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

# Environmental Assessment

## Royal Gorge Field Office Fire and Fuels Management Planning

DOI-BLM-CO-F020-2014-0047 EA

December 2015

# TABLE OF CONTENTS

CHAPTER 1 - INTRODUCTION ..... 3
1.1 IDENTIFYING INFORMATION ..... 3
1.2 INTRODUCTION AND BACKGROUND ..... 3
1.3 PURPOSE AND NEED ..... 4
1.4 DECISION TO BE MADE ..... 7
1.5 PLAN CONFORMANCE REVIEW ..... 7
1.6 SCOPING, PUBLIC INVOLVEMENT AND ISSUES ..... 12
CHAPTER 2 - PROPOSED ACTION AND ALTERNATIVES ..... 13
2.1 INTRODUCTION ..... 13
2.2 ALTERNATIVES ANALYZED IN DETAIL ..... 15
2.2.1 Proposed Action ..... 15
2.2.2 No Action Alternative ..... 19
2.2.3 Alternatives ..... 20
2.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL ..... 20
CHAPTER 3 - AFFECTED ENVIRONMENT AND EFFECTS ..... 20
3.1 INTRODUCTION ..... 20
3.1.1 Interdisciplinary Team Review ..... 21
3.2 PHYSICAL RESOURCES ..... 23
3.2.1 Air Quality and Climate ..... 23
3.2.3 Soils (Includes a Finding on Standard 1) ..... 25
3.2.4 Water (Surface and Floodplains) (Includes a Finding on Standard 5) ..... 28
3.3 BIOLOGICAL RESOURCES ..... 31
3.3.1 Invasive Plants* ..... 31
3.3.2 Threatened, Endangered and Sensitive Species ..... 32
3.3.3 Vegetation (Includes a Finding on Standard 3) ..... 80
3.3.4 Wetlands & Riparian Zones (Includes a Finding on Standard 2) ..... 88
3.3.5 Wildlife Aquatic (Includes a Finding on Standard 3) ..... 90
3.3.6 Wildlife Terrestrial (Includes a Finding on Standard 3) ..... 91
3.3.7 Migratory Birds ..... 97
3.4 HERITAGE RESOURCES AND HUMAN ENVIRONMENT ..... 102
3.4.1 Cultural Resources ..... 102
3.4.2 Native American Religious Concerns ..... 108
3.4.5 Economic ..... 108
3.5 LAND RESOURCES ..... 110
3.5.1 Forest Management ..... 110
3.5.5 Range Management ..... 114
3.6 CUMULATIVE IMPACTS SUMMARY ..... 126
CHAPTER 4 - CONSULTATION AND COORDINATION ..... 129
4.1 List of Preparers and Participants ..... 129
4.2 Tribes, Individuals, Organizations, or Agencies Consulted ..... 129
CHAPTER 5 - REFERENCES ..... 130
FINDING OF NO SIGNIFICANT IMPACT ..... 139
DECISION RECORD ..... 145

# CHAPTER 1 - INTRODUCTION

## 1.1 IDENTIFYING INFORMATION

CASEFILE/PROJECT NUMBER (optional):

PROJECT TITLE: Royal Gorge Field Office Fire and Fuels Management Planning

PLANNING UNIT:

LEGAL DESCRIPTION: All BLM lands within the Royal Gorge Field Office boundary

APLLICANT: BLM

## 1.2 INTRODUCTION AND BACKGROUND

BACKGROUND:

The first fire management plan (FMP) was developed in 2001 for the Royal Gorge Field Office. Several revisions, changes, and updates have been made to the FMP to stay current and consistent with new guidance and policies. Since the original Royal Gorge Fire Management plan and National Environmental Policy Act (NEPA) analysis were completed, federal fire policy has changed to give managers a more flexible approach and a broader view of fire management. This change in policy allows managers to go away from the current management under the A, B, C, and D polygons where each fire is categorized and managed in the way each category allows, and instead allows managers to assess the area and ecological conditions, and consider where fire effects can be beneficial over the landscape.

The Federal Wildland Fire Management Policy (FWFMP) was developed by the secretaries of the Departments of Interior and Agriculture in 1995 in response to the dramatic increases in the frequency, size, and catastrophic nature of wildfires in the United States. In 2001, a review and update of the 1995 FWFMP occurred, and it included findings, guiding principles, policy statements, and implementation actions. This update replaced the 1995 FWFMP. The 2001 FWFMP required land managers to have an approved Fire Management Plan (FMP) for all BLM lands with burnable vegetation. The FWFMP provided fundamentals to the success of the federal wildland fire management program and the implementation of review recommendations. These umbrella principles compel each agency to review its policies to ensure compatibility.

Since the development of the 2001 FWFMP, several changes and revisions have been made to consolidate and clarify policy changes that have occurred since the strategy document was issued. Most recently, in February 2009, the Guidance for the Implementation of Federal

Wildland Fire Management Policy was released. The policy directs federal agencies to achieve a balance between suppression; protection of life, property, and natural resources; and the use of wildland fire for resource benefit, to regulate fuels, and maintain healthy ecosystems. This policy also requires periodic reviews and updates to the FMP. These reviews are necessary to keep up with changing policy, changes in management needs, changes in the public/private land interface, Wildland Urban Interface (WUI), and environmental conditions.

To be in compliance with fire policy, FMP development was initiated in the Royal Gorge Field office in February 1997. The FMP was written to comply with the 1995 Federal Wildland Fire Management Policy. The initial NEPA analysis for the current FMP was competed in 2001 through an interdisciplinary process that began with the involvement of resource specialists and interagency partners. The FMP that was produced served as a guide for the management of wildland and prescribed fires as a natural process and as a tool to incorporate the role of fire as an essential ecological process and natural disturbance agent. The FMP is reviewed annually in the Royal Gorge Field Office. After a recent review of the current FMP, it was determined that landscape and ecological conditions, values at risk, policy, and management direction have changed enough to warrant a new NEPA analysis document to develop a FMP that can serve as a tool for managing naturally ignited fires for resource benefit if conditions are suitable. It can also help managers by identifying priority areas where the utilization of prescribed fire, mechanical, chemical and biological vegetation treatments can be used to reduce the severity of a wildfire or to facilitate the management of naturally ignited wildfires to achieve desired conditions on the landscape. This FMP will be designed to provide for firefighter and public health and safety, and it will include fire management strategies, tactics and alternatives that can be utilized to meet resource management objectives, and to protect resource values. Objectives, goals, resource and fire management constraints, values, and strategies will be developed and incorporated based on resource management direction contained within the Royal Gorge Resource Management Plan planning area and the Northeast Area Resource Management Plan planning area.

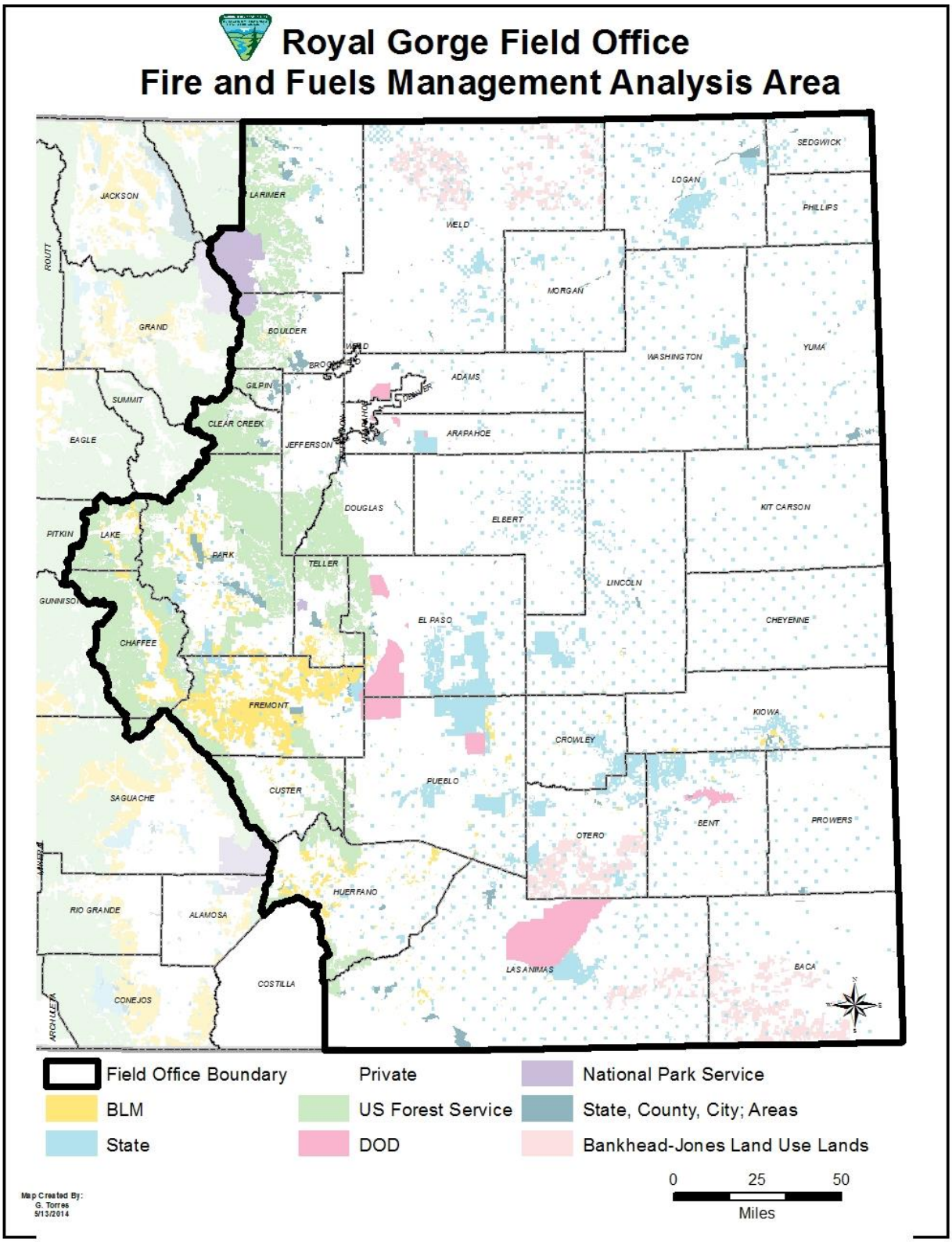
This change in policy, and change in management direction requires additional analysis to ensure that the new FMP revision will be in compliance with federal fire policy and with the decisions in the Resource Management Plans for the Royal Gorge Field Office.

## 1.3 PURPOSE AND NEED

The analysis area for this EA includes all of the BLM lands within the Royal Gorge Field office boundary (see Figure 1). This EA serves as the analysis for managing wildfires to achieve a balance between suppression, the protection of life, property, natural resources, and the management of wildland fire for resource benefit, to regulate fuels, and maintain healthy ecosystems and vegetation conditions. Through this analysis, the current Fire Management Plan will be revised so that it is compliant with national and interagency direction. This EA also serves as a programmatic analysis for vegetation treatments and prescribed fire projects to reduce

fuels to lower the intensity and severity of wildfires on the landscape and to improve ecological conditions. Vegetation treatments can alter fuel arrangements and amounts to give fire managers more options to deploy alternative suppression tactics if necessary. Prescribed fire is a tool that can be used to bring back an important ecological disturbance agent that shaped the landscapes for thousands of years prior to fire suppression. This would give general direction to guide vegetation treatments and help coordinate them with other agencies where possible. A future site-specific document that complies with the National Environmental Policy Act would be written for each vegetation treatment incorporating this document by reference.

The need for this environmental analysis is driven by The Federal Wildland Fire Management Policy (FWFMP) that was developed by the secretaries of the Departments of Interior and Agriculture in 1995 and revised in 2001in response to the dramatic increases in the frequency, size, and catastrophic nature of wildfires in the United States. Most recently in 2009 the Guidance for the Implementation of Federal Wildland Fire Management Policy has provided additional direction for fire management. In addition to the fire management initiatives, the revision is also driven by policy and directives for fire management relative to vegetation, forest health and other resource values as described in the 1996 Royal Gorge Resource Area Resource Management Plan and the 1986 Northeast Resource Area Northeast Resource Management Plan.


Royal Gorge Field Office
Fire and Fuels Management Analysis Area
JACKSON
LARIMER
WELD
LOGAN
SEDGWICK
PHILLIPS
ROUTT
MORGAN
GRAND
BOULDER
BROOMFIELD
WASHINGTON
YUMA
GILPIN
ADAMS
SUMMIT
CLEAR CREEK
EAGLE
JEFFERSON
ARAPAHOE
DOUGLAS
ELBERT
KIT CARSON
PITKIN
LAKE
PARK
TELLER
LINCOLN
GUNNISON
EL PASO
CHEYENNE
CHAFFEE
FREMONT
KIOWA
CROWLEY
CUSTER
PUEBLO
SAGUACHE
BENT
PROWERS
OTERO
HUERFANO
RIO GRANDE
ALAMOSA
LAS ANIMAS
BACA
COSTILLA
CONEJOS
Field Office Boundary
Private
National Park Service
BLM
US Forest Service
State, County, City; Areas
State
DOD
Bankhead-Jones Land Use Lands
0
25
50
Miles
Map Created By:
G. Torres
5/13/2014

## 1.4 DECISION TO BE MADE

The BLM will decide whether to implement the proposed actions for managing and prioritizing wildland fire, and implementing vegetation treatments for hazardous fuel reduction and resource benefit within the Royal Gorge Field Office. This EA will analyze the management of and response to wildland fire. It will also analyze the use of vegetation treatments on BLM lands within the Royal Gorge Field Office boundary according to the decisions made in both the Royal Gorge RMP and the Northeast RMP. The proposed vegetation treatments include prescribed fire, mechanical, chemical and biological treatments that can alter fuel conditions and arrangement to reduce the risk and severity of wildfires. Managed fire along with vegetation treatments can be utilized to improve vegetation conditions to make the landscape more resilient to disturbance and sustainable. The BLM may choose to: a) implement the actions as proposed, b) implement the proposed actions with modifications/mitigation, c) implement an alternative to the proposed actions, or d) not implement the proposed actions. Based on the analysis contained in this Environmental Assessment (EA), the Royal Gorge Field Office Fire Management Plan will be updated to be in compliance with current fire policy.

## 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 Area Resource Management Plan and Final Environmental Impact Statement

  Date Approved: May 1996

  Decision Number: 1-1, 1-14, 1-16, 1-67, 2-1, 2-13, 2-15, 2-56, 3-1, 3-13, 3-15, 4-1, 4-12, 4-14, 5-1, 5-15, 5-17, 5-71, 6-1, 6-12, 6-55, 7-1, 7-14, 7-60, 8-1, 8-12 , 9-1, 10-1, 10-12
  The Following are Decisions Common to all units: C-25, C-27, C-63, C-65, C-66, C-73, C-168

  Decision Language:

- Vegetation management will be as follows:
  -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;
  -Desired Plant Condition objectives will be developed for all Integrated Activity Plans (IAPs);
  -vegetation monitoring will be accomplished on an interdisciplinary basis.
- Productive forested lands will be managed for sustained yield
- Conflicts between wildlife habitat and other values e.g., grazing, mineral development, etc., will be resolved in favor of achieving vegetation management goals.

- All or portions of Browns Canyon, Mosquito Pass, Grape Creek, Arkansas Canyonlands, Droney Gulch, Garden Park, Phantom Canyon, Beaver Creek, Grape Creek, are designated as ACECs and will be managed to protect and enhance their special values.
    - These designated ACECs will receive special management as follows:
      -timber harvesting and wood gathering will be allowed only for enhancement of protected values
- **C-25-Prescribed fire and prescribed natural fire could be used as a management tool to enhance other resources
- Prepare a specific burn plan, including NEPA documentation , in advance of a prescribed burn
- Manage uses in areas with special status plants in compliance with the Endangered Species Act.
- Avoid actions that further jeopardize listed and sensitive species and enhance these species when possible as directed by the Endangered Species Act.
- Determine desired plant community in vegetation manipulation areas to enhance habitat for the species
- Manage any designated wilderness areas in accordance with BLM and Congressional directives.

**1997 Royal Gorge Resource Management Plan Amendment: Changed Decision C-25 to include prescribed natural fire as a management tool to enhance other resources. This Amendment was completed to clarify that fire prescriptions may be written for natural ignitions also. This change was implemented from the analysis done at the Environmental Assessment on Standards for Public land Health and Guidelines for Livestock Grazing Management in Colorado (approved in a Decision Record on 02/03/1997.

- Name of Plan:
    - Northeast Resource Area Northeast Resource Management Plan

  Date Approved: September 1986

  Decision Number/Page: Timber and Firewood (Issue 4, page 9), Wild Fire (Issue 10, page 11), Prescribed Burning (Issue 11, page 11), Pest Control (Issue 24, page 18)

  Decision Language:

  **Issue 4: Timber and Firewood**
  There are several small BLM parcels scattered throughout the Northeast RMP planning area. Each of the parcels will fall into one of the categories (decisions) associated with each issue.

  Forest product sales will continue on areas identified for forest management to meet demand and maintain forest productivity. All BLM administered surface estate is classified in one of four categories based on timber production capability classifications (TPCC) inventory and resource conflicts. Available

(4A) - There are 2,270 acres suitable as intensively managed commercial forest lands available for timber harvesting. These include two forest inventory classes; non-problem and restricted. Non-problem areas are easily managed for timber production and restricted areas will require special consideration for management. The forest management objective for these productive sites is to provide a sustainable timber harvest through the limits of a yearly allowable cut. Harvesting will be accomplished through controlled timber sales to commercial loggers and family firewood cutters. Cutting practices will be limited to those providing for natural regeneration of the timber stand and protection of site productivity.

Unavailable (4B) - Currently 15,570 acres suitable as less intensively managed commercial forest lands are unavailable for general timber harvesting. These include two forest inventory classes; withdrawn-fragile gradient and adverse location. Withdrawn-fragile gradient lands have shallow, droughty, steep, and easily erodible soils. Adverse location results from small size, steep slopes, and fragile soils. The forest management objective is to protect these productive lands from fire, pests, and disease until local technology is available to include them for harvest in the yearly allowable cut. The forest management objective will include direct pest control, mortality salvage, fire control, and controlled harvest by firewood cutters.

Noncommercial (4C) - There are 800 acres suitable as less intensively managed noncommercial forest lands unavailable for general timber harvesting. These include the forest inventory class withdrawn-low site. These sites produce less than 20 cubic feet of wood per acre per year. The forest management objective is to protect these unproductive, fragile lands from loss of forest cover. Forest management will be limited to direct pest control, mortality salvage, and limited and controlled harvest by firewood cutters.

Nonforest (4D) - There are 18,450 acres of land less than 10 percent stocked with commercial tree species. Generally, any management of trees will be for the purpose of improving or maintaining other resource values. Implementation of the forestry program is in accordance with a 5-year timber sale plan. This timber sale plan is updated each year by the area forester. The plan is based on information gained from forest inventories, demand for specific types of forest products by varying user groups, and limitations set by wildlife and visual resource specialists. In addition to the 5-year plan, small unplanned sales of forest products may be needed to accomplish specific goals such as fire, insect, or diseases salvage. Present management units in the 5-year timber sale plan in priority are:
811 NW Empire T.3S., R.74W., Sec. 20
808 Alps Mountain T.4S., R.73W., Sec. 6
808 Alps Mountain T.4S., R.73W., Sec. 5
817 Graymont T.4S., R.75W., Sets. 16 & 21
602 Ward T.lN., R.74W., Sets. 1 & 12
809 Silver Mountain T.3S., R.74W., Sec. 25
809 Silver Mountain T.4S., R.74W., Sec. 4
904 Crooked Top Mountain T.6S., R.73W., Sec. 35

8 12 Mad Creek T.3S., R.74W., Secs. 20 & 29

Priorities can be changed by delays resulting from layout problems, lack of access, public concern, etc. Other units with available acreage may be added during the annual adjustments.

**Issue 10: Wild Fire**
All BLM administered surface estate is in one of two categories, based on the type of wildfire protection needed:
Cooperative (10A) - The prevention and suppression of wildfire is accomplished on 22,520 acres by either a memorandum of understanding or a cooperative agreement. This will include:
Parties involved
Purpose
Authorities
Agreement items and responsibilities
A provision for annual review
A savings clause to cover funding changes or cancellation
Reimbursement clauses defined

Cooperative agreements for wildfire protection will be made immediately and followed until cancellation upon tenure change.

General (10B) - Wildfire protection through a special cooperative agreement is historically not considered necessary for these acres of surface estate because of the rarity of fire occurrence. If a fire occurs reimbursement may be provided to the appropriate suppression agency(s).

**Issue 11: Prescribed Burning**
All acres are in the "Open" category. Proposals for prescribed burning (11 A, B) will be reviewed through the environmental assessment process to determine acceptability and to design the burn project. Criteria used in this review include:

Earlier beneficial successional stage of vegetation
Necessary reduction of fuel hazard
Necessary manipulation of specie composition
Achievable reduction of noxious weeds
No threatened private property
Less fire danger than or equal to Class III (moderate)
Acceptable smoke dispersal and obtainable permit
Full consideration of other resource values

**Issue 24: Pest Management**
When prevention fails, direct control will be taken as areas are identified. All BLM administered surface estate is in the "General" (24A) category. Areas requiring pest control will be identified by: (1) site-specific insect and disease surveys as outlined by

entomology reports form the Rocky Mountain Experimental Station, USFS integrated Pest Management, and BLM; (2) number of acres, location , and species for each infestation; (3) requests for cooperative control. Priority is given to locations near private property, parks, scenic roadways, etc. and when surrounding lands are in jeopardy of being infected.

Actions and restrictions to prevent and protect the forest resource form loss, based on the above requirements, include; Silvicultural methods that manipulate species composition, density, and age to reduce chance of insect or disease infestation. Prompt removal and salvage of diseased trees to prevent further infestations including selective cut, patch cuts, or clear-cuts as directed by sound logging methods.

Application of pesticides as a last resort based on current EPA restrictions on chemicals in accordance with the Federal Insecticide, fungicide, and Rodenticide Act of 1972 (FIFRA).

Introduction of biological control when economically and ecologically feasible: BLM will cooperate with private and public land owners on group projects in controlling noxious weeds on public lands.

**Amendment to Royal Gorge Resource Area RMP and Northeast RMP:**
In January 1997, the Colorado State Office of the BLM approved the Standards for Public Land Health and amended all RMPs in the State including the Royal Gorge Resource Area Resource Management Plan and the Northeast Resource Area Resource Management Plan. 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:

A public scoping effort was initiated in early July 2014 to identify issues and concerns over a 30-day scoping period A scoping letter was distributed to cooperating federal agencies including the Pike and San Isabel National Forest and the Comanche and Cimarron National Grasslands, the Arapaho Roosevelt National Forest, the United States Fish and Wildlife Service, and the Bureau of Reclamation. State agencies, including Colorado State Forest Service, Colorado Parks and Wildlife, and Colorado Department of Fire Prevention and Control were included on the scoping list. Scoping letters were also sent out to the counties with BLM surface ownership within the RGFO field office boundary area. Interest groups were also included on the scoping list.

Additional scoping information about this EA was posted on the Royal Gorge Field Office NEPA website. A press release was also sent out to several local and Front Range media outlets.

Issues Identified:

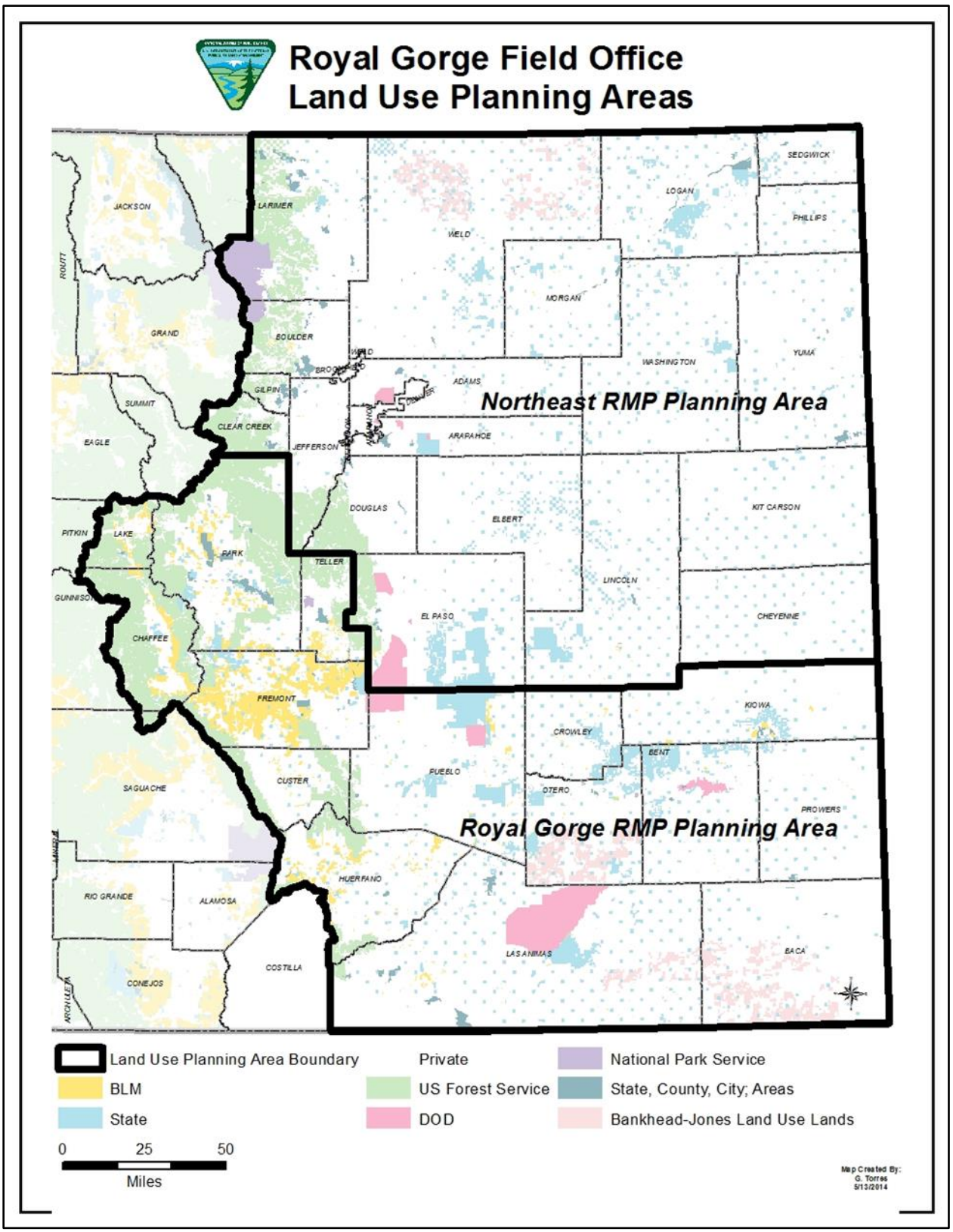
Three comments were received during scoping period. Boulder County Parks and Open Space supported the proposed action. The Colorado State Forest Service-Salida District also supported the proposed action and the approach for developing the Fire Management Plan. Wild Connections (WC), a volunteer organization that is dedicated to protecting biodiversity and the network of wildlands in the Upper Arkansas and South Platte basins of Colorado, provided comment. WC recognized that wildfires are a natural and ineradicable aspect of most western ecosystems, and that undue emphasis on fire suppression can create conditions in which wildfires, when they occur, will be catastrophic. WC's main concern is the potential impact of fire and fuels management on wilderness and potential wilderness areas, and lands with wilderness characteristics (LWC). Their recommendation is for managers to integrate fire and fuels management with the possible designation of such LWC's in the resource management planning process. WC advocates that the fire and fuels management plan should take into account these wilderness characteristics, using let-burn policies, controlled burns, and hand treatment in preference to mechanical treatment methods and managing fuels and fires in a way which would not preclude or hamper designation of these areas as wilderness. These areas are remote and relatively inaccessible, and would seem particularly appropriate for monitoring or minimal suppression activities. It was also recommended that due to the fact that limited funding is available for fuels management, mitigation efforts should be concentrated on areas where human risk to lives and to private or valuable public property is the greatest. Since a large proportion of fires are human-caused, focusing efforts in areas where human activities or human occupancy are the greatest, namely the interface of BLM lands with nonfederal lands, will also aid in fire suppression.

# CHAPTER 2 - PROPOSED ACTION AND ALTERNATIVES

## 2.1 INTRODUCTION

This chapter describes and compares the Proposed Action Alternative and No Action Alternative, and Alternative 1, the full suppression alternative. The Proposed Action complies with Federal Wildland Fire Management Policy (1995 and 2001), and the February 2009 Guidance for the Implementation of Federal Wildland Fire Management Policy. This chapter also incorporates issues identified during the scoping process (see Section 1.6 for these issues). The No Action Alternative represents current fire management direction as directed by the Royal Gorge RMP, the Royal Gorge Field Office FMP 2004, and the Northeast RMP. Alternative 1 is the full suppression alternative meaning that all fires will be suppressed, and no vegetation treatments including prescribed fire, mechanical, chemical, or biological treatments will be implemented.

The analysis area for this EA is all of the BLM lands within the Royal Gorge Field Office boundary. Within the RGFO boundary, there are two Resource Management Plans, the Royal Gorge RMP and the Northeast RMP. **See Figure 2**: **Royal Gorge Field Office Land Use Planning Areas.** Each of these RMPs have planning area boundaries, and within these boundaries, slightly different fire management decisions. Within the Royal Gorge Resource Planning area, a plan amendment occurred in 1997 that allowed for the use of prescribed fire as well as the management of natural ignitions for resource benefit. A similar amendment was not done for the Northeast Resource Management Plan. Under the Northeast RMP planning area prescribed fire is permitted in parcels identified in the “Open” category, but the management of a naturally ignited wildfire is not permitted on BLM parcels.


Royal Gorge Field Office
Land Use Planning Areas
Northeast RMP Planning Area
Royal Gorge RMP Planning Area
JACKSON
LARIMER
WELD
LOGAN
SEDGWICK
PHILLIPS
ROUTT
GRAND
BOULDER
MORGAN
WASHINGTON
YUMA
BROOMFIELD
ADAMS
GILPIN
SUMMIT
CLEAR CREEK
EAGLE
JEFFERSON
ARAPAHOE
DOUGLAS
ELBERT
KIT CARSON
PITKIN
LAKE
PARK
TELLER
LINCOLN
GUNNISON
EL PASO
CHEYENNE
CHAFFEE
FREMONT
KIOWA
CROWLEY
BENT
PUEBLO
SAGUACHE
CUSTER
OTERO
PROWERS
RIO GRANDE
ALAMOSA
HUERFANO
LAS ANIMAS
BACA
COSTILLA
CONEJOS
ARCHULETA
Land Use Planning Area Boundary
BLM
State
Private
US Forest Service
DOD
National Park Service
State, County, City; Areas
Bankhead-Jones Land Use Lands
0
25
50
Miles
Map Created By:
G. Torres
5/13/2014

## 2.2 ALTERNATIVES ANALYZED IN DETAIL

### 2.2.1 Proposed Action

Since the original Royal Gorge Fire Management Plan and NEPA were completed, federal fire policy has changed to give managers a more flexible approach and a broader view of fire management. This change in policy allows managers to go away from the current management under the A, B, C, and D polygons where each fire is categorized and managed in the way each category allows, but instead allowing managers to assess the area and ecological conditions, and consider where fire effects can be beneficial over the landscape.

The proposed action will give fire and fuels managers guidance to facilitate the management of wildfires, fuels, and prescribed fire, and vegetation treatment projects not only for firefighter and public safety, but also to protect key ecological and human values, property, and to manage costs to the local unit. This management is consistent with resource objectives identified in the RMPs, and other plans that have been developed by other BLM programs and local communities in the planning area. The proposed action is to improve ecological conditions to foster more resilient and productive landscapes by improving or maintaining vegetation conditions when appropriate for the site and situation, while still protecting resource values at risk.

**Proposed action for BLM lands within the Royal Gorge RMP planning area:**
A wildland fire is any non-structure fire that occurs in vegetation or natural fuels (NWCG, 2014). Wildland fires include prescribed fire (planned fire), and wildfire (unplanned). Under the proposed action, naturally ignited wildfires in the planning area covered by the 1996 RGFO RMP could potentially be managed for resource benefits (managed wildfires). Each wildfire will be evaluated on a case by case basis to measure potential benefits versus potential risks. Other considerations for managed wildfires include fire intensity level, acreage of public/private land that could be impacted, level of public use, proximity to private residences, communities, and private inholdings and other values at risk, historic fire regimes and current condition class, unique biological, cultural, historical, or archaeological resources, and the potential for non-native species establishment. Special consideration will be given to fires adjacent to private lands where a suppression action will be implemented to reduce the potential of fire spread onto private land unless a cooperative management agreement exists between BLM and the private land owner(s).

The use of resource advisors will be essential to adequately implement the proposed action. The expertise and knowledge of their respective resources will allow management decisions to be made with full use of available data and information while allowing suppression or other management activities to continue without subjecting firefighters and the public to increased risk or excessive cost.

There may be some instances where full or modified suppression tactics, or other response to wildfire procedures, are the only management option due to proximity to values at risk, and firefighter safety. Response to wildfire procedures includes any specific fire suppression actions suitable to meet fire management objectives. Any of these responses or a combination of these

responses can be utilized on a fire at different times. Response to wildfire procedures included as part of the Proposed Action Alternative may include one or more of the following actions:

- Manage from a Distance: Fire situations where inactive fire behavior and low threats or unacceptable risk to firefighters require only periodic assessment.
- Manage On-site: Fire situations that require the physical placement of resources on the fire site to track the fire's spread intensity, and/or characteristics.
- Confinement: Actions taken when fires are likely to have resource benefits or present unacceptable risk to firefighters. Threats from the fire typically do not require costly deployment of large numbers of suppression resources.
- Manage plus Contingency: Fires are managed and contingency actions are developed to ensure adequate preparation for possible developments.
- Manage plus Mitigation: Fires are managed, yet pose real, but not necessarily immediate, threats. These fires are assessed, and plans are developed and implemented to delay, direct, check fire spread, or contain fire, and ensure public safety.
- Initial (Response) Attack: Initially, suppress wildfires to protect people or resource values at risk.
- Full Suppression Fires: A combination of tactics such as direct attack, indirect attack, and confinement by natural or man-made barriers are utilized to accomplish protection objectives and to achieve control of the fire.

In the aftermath of catastrophic wildfires, emergency stabilization (ES) and burned area rehabilitation (BAR) work would take place to improve lands that are unlikely to recover naturally from the effects of wildfires. Emergency stabilization treatments are essential to protecting lives and properties downstream of burned areas. ES activities may include obliteration of fire lines, erosion control, seeding and other administrative activities (closures & signs). ES is only implemented after a wildfire suppression event. ESR would be designed and implemented using an inter-disciplinary team approach, utilizing resource and fire staff to develop site-specific ES plans. The short-term ES objective would be to stabilize soils, reduce potential impacts to health and human safety, and on values at risk (cultural, watershed, fish and wildlife, and any adjacent private holdings), and prevent the establishment of nonnative invasive species. Long-term objectives include further stabilization of sites to assist in the re-establishment of the vegetative community that existed prior to the disturbance.

Managed Wildfire, vegetation treatment, and post fire rehabilitation activities that occur within a WSA will be managed in a manner that is in accordance with BLM Manual 6330-Management of BLM Wilderness Study areas or current policy.

> ….with a suppression method that is least damaging to wilderness values, other resources, and the environment, while requiring the least expenditure of public funds. When managing fire in the WSA, "minimum impact suppression tactics" or "light hand on the land" suppression techniques will be used wherever possible, while providing for the safety of firefighters and the public and meeting fire management objectives. Fire managers should inform suppression personnel during dispatch that the fire is in a WSA and that special constraints may apply to prevent impairment of wilderness characteristics.

Manipulation of vegetation through management-ignited fire, chemical application, mechanical treatment, or human controlled biological means is allowed only where it meets the non-impairment standard or one of the exceptions. Exceptions that may pertain to vegetative treatment include emergencies, the protection or enhancement of wilderness characteristics, grandfathered uses, valid existing rights, and actions taken to recover a federally listed threatened, endangered, or candidate species. Establishing non-native plants is an example of vegetation management that may impair and therefore may not be permitted within a WSA.

Whenever possible, natural processes will be relied on to maintain native vegetation and to influence natural fluctuations in populations. Natural disturbance processes, including fire, insect outbreaks, and droughts, are important functions of the ecosystem. Manipulation of vegetation through management-ignited fire, chemical application, mechanical treatment, or human controlled biological means is allowed only where it meets the non-impairment standard or one of the exceptions. Exceptions that may pertain to vegetative treatment include emergencies, the protection or enhancement of wilderness characteristics, grandfathered uses, valid existing rights, and actions taken to recover a federally listed threatened, endangered, or candidate species

Non-native vegetation that interferes, or has the potential to interfere, with ecosystem processes or function (e.g. non-native annual grasses), may be controlled using the method or combination of methods known to be effective, while causing the least damage to non-target species. Reseeding or planting of native species may be done following weed treatment and fire or other natural disaster as needed where natural seeding is not adequate and to prevent non-native vegetation from becoming dominant.

As an exception to the non-impairment standard, vegetative manipulation in emergency situations may be allowed, e.g. there is no effective alternative for controlling insect and disease outbreaks or fires that threaten lands outside of a WSA. Reseeding or planting of native species may be undertaken following fire or other natural disaster if natural seed sources are not adequate to compete with non-native vegetation or substantial soil loss is expected.

In some instances in the RGFO planning area, prescribed fire, mechanical fuels treatments, biological and chemical treatments may be necessary to alter fuel conditions and arrangement in a way to improve vegetation conditions and to reduce the severity and intensity of a wildfire. These treatments could be used to reduce fuels, to convert vegetation condition classes from a condition class 3 to a condition class 2 or 1, or from a condition class 2 to a condition class 1. These treatments can also be used to maintain past treatment areas that have achieved condition

class 1 status (A full explanation condition classes can be found under the wildfire and fuels management section on page 113).

Prescribed burning activities usually occur during the spring and fall season. Pile burning to remove activity slash from mechanical treatments is usually implemented during the winter months, typically October through March, when there is adequate snow cover on the ground, but pile burning and other burning operations can occur when conditions identified in burn plan are in prescription. These are the typical windows for these activities, but there may be cases where these activities could take place outside of these windows if weather, fuel moisture, and other conditions exist. Fire management staff would initiate prescribed fire projects and burn plans with the input from resource specialists. Prescribed burn bosses and other resource specialists would be required to evaluate and assess the results of the effectiveness of the burn.

Non-fire fuel treatments (mechanical, biological, seeding and chemical) may be considered to achieve desired vegetative and ecological conditions and to reduce hazardous fuels. Suitability of specific areas would be determined through an interdisciplinary process and NEPA requirements must be followed. Mechanical fuel treatments may include hand thinning, hand piling, mastication, mowing, disking, chipping, and bullhog thinning, and other conventional logging methods.

Seeding after the implementation of prescribed fire, and non-fire mechanical, biological, and chemical treatments may be necessary. The purpose of seeding would be to promote the re-establishment of native grasses and forbs, and prevention or reduction of the establishment of invasive or undesired species as well as soil stabilization.

As technology advances, other methods may be utilized to accomplish improved vegetation and ecological conditions. Some non-fire fuel treatments would be used in conjunction with prescribed fire. These treatment methods will be utilized to alter fuel conditions to provide the option to manage a fire where alternate, minimal, or in some cases no suppression actions will be needed.

**Proposed action for BLM lands within the Northeast RMP planning area:**
Wildfires occurring within the Northeast RMP planning area would not be managed for resource benefits. These fires would be managed under the full suppression management option. For the most part, these areas are small, scattered parcels of BLM land that would not be conducive to managed fire due to the land ownership patterns. The main focus in these areas would be mechanical, chemical, or biological vegetation treatments on parcels that have been identified to allow for vegetation treatments in the Northeast RMP. Due to the small acreage of land within the BLM parcels, priority would be given to project areas that could be implemented in a cooperative effort with adjacent land owners. These vegetation treatments would be more effective at reducing the risk and spread of catastrophic wildfire if they are larger and more continuous areas.

### 2.2.2 No Action Alternative

**No action alternative for lands within the Royal Gorge RMP planning area:**
The no action alternative represents current management identified in the 2004 Royal Gorge Fire Management Plan. This alternative only considered lands within the Royal Gorge RMP planning area. Mechanical and prescribed fire vegetation treatments would continue to occur at the current rate. There would still be potential for the management of wildfires for resource benefit as the current FMP outlines. Suppression activities would be consistent with approved suppression activity constraints. Under this alternative, wildfires would be managed according to the A, B, C and D polygons guidance that was developed under the 2004 FMP.

- Category "A" – Fire Management Units are areas where fire is not desired at all. Suppression of all fires will be done utilizing Appropriate Management Response (AMR) with an emphasis on minimizing cost while considering firefighter and public safety, benefits and values to be protected, consistent with resource objectives and based on current conditions and location.

- Category "B" – Fire Management Units are areas where unplanned wild fire is not desired because of current conditions. Appropriate Management Response (AMR) will be utilized to suppress all fires with an emphasis on minimizing cost while considering firefighter and public safety, benefits and values to be protected, being consistent with resource objectives based on current conditions and location. The full range of wildfire and fuels management practices, including prescribed fire, mechanical, cultural, biological or other treatments that will move all affected landscapes toward desired future condition as described in the RG-RMP will be utilized. AMR strategies would be tailored to address areas where plant communities are at risk due to current conditions, season or other ecological constraints.

- Category "C" – Fire Management Units are areas where wildfire is desired but where there are significant constraints that must be considered. Utilize AMR to implement protection objectives in accordance with management objectives based on current conditions and fire location. Implement the full range of wildfire and fuels management practices, including prescribed fire, fire use, mechanical or other treatments that will enhance or maintain desired conditions as described in the RG-RMP. AMR strategies would be tailored to address areas of significant constraints including Areas of Critical Environmental Concern (ACEC), critical habitat for T&E species, areas of soil instability, and areas of other critical resource concern.

- Category "D" – Fire Management Units are areas where wildfire is desired and there are few or no constraints for its use. Utilize AMR to implement fire use objectives in accordance with management objectives based on current conditions and fire location. Wildfire Implementation Plans (WFIP) will be prepared to meet management objectives for fires managed for resource benefits.

Although the No Action Alternative has three of the same goals as the Proposed Action Alternative—protection of life, protection of resources, and cost efficiency—it does not fully incorporate the idea of fire as an ecological process, hazardous fuel treatments to protect

communities and other values at risk, and landscape determinations of fire regime condition class and vegetation condition class as required by policy.

**No action alternative for lands within the Northeast RMP planning area**:
The management direction for wildfires under the Northeast RMP is suppression. These lands were not covered under the 2004 Royal Gorge Fire Management Plan. Vegetation treatments including prescribed fire and mechanical treatments can occur on some parcels that have been identified for those treatments in the RMP. Treatments would continue at the current rate on parcels that have been identified in the Northeast RMP to allow vegetation treatment.

### 2.2.3 Alternatives

**Full Suppression**
Under this alternative, wildfires would be managed under the concept that fire is not desired at all on public lands. All new wildfires will receive aggressive initial attack and would immediately be suppressed in accordance with the Response to Wildfire Procedures and Guidelines. Land use and resource management objectives would receive little consideration in wildfire management strategies. Wildfires would not be used as a management tool to accomplish land use and resource management objectives. Vegetation treatment guidance as described in the proposed action would not be utilized. If vegetation treatments (including managed wildfire, prescribed fire, mechanical, chemical, and biological treatment) do not occur, more fires of undesired intensities will continue. The potential of losing key ecological components and values at risk will increase.

## 2.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

No additional alternative were considered.

# 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.

| **Resource** | **Initial and date** | **Comment or Reason for Dismissal from Analysis** |
|---|---|---|
| **Air Quality**<br>*Ty Webb, Chad Meister, Melissa Hovey* | TW, 9/15/14 | See Air Quality in physical resource section. |
| **Geology/Minerals**<br>*Stephanie Carter, Melissa Smeins* | SSC, 9/23/14 | Geology will not be directly impacted by this proposed action. Active mineral operations and/or unpatented claims cannot be evaluated on this scale and will be looked at on a project by project/incident basis, when possible. |
| **Soils**<br>*John Smeins* | JS, 10/24/14 | See Soils Section 3.2.3. |
| **Water Quality**<br>Surface<br>*John Smeins* | JS, 10/24/14 | See Water Quality Section 3.2.4 |
| **Invasive Plants**<br>*John Lamman* | JL, 11/10/2014 | See Affected Resources Section. |
| **T&E and Sensitive Species**<br>*Matt Rustand* | MR, 12/21/15 | See Affected Resources Sections |
| **Vegetation**<br>*Jeff Williams, Chris Cloninger, John Lamman* | CC, 10/28/14 | See Affected Resources Sections |
| **Wetlands and Riparian**<br>*Dave Gilbert* | DG 10/17/14 | See Affected Resource Section |
| **Wildlife Aquatic**<br>*Dave Gilbert* | DG 10/17/14 | See Affected Resource Section |
| **Wildlife Terrestrial**<br>*Matt Rustand* | MR, 11/21/2014 | See affected environment. |
| **Migratory Birds**<br>*Matt Rustand* | MR, 11/21/2014 | See affected environment. |
| **Cultural Resources**<br>*Monica Weimer, Michael Troyer* | MDT, 11/24/14 | See affected environment |
| **Native American Religious Concerns**<br>*Monica Weimer, Michael Troyer* | MDT, 11/24/14 | See affected environment |

| Resource | Initial and date | Comment or Reason for Dismissal from Analysis |
|---|---|---|
| **Economics**<br>*Martin Weimer* | mw,<br>11/5/15 | See affected environment |
| **Paleontology**<br>*Melissa Smeins, Stephanie Carter* | SSC,<br>9/23/14 | There are paleontological resources present within the proposed project area, however, this project will not have an adverse impact on these resources. |
| **Visual Resources**<br>*Linda Skinner* | LS<br>11/18/14 | Any visual impacts associated with fire and prescribed burns are typically temporary and negligible. Mechanical treatments have a short term negative effect on the aesthetic quality of an area but over time, the long term effects have a positive effect on an area. |
| **Environmental Justice**<br>*Martin Hensley* | mw,<br>11/5/15 | No direct effects would occur to low income or minority populations from the fire plan. Any potential effects from future prescribed burning or fuels manipulation would be evaluated in the project specific NEPA analysis. |
| **Wastes Hazardous or Solid**<br>*Stephanie Carter* | SSC,<br>9/23/14 | Not applicable on this scale. Will be evaluated on a project/incident basis, when possible. |
| **Recreation**<br>*Linda Skinner* | LS<br>11/18/14 | There are recreation areas within the project area. Prescribed fires, managed fires and mechanical treatments may have an effect on some recreational activities but through planning and staff coordination, impacts would be negligible. |
| **Farmlands Prime and Unique**<br>*Jeff Williams, Chris Cloninger, John Lamman* | CC,<br>10/28/14 | There are no Farmlands Prime and Unique within the Fire Management planning units. |
| **Lands and Realty**<br>*Rich Rotte* | RAR,<br>11/17/14 | Not applicable on this scale. There are many uses authorized within the project area of varying types. Will be evaluated on a project/incident basis, when possible |
| **Wilderness, WSAs, ACECs, Wild & Scenic Rivers**<br>*Linda Skinner* | LS<br>11/18/14 | WSAs and ACECs are located within the project area. Will be evaluated on a project/incident basis, when possible. |
| **Wilderness Characteristics**<br>*Linda Skinner* | LS<br>11/18/14 | No new permanent roads would be added, access would be through existing routes or for short term use so impacts are negligible. |
| **Range Management**<br>*Jeff Williams, Chris Cloninger, John Lamman* | CC,<br>10/28/14 | See Affected Resources Sections |
| **Forest Management**<br>*Ken Reed* | KR<br>12/9/14 | See affected environment |
| **Cadastral Survey**<br>*Jeff Covington* | JC<br>12/9/14 | Not applicable on this scale. Will be evaluated on a project/incident basis, when possible. |
| **Noise**<br>*Martin Weimer* | MW,<br>10/13/15 | Short term minor impacts to noise levels from firefighting equipment and vehicles would occur during management of wild fires as well as prescribed treatment activities. |

| Resource | Initial and date | Comment or Reason for Dismissal from Analysis |
|---|---|---|
| **Fire/Fuels**<br>*Glenda Torres* | GT<br>7/10/14 | See Affected Resources Section |
| **Law Enforcement**<br>*Steve Cunningham* | SC<br>11/24/14 | |

The affected resources brought forward for analysis include:

- AIR QUALITY AND CLIMATE
- SOILS
- WATER (SURFACE AND FLOODPLAINS)
- INVASIVE PLANTS
- THREATENED, ENDANGERED AND SENSITIVE SPECIES
- VEGETATION
- WETLANDS & RIPARIAN ZONES
- WILDLIFE AQUATIC
- WILDLIFE TERRESTRIAL
- MIGRATORY BIRDS
- HERITAGE RESOURCES AND HUMAN ENVIRONMENT
- ECONOMIC
- FOREST MANAGEMENT
- RANGE MANAGEMENT
- FIRE_AND FUELS

## 3.2 PHYSICAL RESOURCES

### 3.2.1 Air Quality and Climate

Affected Environment:
Wildland fires, both planned and unplanned, are a potentially significant source of air pollutant emissions because fire is a natural combustion process that releases air pollutants. The amount of emissions depends upon the size and intensity of the fire. Factors influencing the release of emissions include meteorological conditions such as temperature, wind speed/direction, fuel type, moisture content of the fuels, vegetation type, and fuel loading (the mass of combustible material) usually expressed in tons of fuel per acre.

