment management purposes.
28. If needed, consultation with Colorado Parks and Wildlife will occur for recently treated areas regarding the allocation of additional forage and/or application of temporary grazing restrictions.
29. Close coordination with the grazing permittee must occur during site specific planning.
30. The RGFO will reserve the right to impose additional timing restrictions based on concerns related to bark beetle infestations. When possible, work in piñon/juniper forest type will take place between September 1st and April 1st to avoid the Ips bark beetle flight period, avoiding increased beetle activity within and adjacent to treatment areas.
31. Local research will be conducted to locate private survey records that apply to the project area.

APPENDIX A – DESCRIPTION OF FOREST TREATMENT PRESCRIPTIONS

A.1 Conifer restoration thinning

An intermediate treatment to reduce stand density (Figure 11). Objectives are to enhance forest health, improve plant growth and assist in the recover from mortality. This prescription involves retaining large trees, while removing some smaller and all unhealthy large trees (small crown ratios, insect infested, or diseased). A representation of all species and age classes will be reserved to maintain stand structure and diversity. However, fire adapted tree species, those characterized by thick bark, deep root systems, and a higher crown base height, will be selected over other less fire adapted species. Reserve tree densities will vary by species based on site conditions and estimated historic fire regime. The typical reserve tree densities will vary from 50 to 100 trees per acre. One-half to 1 acre openings will be created in unhealthy tree patches to promote herbaceous and sapling growth. Conifer restoration thinning opens the canopy, thins overstocked stands, maintains wildlife snags and down woody debris, and promotes vigor, all indicators of a healthy forest.

Figure 11. Soapy Hill Project conifer restoration thinning completed in 2012, Bureau of Land Management-Royal Gorge Field Office.



A.2 Aspen restoration thinning

An intermediate treatment to reduce stand density (Figure 12). Objectives are to enhance forest health, improve plant growth and assist in the recover from mortality. This prescription will concentrate on the removal of most conifers such as Douglas-fir, spruce and lodgepole pine, regardless of their size, encroaching into aspen stands. The removal of encroaching conifer will improve aspen vigor by providing additional soil moisture during dry periods. Multi-age aspen trees will be retained to ensure aspen age class diversity. The retained aspen reserve tree density will depend on the number and size of trees in each treatment stand. Small pockets of conifers, less than ½ acre in size, that exhibit good wildlife hiding cover characteristics will be retained within aspen stands. The result of this treatment, as evidenced by similar treatments within the BLM Royal Gorge Field Office, will likely be suckering or a flush of new sprouts from the roots of the aspen clone creating a second age class of aspen.

Figure 12. Aspen restoration thinning at Spruce Basin, Bureau of Land Management-Royal Gorge Field Office.



A.3 Patch cutting or clear-cutting

An even-aged stand regeneration treatment (Figure 13). This prescription will focus on the removal of all large trees in 5 to 10 acre groups. This treatment will be utilized in all forest types depending on the site specific project objectives. The treatment prescription is useful in dense

lodgepole forest that create a monoculture of lodgepole pine with very little understory, essentially creating a biological desert. Patch cutting or group selection will increase forest age class diversity and early seral wildlife habitat, two important healthy forest indicators. Treatment areas will be designed for wildlife benefit by keeping them away from open roads, feathering the edges, and varying size and shape. Given the relatively small size patches, the likelihood of any large scars on the landscape is minimal. This treatment requires regeneration or the establishment of trees within 15 years after tree removal.

Figure 13. The Jack Hall II project completed 2013 as an example of patch and clear-cutting, Bureau of Land Management-Royal Gorge Field Office.



A.4 Group selection

An uneven-aged regeneration stand treatment (Figure 14). This prescription will focus on the removal of all large trees in one to five acre groups. The treatment creates small openings in the stand that over time will naturally regenerate. This action results in an uneven-aged stand with a complex stand structure. The group or opening size is based on the existing stand tree heights and potential seed dispersal of species present. Many wildlife species profit from the combination of environmental conditions existing along the boundaries between very young

groups and older trees (Smith 1986). This treatment requires regeneration or the establishment of trees within 15 years after tree removal.

Figure 14. An example of group selection, Bureau of Land Management-Royal Gorge Field Office.



A.5 Meadow restoration

A treatment that involves removing all trees in an area that was historically believed to be a meadow or grassy open park (Figure 15). This prescription will focus on removing all trees in areas identified as meadow prior to fire suppression. Typically this treatment involves removing small trees, less than eight inches in diameter. In many areas the historic boundary between meadows and forested stands can be located on the ground by locating tie-hack stumps, cut with axes and cross-cut saws in the 1800's.

Figure 15. An example of an area where ponderosa pine is encroaching on a meadow in the Tallahassee area which would likely be targeted for meadow restoration treatment, Bureau of



A.6 Seed tree with reserves

An even-aged stand regeneration treatment (Figure 16). This prescription involves reserving 15 to 20 of the healthiest, best seed producing trees per acre to provide a natural seed source throughout the treatment area. Typically, the most fire-adapted trees such as ponderosa pine or Douglas-fir will be reserved; less fire resilient trees will be harvested. This type of treatment, again following the theme of the proposed action, improves the action area's forest age class diversity, and provides early seral wildlife habitat. Seedlings from the carefully selected seed trees should establish within 5 to 15 years after this activity. The selection and reservation of seed trees, followed by a site preparation prescribed burn, assures a healthy diversified forest in the future.

Figure 16. An example of a seed tree with reserves treatment, Bureau of Land Management-Royal Gorge Field Office.



A.7 Pre-commercial

An intermediate treatment to reduce stand density. Objectives are to enhance forest health, improve plant growth and assist in the recover from mortality. This prescription removes small trees (usually less than 8 inches in diameter) in all conifer forest types. Typically trees removed have no or little commercial value. This treatment will be utilized where access and/or slope limits mechanical equipment and/or in stands where there is the need to only remove small trees to meet density objectives. This treatment typically involves thinning with chainsaws and piling or lop and scattering of woody materials. If tree sizes are suitable and there is public motorized access, fuel wood may be removed through public use or commercial sales. The utilization of hand thinning techniques allows thinning of small diameter trees in thick stands and steep slopes, thereby creating a more diversified forest.

A.8 Salvage

A treatment that involves the removal of dead or dying trees to recover value and reduce fuel loads (Figure 17). Typically the prescription is to remove trees previously killed and/or currently under attack by bark beetles. This prescription will remove heavy fuels or large diameter wood

from the site reducing future wildfire severity and intensity, improve forest aesthetics by removing a portion of the standing dead trees, improve wildlife habitat, and provide a desirable forest product. Green trees currently infested will release a new generation of beetles the following summer. Each new generation of bark beetles that emerges from one tree is likely to kill an additional 4 to 5 trees. Salvage may also include trees that had previously died as a result of wildfire, blow-down event or other forest disturbance that causes large-scale tree mortality. Trees will likely be salvaged by commercial firewood harvesters, or those interested in house logs. The work is likely to be performed with chainsaws, small tractors, pickup trucks, trailers or small log hauling trucks on slopes less than 35%.

Figure 17. An example of lodgepole pine salvage (mortality due to mountain pine beetles) in the Cache Creek Project, Bureau of Land Management-Royal Gorge Field Office.