Environmental Effects

Proposed Action

Direct and Indirect Impacts:

Under the proposed action, air quality in the planning area will be positively impacted over the long term. Overall, there will be an increase in acres burned per year. Short term negative impacts will increase due to planned and unplanned ignitions.

Protective/Mitigation Measures:

- Fire managers will cooperate with local land managers and the State of Colorado Air Pollution Control Division to minimize impacts to air quality on local communities.
- The BLM will follow and implement the terms of the interagency Colorado Smoke Management Plan and Memorandum of Understanding (MOU) and obtain site specific smoke permits for all planned ignitions.
- Fire Managers will apply management techniques to minimize smoke production and to enhance smoke dispersion.
- Fire Managers will establish and maintain close communications with state and local agencies regarding the status of managed fires. The general public will be informed of the status of planned and unplanned ignitions and potential smoke impacts through the local press, radio, and television.

Cumulative Impacts:

Continuing the practice of suppressing essentially all wildfires could provide some short term benefit to air quality by eliminating even temporary smoke production as quickly as possible. Preventing periodic fires in the ecosystem has already resulted in unacceptable fuel loads throughout the planning area.

No Action Alternative

Direct and Indirect Impacts:

Under the no action alternative, air quality in the planning area would not be greatly impacted in the short term. Over the long term air quality will be moderately impacted, with some long stretches of good air quality with short to moderate negative impacts due to unplanned ignitions in heavy fuels. Limited areas where unplanned fires can be managed and planned fires can be implemented results in longer impacts from smoke.

- Under the no action alternative, air quality in the planning area will be moderately impacted over the long term. Overall, there will be an increase in acres burned per year. Short term negative impacts will increase due to planned and unplanned ignitions.
- Protective/Mitigation Measures:
- Fire managers will cooperate with local land managers and the State of Colorado to minimize impacts to air quality on local communities.
- The BLM will follow and implement the terms of the interagency Colorado Smoke Management Plan and MOU and obtain site specific smoke permits for all planned ignitions.
- Fire Managers will apply management techniques to minimize smoke production and to enhance smoke dispersion.
- Fire Managers will also establish and maintain close communications with state and local agencies regarding the status of managed fires. The general public will be informed of the status of planned and unplanned ignitions and potential smoke impacts through the local press, radio, and television.

Cumulative Impacts:

Continuing the practice of suppressing essentially all wildfires could provide some short term benefit to air quality by eliminating even temporary smoke production as quickly as possible. Preventing periodic fires in the ecosystem has already resulted in unacceptable fuel loads throughout the planning area, thus extending the smoke impacts to air quality for years to come.

Other Alternative

Direct and Indirect Impacts:

Full Suppression will cause an increase in fuel loadings within the Field Office. The combination of large long duration fires with the heavy fuel loadings will result in negative air quality for communities along the Front Range.

Protective/Mitigation Measures: None foreseen

Cumulative Impacts:

Large long duration fires along the Front Range could have impacts for multiple weeks during the summer time. Impacts to air quality could impacts on social and economic as well as health standards.

### 3.2.3 Soils (Includes a Finding on Standard 1)

Affected Environment:

The planning are covers a vast area of eastern Colorado and numerous soil types are present. To the east are warmer soils generally associated with grasslands, while to the west soils become much rockier, cooler and less developed in the mountainous areas.

**Erosion and Run-off**

Soils may be eroded by water or wind. Water erosion is influenced by the intensity and duration of precipitation, soil texture, soil organic matter, permeability, topography, and vegetation (or artificial) cover. Areas with soils on steep slopes, low infiltration rates, and minimal vegetation cover have the highest erosion hazard. Wind erosion also has the potential to move large volumes of soil and primarily a function of wind velocity and grain size.

Erosion may decrease soil productivity, expose plant roots, impede re-vegetation efforts, and increase sedimentation downstream. Many soils throughout the planning area have features that make reclamation and re-vegetation difficult. These limiting features involve salinity, sodium content, clayey and sandy textures, drought conditions, alkalinity, low organic matter content, shallow depth to bedrock, stones and cobbles, and high wind erosion potential. Certain geological formations tend to form soils that are highly erosive.

**Soil Quality and Health**

The capacity of a soil to sustain plant and animal productivity is related to its inherent physical, biological and chemical properties as well as its current health or condition. Three key attributes of soil and rangeland health have been identified that may assist in assessing the status or health of an area. Site stability relates to the ability of the soil to resist erosion (and loss of nutrients) by wind and water. Hydrologic function is the capacity of the site to capture, store, and safely

release water from rainfall and snowmelt. Biotic integrity is the capacity of a site to support both functional and structural plant, animal, and soil biological communities within the range of variability for that site.

Effects of soil health and erosion are often associated with water quality and wetland/riparian areas. These resources are discussed in the water quality and wetlands and riparian zones sections of this chapter, respectively.

Environmental Effects

Proposed Action

Direct and Indirect Impacts:

The Proposed Action would have varying degrees of impact to the soils, both in the short term and long term. Impacts would come from two parts of the Proposed Action. One being from mechanical fuels reduction treatments and the other would be fire.

The largest impacts to soils under the Proposed Action would come from high severity wildfire when it is used for resource benefit. As opposed to prescribed fire, where conditions under which treatments are carried out generally maintain a low to moderate intensity fire, using fire for resource benefit could result in larger areas being affected by high severity fire. High intensity fire can have severe impacts to soils in the short term as soils are heated to the point of sterilization and vegetative cover is completely removed. At this point, runoff and erosion is greatly accelerated affecting the site itself and down slope, unburned areas. In general, most fires, especially when managed for resource benefit, have relatively small areas that are severally burned. The remaining areas would be affected by a low to moderate intensity fire that tends to reduce heat that decreases soil sterilization and plant mortality. 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. Site specific implementation contains mitigation to keep the piles small to minimize this impact.
During events where fire is managed for resource benefit, resource advisors would be utilized to work with fire managers to determine site specific impacts to soils and develop mitigation to reduce impacts to soils. Additionally, soon after the fire the area would be evaluated for emergency stabilization and rehabilitation needs. This would be the last step in ensuring soils resources are protected.

The next impact from the Proposed Action would come from large mechanical equipment working on steeper slopes related to mechanical fuels reduction. 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. All the other non-fire treatment types proposed would have lesser degrees of impact to the soils than large machinery.

Overall, in the short term, the Proposed Action could result in localized, severe impacts to soils. Procedures would be in place to minimize this potential.

In the long term, it is hoped that managing fire for resource benefit, along with the implementation of prescribed fire, mechanical, chemical, biological and seeding treatments, would create a mosaic of vegetation across the landscape. This is expected to reduce large, catastrophic fires such as the Hayman and Waldo Canyon Fires in the future that have severe impacts on soils over a much larger area and have major offsite impacts.

Protective/Mitigation Measures:
The Proposed Action, subsequent procedures and site specific implementation plans all contain design features and mitigation that would reduce impacts to soil resources.

Cumulative Impacts:
As discussed in the long term impacts, it is hoped that the cumulative effect of the Proposed Action leads to fewer large catastrophic fires, thereby leading to overall lower soil impacts from fire. When this is combined with all the other factors effecting soils in the planning area and looked at from a 6$^{th}$ level watershed scale, the Proposed Action is not expected to result in a combined negative effect.

No Action Alternative

Direct and Indirect Impacts:
The No Action Alternative would continue managing fire as it currently is where the planning area is divided into polygons where fire is identified as desirable or not. Largely, the end result would be similar in terms of impacts to soils since fire could still be used for resource benefit on lands within the Royal Gorge RMP planning area. This option is not as flexible and could lead to some fires that could be beneficial being suppressed.

Protective/Mitigation Measures:
None

Full Suppression Alternative

Direct and Indirect Impacts:
The full suppression alternative would suppress all fires whether or not they could be beneficial. In the short term, this would eliminate the potential for the severely burned areas and associated severe soils impacts as described above. However, in the long term, it could lead to further fuels build up and larger, more destructive fires resulting in greater impact to soils.

Protective/Mitigation Measures:
None

Cumulative Impacts:
Cumulatively, when looked at throughout the 6th level watersheds of the planning area and over the long term, it is anticipated that the long term suppression of fires would further lead to a buildup of fuels and larger, hotter fires. Overall, this could lead to large scale soils impacts.

Finding on the Public Land Health Standard for Upland Soils:
Soils throughout the planning area are largely meeting Land Health Standards; however some areas are not. Most of these areas that are not meeting are the result of overstocked forests. The Proposed Action would help these areas meet standards; however, there is still the potential for some areas to be negatively affected and not meet standards. Overall, the Proposed Action should keep the soils within their natural range of disturbance and function.

### 3.2.4 Water (Surface and Floodplains) (Includes a Finding on Standard 5)

Affected Environment:
Watersheds, aquifers, rivers, and streams are ecologically dynamic interfaces of atmosphere, soils, and water. Healthy watersheds capture precipitation and runoff, store water in the soil (or bedrock) profile, and release it slowly back into surface waters. Most of the water supply to the watersheds within the Royal Gorge planning area comes from snowmelt during the spring and early summer months in the mountain areas above 10,000' and precipitation from high-intensity convective storms throughout the spring, summer, and fall. There are also many ephemeral drainages present throughout the watersheds within the planning area that flow intermittently during the year.

The major watersheds in the Royal Gorge planning area are the Arkansas and South Platte Rivers. Surface water within the planning area is used for domestic, recreational, aesthetic, agricultural, stock-watering, and industrial purposes. Surface waters are also habitat for aquatic and water-oriented wildlife and fish.
The Federal Water Pollution Control Act of 1972 and the Clean Water Act (CWA) of 1977 and subsequent amendments/revisions are the predominant federal legislation that directs management of water quality on BLM-administered lands. The CWA mandates restoration and/or maintenance of the chemical, physical, and biological integrity of our nation's waters, and dictates further compliance to state and local water quality standards. In the Royal Gorge planning area, BLM must also comply with Colorado Department of Public Health and Environment (CDPHE) water quality standards.

Under Section 303(d) of the CWA, CDPHE is directed to list all waters that do not meet water quality standards or have impaired beneficial uses (e.g., drinking water, recreation, etc.). Water bodies in which water quality is impaired are referred to as "303(d)-listed streams" or "impaired waters." The sources of these impairments come predominantly from agriculture (e.g., grazing, irrigation), natural sources (e.g., bedrock), on-the-ground hydrological modification (e.g., resource extraction and road construction), and point-source discharges. When a stream is listed as impaired, the allowable total maximum daily load (TMDL) of a pollutant, such as total dissolved solids, is required to be calculated for the stream.

The CDPHE Water Quality Control Commission has identified numerous water bodies within the planning area as 303(d)-listed streams, reservoirs and lakes.

Environmental Effects

Proposed Action

Direct and Indirect Impacts:

The Proposed Action would have varying degrees of impact to the water quality, both in the short term and long term. Impacts would come from two parts of the Proposed Action. One being from mechanical fuels reduction treatments and the other is wildfire.

The largest impacts to water quality under the Proposed Action would come from high severity wildfire when it is used for resource benefit. As opposed to prescribed fire, where conditions under which treatments are carried out generally maintain a low to moderate intensity fire, using fire for resource benefit could result in larger areas being affected by high severity fire. High intensity fire can have severe impacts to soils in the short term as soils are heated to the point of sterilization and vegetative cover is completely removed. At this point, runoff and erosion is greatly accelerated affecting the site itself and down slope, unburned areas. The result of this is changed channel geometries, increased turbidity, and downstream flooding. In addition, burning releases nutrients and makes them more mobile, resulting in potentially higher nutrient loads in adjacent waterways. In general, most fires, especially when managed for resource benefit, have relatively small areas that are severally burned. The remaining areas would be affected by a low to moderate intensity fire that tends to reduce heat that decreases soil sterilization and plant mortality. This type of burning releases nutrients back into the soil for vegetation to use, essentially speeding up the nutrient cycling process and having little effect on downstream water quality, especially after the first year..

During events where fire is managed for resource benefit, resource advisors would be utilized to work with fire managers to determine site specific impacts to water quality and develop mitigation to reduce impacts. Additionally, soon after the fire the area would be evaluated for emergency stabilization and rehabilitation needs. This would be the last step in ensuring water quality is protected.

The next impact from the Proposed Action would come from large mechanical equipment working on steeper slopes related to mechanical fuels reduction. 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.

Overall, in the short term, the Proposed Action could result in localized, severe impacts to water quality. Procedures would be in place to minimize this potential.

In the long term, it is hoped that the implementation of using fire for resource benefit, along with the implementation of prescribed fire and mechanical treatments, would create a mosaic of vegetation across the landscape. This is expected to reduce large, catastrophic fires such as the

Hayman and Waldo Canyon Fires in the future that have severe impacts on water over a much larger area and have major offsite impacts.

Protective/Mitigation Measures:
The Proposed Action, subsequent procedures and site specific implementation plans all contain design features and mitigation that would reduce impacts to water resources.

Cumulative Impacts:
As discussed in the long term impacts, it is hoped that the cumulative effect of the Proposed Action leads to fewer large catastrophic fires, thereby leading to overall lower water quality impacts from fire. When this is combined with all the other factors effecting water quality in the planning area and looked at from a 6$^{th}$ level watershed scale, the Proposed Action is not expected to result in a combined negative effect.

No Action Alternative
Direct and Indirect Impacts:
The No Action Alternative would continue managing fire as it currently is where the planning area is divided into polygons where fire is identified as desirable or not. Largely, the end result would be similar in terms of impacts to water quality since fire could still be used for resource benefit. This option is not as flexible and could lead to some fires that could be beneficial being suppressed.

Protective/Mitigation Measures:
None

Full Suppression Alternative
Direct and Indirect Impacts:
The full suppression alternative would suppress all fires whether or not they could be beneficial. In the short term, this would eliminate the potential for the severely burned areas and associated water quality impacts as described above. However, in the long term, it could lead to further fuels build up and larger, more destructive fires resulting in greater impact to water.

Protective/Mitigation Measures:
None

Cumulative Impacts:
Cumulatively, when looked at throughout the 6$^{th}$ level watersheds of the planning area and over the long term, it is anticipated that the long term suppression of fires would further lead to a buildup of fuels and larger, hotter fires. Overall, this could lead to large scale negative water quality impacts.

Finding on the Public Land Health Standard for Water Quality:
Water throughout the planning area is largely meeting Land Health Standards; however some areas are not. Most of these areas that are not meeting are the result of historic mining activity. Overall, the Proposed Action should keep the water quality within their natural range of disturbance and function; however the threat of very large catastrophic fire is always present.

## 3.3 BIOLOGICAL RESOURCES

### 3.3.1 Invasive Plants*

Affected Environment:

The variable climate, elevations, and soils of the Royal Gorge Field Office planning area are conducive to extremely varied vegetation. In this document, the vegetation in the planning area is classified into three major groups: grassland, shrubland, and forestland. Most of the weeds identified in the Colorado State Noxious Weed lists (lists A, B, and C) can be found in the project area.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Areas affected by fire, fire management or fuels reduction projects are prone to infestation by a wide variety of weeds when severe soil surface disturbance occurs. Fuels reduction will reduce the incidence of catastrophic wildfires and thus lower the number of acres of severe soil disturbance that are more prone to infestations by invasive plants.

Protective/Mitigation Measures: Motorized equipment used in fire suppression and management activities should be washed on a regular basis. Motorized equipment used for fuels reduction projects should be washed prior to entering project area. Washing is to remove any plant materials, soil, or grease in order to limit new invasive plant infestations.

Cumulative Impacts: Reduction of annual acres of new infestations by invasive plants.

No Action Alternative

Direct and Indirect Impacts: More acres of severe soil disturbance will occur than under the Proposed Action and be potentially impacted by infestations of invasive plants.

Protective/Mitigation Measures: Same as Proposed Action.

Cumulative Impacts: None.

Alternative 1

Direct and Indirect Impacts: Full suppression would increase fuel loading in unburned areas and increase catastrophic wildfire incidence more than other alternatives. More acres of severe soil disturbance would occur than under other alternatives and be potentially impacted by infestations of invasive plants.

Protective/Mitigation Measures: Same as Proposed Action.

Cumulative Impacts: Potential annual increase in number of acres of new infestations by invasive plants.

*Invasive plants are plants that are not part of (if exotic), or are a minor component of (if native), the original plant community or communities that have the potential to become a dominant or co-dominant species on the site if their future establishment and growth are not actively controlled by management interventions, or are classified as exotic or noxious plants under state or federal law. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants.

### 3.3.2 Threatened, Endangered and Sensitive Species

Affected Environment:

The following species may be found on lands managed by the BLM at certain times of the year and require special management attention under the Endangered Species Act (ESA) of 1973, as amended, and Manual 6840-Special Status Species Management. While sensitive species are not federally protected, it is BLM policy to manage these species to prevent future listing, thereby affording them the same level of protection in BLM programs as Threatened and Endangered (T&E) species.

**T&E PLANTS**

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

The species is known from a wide range of riparian-related plant communities, however, it is less common in shrub or tree dominated areas. Populations are widely scattered across 8 western states, at elevations between approximately 4300' and 7000'. The presence of Ute Ladies'-Tresses has been suspected to occur on BLM-controlled lands in the Royal Gorge Field Office (RGFO) in Boulder and Jefferson counties (Fertig et al. 2005) (Figure 3.3.2.1). Prior to 1992, extant populations of Ute ladies'-tresses were known only from Jefferson and Boulder counties along Clear, Boulder, and South Boulder creeks within the Clear and St. Vrain watersheds. Historical (and presumed extirpated) occurrences were also known from Weld and El Paso counties (Jennings 1989) in the Middle South Platte-Cherry Creek and Fountain watersheds, but have not been observed since 1896. Since 1992, additional populations have been recorded from St. Vrain and Left Hand creeks in Boulder County (St. Vrain watershed), Claymore Lake near Fort Collins in Larimer County, Cache La Poudre watershed (Fertig et al. 2005)(Table 3.3.2.1).

Figure 3.3.2.1. Distribution of Ute Ladies'-Tresses (*Spiranthes diluvialis*) within the Bureau of Land Management-Royal Gorge Field Office boundary, 2014.

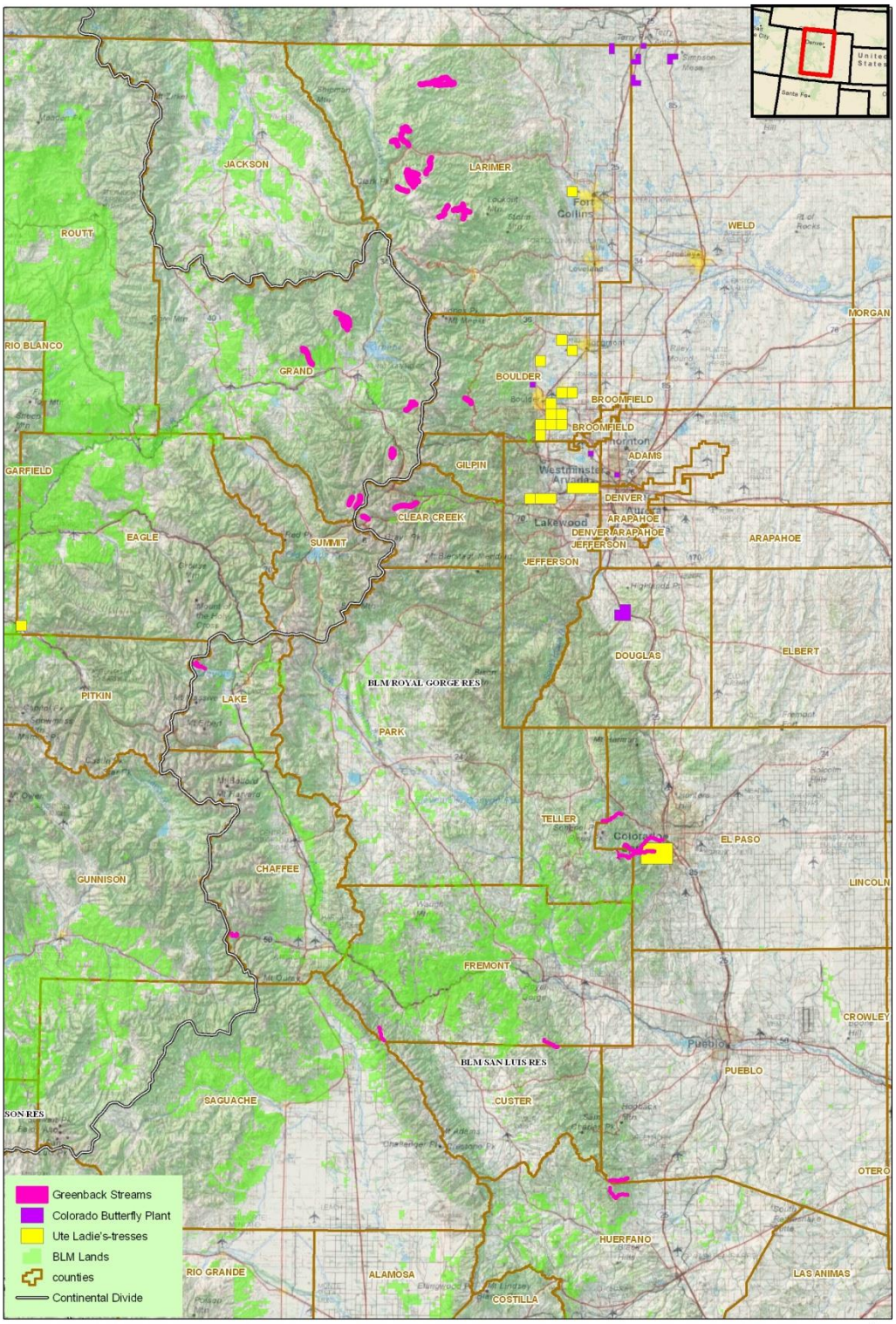


Table 3.3.2.1. Current known locations of Ute Ladies'-Tresses within the Royal Gorge Field Office, 2014 (Fertig et al. 2005).

| Location | Ownership | Land Use | Population Size | Acres |
|---|---|---|---|---|
| Jefferson County: Clear Creek (Wheat Ridge) | Prospect Park, city of Wheat Ridge | Recreation | 2004: 0 plants | 1 |
| Jefferson County: Clear Creek Canyon (Golden) | Private | Recreation | 2004: 271 plants | 10 |
| Jefferson County: Clear Creek Canyon (Indian Gulch) | Private | Recreation | 1992: 6 plants | 1 |
| Jefferson County: Clear Creek Canyon | CO Department of Transportation | Recreation | 1994: 21 plants | 0.1 |
| Jefferson County: Clear Creek Canyon (Clear Creek) | Private | Recreation | 1994: 9 plants | 1 |
| Boulder County: Boulder Creek (Foothills Parkway) | Private | Road Corridor and open space in urban development | 1990: 19 plants | 2 |
| Boulder County: Boulder Creek | Private | Recreation | 1993: 30 plants | 0.2 |
| Boulder County: Boulder Creek | City of Boulder Open Space | Open Space | 2001: 3 plants | 0.2 |
| Boulder County: Boulder Creek | City of Boulder Open Space | Open Space | 2000: 3 plants | 10 |
| Boulder County: Boulder Creek | Private | Conservation Easement | 2004: 151 plants | 1 |
| Boulder county: South Boulder Creek | City of Boulder Open Space | Recreation | 2004: 463 plants | 40 |
| Boulder county: South Boulder Creek | City of Boulder Open Space | Agriculture | 2004: 1 plant | 0.5 |
| Boulder county: St Vrain Creek | Boulder County Open Space | Agriculture | 1993: 5 plants | 0.5 |
| Boulder County: Left Hand Creek | Private | Agriculture | 1998: 0 plants | 0.3 |
| Boulder County: Left Hand Creek | Private | Agriculture | 1994: 5 plants | 0.3 |
| Larimer County: Claymore Lake South | Colorado State University, Private | Agriculture | 1996: 87 plants | 6.6 |

Highly manipulated environments, such as irrigated hay meadows, moderately grazed pastures with river access, areas of increased sediment deposits and intact floodplains with mid-seral, light-penetrating vegetation, were primarily exhibited on private lands. These latter environments are considered more likely to contain suitable habitats. These environments also qualify this orchid's habitats as a terrestrial rather than true aquatic (emergent or sub-emergent) species.

**Colorado Butterfly Plant (*Gaura neomexicana* ssp. *coloradensis*)**

Colorado butterfly plant is endemic to moist soils in mesic or wet meadows of floodplain areas in north central Colorado, extreme western Nebraska, and southeastern Wyoming (Figure 3.3.2.2,

Table 3.3.2.2). This subspecies occurs primarily in habitats created and maintained by streams active within their floodplains, with vegetation that is relatively open and not overly dense or overgrown. Colonies are often found in low depressions or along bends in wide, active, meandering stream channels a short distance upslope of the actual channel. The plant requires early- to mid-successional riparian habitat. It commonly occurs in communities dominated by redtop and Kentucky bluegrass on wetter sites, and wild licorice, Flodman's thistle, curlytop gumweed, and smooth scouring rush on drier sites.

Figure 3.3.2.2. Distribution of Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*) within the Bureau of Land Management-Royal Gorge Field Office boundary, 2014.

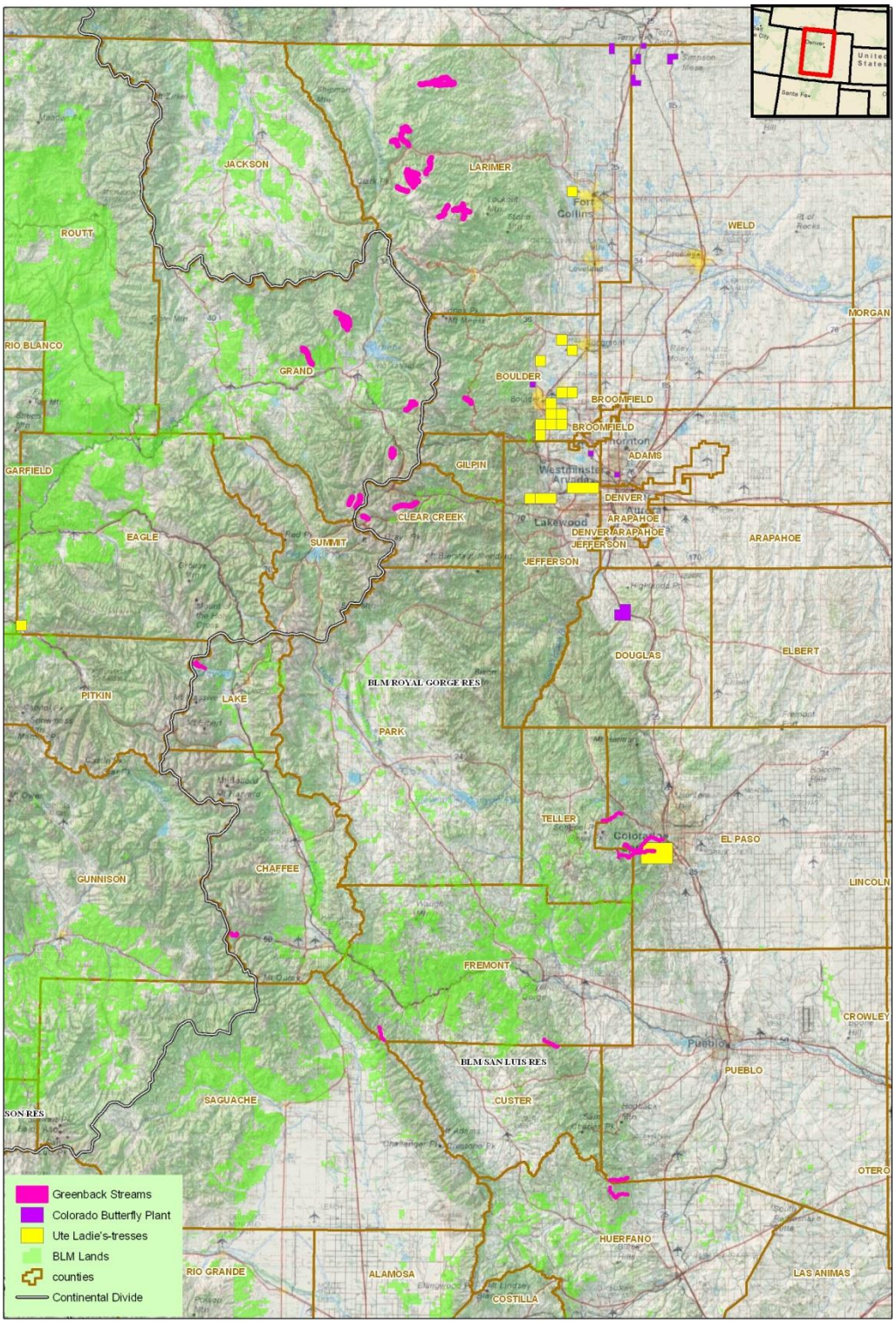


Table 3.3.2.2. Documented locations of Colorado Butterfly Plant within the Royal Gorge Field Office, 2014 (Fertig 2000, USFWS 2010).

| Location | Population Size | Trend |
|---|---|---|
| Weld County: Lonetree Creek, 3.3-3.7 miles south of the Wyoming border along interstate 25 | 1992: 0 plants | Not known |
| Weld County: Lonetree Creek east of I-25, 0.5 miles south of the Wyoming border | 1989: 0 plants | Presumed extirpated |
| Larimer County: "meadow east of Poudre" | 1984: 0 plants | Presumed extirpated |
| Larimer County: "30 miles north of Fort Collins" | 1944: ? | Presumed extirpated |
| Boulder County: Lee Hill Road, 0.6 miles west of junction with foothills highway north of Boulder | 1984: 1 plant | Presumed extirpated |
| Weld County: Meadow Springs Ranch, 0.5 miles south of Exit 293, I-25 | 1998: 1000 plants | Stable in short-term |
| Jefferson County: Chambers Preserve | 2004: small pop. | Stable |
| Larimer County: Soapstone Prairie Natural Area | 2005:35,000-47,000 | Stable |

Colorado butterfly plant is a perennial herb that lives vegetatively for several years before bearing fruit once and then dying. Only a few flowers are open at any one time, and these are located below the rounded buds and above the hard, nutlike fruits. Nonflowering plants consist of a stemless, basal rosette of leaves. Colorado butterfly plant is an early successional plant that is adapted to use periodically disturbed stream channel sites. Historically, flooding was probably the main cause of disturbances in the plant's habitat, although wildfire and grazing by native herbivores also may have been important. Although flowering and fruiting stems may undergo increased mortality because of these events, vegetative rosettes appear to be little affected (Mountain West Environmental Services 1985). In addition, the establishment and survival of seedlings appears to be enhanced at sites where tall and dense vegetation has been removed by some form of disturbance. In the absence of occasional disturbance, the plant’s habitat can become choked out by dense growth of willows, grasses, and non-native plants.

All currently known populations are within a small area (17,000 acres) in southeastern Wyoming, western Nebraska, and north-central Colorado. Two of the populations occur on F.E. Warren Air Force Base in Cheyenne, Wyoming, and five small populations on state land (Chambers Preserve, Colorado; Oliver Reservoir State Recreation Area, Nebraska; and state school trust land, Wyoming). One population occurs on the Meadow Springs Ranch, northern Colorado (owned by City of Fort Collins). The remaining populations occur on privately-owned lands.

The Colorado butterfly plant was federally listed as threatened on October 18, 2000. On January 5, 2005, USFWS designated 8,486 acres along approximately 113.1 stream miles in Laramie and Platte counties; however, no critical habitat was designated within Colorado or BLM-RGFO managed lands.

**Penland Alpine Fen Mustard (*Eutrema penlandii*)**

The Penland alpine fen mustard occurs in alpine tundras of Colorado, where small populations of the plant are distributed in a 25-mile stretch of the Continental Divide (Figure 3.3.2.3). The

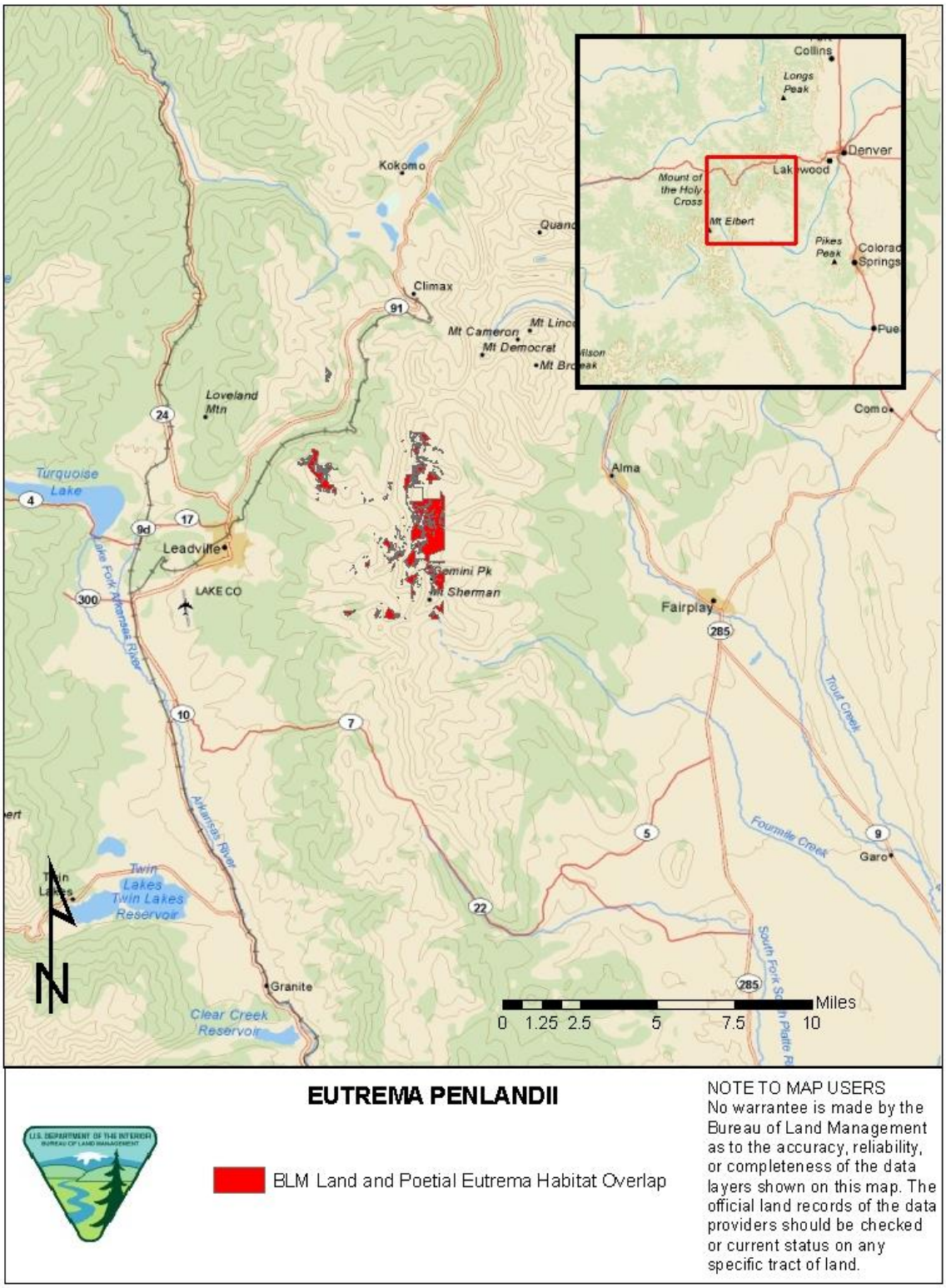
species is habitat-specific, growing only in oligotrophic (nutrient deficient), rheotrophic (groundwater fed) alpine marshes (Weber and Shushan 1955). It grows in a macroclimate of long, cold, wet winters and cool, windy summers, and a microclimate of relatively protected, wet, springy bogs (Johnston et al. 1981). Major components of its microenvironment include moss-covered peat fens, perennial sub irrigation, and high elevations (above 12,150 feet).

The peat mats on which the alpine fen mustard grows form on small, flat to gently sloping benches in steep-walled, rounded glacial valleys. Water required for the development and sustenance of these peat mats comes from snowfields that persist through the summer. Conditions for maintaining these persistent snowfields exist along the east-west trending portion of the Continental Divide, where the plant is found on slopes (Schwendinger et al. 1991). The alpine fen mustard is found on deep organic soils in moist areas that are usually adjacent to clear running water from snowmelt. Plant emergence at a site appears to be dependent on the availability and timing of sufficient water to continuously moisten the mosses in which the plants are rooted, but not so much water as to flood them.

The Penland alpine fen mustard is a small, herbaceous, perennial plant that grows up to about 3 inches in height. Clusters of small, white flowers grow atop the plants' stems. A plant of the Colorado alpine tundra, the alpine fen mustard grows in a harsh environment, with a growing season that may only last 70 days per year (Colorado Native Plant Society 1989). In addition, freezing and thawing soil, drying winds, and windblown snow and ice crystals diminish plant productivity (Zwinger and Williard 1972).

The Penland alpine fen mustard was federally listed as threatened on July 28, 1993. Critical habitat has not been designated for the species. The wetland habitat in which the species occurs is fragile, and sensitive to watershed alterations that divert flows of surface water. Direct impacts to plants and habitats occur from mining, and from OHV use and other forms of recreation. In addition the few small populations of the species on small areas of specialized habitat make it particularly vulnerable to human disturbances as well as random environmental occurrences. The USFWS *Eutrema* recovery team has generated a potential habitat map based on geology, elevation, soils, and hydrology required to maintain populations. This model has documented potential habitat on BLM-RGFO managed lands in the Mosquito Range of Colorado.

Figure 3.3.2.3. Distribution of potential Penland alpine fen mustard (*Eutrema penlandii*) on Bureau of Land Management-Royal Gorge Field Office managed lands, 2014.



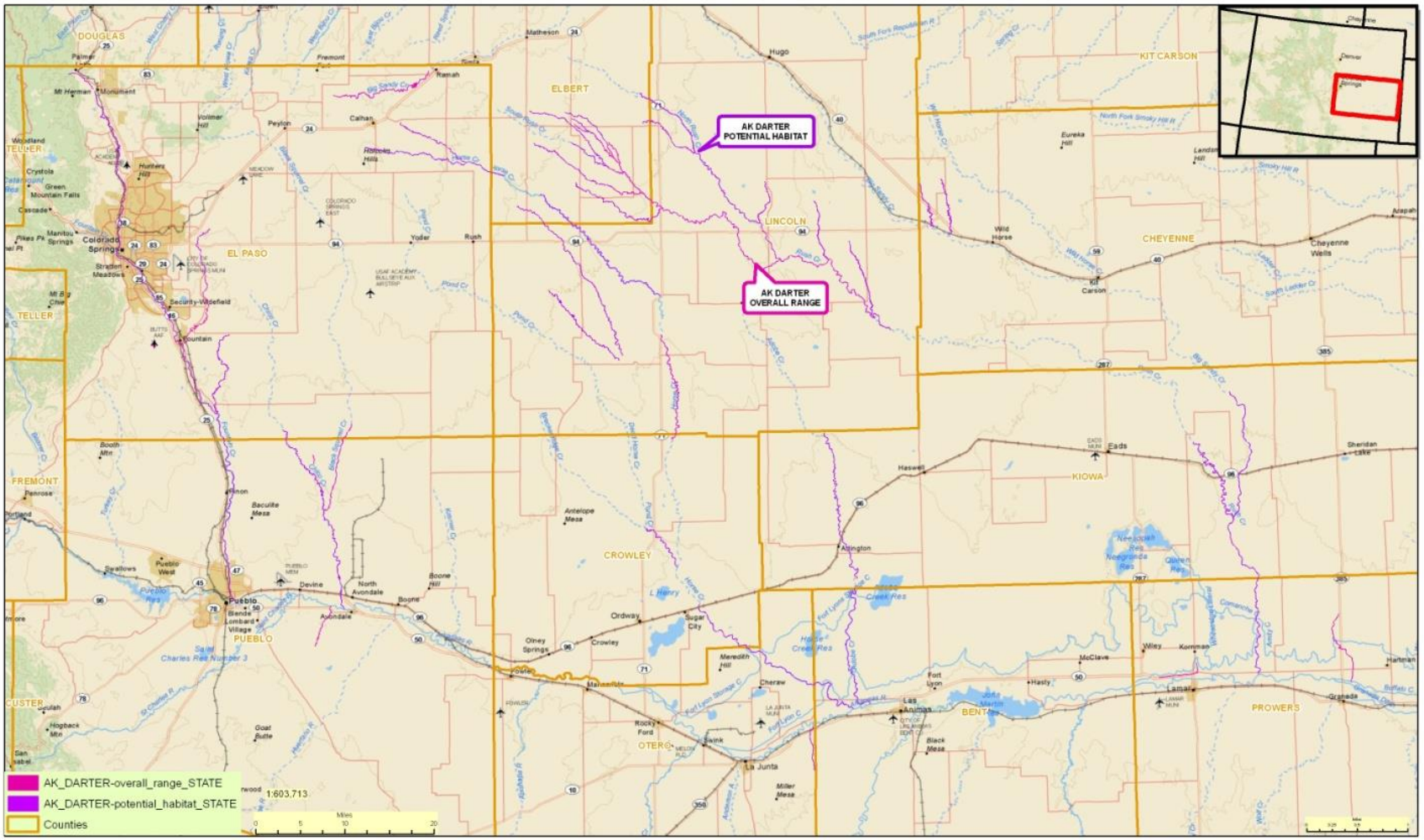
## FISH

### Arkansas Darter (*Etheostoma cragini*)

The Arkansas darter is a small, 2.5 inch fish in the perch family native to portions of the Arkansas River basin (Figure 3.3.2.4). It is listed as threatened in Colorado and is a candidate for protection under the federal Endangered Species Act. The species is most often found in small spring-fed streams with sand substrate and aquatic vegetation. The population appears stable at most sites where spring flows persist, and has declined in areas where spring flows have decreased or been eliminated. Estimates state there are approximately 145 locality occurrences of the Arkansas darter distributed across the 5 States. Currently, the BLM-RGFO does not manage any lands that contain Arkansas darter habitat.

In Colorado, the species is found in the Upper Arkansas, Adobe Creek, Fountain Creek, Horse Creek, Upper Arkansas at John Martin, Big Sandy Creek, Rush Creek, Black Squirrel Creek and Chico Creek drainages. Their distribution has not changed significantly based on comparisons of historic data, particularly since 1979. Darter populations in Colorado persist in large, deep pools during late summer low-water periods when streams may become intermittent. Major threats to the species include stream dewatering resulting from groundwater pumping in the western portion of the species' range, and development pressures in portions of its eastern range. Spills and runoff from confined animal feeding operations also threaten the species locally throughout its range.

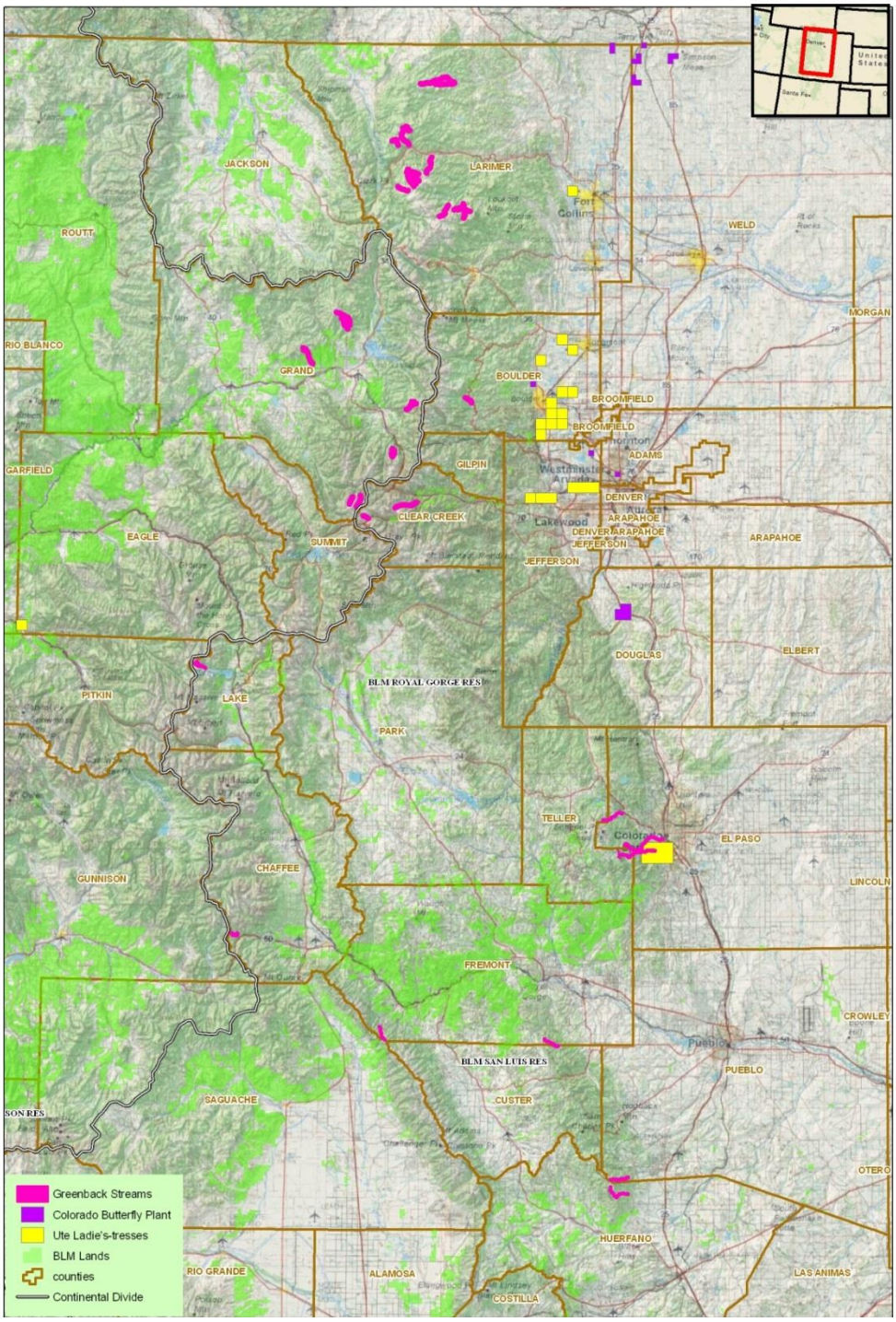
Figure 3.3.2.4. Distribution of the Arkansas darter ((*Etheostoma cragini*) within the Bureau of Land Management-Royal Gorge Field Office management boundary, 2014.



**Greenback Cutthroat Trout (*Oncorhynchus clarki stomias*)**

Greenback cutthroat trout are listed as Threatened under the ESA and are included in the USFWS's TEPC species list for Boulder, Clear Creek, Custer, Douglas, El Paso, Huerfano, Lake, Larimer, Park and Pueblo counties. 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 (BLM 2007). Greenback populations are managed by hydrological units that are scattered throughout the RGFO (Figure 3.3.2.5). However, BLM-RGFO 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.

Figure 3.3.2.5. Distribution of the Colorado cutthroat trout (*Oncorhynchus clarki stomias*) within the Bureau of Land Management-Royal Gorge Field Office management boundary, 2014.



## TERESTRIAL VERTEBRATES

### Piping Plover (*Charadrius melodus*)

The piping plover is a small North American shorebird. Piping plovers breed in three discrete areas of North America: The northern Great Plains, the Great Lakes, and the Atlantic Coast. There is only one breeding population in the project area: the northern Great Plains population. The northern Great Plains breeding range extends from southern Alberta, northern Saskatchewan, and southern Manitoba, south to eastern Montana, the Dakotas, southeastern Colorado, Iowa, Minnesota, and Nebraska, and east to north-central Minnesota. The majority of the U.S. pairs in this population are in the Dakotas, Nebraska, and Montana (USFWS 2001). Occasionally, Great Plains birds nest in Oklahoma and Kansas. Generally, piping plovers favor open sand, gravel, or cobble beaches for breeding. Breeding sites are generally found on islands, lakeshores, coastal shorelines, and river margins. Currently the only known piping plover habitat within the administrative boundaries of BLM-RGFO exists near Las Animas, Colorado (Figure 3.3.2.6).

Breeding census results show a marked decline of the population breeding in the northern Great Plains of the United States. Shoreline development, river flow alteration, channelization, and reservoir construction have all resulted in the loss of plover breeding habitat.

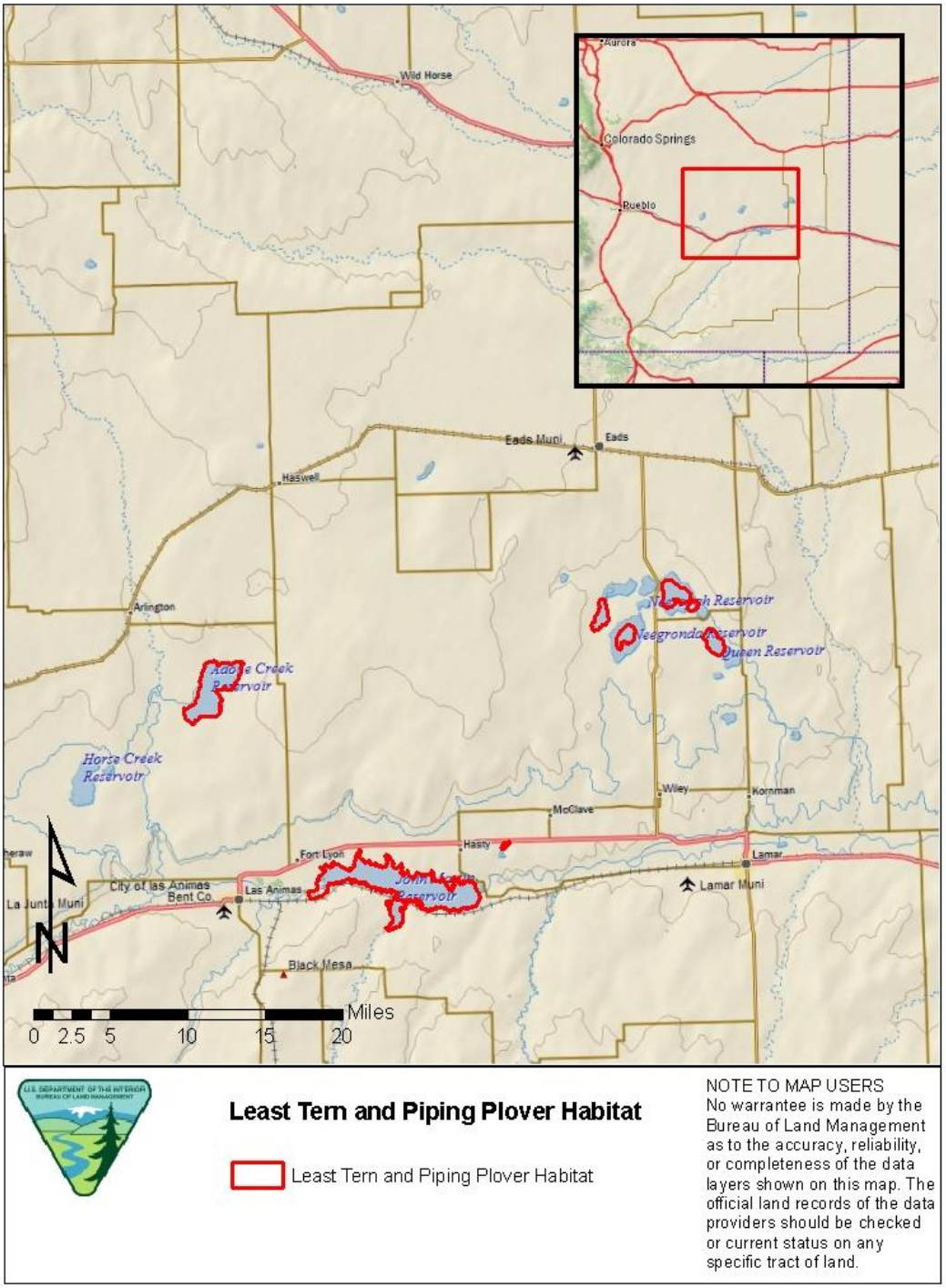
### Least Tern (Interior) (*Sterna antillarum*)

The least tern, the smallest member of the tern family, is represented by three distinct subspecies. The occurrence of breeding least terns is localized and is highly dependent on the presence of dry, exposed sandbars and favorable river flows that support a forage fish supply and isolate the sandbars from the riverbanks. Characteristic riverine nesting sites are dry, flat, sparsely vegetated sandbars and gravel bars within a wide, unobstructed, water-filled river channel. Currently the only known least tern habitat within the administrative boundaries of BLM-RGFO exists near Las Animas, Colorado (Figure 3.3.2.6).

Interior least terns usually arrive on their breeding grounds in early to mid-May and begin to establish feeding and nesting territories. During the breeding season, the terns' home range is generally limited to a 2-mile stretch of river associated with the nesting colony. Interior least terns nesting at sandpits along rivers use the adjoining river as well as the sandpit lake itself for foraging. Interior least terns are semi-colonial nesters that benefit from the anti-predator behavior exhibited by the entire colony when the nesting territory is invaded. The piping plover, a state and federally threatened shorebird species, is often found nesting in the midst of interior least tern colonies in Nebraska. Presumably the piping plover benefits from the defensive group behavior of the nesting terns as well.

Nests are initiated only after spring and early summer flows recede and dry areas on sandbars are exposed, usually on higher elevations away from the water's edge. Artificially created nesting sites, such as sand and gravel pits, dredge islands, reservoir shorelines, and power plant ash disposal areas, also are used.

Figure 3.3.2.6. Known Piping Plover (*Charadrius melodu*) and Least Tern (*Sterna antillarum*) habitat within the administrative boundaries of Bureau of Land Management-Royal Gorge Field Office, 2014.



**Mexican Spotted Owl (*Strix occidentalis lucida*)**

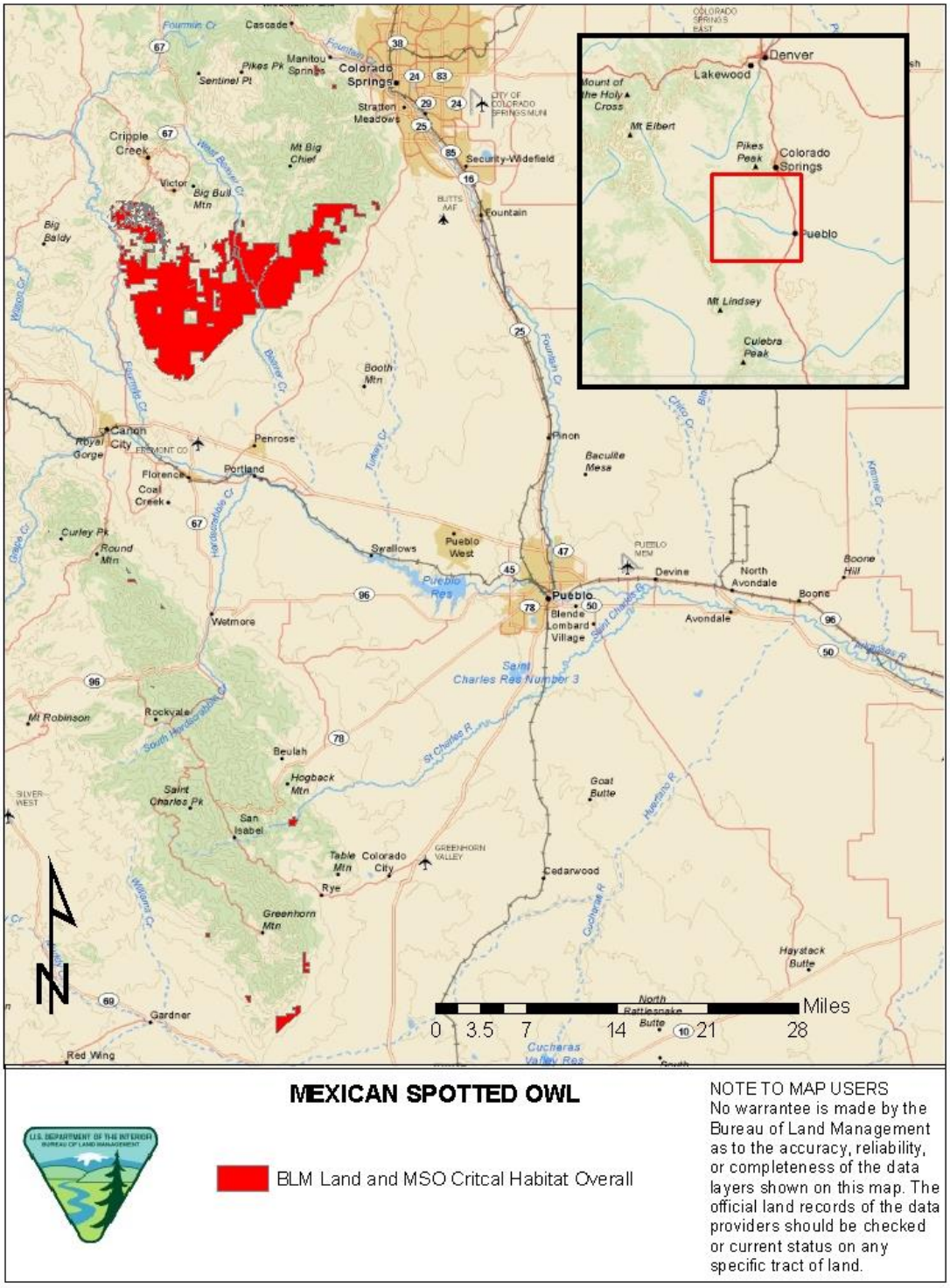
The Mexican spotted owl occurs over a broad geographic range, from southern Utah and Colorado, south through the mountains of Arizona, New Mexico, and western Texas, and into the mountains of Mexico. The subspecies occurs in disjunct localities that correspond to isolated mountain systems and canyons. The range of the Mexican spotted owl in the U.S. has been divided into six recovery units (as identified in the recovery plan), with an additional five recovery units in Mexico. The U.S. recovery units, listed in decreasing order of number of known owls, are Upper Gila Mountain, Basin and Range-East, Basin and Range-West, Colorado Plateau, Southern Rocky Mountain-New Mexico, and Southern Rocky Mountain-Colorado. The RGFO lies within the Southern Rock Mountain-Colorado recovery unit. The habitat within the RGFO is primarily narrow, steep walled canyons that offer a cool microclimate with mixed coniferous forest canopy (Figure 3.3.2.7). In 2011, five adults and one fledging were located during BLM-RGFO annual Mexican spotted owl surveys.

Mexican spotted owls nest, roost, forage, and disperse in a diverse array of biotic communities. Nests and roosts are primarily found in closed-canopy forests or rocky canyons. In the northern portion of the range, most nests are in caves or on cliff ledges in steep-walled canyons. Elsewhere, the majority of nests appear to be in trees (Fletcher and Hollis 1994). Forests used for roosting and nesting often contain mature or old-growth stands that are structurally complex (Skaggs and Raitt 1988; Ganey and Balda 1989, 1994; McDonald et al. 1991). These forests are typically uneven-aged and multi-storied, with high canopy closure. Although a variety of tree species are used for nesting and roosting, Douglas-fir appears to be the most commonly utilized species for both of these activities (Fletcher and Hollis 1994).

Mexican spotted owls typically locate prey from an elevated perch by sight or sound, then pounce on the prey and capture it with their talons. In general, owls appear to forage more in unlogged forests than in selectively logged forests (Ganey and Balda 1994). Common prey items include species of rodent, bat, bird, reptile, and arthropod that use unique habitats. Thus it appears that diverse habitats for prey species provide owls with a diverse prey base.

Mexican spotted owls breed sporadically, but do not nest every year (Ganey 1998). Reproductive chronology varies somewhat across the range of the subspecies. Spotted owls observed in Arizona begin courtship and roosting in March, with eggs laid in either late March or early April. Incubation, which is performed exclusively by the female parent, begins shortly after the first egg is laid, and lasts for approximately 30 days. During incubation and the first half of the brooding period, the female leaves the nest only rarely (Forsman et al. 1984; Ganey 1998). Eggs hatch in early May, and young owls fledge 4 to 5 weeks after hatching, dispersing sometime between mid-September and early October.

The Mexican spotted owl was federally listed as a threatened species on April 15, 1993. On January 18, 2001, the USFWS designated 830,000 acres in Arizona, 525,000 acres in Colorado, 54,000 acres in New Mexico, and 3.2 million acres in Utah as critical habitat for the species. Figure 3.3.2.7. Overlap of Bureau of Land Management-Royal Gorge Field Office managed lands and Mexican spotted owl (*Strix occidentalis lucida*) critical habitat, 2014.




Primary threats to the subspecies are the continued alteration of habitat as a result of even-aged silvicultural practices, and the danger of catastrophic wildfire. Additional threats vary by Recovery Unit, and include such factors as indiscriminate fuelwood cutting, overgrazing recreation, and fragmentation of habitat. There are estimated to be between 800 and 1,600 Mexican spotted owls in the southwestern U.S. (National Audubon Society 2002b).

**Preble's (*Zapus hudsonius preblei*) and New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*)**

Preble's meadow jumping mouse is found along the foothills in southeastern Wyoming, southward along the eastern edge of the Front Range of Colorado to Colorado Springs, El Paso County (Hall 1981; Clark and Stromberg 1987; Fitzgerald et al. 1994). The BLM-RGFO manages several small parcels of land that are located within Preble's overall range (Figure 3.3.2.8-3.3.2.11). The overall range is described by Colorado Parks and Wildlife, the creators of the data set, as the area which encompasses the probable range of Preble's Meadow Jumping Mouse along the Front Range of Colorado below 7600' elevation eastward to include those hydro-units identified by the Preble's Technical Working Group. Preble's Meadow Jumping Mouse is primarily associated with riparian corridors of small intermittent and perennial streams where riparian herbaceous and riparian shrub (primarily willow) dominate.

The subspecies is likely an Ice Age relict (Hafner et al. 1981; Fitzgerald et al. 1994) that was confined to riparian systems where moisture was more plentiful after the glaciers receded from the Front Range of Colorado and the foothills of Wyoming and the climate became drier. The semi-arid climate in southeastern Wyoming and eastern Colorado limits the extent of riparian corridors and restricts the range of the Preble's meadow jumping mouse in this region. The eastern boundary for the subspecies is likely defined by the dry shortgrass prairie, which may present a barrier to eastward expansion (Beauvais 2001). The western boundary of Preble's range in both states appears related to elevation along the Laramie Range and Front Range; the general upward limit of the subspecies' habitat in Colorado is 7,600 feet (USFWS 1998). Currently, there is no designated critical habitat and no known occurrences of Preble's on BLM managed lands.

Typical habitat for the Preble's meadow jumping mouse comprises well-developed plains riparian vegetation with adjacent, undisturbed grassland communities and a nearby water source. Well-developed plains riparian vegetation typically includes a dense combination of grasses, forbs, and shrubs; a taller shrub and tree canopy may be present (Bakeman 1997). When present, the shrub canopy is often willow, although shrub species including snowberry, chokecherry, hawthorn, gambel oak, gray alder, river birch, skunkbrush, wild plum, lead plant, red-osier dogwood, and others also may occur (Bakeman 1997, Shenk and Eussen 1998). Preble's meadow jumping mice regularly use uplands at least as far out as 330 feet beyond the 100-year floodplain for feeding and resting (Ryon 1999, Shenk 2002). The subspecies can also move considerable distances along streams, as far as 1 mile in one evening (Ryon 1999, Shenk and Sivert 1999).

Figure 3.3.2.8. Overlap of Bureau of Land Management-Royal Gorge Field Office managed lands and Preble's meadow jumping mouse (*Zapus hudsonius preblei*) overall habitat near Fort Collins, Colorado, 2014.

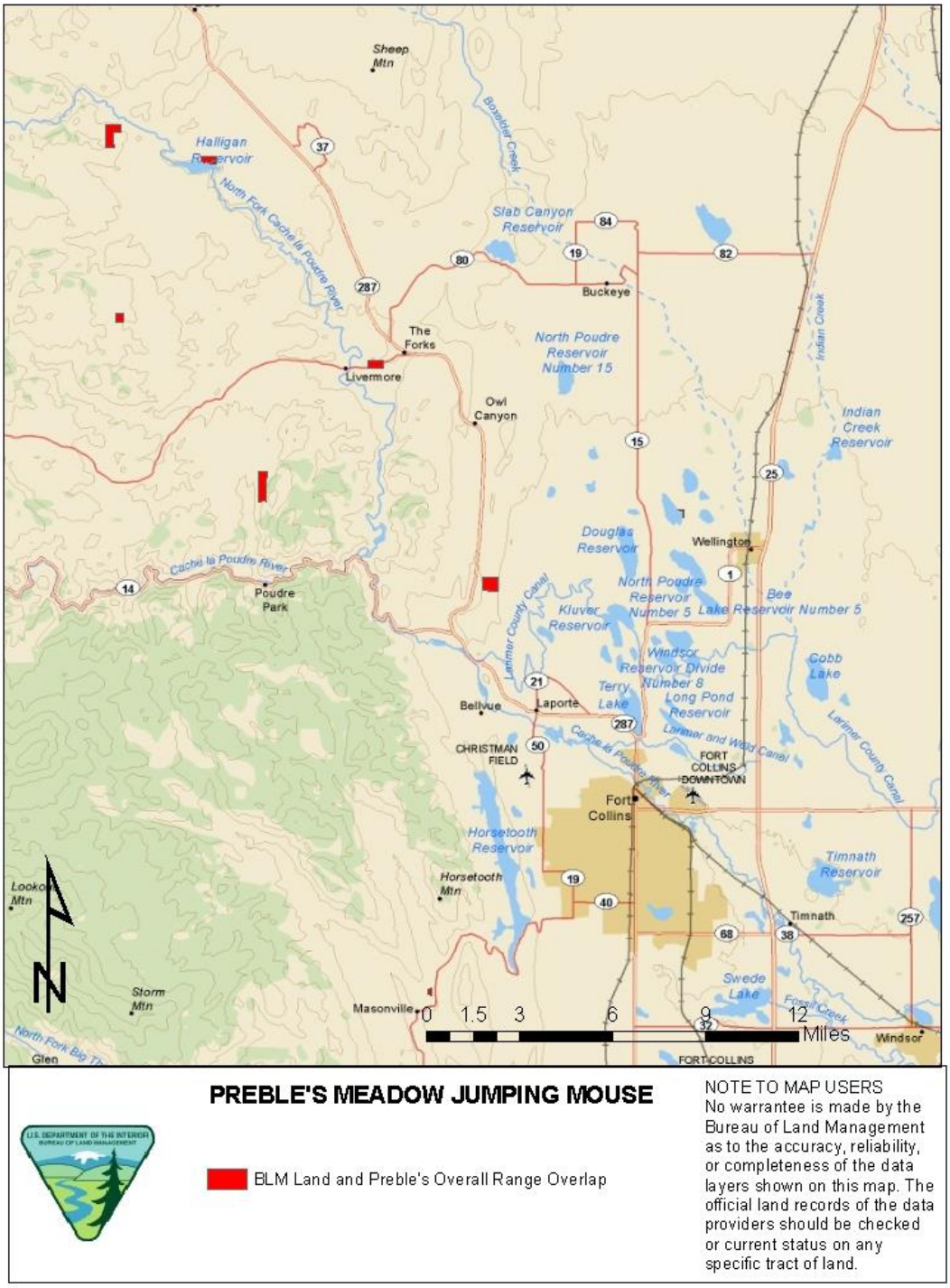



Figure 3.3.2.9. Overlap of Bureau of Land Management-Royal Gorge Field Office managed lands and Preble's meadow jumping mouse (*Zapus hudsonius preblei*) overall habitat near Denver, Colorado, 2014.

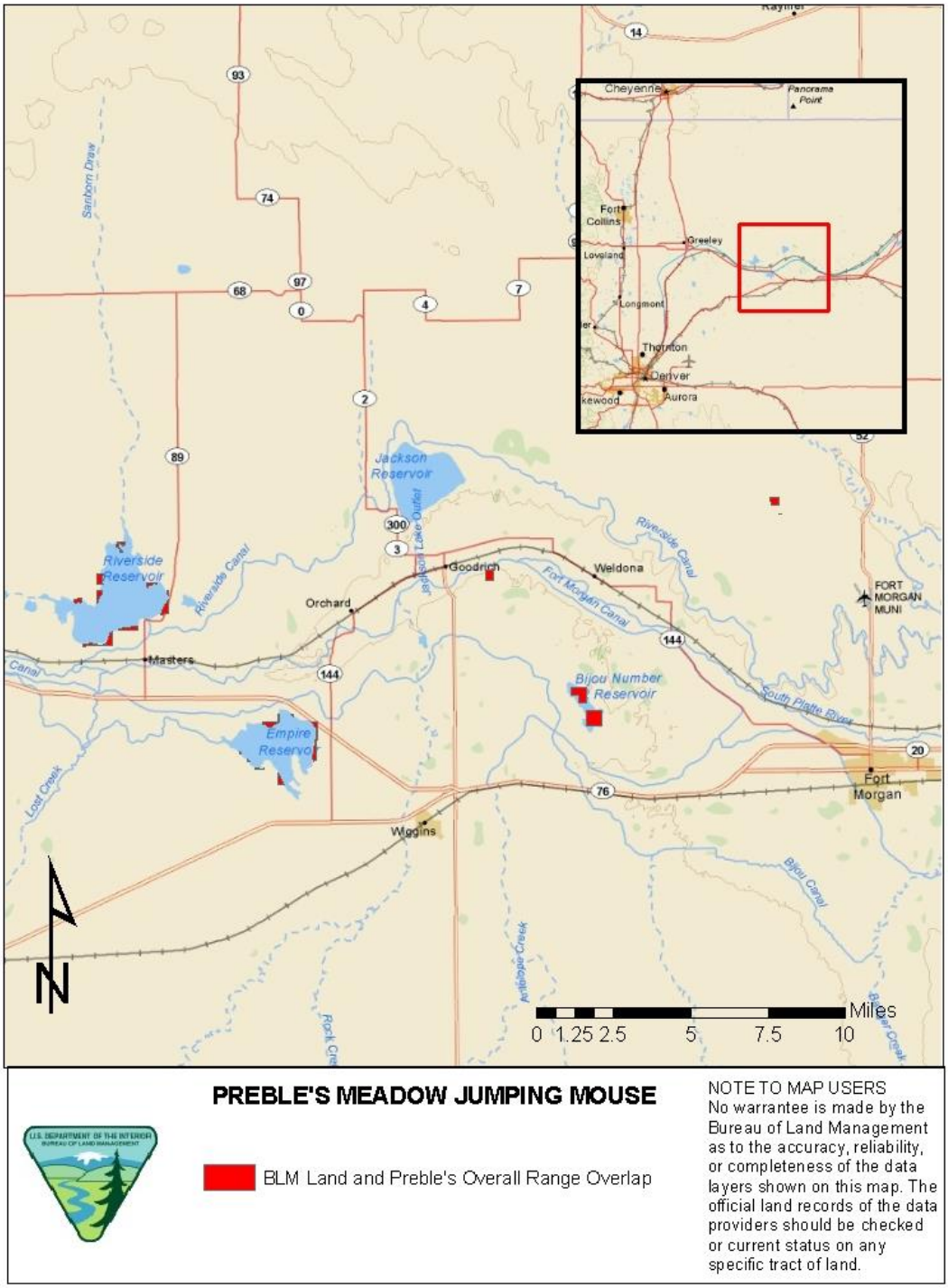



Figure 3.3.2.10. Overlap of Bureau of Land Management-Royal Gorge Field Office managed lands and Preble's meadow jumping mouse (*Zapus hudsonius preblei*) overall habitat near Denver, Colorado, 2014.

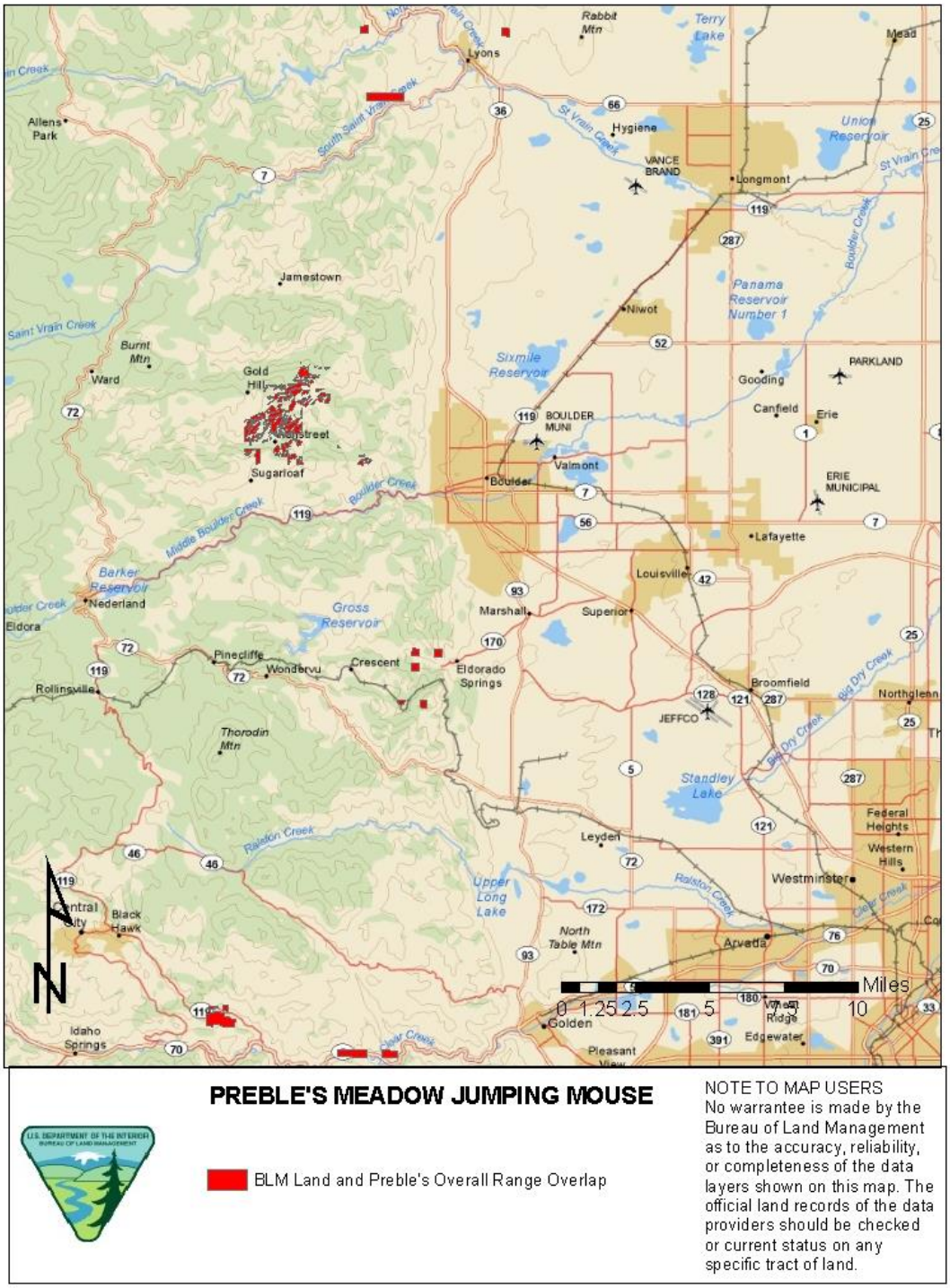
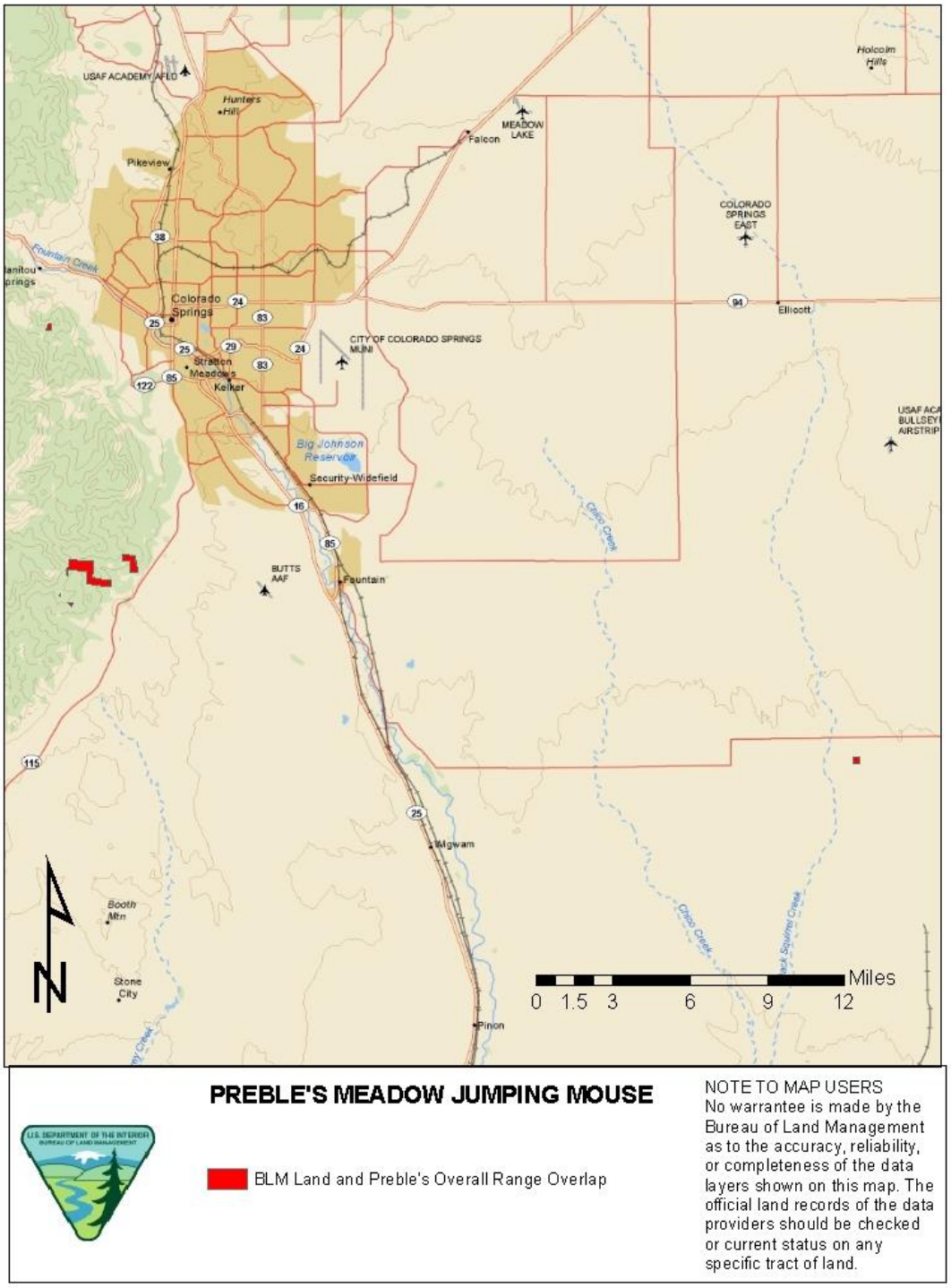



Figure 3.3.2.11. Overlap of Bureau of Land Management-Royal Gorge Field Office managed lands and Preble's meadow jumping mouse (*Zapus hudsonius preblei*) overall habitat near Colorado Springs, Colorado, 2014.




The New Mexico meadow jumping mouse is endemic to New Mexico, Arizona, and a small area of southern Colorado in Las Animas County. Surveys conducted in 2005 and 2006 documented a drastic decline in the number of occupied localities and suitable habitat across the range of the species in New Mexico and Arizona. Of the original 98 known historical localities, there are now only 10 known extant localities in New Mexico, one in Arizona, and an additional eight localities

that have not been surveyed since the early to mid-1990s. However, there is no designated critical habitat and no known occurrences on BLM lands.

The New Mexico meadow jumping mouse nests in dry soils, but uses moist, streamside, dense riparian/wetland vegetation up to an elevation of about 8,000 feet (Frey 2006). It appears to only utilize two riparian community types: 1) persistent emergent herbaceous wetlands (i.e., beaked sedge and reed canary grass alliances); and 2) scrub-shrub wetlands (riparian areas along perennial streams that are composed of willows and alders). It especially uses microhabitats of patches or stringers of tall dense sedges on moist soil along the edge of permanent water. Home ranges vary between 0.37 and 2.7 acres and may overlap (Smith 1999).

The primary threats to New Mexico meadow jumping mice include excessive grazing pressure, water use and management, highway reconstruction, development, and recreation. Moreover, the highly fragmented nature of its distribution is a major contributor to the vulnerability of this species and increases the likelihood of very small, isolated populations being extirpated.

The only known location of New Mexico meadow jumping mouse in Colorado is within Lake Dorothey Stat Wildlife Area; however, few surveys have been conducted elsewhere (Erick Hein, personnel communication, 2/6/2012)

**Lesser Prairie Chicken (*Tympanuchus pallidicinctus*)**

Lesser prairie chickens were likely resident in six counties in Colorado prior to European settlement (Giesen 2000). At present, lesser prairie chickens (LEPC) are known to occupy portions of Baca, Cheyenne, Prowers, and Kiowa counties, but are not known to persist in Bent and Kit Carson counties (Figure 3.3.2.12 and 3.3.2.14). Critical habitat has not been designated for the LEPC; however the CPW has designated LEPC production areas in and around known leks. Currently, populations in Kiowa and Cheyenne counties number less than 100 individuals and appear to be isolated from other populations in Colorado and adjacent states (Giesen 2000). The CPW estimated 800 to 1,000 LEPC in the state in 1997. Giesen (2000) estimated the population size, as of 2000, to be less than 1,500 breeding individuals. There are very few, small parcels of BLM land within the overall range of LEPC.

A new survey method was initiated in 2004 designed to cover a much broader range of habitat types and a larger geographic area, particularly to include lands enrolled in the CRP. The new methodology resulted in the discovery of more leks and the documented use of CRP fields by LEPC in Colorado. The number of LEPC counted in 2005 was 203 birds, with high-count totals of 151 males, 21 females, and 31 of unknown sex. In 2005, 32 active leks were found--13 in Baca County, 1 in Kiowa County, and 18 in Prowers County, including 7 new leks. No known leks in Cheyenne County were surveyed in 2005. Results in 2006 suggest that the population in Baca County continued to decline while the Prowers County population is increasing, with three new lek sites discovered there. Limited data suggest LEPC populations in Kiowa and Cheyenne counties are stable to increasing.

LEPC numbers in Colorado declined 75 percent from 2006 to 2007, from 296 birds observed to only 74. Active leks also declined from 34 in 2006 to 18 in 2007. Due to heavy snowfall, no

cover and little food existed in southern Kiowa, Prowers, and most of Baca counties for over 60 days. The impacts of drought conditions in 2006, coupled with the severe winter weather, probably account for the decline in the number of LEPC observed in 2007.

In 2008, Colorado adopted a dual-frame sampling methodology consisting of a list frame and an area frame. The list frame consisted of known lek locations that have been active at least once within the past ten years. The area frame consisted of areas of unknown LEPC occupancy within the potential range in southeastern Colorado. Opportunistic searches also were conducted, as time permitted, in areas where the public had reported LEPC sightings or in CRP grasslands outside of the area frame.

Total LEPC detected in 2009 was 75 birds, down from 116 birds detected in 2008 and almost identical to the number (74) of LEPC that were detected in 2007 using a different methodology. The total number of active leks detected was 13, down slightly from 17 in 2008 and 18 in 2007. In 2009, 6 leks were detected from Baca County, 1 in Cheyenne County, and 6 in Prowers County. As in 2008, no active leks were counted in Kiowa County during standard survey efforts. Access restrictions prohibited searches of every known lek and active leks may have been present but undetected. An active lek was detected in Kiowa County in 2008. Nesting and brood rearing conditions in the spring of 2008 were not favorable due to drought conditions in southeastern Colorado. Habitat and moisture conditions improved in 2009. CRP lands continue to be important for LEPC, particularly in Prowers County.

As a compliment to CPW surveys, counts are completed on the USFS Comanche National Grassland in Baca County. On the Comanche National Grassland, surveys revealed that the estimated area occupied by the LEPC over the past 20 years was approximately 27,373 ha (65,168 ac). Surveys conducted during 1984 - 2005 identified 53 different leks on or immediately adjacent to USFS lands. Leks were identified based on the presence of at least three birds on the lek. Lek censuses conducted from 1980 to 2005 showed the number of males counted per lek since 1989 has steadily declined. The corresponding population estimate, based on number of males observed at leks, on the Comanche National Grassland was highest in 1988 with 348 birds and the lowest in 2005 with approximately 64 birds and only 8 active leks. The estimate of males per lek in 2005 declined over 80 percent from that of 1988, from 174 males per lek to 32 males per lek, respectively. In 2009, each historic lek was surveyed 2-3 times and 4 active leks were observed (S. Shively, personnel communication, 4/12/2010). A lek is considered active when at least three males are observed displaying on the lek. A high count of 25 males was observed using these four leks. In the spring of 2008, five active leks and 34 birds were observed.

Figure 3.3.2.12. Overlap of Bureau of Land Management-Royal Gorge Field Office managed lands and lesser prairie chicken (*Tympanuchus pallidicinctus*) overall habitat near Granada, Colorado, 2014.

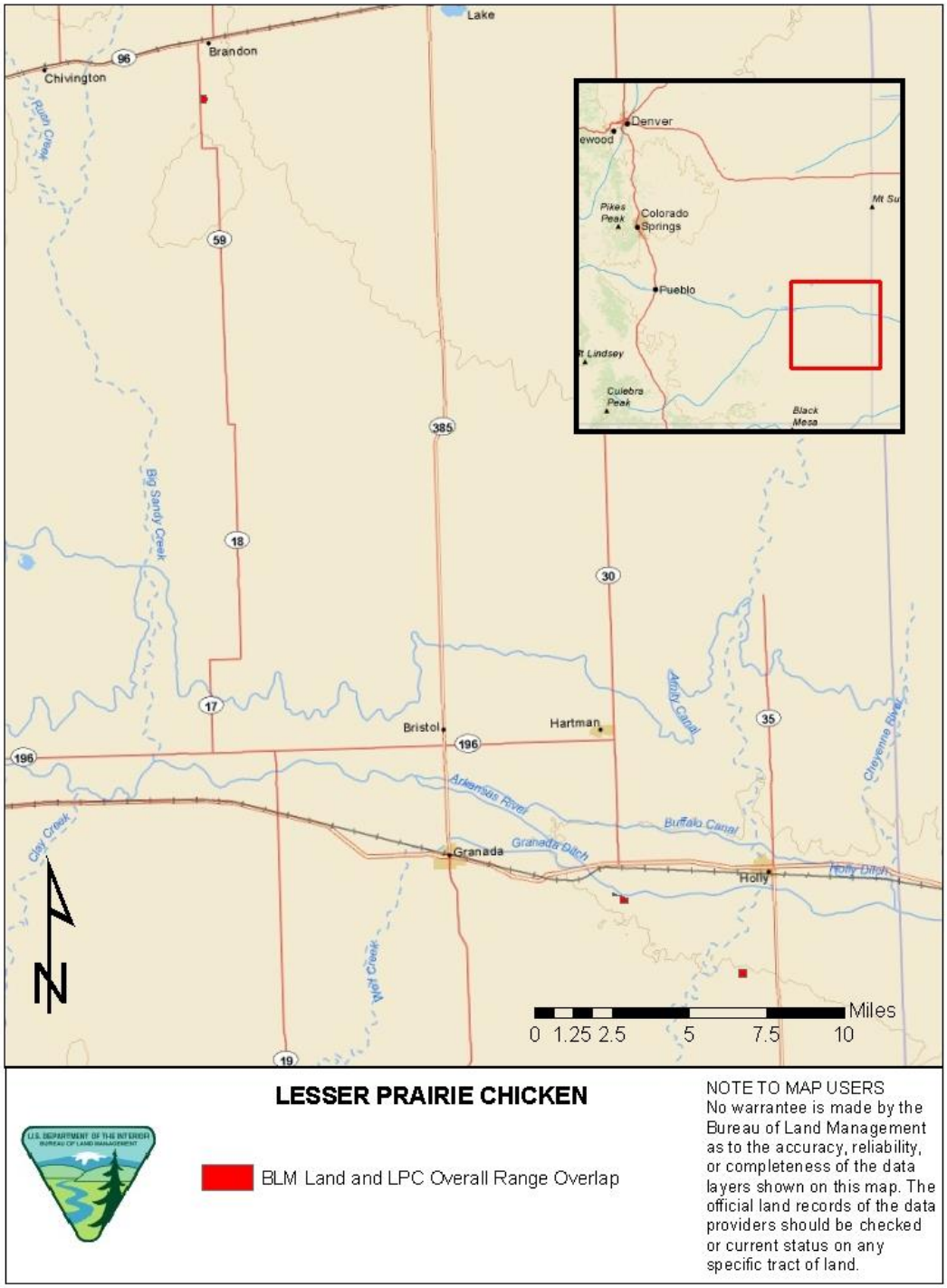
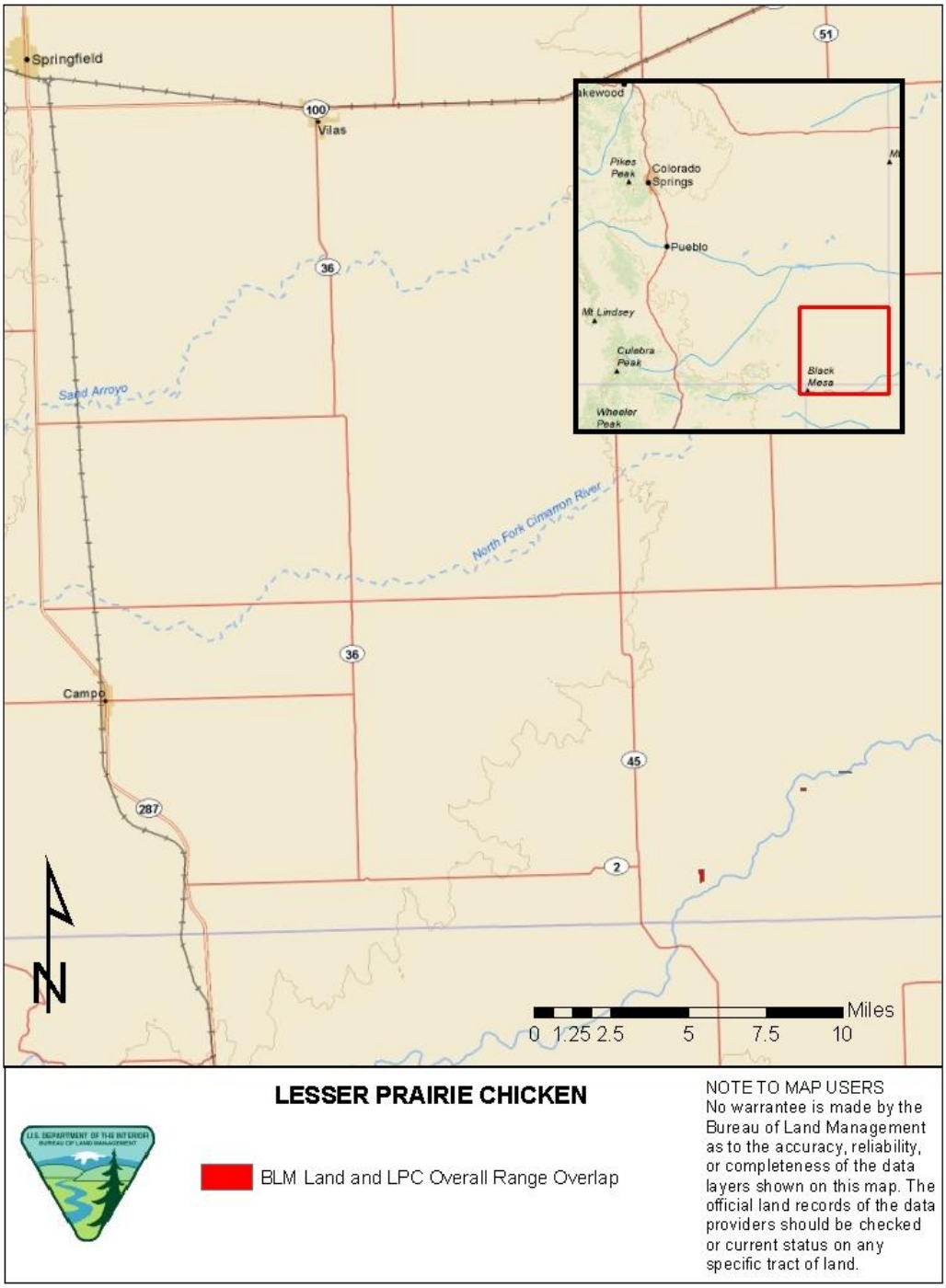



Figure 3.3.2.13. Overlap of Bureau of Land Management-Royal Gorge Field Office managed lands and lesser prairie chicken (*Tympanuchus pallidicinctus*) overall habitat near Springfield, Colorado, 2014.




**Black-Footed Ferret (*Mustela nigripes*)**

Currently, there are no known populations of black-footed ferrets within the RGFO, but potential habitat does exist. All black-tailed prairie dog (*Cynomys ludovicianus*) habitats have been block cleared for the presence of ferrets within the BLM-RGFO.

Black-footed ferrets are obligate associates of prairie dogs (*Cynomys* spp.) for both prey and shelter. Ferrets use prairie dog burrow systems for hunting and shelter, spending a vast majority of their time underground. While ferrets may consume other small mammals (e.g. mice, rabbits, carrion, etc.), their primary prey is prairie dogs. Ferrets are active year-round. They breed in February and March and kits emerge from natal burrows in mid-July. Thorough descriptions of ferret natural history and the local reintroduction efforts can be found in "A Review of Black-Footed Ferret Reintroduction in Northwest Colorado, 2001-2006" (Holmes 2008).

**Canada Lynx**

Canada lynx (*Lynx canadensis*) are listed as Threatened under the ESA. There is no designated critical habitat for this species within Colorado. There are documented occurrences of lynx on BLM land within the RGFO. Within the RGFO, habitat classified as denning, winter, or "other" within the LAUs is considered Canada lynx habitat (Figure 3.3.2.14-3.3.2.19).

Lynx occur in sub-alpine coniferous forests and in riparian shrub communities (e.g. willow, alder). Large woody debris (e.g. downed logs) is used as den sites and provides kittens with both thermal cover and cover from predators. The primary prey of lynx is snowshoe hare (*Lynx canadensis*), but they will also consume other small mammals and birds. Lynx breed in late winter/early spring and produce one litter every one to two years. Thorough descriptions of lynx natural history can be found in the "Canada Lynx Conservation Assessment and Strategy" (Interagency Lynx Biology Team 2013.).

Figure 3.3.2.14. Overlap of Bureau of Land Management-Royal Gorge Field Office managed lands and Canada lynx (*Lynx canadensis*) overall habitat near Salida, Colorado, 2014.

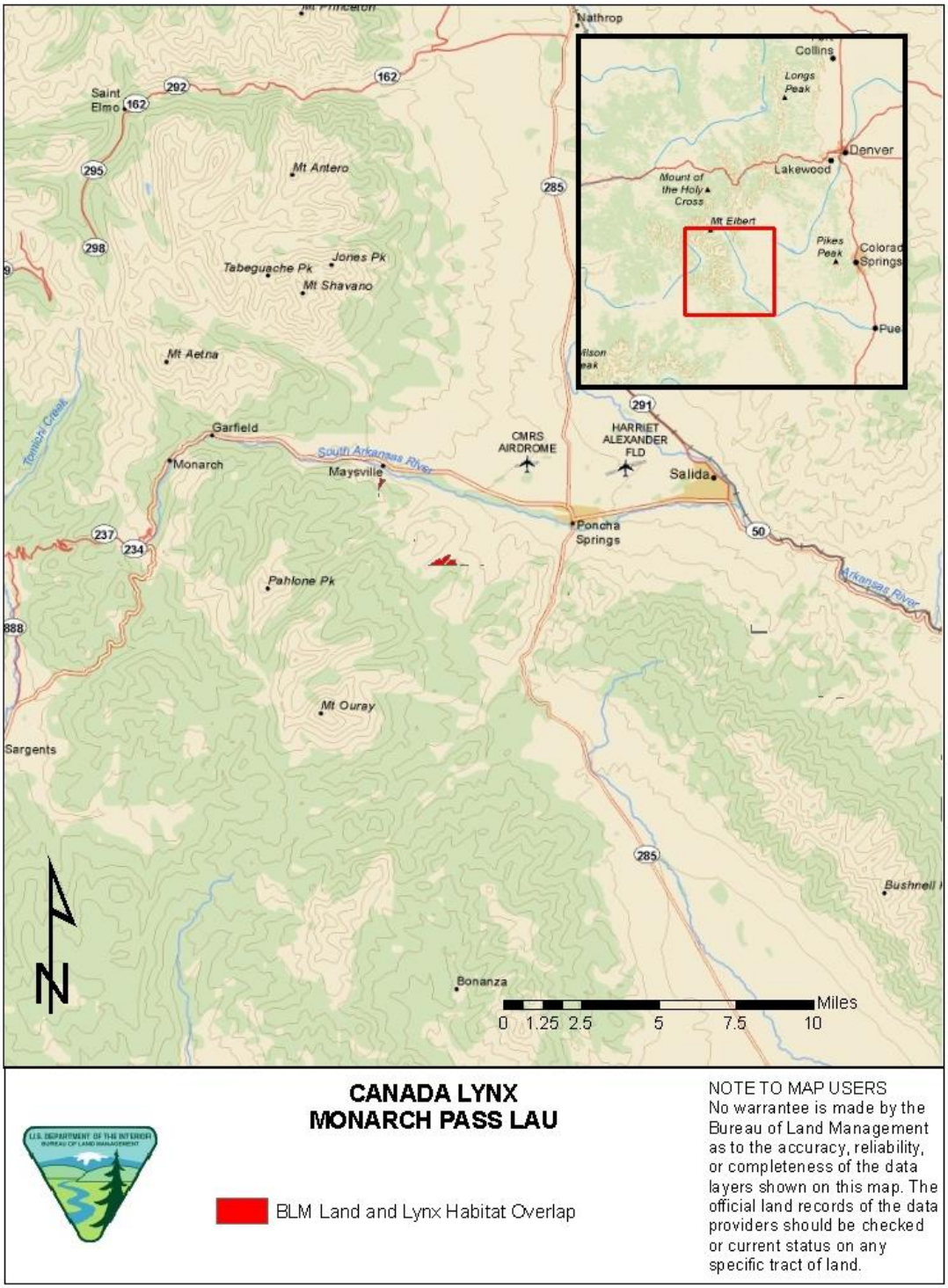


Figure 3.3.2.15. Overlap of Bureau of Land Management-Royal Gorge Field Office managed lands and Canada lynx (*Lynx canadensis*) overall habitat near Gardner, Colorado, 2014.

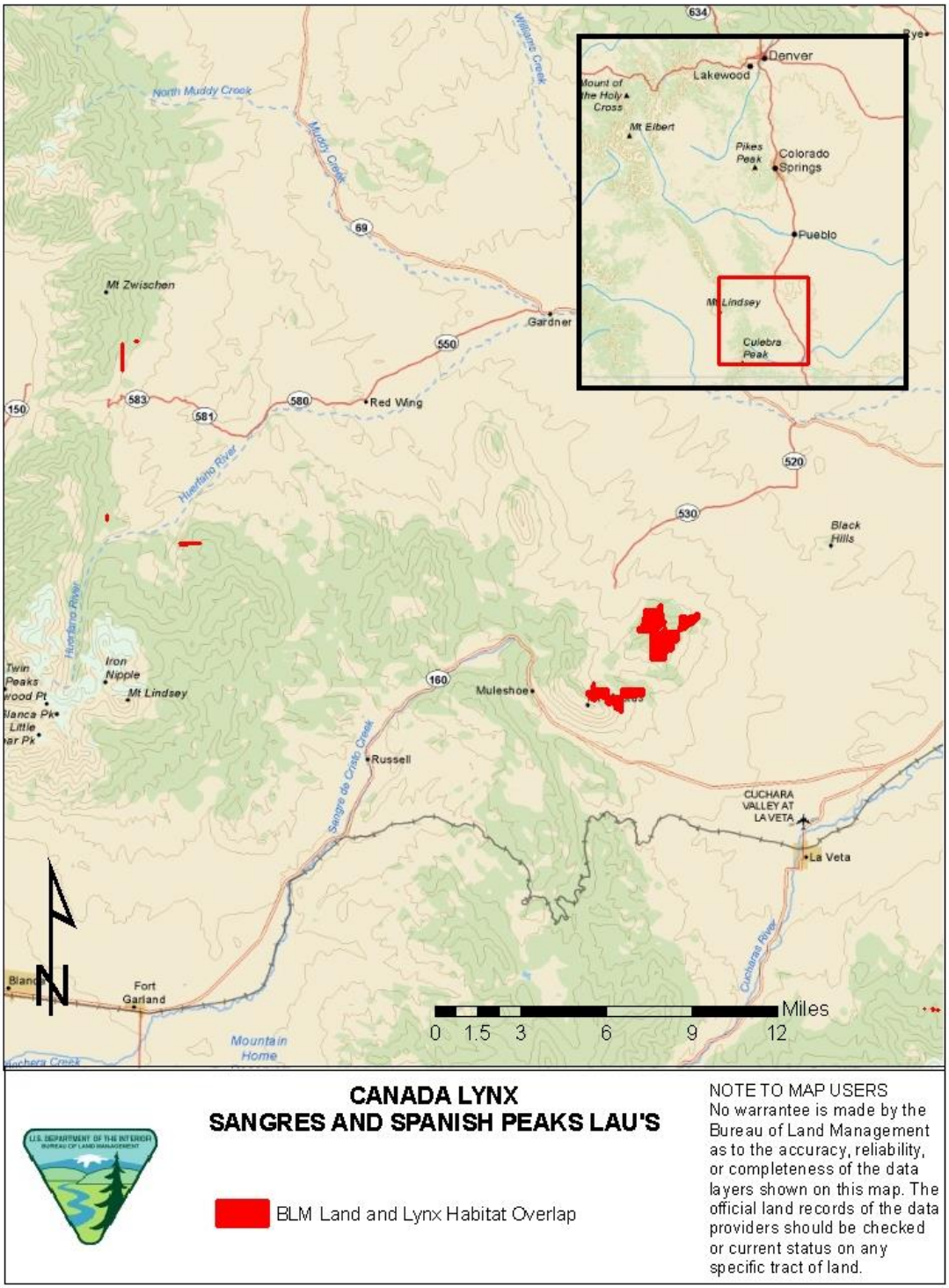


Figure 3.3.2.16. Overlap of Bureau of Land Management-Royal Gorge Field Office managed lands and Canada lynx (*Lynx canadensis*) overall habitat near Cotopaxi, Colorado, 2014.

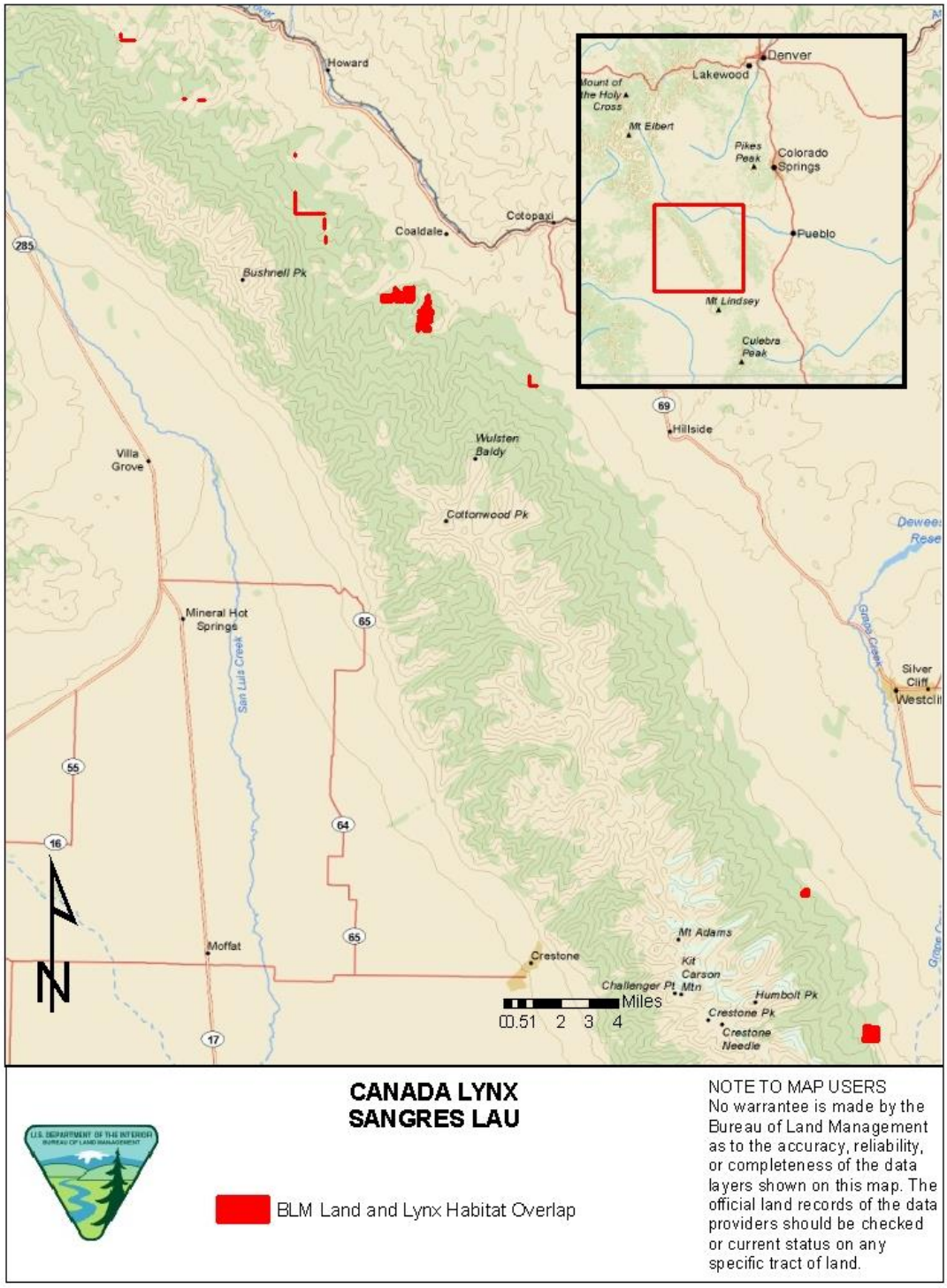


Figure 3.3.2.17. Overlap of Bureau of Land Management-Royal Gorge Field Office managed lands and Canada lynx (*Lynx canadensis*) overall habitat near Wetmore, Colorado, 2014.

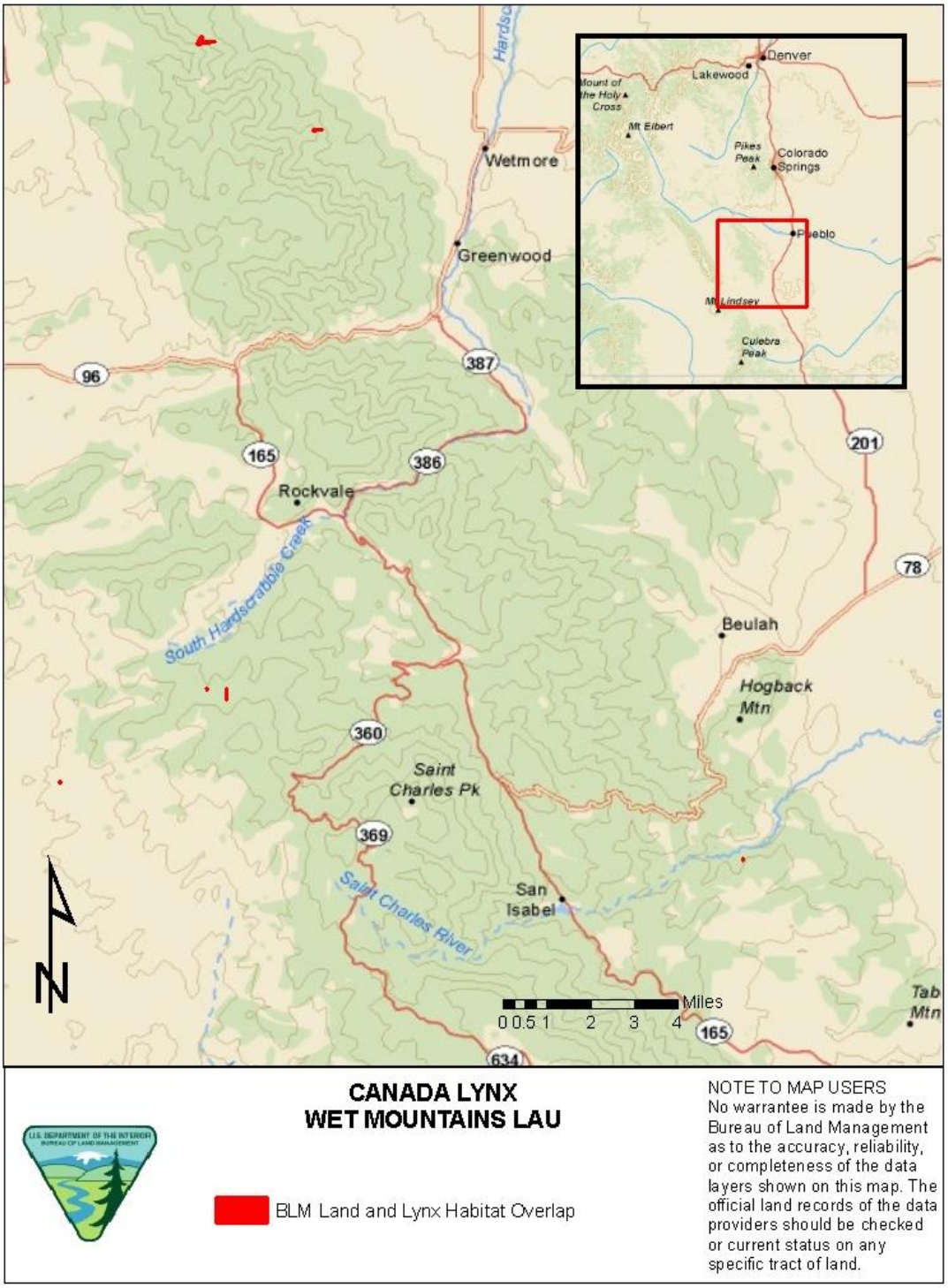


Figure 3.3.2.18. Overlap of Bureau of Land Management-Royal Gorge Field Office managed lands and Canada lynx (*Lynx canadensis*) overall habitat near Central City, Colorado 2014.

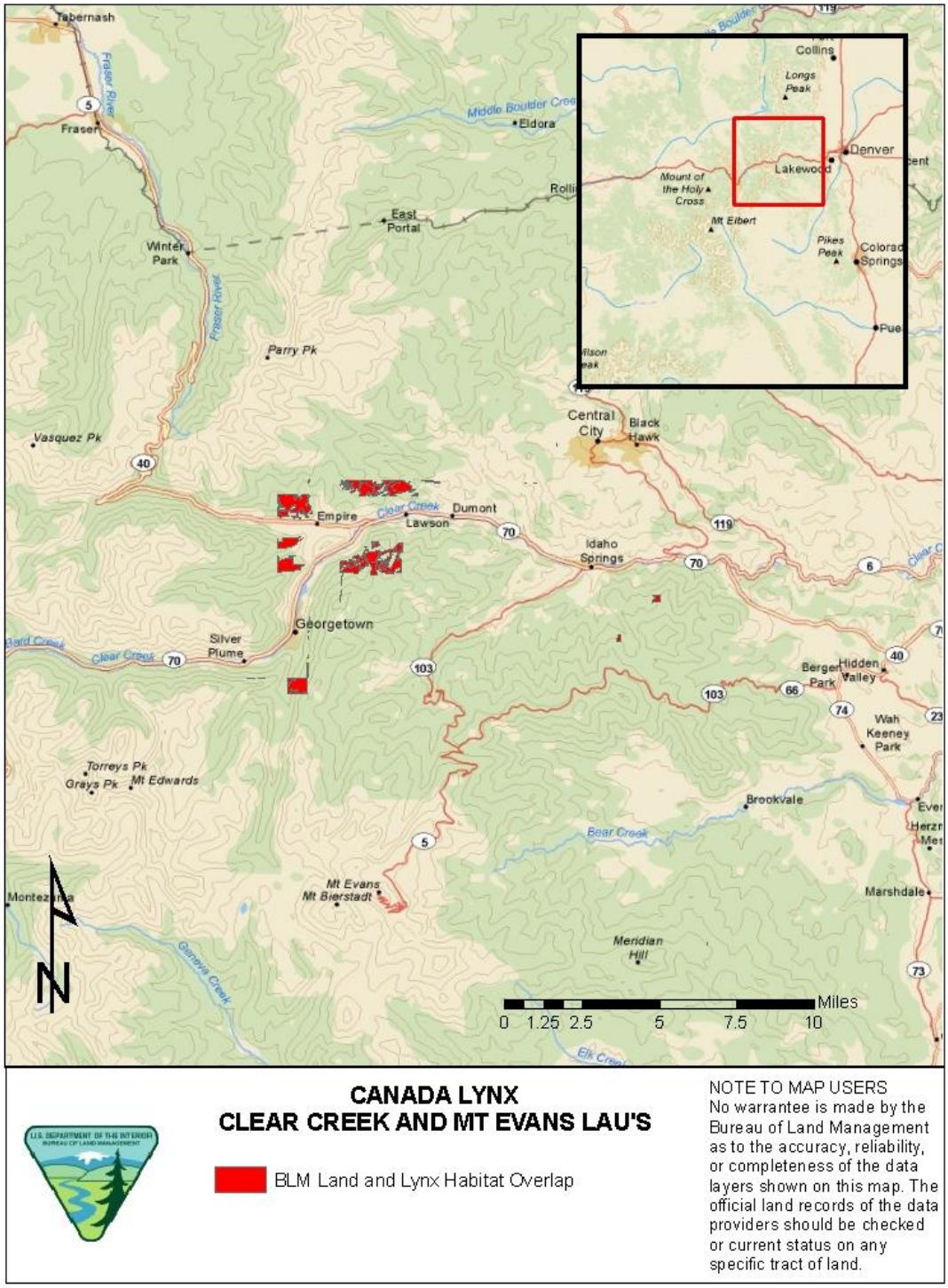
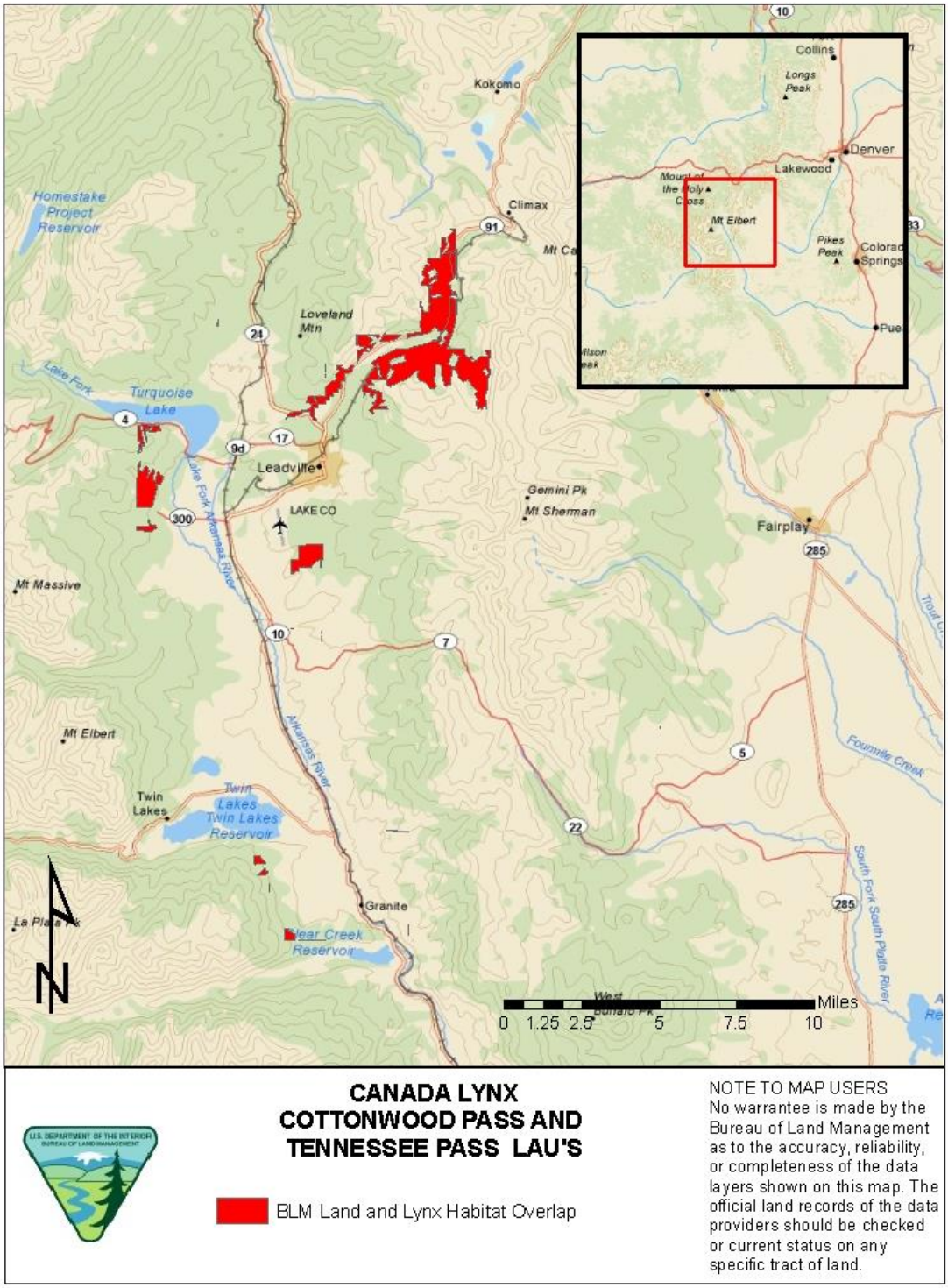



Figure 3.3.2.19. Overlap of Bureau of Land Management-Royal Gorge Field Office managed lands and Canada lynx (*Lynx canadensis*) overall habitat near Leadville, Colorado, 2014.




## TERRESTIRAL INVERTEBRATES

### Uncompahgre Fritillary Butterfly and Montane Pawnee Skipper

The Uncompahgre fritillary was federally listed as endangered on June 24, 1991. Critical habitat has not been designated. Over-collection is considered the greatest human-caused threat to the species. Its sedentary nature, weak flying ability, and tendency to fly low to the ground make it easy to collect. Other actual or potential effects to the species include negative climatic changes, small population size, and low genetic variability. There is also a minor potential threat from the trampling of larvae by livestock and humans.

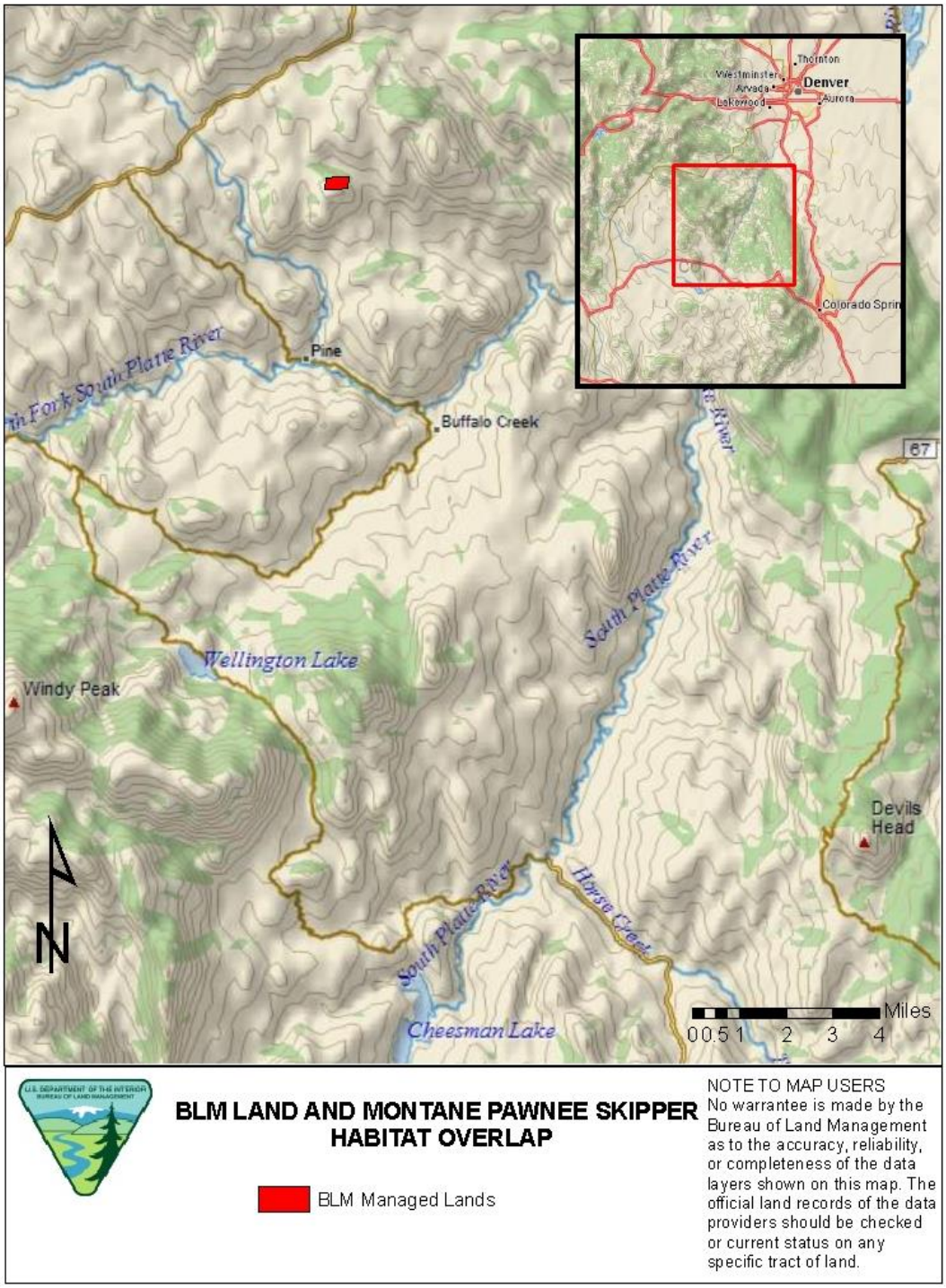
The Uncompahgre fritillary butterfly (*Boloria acrocnema*) has the smallest total range of any North American butterfly species. Its habitat is limited to two verified areas (inhabited by three colonies), and possibly an additional two small colonies in the San Juan Mountains and southern Sawatch Range in Gunnison, Hinsdale, and Chaffee counties in southwestern Colorado. All colonies known to the USFWS are associated with patches of snow willow, which provides larval food and cover, and are located above 12,500 feet. The species has been found only on northeast-facing slopes, which are the coolest and wettest microhabitat available in the San Juan Mountains (Scott 1982, Brussard and Britten 1989). Adults nectar on a range of flowering alpine plants.

The females usually lay their eggs on snow willow plants, or in litter within snow willow patches. It is believed that the species has a biennial life history, requiring 2 years to complete its life cycle (Scott 1982, Brussard and Britten 1989). Eggs laid in even years are caterpillars during the following odd year, and then mature into adults during the following even year. Although odd- and even-year broods may function as essentially separate populations, evidence of gene flow between the two (Brussard and Britten 1989) suggests that at times, larvae hatched early in the summer can develop into adults the following year.

The Pawnee montane skipper (*Hesperia leonardus montana*) occurs only on the Pikes Peak Granite Formation in the South Platte River drainage system in Colorado, involving portions of Jefferson, Douglas, Teller, and Park Counties.

An intensive distribution survey was conducted within the South Platte drainage by the consulting firms of Environmental Research & Technology, Inc. (ERT) and Professional Entomological Services Technology, Inc. (PEST) during August and September 1985. They found the range of the skipper to be centered at Deckers, Colorado, and to extend northwestward just beyond Pine, Colorado, and southward to the point where the county lines of Teller, Park, Jefferson, and Douglas Counties nearly converge. This total area is roughly 23 miles long and 5 miles wide. The total known habitat within this range is estimated to be 37.9 square miles. The area occupied by the skipper is owned and/or administered by the U.S. Forest Service (Pike National Forest), Jefferson County, Colorado State Land Board, and the Bureau of Land Management. Denver Water Department and private individuals own the rest of the habitat. The BLM-RGFO manages approximately 80 acres four miles north of Pine, Colorado within the described range of the skipper (Figure 3.3.2.20).

Figure 3.3.2.20. Overlap of Bureau of Land Management-Royal Gorge Field Office managed lands and Montane Pawnee Skipper (*Hesperia leonardus montana*) overall habitat near Denver, Colorado, 2014.




The skippers occur in dry, open, Ponderosa pine woodlands at an elevation range of 6,000 to 7,500 feet. The slopes are moderately steep with soils derived from Pikes Peak granite. The understory is limited in the pine woodlands. Blue grama grass, the larval food plant, and the

prairie gayfeather, the primary nectar plant, are two necessary components of the ground cover strata. Small clumps of blue grama occur throughout the warm, open slopes inhabited by skippers. Prairie gayfeather occurs throughout the ponderosa pine woodlands. Skippers are very uncommon in pine woodlands with a tall shrub understory (Keenan et al. 1986) or where young conifers dominate the understory (ERT 1986).

Based on quantitative skipper occurrence studies (ERT 1986), general characteristics of Pawnee montane skipper habitat include:

- Tree canopy cover of 30 percent.
- Ponderosa pine crown cover of 25 percent, Douglas fir crown cover of *5* percent.
- Tree density of less than 120 trees/acre in the smallest size class (0 to *5* feet diameter breast high); overall tree density of less than 200/acre.
- Shrub and grass cover generally less than 10 percent.
- Prairie gayfeather flower stem density ranging from 50 to 500/acre.
- Blue grama cover *5* percent or less, present nearly everywhere.

Population estimates for 1985, 1986 and 1987 were based on census survey transects and distribution survey counts (ERT 1986a, 1986b, 1988). The distribution surveys were done by plotting a 200-pace transect within each quarter/quarter section (40 acres) of each quarter section assigned for sampling. Observers counted gayfeather, blue grama and skippers along transects. The census surveys were done on 48 randomly sampled 400 meter transects. The 1985 population estimate was 80,000 to 140,000; in 1986 the estimate was 67,900 to 166,100; and in 1987, the estimate was 116,000.

## SENSITIVE SPECIES PLANTS

### Rock-loving Aletes (*Neoparrya lithophila)*

This member of the parsley family is formerly a federal candidate, BLM sensitive, and State rare. The rock-loving aletes is a narrow endemic, largely known in the San Luis Valley, that inhabits igneous rock outcrops or sedimentary rock derived from tertiary volcanic rocks with little soil development, such as shelves, crevices, and loose gravel on steep inaccessible cliffs (Anderson 2004). It is found at elevations between 7,000 and 10,000 feet and tends to prefer north-facing cliffs and ledges within piñon-juniper woodlands (O'Kane 1988; Peterson et al. 1981a). The rock-loving aletes flowers in May to early July and fruits in late June-September.

### Brandegee Wild Buckwheat (*Eriogonum brandegeei)*

The Brandegee wild buckwheat is a mat forming perennial with deep woody taproots. It inhabits steep, unstable slopes and pedestals, with much of its woody roots exposed. The Brandegee wild buckwheat has erect, densely hairy leaves that give it a bluegreen look, and it flowers and fruits during July/August. It grows in open piñon/juniper and sagebrush in white to grayish soil derived from limestone or sandstone in the Morrison Formation and Dry Union Formation between elevations 5,775-8,400 feet. (O'Kane 1988). No suitable geology or populations of Brandegee wild buckwheat were found in the panel areas. The Brandegee wild buckwheat in the Castle Gardens PCA is the largest known population (Anderson 2006). It grows in the greatest densities

on fine-textured soils on steep, eroding slopes where there is virtually no other vegetation (Neid 2007).

### Arkansas Canyon Stickleaf (*Mentzelia densa)*

The Arkansas Canyon stickleaf is a shrubby plant in the shape of a tumbleweed. It has lemon yellow flowers that open after 6 p.m. and close around 9 p.m. (Spackman Panjabi 2004). The Arkansas Canyon stickleaf is endemic to the Arkansas River Canyon between Salida and Cañon City, especially between Texas Creek and Parkdale. It grows in granite bedrock and dark shale in sparsely vegetated, gravelly substrates like rocky cliffs and outcrops, as well as sand and gravel washes (O'Kane 1988). This member of the blazing star family is a stress-tolerant, annual or short-lived perennial species that tends to prefer ruderal or disturbed environments (Darlington 1934). The Arkansas Canyon stickleaf produces numerous flowers and dies shortly after setting seed. It is inherently mobile and is likely dispersed by gravity, especially along roads and railroads.

### Fendler's False Cloak Fern (*Argyrochosma fendleri)*

This xeric fern grows in crevices of granitic or volcanic cliffs and rock outcrops in the southern Rocky Mountains in Colorado (Flora of North America Editorial Committee 1993). Its range includes southeastern Wyoming to New Mexico and to the Sonoran region of Mexico. The Fendler's false cloak fern is diminutive in size, occurs in small sporadic populations, and is difficult to detect. Little is known about this species' habitat restrictions and unoccupied habitat is prevalent surrounding known populations.

### Degener Beardtongue (*Penstemon degeneri* )

This member of the figwort family is a low-growing perennial herb on loose, poorly developed granitic soils in open piñon-juniper woodland or open ponderosa pine (Neid 2007). Reproductive timing of this species fluctuates from year to year and may not reflect abundance of different species of pollinators (Nielson 1998, Tepedino et al. 1999). Leaves are lanceolate, entire and up to 6 cm long, and the cauline leaves are more pubescent. When flowering, the plant lacks a basal rosette. The corolla of the flower is dark blue to violet and inflated. The corollas are slightly ridged on the floor and have straight, reddish guides and sparse yellow hairs on the throat.

## TERRESTRIAL VERTABRATES

### Black-tailed Prairie Dog (*Cynomys ludovicianus*)

The BLM considers the black-tailed prairie dog a sensitive species. Black-tailed prairie dogs primarily occur in scattered colonies throughout the eastern plains of Colorado. In the summer of 2001, Colorado started aerial surveys for black-tailed prairie dogs throughout their historic range. Based on known locations of black-tailed prairie dogs, transects were developed for each county to give a 95% confidence interval to the resulting data. Statewide 631,000 acres of black-tail prairie dog colonies were documented.

**Gunnison's Prairie Dog (*Cynomys gunnisoni*)**

The Gunnison's prairie dog is an Endangered Species Act candidate species. The BLM has been issued guidance not to conference on candidate species; however, mandates require that BLM authorized actions cannot contribute to the need to list.

The Gunnison's prairie dog (GDP) is limited to the high mountain valleys and plateaus in the southern Rocky Mountains. Its distribution centers on the Four Corners region where the states of Utah, Colorado, New Mexico, and Arizona meet. The northernmost population of the species is found in South Park, CO, while the southernmost population resides near the Mogollon Mountains in southwestern New Mexico.

Compared to the habitats of other prairie dog species, the habitat of GPD varies greatly with respect to topography and vegetation. In addition, the burrow systems of GPD are more similar to those of ground squirrels than they are to other species of prairie dogs. Entrances are usually located on slopes or small hummocks rather than in depressions, which protects the burrows from flooding. Most of the impacts to GPD can be attributed to predators, disease, and disturbance by man. Human caused impacts include fragmentation and loss of habitat from development, shooting and poisoning (Pizzimenti and Hoffmann 1973). Predators include such animals as badgers, coyotes, weasels, and several species of raptors, and an occasional pup may be lost to the rattlesnakes that often inhabit the burrow systems (Cully 1991 and Pizzimenti and Hoffmann 1973).

**Swift Fox (*Vulpes velox*)**

Swift foxes primarily occur in short-grass and mixed-grass prairie in the eastern plains of Colorado. The distribution of swift foxes became severely reduced in concert with conversion of mid- and shortgrass prairies to agriculture. Swift fox dens occur in ridges, slopes, hill tops, pastures, roadside ditches, fence rows and cultivated fields. Dens may be relatively close to human habitations and swift foxes occasionally den in human-made structures such as culverts. Swift foxes primarily consume animals, with leporids and rodents the most frequent prey.

**Townsend's Big-eared Bat (*Corynorhinus townsendii*)**

The Townsend's big-eared bat occurs throughout the west and in Colorado. Habitat associations include: coniferous forests, deserts, native prairies, riparian communities, and agricultural areas. 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. Townsend's 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. They often travel large distances while foraging, including movements of over

10 miles during a single evening. Townsend's are a moth specialist with over 90% of its diet composed of lepidopteron.

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.

**Common King Snake (*Lampropeltis getula*)**

This species is generally associated with lowland river valleys. In Southeastern Colorado it has been found near irrigated fields on the floodplain of the Arkansas River, in rural residential areas in plains grassland, near stream courses, and in other areas dominated by shortgrass prairie. Most activity occurs on the ground or in rodent burrows. Periods of inactivity are spent in burrows and logs, in or under old buildings, in other underground spaces, or beneath various types of cover.

Known from a few locations in southeastern Colorado (north to the vicinity of the Arkansas River) and a few sites in extreme southwestern Colorado (western Montezuma County), at elevations below about 5,200 feet. Generally difficult to find but may be locally fairly common in the very restricted range in Colorado.

**Milk Snake (*Lampropeltis triangulum*)**

The milk snake utilizes a wide variety of habitats in Colorado, including shortgrass prairie, sandhills, shrubby hillsides, canyons and open stands of ponderosa pine with Gambel oak in the foothills, piñon-juniper woodlands, arid river valleys, and abandoned mines; generally stays hidden, except at night; found under discarded railroad ties in sand-hill regions. Hibernation sites include rock crevices that may be shared with other snake species.

The species occurs throughout most of Colorado at elevations primarily below 8,000 feet and is generally scarce or at least hard to find, but locally fairly common.

**Massasauga (*Sistrurus catenatus*)**

Habitat for massasauga in Colorado consists of dry plains grassland and sandhill areas. Massasauga may be attracted to sandy soils supporting abundant rodent populations. The species occurs in the Great Lakes region of southern Ontario and western New York southwest through the Midwest and central and southern Great Plains to southeastern Arizona, northern Mexico, and southern Texas. It occurs in southeastern Colorado at elevations below about 5,500 feet.

**Mountain Plover (*Charadrius montanus*)**

Mountain Plovers are found throughout the Royal Gorge Field Office (RGFO) in suitable habitats. While the species is relatively rare they can be found generally in open, flat tablelands that display some function of disturbance such as agricultural production, drought, grazing, fire,

etc. (Knopf and Miller 1994). Primarily this species can be found during the nesting season in Colorado, within the shortgrass prairie habitat in South Park, Colorado and on the Great Plains in the eastern portion of the state.

**American White Pelican (*Pelecanus erythrorhynchos*)**

Habitat in Colorado includes rivers, lakes, and reservoirs. Pelicans will rest, roost, and nest on islands and peninsulas. Eggs are laid on the ground in a slight depression or on a mound of earth and debris 24-36 inches across, 15-20 inches high, usually on low, flat, or gently sloping terrain. Nest sites usually are in open areas but often near vegetation, driftwood, or large rocks.

**Ferruginous Hawk (*Buteo regalis*)**

The ferruginous hawk inhabits grasslands and semi-desert shrublands, and is rare in piñon-juniper woodlands. Breeding birds nest in isolated trees, on rock outcrops, structures such as windmills and power poles, or on the ground. Winter residents concentrate around prairie dog towns. Winter numbers and distribution fluctuate greatly according to the availability of prairie dogs; when a local prairie dog population dies off due to plague, hawk numbers decrease drastically. Migrants and winter residents may also occur in shrublands and agricultural areas. Ferruginous hawks are typically winter resident on eastern plains, but may nest in this area on occasion.

**Northern Goshawk (*Accipiter gentilis*)**

Habitat for the goshawk varies by region, but in southern Colorado they tend to choose ponderosa pine and mixed conifer forests. Goshawks nest in forest stands with large, older trees and relatively open canopies, and require large patches of mature matrix forest with an open understory for hunting (Kingery 1998). Goshawks will typically use the same territory year to year and often have a few alternate nest locations within their territory (Kingery 1998).

**Peregrine Falcon *(Falco peregrinus anatum)***

The peregrine falcon has rebounded from a population of 4 nesting pairs in Colorado in 1977 to 68 pairs nesting in 1985 (Kingery 1998). They have been removed from the federal endangered species list and currently are monitored as a species of special concern by CPW. Peregrine falcons prefer to nest on ledges of high cliffs and mate for life. Nests located in more accessible sites, such as dikes, are less likely to withstand increasing human disturbance. Preferred habitats for the falcon include piñon-juniper or ponderosa pine forests, and are near water and plentiful prey. An ideal eyrie also is in an area with little disturbance (Kingery 1998).

**Bald Eagle *(Haliaeetus leucocephalus)***

Colorado populations of bald eagles typically nest in large cottonwood trees along rivers and reservoirs. Eagle densities reach their peak during the winter months when migrants arrive from the north. The bald eagle is a common winter (December through February) visitor to RFGO.

Bald eagle usage (winter roosting, nesting, etc.) occurs near several major riparian areas and reservoirs on the resource area.

Environmental Effects

Proposed Action
Direct and Indirect Impacts: Due to the nature of the proposed actions, for an unplanned event, consultation with the United States Fish and Wildlife Service will take place post-fire during the emergency consultation process. However, when an unplanned event is detected and acted upon, the Service will be contacted to provide insight into possible conservation measures that may be implemented to help protect and and/or benefit listed species. Recovery activities that are to occur post-fire will also be addressed in the emergency consultation package. Planned events that may affect listed species and/or their habitat will be addressed in the Section 7 consultation process established in the Endangered Species Act prior to project implementation.

Management activities resulting from wildfire management would include all suppression and management actions and the associated activities and infrastructure necessary to support the suppression effort. Activities such as fire camps, heli-bases, heli-spots, opening of closed roads, creation of temporary roads, development or improvement of water sources (pump chance), staging areas are some of the activities that may occur. In general, direct and indirect effects to threatened, endangered, and BLM sensitive species could result from these actions/activities. These effects would, for the most part, be limited to insignificant, short-term negative effects due to disturbance and possible displacement of individuals.

There would be some risk of direct take on individual plants and animals from vehicle collisions, aerial suppression (retardant or water drops), heavy equipment operations, and human activities. There could also be some risk of long-term indirect effects from loss of essential habitat. Destruction of substrate, courting, nesting, denning, communal roosts, or other habitat necessary to maintain or improve reproductive levels could result. Conservation and protection measures should be incorporated into activity plans to mitigate these potential effects.

Effects on wildlife from fire management depend on the timing, intensity, and vegetative species burned. Treatments that cause changes in wildlife forage and habitat may be beneficial or negative, depending on the species. It is impossible to quantify these effects without having site-specific project proposals. Even with specific project design, the effects of fire, either wildfire or prescribed fire, can be significantly different even on the same vegetative communities. Response of different vegetative communities [even in similar cover class (e.g., shrub, grass, and forestland)] can have vastly different responses to similar treatments let alone different treatments or timing and intensity of treatments.

Prescribed fires may change forage quality and quantity, intersperse new feeding areas with areas providing cover, and rejuvenate decadent browse plants. Changes in vegetation structure and dispersion of burned areas are key factors when planning prescribed fires for wildlife purposes.

Many of the species listed above are unlikely to be affected by fire management actives due to the scale in which their habitat occurs on public lands. The RGFO manages little surface estate on the Great Plains and in other locales resulting in very little federal management discretion. Species associated with this scenario include the Arkansas darter, greenback cutthroat trout,

butterfly species, swift fox, lesser prairie chicken, jumping mice, black-tailed prairie dog, black-footed ferret, snake species, Colorado butterfly plant, and Ute-ladies tresses. Other species occur in areas that are unlikely to be affected by wildfire or its associated activities which include the American white pelican, piping plover, least tern, and *Eutrema penlandii*. Sensitive plant species are adapted to the fire regime in this region; therefore, no detrimental effect due to wildfire/prescribed fire would be expected. However, sensitive plant species may be affected by fire management activity, such as trampling, if camps or congregation areas are located where plants exist.

Specifically, in regard to Mexican spotted owl, direct and indirect fire effects on habitat include the alteration of vegetation structure, soil, and watershed conditions. These effects can be detrimental, beneficial, or both. Evaluation of effects is also dependent on temporal scale; effects that are detrimental in the near-term may have long-term beneficial effects. Conversely, fires may provide short-term benefits, but result in stand degradation over time. The fire-severity class is directly related to the magnitude of these effects, and it also influences whether such effects are positive or negative on owl habitat. High-severity burns have the most negative long-term effects on spotted owl nest and roost habitats but could enhance foraging habitats used by owl prey species (e.g., woodrats or deer mice) (Franklin et al. 2000, Kyle and Block 2000). Bond et al. (2002) monitored the fate of 21 color-marked owls representing all three (northern, California, and Mexican) spotted owl subspecies. They concluded that when relatively large wildfires burned known nest and roost sites, the fires appeared to have a short-term effect on survival; site fidelity, mate fidelity, and reproductive success (see also Jenness et al. 2004).

Bond et al. (2009) evaluated wildfire effects on seven radio-marked California spotted owls and found that owls roosting during the breeding season selected low-severity burned forest and avoided moderate- and high-severity burned areas. Bond et al. (2009) also found that most owls foraged in high-severity burned forest more than other burned-forest categories. Furthermore, within 1 km (0.6 mi) of the center of foraging areas, foraging owls selected all severities of burned forest and avoided unburned forest. Further, anecdotal evidence from Mexican spotted owl monitoring suggests that PACs burned with moderate-to-high fire severity continue to be occupied by reproductive owls (S. Hedwall, FWS, pers. obs.; J.P. Ward, Jr, FWS, pers. obs.). Conversely, owl surveys conducted two years post-wildfire in some previously occupied, but severely burned areas (e.g., within some areas of the Rodeo-Chedeski Fire on the Mogollon Rim in Arizona), failed to locate Mexican spotted owls (S. Hedwall, FWS, pes. comm.).

Fire-suppression activities can result in habitat loss through building of fire lines, construction of support areas such as helipads and fire camps, and ignition of backfires and burnouts to reduce the amount of fuel available to the wildfire. Whether the habitat effects of fire-suppression activities cause more or less impact to habitat than the benefits gained by controlling the fire can only be determined site-specifically, and then only to the extent that with-suppression and without-suppression scenarios can be accurately evaluated. Fire-management teams typically include resource advisors whose responsibility is to assess and attempt to minimize potential effects to threatened, endangered, and sensitive species habitats. Although fire-suppression activities can have significant negative effects on owl habitat, at least locally, fire suppression tactics like backfires and burnouts can also be used to reduce fire severity and canopy losses.

Emergency stabilization (ES) and burned area rehabilitation (BAR) treatments are applied to stabilize and rehabilitate a burned area so that it can recover more rapidly. ES is performed within one year of the wildfire to stabilize and prevent unacceptable degradation to natural and cultural resources, to minimize threats to life or property resulting from the effects of a fire, or to repair/replace/construct physical improvements necessary to prevent degradation of land or resources (USDA and USDI 2006). BAR is undertaken within three years of wildfire containment to repair or improve fire-damaged lands unlikely to recover naturally to management-approved conditions, or to repair or replace minor facilities damaged by fire (USDA and USDI 2006). Methods of ES and BAR include aerial mulching and seeding, tree planting, and construction of water/soil control structures (e.g., gabions, water bars, and straw bales). From a habitat standpoint, ES and BAR activities are probably beneficial in that they provide protection of soils, thereby reducing the likelihood of permanent soil loss in preparation for longer-term rehabilitation efforts. Use of non-native species, however, for post-fire seeding is often ineffective at meeting management objectives and may have long-term implications on forest ecology (Peppin et al. 2010). ES and BAR activities probably do not constitute a significant threat to spotted owls, but treatments instituted post-fire can have an effect on stand structure well into the future.

Guidance for Implementation of Federal Wildland Fire Management Policy (Fire Executive Council 2009) defined the WUI as the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetation fuels. These areas may include critical communications sites, municipal watersheds, high-voltage transmission lines, observatories, camps, research facilities, and other structures that, if destroyed by fire, would result in hardship to people and communities. The WUI often is defined to encompass these sites and a buffer that includes continuous slopes and fuels that lead directly to the sites, regardless of distance. The amount of area included can be substantial. Fuels reduction treatments in the WUI typically aim to reduce tree BA to 30 to 60 sq. ft./ac and change forest structure (e.g., reduce canopy cover by 35 to 75%) to significantly modify fire behavior (USDA, USDI 2001). As proposed, the intensity of many of these treatments may affect owls and owl habitat negatively. Also, note that many proposed treatments within the WUI were not consistent with guidelines in the 1995 Recovery Plan.

In context of Canada lynx, fuels treatments commonly are designed to remove understory biomass and reduce stem density in forests that are outside their historical range of variability, and to clear fuels adjacent to human developments for safety or to protect investments. These types of projects are becoming more common. In the western United States, projects designed to restore forests to a condition more representative of the historical range of variability are generally targeted to drier, lower-elevation forests affected by fire suppression (Hessburg et al. 2005), which are not lynx habitat. Lynx habitats in higher-elevation spruce-fir forests have been less affected by past fire suppression and are mostly within the historical range of variability (Agee 2000). Fuels treatments may be needed to protect human communities and capital improvements by reducing the intensity and rate of spread of a fire, affording control actions with a higher probability of success and providing safer conditions for fire fighters. By removing or reducing the understory and ladder fuels to meet those objectives, dense horizontal cover important to snowshoe hares is reduced and habitat value is diminished for hares and lynx.

Prescribed burning is a technique used to reduce tree stem density and reduce fuels. In the western United States, prescribed fire for ecosystem restoration is most applicable to the dry ponderosa pine and Douglas-fir forests that are not lynx habitat. Because spruce-fir forests are generally composed of thinner-barked trees that are easily killed even with light fire, this technique is not used frequently in most lynx habitat.

Fire and other natural disturbance processes historically played an important role in maintaining a mosaic of forest successional stages that provides habitat for both snowshoe hare and lynx (Fox 1978, Bailey et al. 1986, Quinn and Thompson 1987, Koehler and Brittell 1990, Poole et al. 1996, Slough and Mowat 1996). The response of snow-shoe hare and lynx in their use of habitat after fires follows a somewhat predictable pattern. For the first few years after a burn, there appears to be a negative correlation between lynx use and the amount of area burned (Fox 1978). This short-term effect is likely a response to a reduction of snowshoe hare populations, reduced cover, and possibly also to increased competition from coyotes in the now open habitat (Stephenson 1984, Koehler and Brittell 1990). The mid-term (10–40 years post-fire) effect on vegetation in a burned area is development of small tree and shrub cover sufficient for hare populations to reoccupy the area. The length of time varies depending on tree species, potential vegetation, fire severity, and the presence of re-sprouting broadleaf species. Where broadleaf species are denser, hare re-occupancy occurs more quickly (within 3–12 years). Hare population density again decreases as the conifer tree canopy develops and shades out the understory. Forest gap processes, such as tree blowdown, insect infestations, and outbreaks of disease, follow a similar pattern (Agee 2000).

Across the range of lynx, vegetation dynamics differ somewhat as a result of the natural fire frequency and intensity. In much of the Rocky Mountains, the fire regime was more variable in lynx habitat, with both frequent (35–100 years) stand-replacing or mixed-severity fires, and infrequent (200+ years) stand-replacement fires (Hardy et al. 1998). Disturbance interval and fire severity vary by cover type, with xeric pine types such as lodgepole typically experiencing more frequent and more severe fires than mixed-conifer types and spruce/fir.

Cohen and Miller (2001) and McKenzie et al. (2004) have suggested climate change could affect the extent of bark beetle outbreaks, in turn extending fire seasons and total area burned in the west. Land management agencies began effective fire suppression with the advent of aircraft support approximately 70 years ago. Over time, continued fire suppression altered vegetation mosaics and species composition. In the western United States, a shift to uncharacteristically severe and intense wildfires has occurred recently in lower-elevation forests (Quigley et al. 1996, Morgan et al. 1998). However, fire suppression in areas with a history of infrequent fires, as is typical of cool moist forest types such as spruce-fir forests, has probably not had much impact (Habeck 1985, Agee 1993, Schoennagel et al. 2004, Whitlock 2004). This is true across much of the boreal forest in the western United States.

The current goals for vegetation management on federal lands in the United States are to restore ecosystem health, ecological processes, and forest structure, composition, and function appropriate to the site (e.g., USDA Forest Service 2010). Westerling et al. (2006) suggested fuel management and ecological restoration practices will likely not reverse current wildfire trends; large increases in wildfires in the western United States since 1970 resulted from increased

temperatures and earlier spring snowmelt. Particularly in the western United States, ecosystem restoration is primarily focused in the dry and mesic forest types at lower elevations, rather than in lynx habitat, and includes reestablishing frequent, low-intensity fire in those systems. Applying ecosystem restoration across a landscape may reduce the risk of uncharacteristic large, stand-replacing fires occurring in the lower-elevation forest types, and thereby prevent their spread into adjacent lynx habitat.

After large dead trees fall to the ground, they provide cover and may enhance lynx foraging habitat in the short term and potential denning habitat in the longer term, depending on post-disturbance stand conditions. Standing snags also may provide sufficient vertical structure and cover to allow lynx to traverse long distances (>1 km [>0.6 mi]) across burned habitat (Maletzke 2004).

Similar to vegetation management, wildfire management may diminish, enhance, or sustain the density and distribution of snowshoe hare prey resources and lynx habitat, depending on the design and implementation of programs and actions.

Protective/Mitigation Measures: It is vital a resource advisor with background knowledge of threatened, endangered, and sensitive species in the RGFO be available during fire management related activity. While fire fighter safety is of utmost importance, a resource advisor can provide expert knowledge quickly and efficiently to ensure fire management strategy does not imperil special status species.

Overall, most species are not likely to be affected by fire management activities. In these cases, either the amount of public land managed that contains their habitat is too small to manage and/or these species occur in areas that are not conducive to wildfire or wildfire management. If fire does occur in this scenario, a resource advisor will be consulted for the best course of action to protect these species and their habitat.

Sensitive plant species may occur in areas where either wildfire or where wildfire management activity may occur. Therefore, for areas that contain populations of sensitive plants, wildfire should be managed to the greatest extent possible in a manner that reflects historical fire regimes. However, these areas should be protected to the greatest extent possible from fire management related activities outside of the fire itself (e.g. avoid setting camps or staging areas on known population sites).

Conservation measure in regards to wildland fire and fire management activity for Canada lynx are provided in the Canada Lynx Conservation Assessment and Strategy, revised in 2013 (Interagency Lynx Biology Team 2013). The conservation measures provided are as follows:

- Provide a mosaic that includes dense early-successional coniferous and mixed-coniferous-deciduous stands, along with a component of mature multi-story coniferous stands to produce the desired snowshoe hare density within each lynx analysis unit (LAU).

- Use fire and mechanical vegetation treatments as tools to maintain a mosaic of lynx habitat, in varying successional stages, distributed across the LAU in a landscape pattern that is consistent with historical disturbance processes.
- Design vegetation management to develop and retain dense horizontal cover. Focus treatments in areas that have the potential to improve snowshoe hare habitat by developing dense horizontal cover in areas where it is presently lacking. In areas of young, dense conifers resulting from fire, timber harvest or other disturbance, do not reduce stem density through thinning until the stand no longer provides low, live limbs within the reach of hares during winter (e.g., self-pruning processes in the stem exclusion structural stage have eliminated snowshoe hare cover and forage availability during winter conditions with average snowpack). If studies are completed that demonstrate that thinning can be used to extend the duration of time that snowshoe hare habitat is available (e.g., by maintaining low limbs), then earlier thinning could be considered.
- Retain mature multi-story conifer stands that have the capability to provide dense horizontal cover. If portions of these stands currently lack dense horizontal cover, focus vegetation management practices (such as group selection harvest) in those areas to increase understory density and improve snowshoe hare habitat.
- To maintain the amount and distribution of lynx foraging habitat over time, manage so that no more than 30% of the lynx habitat in an LAU is in an early stand initiation structural stage or has been silviculturally treated to remove horizontal cover (i.e., does not provide winter snowshoe hare habitat). Emphasize sustaining snowshoe hare habitat in an LAU. If more than 30% of the lynx habitat in an LAU is in early stand initiation structural stage or has been silviculturally treated to remove horizontal cover (e.g., clearcuts, seed tree harvest, precommercial thinning, or understory removal), no further increase as a result of vegetation management projects should occur on federal lands.
- Recognizing that natural disturbances and forest management of private lands also will occur, management-induced change of lynx habitat on federal lands that creates the early stand initiation structural stage or silviculturally treated to remove horizontal cover should not exceed 15% of lynx habitat on federal lands within a LAU over a 10-year period.
- Conduct a landscape evaluation to identify needs or opportunities for adaptation to climate change. Consider potential changes in forest vegetation that could occur as a result of climate change (e.g., Gärtner et al. 2008). Identify reference conditions relative to the landscape's ecological setting and the range of future climate scenarios. For example, the historical range of variability could be derived from landscape reconstructions (e.g., Hessburg et al. 1999, Blackwell et al. 2003, Gray and Daniels 2006).
- Design harvest units to mimic the pattern and scale of natural disturbances and retain natural connectivity across the landscape.
- In aspen stands, maintain native plant species diversity including conifers.
- Recruit a high density of stems, generally greater than 4,600/ha (1,862/ac), of conifers, hardwoods, and shrubs, including species that are preferred by hares.
- Provide for continuing availability of lynx foraging habitat in proximity to denning habitat.
- When designing fuels reduction projects, where possible retain patches of untreated areas of dense horizontal cover within treated areas.

- Maintain fire as an ecological process in lynx habitat, where small populations are not at risk of extirpation due to habitat loss. Evaluate whether fire suppression, forest type conversions, and other management practices have altered fire regimes and the functioning of ecosystems.
- Consider the use of mechanical pre-treatment and management ignitions if needed to restore fire as an ecological process or to maintain specific lynx and/or prey species habitat components.
- As federal fire management plans are developed or revised, integrate lynx habitat management objectives into the plans. Prepare plans for areas that are large enough to encompass large historical fire events. Collaborate across management boundaries to develop approaches that are complementary and that simulate natural disturbance patterns where possible.
- Design burn prescriptions to promote response by shrub and tree species that are favored by snow-shoe hare.

The "Recovery Plan for the Mexican Spotted Owl, First Revision" provides a number of conservation measures in response to wildland fire and fire management activity (U.S. Fish and Wildlife Service 2012). Excerpts from this document are as follows:

> The appropriate management of prescribed fire and wildland fire outside of protected activity centers (PACs) to moderate fire severity and the potential for stand-replacing fire may provide most alternatives to mitigate severe fire threats. Mechanical treatments, however, may be necessary in some areas before fire can be effectively and safely applied to meet management objectives. The focus of mechanical thinning will likely be concentrated in the WUI communities at risk to fire, where fires are a greater threat to people and property and where fire applications have much greater risk and liabilities. Planning and implementing fire risk-reduction activities should balance the intensity and arrangement of treatments needed to reduce the landscape risk of high-severity fire yet maintain owl habitat. Due to the current magnitude of forest fuel accumulations, some preliminary treatments (e.g., thinning combined with pile and low intensity prescription burning) will be required to reduce the severity of wildland fires and to allow for the safer management of prescribed fire and wildland fires. Cumulative effects of multiple treatments across the watershed, downstream effects, and effects to spotted owl habitat will need to be evaluated through landscape analyses and modeling, and effects should be moderated to promote Mexican spotted owl recovery.
>
> **Wildfire fire Suppression**
>
> *Protect Public Safety and Property.* Fire fighter safety and community protection are the utmost priorities during ES and BAR activities.
>
> *Wildfire Behavior and Incident Planning*. Conduct landscape-level fire behavior assessments to strategically locate and prioritize fire suppression activities/tactics to mitigate the effects of high-severity fire and suppression activities on PACs and recovery habitat. Potential strategies include locating fire-line construction and other suppression activities where possible outside of PACs, and conducting night burning ahead of

approaching moderate-high severity wildland fire in areas surrounding PACs to reduce wildland fire severity within PACs.

*Retain Key Habitat Elements.* Where possible, wildland fire suppression activities should be applied that limit high-severity fire and loss of key habitat elements within PACs and recovery habitats.

*Applied Research*. Research should be conducted to evaluate the short- and long-term correlates of wildland fire severities and their spatial extent on Mexican spotted owls and their habitat.

**Burned Area Emergency Stabilization (ESDOI) and Burned Area Rehabilitation (BAR-DOI).**

*Protect Public Health, Safety, and Property.* Personnel safety and community protection are the utmost priorities during ES and BAR activities.

*Seasonal Restrictions*. BAR treatments where deemed necessary in or near PACs should occur during the non-breeding season (1 Sep - 28 Feb) to minimize disturbance to resident owls during the breeding season, unless non-breeding is inferred or confirmed that year per the accepted survey protocol.

*Treatment Priorities*. ES and BAR treatments should be only be considered when critical to stabilize soils, retain key habitat elements, and enhance ecosystem recovery. Soil stabilization should be considered only where crucial and implemented through local biomass mulching or other seed-free mulching materials to minimize risk of introduced exotic species. Seeding is not recommended due to its limited effectiveness, lack of local genetically compatible seed stock, and exotic contaminants found in most seed mixes (Peppin et al. 2010a, 2010b; Dodson et al. 2010; Stella et al. 2010). If seed is used on ES and BAR efforts on BLM lands, it is required to be noxious weed-free seed and it must meet standards set forth by state seed certification agencies for seed quality. All seed to be applied on public land must have a valid seed test, within one year of the acceptance date, from a registered seed analyst. The seed lab results can show no more than 0.5% by weight of other weed seeds; and the seed lot shall contain no noxious, prohibited, or restricted weed seeds according to State seed laws.

Measures to protect remaining green trees from insect and disease may also be necessary.

**Prescribed Fire, Hazardous Fuels Treatments, and Wildland Urban Interface (WUI).**

*Protect Public Health, Safety and Property.* Fire fighter safety and community protection are the utmost priorities during prescribed fire and hazardous fuels treatment activities.

*Area Limitations*. Mechanically treat as needed up to 20% of the non-core PAC area within a recovery units identified through the landscape-level assessment.

*Seasonal Restrictions*. Light burning of surface and low-lying fuels may be conducted within PACs following careful review by biologists and fuel-management specialists on a case-specific basis. Mechanical or prescribed fire treatments should occur during the non-breeding season (1 Sep - 28 Feb) to minimize disturbance to resident owls, unless non-breeding is inferred or confirmed that year per the accepted survey protocol. Treatments should be planned when environmental conditions provide enhanced opportunities to achieve fuel reduction and forest-restoration objectives. These activities however should be deferred in severe drought years and times of high to extreme wildland fire risk.

*Types of Treatments.* Combinations of mechanical and prescribed fire treatments may be used to minimize risk of high-severity fire effects while striving to maintain or improve habitat conditions for the owl and its prey.

*Strategic Placement of Treatments.* Treatments should be placed strategically to minimize risk of high-severity fire effects to the nest core while mimicking natural mosaic patterns.

*Treatment Priorities*. Emphasize treatments in other forest and woodland types over those of PACs and recovery habitats to the extent practicable. Treatments in these areas might buffer owl habitat as well as provide fire risk reduction to WUI communities. Where appropriate, areas surrounding PACs could be treated with higher prescribed fire and mechanical treatment intensities to better achieve management objectives (e.g., reduction of hazardous fuels and potential for stand-replacing fires, enhancement of landscape, and forest structural diversity).

*Landscape Assessment*. A landscape-level assessment should be conducted to strategically locate and prioritize prescribed and hazardous fuels treatments to best mitigate the risk of stand replacing fires and high severity fire effects to current and future spotted owl habitat elements.

*Monitoring.* Monitoring should be designed and implemented to evaluate the effects of prescribed fire and hazardous fuel reduction treatments on spotted owl habitat, and to retain or move towards Mexican spotted owl desired conditions.

*Applied Research Experiments*. Management experiments should be conducted in places to evaluate the short-term, long- term, cumulative, and watershed effects of these activities on Mexican spotted owls and their habitats.

These recommendations, when implemented, should help reduce high-severity fire effects across broader forest landscapes and help protect Mexican spotted owl PACs, potential habitats, and suitable nesting/roosting habitat locations from future stand-replacing wildfires and enhance landscape-level forest resiliency to climate variability. Additionally, these recommendations are supported by current research and monitoring on Mexican spotted owl fire effects that show limited, short-term effects from moderate- to high-severity fires (Bond et al. 2002, 2009; Jenness et al. 2004).

Cumulative Impacts: In general, this alternative will provide the greatest management flexibility in using fire to achieve resource objectives, and it will achieve the desired landscape objectives in the shortest time period. By identifying the desired landscape objectives, the Plan provides a means to coordinate all of the vegetation manipulation projects in the RGFO planning area. The cumulative impact of implementing the Fire Management Plan, in conjunction with other management activities in the Royal Gorge Field Office, should affect vegetation in a positive manner over the long term, resulting in a vegetation mosaic which will reduce the likelihood of large scale insect and disease epidemics, the probability of catastrophic wildfire, and the vegetation destruction that occurs along with these.

No Action Alternative

Direct and Indirect Impacts: The No Action Alternative would continue managing fire as it currently is where the planning area is divided into polygons where fire is identified as desirable or not. Largely, the end result would be similar in terms of impacts to water quality since fire could still be used for resource benefit. This option is not as flexible and could lead to some fires that could be beneficial being suppressed.

Protective/Mitigation Measures: None

Full Suppression Alternative

Direct and Indirect Impacts: The full suppression alternative would suppress all fires whether or not they could be beneficial. In the short term, this would eliminate the potential for the severely burned areas and associated water quality impacts as described above. However, in the long term, it could lead to further fuels build up and larger, more destructive fires resulting in greater impact to.

Protective/Mitigation Measures: None

Cumulative Impacts: Cumulatively, when looked at throughout the 6$^{th}$ level watersheds of the planning area and over the long term, it is anticipated that the long term suppression of fires would further lead to a buildup of fuels and larger, hotter fires. Overall, this could lead to large scale negative water quality impacts.

Finding on the Public Land Health Standard for Threatened & Endangered species: Threatened and endangered and sensitive species habitat throughout the planning area are largely meeting Land Health Standards. The proposed action will ideally allow the historical fire regime to be restored to the landscape by managing naturally ignited fires when possible. Therefore, sensitive species habitat should be enhanced in the long-term.

### 3.3.3 Vegetation (Includes a Finding on Standard 3)

Affected Environment:

Vegetation management is the process of describing and achieving the plant community that would best support a desired resource use and resource condition on a site-specific basis. The variable climate, elevations, and soils of the Royal Gorge Field Office planning area are

conducive to extremely varied vegetation. In this document, the vegetation in the planning area is classified into three major groups: grassland, shrubland, and forestland.

These groups are broken down as follows, and estimates of acreages for each type are derived from the Royal Gorge Resource Area RMP and EIS.

Grassland Group: This group includes the grass and meadow types and covers approximately 260,000 acres of BLM-administered land or approximately 39 percent of the planning area. Types within the grassland group are blue gramma *(Bouteloua gracilis)*, mountain muhly *(Muhlenbergia* spp.*)*, and Arizona fescue *(Festuca arizonica).* These types intergrade with each other and exist throughout the planning area within specific elevational zones. Each occurs as extensive acreages or as very small parks within shrub or forest types. The grassland type provides forage for big game and livestock, and amounts can vary with site condition, precipitation, and disturbance history. Typical annual productivity can vary from next to nothing upwards to 1,000-2,000 lbs/acre in mountain grasslands. Blue gramma is found at elevations between 5,000 to 9,000 feet, mountain muhly is found at 8,000 to 10,000 feet, and Arizona fescue at 9,000 to 11,500 feet in elevation.

The meadow type includes the sedges *(Carex* spp.*)*, and rushes *(Juncus* spp.*)*, and brome meadow subtypes. Sedge-rush meadows are mostly in the South Park area, and brome meadows are the mid to high elevations throughout the resource area.

The effect of fire on grasses depends largely on their growth form and season of burning. When cured and dry, grassland fuels are ideally suited for burning. For the most part, they fall into the fine fuel category; however, the compact arrangement of stems in the "tufts" of bunchgrasses makes these portions of the plant difficult to ignite regardless of their dryness. Once ignited, however, they can smolder for long periods if enough old stem material has accumulated. Fuel accumulations and continuity in this vegetation type generally allow only cool, fast moving ground fires to occur. Fire tends to pass fairly quickly through coarse stemmed bunch grasses, which do not have much fuel concentrated at their base near reproductive structures. Fine-stemmed grasses with a dense clumping of basal stems can burn slowly and generate a fair amount of heat that can be transferred to meristems and buds. Meristems and dormant buds of different bunch grass species can be located within the bunch or *culms* above soil level, or at various depths below the soil surface. Buds and meristems can be readily exposed to lethal temperatures or be fairly well protected if deeply buried in unburned organic materials or in soil. For example, buds in the fairly compact root crown of Arizona fescue lie at or above the surface of the ground and are easily killed unless the fire is of low intensity or moves through the grass litter too quickly to ignite the root crowns.

All rhizomatous grasses increase immediately after fire. Production from rhizomatous grasses such as western wheatgrass on burned areas will be above that for non-burned areas for about 30 years (Harniss and Murray 1973).

The grasses typically re-sprout in the first year after the fire. However, the shrubs that may be found in association with the grasses are either killed or suffer major damage. The presence of cheatgrass can present a problem because it increases the flammability. On less productive sites

with discontinuous grass cover, fires are less frequent and burns are typically small and patchy. However, where grass cover is more continuous, fire frequencies were probably more frequent (10 year interval or less) and tended to maintain these sites as savannas or grasslands.

As a result of historic practices and fire suppression, extensive areas of grassland are being invaded by young piñon and juniper trees. In these areas, and many where tree invasion has not yet occurred fire would play a role in maintaining the health and sustainability of these grassland systems. Succession without fire in these areas will eventually reduce their ability to carry fires.

It is important to understand that repeated burning every few years or burning in early summer will potentially deplete a stand of perennial grasses and allow annual grasses, primarily cheatgrass to increase sharply (Pickford 1932; Wright and Klemmedson 1965).

Mountain muhly is a principle grass in some ponderosa pine/grass types where recurring fires have maintained savanna. Fire would again play a positive role in these systems where it is applied frequently enough to reduce fuels and to thin tree seedlings, and it normally recovers to pre-fire levels within about 12 months following fire. It is an important range species and it is one of the more palatable bunchgrasses for cattle. However, it becomes less palatable as it matures.

Blue gramma's response to fire varies. It may be harmed, largely unaffected, or increased by fire. Its response depends on season burning, soil moisture, temperature, plant community composition, and fire severity. Recovery following fire is more rapid during years of above average precipitation and recovery time can range from 1 to 4 years or more depending on conditions. Fires generally top-kill blue gramma. Rhizomes are generally unharmed. This species is generally less damaged when burned during the spring than when burned during the summer or fall. During the spring when soils are moist, heat penetration into the soil is slight, and damage to underground parts is minimal. Blue gramma is usually unharmed by fires in years with normal precipitation, but can be severely damaged by fires that occur during drought years.

Grassland fire regimes have shifted dramatically from the pre-settlement period. The shift to woody plant domination has been substantial over much of the planning area during the past hundred years. Grazing and possibly climate changes have acted with reduced fire to give a competitive advantage to woody plant species. Some large trees that develop thick bark with age become more resilient to surface wildfires, develop fuel discontinuities, and reduce the spread of fire. Generally this results in decreased fire frequency and encroachment by conifers that causes a reduction in herbaceous and shrub vegetation.

Shrubland Group: This group includes the piñon-juniper type at 5,000 to 10,000 feet elevation and covers approximately 300,000 acres of BLM-administered land or 45 percent of the planning area; the mountain shrub type at 6,000 to 9,500 feet; sagebrush at 7,500 to 10,000 feet; and saltbush at 5,400 to 5,500 feet.

Piñon-juniper is the most significant shrub type because of the large area it covers. It grows in shallow, rocky soils on ridges, in deep soils in valleys, and on benches. Piñon dominates at the

higher elevations and juniper is more common at the lower. Current forage production depends mainly on the successional stage of the vegetation. Mature stands support little or no understory vegetation. Young stands support a productive and diverse plant community that includes grasses, forbs, and shrubs and has a higher percent of the soil surface covered by live plants than do the mature stands.

The mountain shrub type is dominated by Gambel oak and mountain mahogany. These occur predominately in the Arkansas Canyon area or on shallow rocky soils. This type is less extensive than the piñon-juniper type, but it is important because it contributes a significant amount of forage and cover where it occurs. The sagebrush and saltbush types are less important since they occupy relatively little area on BLM-administered lands. Wyoming big sagebrush occupies an 8-12 in precipitation zone and grows from 1.5 to 2 feet tall and is the dominant subspecies along with low sagebrush *(Artemisia arbuscula)*. Dominant grasses include bluebunch wheatgrass *(Agropyron spicatum)*, Idaho fescue *(Festuca idahoensis)*, needle-and-thread *(Stipa comata)*, Thurber needlegrass *(Stipa thurberiana)*, and to a lesser extent, Indian ricegrass *(Oryzopsis hymenoides)*. All of these species or only one may be present in a particular understory.

Fires can be a useful tool in many sagebrush communities if they are timed correctly and if livestock do not graze the burn for two growing seasons. Depending on vegetation, fires should not be too frequent and should be planned in the early spring or after late summer. Rabbitbrush, a common genus in the sagebrush-grass zone, is usually enhanced by fire, as is Antelope bitterbrush if burned when the soil is wet, and seeds of antelope bitterbrush germinate best following fall burns.

Piñon-juniper woodland within the RGFO boundary occurs extensively between 5,000' and 9,000', and is located in foothill and mesa areas below the mountain shrub type across the planning area. It occurs where annual precipitation ranges from 10 to 18 inches. The major overstory species are Colorado piñon pine *(Pinus edulis)* and Rocky Mountain and One-seed juniper *( Juniperus scopulorum and Juniperus monosperma)*, with a frequently sparse understory of grasses such as muttongrass *(Poa fendleriana)* and bottlebrush squirreltail *(Elymus elymoides)*, and forbs including a variety of milkvetches *(Astragalus spp.), rock goldenrod (Petradoria pumila)*, and numerous other species. Deciduous shrubs like Utah serviceberry *(Amelanchior utahensis)*, mountain mahogany *(Cercocarpus montanus)* and Gambel oakbrush *(Quercus gambelii)* occur within higher elevation stands, or those on cooler aspects. Stands of piñon- juniper are typically interspersed with sagebrush parks composed of big sagebrush *(Artemesia tridentata ssp. vaseyana and ssp. tridentata)*, black sagebrush *(Artemesia nova)* and rabbitbrush *(Chrysothamnus spp.)*. .

In Colorado, piñon is the climax species in most piñon-juniper woodlands. It competitively confines juniper to the more marginal, low-elevation sites. Piñon is responsible for most of the increases in tree dominance and density within the piñon-juniper woodlands over the past 150 years. Within the piñon-juniper woodlands, piñon composition increases with increasing elevation. Stand composition can range from essentially pure piñon to stands where piñon is co-dominant with one, and sometimes two, juniper species. These co-dominants include One-Seed

and Rocky Mountain juniper. Blue gramma is a common understory associate throughout much of the area.

Piñon and juniper woodlands are encroaching into the ponderosa and mixed conifer forest types throughout the field office. They provide ladder fuels for fire to travel from the ground into the forest canopy placing these fire resilient trees at threat from a catastrophic wildfire.
Dense piñon-juniper stands (450 tree/acre or greater) can burn in crown fires under extreme weather conditions, generally low relative humidity, and high wind speeds. The key conditions are a closed canopy to allow the spread of fire through the crowns and abundant dead material on the ground and as snags. It appears that pre settlement fire regimes in dense stands were a mix of surface and crown fires, and that intensities and frequencies varied depending on site productivity.

On less productive sites with discontinuous grass cover, fires were probably infrequent and burns were small and patchy. Fire frequencies were probably greater than 100 years in these areas, but did occur more frequently under extreme conditions. However, where grass cover was more continuous, fire frequencies were probably more frequent (10-year interval or less) and tended to maintain these sites as savannas or grasslands.

Prior to fire suppression and heavy livestock grazing, fire, interacting with drought and competition, was an important factor maintaining boundaries between piñon-juniper associations and nearby grass or shrub communities. It is suspected that prior to the introduction of heavy livestock use that large areas of savanna and woodland periodically burned. These fires could have occurred during dry years that followed wet years when substantial herbaceous growth developed. While herbaceous species could hold off tree invasions for long periods by competing for moisture, trees would eventually invade grass stands. However, it is thought that competition and drought, when coupled with fire, typically limited piñon and juniper to rocky ridges that would not burn (Crane, 1982), or to isolated large mature trees in a savanna vegetation type.

Estimates of fire return intervals in this vegetation type in Colorado are scarce. Where estimates do exist, they often vary both because lightening frequency varies regionally and locally, and because fuel characteristics of piñon-juniper woodland vary depending on the tree density and understory characteristics. Unpublished research on piñon-juniper sites in Mesa Verde National Park indicates long fire return intervals for stand-replacing events. This research also indicates that when these events occur, the fires tend to be large and very intense (Hanna, 1996). Other estimates from throughout the West indicate fire return intervals of 8-30 years (Crane, 1982).

The successional pattern for piñon-juniper woodland following stand replacement fire is described for the Mesa Verde area by Erdman (1970) as follows: skeleton forest and bare soil tend to dominate from 0-1 years, annuals from 2-3 years, perennial grasses and forbs from 4-24 years, shrubs from 25 to 99 years, a shrub-open tree stage from 100 to 300 years, and climax woodland thereafter. This pattern takes approximately 300 years; however, new fires could set back succession before climax is achieved. In a mature woodland, lightning struck trees may be common, but fire seldom carries through the stand because of the lack of ground fuel, although strong wind conditions will carry a crown fire. In the shrub and forb dominated stages, ground

fires are more common once ignition occurs because of the continuity and flammability of the fuels. Fuel continuity is lowest in the open tree stage, or on drier sites, so these are unlikely to burn (Crane, 1982).

Under current conditions, which reflect a combination of historically heavy livestock use coupled with fire suppression, many areas formerly dominated by grass and shrubs are being invaded by young piñon and juniper trees. This succession is occurring both in chained areas and in naturally occurring parks on deep and productive soils.

Mechanical methods of clearing piñon-juniper are increasingly expensive, but should be considered in those areas where the preburn or adjacent vegetation contains undesirable species, such as cheat grass. Very hot fires can seriously slow initial succession of desirable species (Bunting 1984). Reintroducing low intensity fire into piñon-juniper woodlands could help meet ecosystem goals such as limiting tree regeneration and to maintain overstory stand densities that would promote vigorous understory vegetation for livestock and wildlife. Piñon however, is very intolerant of fire and even low intensity burns may cause mortality. Mortality rates are typically high in juniper trees. Fire is typically used where the goal is to eliminate or discourage PJ in favor of other vegetation types (Intermountain Society of American Foresters).
Fire would also play a positive role in maintaining herbaceous cover dominance in natural savannas and ecotonal grasslands. In some areas the mechanical thinning of piñon and juniper trees should preceed the prescribed fire use by several years to increase the herbaceous vegetation following the thinning which provides fuels to carry the fire, which would reduce the residual slash and kill remaining juniper seedlings. Grazing management may be critical to the success of any prescribed fire treatments in these areas as most research indicates that resting these areas prior to treatment can help supply sufficient fuels to carry the fire.

## Environmental Effects

### Proposed Action

#### Direct and Indirect Impacts:

Under the proposed action, vegetation in the planning area will be positively impacted. Implementing the proposed action will help to overcome many of the vegetation problems in the planning area that have arisen as a result of historic management practices. In vegetation types that have adapted to fire, vegetation will benefit by the removal of decadent, old age classes, allowing more vigorous, younger age classes to increase on the landscape. Other vegetation types that are fire resilient, but are now being invaded by woody species (e.g. sagebrush-grass), will benefit from the removal of the invading species and the creation of more area suitable for their growth. Vegetation types that are not fire resilient (e.g. piñon juniper woodland) will be reduced and will cover a lower proportion of the landscape. However, this vegetation type will not be reduced to the point that it becomes vulnerable. Vegetation types that typically do not burn, such as salt-desert shrub, or barren areas should not be significantly impacted. Fires can cause dramatic and immediate changes in vegetation, eliminating some species or causing others to appear where they were not present before the fire. However, in burned areas with a high component of surviving trees and re-sprouting vegetation, within a few years it will be difficult to determine that a fire recently occurred.

There is a slight chance that unintentional impacts to vegetation may occur under the proposed action for fire management in this analysis. These impacts include the spread of nonnative, invasive species; increased damage to some vegetation types by fuels treatment projects; and escaped wildfire. The proposed action has been designed to avoid or mitigate negative impacts associated with fire and fire suppression activities or with other natural disturbances that remove vegetation.

Protective/Mitigation Measures:

Knowledge of plant response to fire can be critical to the successful application of the proposed action. Design of fire prescriptions will involve the use of fire behavior prediction, fire effects, predicted severity, species survival mechanisms and adaptations to fire, as well as the use of tools to describe the set of weather and fuel moisture conditions that will be desired in a given area.

Another mitigating factor under the proposed action is that it allows for some revision and evaluation of the management or suppression tactics as more data becomes available about the use and effects of fire, and other tools that duplicate it. This flexibility is incorporated to ensure that the best approaches are being used to restore the natural disturbance effects fire once had on the vegetation.

Cumulative Impacts:

In general, this alternative will provide the greatest management flexibility in using fire to achieve resource objectives, and it will achieve the desired landscape objectives in the shortest time period. By identifying the desired landscape objectives, the proposed action provides a means to coordinate all of the vegetation manipulation projects in the RGFO planning area. The cumulative impact of implementing the proposed action, in conjunction with other management activities in the Royal Gorge Field Office, should affect vegetation in a positive manner over the long term, resulting in a vegetation mosaic which will reduce the likelihood of large scale insect and disease epidemics, the probability of catastrophic wildfire, and the vegetation change that occurs along with these.

Many of the vegetation health attributes described in Range Health Standard 3 will also show improvement with implementation of the proposed action. Standard 3 calls for healthy, productive plant communities of native and other desirable species maintained at viable population levels commensurate with the species' and habitat's potential. It also calls for populations that are able to reproduce and sustain natural fluctuations and ecological processes. This health standard is determined by indicators such as habitat connectivity, minimal amounts of undesirable weeds, adequate plant distribution for sustaining reproduction, maximal representation of all forest age classes, and adequate (several) successional stages in the landscape.

No Action Alternative

Direct and Indirect Impacts:

The No Action Alternative would continue managing fire as it currently is where the planning area is divided into polygons and fire is identified as desirable or not. Largely, the end result would be similar in terms of impacts to vegetation since fire could still be used for resource benefit. This option is not as flexible and could lead to some fires that could be beneficial being suppressed.

Protective/Mitigation Measures: None

Other Alternative – Full Suppression Alternative

Direct and Indirect Impacts:

Under the Full Suppression Alternative, all wildfires would be suppressed. Many vegetation types in the planning area would be negatively impacted. Over time, it could lead to further fuels build up and larger, more destructive fires, resulting in greater impact to vegetation. Forest health would continue to decline as forests age, densities increase, and susceptibility to insect and disease outbreaks would increase.

Protective/Mitigation Measures: None

Cumulative Impacts:

Most of the impacts under this alternative are cumulative. Historic fire suppression practices, coupled with historic heavy grazing practices, have created the current conditions where much of the landscape is already occupied by woody species, and invasive, weed species appear to be spreading. Under this alternative, piñon-juniper woodland will continue to expand and mature, leading to increased fuel loading. Eventually, much of this vegetation type will be subject to extensive infestations or disease and to catastrophic fires. Sagebrush-grass vegetation will experience continued aging of the shrubs, reduction in the herbaceous species, and invasion by trees. The mountain shrub vegetation will continue to be dominated by stands of old age class, low vigor shrubs. The dominance of conifers in the higher elevation forests will increase, and these stands may eventually undergo an uncontrollable, stand replacing fire. Also the increased likelihood of large, catastrophic fires, in turn, increases the chance that riparian vegetation will burn, which may result in the loss of old cottonwoods or the spread of salt cedar or other non-native species.

None of the cumulative impacts anticipated under this alternative comply with Range Health Standard 3, which calls for healthy, sustainable, diverse and resilient plant communities. Of course, managers will still have recourse to prescribed treatments. Mechanical or other types of cultural vegetative treatment will help to mitigate these impacts to some degree. However, under this alternative, these treatments will not be coordinated nor guided by landscape objectives for maximum efficiency.

Finding on the Public Land Health Standard for Plant Communities:

Plant Communities throughout the planning area is largely meeting Land Health Standards; however some areas are not. Most of these areas that are not meeting are the result of historic mining activity, historic fire suppression practices, historic heavy grazing practices, and

encroachment of piñon-juniper. Overall, the Proposed Action should keep the vegetation within their natural range of disturbance and function; however the threat of very large catastrophic fire is always present.

### 3.3.4 Wetlands & Riparian Zones (Includes a Finding on Standard 2)

Affected Environment:

The area and resources affected consist of inclusions of wetland and riparian resources within a wide range of land forms and elevations including many miles of stream side riparian. This results in a high variation in vegetation communities in these wetland and riparian areas in various regions managed by RGFO. Land management, soils, geology, vegetation, and land morphology dictate the stability of such environments and their ability to function during a period of change such as during, or post fire.

Precipitation inputs to a watershed are affected little by burning. However, overall watershed scale function such as interception, infiltration, evapotranspiration, soil moisture storage, and the overland flow of water can be significantly affected by fire. An increase in overland flow often results when a fire decreases interception and infiltration rates (when a severe fire consumes all or nearly all of the protective vegetative cover and litter layer). Rapid vegetation and soil condition change is a major factor in increases in stream flow, flood peak flows, sediment loads, and erosion. Prescribed or wildfire can have its greatest hydrologic influence on the infiltration processes, and as a consequence, on the potential for increased overland flow. Baseflows from springs and streams are important in maintaining perennial flow, which is critical for hydrophilic plant survival and great rates of change in baseflows can significantly alter stream channels altering stream function for periods of time post fire.

Because this is an umbrella, programmatic EA, no further attempt is made to quantify and describe the hundreds of miles and numerous acres of wetland and riparian resources. Additionally, the public land managed by RGFO often contains stream reaches draining only small portions of watersheds and private land watershed acres can also be involved and affected by fire. The public land fire impact to the larger watershed changes by watershed. Basins where public lands dominate the landscape include areas of Badger, Four Mile (north of Canon City), Currant, Eight Mile, and Grape Creeks in addition to some lesser known larger tributaries to the Arkansas River.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: The proposed action calls for case-by-case management when fires are ongoing. This will generally result in more discussion and a positive impact on wetland and riparian systems within RGFO in that each specific burn area will be considered with the objective to improve or maintain ecological conditions at a larger watershed scale. Attempting to foster more resilient and productive upland landscapes while protecting resource values at risk, best keeps fire on the landscape better than the other alternatives. Near, or total suppression has consistently lead to watersheds with imbalanced water cycles and heightened catastrophic fire risk; and when these areas burn, impacts to down gradient wetlands are more

severe. Actual burning of riparian and wetland resources, i.e. the plants within wetland zones does have a direct impact, but wetland habitats function well with disturbance and direct fire impacts are shorter lived in these productive environments than elsewhere. Fire cycle within wetlands is an accepted beneficial practice and these areas are often targeted for prescribed fire in areas with intensive management such as refuges, or wildlife management areas. It is anticipated that the Proposed Action will not have an overall negative affect to these resources, rather more positive impacts.

Protective/Mitigation Measures: The major negative impact to wetland and riparian resources from fire activity is likely to occur as a result of catastrophic fire. Large fires may need to be partially suppressed or utilize an alternative suppression action in order to maintain ecological conditions in stream and wetland environments. Input on fire size and severity of impacts would be collected through resource advisor input at the fire management planning stage. Additionally, pre fire fuel loads are better studied and monitored to help reduce the risk of catastrophic fires.

Cumulative Impacts: Fire management and mitigation as proposed will allow for wetland and riparian environments within RGFO-managed lands to function and meet BLM land heath standard at a large scale in-between fire events. Short periods of nonfunctional conditions after burns would be variable, but would always tend to recover.

No Action Alternative

Direct and Indirect Impacts: Under this Alternative, impacts would likely be similar to those of the Proposed Action. Polygon categories where fire becomes important on a larger scale occur in areas C1 through C8, D1, and D2, which include the previously mentioned portions of Badger, Four Mile, Currant, Eight Mile, and Grape Creeks along with larger tributaries to the Arkansas River. However the restrictions in place on fire size, etc. could limit getting large areas lightly burned when conditions may be favorable thus potentially keeping more area prone to catastrophic fire risk.

Protective/Mitigation Measures: Site/situation-specific impacts to the larger creeks on RGFO-managed land would need to be addressed through additional NEPA analysis and through resource advisor input during an event. Impact risk on a case-by-case scenario would need to be determined through the evaluation of specific parameters such as stream condition, soils, vegetation, fire size, fire proximity to drainage, etc.

Other Alternative

Direct and Indirect Impacts: Under this Alternative, all fires would be fully suppressed. This sustains wetland and riparian areas in that very large fires would be rare, and these systems would not be at risk of high sediment loads, poor water quality, erosion, and reduced water infiltration. However, every successful controlled fire, prescribed fire, or upland fuels treatment project will benefit wetland and riparian areas in future years over that situation brought about by catastrophic fires.

Protective/Mitigation Measures: With the suppression of all fires, case-by-case scenarios would not need to be analyzed. Protective monitoring would not need to occur. Conversely, it is

recommended that each wildfire be managed and monitored on a site-specific basis as there is a large range of variation among areas.

Cumulative Impacts: If vegetation treatments (e.g. fire, chemical, and biological treatment) do not occur, more intense fires can be predicted. The risk of losing key ecological components of riparian and wetland systems will increase.

Finding on the Public Land Health Standard for Riparian Systems: The Proposed Actions best sustains the wetland and riparian areas in a long term direction to maintain the BLM Riparian Land Health Standards over a Full Suppression Alternative. However, directly after burns within riparian areas, land health standards are possibly not likely to be met depending upon the severity. Recovery however would begin quickly and the trend towards meeting the standard would develop eventually meeting the Public Land Health Standard. These resources would not be sustained as not functioning over time given the way riparian areas recover, and that fires do not happen yearly in riparian areas.

### 3.3.5 Wildlife Aquatic (Includes a Finding on Standard 3)

Affected Environment:

Aquatic habitat is scattered throughout the affected area and varies based on soils, vegetation, land management activities, geomorphology, elevation, etc. Watershed disturbances have occurred on RGFO-managed lands for the past century. Roads to support timber harvest, timber harvest, and grazing of watersheds have cumulatively disturbed and altered watersheds. Dams, diversions, and road culverts, along with introduction of nonnative species have fragmented and isolated amphibian and fish populations. Fire suppression can alter the vegetative and litter component of forested landscapes, increasing tree density and litter loads. These combined factors have the potential to facilitate more intense fires that can be devastating to fish, amphibians and aquatic habitats. Aquatic habitat closely aligns with riparian and wetland resources (see section 3.3.4), but can also occur as seasonal waters where wetland vegetation does not develop.

Key factors in immediate fish mortality are the size of the riparian area, the riparian fuel load, fire severity, and stream size. Small streams, like those on public land, with high fuel loads that experience severity fire are the ones most likely to suffer immediate aquatic organism mortality from fire. However, the effects of wildfire fire on fish are mostly indirect. The largest problems arise from longer term impacts to habitat include ashy flows, increase in flood peak flows, sedimentation due to increased landscape erosion, and changes in stream temperature due to plant understory removal. Still, both fish and amphibians can benefit from wetland fires due to vegetation structure improvement. Amphibians specifically can benefit from increases in the surface area of open water.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: The Proposed Action will have a positive impact on aquatic wildlife. By considering ecological conditions, protecting resource values at risk, and managing on a case-by-case basis, fish and amphibians will benefit from decreases in sedimentation and improved watershed health.

Protective/Mitigation Measures: Large fires might need to have an alternate suppression action, or be managed in order to maintain riparian habitat and good water quality for aquatic wildlife. Vegetation treatments as discussed in the Proposed Action such as mechanical, prescribed fires, or treatments utilizing chemical and biological that result in the removal of deep-rooted invasive vegetation will benefit fish and amphibians. Cumulative Impacts: Managing and implementing the Proposed Action will help the riparian and wetland areas obtain or maintain proper functioning condition and optimize aquatic habitat variables.

No Action Alternative

Direct and Indirect Impacts: Under this Alternative, impacts would likely be similar to those of the Proposed Action. However, this Alternative does not fully incorporate the idea of fire as an ecological process and hazardous fuel treatments to protect communities. Site-specific consideration would benefit aquatic wildlife. Case-by-case management would help to improve or maintain these habitats for future inhabitants so the No Action Alternative is less favorable than the Proposed Action.

Protective/Mitigation Measures: Similar to proposed.

Other Alternative

Direct and Indirect Impacts: Under the Full Suppression Alternative, aquatic life would initially benefit from very rare large fires and habitat destruction. However, as time went on and land use and resource management objectives received little consideration, the risk of catastrophic fires would increase. Aquatic wildlife would be at an increased risk of loss of habitat and poor water quality.

Protective/Mitigation Measures: Similar to proposed

Cumulative Impacts: If vegetation treatments (e.g. fire, chemical, and biological treatment) do not occur, more intense fires will ensue. The risk of losing key ecological components of riparian and wetland systems will increase resulting in the extirpation of fish and amphibians.

Finding on the Public Land Health Standard for Plant and Animal Communities: The Proposed Action will have positive impacts on plant and animal communities above the Full Suppression Alternative and will help sustain public land health standards for plants and animals over the long term. A fire directly within riparian / wetland environments, depending upon the time of year and severity however would likely harm individual animals. Recolonization post fire, and with conditions moving more towards being within a natural range of variability will favor aquatic communities over the longer term as opposed to situations that arise with catastrophic fire.

### 3.3.6 Wildlife Terrestrial (Includes a Finding on Standard 3)

Affected Environment:

The mixed coniferous and ponderosa pine forests are typically very dry and warm, with less than 25 inches of precipitation annually. 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. The forests on public land are generally closed canopy systems due to a lack of disturbance. A closed canopy obstructs the amount of sunlight reaching the forest floor, inhibiting the amount of understory growth, decreasing diversity in habitat for terrestrial wildlife. Game species expected to inhabit this habitat type include elk, mule deer, black bear, and wild turkey.

Piñon-juniper habitat extends over large areas in the planning area. The piñon-juniper habitat type is evergreen woodland situated above desert or grassland vegetation and below mountain shrub. Elevations range from 5,000-9,000 feet. Colorado piñon pine is the predominate piñon species in the area and Rocky Mountain juniper is also dominate. Proportions of juniper and piñon within this habitat type vary greatly, and pure stands of either tree may occur. Typically, as elevation increases piñon dominance increases, juniper density decreases, total tree density increases, and trees become larger. Piñon pines drop out completely at the lowest elevations. Depending on site variables, piñon-juniper may range from an openly spaced savanna to a closed forest. Piñon-juniper understories vary from completely open to quite dense, the densest understories occurring in open canopy woodland/oak communities. Soils underlying piñon-juniper often are shallow, rocky and low in fertility. Piñon-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 eastern plains of Colorado and portions of South Park, Colorado contain flat to gently rolling topography, with occasional canyons and bluffs. The dominant habitat in this physiographic area is shortgrass prairie. Shortgrass is dominated by two low-growing warm-season grasses, blue grama and buffalo grass; western wheatgrass is also present, along with taller vegetation including widespread prickly-pear cactus and yucca, and cholla in the south. Sandsage prairie is found where sandy soils occur, and is dominated by sand sagebrush and the grasses sand bluestem and prairie sand-reed. Mixed grass (needle-and-thread, side-oats grama) and tallgrass (big bluestem, little bluestem, switchgrass) communities occur locally.

In the shortgrass prairie, lowland riparian habitats occur along the few stream and river courses. Riparian vegetation is dominated by plains cottonwood, willow shrubs, and introduced species such as Russian-olive and Chinese elm. Trees were uncommon features of the shortgrass prairie before European settlement; development of woody vegetation has been facilitated in historical times by alteration of natural river flow regimes, a result of irrigation drawdown and reservoir construction for flood control.

Elk populations are typically meeting or exceeding population objectives set by Colorado Parks and Wildlife. Elk are both grazer and browsers, although they show a strong preference for grasses when available. Elk are inhabitants of a variety of seasonal and transitional ranges, occupying nearly all habitat types available at some point throughout the year. Currently, habitat factors are not limiting the elk population. In Colorado, elk numbers are primarily managed through hunting which is the primary cause of mortality.

Mule deer populations for this area are currently below Colorado Parks and Wildlife objectives. Being a successional species, deer rely on pre-climax habitat conditions. As the trend since the

early 1900s has been towards more stability and approaching climax vegetative conditions, the ability of the habitat to support deer has declined. The primary causes of this trend in habitat conditions are thought to result from the elimination of wildfire from the forests, the encroachment of forest cover in formerly open grassland and shrubland habitats, and the improved soil and range management that has resulted in more stable grasslands. All these factors are to the detriment of the forb and shrub components, which are important parts of the deer diet.

The Merriam's turkey is a fairly common resident in foothills and mesas of southern Colorado. The Merriam's turkey is common in the assessment area in suitable habitat. Merriam's are found primarily in ponderosa pine forests with an understory of Gambel's oak. Tall pines are used during all seasons for roosting. In the assessment area it is often found in foothill shrublands (mountain mahogany) and piñon-juniper woodlands.

Black bear, mountain lion, bobcat and other meso-carnivores among others likely inhabit the project area sporadically. Home ranges of these species can be very large resulting in a small probability of occupancy at any one time.

Environmental Effects

Proposed Action
Direct and Indirect Impacts: Management activities resulting from wildfire management would include all suppression and management actions and the associated activities and infrastructure necessary to support the suppression effort. Activities such as fire camps, heli-bases, heli-spots, opening of closed roads, creation of temporary roads, development or improvement of water sources (pump chance), staging areas, are some of the activities that may occur. Direct and indirect effects to species could result from these actions/activities. These effects would, for the most part, be limited to insignificant, short-term negative effects due to disturbance and possible displacement of individuals.

There would be some risk of direct take on individual animals from vehicle collisions, aerial suppression (retardant or water drops), heavy equipment operations, and human activities. There could also be some risk of long-term indirect effects from loss of essential habitat. Destruction of courting, nesting, denning, communal roosts, or other habitat necessary to maintain or improve reproductive levels could result. Conservation and protection measures should be incorporated into activity plans to mitigate these potential effects.

Effects on wildlife from fire management depend on the timing, intensity, and vegetative species burned. Treatments that cause changes in wildlife forage and habitat, may be beneficial or negative, depending on the species. It is impossible to quantify these effects without having site-specific project proposals. Even with specific project design, the effects of fire, either wildfire or prescribed fire, can be significantly different even on the same vegetative communities. Response of different vegetative communities [even in similar cover class (e.g., shrub, grass, forestland) can have vastly different responses to similar treatments let alone different treatments or timing and intensity of treatments.

Prescribed fires may change forage quality and quantity, intersperse new feeding areas with areas providing cover, and rejuvenate decadent browse plants. Changes in vegetation structure and dispersion of burned areas are key factors when planning prescribed fires for wildlife purposes.

While complete type conversion of juniper sites to grassland may reduce wildlife diversity, creating a mosaic of successional stages with prescribed burning can benefit wildlife (Severson and Medina 1984). Spotty burning would favor the greatest diversity of rodent and bird species (Wright and Bailey 1982). Fire suppression has favored expansion of mule deer populations in some juniper areas because of the increased forage or cover. Deer and elk use of burned juniper areas depends on post-fire successional stages (Stager and Klebenow 1987), because burning can eliminate some important deer browse species (McCulloch 1969). An important factor in the degree of use of burned juniper habitats by deer and elk is the interspersion of burned habitats, which provide food, and unburned sites, which provide thermal and hiding cover. Old growth juniper stands may offer unique and valuable wildlife habitats, adding to the variety within juniper stands. When planning site-specific treatments, it should be recommended that these old growth communities be left standing as islands and edge communities to the prescribed burning areas.

Fire effects on wildlife in coniferous forests depend on ecological relationships and animal habitat needs. Ground fires have little direct influence on tree squirrels and may even be favorable by perpetuating ponderosa pine communities (Wright and Bailey 1982). Ground squirrels initially decreased in burned ponderosa pine communities but increased later as early successional advances were made (Lowe et al. 1978). Fire would probably adversely affect chipmunks in those communities where drier conditions prevail, but chipmunks may increase post-burn on more moist sites (Lowe et al. 1978, Wright and Bailey 1982). Total bird numbers increased initially after burning in ponderosa pine communities but fell to below pre-fire levels later, although some individual species responded in an opposite manner (Lowe et al. 1978).

In one study, both deer and elk decreased their use of areas immediately following a burn but quickly increased levels of use as compared to control plots. Benefits to deer and elk from fires in these types are generally related to increases in understory vegetation (Leege and Hickey 1971, Severson and Medina 1983). Burns in Douglas-fir and ponderosa pine communities improved forage palatability to mule deer (Keay and Peek 1980). Prescribed fire also can improve winter forage for mountain sheep (Hobbs and Sporwart 1984). Prescribed fire can be used to rejuvenate old aspen stands, increasing habitat for moose, elk, deer, grouse, and snowshoe hare, all of which depend on the forage or cover produced in a young aspen community (DeByle 1985).

Because mechanical treatments have the advantage of being highly selective, impacts to wildlife can be minimized through properly designed treatment plans developed in site-specific environmental analyses. These treatments would benefit wildlife that adapt to lower seral stages of vegetation referred to in prescribed fire. Wildlife species diversity may be reduced in the treatment areas, but the habitat edges created by the treatments will have increased wildlife species diversity. Mechanical methods can result in soil compaction, damaging the subterranean habitat used by burrowing animals. In general, mechanical treatments can be beneficial for wildlife if the treatment areas are arranged in strips and patches and if methods are selected that increase browse and forage availability.

Site-specific environmental assessments for each vegetation treatment will ensure that local wildlife species concerns are addressed. All treatments would affect some change in the wildlife communities, which would be analyzed in the site-specific environmental analysis. The project would not be recommended if the impacts to the wildlife community are unacceptable or cannot be mitigated. Properly designed treatments can enhance wildlife and species diversity by creating edge effect. The amount of edge per unit area is directly related to habitat and species diversity. Any improvement of vegetative communities that increases structural (both horizontal and vertical) and species diversity would indirectly benefit wildlife.

Vegetation treatments can be considered tools for wildlife habitat management when vegetation responses and habitat requirements are understood. Accordingly, determinations on whether particular vegetation treatments will increase or decrease wildlife populations must be made on a site-specific basis, with consideration for local vegetation and wildlife information and responses to treatment.

The proposed action would result in fewer cumulative impacts to wildlife species and habitat compared to cumulative effects of the large, catastrophic wildfires that would be prevented. If fuels are left untreated, many of these wildfires would be stand replacement fires with a drastic change in ecological condition from late seral climax vegetation to an early seral stage.

Protective/Mitigation Measures: Avoid disturbance or degradation of designated habitats of concern by placement of temporary facilities (such as fire camps, staging areas, and helibases) and infrastructure.

During multiple ignition episodes ensure that priority wildlife habitat data are available during initial attack and incorporated into situation analyses.

Give wildfire suppression priority to designated known wildlife habitat, especially known special status species habitat, unless doing so would compromise protection of human life or property.

Use direct attack tactics when it is safe and effective at minimizing the amount of wildlife habitat imperiled by wildfire.

Retain unburned areas (including interior islands and patches between roads and fire perimeter) of wildlife habitat, unless doing so would compromise safety, resource protection, or wildfire control objectives.

To the greatest extent possible, protect nesting trees associated with raptors.

Cumulative effects of wildfires and vegetation treatments on wildlife habitat in the area should be considered in site-specific NEPA analyses.

Where appropriate, adopt vegetation treatments in wildlife habitat areas to control invasive weeds and aid the recovery of native vegetation.

Wildlife habitat enhancements should be included in fuels project design when feasible.

Fuels projects should be designed to enhance wildlife species and habitat diversity in concert with fuels management objectives by:

- Burning in a mosaic pattern to create ecotones or edge effect in vegetation
- Using mechanical treatments to create diversity in burn patterns in areas where fuel type and loadings are contiguous

Grassland features:

- If treatment areas are dominated by exotic annual grasses projects should include restoration and, if necessary, reseeding to re-establish native vegetation.

Forestland and woodland features:

- General: Treatments should maintain snags and down woody debris as important habitat features. The amount of snags and debris should be based on apparent natural occurrence in the larger area surrounding fuels projects.
- Aspen: Fuels treatments in aspen stands could be used to improve vigor, stimulate regeneration, increase vegetative diversity, and preserve the genetics of aspen clones in degraded aspen stands.
- Piñon/Juniper: To achieve fuels management benefits while minimizing impact to wildlife, treatments should focus on dense young piñon/ juniper as opposed to mature, large piñon/juniper. Manage ecotones to have piñon/juniper with prominent shrub understories to promote wildlife diversity.

Shrubland features:

- Vegetation management strategies should be consistent with historical succession and disturbance regimes. Strategies should be based on comparison of historical and current ecological processes and landscape patterns, and should address the habitat needs shrubland dependent species.
- Shrubs along riparian zones, meadows, lake beds, and farmlands should be maintained to provide habitat diversity, forage, and hiding cover for wildlife.

Cumulative Impacts: In general, this alternative will provide the greatest management flexibility in using fire to achieve resource objectives, and it will achieve the desired landscape objectives in the shortest time period. By identifying the desired landscape objectives, the proposed action provides a means to coordinate all of the vegetation manipulation projects in the RGFO planning area. The cumulative impact of implementing the proposed action, in conjunction with other management activities in the Royal Gorge Field Office, should affect vegetation in a positive manner over the long term, resulting in a vegetation mosaic which will reduce the likelihood of large scale insect and disease epidemics, the probability of catastrophic wildfire, and the vegetation destruction that occurs along with these.

No Action Alternative

Direct and Indirect Impacts: The No Action Alternative would continue managing fire as it currently is where the planning area is divided into polygons where fire is identified as desirable or not. Largely, the end result would be similar in terms of impacts to water quality

since fire could still be used for resource benefit. This option is not as flexible and could lead to some fires that could be beneficial being suppressed.

Protective/Mitigation Measures: None

Full Suppression Alternative

Direct and Indirect Impacts: The full suppression alternative would suppress all fires whether or not they could be beneficial. In the short term, this would eliminate the potential for the severely burned areas and associated water quality impacts as described above. However, in the long term, it could lead to further fuels build up and larger, more destructive fires resulting in greater impact to water.

Protective/Mitigation Measures: None

Cumulative Impacts: Cumulatively, when looked at throughout the 6$^{th}$ level watersheds of the planning area and over the long term, it is anticipated that the long term suppression of fires would further lead to a buildup of fuels and larger, hotter fires. Overall, this could lead to large scale negative water quality impacts.

Finding on the Public Land Health Standard for Plant and Animal Communities: Plant and animal communities throughout the planning area are largely meeting Land Health Standards. However, due to the removal of the natural fire regime, forest encroachment and over stocked stands are becoming increasingly prevalent. The proposed action will ideally allow the historical fire regime to be restored to the landscape by managing naturally ignited fires when possible. Therefore, plant and animal communities should be enhanced in the long-term.

### 3.3.7 Migratory Birds

Affected Environment:

Ponderosa pine forests are very dry and warm, with less than 25 in of precipitation annually. 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 sometimes found mixed with ponderosa pine are junipers, piñon pine, aspen, white fir, and Douglas-fir. Birds typical of the ponderosa pine forest type include Merriam’s turkey, Williamson's sapsucker, pygmy nuthatch, western bluebird, band-tailed pigeon, Grace’s warbler, flammulated owl, red-breasted nuthatch, violet-green swallow, western tanager, and chipping sparrow. Ponderosa pine forests support a rich avifauna, in part a reflection of the prevalence of Gambel’s oak in many ponderosa stands. Oak adds structure and prey--insect densities are higher in oak than in nearby conifers.

Birds typical of the ponderosa pine forest type include wild turkey, pygmy nuthatch, western bluebird, and chipping sparrow. More bird species are found in ponderosa pine forests than any other coniferous forest habitat in this region. This abundant bird life reflects in part the prevalence of Gambel oak in many ponderosa stands. Oak adds structure, acorns, and prey--insect densities are higher in oak than in nearby conifers. Five species are identified as high priority in ponderosa pine habitats: band-tailed pigeon, flammulated owl, Mexican spotted owl, Lewis's woodpecker, and Grace's warbler.

Piñon-juniper habitat supports the largest nesting bird species list of any upland vegetation type in the West, and this habitat type is the most prevalent in the resource area. The richness of the piñon-juniper vegetation type is important due to its middle elevation. Survey tallies in piñon-juniper are similar in species diversity to the best riparian. Several species are found in the piñon-juniper habitat and include: black-chinned hummingbird, gray flycatcher, Cassin's kingbird, gray vireo, piñon jay, juniper titmouse, black-throated gray warbler, Scott's oriole, ash-throated flycatcher, Bewick's wren, mountain chickadee, white-breasted nuthatch, and chipping sparrow.

The eastern plains of Colorado and portions of South Park, Colorado contain flat to gently rolling topography, with occasional canyons and bluffs. The dominant habitat in this physiographic area is shortgrass prairie. Shortgrass is dominated by two low-growing warm-season grasses, blue grama and buffalo grass; western wheatgrass is also present, along with taller vegetation including widespread prickly-pear cactus and yucca, and cholla in the south. Sandsage prairie is found where sandy soils occur, and is dominated by sand sagebrush and the grasses sand bluestem and prairie sand-reed. Mixed grass (needle-and-thread, side-oats grama) and tallgrass (big bluestem, little bluestem, switchgrass) communities occur locally.

In the shortgrass prairie, lowland riparian habitats occur along the few stream and river courses. Riparian vegetation is dominated by plains cottonwood, willow shrubs, and introduced species such as Russian-olive and Chinese elm. Trees were uncommon features of the shortgrass prairie before European settlement; development of woody vegetation has been facilitated in historical times by alteration of natural river flow regimes, a result of irrigation drawdown and reservoir construction for flood control.

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 and BCR 18-Shortgrass Prairie. 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, piñon-juniper woodlands, and ponderosa pine forests, but 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.

Northern harriers reside throughout Colorado, with highest densities on the eastern plains, mountain parks, and western valleys. These hawks feed on small mammals, birds, reptiles, and amphibians. They hunt by flying low over wetlands, grasslands, shrublands, and croplands.

Peregrine falcons in Colorado breed on cliffs and rock outcrops from 4,500-9000 ft. in elevation. They most commonly choose cliffs located within piñon-juniper and ponderosa pine zones. These falcons feed on smaller birds almost exclusively, with White-throated swifts and rock doves being among their favored 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.

Flammulated owls prefer old-growth or mature ponderosa pine, apparently 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 under story 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.

Piñon 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. Piñon jays are piñon and juniper obligates in Colorado and nest commonly at the lower elevations of piñon-juniper woodlands, often where junipers dominate. A few nest in ponderosa pine. They prefer extensive stands far from high human activity.

Black-throated gray warblers are fairly common summer residents in piñon-juniper woodlands across the southwestern half of Colorado. Some surveys show these warblers to be the most frequently encountered birds in the piñon-juniper woodland. Black-throated gray warblers, in Colorado, are piñon-juniper obligates, preferring tall, dense piñon-juniper woodlands.

Virginia's warblers in Colorado nest between 5,000-9,000 feet in elevation. They breed most abundantly in the western quarter of the state, along the eastern slope foothills, and in the upper Arkansas River drainage. Virginia's warblers nest in dense shrublands and on scrub-adorned slopes of mesas, foothills, open ravines, and mountain valleys in semiarid country. They use scrubby brush, piñon-juniper woodland with a well-developed shrubby understory, ravines covered with scrub oak and dense shrublands--especially Gambel oak. They also breed in open ponderosa pine savannahs that have a dense understory of tall shrubs.

Williamson's sapsuckers breed in forested regions and in Colorado populations are concentrated along the eastern edge of the Rockies. Williamson's sapsuckers nest primarily in ponderosa pine and in aspen components of mixed-conifer. They often place nest cavities in aspen trees, and often choose nest trees in aspen stands adjacent to open ponderosa pine or mixed-conifer forest.

The Gray vireo nests in western Colorado and on the eastern slope of Las Animas County. Gray Vireos are piñon-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.

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 Gamble’s oak.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Migratory birds inhabiting the region have evolved in the presence of fire under historic fire regime conditions. Wildfires typically create a mosaic pattern of burned and unburned vegetation and historically altered the successional stages on a landscape scale. For these reasons, the short-term effects of fire are positive for species that exploit early seral habitats and negative for species relying on more mature forest types. While some habitat loss or displacement of individual birds would occur in areas subjected to fire (whether planned or unplanned), long-term benefits to migratory birds, such as increased in habitat diversity, improved habitat quality, and enhanced ecosystem vigor, would be derived by restoring fire maintained habitats.

Species such as the hairy woodpecker, mountain bluebird, chipping sparrow, pine siskin, American robin, dark-eyed junco, yellow-rumped warbler, western tanager, Cassin's finch, northern flicker, red-breasted nuthatch are common in early successional forests and will benefit from fires (Hutto 1995). Some species (black-backed woodpecker, three-toed woodpecker, olive-sided flycatcher, Townsend's solitaire) are post-fire specialists (Hutto 1995). In contrast, brown creepers, kinglets, hermit thrushes, and certain warblers are more commonly associated with denser, more mature forests (Hutto and Young 1999).

Direct and indirect effects to migratory birds could result from activities that alter existing vegetative communities. Depending on timing of disturbances, nesting migratory birds could be disturbed and productivity of individual pairs reduced. Current activities occurring within RGFO are not expected to be of sufficient magnitude to adversely affect migratory birds on a population level although some activities may negatively affect individuals and/or nesting pairs. The measures used to determine the level of impact to migratory birds associated with managed fire include alteration of nesting and foraging habitat and disruption of reproductive activities.

Unplanned events, such as wildfire and fire suppression activities, have the potential to affect migratory birds and their habitat. However, direct adverse impacts occurring to birds from wildfire are unpredictable and, therefore, unknown. Direct impacts to migratory birds, such as mortality and reduction in reproductive success, resulting from wildfires are likely reduced in localized areas. Allowing the management of wildfire for resource benefit would benefit migratory birds in the long-term by creating mosaics of successional vegetation, improving foraging and nesting habitat.

Planned events, such as prescribed burns and mechanical treatments, are primarily associated with hazard fuels reduction efforts. Resource objectives associated with planned events are secondary to other management objectives and would be primarily limited to creating age-class diversity and vegetative mosaics in vegetative communities.

There is potential of directly and indirectly affecting migratory birds through modification of suitable habitat, disturbance and displacement during critical life stages, and changing the risk of mortality. Mechanical treatments may cause, in the short-term, a small reduction in migratory bird habitat, reduce habitat quality, and create disturbances that may displace individual birds in

proximity to WUI areas. However, these actions are expected to affect birds on a localized and individual level. The vast majority of habitat in RGFO occurs outside of developed areas.

Prescribed fire would be used to achieve resource objectives but a small portion may be part of the hazard fuel reduction program. Prescribed burns may adversely impact migratory birds in the short-term by altering plant communities and displacing individuals from certain portions of habitat. The long-term effects can create vegetative diversity that favors some migratory bird species.

Protective/Mitigation Measures: For planned projects, 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.

Cumulative Impacts: In general, this alternative will provide the greatest management flexibility in using fire to achieve resource objectives, and it will achieve the desired landscape objectives in the shortest time period. By identifying the desired landscape objectives, the proposed action provides a means to coordinate all of the vegetation manipulation projects in the RGFO planning area. The cumulative impact of implementing the proposed action, in conjunction with other management activities in the Royal Gorge Field Office, should affect vegetation in a positive manner over the long term, resulting in a vegetation mosaic which will reduce the likelihood of large scale insect and disease epidemics, the probability of catastrophic wildfire, and the vegetation destruction that occurs along with these.

No Action Alternative

Direct and Indirect Impacts: The No Action Alternative would continue managing fire as it currently is where the planning area is divided into polygons where fire is identified as desirable or not. Largely, the end result would be similar in terms of impacts to water quality since fire could still be used for resource benefit. This option is not as flexible and could lead to some fires that could be beneficial being suppressed.

Protective/Mitigation Measures: None

Full Suppression Alternative

Direct and Indirect Impacts: The full suppression alternative would suppress all fires whether or not they could be beneficial. In the short term, this would eliminate the potential for

the severely burned areas and associated water quality impacts as described above. However, in the long term, it could lead to further fuels build up and larger, more destructive fires resulting in greater impact to water.

Protective/Mitigation Measures: None

Cumulative Impacts: Cumulatively, when looked at throughout the 6th level watersheds of the planning area and over the long term, it is anticipated that the long term suppression of fires would further lead to a buildup of fuels and larger, hotter fires. Overall, this could lead to large scale negative water quality impacts.

## 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 resources that make up a unique cultural record. 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 varies throughout BLM RGFO-administered land, which includes the plains, foothills, Front Range Mountains, South Park Valley, and the Arkansas and Platte River drainages. Within the analysis area, and as of this writing, there are over 70,000 individual cultural resources within the RGFO administrative area. Of those, nearly 12 percent are considered historic properties – i.e. eligible for inclusion on the National Register of Historic Places (NRHP). Pursuant to the Section 106 process, BLM aims to inventory, identify, and evaluate cultural resources, and subsequently mitigate the effects of federal actions on historic properties.

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, which directly contributes to the long-term degradation and destruction of archaeological resources. Proactive fire and fuels management has the potential to allow for the maintenance of healthy forests and to minimize threats to cultural resources resulting from fire and firefighting activities.

The proposed action involves both planned and unplanned fire activities. Planned activities may include hand and mechanical thinning, chemical herbicide application, and prescribed burning.

Wildfire suppression activities are reactionary and lack prior planning for potential impacts. Unplanned incident fire control actions include construction of hand lines, dozer lines, and staging areas, and often involve retardant drops and off-road vehicle travel. Unplanned fire incidents present a genuine threat to life and property and require quick, decisive action, often precluding advance identification and evaluation of cultural resources.

The effect of fire (whether planned or not) and fuels management actions on cultural resources depends on the methods and specific techniques used, resulting in direct, indirect and cumulative impacts. Mechanical and hand treatments may create ground disturbance resulting in vegetation removal and soil compaction that could undermine the cultural contexts of prehistoric and historic sites. Heavy equipment and ATVs used off roads and trails may have the greatest impacts in that they possess the potential to directly impact the surface and shallow subsurface via tire and track damage, soil churning, uprooting, and mulching and cutting (Andrews 2004). Cultural resources within these areas may potentially be directly impacted (crushed, deflated, dispersed) or dislodged and displaced thereby compromising the cultural context and information potential of the material.

Ground disturbance can also cause the loss of vegetation cover and subsequent soil movement, which could erode buried cultural deposits. Subsequent increases in surface vegetation following thinning actions can also make cultural resources harder to identify. The temporary or permanent relocation and disposition of removed material must also be considered. 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 altering the chemical composition of the sedimentary matrix, potentially resulting in changes in the preservation potential of those soils and sediments.

The burning of thinned materials (prescribed pile burning) can also significantly impact cultural resources (see below). Fire response activities such as the construction of hand and dozer lines, clearing staging areas, and dropping retardant and other liquids can also have significant direct impacts on cultural resources.

The use of fire to treat areas where mechanical 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.

Fire can damage prehistoric artifacts and features in variable ways depending on location, fuel characteristics, depth of cultural deposits, and degree of exposure (Andrews 2004). Fire can directly affect the artifacts and features themselves, as well as compromise the context and associated informational value of these items (RMRS 2012, Andrews 2004). For example, direct exposure to heat may cause rock art panels to spall or become covered in the byproducts of combustion (ash, soot); rock art panels are frequently located on easily carved or otherwise

manipulated rock surfaces (often sandstone or limestone), and these rock types are particularly susceptible to spalling and physical degradation (Kelly and McCarthy 2001, Tratebas et al. 2004). 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. Damage to aboriginal lithic artifacts from rapid heating includes spalling and fracturing of chipped and ground stone tools, resulting to changes in form and character (Ahler 1983, Collins and Fenwick 1974), and may also give a false indication of anthropogenic use of fire in the lithic manufacturing process, thereby complicating interpretation (Domanski and Webb 1992). Surface fires contribute charcoal and ash to the sedimentary matrix and may further conflate understandings of anthropogenic use of fire that may have been evidenced in surface and subsurface hearth features. Direct heating can also compromise pollen, photolith, and protein analysis, further limiting the information potential of artifacts and features. Surface fire and charcoal can also compromise radiometric, dendrochronological, and archaeomagnetic dating results, 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.

**Proposed Action for Planned Fire Management Actions**

Direct and Indirect Impacts: The proposed fire management actions present the potential for direct and indirect effects to cultural resources. However, until specific areas are identified for treatment or rehabilitation, effects on historic properties cannot be definitively assessed.

Recommended Mitigation Measures: Because cultural resources inventories will not be completed for the present Environmental Assessment, it is not possible to identify specific mitigation measures at this time. In general, however, planned thinning and prescribed fire treatment activities will be identified through the planning process on a case-by-case basis, with the goal of identifying at-risk historic properties and previously unsurveyed areas. BLM will require reconnaissance (Class II) or intensive (Class III) inventory within the area of potential effects (APE) in order to identify and evaluate impacts to historic properties as outlined below. Similarly, post-fire stabilization and rehabilitation will be evaluated on a case-by-case basis and will require a Class II or Class III inventory (or some combination thereof) prior to stabilization or rehabilitation action.

In general, BLM has developed the following process for identifying and evaluating impacts resulting from planned fire and fuels management activities:

1. Project Initiation:
   - BLM will identify and involve the public, interested parties, and Native American tribes as necessary.

2. Inventory and Identification:
   - BLM will conduct reconnaissance (Class II; sample) inventories for all proposed mechanical and chemical (herbicide) vegetation treatment requests

in order to identify historic properties that might be affected. If previous, nearby survey results, archaeological or institutional knowledge of the area, and/or the Class II inventory indicates that historic properties are located within the APE, and likely to be impacted by the proposed action, an intensive (Class III; 100 percent) pedestrian inventory will be required.

- BLM will conduct a Class III inventory for all proposed pile burns, temporary roads, and staging areas associated with hand or mechanical thinning.
- BLM will conduct Class III inventories for all proposed prescribed burn requests in order to identify historic properties that might be affected.
- BLM will seek and consider the views of a Native American tribe that attaches religious and cultural significance to cultural resources or places within the APE.

3. Evaluation of Eligibility and Effect:
   - If previously-recorded historic properties are located in the APE BLM will analyze the impact of the undertaking on the historic properties, including a field visit and subsequent treatment, if necessary.
   - If resources are identified within the APE as a result of either a Class II inventory, Class III inventory, or both, BLM will evaluate the resource(s) for NRHP significance and integrity and will develop a plan to avoid, minimize or mitigate any adverse effects of the action on historic properties. Historic property avoidance is always the preferred option.

4. Mitigation of Adverse Effects
   - If historic properties in the APE cannot be avoided, BLM will prepare a plan to mitigate the effects of the fire management action. Mitigation strategies to historic properties will be completed in consultation with the Colorado State Historic Preservation Office (SHPO), the Advisory Council on Historic Preservation (ACHP), and potentially affected Indian tribes and other consulting parties, as needed. SHPO concurrence with BLM's mitigation plan will be required before the fire management action commences and a formal agreement document (Memorandum of Agreement – MOA) may be required, pursuant to the Colorado State Protocol. Mitigation may include, but is not limited to, data recovery, HABS/HAER documentation (for standing buildings, structures and other historic-era phenomena), stabilization, and production of synthetic and/or historic context documentation. Where the proposed action may be phased into a multi-year undertaking whose effects

are undetermined, a project specific Programmatic Agreement (PA) may be required to complete the 106 process.

Post-fire stabilization and rehabilitation will be evaluated on a case-by-case basis, through the NEPA process, and may require a Class II or Class III inventory (or some combination thereof) prior to stabilization or rehabilitation action. Post-fire rehabilitation also presents the opportunity to evaluate the effect of fire on cultural resources and refine expectations for future impacts.

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

Cultural Resource Specialists will:

- Work with fire managers 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.

Fire Managers will:

- Avoid burning heavy fuel accumulations in the vicinity of sensitive historic properties and/or cultural resource 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 historic properties and/or cultural resource areas.

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

No Action Alternative

Direct and Indirect Impacts: Same as Proposed Action.
Protective/Mitigation Measures: Same as Proposed Action.

Full Suppression Alternative

Direct and Indirect Impacts: Same as Proposed Action.
Protective/Mitigation Measures: Same as Proposed Action.

**Proposed Action for Unplanned (Incident) Fire Management Actions**

Direct and Indirect Impacts: Wildfire suppression activities are reactionary and lack prior planning for potential impacts. Unplanned incident fire control actions include construction of hand lines, dozer lines, and staging areas, and often involve retardant

drops and off-road vehicle travel. Unplanned fire incidents present a genuine threat to life and property and require quick, decisive action, often precluding advance identification and evaluation of cultural resources.

Recommended Mitigation Measures: During wildfire response, BLM cultural resource staff will identify at-risk resources and un-surveyed areas with a high potential for cultural resources, and the necessary treatment to address potential impacts to these resources and areas. Cultural resource management efforts during the wildfire response period are generally limited to protecting/avoiding known historic properties through close coordination with fire managers. Post-fire efforts will focus on additional inventory, evaluation, and mitigation of historic properties within the APE. When available, a cultural resource specialist with the requisite certification may be utilized to provide assessment and mitigation during fire suppression activities. However, for all fire scenarios, all suppression actions should limit resource impacts to the maximum reasonable extent with priority given to the protection of the public, fire personnel, and public property.

In general, BLM cultural resource staff has developed the following process for responding to unplanned (incident) fire management actions:

1. Cultural resource staff and fire managers will coordinate in order to identify the location of the incident, the anticipated character and behavior of the fire, and the type of fire management actions that may be employed.

2. BLM cultural resource staff will provide comments on the density and distribution of cultural resources within the area potentially impacted by the fire, the character and extent of survey coverage, the nature and extent of anticipated impacts to cultural resources within the impact area, and possible mitigation strategies.

3. BLM cultural resource staff will maintain communication with fire managers throughout the management of the incident for the purposes of reevaluating at-risk resources, survey coverage, potential impacts, and mitigation strategies as the incident progresses and evolves.

4. When available, a cultural resource specialist with the requisite certification may be utilized to provide inventory, assessment, and mitigation during active fire suppression activities.

Post-fire stabilization and rehabilitation will be evaluated on a case-by-case basis, through the NEPA process, will be conducted in close consultation with the SHPO and other consulting parties, and may require a Class II or Class III inventory (or some combination thereof) prior to stabilization or rehabilitation action. Post-fire rehabilitation also presents the opportunity to evaluate the effect of fire on cultural resources and refine expectations for future impacts.

No Action Alternative

Direct and Indirect Impacts: Same as Proposed Action.
Protective/Mitigation Measures: Same as Proposed Action.

Full Suppression Alternative

Direct and Indirect Impacts: Same as Proposed Action.
Protective/Mitigation Measures: Same as Proposed Action.

### 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. Consultation with various potentially affected Native American Indian Tribes and community groups will be conducted on an individual project basis. As stated above, mitigation to historic properties will be completed in consultation with the SHPO, ACHP, and potentially affected Indian tribes and community groups, as needed.

Environmental Effects:

Because specific geographic locations have not been proposed for the present Environmental Assessment, it is not possible, at this time, to identify specific effects to places or resources of traditional concern. Consultation with various potentially affected Native American Indian Tribes will be conducted on an individual project basis.

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.

Full Suppression Alternative

Direct and Indirect Impacts: Same as Proposed Action.
Protective/Mitigation Measures: Same as Proposed Action.

### 3.4.5 Economic

Affected Environment:

The affected economic environment relative to the fire plan can be viewed from two perspectives. These include economics related to wildfire and that related to prescribed burning

and fuels and vegetation management. Wildfire economics could include all related costs to federal, state and local governments to fight fires as well as the cost of post fire rehabilitation and stabilization. The private sector would see effects to economics through homes, businesses and infrastructure lost to wildfire when such fires involve the urban interface. Wildfires can also have second tier short term effects of closing roads that can affect commerce and livelihoods as well as alternately bringing increased business to an area for the short term when large fire crews are stationed nearby.

Economics related to vegetation management include that related to prescribed fires, forest thinnngs and other forms of fuels reductions and vegetation manipulation. Vegetation management is generally viewed as a positive improvement to land health, and while the cost of such actions can be measured, the benefits are more difficult to put a dollar value on, as the effects are more indirect.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: The fire planning process is considered to have an indirect effect on the economics of fire management since the benefits of a well-designed plan are realized at implementation. Relative to wildfire, the proposed plan allows fire management officers to objectively evaluate a fire and manage it with a flexible approach, assessing ecological conditions and determining where fire effects can be beneficially used. This is opposed to the previous plan where more rigid fire management polygons were used, defining how fires could be managed for a given area, sometimes limiting the fire management teams ability to intelligently manage a fire. The effects of this change in management on economics as described in the affected environment is only speculative, but giving a fire team more flexibility in how they approach wildfire might ultimately provide for reduced costs and fewer fire impacts.

Relative to vegetation management, the effects of the proposed plan is also an indirect effect. These indirect benefits could include a reduction in fuel loading which reduces the potential for costly wildfires in the future. Fuels reductions and thinnings can also benefit land health, opening up canopies, promoting understory growth and providing improved forage for both wildlife and livestock.

Protective/Mitigation Measures: None
Cumulative Impacts: None

No Action Alternative

Direct and Indirect Impacts: There would be little difference to economics from the proposed action other than the lack of flexibility in the current plan could potentially lead to increased costs in firefighting.

Protective/Mitigation Measures: None
Cumulative Impacts: None

Full Suppression Alternative

Direct and Indirect Impacts: Fully suppressing all wildland fires could potentially increase the costs to federal, state and local governments.

Protective/Mitigation Measures: None

Cumulative Impacts: None

## 3.5 LAND RESOURCES

### 3.5.1 Forest Management

Affected Environment:

Historically, the forests of the Rocky Mountain West were believed to be less dense, consisting of larger and older trees than the forests of present times. There were dense stands of trees, but these were intermixed in a mosaic pattern of diverse forest age classes and openings. Whereas the forests of today are characterized as even-aged stands with little age class diversity and many are overstocked with too many trees per acre. During the settlement of the Arkansas River drainage most of the larger trees were removed for infrastructure and energy, thereby altering the natural processes. Due to this heavy timber harvesting during the 19$^{th}$ and early 20$^{th}$ centuries, much of the forest has regenerated as a single aged cohort. Consequently, most of the old growth trees are gone and the older/larger trees seen today were probably too small to be utilized at settlement times. These facts serve as a historical reminder of how different the forests of today are compared to those prior to settlement.

Prior to European settlement wildfires played an important ecological role in maintaining the function and pattern of the vegetation on the landscape throughout the Rocky Mountains. Wildfires reduced natural fuel accumulations, maintained forest health by clearing smaller understory trees, recycled nutrients, maintained meadows and parks, improved wildlife habitat, and assured a diversity of forest age classes by creating early seral habitat for young tree establishment. The past 100 years of wildfire suppression, 150 years of cattle grazing, heavy-handed historic timber harvest and the recent urbanization of the West have interrupted the natural frequency and intensity of wildfires. As a result the forests have become overstocked with numerous small diameter trees, most less than 100 years old. As these smaller trees compete with the larger trees for moisture during drought periods, the larger trees become stressed, subjecting them to increased risk of bark beetle attack. These small diameter trees also provide a ladder for wildfire to move into the forest crown, a prescription for a catastrophic crown fire. Crown fires are the most destructive and difficult type of wildfire to control, pose the greatest catastrophic risk to growing populations and threaten private property adjacent to these forests. Therefore, given the human induced changes to the forest and the current state of the forests in Colorado, namely the lack of recent disturbance, these forests are in desperate need of multiple silvicultural treatments designed to induce the effects of lost ecological processes, such as fire, that these forests evolved with for thousands of years.

In places where fire has been a fundamental feature over time, many plants and animals are adapted to and can even depend on fire effects. Fire is a means by which many tree species gain a competitive edge over other species. Trees found within the RGFO have adaptations to survive a wildfire. Some trees have thick bark, some naturally self-prune which removes ladder fuels, others sprout from roots, one species produces serotinous cones which open with the heat from a

wildfire, while others are prolific seed producers. In general, large trees are more fire adapted to survive a wildfire than the smaller trees.

In some areas, fires that once burned often but relatively cool now burn infrequently but intensely hot. In others, fires are now more numerous where they once were scarce, or they are absent altogether where they once played a key role. Such uncharacteristic fires, combined with other land use changes, can result in altered types and patterns of vegetation, affecting the ability of forested systems and species to respond to fire (USDA, USFS, Wildland Waters 2005). Historically, the mixed fire regime characterized about 40% of the forest in the broad regions of the west (Quigley, et al. 1996). The mixed regime generally occurred in the cooler, more moist, and higher elevation forests than the lower elevation frequent fire regime. Fuel dried sufficiently to allow burning for several days or a few weeks each summer, and in any given place fires occurred at intermediate intervals, averaging about 30-100 years (Brown 2000). Individual fires ranged from low intensity understory burns to stand replacement fires, but many were intermediate intensity, killing most fire susceptible trees – species with thin bark and saplings of all species – but fewer fire resistant trees. Relatively moist and productive areas in the historical mixed fire regime readily transform into dense forests of shade-tolerant trees when fire and substitute treatments are withheld (Arno and Fiedler 2005). Fire ecologists agree that the question is not whether these forests will burn but when (Mason et al. 2006). The RGFO forestry program completes this common statement by asking "why don't we pick the day it burns". The recent catastrophic wildfire burn areas are the only known deforestation occurring within the RGFO.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: The proposed action supports the objectives of the forestry program. Prescribed burning and fuels treatment, would 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 and preparing the seedbed. Site specific burning prescriptions would be designed to accomplish the stated resource management objectives for the project area. Fire intensities would be variable, however a low to moderate intensity fire is most desirable for first-entry burns aimed at reintroducing fire into these forests, raising crown base heights, and minimizing large tree mortality.

The practices proposed would be implemented with an eye towards improving forest health by reducing tree densities which improves forest age class diversity, reducing hazardous fuels and improving wildlife habitat. An important treatment goal is to return prescribed fire to forests that evolved with fire. The proposed treatments would attempt to mimic the natural fire regime for each tree species found at the different elevations in the area by utilizing unique and appropriate prescriptions. Generally, fire-adapted species such as ponderosa pine and Douglas-fir would thrive with reduced levels of competition, while early-succession and pioneer species such as quaking aspen would be re-invigorated in stand openings. Most of the shrubs found in the RGFO are old decadent and severely browsed. Prescribed fire can stimulate shrub sprouting and new growth. In short, the proposed action will give forests a chance to shift from an unsustainable track to a more natural and historically healthy one.

By allowing prescribed fire and managed wildfire on the landscape, resource managers will have a necessary and effective tool for restoring forests to a mosaic of successional patterns on the landscape and sustainable tree densities. The proposed action will specifically allow managers to hone that tool and to utilize it to the degree appropriate for each unique site and forested stand, rather than thinking that one universal treatment will suffice for the entire landscape. It allows managers to assess the area and ecological conditions, and consider where fire effects can be beneficial over the landscape.

Mechanical treatments through range, wildlife and fuels projects typically involve a reduction in tree density through hand thinning or mastication. Forestry treatments typically involve tree removal through commercial sales. Most forest restoration scientists recommend thinning with a follow-up prescribed burn as the means to create healthy resilient forest conditions

In general, this alternative will provide the greatest management flexibility in using fire to achieve resource objectives, and it will achieve the desired landscape objectives in the shortest time period.

Protective/Mitigation Measures:

- Currently all forest treatments are falling short by 15,000 acres in the historic range of variability each year, plan large scale prescribed burns each year to make up for this deficit.
- All natural ignitions within all WSAs and in areas inventoried with wilderness characteristics should be strongly considered to be managed for resource and ecological benefit, and not suppressed if fuel and weather conditions, fire location relative to values at risk or other important infrastructure and other factors are conducive to this activity. Managing wildfires in these areas will increase acres treated by wildfire and will be key in helping land managers to gain some ground on bringing the forest and landscape within the historic range of variability.
- Mechanical treatment areas should be focused in areas near subdivisions or private lands to create areas where vegetation has been modified to reduce crown fire potential and to provide more options for fire managers to deploy the alternative fire management or suppression tactics that would allow the management of fire for ecological benefits.

- Following mechanical restoration treatments in the appropriate forest types, prescribed broadcast burning should be strongly considered for implementation within 1-5 years post treatment to reduce activity fuels, to stimulate understory development, and to work toward creating resilient forests if funding is available.

Cumulative Impacts: The proposed action will not have significant negative impacts on forest management. Forest health will be improved by promotion of age-class diversity, reinvigoration of early seral tree and forb species, reduction in stand densities, bark beetle

outbreak risk reduction (assuming tree crowns are not severely scorched or stems damaged), a decrease in the likelihood of running crown fires, and a mosaic of stand types and age classes across the landscape.

The proposed action should result in less catastrophic wildfire and more wildfire under ideal burning conditions on the landscape.

No Action Alternative

Direct and Indirect Impacts: The No Action Alternative would continue managing fire as it currently being done where the planning area is divided into polygons where fire is identified as desirable or not. Largely, the end result would be similar in terms of impact to forest management as fire could still be used for resource benefit, but this alternative will result in less fire on the ground and less acres treated by managed fire. Forest will keep expanding into parks and meadows. As forest canopies close site plant diversity is likely to decrease.

However, this alternative does not include the flexibility found within the proposed alternative. Fire may be suppressed on some sites where it would be beneficial and vice versa. Essentially this alternative is less flexible and promotes the one treatment fits every acre approach.

Protective/Mitigation Measures: None

Cumulative Impacts: Cumulative impacts may vary slightly but would essentially be the same as those for the proposed action.

Full Suppression Alternative

Direct and Indirect Impacts: Under the Full Suppression Alternative, forest health or fuels reduction treatments would occur on small site specific planning areas rather than looking at the entire Field Office in one document. 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 forest densities increase, and individual tree stress is exacerbated further by drought. Aspen would 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 the area's already existing fuel loading, increasing the potential for a catastrophic wildfire threatening life, private property and infrastructure. The forest stand density and associated fuel accumulation will continue to increase further exacerbating the overall volatility of the available fuel bed. During periods of drought, wildfire severity will increase with the potential for high intensity, stand replacing wildfire, and a corresponding higher resistance to suppression and control efforts.

The full suppression alternative in essence repeats missteps taken by land management agencies in the past. By immediately suppressing and excluding all fire on the landscape, the forest will be further characterized by high stand densities that rob otherwise healthy trees of limited moisture and an ever increasing number of fire intolerant and shade tolerant species. These conditions are uncharacteristic in forests with a history of low and mixed severity fires, and favor the buildup of litter, duff and ladder fuels. These conditions disrupt the natural cycle of forests and create even age stands that are susceptible to insect devastation, fail to remove the ladder fuels, and

potentially lead to uncharacteristic and catastrophic crown fires. Catastrophic crown fires, as mentioned earlier, usually replace entire stands, sterilize soils, devastate any adjoining private property and are very costly to fight. By managing lands in a manner which fails to mimic the natural processes of a fire-adapted ecosystem, atypical consequences such as catastrophic wildfire become more common.

Catastrophic fires are more probable in areas characterized by heavy fuel loads and dense forests which result from fire suppression. During these catastrophic fires, 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. Range or cattle grazing infrastructure such as fences and improvements can be destroyed and grazing may have to be deferred for several years. This alternative will result in an increase in firelines which increases soil erosion and if not properly closed, can provide travel corridors for illegal off road travel.

The full suppression alternative, lacking forest health or fuels reduction treatments, fails to consider the need to protect firefighters, protect adjacent land owners, protect the area from potential beetle infestations, promote the growth of declining aspen stands and early seral species, and in general, work towards a healthier forest. Rather than promoting beneficial surface fires which recharge the fire-adapted ecosystem, full suppression promotes crown fires which sterilize soils and denude forestlands.

Protective/Mitigation Measures: None

Cumulative Impacts: This alternative does not incorporate wildfire as an ecological process shaping these forests and the benefits it provides. It ignores the best available science regarding wildfire and forest development. . Forest will keep expanding into parks and meadows. As forest canopies close site plant diversity is likely to decrease.

### 3.5.5 Range Management

Affected Environment:

Rangelands are distributed throughout the Royal Gorge Field Office planning area and include a variety of vegetation types. The areas most likely to be impacted by the proposal are the woodlands which are dominated by piñon pine, Rocky Mountain juniper & ponderosa pine. These areas include the wooded sites as well as openings such as chaining and other mechanical treatments with young stands of trees or any other opening that still retains a grassland appearance but that is being invaded by woodland vegetation.

These woodland openings are critical for range management and livestock production. Livestock prefer to graze in areas where there is an abundance of forage, and this type of area is usually found in these woodland openings or grasslands. Fire is a natural means by which these openings are maintained or renewed. Without disturbances such as fire, these openings tend to be invaded by woody species such as piñon pine, Rocky Mountain Juniper, oak brush, and

ponderosa pine. When this succession occurs, the portion of plant material that is available for grazing or browsing by domestic livestock decreases, even though some of the invading species have some forage value at various times of the year.

Rangeland health assessments and trend monitoring studies have indicated issues in relation to woodland encroachment and the lack of early successional forests. Rangeland health assessments identified certain land health concerns regarding the amount and density of woodland vegetation in the area. As the woodland vegetation begins to invade more productive, deeper soiled site (typically sites with slopes of 20% or less), these areas are characterized by decreasing amounts of herbaceous plant cover and higher amounts of bare ground. Productivity, vigor and diversity of the site decrease. These areas begin to retain less moisture during precipitation events and allow higher levels of surface runoff and soil movement. These sites were considered to be no longer meeting rangeland health standards. In addition, trend studies located within old chaining units has indicated a downward trend in response to the re-invasion of woodland vegetation. These changes in the plant communities appear to be related to the lack of naturally occurring fire in the area rather than livestock grazing at the present time.

A secondary vegetative type that will also be impacted by the proposal is the mountain shrub type. These areas consist mainly of oak brush and mountain mahogany. This cover type typically has a more diverse understory of grasses and forbs than the piñon-juniper type and produces higher quality and quantities of forage for grazing and browsing animals. Natural fire occurrence in this type is relatively rare for a variety of reasons, including higher fuel moisture, lack of ignition source, and lack of fine fuels because of grazing animals.

Environmental Effects

Proposed Action

Direct and Indirect Impacts:

Under the proposed action, range management in the planning area will be positively impacted in the long term. However, there are short term impacts that should be considered. The loss of herbaceous production and time needed to recover in response to a fire may force the permittee to find alternative feed or private pasture sources. This effect may be mitigated by allowing flexibility in allotment schedules or alternative use in non-designated allotments within public land. There is risk of loss to expensive range developments within allotments. Structural range developments should be identified and protected when possible. It is essential that communication is implemented with the potentially affected permittee and the public of prescribed burn schedules and suppression/ mitigation plans through the media and/or personal contacts.

However, this alternative will provide the greatest management flexibility in using fire to achieve resource objectives, and it will achieve the desired landscape objectives in the shortest time period. Therefore, the cumulative impact of the proposed action will be positive for range management in the long term because it will provide more pasture rotation flexibility and increased production.

The increased use managed wildfires is anticipated to be beneficial to the forage resources in the woodland sites. Reducing the woodland vegetation from naturally occurring parks and meadows will result in a positive move toward meeting vegetative health standards for public lands. In general, it will create a balance of seral stages, open up more grassland parks, and increase forage production. Where a fire has been allowed to burn, carrying capacity, as measured in terms of pounds per acre, will increase from as low as 20-25 pounds per acre to 250-400 pounds per acre in the piñon-juniper types. Mountain shrub types that are burned experience a similar increase in forage productivity.

This benefit in increased forage productivity will indirectly result in increased livestock production, as grazing animals will have to travel less to forage sources. In addition, these animals will not be as dependent on riparian areas where they might otherwise concentrate. Dispersing the animals more will result in secondary benefits from improved water quality and reduced erosion of topsoil. Grazing wildlife will also benefit. Additional forage available to all herbivores will tend to reduce competition among them for food. This could also be considered a secondary benefit, since in some instances, competition for forage could be considered limiting.

Protective/Mitigation Measures:

It is essential that communication and the utilization of a resource advisor is implemented with the potentially affected permittee and the public of prescribed burn schedules and suppression/ mitigation plans through the media and/or personal contacts.

Grazing management may be critical to the success of any prescribed fire treatments in these areas as most research indicates that resting these areas prior to treatment can help supply sufficient fuels to carry the fire.

Fires can be a useful tool in many sagebrush communities if they are timed correctly and if livestock do not graze the burn for two growing seasons.

Cumulative Impacts:

This alternative will provide the greatest management flexibility in using fire to achieve resource objectives, and it will achieve the desired landscape objectives in the shortest time period. Therefore, the cumulative impact of the proposed action will be positive for range management in the long term because it will provide more pasture rotation flexibility and increased production.

No Action Alternative

Direct and Indirect Impacts:

Same as proposed action above. Under the no action alternative, range management in the planning area will be positively impacted in the long term. The No Action Alternative would continue managing fire as it currently being done where the planning area is divided into polygons where fire is identified as desirable or not. Largely, the end result would be similar in terms of impact to range management as fire could still be used for resource benefit, but this alternative will result in less fire on the ground and less acres treated by managed fire.

However, this alternative does not include the flexibility found within the proposed action. Fire may be suppressed on some sites where it would be beneficial and vice versa. Essentially this alternative is less flexible and promotes the one treatment fits every acre approach.

Protective/Mitigation Measures: Same as proposed action.

Full Suppression Alternative – Full Suppression Alternative/No mechanical/RX treatments

Direct and Indirect Impacts:

Under the Full Suppression Alternative, forage resources will be negatively impacted. Suppressing all wildland fires will result in a more wooded landscape with little or no forage available for livestock in the understory. The increased competition for sunlight, water, and nutrients by the woody species will reduce the understory components of grasses and forbs, resulting in the progressive loss of herbaceous diversity and not meeting vegetative health standards on public lands.

If vegetation treatments (including managed fire, prescribed fire, mechanical, chemical and biological treatment) do not occur, more fires of undesired intensities will continue. The risk of losing key ecological components, as well as an increase in loss of values at risk (such as range improvements) will increase.

Protective/Mitigation Measures: Close communication with Range staff and affected grazing permittee's is necessary.

Cumulative Impacts:

To retain domestic livestock grazing as one of the uses in the planning area and meet vegetative health standards, these open foraging areas will have to be maintained by mechanical means. The cost of these prescribed treatments ranges from $100 per acre to $500 per acre, depending on the treatment type and the need to reseed.

Without the presence of wildfire, or further prescribed treatments, it is likely that the grasslands created by fire or mechanical treatments will continue to succeed to brush stands or woodlands that are dominated by piñon and juniper. This process of succession will severely reduce the production of forage in these areas. The carrying capacity of an opening within piñon-juniper could change from 3-4 acres per Animal Unit Month (AUM) to 30-50 acres per AUM as trees invade. An AUM is the amount of forage necessary to feed one cow for a month. Under the continued practice of fire suppression, it is likely that most of the woodland openings will be dominated by trees within 30 years and producing 1 AUM for every 30-50 acres. At this level of forage production, the range will become unsuitable, both in terms of quantity and quality, because of the high indigestible lignin content of the plants. There will be a need to retreat treated areas in order to maintain plant diversity and forage production.

The later seral stages of the mountain shrub type will show a similar reduced carrying capacity as the piñon-juniper sites, although not as dramatic. However, carrying capacity could be reduced by up to 50 percent as these sites produce less and less available forage for grazing livestock. All three classes of forage: grass, forbs, and browse species could be reduced or become unavailable.

## 3.5.8 FIRE AND FUELS

Affected Environment:
Fires have played a significant role on the landscape within the RGFO analysis area. Several plant communities have evolved with fire and have adapted to it in various ways. Fires occurred naturally at certain average time intervals, which varied by vegetation and climatic conditions. These fires created and maintained a mosaic of different age and succession classes and species mixtures across the landscape. Periodic fires are essential to sustaining healthy, sustainable, and resilient ecosystems. Forest and vegetation health conditions have been on the decline, and they have become more increasingly susceptible to large-scale, severe wildfire, insect and disease episodes resulting in altered plant and animal demographics, reduced productivity and biodiversity, and impaired ecosystem processes and functions (Richard T. Reynolds, Andrew J. Sachez et.al).

**Fire Weather Patterns within the RGFO analysis area**
The Royal Gorge Field Office is characterized by rugged mountainous/high valley terrain in the west and relatively flat high plains in the east. It consists of a typical continental climate with dry air, sunny days, clear nights, variable precipitation, moderate evaporation, and large daily temperature changes. Weather systems usually enter the region from the west and southwest, because of the western mountains. Occasional low pressure systems on the plains circulate gulf moisture from the east (upslope). The complex topography of the region causes considerable variation in site-specific temperature, precipitation, and surface winds.

Temperatures vary mostly with elevation, and to a lesser extent, local micro-climate. Summer temperatures usually range from lows in the upper 40s to the high 80s (mountains), and lower 60s to 110s (foothills and plains). Annual precipitation is highly variable, primarily because of the orographic effect of the Rocky Mountains. Annual precipitation over most of the area averages 10-20 inches annual. Except for areas with high snowpack, most precipitation comes from late spring and summer thunderstorms. The monsoonal flow begins mid-May to mid-July and produces isolated occurrence of thunderstorm. The true monsoon sets up around the first of July with numerous daily thunderstorms. The typical period for lightning to occur is June through August.

Upper level winds prevail from the southwest, but varying ground cover, diverse terrain, and upslope conditions cause complex surface wind patterns. Persistent winds with little directional modification occur on the plains, but winds in valleys show strong drainage influence.

**Fuel Types within the RGFO analysis area**
Grasslands
These communities are predominately range in elevations from 5,300 to 9,500 feet. Grass species can include a variety of cool and warm season grasses, such as blue grama, mountain muhly, Arizona fescue, sand dropseed, and Indian ricegrass. Fires are typically fast moving and low to moderate intensity. Fire duration is usually a single day unless the fire moves into a fuel type that contains large, woody fuels where fire can hold over night and extend into a second burning period

Shrub lands
At lower elevations (5,300-5,500 feet), salt brush communities dominate. Mountain shrub communities consist of Gamble's oak, mountain mahogany, snowberry, and currant occupies mid-elevation sites (5,500 to 9,500 feet), on shallow rocky soils. Sagebrush communities are found at higher elevations (7,500-10,000 feet). Fires are fast moving and of the moderate to high intensity.

Piñon-juniper
Usually found in elevations from 5,400 to 10,000 feet, but is typically found below 8,500 feet in the RGFO. Mature stands of piñon-juniper support little of no understory vegetation. Currently the piñon-juniper communities are being affected by outbreaks of Ips beetle. While mature piñon-juniper is difficult to burn under most conditions, on occasions when temperatures are near 100 degrees, single digit relative humidity, and winds above 10 mph, fires are fast moving high intensity stand replacement.

Ponderosa pine
Historically, Ponderosa pine has occurred in open stands with a productive understory of grasses, forbs, and shrubs. In the RGFO Ponderosa pine forests have a piñon/juniper component in the understory, and in most cases have become overcrowded by small diameter ponderosa pine, In higher elevation, wetter, cooler sites it has been successfully and encroached upon by Douglas fir. The result is a continuous bed of vegetation from grasses and litter on the ground, up through the ponderosa pine canopy. Once fire is ignited in such a fuel bed, control is very difficult, and the result may be a running crown fire. This condition is very different from the low intensity fire that historically would have occurred through the litter, grasses and minor shrub component. This situation is aggravated by outbreaks of mountain pine beetle and Ips beetle. Both infestations result in increased volumes of dead and down within the forest.

Mixed Conifer
Mixed-conifer forest type includes a diverse range of species. The distribution and structure of mixed-conifer forests are strongly influenced by temperature and moisture gradients, in addition to aspect, soil types and fire. White fir often dominates as the climax species on moist sites, and ponderosa pine, Douglas-fir or Rocky Mountain juniper tend to be the climax species on warmer and drier sites. Engelmann spruce, blue spruce, subalpine fir, bristlecone pine lodgepole pine and limber pine also may be present in the mix. As a result of fire suppression, many mixed-conifer forests currently are denser and contain more dead fuel than they did historically. These heavy accumulations greatly increase the chances for high-intensity, stand-replacing crown fires.

Aspen
Aspen is widely distributed in the planning unit. Aspen communities generally have a highly productive grass-forb understory and typically occur in moist environments. Fire behavior in aspen communities can be expected to be less intense than in most surrounding fuels, but dry conditions, fire can run through the aspen stands. The aspen vegetation community is being lost through the field office. This loss is occurring due to the lack of disturbance, conifer encroachment, browse, insect and disease, the age of most aspen stands which were established in the 1800's and drought conditions.

**Wildfire Fire and Fuels Management in the RGFO**

The Royal Gorge Field Office has an active interagency wildland fire management program as well as a hazardous fuels reduction program. Wildland fire activity has occurred in all months of the year within the Royal Gorge Field Office planning area; however, most fire activity occurs during the months of April thru October with fire activity reaching its peak in July. There has been an increase in the number of fires and acres burned annually over the last 10 years. From 1980 to 2013 the unit averaged 38 wildland fires per year and an average of 218 acres has burned on BLM administered lands annually. The fires that occur are relatively small with 89% of the wildland fires burning 10 acres or less. Conditions exist within the planning area for large, catastrophic wildfires that can result in loss of life, property and resources. The complexity along the Front Range of Colorado, Larimer County to Las Animas County, is increasing every year due to urban sprawl and the increase of infrastructure development. The result is the number of large fires within the urban interface. Within the planning area, there have been over 21 large fires that have resulted in the loss of over 1000 structure in the last ten years.

The RGFO hazardous fuels program has implemented a number of fuels mitigation and other vegetation treatment projects. Most of these treatments have been mechanical projects. Treatment methods include the use of large machines including masticators roller choppers, and other machines for commercial harvest. These methods are utilized in areas where fuel conditions and topography would allow for treatment with minimal ground disturbance and resource impacts. Mastication has been the most frequently utilized piece of equipment in past projects. It has been effective in vegetation types including piñon juniper, ponderosa pine, mixed conifer, and shrub species (i.e. oak and mountain mahogany). Mastication allows for selectivity of trees to be removed with little to no damage to the reserve trees and leaves small amounts slash. With this type of machine, project specifications (desired tree spacing, size classes, and forest structure) can be achieved and the large rubber tires on the machine create minimal surface/ground disturbance. Hand thinning has been another method that is commonly used for treatments. Hand thinning is most effective in areas where terrain is difficult (rocky, steep, etc.), and slope is greater than 30%. Hand thinning treatments have been accomplished with both in-house “force account” crews as well as contract crews. Mechanical treatment methods allow for the creation of a mosaic of vegetation patterns and types in different successional stages throughout the landscape. These treatments reduce fuels or alter the arrangement of fuels for the implementation of prescribed broadcast burns or they could potentially be used to facilitate the management of a wildfire to protect life and property and to reduce the risk of the loss of key ecological components. Additionally mechanical treatments improve forest health, improve habitat and forage conditions for cattle and wildlife. From 2005-2013, an average of 1,000 acres has been treated annually in the Royal Gorge Field Office with mechanical methods.

Fire is recognized as a natural and indispensable process and can also be used to achieve objectives for other resources. It is the ultimate goal to re-introduce fire to the landscape to return an area to natural historical conditions, and to maintain areas that have been treated to achieve sustainable and healthy vegetation conditions. Wherever possible, mechanical treatments would be followed by prescribed broadcast burning. Prescribed broadcast burns would be used to reduce activity and natural fuel loadings, to create small openings and maintain existing openings, and to maintain thinned stands that increase horizontal diversity and reduce the spread

of catastrophic wildfire. Removal of activity slash piles that are created during mechanical treatments is accomplished through pile burning. All burning operations have appropriate burn plans and accompanying smoke permits in place to meet state and federal regulations. Prescribed fire projects are initiated by the fire program and by BLM resource programs including range, wildlife and forestry. From 2005-2013, an average of 250 acres has been treated each year with prescribed fire methods annually.

A measure that is used to assess the vegetative conditions is Fire Regime Condition Class (FRCC). FRCC is an interagency, standardized index for determining the degree of departure from the historic range of variability in vegetation, fuels and disturbance regimes. This method has been used in the Royal Gorge Field office to guide management objectives, and set priorities for treatments. Fire regime condition classes measure the degree of departure from reference conditions, possibly resulting in changes to key ecosystem components, such as vegetation characteristics (species composition, structural stage, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances, such as insect and disease mortality, grazing, and drought. Possible causes of this departure include (but are not limited to) fire suppression, timber harvesting, livestock grazing, introduction and establishment of exotic plant species, and introduced insects and disease (Schmidt et al. 2002, Barrett et al. 2010). A FRCC rating of 1 (low), 2 (moderate), or 3 (high) is assigned depending on the degree of departure from the natural range of variability for a particular area.

**Condition Class 1**

Fire regimes are within historical range and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within a historical range.

**Condition Class 2**

Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased). These results in moderate changes to one or more of the following: fire size, intensity and severity and landscape patterns. Vegetation attributes have been moderately altered from their historical range.

**Condition Class 3**

Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. These results in dramatic changes to one or more of the following: fire size, intensity, severity and landscape patterns. Vegetation attributes have been significantly altered from their historical range.

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995). Coarse-scale definitions for natural (historical) fire regimes have been developed by Hardy et al. (2001) and Schmidt et al. (2002) and interpreted for fire and fuels management by Hann and Bunnell (2001). The five natural (historical) fire regimes are

classified based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant over-story vegetation.

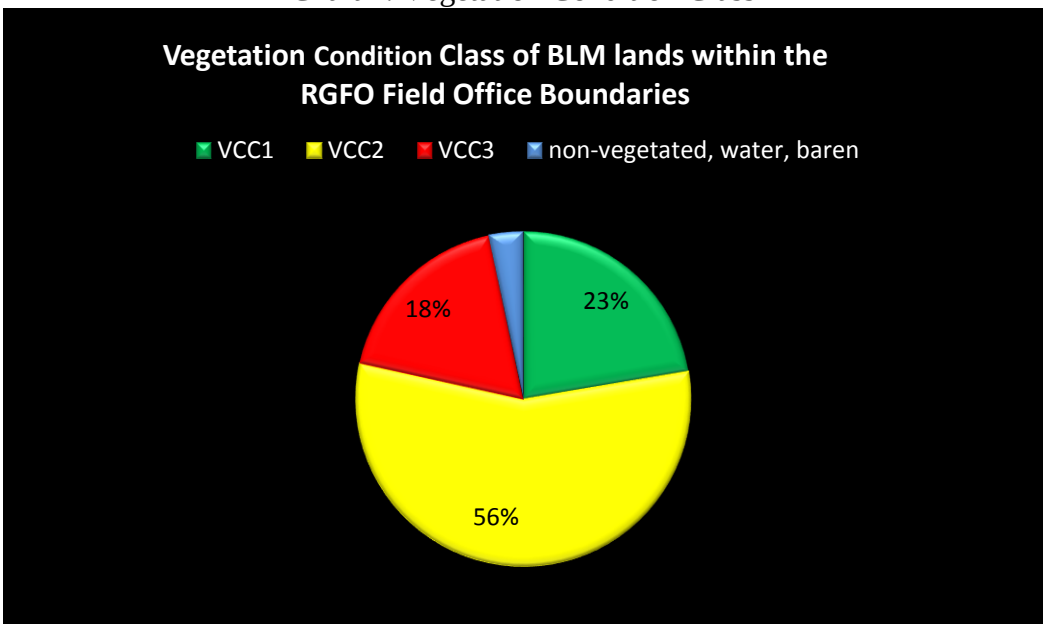
I. 0-35 year frequency and low (surface fires most common) to mixed severity (less than 75% of the dominant over-story vegetation replaced).
II. 0-35 year frequency and high (stand replacement) severity (greater than 75% of the dominant over-story vegetation replaced.

III. 35-200 year frequency and mixed severity (less than 75% of the dominant over-story vegetation replaced).
IV. 35-200 year frequency and high (stand replacement) severity (greater than 75% of the dominant over-story vegetation replaced).
V. 200+ year frequency and high (stand replacement) severity.

A comprehensive FRCC data layer that is consistent across the whole RGFO planning area does not exist. LANDFIRE (also known as Landscape Fire and Resource Management Planning Tools) Vegetation Condition Class (VCC) data is available for the planning area. VCC is a close approximation for FRCC as it reflects the changes in vegetation structure and composition resulting from changes in fire regime. VCC does not include the fire regime departure which is a component of FRCC. The VCC layer quantifies the amount that current vegetation has departed from simulated historical vegetation reference conditions. Three condition classes describe low departure (VCC 1), moderate departure (VCC 2), and high departure (VCC 3). Vegetation condition class is a close approximation for FRCC, VCC is calculated based on changes to species composition, structure state, and canopy closure suing methods described in the Interagency Fire Regime Condition Class Guidebook (Barrett et al. 2010). VCC is based on departure of current vegetation conditions from reference vegetation conditions only. LANDFIRE simulates historical vegetation reference conditions using the vegetation and disturbance dynamics model VDDT (Vegetation Dynamics Development Tool) (LANDSUM for LF_1.0.0 only). Current vegetation conditions are derived from a classification of existing vegetation type, cover, and height. The use of VCC data provides a tool for the measurement of departure from normal conditions on a broad scale, and allows land managers to measure the number of acres within each condition class for planning efforts to focus on moving the landscape to an improved vegetation condition class.

The chart below displays a breakdown of Vegetation Condition Class of BLM lands within the RGFO Field Office Boundaries area.

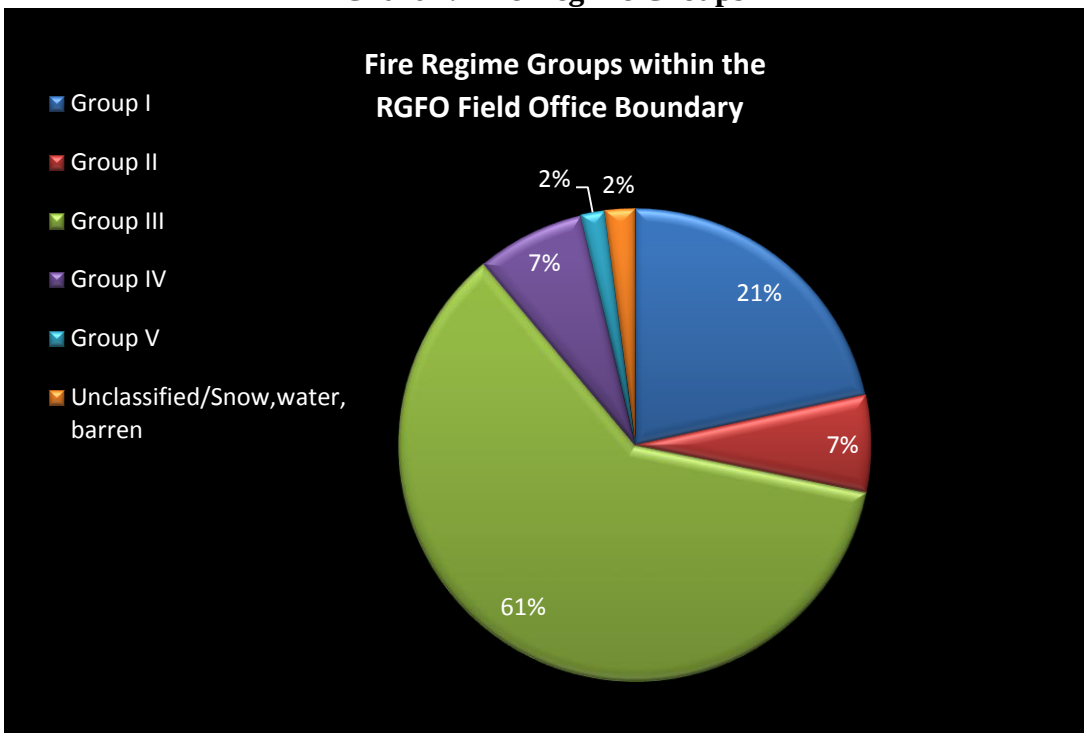
Chart 1: Vegetation Condition Class




**Fire Regime**

A majority of the field office is within Fire Regime Group (FRG) III. Within this group the fire return interval can range from 35-200 year plus frequency. Fires in this group tend to be mixed severity fires with less than 75% of the dominant over story vegetation being replaced. The next most dominant group is Fire Regime Group I. FRG I has a 0-35 year fire return interval. Fires in this group tend to be surface fires that are low to mixed severity. Less than 75% of the dominant over story vegetation is replaced when fire occurs. FRG II and FRG IV both comprise 7% of the planning area. The fire return interval in Group II fire regime is 0-35 years. FRG IV has a 35-200 year plus fire return interval. Fires tend to be high severity stand replacing fires with greater than 75% of the dominant over story being replaced in both of these groups. Fire Regime Group V comprises only 2% of the planning area. FRG V has a fire return interval of 200 years or more. Fires in this group tend to be high severity, stand replacing fires.

**Chart 2: Fire Regime Groups**




Environmental Effects

Proposed Action

Taking all of the treatment methods and project work that occurs within the planning area into account, there is still a huge deficit in the number of acres that need to be treated to return the landscape and vegetation to a condition that is healthy and sustainable. The table below displays a breakdown of BLM lands within the RGFO planning area in each fire regime group. The number of acres that need to be treated annually to be within the historic range of variability was calculated by dividing the number of acres of BLM within each fire regime group by the mid-point for the number of years of the average fire return interval within each fire regime group. The combined acreage of all of the fire regime groups that needs to be treated annually to maintain the historical range of variability is approximately 17,367 acres. Currently, with prescribed fire, mechanical treatment, and wildland fire, the nine year average of acres treated on BLM through all of these methods annually is 2,039 acres. The rate at which historic fire occurred far outpaces the current treatments, managed fire, and wildland fire that are occurring within each of the fire regime groups on BLM lands. This coupled with the fact that 74% of BLM lands within the planning area are either in VCC2 (moderately departed) or VCC 3 (highly departed) pose a significant challenge to return the landscape to more sustainable and resilient condition.

**Table 3:**

| **Fire Regime Group** | **Acres of BLM in each Group** | **Number of acres needed to be treated within each FRG if fire was within its historical range of variability** |
|---|---|---|
| Group I | 142,619 | 8,150 |
| Group II | 43,686 | 2,496 |
| Group III | 401,227 | 5,944 |
| Group IV | 48,731 | 722 |
| Group V | 10,991 | 55 |
| Other including Barren, Snow, Ice, Sparsely vegetated, Water | 13,277 | |
| **Total** | **660,531 acres** | **17,367 acres** |

Direct and Indirect Impacts: Under the proposed action, a variety of management and a full range of alternative suppression tactics could be utilized to achieve vegetation, ecological, and resource management objectives. The use of mechanical, prescribed fire, chemical and biological treatments in to reduce fuel loading or to alter fuel conditions to a more manageable condition will be necessary in many cases to modify fire behavior in the event of a wildfire. These treatments can reduce threat of high severity, crown fires that can be detrimental to wildlife habitat, ecological components, developed infrastructure, and private land and homes, by creating breaks in the continuous canopy, removing ladder fuels, and decreasing the accumulation of heavy fuels on the forest floor. Both fire (prescribed fire and managed wildfire) and non-fire fuels treatments can be utilized to improve wildlife habitat, range and forage conditions for cattle, and forest health and resiliency. The flexibility in the proposed action supports the objectives of the fire and fuels program because it allows fire managers the ability provide for firefighter and public safety while achieving landscape, ecological, and other resource management objectives. The involvement of resource advisors will allow for managers to make decisions with the full use of available information and resource expertise while allowing suppression activities to continue without subjecting firefighters and the public to increased risk or excessive cost.

Protective/Mitigation Measures:

Cumulative Impacts: Initially the cost for managing wildfires can be variable depending on complexity. In theory, suppression costs should be the lowest in the long term under the proposed action because a full range of management strategies and alternative suppression tactics can be used. This allows for the tactical decision to not be based upon smallest fire size, but instead, on that balances risks versus gains. Planned mechanical, biological, chemical, a prescribed fire treatments could elevate costs in the short term, but in the long term these treatments will provide fuel treatment areas, and therefore, more options to managers in the event of a future wildfire.

No Action Alternative
Under current management
Direct and Indirect Impacts: The No Action Alternative would continue managing fire as it currently is where the planning area is divided into polygons where fire is identified as desirable or not depending on a variety of ecological values, critical wildlife habitat, or infrastructure or other values at risk. The end result would be similar as the proposed action since wildfire could still be managed for resource benefit. Mechanical treatments and prescribed fire would still occur at the same rate as budgets allow. The effects in this alternative would be similar to the proposed action except for that this option is not as flexible and could lead to some fires that could be beneficial, but instead they are being suppressed because of management direction that has been established based on its location within the polygon. Fewer acres would be treated by wildfires, which in the long run will cause a larger fire deficit in the future.

Direct and Indirect Impacts:
Protective/Mitigation Measures:

Other Alternative
Direct and Indirect Impacts:
In the short term, as full suppression tactics will be deployed there will be fewer acres impacted by severe, catastrophic wildfire because in many cases these fires will stay small as they will be suppressed quickly. In the long term, fuel accumulations will continue to increase, forest health will continue to decline with increased and expansive insect and disease outbreaks. The unnatural accumulation of fuels will eventually lead to larger scale, high severity wildfires. If vegetation treatments (including managed fire, prescribed fire, mechanical, chemical and biological treatment) do not occur, more fires of undesired intensities and scales will continue. The risk of losing key ecological components, as well as an increase in loss of values at risk will increase.

Protective/Mitigation Measures:
Cumulative Impacts
Other than immediate protection of resources, this alternative would not support the goals of the fire and fuels management program. Suppression costs would be higher than the other alternatives in the long term because eventually the expanse of unnatural fuel accumulation will continue to grow. This will lead to large scale, high complexity wildfires that will require more resources for suppression activities. These high severity wildfires will require more BAR/ES activities which will cause increase in overall costs as well.

## 3.6 CUMULATIVE IMPACTS SUMMARY

### Soils

As discussed in the long term impacts, it is hoped that the cumulative effect of the Proposed Action leads to fewer large catastrophic fires, thereby leading to overall lower soil impacts from fire. When this is combined with all the other factors effecting soils in the planning area and looked at from a 6$^{th}$ level watershed scale, the Proposed Action is not expected to result in a combined negative effect.

**Water (Surface and Floodplains)**
As discussed in the long term impacts, it is hoped that the cumulative effect of the Proposed Action leads to fewer large catastrophic fires, thereby leading to overall lower water quality impacts from fire. When this is combined with all the other factors effecting water quality in the planning area and looked at from a 6th level watershed scale, the Proposed Action is not expected to result in a combined negative effect.

**Invasive Plants**
Reduction of annual acres of new infestations by invasive plants

**Threatened, Endangered and Sensitive Species**
In general, this alternative will provide the greatest management flexibility in using fire to achieve resource objectives, and it will achieve the desired landscape objectives in the shortest time period. By identifying the desired landscape objectives, the Plan provides a means to coordinate all of the vegetation manipulation projects in the RGFO planning area. The cumulative impact of implementing the Fire Management Plan, in conjunction with other management activities in the Royal Gorge Field Office, should affect vegetation in a positive manner over the long term, resulting in a vegetation mosaic which will reduce the likelihood of large scale insect and disease epidemics, the probability of catastrophic wildfire, and the vegetation destruction that occurs along with these.

**Vegetation**
In general, this alternative will provide the greatest management flexibility in using fire to achieve resource objectives, and it will achieve the desired landscape objectives in the shortest time period. By identifying the desired landscape objectives, the Plan provides a means to coordinate all of the vegetation manipulation projects in the RGFO planning area. The cumulative impact of implementing the Fire Management Plan, in conjunction with other management activities in the Royal Gorge Field Office, should affect vegetation in a positive manner over the long term, resulting in a vegetation mosaic which will reduce the likelihood of large scale insect and disease epidemics, the probability of catastrophic wildfire, and the vegetation change that occurs along with these.

Many of the vegetation health attributes described in Range Health Standard 3 will also show improvement with implementation of the Fire Management Plan. Standard 3 calls for healthy, productive plant communities of native and other desirable species maintained at viable population levels commensurate with the species' and habitat's potential. It also calls for populations that are able to reproduce and sustain natural fluctuations and ecological processes. This health standard is determined by indicators such as habitat connectivity, minimal amounts of undesirable weeds, adequate plant distribution for sustaining reproduction, maximal representation of all forest age classes, and adequate (several) successional stages in the landscape.

**Wetland and Riparian Zones**
Fire management and mitigation as proposed will allow for wetland and riparian environments within RGFO-managed lands to function and meet BLM land heath standard at a large scale in-

between fire events. Short periods of nonfunctional conditions after burns areas will recover would be variable, but would always tend to recover.

**Wildlife Aquatic**

Managing and implementing the Proposed Action will help the riparian and wetland areas obtain or maintain proper functioning condition and optimize aquatic habitat variables.

**Wildlife Terrestrial**

In general, the proposed action will provide the greatest management flexibility in using fire to achieve resource objectives, and it will achieve the desired landscape objectives in the shortest time period. By identifying the desired landscape objectives, the proposed action provides a means to coordinate all of the vegetation manipulation projects in the RGFO planning area. The cumulative impact of implementing the proposed action in conjunction with other management activities in the Royal Gorge Field Office, should affect vegetation in a positive manner over the long term, resulting in a vegetation mosaic which will reduce the likelihood of large scale insect and disease epidemics, the probability of catastrophic wildfire, and the vegetation destruction that occurs along with these.

**Migratory Birds**

In general, this alternative will provide the greatest management flexibility in using fire to achieve resource objectives, and it will achieve the desired landscape objectives in the shortest time period. By identifying the desired landscape objectives, the proposed action provides a means to coordinate all of the vegetation manipulation projects in the RGFO planning area. The cumulative impact of implementing the proposed action, in conjunction with other management activities in the Royal Gorge Field Office, should affect vegetation in a positive manner over the long term, resulting in a vegetation mosaic which will reduce the likelihood of large scale insect and disease epidemics, the probability of catastrophic wildfire, and the vegetation destruction that occurs along with these.

**Cultural Resources**

As with direct and indirect effects, cumulative impacts on historic properties cannot be specifically identified until cultural resources inventories are completed and historic properties have been identified.

**Forest Management**

The proposed action will not have significant negative impacts on forest management. Forest health will be improved by promotion of age-class diversity, reinvigoration of early seral tree and forb species, reduction in stand densities, bark beetle outbreak risk reduction (assuming tree crowns are not severely scorched or stems damaged), a decrease in the likelihood of running crown fires, and a mosaic of stand types and age classes across the landscape.

The proposed action should result in less catastrophic wildfire and more wildfire under ideal burning conditions on the landscape.

**Range Management**
This alternative will provide the greatest management flexibility in using fire to achieve resource objectives, and it will achieve the desired landscape objectives in the shortest time period. Therefore, the cumulative impact of the proposed action will be positive for range management in the long term because it will provide more pasture rotation flexibility and increased production.

**Fire and Fuels**
The proposed action will provide the greatest management flexibility in using fire and vegetation treatments to achieve resource and desired landscape objectives. The cumulative impact of implementing the Fire Management Plan, in conjunction with other management activities in the Royal Gorge Field Office, should facilitate the improvement of VCC3 to a VCC2 or a VCC1 and it should help maintain desired VCC over the long term. The management of fire and use of other vegetation treatments will result in a vegetation mosaic that will improve forest health, reduce the likelihood of large scale insect and disease epidemics, the probability of catastrophic wildfire.

# 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

USFS
USFWS
USDI BOR
Colorado State Forest Service
Colorado State Department of Fire Prevention and Control
All Counties within the planning area with surface ownership
Colorado State Historic Preservation Office (SHPO)
Native American Tribes: Because specific project locations have not been proposed for the present Environmental Assessment, it is not possible, at this time, to identify specific effects to places or resources of traditional concern. Consultation with potentially affected Native American Indian Tribes will be conducted on an individual project basis, and will include the Apache Tribe of Oklahoma, Cheyenne and Arapaho Tribes of Oklahoma, Cheyenne River Lakota Tribe, Comanche Tribe of Oklahoma, Crow Creek Sioux Tribe, Eastern Shoshone Tribe, Jicarilla Apache Tribe, Kiowa Tribe of Oklahoma, Northern Arapaho Tribe, Northern Cheyenne Tribe, Oglala Lakota Tribe, Rosebud Sioux Tribe, Southern Ute Tribe, Standing Rock Sioux Tribe, Ute Tribe, and the Ute Mountain Ute Tribe.

## CHAPTER 5 - REFERENCES


Bureau of Land Management (BLM). 198X. Draft Resource Management Plan and Environmental Impact Statement. X Field Office. X, Colorado.

Bureau of Land Management. 198X. X Resource Area Resource Management Plan and Record of Decision. X District. X, Colorado.

Bureau of Land Management. 198X. H-1790-1 National Environmental Policy Handbook. Washington, D.C.

BLM (Bureau of Land Management 1996 *Manual H-4180* Department of the Interior, Bureau of Land Management

Bureau of Land Management 2012, 6330 - Management of Wilderness Study Areas Release 6-134

Ahler, Stanley A. 1983 Heat Treatment of Knife River Flint. *Lithic Technology* 2(1):1-6.

Andrews, Bradford 2004 *Vegetative Treatments and Their Potential Effects to Cultural Resources*. Alpine Archaeological Consultants. Submitted to Uncompahagre/Con. Inc., Uncompahagre Plateau Study Project, Contract No. UPSP03-01.

Collins, Michael B. and Jason M. Fenwick
1974 Heat Treatment of Chert, Methods and Implications of their Application. *Plains Anthropologist* 19(64):134-143.

Domanski, M. and J.A. Webb
1992 Effects of Heat Treatment on Siliceous Rocks used in Prehistoric Technology. *Journal of Archaeological Science* 19(6):601-614.

Kelly, Roger and Daniel F. McCarthy
2001 Effects of Fire on Rock Art. In *American Indian Rock Art*, edited by S. M. Freers and A. Woody, pp. 169-176. Vol. 27. American Rock Art Research Association, Tucson.

RMRS - Rocky Mountain Research Station
2012 *Wildfire in Ecosystems: Effects of Fire on Cultural Resources and Archaeology*. General Technical Report RMRS-GTR-42-volume 3. United States Department of Agriculture, Forest Service.

Tratebas, Alice M., with Niccole Villa Cerveny, and Ronald I. Dorn
2004 The Effects of Fire on Rock Art: Microscopic Evidence Reveals the Importance of Weathering Rinds. *Physical Geography* 25(4):313-333.

Barrett, S.; Havlina, D.; Jones, J.; Hann, W.; Frame, C.; Hamilton, D.; Schon, K.; Demeo, T.; Hutter, L.; and Menakis, J. 2010. Interagency Fire Regime Condition Class Guidebook. Version 3.0 [Homepage of the Interagency Fire Regime Condition Class website, USDA Forest Service, US Department of the Interior, and The Nature Conservancy]. [Online], Available: http://www.frcc.gov/.

Richard T. Reynolds, Andrew J. Sanchez Meador, James A. Youtz, Tessa Nicolet, Megan S. Matonis, Patrick L. Jackson, Donald G. DeLorenzo, Andrew D. Graves. 2013. Restoring Composition and Structure in Southwestern Frequent-Fire Forests, A science –based framework for Improving Ecosystem Resiliency, USDA Forest Service, General Technical Report RMRS-GTR-310. September 2013

Arno, S. F.; Fiedler, C.E.; Mimicking Nature's Fire: Restoring Fire-Prone Forests in the West. 2005

Brown, J. K.; Introduction to Fire Regimes. 2000. USDA Forest Service, Rocky Mountain Research Station, General Technical Report 42, Vol. 2

Intermountain Society of American Foresters.; Management of Piñon-Juniper "Woodland" Ecosystems. February 15, 2013.

Mason, L.C.; Lippke, B.R.; Zobrist, K.W.; Bloxton, T.D.; Ceder, K.R.; Comnick, J.M.; McCarter, J.B.; Rogers, H.K.; Investments in Fuel Removals to Avoid Forest Fires Result in Substantial Benefits. 2006. Journal of Forestry 104(1): 27-30.

Quigley, T. M.; Hayes, R.; Graham R.; Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin. 1996. USDA, Forest Service, Pacific Northwest Research Station, General Technical Report 382.

U.S. Department of Agriculture Forest Service. Wildland Waters, http;//www.fs.fed.us/wildlandwaters/. Summer 2005.

*National Wildfire Coordinating Group (*NWCG) 2014 Glossary of Wildland Fire Terminology PMS 205 October 2014

Agee, J. K. 2000. Disturbance ecology of North American boreal forests and associated northern mixed/subalpine forests. Pages 39–82 in L. F. Ruggiero, K. B. Aubry, S. W. Buskirk, G. M. Koehler, C. J. Krebs, K. S. McKelvey, and J. R. Squires, editors. Ecology and conservation of lynx in the United States. University Press of Colorado. Boulder, Colorado, USA.

Anderson, D.G. 2004. *Neoparrya lithophila* Mathias (Bill's neoparrya): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region.

Anderson, D.G. 2006. *Eriogonum brandegeei* Reveal (Brandegee's buckwheat): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region.

Bailey, T. N., E. E. Bangs, M. F. Portner, J. C. Malloy, and R. J. McAvinchey. 1986. An apparent overexploited lynx popu-lation on the Kenai Peninsula, Alaska. Journal of Wildlife Management 50:279–290.

Bakeman, M. E. and A. Deans. 1997. Habitat of the Preble's meadow jumping mouse at Rocky Flats, Colorado. U.S. Fish and Wildlife Service and Colorado Division of Wildlife. Denver, USA.

Beauvais, G. P., and R. Smith. 2003. Model of breeding habitat of the Mountain Plover (*Charadrius montanus*) in western Wyoming. Western North American Naturalist 63: 88–96.

Blackwell, B. A., R. W. Gray, R. N. Green, F. Feigl, T. Berry, D. Ohlson and B. Hawkes. 2003. Developing a coarse scale approach to the assessment of forest fuel conditions in southern British Columbia. Forest Innovation Investment. Victoria, British Columbia, Canada.

Bond, M.L., R.J. Gutiérrez, A.B. Franklin, W.S. LaHaye, C.A. May, and M.E. Seamans. 2002. Short-term effects of wildfires on spotted owl survival, site fidelity, mate fidelity, and reproductive success. Wildlife Society Bulletin 30:1022-1028.

Bond, M.L., D.E. Lee, R.B. Siegel, and J.P. Ward, Jr. 2009. Habitat use and selection by California spotted owls in a postfire landscape. Journal of Wildlife Management 73:1116-1124.

Brussard, P. F., and H. Britten. 1989. The status of the Uncompahgre fritillary. Fian report. Technical report, U. S. Forest Service Gunnison, Colorado, 47 pp.

Bureau of Land Management (BLM). 2007. Final biological assessment, vegetation treatments on BLM lands in 17 western states (PBA). Reno, Nevada.

Clark, T. W. and M. R. Stromberg. 1987. Mammals in Wyoming. University Press of Kansas, Lawrence, Kansas.

Cohen, S. and K. Miller (editors). 2001. North America. in Climate change 2001: Impacts, adaptation, and vulnerability. J. McCarthy, O. Canziani, N. Leary, D. Dokken, and K. White editors. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, United Kingdom. http://www.grida.no/climate/ipcc_tar/wg2/pdf/wg2TARchap15.pdf Accessed August 2013.

Cully, J. F. Jr. 1991. Response of Raptors to Reduction of a Gunnison's Prairie Dog Population by Plague. American Midland Naturalist 125:140-149.

Dodson E.K., D.W. Peterson, and R.J. Harrod. 2010. Impacts of erosion control treatments on native vegetation recovery after severe wildfire in the Eastern Cascades, USA. International Journal of Wildland Fire 19:490-499.

ERT Company. 1986. Status report on the pawnee montane skipper (*Hesperia leonardus montana s*). Prepared for the Denver Water Department, Denver, Colorado. 45 pp.

Fertig,W., Black, Wolken. 2005. Rangewide Status Review of Ute Ladies'-Tresses (*Spiranthes diluvialis*). Prepared for USFWS.

Fire Executive Council. 2009. Guidance for Implementation of Federal Wildland Fire Policy (February 2009). http://www.nifc.gov/policies/policies_documents/GIFWFMP.pdf.

Fitzgerald, J.P., C.A Meaney, and D.M. Armstrong. 1994. Mammals of Colorado. University Press of Colorado, Niwot, CO, 467 pp.

Fletcher, K. W. and H.E. Hollis. 1994. Habitats used, abundance, and distribution of the Mexican spotted owl (*Strix occidentalis lucida*) on National Forest System lands in the Southwestern Region. USDA For. Serv., Southwestern Region, Albuquerque, N.M

Forsman, E. D., E. C. Meslow, and H. M. Wight. 1984. Distribution and biology of the Spotted Owl in Oregon. Wildlife Monographs 87.

Fox, J. F. 1978. Forest fires and the snowshoe hare-Canada lynx cycle. Oecologia 31:349–374.

Franklin, A.B., D.R. Anderson, R.J. Gutíerrez, and K.P. Burnham. 2000. Climate, habitat quality, and fitness in northern spotted owl populations in northwestern California. Ecological Monographs 70:539-590.

Frey, J.K. 2006. Status of the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*) in the Sangre de Cristo Mountains, New Mexico. Final report to New Mexico Dept. Game & Fish, Conservation Serv. Div., Santa Fe, contract 06-516.0000.0049. 78 p + CD.

Ganey, J. L. 1988. Distribution and habitat ecology of Mexican spotted owls in Arizona. M.S. thesis, Northern Arizona University, Flagstaff, Arizona.

Ganey, J. L., and R. P. Balda. 1989. Distribution and habitat use of Mexican spotted owls in Arizona. The Condor 91: 355-361.

Ganey, J. L. and R. P. Balda. 1994.Habitat selection by Spotted Owls in northern Arizona. Auk 111: 162-169.

Gärtner, S., K. M. Reynolds, P. F. Hessburg, S. Hummel, M. Twery. 2008. Decision support for evaluating landscape departure and prioritizing forest management activities in a changing environment. Forest Ecology and Management 256: 1666–1676.

Giesen, K. M. 2000. Population status and management of lesser prairie-chicken in Colorado. Prairie Naturalist 32:137–148.

Gray, R. W. and L. D. Daniels. 2006. Range of natural variation of old growth forests in the sea-to-sky land and resource management area: status of knowledge and understanding. Final Report to British Columbia Ministry of Forests, Victoria, Canada.

Habeck, J. R. 1985. Impact of fire suppression on forest succession and fuel accumulations in long-fire-interval wilderness habitat types. Pages 110–118 in J. E. Lotan, B. M. Kilgore, W. C. Fischer, and R. M. Mutch, editors. Proceedings Symposium and Workshop on Wilderness Fire, November 15–18, 1983, Missoula, Montana. USDA Forest Service, Intermountain Forest and Range Experiment Station, General Technical Report INT-GTR-182. Ogden, Utah, USA.

Hafner, D. J., K. E. Petersen, and T. L. Yates. 1981. Evolutionary relationships of jumping mice (genus *Zapus*) of the southwestern United States. Journal of Mammalogy 62:501-512.

Hall, E. R. 1981. The mammals of North America. Second edition. John Wiley and Sons, New York, New York.

Hardy, C. C., J. P. Menakis, J. K. Brown, and D. L. Bunnell. 1998. Mapping historic fire regimes for the Western United States: Integrating remote sensing and biophysical data. Pages 288–300 in J. D. Greer, editor. Natural resource management using remote sensing and GIS, Proceedings of the Seventh Forest Service Remote Sensing Applications Conference; 1998 April 6-10; Nassau Bay, Texas. American Society for Photogrammetry and Remote Sensing, Bethesda, Maryland, USA.

Hessburg, P. F., B. G. Smith, S. D. Kreiter, C. A. Miller, B. R. Salter, C. H. McNicoll, and W. J. Hann. 1999. Historical and current forest and range landscapes in the interior Columbia River basin and portions of the Klamath and Great Basins. Part 1: Linking vegetation patterns and landscape vulnerability to potential insect and pathogen disturbances. USDA Forest Service, Pacific Northwest Research Station, General Technical Report PNW-GTR-458. Portland, Oregon, USA.

Hessburg, P. F., J. K. Agee, and J. F. Franklin. 2005. Dry forests and wildland fires of the inland Northwest USA: Contrasting the landscape ecology of the pre-settlement and modern eras. Forest Ecology and Management. 211:117–139.

Holmes, B.E. 2008. A review of black-footed ferret reintroduction in northwest Colorado, 2001-2006. Technical note 426. US Department of the Interior, Bureau of Land Management, White River Field Office, Colorado. 43pp.

Interagency Lynx Biology Team. 2013. Canada lynx conservation assessment and strategy. 3rd edition. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication R1-13-19, Missoula, MT. 128 pp.

Jenness, J.S. 2000. The effects of fire on Mexican spotted owls in Arizona and New Mexico. M.S. Thesis, Northern Arizona University, Flagstaff, USA.

Jennings, W. F. 1989. Final report Colorado Natural History Small Grants Program. Species studied: *Eustoma graniflorum, Spiranthes diluvialis, Malaxis brachypoda, Hypoxis hirsute, Physaria bellii, Alete humilis*. Report prepared for The Nature Conservancy.

Johnston, B. C., J. S. Peterson, and W. Harmon. 1981. Status report: Eutrema penlandii Rollins. Unpublished report on file with the Colorado Natural Areas Program.

Keenan, L.D., R.E. Stanford, S.L. Ellis, and B. Drummond. 1986. Status report on: Pawnee montane skipper. Prepared for Denver Water Department, Denver, Colorado. February. 49 pp.

Kingery, H.E., ed., 1998. Colorado Breeding Bird Atlas. Colorado Bird Atlas Partnership and Colorado Division of Wildlife, Denver, CO, 636pp.

Knopf, F. L., and B. J. Miller. 1994. *Chardrius montanus*: Montane, grassland, or bare-ground plover? The Auk 111: 504-506.

Koehler, G. M. and J. D. Brittell. 1990. Managing spruce-fir habitat for lynx and snowshoe hares. Journal of Forestry 88:10–14.

Kyle, S.C. and W.M. Block. 2000. Effects of wildfire severity on small mammals in northern Arizona ponderosa pine forests. Pp. 163-168 *in* W.K. Moser and C.F. Moser (eds.), Fire and forest ecology: innovative silviculture and vegetation management. Tall Timbers fire ecology conference proceedings 21. Tall Timbers Research Station, Tallahassee, Florida, USA.

Maletzke, B. T. 2004. Winter habitat selection of lynx (*Lynx canadensis*) in northern Washington. Thesis, Washington State University, Pullman, Washington, USA.

McKenzie, D., Z. Gedalof, D. L. Peterson, and P. Mote. 2004. Climatic change, wildfire, and conservation. Conservation Biology 18:890–902.

Morgan, P., S. C. Bunting, A. E. Black, T. Merrill, and S. Barrett. 1998. Past and present fire regimes in the Interior Columbia River Basin. In K. Close and R. A. Bartlette, editors. Fire management under fire (adapting to change), Proceedings for the 1994 Interior West Fire Council meeting and program; 1994 November 1–4; Coeur d'Alene, ID. International Association of Wildland Fire, Fairfield, Washington, USA.

Mountain West Environmental Services. 1985. Field inventory and plot sampling of *Gaura neomxicana* ssp. *coloradensis* in Wyoming and Nebraska, 1985. Report prepared for the Rocky Mountain Heritage Task Force, TNC.

National Audubon Society. 2002. Spotted Owl (*Strix occidentalis*) Available at: http://audubon2.org/webapp/watchlist/.

Neid, S.L. and D. Clark. 2006. Field survey at Curley Peak in Fremont County, Colorado. Colorado Natural Heritage Program. Ft. Collins, Colorado.

O'Kane, S. 1988. Colorado's rare flora. Great Basin Naturalist 48(4): 434-484.

Peppin, D.L., P.Z. Fulé, C. Hull Seig, J.L. Beyers, and M.E. Hunter. 2010. Post-wildfire seeding in forests of the western United States: an evidence-based review. Forest Ecology and Management 260:573-586.

Pizzimenti, J. J. and R. S. Hoffmann. 1973. Mammalian Species: *Cynomys gunnisoni*. Volume One. The American Society of Mammalogists, New York City.

Poole, K. G., L. A. Wakelyn, and P. N. Nicklen. 1996. Habitat selection by lynx in the Northwest Territories. Canadian Journal of Zoology 74:845–850.

Quigley, T. M., R. Haynes, R. W. Graham, and T. Russell, technical editors. 1996. Integrated scientific assessment for ecosystem management in the interior Columbia basin and portions of the Klamath and Great Basins. USDA Forest Service, Pacific Northwest Research Station. General Technical Report PNW-GTR-382. Portland, Oregon, USA.

Quinn, N. W. S. and J. E. Thompson. 1987. Dynamics of an exploited Canada lynx population in Ontario. Journal of Wildlife Management 51:297–305.

Ryon, T. R. 1999. Travel distance and movement patterns of the Preble's meadow jumping mouse (*Zapus husonius preblei*) at the Rocky Flats Environmental Technology Site. Journal of the Colorado-Wyoming Academy of Science 31:12.

Scott. J. A. 1982. The life history and ecology of an alpine relict, *Boloria improba*, illustrating a new mathematical population census method. Papilio 2: 1-12.

Shenk, T. M. 1998. Conservation assessment and preliminary conservation strategy for Preble's meadow jumping mouse (*Zapus hudsonius preblei*). Colorado Division of Wildlife Federal Aid Report WP-0662-T-1. Fort Collins, USA.

Shenk. T. M. and J. T. Eussen. 1998. Habitat use and distribution of Preble's meadow jumping mouse (*Zapus hudsonius preblei*) in Larimer and Weld counties, Colorado. Unpublished report. Colorado Division of Wildlife. 25 pp. + figures.

Shenk, T.M. and M.M. Sivert. 1999. Movement patterns of the Preble's meadow jumping mouse (Zapus hudsonius preblei) as they vary across time and space. Fort Collins (CO): Colorado Division of Wildlife. 35pp.

Shenk, T. 2000. Temporal and spacial variation in the demography and movement patterns of Preble's meadow jumping mouse (Zapus hudsonius preblei). Fort Collins (CO): Colorado Division of Wildlife. 41 pp.

Schoennaagel, T., T. T. Veblen, and W. H. Romme. 2004. The interaction of fires, fuels, and climate across Rocky Mountain forests. BioScience 54:661–676.

Schwendinger, R. B., G. K. Carlson, C. O. Spielman Jr. 1991. Status report on *Eutrema penlandii rollins* as a result of filed investigation in Park, Summit, Gunnison, Chaffee, and Clear Creek Counties, Colorado, in July and August, 1991. Golden, CO: Submitted to Lee Carlson, USFWS by Alma American Mining Corporation. pg. 46. Unpublished report.

Skaggs, R. W., and R. J. Raitt. 1988. A spotted owl inventory on the Lincoln Nation Forest Sacramento Division: 1988. Contract No. 5-516.6-76-17. New Mexico Department of Game and Fish. Santa Fe, New Mexico.

Slough, B. G. and G. Mowat. 1996. Lynx population dynamics in an untrapped refugium. Journal of Wildlife Management 60:946–961.

Smith, J. 1999. "Zapus hudsonius" (On-line), Animal Diversity Web. Accessed April, 7, 2015 at http://animaldiversity.ummz.umich.edu/site/accounts/information/Zapus_hudsonius.html.

Stella, K.A., C.H. Sieg, P.Z. Fulé. 2010. Minimal effectiveness of native and non-native seeding following three high severity wildfires. International Journal of Wildland Fire 19:746-758.

Stephenson, R. O. 1984. The relationship of fire history to furbearer populations and harvest. Final Report, Federal Aid in Wildlife Restoration, Project W-22-2, Job 7.13R Alaska Dept. of Fish and Game, Juneau, Alaska, USA.

U.S. Department of Agriculture, Forest Service. 2010. The Okanogan-Wenatchee National Forest restoration strategy: adaptive ecosystem management to restore landscape resiliency, 2010 Final Version. Okanogan-Wenatchee National Forest, Wenatchee, Washington, USA.

U. S. Department of Interior, U.S. Fish and Wildlife Service (USFWS). 2001. Final Determination of Critical Habitat for Wintering Piping Plovers. Federal Register 66(132):36037-36086.

U. S. Department of Interior, U.S. Fish and Wildlife Service (USFWS). 1998. Endangered and threatened wildlife and plants; final rule to list the Preble's meadow jumping mouse as a Threatened Species. Federal Register 63:26517-26530.

U.S. Department of Interior, U.S. Fish and Wildlife Service. 2012. Final Recovery Plan for the Mexican Spotted Owl (*Strix occidentalis lucida*), First Revision. U.S. Fish and Wildlife Service. Albuquerque, New Mexico, USA. 413 pp.

U.S. Department of Agriculture and U.S. Department of the Interior [USDA and USDI]. 2001. Managing the Impacts of Wildland Fires on Communities and the Environment: A Report to the President in Response to the Wildfires of 2000. USDA Forest Service and US Department of Interior, Washington, DC.

U.S. Department of Agriculture and U.S. Department of the Interior [USDA and USDI]. 2006. Interagency Burned Area Emergency Response Guidebook. Interpretation of Department of the Interior 620 DM 3 and USDA Forest Service Manual 2523. Version 4.0. February 2006. Washington, D.C., (Available at; www.fws.gov/fire/ifcc/esr/Policy/BAR_Guidebook11-06.pdf).

Weber, W. A., and S. Shushan. 1955. The lichen flora of Colorado: *Cetraria, Cornicularia, Dactylina,* and *Thamnolia.* University of Colorado Studies, Series Biology 3: 115-334.

Westerling A. L., H. G. Hidalgo, D. R. Cayan, T.W. Swetnam. 2006. Warming and earlier spring increase western U.S. wildfire activity. Science 313: 940–943.

Whitlock, C. 2004. Land management: forests, fires, and climate. Nature. 432:28–29.

Zwinger, A.H. and B.E. Willard. 1972. Land Above the Trees: A Guide to American Alpine Tundra. University of Arizona Press, Tucson, AZ.

# FINDING OF NO SIGNIFICANT IMPACT

# Finding of No Significant Impact
# (FONSI)

# DOI-BLM-CO-200-2014-0047 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:

**Context**:
The Federal Wildland Fire Management Policy (FWFMP) was developed by the secretaries of the departments of Interior and Agriculture in 1995 in response to the dramatic increases in the frequency, size, and catastrophic nature of wildfires in the United States. The 2001 Review and Update of the 1995 FWFMP consists of findings, guiding principles, policy statements, and implementation actions, and it replaces the 1995 FWFMP. Since the development of the 2001 FWFMP, several changes and revisions have been made to consolidate and clarify policy changes that have occurred since the strategy document was issued. Most recently, in February 2009, the Guidance for the Implementation of Federal Wildland Fire Management Policy was released. The policy directs federal agencies to achieve a balance between suppression; protection of life, property, and natural resources; and the use of wildland fire for resource benefit, to regulate fuels, and maintain healthy ecosystems. This policy also requires periodic reviews and updates to the FMP. These reviews are necessary to keep up with changing policy, changes in management needs, changes in the public/private land interface, Wildland Urban Interface (WUI), and environmental conditions.

The FMP will manage fire related activities for all BLM administered lands in the Royal Gorge Field Office, including all public lands of eastern Colorado from the Front Range and mountain interior to the Kansas border, and south from the Wyoming to the New Mexico and Oklahoma borders.

In the RGFO, the initial NEPA analysis for the current FMP was competed in 2001 through an interdisciplinary process that began with the involvement of resource specialists and interagency partners. The FMP that was produced served as a guide for the management of wildland and prescribed fires as a natural process and as a tool to incorporate the role of fire as an essential ecological process and natural disturbance agent. The FMP is reviewed annually in the Royal Gorge Field Office. After a recent review of the current FMP, it was determined that landscape and ecological conditions, values at risk, policy, and management direction have changed enough to warrant a new NEPA analysis document to develop a FMP that can serve as a tool for managing naturally ignited fires for resource benefit if conditions are suitable. It can also help managers by identifying priority areas where the utilization of prescribed fire, mechanical, chemical and biological vegetation treatments can be used to reduce the severity of a wildfire or

to facilitate the management of naturally ignited wildfires to achieve desired ecological conditions on the landscape.

The proposed action alternative is the selected alternative. This alternative complies with FWFMP (1995 and 2001), and the February 2009 Guidance for the Implementation of Federal Wildland Fire Management Policy. The proposed action will allow the fire management program to update the fire management plan so that it is in compliance with this policy.

The proposed action will provide fire managers guidance and a foundation for integrating the management of wildland fires, fuels, prescribed fire, and vegetation treatment projects with other resource management programs.

**Intensity**:
I have considered the potential intensity/severity of the impacts anticipated from the Royal Gorge Field Office Fire and Fuels Management Planning decision relative to each of the ten areas suggested for consideration by the CEQ. With regard to each:

The fire management plan provides a foundation for integrating fire management with all other resources management programs administered by the Royal Gorge Field Office.

Impacts that may be beneficial and adverse:
This alternative will provide the greatest management flexibility in achieving a balance between fire suppression, managed fire, and alternative treatment methods to achieve resource objectives while providing for firefighter and public safety. This action will allow fire to play its natural role in achieving and maintaining healthy forest, vegetation, and ecosystem conditions while protecting private land, wildlife habitat, critical infrastructure, and valuable ecosystem components.

The use of fire, (managed wildfires and prescribed), mechanical, chemical, and biological treatments will create a mosaic of vegetation conditions, and will alter fuels arrangements to create more manageable conditions across the landscape. This would reduce the potential for large, high severity, catastrophic fires that would have severe impacts on multiple resources. These treatments would improve forest health conditions, and would improve habitat and forage conditions for wildlife and livestock.

Although analysis showed mostly beneficial impacts for most resources, in some cases, the proposed action could potentially present some negative impacts. These negative effects associated with any activity, but are mostly associated with larger scale, higher severity wildfires and large scale mechanical treatments where there is extensive soil disturbance and compaction. There can be negative impacts to soils with sterilization and hydrophobicity in severe cases. This can cause an increase in run off and erosion. Water quality can be negatively impacted following an event. Following any soil or ground disturbing event, including fire or mechanical treatments, areas are more prone to noxious weed infestation. There could be short term negative impacts to wildlife and bird species due to disturbance and possible displacement of individuals. In some cases a risk of long-term indirect effects due to loss, alteration, or degradation, of habitat can occur, especially on large scale, high severity fires. For the most part,

these negative impacts are localized and short term in nature and the overall long term benefits will outweigh the negative.

Resource advisors will be a critical component in developing a management strategy that would present the least negative impacts to the resource. Mitigation measures have been identified and will be developed further during site specific events or activities. Following these events, emergency stabilization or rehab activities will be developed to lessen the negative impacts and hasten the recovery of the system.

Public health and safety:
Managed fire, prescribed fire, mechanical and other treatment methods can be used to manipulate vegetation conditions to reduce ladder fuels and to create breaks in the continuous canopy. These treatments can reduce the chance of a fire getting into the crowns of the trees. Running crown fires are difficult, and in most cases impossible to control. These types of fires are typically high severity. If large in scale, they can cause negative effects to multiple resources. Utilizing managed fire as a tool along with alternate treatment methods is a proactive approach that could give fire fighters a better chance to safely employ suppression tactics if necessary. Those treatments also provide options for fire managers to utilize alternative fire management techniques to manage a wildfire to achieve resource management objectives with minimal loss or damage to property and resources.

**Unique characteristics of the geographic area:**
The environmental assessment evaluated the analysis area for the proposed action. Within the analysis area, there are WSA's, ACEC's, and a RNA. Resource advisers and existing guidance would be consulted when conducting fire activities in these special designations.

**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 relating to managed fire are highly uncertain due the dynamic nature of fire, fuels conditions, and the predictability or in some cases unpredictability of weather or unforeseen weather events that can occur. All management decisions are made based on best data that is available. Managers utilize fire behavior, weather, and fuel condition modeling, in developing a strategy to manage a fire, but ultimately, firefighter and public safety drive the decisions. Other methods of vegetation treatment, including mechanical, chemical, and biological treatments 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 managed fire and vegetation treatments on public lands. The decision is within the scope of the Resource Management Plans 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:**
Wildland fire activity has occurred in all months of the year within the planning area. Most fire activity occurs during the months of April thru October with fire activity reaching its peak in July. There has been an increase in the number of fires and acres burned annually over the last 10 years. From 1980 to 2013 the unit averaged 38 wildland fires per year and an average of 218 acres has burned on BLM administered lands annually. The fires that occur are relatively small with 89% of the wildland fires burning 10 acres or less. Fuel loading conditions that would support large catastrophic wildfire do exist. Because of the wide distribution of fire occurrences, the cumulative impacts of the managed fire are possible. However, given the historic/natural range of variability the cumulative effects would be negligible.

Several vegetation treatments (prescribed fire, mechanical, chemical, and biological) have occurred throughout the analysis area in the past. For the most part these projects have been small in scale and scattered over an extended period of time. The vegetation 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:**
Being a planning level document, the proposed fire management actions present the potential for direct and indirect effects to cultural resources. However, until specific areas are identified for treatment or rehabilitation, effects on historic properties cannot be definitively assessed until site specific actions occur.

**Threatened and endangered species and their critical habitat:**
Due to the nature of the proposed actions, for an unplanned event, consultation with the United States Fish and Wildlife Service will take place post-fire during the emergency consultation process. However, when an unplanned event is detected and acted upon, the Service will be contacted to provide insight into possible conservation measures that may be implemented to help protect and and/or benefit listed species. Recovery activities that are to occur post-fire will also be addressed in the emergency consultation package. Planned events that may affect listed species and/or their habitat will be addressed in the Section 7 consultation process established in the Endangered Species Act prior to project implementation.

**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: Glenda Torres- Natural Resource Specialist-Fuels

SUPERVISORY REVIEW: Tyler Webb- Fire Management Officer

NAME OF ENVIRONMENTAL COORDINATOR: /s/ Martin Weimer

DATE: 01/25/16

SIGNATURE OF AUTHORIZED OFFICIAL: _____
Keith E. Berger, Field Manager

DATE SIGNED: 3/18/16

APPENDICES:
ATTACHMENTS:

# DECISION RECORD

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

# DECISION RECORD

**Project Name**

# DOI-BLM-CO-200-2014-0047-EA

DECISION: It is my decision to implement the Proposed Action as described in the attached EA. With the approval of the proposed action, the Royal Gorge Fire and fuels program will be able to stay current and consistent with new guidance and policies. The fire management plan will be updated so that it is compliance with federal fire policy and with the decisions in the Resource Management Plans for the Royal Gorge Field Office.
Under the proposed action, fire and resource managers will have the option of managing fires, using prescribed fire, mechanical, chemical, and biological treatments and fuels reduction projects to achieve resource and vegetation management objectives. It will also help reduce hazardous fuel conditions and maintain the health of the landscape. These treatments will also provide more options to fire managers to safely employ appropriate tactics to manage or suppress a fire depending on the conditions. Site specific actions including prescribed fire, mechanical, chemical, and biological treatments will be further analyzed in NEPA documents. Resource advisors will be an important component of decision making and planning for managed fires within the planning areas.

Because the analysis area for this environmental assessment falls in the planning areas of two RMP's (the 1996 RGFO RMP, and the Northeast RMP), the proposed action has been developed so that actions that occur within those different planning areas are in compliance with each respective RMP.

The proposed action for BLM lands within the Royal Gorge RMP planning area is to consider all naturally ignited wildfires in the planning area covered by the 1996 RGFO RMP could potentially be managed for resource benefits. Each wildfire will be evaluated on a case by case basis to measure potential benefits versus potential risks.

The use of resource advisors will be essential to adequately implement the proposed action. Resource advisors would allow management decisions to be made with full use of available information and resource expertise while allowing suppression activities to continue without subjecting firefighters and the public to increased risk or excessive cost.

Under the proposed action, there may be some instances where full or modified suppression tactics or a modified response to wildland fire procedures is the only management option due to proximity to values at risk, and firefighter safety.

Wildfires occurring on BLM lands within the Northeast RMP planning area would not be managed for resource benefits. For the most part, these areas are small, scattered parcels of

BLM land that would not be conducive to managed fire due to the land ownership patterns. The main focus in these areas would be mechanical, chemical, or biological vegetation treatments on parcels that have been identified to allow for vegetation treatments in the Northeast RMP. Due to the small acreage of land within the BLM parcels, priority would be given to project areas that could be implemented in a cooperative effort with adjacent land owners. These vegetation treatments would be more effective at reducing the risk and spread of catastrophic wildfire if they are larger and more continuous areas.

A public scoping effort was initiated in July 2014, providing interested parties at thirty day period to identify issues and concerns. The scoping was in the form of a scoping letter that was went out to cooperating federal, state, and local agencies, as well as interest groups. In addition, a press release was sent out to sever local and Front Range media outlets. Three comments were received. Boulder County Parks and Open Space and the Colorado State Forest Service-Salida District both supported the proposed action. Wild Connections also provided comment and overall supported the proposed action. With their support came recommendations for managers to integrate fire and fuels management with the possible designation of Lands with Wilderness Characteristics in the planning process. Wild Connections advocates that the fire and fuels management plan should take into account these wilderness characteristics, using "let-burn policies, controlled burns, and hand treatment in preference to mechanical treatment methods and managing fuels and fires in a way which would not preclude or hamper designation of these areas as wilderness. They also recommended that mitigation efforts should be concentrated on areas where human risk to lives and to private or valuable public property is the greatest.

This office completed an Environmental Assessment DOI-BLM-CO-F02-2014-047 EA and reached a Finding of No Significant Impact. However, this decision is contingent on meeting all mitigation measures and monitoring requirements listed below.

RATIONALE:
Overall, the proposed action allows managers to assess the area's ecological conditions, and consider where fire effects can be beneficial over the landscape. The proposed action will be a tool to help managers prioritize and implement alternative treatment methods to achieve desired conditions in conjunction with managed fire.

MITIGATION MEASURES\MONITORING:

This decision is contingent on meeting all mitigation measures and monitoring requirements listed below.

**Invasive Plants**
Motorized equipment used in fire suppression should be washed on a regular basis. Motorized equipment used for fuels reduction projects should be washed prior to entering project area. Washing is to remove any plant materials, soil, or grease in order to limit new invasive plant infestations.

**T&E and Sensitive Species**

It is vital a resource advisor with background knowledge of threatened, endangered, and sensitive species in the RGFO be available during fire management related activity. While fire fighter safety is of utmost importance, a resource advisor can provide expert knowledge quickly and efficiently to ensure fire management strategy does not imperil special status species.

Overall, most species are not likely to be affected by fire management activities. In these cases, either the amount of public land managed that contains their habitat is too small to manage and/or these species occur in areas that are not conducive to wildland fire or wildfire management. If fire does occur in this scenario, a resource advisor will be consulted for the best course of action to protect these species and their habitat.

Sensitive plant species may occur in areas where either wildland fire or where wildland fire management activity may occur. Therefore, for areas that contain populations of sensitive plants, wildland fire should be managed to the greatest extent possible in a manner that reflects historical fire regimes. However, these areas should be protected to the greatest extent possible from fire management related activities outside of the fire itself (e.g. avoid setting camps or staging areas on known population sites).

Conservation measure in regards to wildland fire and fire management activity for Canada lynx are provided in the Canada Lynx Conservation Assessment and Strategy, revised in 2013 (Interagency Lynx Biology Team 2013). The conservation measures provided are as follows:

- Provide a mosaic that includes dense early-successional coniferous and mixed-coniferous-deciduous stands, along with a component of mature multi-story coniferous stands to produce the desired snowshoe hare density within each lynx analysis unit (LAU).

- Use fire and mechanical vegetation treatments as tools to maintain a mosaic of lynx habitat, in varying successional stages, distributed across the LAU in a landscape pattern that is consistent with historical disturbance processes.

- Design vegetation management to develop and retain dense horizontal cover. Focus treatments in areas that have the potential to improve snowshoe hare habitat by developing dense horizontal cover in areas where it is presently lacking. In areas of young, dense conifers resulting from fire, timber harvest or other disturbance, do not reduce stem density through thinning until the stand no longer provides low, live limbs within the reach of hares during winter (e.g., self-pruning processes in the stem exclusion structural stage have eliminated snowshoe hare cover and forage availability during winter conditions with average snowpack). If studies are completed that demonstrate that thinning can be used to extend the duration of time that snowshoe hare habitat is available (e.g., by maintaining low limbs), then earlier thinning could be considered.

- Retain mature multi-story conifer stands that have the capability to provide dense horizontal cover. If portions of these stands currently lack dense horizontal cover, focus vegetation management practices (such as group selection harvest) in those areas to increase understory density and improve snowshoe hare habitat.

- To maintain the amount and distribution of lynx foraging habitat over time, manage so that no more than 30% of the lynx habitat in an LAU is in an early stand initiation structural stage or has been silviculturally treated to remove horizontal cover (i.e., does not provide winter snowshoe hare habitat). Emphasize sustaining snowshoe hare habitat in an LAU. If more than 30% of the lynx habitat in an LAU is in early stand initiation structural stage or has been silviculturally treated to remove horizontal cover (e.g., clear cuts, seed tree harvest, pre-commercial thinning, or understory removal), no further increase as a result of vegetation management projects should occur on federal lands.

- Recognizing that natural disturbances and forest management of private lands also will occur, management-induced change of lynx habitat on federal lands that creates the early stand initiation structural stage or silviculturally treated to remove horizontal cover should not exceed 15% of lynx habitat on federal lands within a LAU over a 10-year period.

- Conduct a landscape evaluation to identify needs or opportunities for adaptation to climate change. Consider potential changes in forest vegetation that could occur as a result of climate change (e.g., Gärtner et al. 2008). Identify reference conditions relative to the landscape's ecological setting and the range of future climate scenarios. For example, the historical range of variability could be derived from landscape reconstructions (e.g., Hessburg et al. 1999, Blackwell et al. 2003, Gray and Daniels 2006).

- Design harvest units to mimic the pattern and scale of natural disturbances and retain natural connectivity across the landscape.

- In aspen stands, maintain native plant species diversity including conifers.

- Recruit a high density of stems, generally greater than 4,600/ha (1,862/ac), of conifers, hardwoods, and shrubs, including species that are preferred by hares.

- Provide for continuing availability of lynx foraging habitat in proximity to denning habitat.

- When designing fuels reduction projects, where possible retain patches of untreated areas of dense horizontal cover within treated areas.

- Maintain fire as an ecological process in lynx habitat, where small populations are not at risk of extirpation due to habitat loss. Evaluate whether fire suppression, forest type conversions, and other management practices have altered fire regimes and the functioning of ecosystems.

- Consider the use of mechanical pre-treatment and management ignitions if needed to restore fire as an ecological process or to maintain specific lynx and/or prey species habitat components.

- As federal fire management plans are developed or revised, integrate lynx habitat management objectives into the plans. Prepare plans for areas that are large enough to encompass large historical fire events. Collaborate across management boundaries to develop approaches that are complementary and that simulate natural disturbance patterns where possible.

- Design burn prescriptions to promote response by shrub and tree species that are favored by snow-shoe hare.

The "Recovery Plan for the Mexican Spotted Owl, First Revision" provides a number of conservation measures in response to wildland fire and fire management activity (U.S. Fish and Wildlife Service 2012). Excerpts from this document are as follows:

> *The appropriate management of prescribed fire and wildland fire outside of protected activity centers (PACs) to moderate fire severity and the potential for stand-replacing fire may provide most alternatives to mitigate severe fire threats. Mechanical treatments, however, may be necessary in some areas before fire can be effectively and safely applied to meet management objectives. The focus of mechanical thinning will likely be concentrated in the WUI communities at risk to fire, where fires are a greater threat to people and property and where fire applications have much greater risk and liabilities. Planning and implementing fire risk-reduction activities should balance the intensity and arrangement of treatments needed to reduce the landscape risk of high-severity fire yet maintain owl habitat. Due to the current magnitude of forest fuel accumulations, some preliminary treatments (e.g., thinning combined with pile and low intensity prescription burning) will be required to reduce the severity of wildland fires and to allow for the safer management of prescribed fire and wildland fires. Cumulative effects of multiple treatments across the watershed, downstream effects, and effects to spotted owl habitat will need to be evaluated through landscape analyses and modeling, and effects should be moderated to promote Mexican spotted owl recovery.*
>
> **Wildland Fire Suppression**
>
> - *Protect Public Safety and Property.* Fire fighter safety and community protection are the utmost priorities during ES and BAR activities.

- *Wildland fire Behavior and Incident Planning*. Conduct landscape-level fire behavior assessments to strategically locate and prioritize fire suppression activities/tactics to mitigate the effects of high-severity fire and suppression activities on PACs and recovery habitat. Potential strategies include locating fire-line construction and other suppression activities where possible outside of PACs, and conducting night burning ahead of approaching moderate-high severity wildland fire in areas surrounding PACs to reduce wildland fire severity within PACs.
- *Retain Key Habitat Elements.* Where possible, wildland fire suppression activities should be applied that limit high-severity fire and loss of key habitat elements within PACs and recovery habitats.
- *Applied Research*. Research should be conducted to evaluate the short- and long-term correlates of wildland fire severities and their spatial extent on Mexican spotted owls and their habitat.

**Burned Area Emergency Stabilization (ES-DOI) and Burned Area Rehabilitation (BAR-DOI).**

- *Protect Public Health, Safety, and Property.* Personnel safety and community protection are the utmost priorities during ES and BAR activities.
- *Seasonal Restrictions*. BAR treatments where deemed necessary in or near PACs should occur during the non-breeding season (1 Sep - 28 Feb) to minimize disturbance to resident owls during the breeding season, unless non-breeding is inferred or confirmed that year per the accepted survey protocol.
- *Treatment Priorities*. ES and BAR treatments should be only be considered when critical to stabilize soils, retain key habitat elements, and enhance ecosystem recovery. Soil stabilization should be considered only where crucial and implemented through local biomass mulching or other seed-free mulching materials to minimize risk of introduced exotic species. Seeding is not recommended due to its limited effectiveness, lack of local genetically compatible seed stock, and exotic contaminants found in most seed mixes (Peppin et al. 2010a, 2010b; Dodson et al. 2010; Stella et al. 2010). If seeding is used as a treatment method in an ES or BAR effort, all seed must meet the standards set forth in BLM policy on seed use. With the BLM policy, all seed used on lands administered by the Bureau of Land Management is required to be noxious weed-free and meet standards set forth by state seed certification agencies for seed quality. All seed to be applied on public land must have a valid seed test, within one year of the acceptance date, from a registered seed analyst. The seed lab results can show no more than 0.5% by weight of other weed seeds; and the seed lot shall contain no noxious, prohibited, or restricted weed seeds according to State seed laws in the respective State(s). Measures to protect remaining green trees from insect and disease may also be necessary.

**Prescribed Fire, Hazardous Fuels Treatments, and Wildland Urban Interface (WUI).**

- *Protect Public Health, Safety and Property.* Fire fighter safety and community protection are the utmost priorities during prescribed fire and hazardous fuels treatment activities.
- *Area Limitations*. Mechanically treat as needed up to 20% of the non-core PAC area within recovery units identified through the landscape-level assessment.
- *Seasonal Restrictions*. Light burning of surface and low-lying fuels may be conducted within PACs following careful review by biologists and fuel-management specialists on a case-specific basis. Mechanical or prescribed fire treatments should occur during the non-breeding season (1 Sep - 28 Feb) to minimize disturbance to resident owls, unless non-breeding is inferred or confirmed that year per the accepted survey protocol. Treatments should be planned when environmental conditions provide enhanced opportunities to achieve fuel reduction and forest-restoration objectives. These activities however should be deferred in severe drought years and times of high to extreme wildland fire risk.
- *Types of Treatments.* Combinations of mechanical and prescribed fire treatments may be used to minimize risk of high-severity fire effects while striving to maintain or improve habitat conditions for the owl and its prey.
- *Strategic Placement of Treatments.* Treatments should be placed strategically to minimize risk of high-severity fire effects to the nest core while mimicking natural mosaic patterns.
- *Treatment Priorities*. Emphasize treatments in other forest and woodland types over those of PACs and recovery habitats to the extent practicable. Treatments in these areas might buffer owl habitat as well as provide fire risk reduction to WUI communities. Where appropriate, areas surrounding PACs could be treated with higher prescribed fire and mechanical treatment intensities to better achieve management objectives (e.g., reduction of hazardous fuels and potential for stand-replacing fires, enhancement of landscape, and forest structural diversity).
- *Landscape Assessment*. A landscape-level assessment should be conducted to strategically locate and prioritize prescribed and hazardous fuels treatments to best mitigate the risk of stand replacing fires and high severity fire effects to current and future spotted owl habitat elements.
- *Monitoring.* Monitoring should be designed and implemented to evaluate the effects of prescribed fire and hazardous fuel reduction treatments on spotted owl habitat, and to retain or move towards Mexican spotted owl desired conditions.

- *Applied Research Experiments*. Management experiments should be conducted in places to evaluate the short-term, long- term, cumulative, and watershed effects of these activities on Mexican spotted owls and their habitats.

These recommendations, when implemented, should help reduce high-severity fire effects across broader forest landscapes and help protect Mexican spotted owl PACs, potential habitats, and suitable nesting/roosting habitat locations from future stand-replacing wildland fires and enhance landscape-level forest resiliency to climate variability. Additionally, these recommendations are supported by current research and monitoring on Mexican spotted owl fire effects that show limited, short-term effects from moderate- to high-severity fires (Bond et al. 2002, 2009; Jenness et al. 2004).

**Vegetation**

Knowledge of plant response to fire can be critical to the successful application of this plan. Design of fire prescriptions will involve the use of fire behavior prediction, fire effects and predicted severity, species survival mechanisms and adaptations to fire, as well as the use of tools to describe the set of weather and fuel moisture conditions that will be desired in a given area.

Another mitigating factor in the Plan is its flexibility, which allows for some revision of the objectives and constraints as more data becomes available about the use and effects of fire, and other tools that duplicate it. This flexibility is incorporated to ensure that the best approaches are being used to restore the natural disturbance effects fire once had on the vegetation. The objectives will be revised periodically to incorporate annual monitoring, which will provide a gauge to prevent too much of the landscape from being converted to an early seral stage.

**Wetlands and Riparian Zones**

The major negative impact to wetland and riparian resources from fire activity is likely to occur as a result of catastrophic fire. Large fires may need to be partially suppressed or utilize an alternative suppression action in order to maintain ecological conditions in stream and wetland environments. Input on fire size and severity of impacts would be collected through resource advisor input at the fire management planning stage. Additionally, pre fire fuel loads are better studied and monitored to help reduce the risk of catastrophic fires.

**Wildlife Aquatic**

Large fires might need to have an alternate suppression action, or be managed in order to maintain riparian habitat and good water quality for aquatic wildlife. Vegetation treatments as discussed in the Proposed Action such as mechanical, prescribed fires, with chemical and biological agents such as beetles that result in the removal of deep-rooted invasive vegetation will benefit fish and amphibians over not treating vegetation as in the Alternative.

**Wildlife Terrestrial**

- Avoid disturbance or degradation of designated habitats of concern by placement of temporary facilities (such as fire camps, staging areas, and helibases) and infrastructure.
- During multiple ignition episodes ensure that priority wildlife habitat data are available during initial attack and incorporated into situation analyses.
- Give wildland fire suppression priority to designated known wildlife habitat, especially known special status species habitat, unless doing so would compromise protection of human life or property.
- Use direct attack tactics when it is safe and effective at minimizing the amount of wildlife habitat imperiled by wildland fire.
- Retain unburned areas (including interior islands and patches between roads and fire perimeter) of wildlife habitat, unless doing so would compromise safety, resource protection, or wildfire control objectives.
- To the greatest extent possible, protect nesting trees associated with raptors.
- Cumulative effects of wildfires and vegetation treatments on wildlife habitat in the area should be considered in site-specific NEPA analyses.
- Where appropriate, adopt vegetation treatments in wildlife habitat areas to control invasive weeds and aid the recovery of native vegetation.
- Wildlife habitat enhancements should be included in fuels project design when feasible.
- Fuels projects should be designed to enhance wildlife species and habitat diversity in concert with fuels management objectives by:
    - Burning in a mosaic pattern to create ecotones or edge effect in vegetation
    - Using mechanical treatments to create diversity in burn patterns in areas where fuel type and loadings are contiguous
- Grassland features:
    - If treatment areas are dominated by exotic annual grasses projects should include restoration and, if necessary, reseeding to re-establish native vegetation.
- Forestland and woodland features:
    - General: Treatments should maintain snags and down woody debris as important habitat features. The amount of snags and debris should be based on apparent natural occurrence in the larger area surrounding fuels projects.

- Aspen: Fuels treatments in aspen stands could be used to improve vigor, stimulate regeneration, increase vegetative diversity, and preserve the genetics of aspen clones in degraded aspen stands.
- Piñon/Juniper: To achieve fuels management benefits while minimizing impact to wildlife, treatments should focus on dense young piñon/ juniper as opposed to mature, large piñon/juniper. Manage ecotones to have piñon/juniper with prominent shrub understories to promote wildlife diversity.

- Shrubland features:
  - Vegetation management strategies should be consistent with historical succession and disturbance regimes. Strategies should be based on comparison of historical and current ecological processes and landscape patterns, and should address the habitat needs shrubland dependent species.
  - Shrubs along riparian zones, meadows, lake beds, and farmlands should be maintained to provide habitat diversity, forage, and hiding cover for wildlife.

**Migratory Birds**

- For planned projects, 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.

**Cultural Resources**

Because cultural resources inventories will not be completed for the present Environmental Assessment, it is not possible to identify specific mitigation measures at this time. In general, however, planned thinning and prescribed fire treatment activities will be identified through the planning process on a case-by-case basis, with the goal of identifying at-risk historic properties and previously un-surveyed areas. BLM will require reconnaissance (Class II) or intensive (Class III) inventory within the area of potential effects (APE) in order to identify and evaluate impacts

to historic properties as outlined below. Similarly, post-fire stabilization and rehabilitation will be evaluated on a case-by-case basis and will require a Class II or Class III inventory (or some combination thereof) prior to stabilization or rehabilitation action.

In general, BLM has developed the following process for identifying and evaluating impacts resulting from planned fire and fuels management activities:

1. Project Initiation:

- BLM will identify and involve the public, interested parties and Native American tribes as necessary.

2. Inventory and Identification:

- BLM will conduct reconnaissance (Class II; sample) inventories for all proposed mechanical and chemical (herbicide) vegetation treatment requests in order to identify historic properties that might be affected. If previous, nearby survey results, archaeological or institutional knowledge of the area, and/or the Class II inventory indicates that historic properties are located within the APE, and likely to be impacted by the proposed action, an intensive (Class III; 100 percent) pedestrian inventory will be required.
- BLM will conduct a Class III inventory for all proposed pile burns, temporary roads, and staging areas associated with hand or mechanical thinning.
- BLM will conduct Class III inventories for all proposed prescribed burn requests in order to identify historic properties that might be affected.
- BLM will seek and consider the views of a Native American tribe that attaches religious and cultural significance to cultural resources or places within the APE.

3. Evaluation of Eligibility and Effect:

- If previously-recorded historic properties are located in the APE BLM will analyze the impact of the undertaking on the historic properties, including a field visit and subsequent treatment, if necessary.
- If resources are identified within the APE as a result of either a Class II inventory, Class III inventory, or both, BLM will evaluate the resource(s) for NRHP significance and integrity and will develop a plan to avoid, minimize or mitigate any adverse effects of the action on historic properties. Historic property avoidance is always the preferred option.

4. Mitigation of Adverse Effects

- If historic properties in the APE cannot be avoided, BLM will prepare a plan to mitigate the effects of the fire management action. Mitigation strategies to historic properties will be completed in consultation with the Colorado State

Historic Preservation Office (SHPO), the Advisory Council on Historic Preservation (ACHP), and potentially affected Indian tribes and other consulting parties, as needed. SHPO concurrence with BLM's mitigation plan will be required before the fire management action commences and a formal agreement document (Memorandum of Agreement – MOA) may be required, pursuant to the Colorado State Protocol. Mitigation may include, but is not limited to, data recovery, HABS/HAER documentation (for standing buildings, structures and other historic-era phenomena), stabilization, and production of synthetic and/or historic context documentation. Where the proposed action may be phased into a multi-year undertaking whose effects are undetermined, a project specific Programmatic Agreement (PA) may be required to complete the 106 process.

Post-fire stabilization and rehabilitation will be evaluated on a case-by-case basis, through the NEPA process, and may require a Class II or Class III inventory (or some combination thereof) prior to stabilization or rehabilitation action. Post-fire rehabilitation also presents the opportunity to evaluate the effect of fire on cultural resources and refine expectations for future impacts.

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

Cultural Resource Specialists will:

- Work with fire managers 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.

Fire Managers will:

- Avoid burning heavy fuel accumulations in the vicinity of sensitive historic properties and/or cultural resource 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 historic properties and/or cultural resource areas.

**Forest Management**

- Currently all forest treatments are falling short by 15,000 acres in the historic range of variability each year, plan large scale prescribed burns each year to make up for this deficit.
- All natural ignitions within all WSAs and in areas inventoried with wilderness characteristics should be strongly considered to be managed for resource and ecological benefit, and not suppressed if fuel and weather conditions, fire location relative to values at risk or other important infrastructure and other factors are conducive to this activity. Managing wildfires in these areas will increase acres treated by wildfire and will be key in helping land managers to gain some ground on bringing the forest and landscape within the historic range of variability.
- Mechanical treatment areas should be focused in areas near subdivisions or private lands to create areas where vegetation has been modified to reduce crown fire potential and to provide more options for fire managers to deploy the alternative fire management or suppression tactics that would allow the management of fire for ecological benefits.

- Following mechanical restoration treatments in the appropriate forest types, prescribed broadcast burning should be strongly considered for implementation within 1-5 years post treatment to reduce activity fuels, to stimulate understory development, and to work toward creating resilient forests if funding is available.

**Range Management**

- It is essential that communication and utilization of a resource advisor is implemented with the potentially affected permittee and the public of prescribed burn schedules and suppression/ mitigation plans through the media and/or personal contacts. Grazing management may be critical to the success of any prescribed fire treatments in these areas as most research indicates that resting these areas prior to treatment can help supply sufficient fuels to carry the fire.
- Fires can be a useful tool in many sagebrush communities if they are timed correctly and if livestock do not graze the burn for two growing seasons.

APPEALS: Any appeal of this decision must follow the procedures set forth in 43 CFR Part 4. Within 30 days of the decision, a Notice of Appeal must be filed in the office of the Authorized Officer at the Royal Gorge Field Office, 3028 E. Main St., Canon City, CO 81212 with copies sent to the Regional Solicitor, Rocky Mountain Region, 755 Parfet St., Suite 151, Lakewood, CO 80215, and to the Department of the Interior Board of Land Appeals, 801 North Quincy St., MS300 QC, Arlington, VA, 22203. If a statement of reasons for the appeal is not included with the notice, it must be filed with the Interior Board of Land Appeals at the above address within 30 days after the notice of appeal is filed with the Authorized Officer.

*http://www.blm.gov/wo/st/en/prog/planning/news/webguide/document_pages/8_6__program-specific.html*

SIGNATURE OF AUTHORIZED OFFICIAL: _____
Keith E. Berger, Field Manager

DATE SIGNED: 3/18/06

ATTACHMENTS: