National Park Service

U.S. Department of the Interior

Rocky Mountain National Park

Colorado

Fire Management Plan

Cow Creek Fire 2010 *Photo By: The Yenter Family*

June 2012

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Rocky Mountain National Park

2012 Wildland Fire Management Plan

Rocky Mountain National Park

Intermountain Region

National Park Service

Department of the Interior

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Introduction

An updated Fire Management Plan (FMP) is necessary to provide Rocky Mountain National Park (RMNP) with the flexibility to manage fire in accordance with the National Park Service (NPS) Wildland Fire Management Strategic Plan 2008-2012 (2008d), 1995 and 2001 Federal Fire Policy (USDA and USDI 1995, 2001) and the related guidelines in NPS Director's Order #18: Wildland Fire Management (2008b), and NPS Management Policies (2006). These policies and directives, in addition to a Congressional mandate, require an approved FMP in order for RMNP to implement planned and unplanned fire management strategies.

The purpose and need for the fire management program is summed up in the first three fire management goals, presented in priority order:

1. Provide for the safety of employees and the public
2. Protect communities, infrastructure, natural and cultural resources
3. Restore and maintain fire adapted ecosystems

Collectively, these goals are referred to as "The Fire Decision Framework." The reason for this is that these three goals are forefront in all decision making throughout the program, from programmatic planning efforts to initial response of a wildfire. Chapter 3 of this FMP details all six fire management goals, but the first three are set apart in that they are the purpose and need of the program, and the second three support them. The importance of these three goals is reflected in the fire programs Mission Statement:

Mission Statement:

"Rocky Mountain National Park's fire management program will protect employees and the public, communities and infrastructure, conserve natural and cultural resources and restore and maintain ecological health."

There are two main program elements of the fire management program that focuses all activities on achieving the Mission:

1. Fuels Management

   Proactive planned activities such as prescribed fire, manual and mechanical thinning of forest vegetation with the objective of reducing hazardous fuels around local communities and infrastructure, restoring fire adapted landscapes, and other protection and resource management objectives.

2. Response to Wildfires

Decisions and actions implemented to manage a wildfire based on ecological, social, and legal consequences, the circumstances under which a fire occurs, and the likely consequences on firefighter and public safety and welfare, natural and cultural resources and values to be protected.

The Fire Decision Framework is the foundation for all planning in Fuels Management and the Response to Wildfires. All projects and response plans are designed based upon improving the ability to achieve the elements within the Framework.

Fire Decision Framework:

1. Provide for the safety of employees and the public:

   All management decisions, plans, and actions will take into account the safety of our employees and the public. No structures or other resources are worth risking human lives. Effective risk management will guide all management actions.

2. Protection of communities, infrastructure, and natural and cultural resources:

   Having provided for employee and public safety, fuels mitigation activities and fire response will strive to protect communities and infrastructure, natural and cultural resources. These values can be damaged or destroyed by unwanted fire; however long term protection of these values can be realized through managed fire. Fire management activities will use a risk management process to protect these values. Fuels reduction and fuels management will be accomplished through manual and mechanical means, prescribed fire, and management of wildfires.

3. Restore and maintain fire-adapted ecosystems:

   Through a combination of manual and mechanical fuels reduction, prescribed fire, and management of wildfires, the fire management program seeks to maintain natural fire regimes to the greatest extent possible so that ecosystems can continue to function as they have for thousands of years, thus encouraging healthy interactions between fire and the environment. As described in section 1.4.6 of NPS Management Policies, “the ecological, biological, and physical processes that created the park and continue to act upon it” are recognized and valued as park resources in keeping with the NPS mission (NPS 2006).

This FMP covers all of RMNP and is intended to provide guidance in the professional management of wildland fire and fuels management.

Reason for the Fire Management Plan

FMPs are required by NPS policy. From NPS Director's Order 18, Wildland Fire Management (2008b):

"Each park with burnable vegetation must have an approved Fire Management Plan that will address the need for adequate funding and staffing to support its fire management program. Parks having an approved Fire Management Plan and accompanying National Environmental Policy Act (NEPA) compliance may use wildland fire to achieve resource benefits in predetermined fire management units. Parks lacking an approved Fire Management Plan may not use resource benefits as a primary consideration influencing the selection of a management strategy, but they must consider the resource impacts of fire management alternatives in their decisions."

Supplementary Purposes for the Plan:

- Provide consistent operational guidance.
- Provide stakeholders with a concise description of why and how fire will be managed in the park.
- Provide park managers a concise communications tool for understanding actions, roles and responsibilities.
- Demonstrate the connection of park-wide goals and objectives to fire management actions.
- Document fire program logic and objectives.

General Description of the Park

RMNP is located in north central Colorado and encompasses approximately 265,828 acres. The park lies within Larimer, Boulder, and Grand counties and is bordered by the towns of Estes Park, Allenspark, and Glen Haven on the east and Grand Lake on the west (see Figure 1). The Continental Divide runs northwest to southeast through the center of the park. This accounts for two distinct climate patterns—one arid on the east side, where Estes Park receives about 14 inches of precipitation annually on average, and the other more moist west side where Grand Lake receives just under 21 inches of annual precipitation on average.

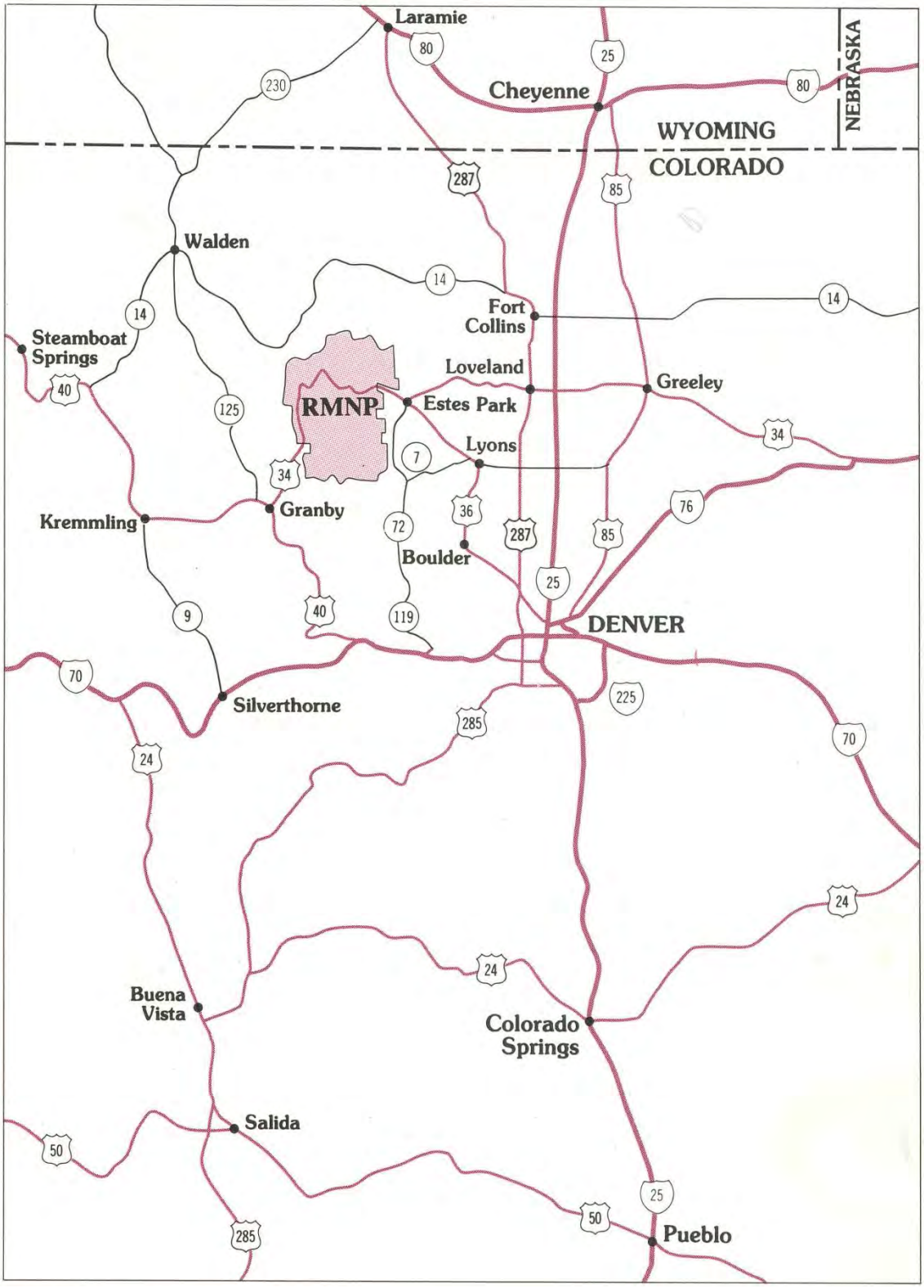

Figure 1. Rocky Mountain National Park and Vicinity.

Nearly 60 percent of the park is forested. At the lowest elevations on the east side of the park, forest types in the montane zone include ponderosa pine, Douglas-fir, and lodgepole pine communities. These three species often intermingle in ecotonal areas, forming mixed stands. Ponderosa pine tends to dominate the lower portions of the montane, increasing in density with increased elevation and gradually giving way to Douglas-fir, particularly on moist north-facing slopes (Clements 1910, Marr 1961, Mast et al. 1998). Following disturbance, upper montane sites often re-emerge as dense even-aged stands of lodgepole pine on drier sites and aspen on more mesic sites. In the absence of further disturbance, these lodgepole and aspen stands may gradually be replaced by Douglas-fir at lower elevations and Engelmann spruce and subalpine fir at higher elevations (Clements 1910, Peet 1978b, Whipple and Dix 1979, Veblen et al. 1991). In contrast to the variety of forested communities found on the east side, montane forests on the west side of the park are composed almost exclusively of lodgepole pine.

Above approximately 9500 feet in elevation, the subalpine zone is dominated by widespread stands of Engelmann spruce and subalpine fir. These spruce-fir forests extend up to treeline at approximately 11,500 feet. Scattered stands of limber pine can be found within the subalpine zone, primarily on exposed rocky ridges. Approximately one third of the park lies above treeline.

The park has a very diverse ecosystem, with 276 bird, 66 mammal, 11 fish, 5 amphibian, and two reptile species, as well as over 900 species of flowering plants. Elk, bighorn sheep, moose, and mule deer are representative of the large hoofed mammals found in the park. Wildlife viewing is a popular activity in the park, with herds of resident elk drawing many visitors.

Purpose of the Park

Park Purpose

The park purpose identifies the specific reason for the creation of a particular park. Purpose statements are crafted through a careful analysis of the enabling legislation and the legislative history that molded the creation and development of the park. Rocky Mountain National Park was first created in 1915 when the park's initial enabling legislation was passed and signed into law. The purpose statement reinforces the foundation for future park management administration, and use decisions. The following purpose statement was based on the review of park legislation, previous management documents, and discussions with park staff:

The purpose of Rocky Mountain National Park is to preserve the high elevation landscapes and wilderness character of the southern Rocky Mountains, and to provide the freest recreational use of and access to the park's scenic beauties, wild life, natural features and processes, and cultural objects. Establishment

Park Significance

Significance statements express why the park's resources and values are important enough to warrant national park designation. Statements of significance describe why an area is important within a global, national, regional, and system-wide context. These statements are linked to the purpose of the park, and are substantiated by data, research, and consensus. They describe the park's distinctive nature and help inform management decisions, focusing efforts on preserving and protecting the park's most important resources and values. The following significance statements have been identified for Rocky Mountain National Park.

1. Rocky Mountain National Park provides exceptional access to wild places for visitors to recreate and experience solitude. Trail Ridge Road, the highest continuous paved road in the United States, and the 350 miles of trails bring visitors to the doorstep of a variety of wilderness-based recreational opportunities.

2. Fragile alpine tundra encompasses one-third of the Rocky Mountain National Park, one of the largest examples of alpine tundra ecosystems protected in the contiguous United States.

3. Glaciers and flowing fresh water carved the landscapes of Rocky Mountain National Park and also give birth to several river systems,

including the Colorado River and the Cache la Poudre, Colorado's first and only designated Wild and Scenic River.

4. The massive elevation range within the park boundary, which spans from 7,630 feet to 14,259 feet and straddles the Continental Divide, allows for diverse ecosystems, varied plant and animal communities and a variety of ecological processes. The park is designated as a UNESCO International Biosphere Reserve, with portions of the park's montane, subalpine, and alpine ecosystems managed as research natural areas for scientific and educational purposes.

5. The mountainous landscape of Rocky Mountain National Park has drawn people to the area for thousands of years. Visitors can see remnants of the different ways people have used this land over time, ranging from prehistoric big game drives to dude ranching to recreational tourism.

Management Environment

Land Ownership, Significant Resources, Mission, and Management Direction

Most of the park (95 %) is designated wilderness (see Figure 2), with only 2.9 percent developed. Fire management actions will conform to the basic purposes of wilderness as described in the 1964 Wilderness Act. This plan, in combination with direction provided in the park Backcountry/Wilderness Management Plan and Environmental Assessment (NPS 2001a), identifies management actions to be considered for all wildland fires within the park.

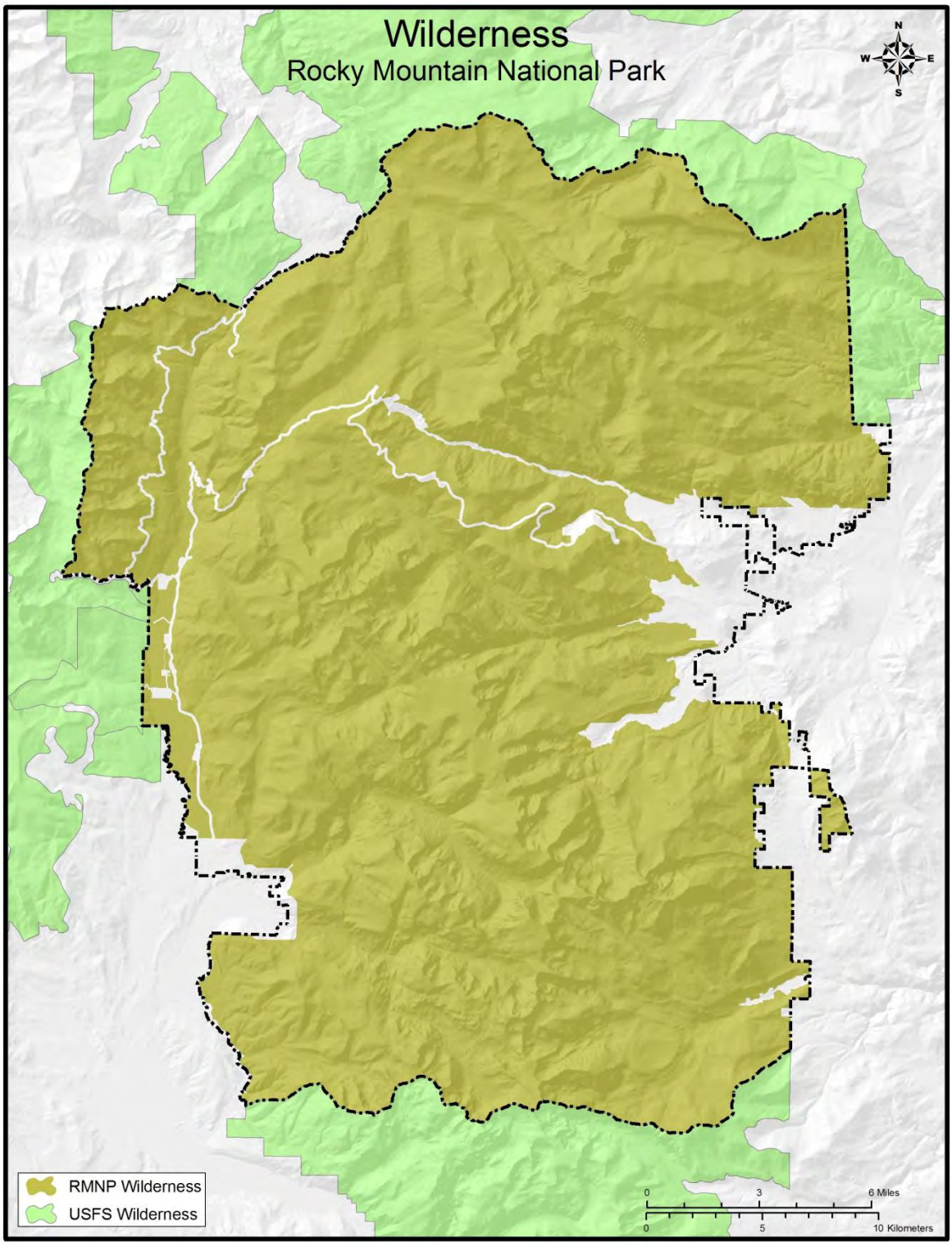

Figure 2. Rocky Mountain National Park Designated Wilderness.

The park is surrounded by a mixture of federal, state, local, and privately owned lands (see Figure 3). About 62 percent of the park is surrounded by national forest land, most of which (70%) is designated wilderness. The remaining 38 percent of land around the boundary is a complex mix of rural developments, summer homes, resort areas, subdivisions, and other property assets on private land. Most of these developments are concentrated in five communities: Grand Lake, Estes Park, Meeker Park, Glen Haven and Allenspark.

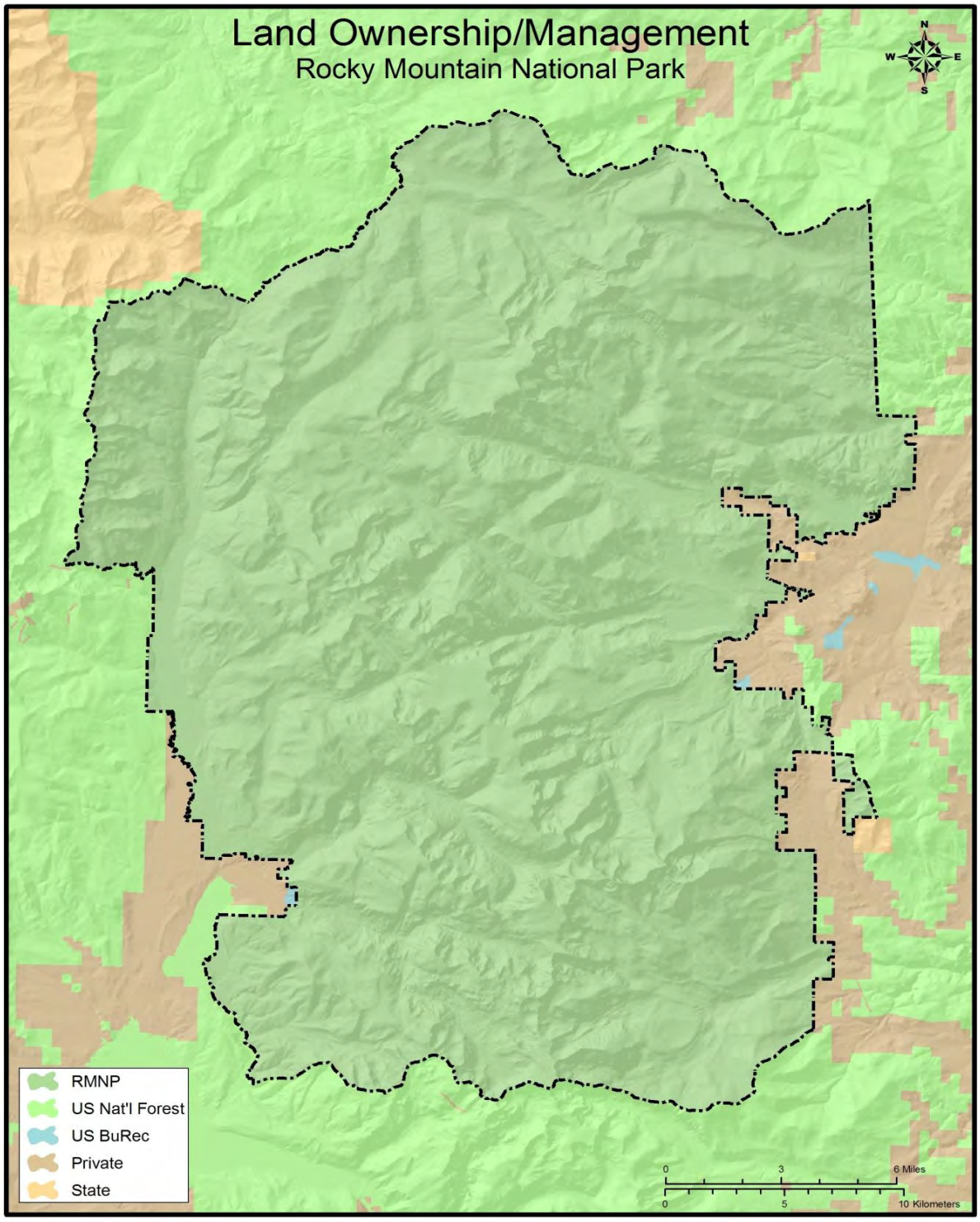

Figure 3. Rocky Mountain National Park and Surrounding Land Ownership.

The park is accessible from the Denver metropolitan area, 65 miles to the southeast. Interstates 25, 70 and 76, which converge in Denver, provide access for visitors coming from all regions of the United States. Local thoroughfares that provide access to the park include State Highways 7, 34, and 36. RMNP is located near populated Front Range communities and receives over 3 million visitors annually.

Overview of Physical and Biotic Characteristics of the Park

Vegetation

In RMNP, alpine systems occupy the high mountain summits, slopes and ridges above the upper elevational limits of tree species (Peet 2000). Vegetation in this zone encounters the greatest extremes in temperature and insulation coupled with very thin, young soils (Salas et al. 2005). The alpine tundra in RMNP covers over 50 square miles above timberline (approximately 11,500 feet).

Fire does not play a large role within the alpine systems of the park due to the cool, moist conditions and low fuel levels found within this elevational zone. However, over long time periods, fire may move into the alpine zone from adjacent spruce-fir forests with fire return intervals that are similar to or longer than this forest type.

The subalpine zone occurs roughly between 9,500 ft. and 11,500 ft. elevation. Common ecological systems in this zone are limber pine woodland, spruce-fir forest, wet meadow, subalpine-montane riparian shrubland, and high gradient streams (Neely et al. 2001). At the upper elevational limit of this zone, trees take on a stunted growth form known as krummholz due to the harsh growing conditions encountered there. Tree line marks the elevational limit of the trees and is largely determined by a complex interplay of weather, topography, and soil (Arno and Hammerly 1984, Stevens and Fox 1991).

Fire, insect outbreaks, avalanches, and wind events all play important roles in shaping subalpine forests. Fires in the subalpine forest are typically large, infrequent, and stand-replacing, thus creating a coarse-scale mosaic across the landscape (Clements 1910, Peet 1981, Baker and Veblen 1990, Veblen et al. 1994, Agee 1999, Veblen 2000, Buechling and Baker 2004, Veblen and Donnegan 2004, Sibold et al. 2006). Long fire-return intervals in spruce-fir forests occur primarily at high elevations that receive more precipitation and cooler temperatures than lower elevations throughout the growing season. Following spring

snowmelt, there is abundant soil moisture throughout the growing season and cool temperatures keep understory fuels moist. Therefore, fires are more likely to occur in the fall, late summer, or after an unusually dry winter rather than the spring (Veblen and Donnegan 2004).

The upper montane zone occurs generally between 7,500 and 9,500 ft. elevation, and is characterized by lodgepole pine forest, aspen forest, ponderosa pine forest and woodland, mixed conifer forests, montane grasslands, mountain sagebrush shrubland, montane riparian woodland and shrubland, high montane lakes and streams of high-moderate gradient. Montane forests on the east side of the park are dominated by ponderosa pine on south-facing slopes and mixed conifer stands on more moist north-facing slopes. Montane forests on the west side of the park are predominantly comprised of lodgepole pine and aspen.

Lodgepole pine forests occur on gentle to steep slopes in extensive stands of pure lodgepole pine, or in association with other conifer species. Lodgepole pine is shade intolerant and is an aggressive pioneer, developing on sites recently opened up due to fire, insects, disease, windstorms, or other major stand removing disturbance. These stands tend to self-perpetuate in the presence of repeated disturbance. Depending on site conditions, lodgepole seedling reestablishment following disturbance may take 30-100 years (Peet 1981). Fires are more frequent in lodgepole pine than spruce-fir forests, as lodgepole pine forests occur in warmer and drier environments. Lodgepole forests are typically characterized by a stand-replacement severity fire regime with fire return intervals in the 50-200 year range (Clements 1910, Peet 1981, Sibold et al. 2006). Fire return intervals tend to be longer in lodgepole stands adjacent to forest types such as spruce-fir, that have long fire return intervals. Conversely, fire frequencies are often higher and may occasionally include a portion of low severity fire events where stands are adjacent to ponderosa pine or mixed conifer forests that experience more frequent fire (Peet 1981, Veblen and Lorenz 1991, Sibold et al. 2006).

Aspen forests are found at elevations similar to those of lodgepole pine. They are also maintained by disturbance and usually occur as a mixture of many communities and may be surrounded by a variety of diverse ecosystems, including montane grasslands and wetlands. Aspen is confined to relatively moist sites that have cold winters and a

reasonably long growing seasons. Aspen ecosystems are rich in number and species of animals, especially in comparison to associated coniferous forest types (Neely et al. 2001, Salas et al. 2005).

Ponderosa pine dominates the lower elevations of the montane zone on the east side of the park, before yielding to Douglas-fir, primarily on the moist, north-facing slopes. Once disturbed, these sites are succeeded by dense stands of lodgepole pine on drier sites and stands of aspen on moister sites. In contrast, the west side of the park is made up almost exclusively of lodgepole pine in the montane zone.

Bitterbrush (*Purshia tridentata*) and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyanum*) are the dominant shrub species found in the upland shrub habitat in the park. The natural or historic (pre-1860) coverage of bitterbrush and sagebrush in RMNP is unknown. By the time shrub communities in the park were studied in the 1930s, they had already been considerably altered. Market hunting during the 1860s and 1870s significantly reduced elk and deer numbers, allowing upland shrubs to expand. However, fires in ponderosa pine forests during the 19th century (Veblen et al. 2000, Ehle and Baker 2003) and expanding deer population in the early 1900s (Stevens 1980) may have also greatly decreased shrub abundance.

Wildlife

Nearly 350 vertebrates are found in the RMNP area, including 276 species of birds, 66 mammals, 11 fish, 5 amphibians, and 2 reptiles. The distribution of species within the park varies by season, elevation, and varieties of habitats present.

Soils

Soils are largely the result of geology and geologic processes. Mountains in RMNP were formed by a series of granitic batholiths intruding into Precambrian mica schists and pegmatites. Glacial activity, occurring as recently as 12,000 years ago, created much of the geologic landforms evident in the park today by decomposing the mountains. Glacier-carved valleys and their associated features are present along the St. Vrain River, Big Thompson River, Colorado River, and associated tributaries. Ultimately, the weathering of the glacial and alluvial granites, schist, and gneiss parent material developed soils in the park (Natural Resources Conservation Service 2007).

Air Quality

National parks, including RMNP, are categorized as Class I air quality areas under the 1977 Clean Air Act, as amended (CAA).

Within 50 air miles of the park, Class II and III airsheds exist. The greater Denver metropolitan area airshed consistently exceeds national air pollution standards. Air quality at RMNP is adversely affected by Denver, other urban areas along Colorado's Front Range, and areas as far away as southern California, Mexico, and Texas (NPS 1992a). Increasing development around the park boundary, along with development extending from Colorado Springs to Fort Collins, affects air quality particularly when winds blow from easterly directions.

Visibility and clean air are primary natural resource values at RMNP. Without the effects of pollution, a natural visual range is approximately 140 miles in the park. Currently, visibility is impaired within the park about 90 percent of the time, primarily due to outside sources. The average summer (July- August) viewing distance from Rocky Mountain is 83 miles, 50 percent of the time. Viewing distances can vary from 120 miles on a clear day to 30 miles on a high pollution day (NPS 1998, 2008a).

Water Resources

RMNP contains 1143 acres of lakes and ponds, with 167 lakes greater than an acre and 397 less than an acre. Streams in the park total 532 miles, with an additional 38 miles of intermittent streams. The Continental Divide splits the park into two distinct watersheds where water flowing west drains into the Colorado River, and water flowing east empties into the Missouri and Mississippi Rivers. The headwaters of four major river basins originate in the park, including the Big Thompson, North Fork of the St. Vrain, North Fork of the Colorado, and the Cache la Poudre Rivers.

Role of Fire in the Park

Of the many disturbance types found in natural systems, perhaps the most widespread is that of fire. The current structure, species composition, and dynamics of many ecosystems are often the direct result of past fires or the result of other processes that in themselves were affected by fire. In general, fire regimes in the southern Rockies are thought of as following an elevational gradient (Peet 1981, Romme

and Knight 1981, Romme et al. 2003). The lower montane is often characterized by more frequent surface fires, while forests in the subalpine typically experience infrequent stand replacement fire events. However, fires of any intensity can occur in both elevational zones (Veblen 2000). Please see the Environmental Assessment (EA) associated with this FMP for an in-depth discussion of the role of fire within RMNP.

Environmental Compliance

This FMP has been prepared in compliance with:

- The National Environmental Policy Act (NEPA) of 1969 (42 United States Code (USC) 4321 et seq.), which requires an environmental analysis for major Federal Actions having the potential to impact the quality of the human environment;
- Council of Environmental Quality Regulations at 40 Code of Federal Regulations (CFR) 1500-1508, which implement the requirements of NEPA;
- The National Historic Preservation Act (NHPA) (16 USC 470 et seq.), which requires protection of historic properties significant to the Nation's heritage;
- The Wilderness Act (16 USC 1131 et seq.), which requires the preservation of wilderness character and wilderness resources in an unimpaired condition for the park's 252,256 acres of Congressionally designated wilderness;
- The Endangered Species Act of 1973 (ESA) (19 U.S.C. 1536 (c), 50 CFR 402), which requires that the effects of any agency action that may affect endangered, threatened, or proposed species must be evaluated in consultation with either the United States Fish & Wildlife Service (USFWS) or National Marine & Fisheries Study (NMFS), as appropriate;
- Clean Water Act of 1972, as amended (CWA) (33 USC 1251-1387), which requires the protection of the chemical, physical, and biological integrity of the Nation's waters;
- Executive Order 11990, "Protection of Wetlands", which requires federal agencies to avoid, where possible, impacts on wetlands; and
- NPS Conservation Planning, Environmental Impact Analysis, and Decision Making; Director's Order #12 and Handbook (NPS 2001b).

To guide wildland fire management decisions including the creation of this FMP, an interdisciplinary (ID) team of specialists established a set of wildland fire management goals and objectives for RMNP. Goals and objectives are

based on the park's enabling legislation and federal, departmental, and agency-specific policies. The ID team also identified a number of potential fire management strategies, designed to provide support for achieving the goals and objectives.

An EA was prepared for RMNP in conjunction with this FMP. The EA was made available for review to the general public; local, State, and Federal agencies; associated Native American tribes; the State Historic Preservation Office (SHPO); and U.S. Fish and Wildlife Service's Ecological Services (FWS-ES) on September 15, 2011. A Biological Assessment was signed by the U.S. Fish and Wildlife Service's Ecological Services on May 25, 2012. A letter of concurrence was received from the Colorado State Historic Preservation Office (SHPO) on June 29, 2011. A Finding of No Significant Impact was signed by the NPS on June 12, 2012 by Laura Joss, Acting Regional Director (Appendix D).

Policy, Land Management Planning, and Partnerships

2.1 Fire Policy

DIRECTION & INTENT: Management of RMNP is governed by federal law, NPS policy, and park planning, respectively. Each park in the national park system has a particular mandated purpose, which distinguishes each park unit from other federal land management agencies. RMNP was established by an act of Congress of January 26, 1915 as referenced in the Introduction. The RMNP Master Plan (1976) further states:

"The park experience, now and in the future, should be a dynamic interaction of human values based on the perpetuation of natural features in as near to pristine conditions as possible. This plan recognizes man, where present, as part of the park's ecosystem, but the major emphasis is on the perpetuation of natural processes… Man's impact must be minimized and controlled. To this end, living plant and animal communities— the dynamic culmination of natural processes in the park—provide visible indicators against which to measure and evaluate the condition of those processes."

In addition, the 1976 RMNP Master Plan includes the following management direction:

"Zealous efforts to extinguish all natural and human-caused fires resulted in favoring selected species at the expense of those developing after a fire."

"Providing opportunities for understanding and appreciation of the ecological and geological processes that have created this segment of the Colorado Rockies, while providing only the means of access and facilities necessary to allow for said appreciation and protect the park ecosystems."

"Designing corridors for use to provide safeguarding the park's vital land processes and restore the native ecosystems. Allowing natural wildfires to burn themselves out where they do not threaten an undesirably large area, lands outside the park, prime scenic resources near roads, trails, or developed areas."

The NPS policy on wildland fire is expressed in section 4.5 of Management Policies (2006) and supplemented by Director's Order 18: Wildland Fire Management (NPS 2008b). Reference Manual 18 (RM-18, NPS 2008c), issued by the Associate Director of Visitor and Resource Protection, is a technical expression of background information, standardized definitions,

agency requirements, standards, and procedures for implementing Director's Order 18.

As stated in Section 1.1, NPS Director's Order 18, Wildland Fire Management requires each park with burnable vegetation to have an approved FMP that addresses the need for adequate funding and staffing to support its fire management program. Parks having an approved FMP and accompanying NEPA compliance may use wildland fire to achieve resource benefits in predetermined fire management units.

Background info, taken from NPS Director's Order 18:

"All fires burning in natural or landscaped vegetation will be considered wildland fires. Wildland fire is defined as any non-structure fire that occurs in the wildland." … continued… "All wildland fires will be effectively managed through application of the appropriate strategic and tactical management options. These options will be selected after comprehensive consideration of firefighter and public safety, the resource values to be protected and costs. Prescribed fires are those fires ignited by park managers to achieve resource management and fuel treatment objectives. Prescribed fire activities will include effective communication on prescribed fire activity in the park and local community and the monitoring programs that provide information on whether specific objectives are being met. In conformance with the park's fire management plan, a systematic decision-making process will be used to determine the most appropriate management strategies for wildland fires that are no longer meeting resource management objectives."

APPLICABLE LAWS AND LEGISLATION : Acts passed by the U.S. Congress and approved by the President. All laws must be consistent with the U.S. Constitution. Federal laws have supremacy over state and local laws.

- Enabling Legislation (38 Stat. 798, January 26, 1915)

  "…hereby reserved and withdrawn from settlement, occupancy, or disposal under the laws of the United States, and said area is dedicated and set apart as a public park for the benefit and enjoyment of the people of the United States… with regulation being primarily aimed at the freest use of the said park for recreational purposes by the public and for the preservation of the natural conditions and scenic beauties thereof."
- ***NPS Organic Act*** of August 25, 1916***,*** P.L. 64-235, 16 U.S.C. Section 1 et seq. as amended

- ***National Environmental Policy Act*** of 1969 as amended , P.L. 91-90, 42 U.S.C. 4321-4347, January 1, 1970, as amended by P.L. 94-52, July 3, 1975, and P.L. 94-83, August 9, 1975
- Wilderness Act 1964

NPS Directives System - The NPS has a three-tiered Directives System to direct policy and provide instructions for implementation. They are:

- **Level 1 - NPS Management Policies** provide a framework for making management decisions and are approved by the Director after review by the WASO Office of Policy and the National Leadership Council (NLC). Compliance is mandatory. Other management policies relevant to fire are found in the Federal Wildland Fire Management Policy. The Interagency Federal Wildland Fire Policy Review Working Group revised the Federal Wildland Fire Management Policy in 2001 and it is titled: Managing Impacts of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire Adapted Ecosystems—A Cohesive Strategy (USDA, 2001). The document in its entirely is available online at:
  http://www.fs.fed.us/publications/2000/cohesive_strategy10132000.pdf

  Other management policies include:

  - NPS Management Policies (2006)
  - National Fire Plan
  - The Review and Update of the 1995 Federal Wildland Fire Management Policy (USDA and USDI 2001)
  - Guidance for Federal Wildland Fire Management Policy

- **Level 2 - NPS Director's Orders** are instructions for implementing policy, and may articulate new or revised policy; provide specific instructions; outline requirements or standards for NPS functions, programs, and activities; are approved by the Director after review by the WASO Office of Policy and the NLC. Compliance is mandatory. FMP FEIS/AEF-related Director's Orders include:

  - DO-12 Conservation Planning and Environmental Impact Analysis (NPS 2001b)
  - DO-18 Wildland Fire Management (NPS 2008b)
  - DO-41 Wilderness Preservation and Management (NPS 1999a)
  - DO-57 Occupational Medical Standards, Health and Fitness (NPS 1999b)

- These can be found at the following online address: http://home.nps.gov/applications/npspolicy/DOrders.cfm

- Level 3 – Handbooks, reference manuals, and other professional materials.

2.2 Park Management Planning

- The RMNP Master Plan (NPS 1976)

  The Master Plan states that "lightning fires have always denuded large areas and have changed vegetative patterns for decades. Natural wildland fires should be allowed to burn themselves out where they do not threaten an undesirably large area, lands outside the park, prime scenic resources near roads, trails, or developed areas."

  The Master Plan also recognizes the significance of the landscape and specifies that "the park experience, now and in the future, should be a dynamic interaction of human values based on the perpetuation of natural features in as near to pristine conditions as possible."

- The Backcountry/Wilderness Management Plan (NPS 2001a)

  The plan states: “[t]he restoration of fire on the landscape is an important and immediate need. The longer the process is delayed, the more extreme the problem becomes. To restore natural fire regimes and maintain public safety, a systematic and comprehensive program of action with consideration for the immediacy of the need is critical.”

2.3 Partnerships

The Arapaho and Roosevelt National Forests (USFS), Colorado State Forest Service (CSFS), as well as local fire departments collaborated with the NPS during the concept phase of this plan. Ongoing collaboration on fire planning continues with these partners multiple times per year.

RMNP Wildland Fire Branch utilizes Fort Collins (FTC) Interagency Dispatch as its fire dispatch through an Interagency Agreement with the USFS. The FTC Zone is a network of agencies, municipalities, counties, and volunteer fire departments.

- Annual Operating Plans (AOPs)
  - The Fire Branch maintains three AOPs with county cooperators: Boulder County, Larimer County, and Grand County.

- Colorado Cooperative Fire Management Agreement (USDI et al. 2006)
  - An agreement of all the Federal Agencies and the State of Colorado committing to documentation of agreement and commitment to fire management assistance and cooperation.
- Besides AOPs, a General Agreement exists with each of these offices:
  - Boulder County Sheriff's Office
  - Estes Park Volunteer Fire Protection District
  - Town of Grand Lake
  - Grand County Sheriff's Office
  - Town of Estes Park
- Memorandums of Understanding exist with:
  - Allenspark Fire Protection District
  - Colorado State Forest Service
  - USFS Arapaho and Roosevelt National Forests

Park-wide Characteristics

For the purposes of this FMP, the park will be considered one Fire Management Unit (FMU) within the context of the Fort Collins Dispatch Zone. Within this zone, the park has unique management objectives, constraints, access, values to be protected, and political boundaries.

3.1 Park-wide General Management Considerations

RMNP's fire management program mirrors other park programs by designating safety of employees and the public as its first priority in all actions. Along with the safety of employees and the public, the goals of protecting communities, infrastructure, and cultural and natural resources; and restoring and maintaining fire adapted ecosystems provide guidance to all management planning and actions.

Resource Objectives: Managing for Resilient Ecosystems

Resilience is usually defined as the capacity of an ecosystem to absorb disturbance without shifting to an alternative state and causing fundamental changes in ecosystem function (Holling 1973). Managing for resilient ecosystems is essential for coping with uncertainty and surprise in a world increasingly shaped by human activity (NPS 2010). Ecosystems can be subject to abrupt regime shifts, and such shifts may more easily occur if resilience has been reduced as a consequence of human actions such as pollution, the alteration of natural disturbance regimes, and climate change. Ecosystems are resilient when ecological interactions reinforce one another

and dampen the effects of disturbance (Peterson et al. 1998). Preserving biodiversity and perpetuating natural disturbance regimes, therefore, are critical to maintaining ecosystem resilience and sustaining desired ecosystem states in the face of change.

Most ecosystems are subject to disturbance regimes that operate across a range of temporal and spatial scales. Of the many types of disturbances that have shaped RMNP, fire is one of the most common. As described in section 1.4.6 of NPS Management Policies, “the ecological, biological, and physical processes that created the park and continue to act upon it” are recognized and valued as park resources in keeping with the NPS mission (NPS 2006). One of the main goals of RMNP’s fire management program is to restore and maintain fire-adapted ecosystems throughout the park. By allowing (or in some cases mimicking) natural processes such as fire, that created the variety of naturally-functioning ecosystems found within the park, the vast majority of species that evolved within these ecosystems will be maintained.

The majority of ecological systems within the RMNP landscape are thought to be within or close to their natural range of variability with respect to fire. For thousands of years, fire has played an important role in maintaining and creating conditions suitable for native flora and fauna in the park’s varied ecosystems. This plan therefore, seeks to maintain natural fire regimes to the greatest extent possible resulting in the continued health of park ecosystems and allowing for the continued interactions between fire and the environment. Utilizing fire as a dynamic ecosystem process to maintain ecosystem structure, composition, and function provides our best opportunity to conserve biological diversity in the park.

Defining precise desired future conditions for entire landscapes is fraught with uncertainty. Stephenson (1999) compares two widely used approaches to address desired future condition: the structure-oriented approach and the process-oriented approach. The structure-oriented approach focuses on managing forests for particular stand structure, composition, and patch size, whereas the process-oriented approach focuses on restoring and maintaining the natural processes that historically shaped forest structure and composition. Neither approach is perfect. However, our knowledge of current fire regimes far exceeds our knowledge of forest conditions during the past 100 to 400 years.

The definition of precise structural or compositional targets for desired conditions is further complicated by the spatial and temporal variability inherent in plant communities as influenced by site conditions, climate,

disturbance response, and individual species recruitment and mortality patterns. Process oriented, functional definitions for target conditions (e.g. historic fire frequency and fire behavior) therefore may be more practical since they acknowledge the inherent variability in natural systems. Factors to be considered when considering historic fire regimes include:

- Fire frequency
- Fire intensity and severity
- Fire extent
- Seasonality

Process oriented target conditions are appropriate for areas such as RMNP that have not been significantly altered by fire exclusion and do not require significant restoration efforts to return to natural conditions. This process oriented coarse-filter approach helps maintain ecosystem structure, composition, and function within the historic range of variability, thus preserving conditions suitable for the majority of species that have evolved with these ecosystems. However, this approach may not be suitable for some special status species and rare habitats. In these instances, habitat- or species-specific plans may be implemented to address particular concerns.

3.1.1 Fire Management Goals and Objectives

The purpose, goals and objectives of the park's fire management program are result from agency mandates, policy statements, environmental laws and park planning documents. The FMP must reflect direction provided in Federal and NPS policy statements such as the 2001 Review and Update of the 1995 Federal Wildland Fire Management Policy (USDA and USDI 2001). Fire management action must also comply with laws such as the National Park Service Organic Act, Endangered Species Act, Clean Air Act, Clean Water Act, Wilderness Act, National Historic Preservation Act, Archeological Resources Protection Act, and other laws related to the NPS.

Within the framework of larger agency policy and environmental law, the FMP Interdisciplinary Team has identified the following goals for the fire management program. Each goal is further refined through associated objectives which assist managers in measuring the success of fire management actions. An adaptive approach will allow the fire program to refine fuel treatment prescriptions and fire applications to assure desired outcomes are achieved.

As stated in Chapter 1, the first three goals are set apart from the latter three and referred to as the “Fire Decision Framework.”

Goal 1: Provide for the safety of employees and the public through all phases of fire management.

Objectives:

- Ensure firefighter, employee, and public safety is the first priority for all fire management activities.
- Ensure that all assigned fire personnel are appropriately trained and qualified for the assignments they receive.
- Through organized, comprehensive, and systematic risk management, an acceptable level of risk will be determined that allows for providing safety yet achieve fire management goals.

Goal 2*:* Protect communities and infrastructure, as well as natural and cultural resources from the potential adverse impacts of unwanted wildfire.

Objectives:

- All fire response strategies will be developed utilizing state of the art wildland fire decision support processes that reduce risk of adverse impacts of wildfires to public and private property, cultural resources, and ecologically sensitive areas.
- Utilize planned fuels management actions to achieve protection objectives on public and private facilities, infrastructure, natural and cultural resources.
- Ensure all unplanned ignitions are evaluated and considered for their potential to achieve long-term protection benefits to public and private facilities, infrastructure, natural and cultural resources.
- When necessary or appropriate, implement emergency stabilization and burned area rehabilitation in a timely manner to prevent resource degradation and promote recovery in critical watersheds in accordance with methods described in this plan and other park planning documents.

Goal 3: Restore and maintain fire-adapted ecosystems and implement strategies that use fire to the maximum extent possible, allowing park ecosystems to exhibit a high degree of resiliency.

Objectives:

- Having provided for the safety of employees and the public, and the protection of values at risk, ensure all naturally ignited wildfires are evaluated and considered for their potential to achieve ecological restoration and maintenance objectives.
- Allow wildland fire to perform its ecological role as a dynamic ecosystem process, to the greatest extent possible.
- Utilize prescribed fire, manual and mechanical treatments to restore and maintain fire-adapted ecosystems in defined locations where wildfire is not likely to achieve those objectives.
- Fire management program actions will be implemented in collaboration with cooperators and affected partners with due consideration of all management objectives.
- All resource benefit response strategies will be developed utilizing state of the art wildland fire decision support processes.

Goal 4: Base the RMNP fire management program on sound data obtained through scientific investigation, the evaluation of monitoring results, and the development of local data-driven models.

Objectives:

- Monitor and evaluate all fire management activities, while assessing effects on natural and cultural resources.
- Determine fire-related natural resource data needs and develop strategies to address those needs.
- Utilize an adaptive management approach to fire management using monitoring results and the best available scientific data to continue to develop and refine a range of ecologically sound fire and resource management objectives.

Goal 5: Promote greater understanding and support for all aspects of fire management through public information and education efforts.

Objectives:

- Keep stakeholders informed about fire operations, including wildfire response, prescribed fire and manual/mechanical fuels treatments.
- Inform the public and staff regarding the natural role of fire within ecological systems and the value of using fire to meet resource goals.

Goal 6: Fire management activities conducted in designated or potential wilderness areas will conform to the basic purposes of wilderness.

Objectives:

- Actions taken to manage wildland fire in wilderness including the full range of management alternatives will use the minimum requirement concept and will be conducted in such a way as to minimize, and where necessary rehabilitate, the unwanted impacts of the management actions (Section 2.1.2.5 Backcountry/Wilderness Management Plan).
- All fuels management activities conducted in wilderness will be designed and implemented within the guidelines of the Backcountry/Wilderness Management Plan and with the primary intent of maintaining wilderness values for future generations.

Wildland Fire Management Actions

The wildland fire management program includes a broad scope of actions in order to be comprehensive and successful. The following is a brief summary of these actions approved for use in the park. Operational aspects of each program element are detailed in Chapter 4 and the appendix.

Preparedness Activities

Preparedness activities include detailed procedures and standards for wildland fire operations, including pre-season and ongoing activities throughout the fire season. It also includes pre-planned procedures for initial response and incident management.

Wildland fire preparedness activities include a wide range of readiness and program elements that are essential for dealing with unplanned ignitions and fuels treatments. Current versions of these documents can be found in the Appendix:

- Annual Delegation of Authority to the Fire Management Officer (FMO) from the Superintendent.
- Response plan
- Step Up Plan
- Strategic fire size-up procedures
- Minimum Impact Tactics and Wilderness Guidelines
- Fire Danger Operating Plan
- Job Hazard Analysis
- Agency Administrators Guide to Critical Incident Management.

Safety Program

Firefighter and public safety is the first priority of the RMNP wildland fire management program. This FMP, and the activities defined within, reflect this commitment. This commitment to, and accountability for safety is a joint responsibility of all firefighters, managers, and administrators. As such, individuals must be responsible for their own performance and accountability, and every supervisor, employee, and volunteer is responsible for following safe work practices and procedures, identifying and reporting unsafe conditions. All firefighters, fireline supervisors, fire managers, and agency administrators have the responsibility to ensure compliance with established safe fire management practices. It should be stressed that no natural or cultural resource, home, or item of property is worth a human life. All strategies and tactics will be designed to mitigate the risk to firefighters and the public.

All actions defined in this FMP conform to safety policies defined in agency and departmental policy, including, but not limited to:

- Interagency Standards for Fire and Fire Aviation Operations (the "Red Book", USDI and USDA 2011)
- Director's Order 18 - Wildland Fire (NPS 2008b)
- NPS Reference Manual 18 (NPS 2008c)

Management of Unplanned Ignitions

All wildfires will receive an initial response and management strategy that will consider the goals and objectives defined in this plan and the Fire Decision Framework. Those actions are identified in section 4.3 of this plan.

The full spectrum of management actions will be employed on unplanned ignitions depending on the needs of a given fire; from aggressive initial attack for full perimeter control, to monitoring of a wildland fire burning over time and space for multiple objectives.

Management of Planned Fuels Treatments

The wide range of fuels treatments, including prescribed fire, manual treatments (work completed by hand tools, including chainsaws) and mechanical treatments (work completed using machinery) will be utilized in the park. Those actions are identified in Section 4.5 of this plan. A Multi-Year Fuels Treatment Plan (see Appendix E) has been developed

describing a combination of all available tools that will be used within the scope of park management documents to accomplish park wide goals.

Communication and Education

The Communication and Education program concentrates on internal and external outreach emphasizing the goals and objectives of the program. This outreach is critical to the success of the fire program. RMNP utilizes traditional and innovative communication and education strategies to affect program success. The Interpretation Division assists with this outreach. Those actions are identified in Section 4.6 of this plan.

Adaptive Management

An adaptive management approach to all fire management activities will be applied. This approach will promote achieving park management goals in the face of unanticipated changes in environmental conditions, inaccurate predictions, and/or subsequent information that might affect the original environmental assumptions.

3.2 Fire Management Unit Characteristics

Under this FMP, the entire park is considered one Fire Management Unit (FMU). Detailed operational descriptors and guidance are provided in Chapter 4.

Wildland Fire Operations

4.1 Safety

Employee and public safety is the first priority of every fire management activity. This FMP and the activities defined reflect this commitment. The commitment to and accountability for safety is a joint responsibility of all firefighters, managers, and administrators. Individuals must be responsible for their own performance and accountability. Every supervisor, employee, and volunteer is responsible for following safe work practices and procedures, as well as identifying and reporting unsafe conditions. All firefighters, fireline supervisors, fire managers, and agency administrators have the responsibility to ensure compliance with established safe firefighting practices.

In the 2009 Employee Safety Handbook, the Park Superintendent communicated RMNP's commitment to a safe work ethic through his safety message, which reads as follows:

> *Safety is a state of mind. If we truly think safety in everything we do, we minimize and control the risks that we and others are exposed to as we go about our jobs. A Forest Service colleague said, "Our job is not done until we get home safely." That struck a chord, as it says we're not just concerned about safety in the office or at the work site, but also with how you arrive in the morning and go home in the evening. Routine tasks may be our biggest challenge in terms of safety. When facing something that is non-routine, we often include safety as a primary concern so that it is front and center in our planning. However, as we go about our daily routine we don't as often pause to analyze risks and then mitigate them. Thinking safety in everything we do will take a cultural shift in our busy work days.*
>
> *A few years ago, we adopted the following safety policy for the park—*
>
> *In RMNP we believe:*
>
> - *All people are important.*
> - *There is nothing that we do that is so important or urgent to justify unsafe decisions or actions.*
> - *Everyone is responsible for safety.*
> - *People should go home each day without injury or illness.*
> - *Achieving zero injuries/illnesses is the only acceptable goal. Therefore:*
> - *We will make safety a part of all activities.*

- *We all share accountability and responsibility for safety.*
- *Appropriate safety training and a safe work environment will be provided.*
- *Safe performance is required in all that we do.*
- *Safety problems will be addressed promptly.*

Before any of us undertakes an activity, we should ask "What's Going to Get Me Hurt?"-- then take the time to eliminate or manage the hazards, or stop the activity until it can be done safely.

One final thought for each of you -- taking risks where your personal safety is concerned is not expected, is not encouraged, and is not an acceptable means to accomplish a task quicker or cheaper. There is nothing that we do that is so important or urgent to justify unsafe decisions or actions.

Please be safe out there.

/s/ Vaughn Baker
Superintendent

4.1.1 Employee Safety

The commitment to employee safety is demonstrated in our programmatic goals and objectives for the program. The number one goal in everything we do is "provide for the safety of employees and the public." This goal is written with intent; that it is in priority order with the *employee* being our highest value.

Fire management maintains a Fire Branch Safety Plan. This plan serves as a reference which provides guidance for our safety program. Safety is the responsibility of every employee, but this responsibility is shared at all levels of the organization. The requirement of safe work practices is shared, supported, and expected by the NPS Fire Director as well as our Park Superintendent.

There is a wealth of safety material included in agency and departmental policies and guidance. All actions of the Fire Branch will conform to these and other applicable policies, including:

- Interagency Standards for Fire and Aviation Operations (the "Red Book", USDI and USDA 2011)
- NPS Director's Order 18 – Wildland Fire (NPS 2008b)

- NPS Reference Manual 18 (NPS 2008c)

Elements of the Safety Program implemented at RMNP:

- Job Hazard Analysis: The Park uses Job Hazard Analysis as one tool to determine project and incident hazards and their subsequent mitigations. This folder can be found on the: *O:Drive\resmgmt\Safety\JHA's* and also printed in a folder located at the Interagency Fire Station.
- Operational Leadership (OL): OL practices help employees identify risk factors and provide practical tools for individuals and teams to use in assessing and mitigating risks. The OL program empowers employees to be assertive about their safety and the safety of their team, and it encourages them to participate in the decision-making and risk management process. To successfully do this each employee must be able to inspire, influence, and guide; this is the essence of leadership.
- Physical Fitness and Wellness: Due to high elevation (over 8000 feet), long fire seasons, and a laborious work environment, an elevated level of physical fitness is desired in all Fire Branch employees. The minimum fitness standard is successful completion of the work capacity test; however, higher standards are desired. To enforce this commitment to fitness, those Fire Branch employees maintaining fire qualifications at the "Arduous" level are allowed one hour of physical training per day as outlined in the Red Book.

Additional Safety Program elements are included below:

- Health Screening – Annual Physical for Duty. In addition to health screenings the park also hosts periodic Safety Fairs.
- First Aid/CPR training
- Wildland Fire Branch Safety Plan which includes:
  - Work/Rest Standards
  - Job Hazard Analysis
  - After Action Reviews
  - Length of assignment standards
  - Driving standards
  - Personal Protective Equipment
  - Fireline safety standards

  - Summary of standard fire checklists, i.e. Fire Orders/Watch out Situations, etc.
- Safety Training – Daily, Weekly, and Monthly
- Safety Committee Oversight
- Serious Accident and Review Procedures
- Critical Stress Debriefing Procedures
- Right of Refusal of Assignment

4.1.2 Public Safety

The number one programmatic goal is: "Provide for the safety of employees and the public." All of the wildland fire program activities and elements are built around the protection of human life. The second goal is: "Protect communities, infrastructure, natural and cultural resources." Operationally, there are two main fire management program elements: how we respond to and manage wildfires and fuels reduction projects. These program elements are fundamentally designed to reduce risk to employees and the public. These program elements are described in detail in sections 4.2-4.5.

4.2 Preparedness

Preparedness activities provide detailed procedures and standards for: pre-season and readiness activities, wildland fire response and ongoing operations. These procedures and standards are designed to provide safe, effective, and efficient response to wildland fires or other incidents.

4.2.1 Coordination and Dispatching

All wildland fire activities are coordinated through Fort Collins Interagency Dispatch Center (FTC). The purpose of the FTC is to manage wildland fires and the mobilize wildland firefighting resources in north-central Colorado and the northern Front Range area. The Northern Colorado Front Range Wildfire Cooperators (NFRWC) Board of Directors is made up of representatives from the Arapaho and Roosevelt National Forests, RMNP, the US Fish and Wildlife Service, the Colorado State Forest Service, Boulder County, Larimer County, the City of Boulder, and Poudre Fire Authority. Numerous volunteer fire departments and fire protection districts in the northern Front Range and northeastern Colorado participate in local, regional, and national interagency wildland fire management through the FTC Zone Dispatch.

RMNP also hosts a dispatch center for daily park operations, radio call sign “ROMO.” RMNP fire staff uses the ROMO dispatch operation as a redundant dispatch in an effort to keep the park informed of fire activities. Incident and project specific communications plans specify dispatch responsibilities. Additional dispatch centers also exist in Boulder County, Larimer County, Estes Park, Grand Lake, and Grand County.

The Wildland Fire Branch coordinates operational activities with the state of Colorado, various municipal and volunteer fire departments, and the county wildland fire organizations through the use of three Annual Operating Plans -- Larimer County, Boulder County, and Grand County.

4.2.2 Preparedness Activities

Wildland fire preparedness activities include a wide range of readiness activities and program elements that are essential to dealing with unplanned ignitions and fuels treatments. It also includes pre-planned procedures for initial response and incident management.

These can be found in the FMP appendix and include:

- *Annual Delegation of Authority from Park Superintendent*
- *Response Plan (Interagency response plan coordinated with FTC)*
- *Step-up Plan and Staffing Plan (included in the Fire Duty Officer Manual, Appendix G)*
- *Strategic fire size-up procedures*
- *Minimum impact tactics guidelines that are used in the park, including wilderness considerations if applicable*
- *Fire Danger Rating Operating Plan (located at FTC)*
- *Job Hazard Analyses for wildland fire and fire aviation operations (O:\resmgmt\Fire Management\FM JHA Master)*
- *Agency Administrators Guide to Critical Incident Management (NFES 1356)*

Various other elements go into being prepared to implement fire operations. These include:

- *Incident Qualifications and Training* - An annual 8 hour Firefighter Safety Refresher training is currently required for all who possess a red card. That refresher is intended to include fire shelter use and care. Qualifications for all positions will conform to minimum standards

established in the Wildland Fire Qualification System Guide (National Wildfire Coordinating Group 2011).

The park has assembled a Fire Qualifications Committee (FQC) to assess needs, determine final certification, and to address position task book inquiries. The Fire Management Officer has final certifying delegation, and as such, acts as the chair of the committee. The rest of the committee is comprised of fire management program leads. This committee convenes on an as-needed basis. The group can provide direction for identifying critical qualification needs in the park, prioritizing training needs, and ensuring employees are meeting the quality standards and intent of the position.

- *Fitness and Physical Examinations* - All employees possessing fire qualifications which require and "arduous" fitness level are required to pass a baseline "arduous" level physical exam. After the baseline, employees are required to follow current agency policy regarding physical exams. Upon successful completion of the exam, employees are also required to pass an annual working capacity test (aka "pack test") congruent with national guidance and position qualifications. Those employees maintaining fire qualifications at the "arduous" level are authorized to participate in one hour of physical fitness activity daily and employees with non-arduous qualifications are allowed three hours a week to promote ongoing general fitness and wellness.

- *Fire Prevention* - - Fire prevention is a critical aspect of any fire program. RMNP will coordinate fire prevention activities with neighboring cooperators and conduct fire prevention activities in accordance with regional and national guidance to include, but not limited to: public messages, inspections, community assistance, hazardous fuel reduction including removal adjacent to structures, restrictions, and education programs through the Interpretation division and other park staff. Increased park patrols may take place during periods of higher fire danger.

- *Fire Readiness* - Readiness is a year-round cycle of: organization, cache inventory, procurement, equipment assessments, and position management. Additionally, a general Fire Readiness Review is conducted annually to assess and address fire module, fire crew, and fire engine function. This review is formal in nature and the findings

are forwarded to the IMR Deputy FMO upon completion. Normally the checklists that are completed are:

- Agency Administrator
- Fire Management Administrator
- Facilities and Cache
- Training
- Individual Firefighter
- Engines
- Interagency Hotshot Crew
- Handcrew non-IHC

- *Fire Weather* - The park hosts two Remote Automated Weather Stations (RAWS) located on opposite sides of the continental divide. These stations record weather observations which are then processed in the Weather Information Management System (WIMS) application to determine fire danger indices, staffing classes, and fire danger adjective classes in accordance with National Fire Danger Rating System (NFDRS) (National Wildfire Coordinating Group 2002) protocols. This process provides daily fire danger indices relating to potential and expected fire behavior. The stations are owned and managed by the USFS – Arapaho/Roosevelt National Forests at the Fort Collins Interagency Dispatch Center. Both of these stations are located within the park. The park Fire Ecologist currently serves as the liaison with the USFS in managing these stations. Their assigned NFDRS station identifiers are:

  - 050507 – Estes Park (East Side)
  - 050402 – Harbison Meadow (West Side)

Energy Release Component - The park uses the Energy Release Component (ERC) as the primary indicator for preparedness planning and step-up actions. Step-up activities are designed to direct incremental preparedness actions in response to corresponding fire danger. Preparedness and Response Plan actions are implemented according to "Staffing Class." In accordance with RM-18, the step-up plan addresses five staffing classes with corresponding adjective classes (1-low, 2-moderate, 3-high, 4-very high, and 5-extreme). The park currently uses the 90th and 97th percentile of ERC as the break

points for staffing class 4 and 5, respectively. The park monitors all NFDRS elements to inform daily staffing and preparedness level.

4.2.3 Staffing Plan

Upon completion of daily fire weather plotting, and determination of fire danger ratings, the Fire Duty Officer (FDO) will implement preparedness staffing following the *Preparedness and Step Up Plan (Found in the Fire Duty Officer Manual Appendix G).* This ensures and justifies adequate and appropriate fire staffing levels are available for the day. The plan includes guidelines for increasing or decreasing staffing, changing the tour of duty, etc.

Fire Danger Determination - The FDO will track daily NFDRS indices and set staffing needs accordingly. The Fort Collins Interagency Dispatch Center is responsible for posting the Fire Danger Ratings on a daily basis at: http://gacc.nifc.gov/rmcc/dispatch_centers/r2ftc/DobsFindForm_jsp.htm. The ERC is an NFDRS index related to the potential energy release per unit area within the flaming front at the head of a fire. As determined from the Estes Park and Harbison Meadow RAWS, ERC is the most representative NFDRS output for determining relative expected wildland fire behavior for all ignition sources.

The Fire Duty Officer may adjust to the next higher Staffing Level during periods of increased visitation, (e.g., holiday weekends, hunting seasons, special events, etc.) or when the geographic area preparedness level is elevated due to resource draw-down or fire activity.

4.2.4 Fire Response Plan

Each fire receives an appropriate response consistent with fire management goals following the Fire Decision Framework. A more detailed outline on how the Fire Decision Framework is implemented is included in Section 4.3 Section C. Each fire, and subsequent request to respond, will include communication and approval by the Fire Duty Officer.

Within the boundaries of the park, initial response normally is one engine or squad as available. FTC hosts a Wildcad Dispatch System that includes increased response based on fire danger. This Wildcad response plan is Zone wide and is consistent with the “closest forces” concept. The FDO can raise or decrease the response based on

conditions at the time of dispatch. In all cases, the FDO should be notified immediately.

The Fire Duty Officer Manual (Appendix G) includes valuable information that addresses much of the information needed for the FDO to make well-informed decisions. Upon confirmation of a wildfire, notification will include at a minimum the FMO (or acting). Based on availability, the FMO and/or FDO will coordinate additional notifications to include Chief of Resource Stewardship, Chief of Visitor Protection, "ROMO" Dispatch, Superintendent, Information Officer, Deputy Superintendent, and Chief of Interpretation.

4.2.5 Wilderness

The park recognizes the need to integrate responsible wildland fire, ecosystem, and wilderness management practices with the protection of community and public safety. The FMP identifies the natural and historical role of fire in the wilderness and defines the management response to all wildfires, including the full range of management alternatives from aggressive control strategies to monitoring. The park's Backcountry/Wilderness Management Plan (NPS 2001a) states: "[t]he restoration of fire on the landscape is an important and immediate need. The longer the process is delayed, the more extreme the problem becomes. To restore natural fire regimes and maintain public safety, a systematic and comprehensive program of action with consideration for the immediacy of the need is critical."

Nearly 95% of RMNP is designated wilderness (251,945 of 265,800 acres). As such, all actions taken in the wilderness will conform to the basic principles of managing wilderness. The park will apply the 'minimum requirement' concept procedures known as 'minimum tool,' and 'primitive tool' as much as feasible and in accordance with the park Backcountry/Wilderness Management Plan (NPS 2001a), NPS Reference Manual 41 (NPS 1999c), and NPS Director's Order #41 (NPS 1999a).

All wildfires, whether wilderness or non-wilderness, will be effectively managed considering resource values while providing for firefighter and public safety using the full range of tactics and strategies. The FMO or FDO will coordinate with the Branch Chief of Natural Resources to determine when a line-qualified Resource Advisor (READ) should be assigned. This is usually for all incidents lasting longer than one

operational period. Minimum Impact Tactics (MIT) (Appendix J) will be applied to all fire response activities.

4.3 Management of Unplanned Ignitions

A. Preparing for Unplanned Ignitions

Management response to wildfires within RMNP is based on the goals and objectives established in this FMP with respect to the Fire Decision Framework, firefighter and public safety, values to be protected, and cost efficiency. Wildfires may be concurrently managed for one or more objectives and objectives can change as fire spreads across the landscape. Objectives are affected by changes in fuels, weather, topography; varying social understanding and tolerance; and involvement of other governmental jurisdictions having different missions and objectives.

Prior to the full implementation of strategic and tactical options, RMNP will meet the following criteria:

- Make direct contact with the Regional Fire Management Officer (RFMO) (or delegate) regarding wildland fire situation and management options. RFMOs are responsible for appraising all wildland fire activities within the region; on rare occasions, circumstances or situations may exist which require the Regional Director to intervene in the wildfire management decision process.

- Approval of the management decision by the Park Superintendent. Once published, a decision becomes a system of record and the published decision cannot be undone.

RMNP will use the most current decision support process (currently WFDSS) to guide and document wildfire management decisions. The process will provide situational assessment, analyze hazards and risk, define implementation actions, and document decisions and rationale for those decisions. There are several operational aspects that are addressed by the RMNP fire management program:

- A decision process to evaluate new fire starts and assess ongoing wildland fires in the park. This process will consider the following elements:
  - Determination of fire origin and cause
  - Immediate and projected threats to life and property

  - Smoke and health concerns
  - Necessary qualified personnel and fire management resources availability
  - Availability of a qualified incident commander for the fire
  - Immediate and potential impacts to visitors, users, and local communities
  - Projected fire growth under normal and drought conditions

- Documentation of Wildland Fire Decisions. The Park Superintendent must carefully consider the long-term benefits of fire in relation to risks both in the short and long term based upon on-site information, fire location, and management objectives. This process must use the decision process and land management objectives defined in this FMP. Wildland fires that begin outside of the park must receive the same consideration as new starts once they enter the park, unless the park and adjacent landowner collaborated on a plan before the fire entered the park. The Park Superintendent must validate the decision support process in consultation with cooperators. RMNP will interact and communicate with neighbors about all wildland fires that have the potential to leave or enter park lands. Joint decision making and planning processes should involve all affected agencies. *A single interagency decision support document prepared with all agencies' input during the initial decision-making phase of the fire will be actively pursued.* For each wildland fire, the Park Superintendent (or delegate) is required to affirm periodically that adequate organizational capability exists to continue management of the fire.

- Development of a Wildland Fire Decision Support Document. The decision support document is a progressively developed strategic plan. Not all fires will warrant and receive intensive on-the-ground management actions. The progressive developmental nature of a decision support document allows prioritization of immediate needs and reduces the workload by minimizing unnecessary planning.

- Fire Planning Area. All wildland fires will be managed within a planning area. This is to ensure that there is a clear and common understanding among the various layers of NPS managers and cooperators of the authorized size and location of the fire.

- Selection of New Strategies. When any of the following conditions occur, the decision support process must be amended:

- Fire does not meet every element of the decision criteria, or is exceeding management capability to implement the decision.
- Fire is projected to leave NPS jurisdiction, and the adjoining jurisdiction will not/cannot accept management of the fire.
- The Park Superintendent (or acting) will not approve the decision support document for the wildland fire.
- The regional fire management officer, with the concurrence of the Park Superintendent, determines that regional and/or national conditions outweigh potential benefits of the fire and more aggressive strategies and tactical actions are warranted.

1. Objectives - The first three Fire Management Goals, (listed in section 3.1.1) have been formalized into a Fire Decision Framework that shapes how the program prepares for and responds to wildfires. The following objectives are utilized as the Fire Decision Framework and are considered in priority order:

   - Provide for the safety of employees and the public through all phases of fire management.
   - Protect communities and infrastructure, as well as natural and cultural resources from the potential adverse impacts of unwanted wildfire.
   - Restore and maintain fire-adapted ecosystems and implement strategies that use fire to the maximum extent possible, allowing park ecosystems to exhibit a high degree of resiliency.

   This Fire Decision Framework is the foundation from which the decision support process is formulated. In every step of the decision process, from initial response to Superintendent's approval, fulfilling the elements of the Framework should be forefront in the decision making process.

2. Risk Assessment - The first step in the risk assessment process for an initial response on an unplanned ignition starts with the implementation of the Fire Decision Framework (Implementation procedures described in next section). For all wildland fires managed longer than the first operational period, state of the art wildland fire decision support processes will aid managers in a systematic risk assessment process. This process can include:

   - Potential incident area mapping to include values at risk in the planning area

- Fire behavior and fire spread modeling
- Relative Risk Analysis that evaluates Hazards, Probability and Values: Federal Fire Policy requires that sound risk management be a foundation for all fire management activities. All wildland fires present an inherent level of risk, given that we are dealing with a number of unknowns and uncertainty in what the future will bring. The relative risk rating is intended to characterize the general magnitude of risks associated with implementing wildland fire management activities as a snapshot in time. It is an attempt to qualify the level of uncertainty regarding the eventual outcomes of the fire in relationship to the management objectives and other mandates. The Wildland Fire Relative Risk Assessment provides the Agency Administrator with a quick but comprehensive assessment of the relative risk of the fire. This is a qualitative process that can be completed in less time than a quantitative long-term risk assessment.
- Organizational Needs Assessment to guide appropriate staffing and management

  The Organizational Needs Assessment (ONA) guides the Park Superintendent in determining the management organization selection both in escalating and moderating situations (i.e., can be used to go up or down in organizations). The Organizational Needs Assessment will provide managers information pertaining to Type 1, 2, and 3 organizations while Types 4 and 5 will be addressed through the Incident Complexity Analysis. Organizational Needs Assessment is based on the following variables:

  - Relative risk
  - Implementation difficulty
  - Decision concerns

  The ONA allows management to evaluate risk in relationship to resources needed and available. RMNP will assess Relative Risk before completing the organizational needs assessment. The ONA is incorporated into online decision support tools.

- Incident Complexity: For all incidents, managers will determine incident complexity to establish the appropriate Incident Command System (ICS) management structure. Complexity Analysis direction is provided in the Interagency Standards for Fire and Fire Aviation Operations (USDI and USDA 2011), the Incident Response Pocket

Guide (National Wildfire Coordinating Group 2010), and the Fireline Handbook (National Wildfire Coordinating Group 2004). For Type 1 and Type 2 incidents, and for incidents managed for resource benefit, managers may use the ONA to supplement the complexity analysis. The ONA provides a more selective assessment of implementation difficulty, decision concerns, and overall risk. As with the Complexity Analysis, this assessment can be used to assist in the selection of the appropriate management organization for a complex incident.

- Implementation Difficulties: The Implementation Difficulty is a measure of how the specific circumstances associated with a particular fire combine to represent potentially intricate implementation concerns. While many specific situational elements are addressed by Relative Risk, Implementation Difficulty addresses potential fire duration, special functional concerns, and requirements for the selected course of action. This assessment area also allows the Agency Administrator to identify local information regarding historic fire durations, special needs and concerns, and potential tactical responses.

- Decision Concerns: The Decision Concerns are an indicator of how difficult and involved the decision is for the specific situation associated with a particular fire. The following key areas influence and affect an Agency Administrator's decision space and range of options:

    - The type of objectives to be implemented on the fire
    - The particular ownership situation
    - Any external influences that may exert strong influences on the Agency Administrator and his/her decision. This assessment area also allows the Agency Administrator to identify local information regarding attention to fire activity, local public and political opinions, and local knowledge.
- Identification and implementation procedures for management action points (MAP's)

The risk assessment process is a collaborative effort and will be initiated by the FMO (or acting) and/or FDO and other fire and park managers, as well as fire specific stakeholders. The Superintendent has ultimate decision authority.

3. Implementation Procedures

    - Monitor and track seasonal fire severity indices
    - Ensure that preparedness activity elements are reviewed and updated annually
    - Ensure all interagency agreements are in place
    - Ensure employees maintain required currency commensurate with their fire qualifications
    - Annual FMP review completed
    - Annual readiness reviews completed
    - Decision support data current and available

    Implementation Process:

    - Initial response and long term management will utilize the Fire Decision Framework
    - Size-up reported to FDO
    - The FDO has authority to make initial response decisions for immediate protection strategies.
    - For fires lasting more than one operational period, the FMO and/or FDO will assemble a “Fire Decision Team.” The make-up of the team will depend on the complexity of the incident. At a minimum, the FMO and/or the Chief of Resources Stewardship (or acting) will participate on the team, prior to obtaining management approval from the Superintendent.
    - Initiate the wildfire decision support process. This process will aid in determining short and long-term management of the fire. FDO will ensure the decision support process is initiated and take ownership and create a shared group.
    - Ordering of resources will be through FTC. Initial Response Incident Commander will order direct with FTC and coordinate with the FDO

4. Staffing

    - The park will have an assigned FDO on duty. If an NPS FDO is not available, the Arapaho and Roosevelt National Forests can provide FDO coverage for the park as available and negotiated at the time of request.
    - Based on the complexity of a fire incident, the Fire Decision Team will be made up of representatives from appropriate park divisions, affected stakeholders and interagency partners.

5. Information

   - The park Public Affairs Officer (PAO) or designated acting, will be the lead for all public information activities on wildfires. The PAO may assign information duties to other information officers. Ordering Regional level Fire Public Information Officers (PIO's) should be considered.

6. Record Keeping

   - Records will be kept following agency standards. These standards can be found in the following location: http://www.nwcg.gov/policies/records/index.html
   - Wildland fire incident records retention guidance is found in the following location: http://www.nwcg.gov/policies/records/docs/RetentionGuidanceRefSheet.pdf

B. Expected Fire Behavior

In general terms, the RMNP fire season begins in June and lasts through September, at times lasting into October. Large fires have occurred in the Zone at all times of the year due to dry conditions and strong winds.

1. In the montane zone, fire behavior is expected to be understory burning with occasional single tree and group torching.

2. In the Sub-Alpine Zone most fires are single tree events, with limited creeping and smoldering fire spread. Under more extreme conditions, these forest types are expected to have single tree torching to running crown fire. Downslope winds on the east side of the park can contribute to extreme fire behavior and very fast rates of spread. Crown fire thresholds have not been established, however a correlation with several days of low nighttime humidities, warm dry conditions with wind can produce extreme fire behavior.

C. Initial Response Procedure

All wildfires will receive an initial response that focuses on the safety of employees and the public, protection of communities and infrastructure, natural and cultural resources, and restoring and maintaining fire-adapted ecosystems. The range of initial response strategies and tactics can vary from aggressive perimeter control to management over time and space.

Initial response decisions will be based on the following Fire Decision Framework and followed in priority order:

1. Employee and public safety

    - Is it safe or necessary for firefighters to engage?
    - Is there an immediate or anticipated threat to life?
        - Evacuation may be the priority
    - Can identified risks be mitigated?
    - What strategies and tactics will be the safest for firefighters and the public?
    - How can we continually re-assess risk management process?

2. Protection of communities and infrastructure, natural and cultural resources

    - Is there a current or potential threat to communities and infrastructure, natural or cultural resources?
    - What protection measures can be successfully implemented considering the safety of firefighters and the public?
    - What strategies and tools will best protect these values?
    - What management efforts will minimize undesirable impacts on natural and cultural resources?
    - Is there strategic placement of viable holding lines using existing improvements such as trails or roads and/or other natural features?
    - Can the fire achieve protection benefits to the communities and infrastructure, natural or cultural resources?
    - Is the fire providing long term protection of structures, natural or cultural resources through fuels consumption?

3. Ability of the fire to restore and/or maintain fire adapted ecosystems.

    - Is the fire exhibiting behavior and producing fire effects typical of historic fire regimes?
    - What management strategies and tactics can be implemented to allow wildland fire to perform its ecological role on the landscape while maintaining priority number 1 (employee and public safety) and priority number 2 (protection of communities and infrastructure, natural and cultural resources)?

In addition:

1. Information Needed To Set Initial Response Priorities

    - Location of the fire
    - Natural/cultural values of concern
    - Resources available
    - Forecasted weather
    - Tactical options available

2. Incident Documentation and Reporting

    - A record for each unplanned ignition will be initiated per most recent policy guidance.
    - Each fire will be reported in the most current fire occurrence reporting system within three weeks of a fire being called out.

3. Criteria for Selecting the Initial Response

    - The closest available resource will be dispatched to fires. The strength of initial dispatch will be based on the predefined response plan in the Wildcad System at FTC.
    - The FDO can increase or decrease the response depending on the current situation, such as other fires in the area, fire location (near structures?), availability of resources, etc.
    - Following initial size up, the Incident Commander will execute management tactics in accordance with the strategic direction provided by the FDO.
    - Selection of every initial response strategy will be based on the Fire Decision Framework.

4. Response Times

    - Response times can vary from five minutes on a front-country fire to several hours, depending on location. Many fires are not near roads and require hiking in. The goal is to have personnel on scene within an hour. If this is not possible, aerial reconnaissance is desired, helitack, and/or smokejumpers may be an alternative.

5. Management Requirements and Restrictions

    - Bulldozers will not be used within park boundaries without prior approval from the park superintendent.

- The use of fire retardant will be minimized. If used, it will be at least 300 feet away from all streams. Usually the decision to use retardant is time sensitive, therefore the decision to use retardant has been delegated to the FMO.
- During the initial response, low level flights, chainsaws and pumps are allowed in wilderness to implement protection strategies. After the first operational period, the Fire Decision team will discuss Minimum Impact Tactics (MIT) and recommend appropriate minimum tools needed to achieve safety and wilderness objectives.

D. Transition to Extended Response and Large Fire

Criteria for Transition

- WFDSS Decision and Decision Rationale are documented.
- Decisions in WFDSS are approved and published by the appropriate individual by position title as defined in the Red Book.
- Periodic assessments must be completed by the designated approver at the timeframe set during the publication process.
- Based on Organizational Needs Assessment
- Based on Complexity Analysis

E. Implementation Plan Requirements and Responsibilities

- The current decision support system will be used to develop and document decisions and support extended response needs.
- Resource Advisors will be deployed for each incident when appropriate.
- The individual by position title as defined in the Red Book will approve and publish the decision.

F. Delegation of Authority

- A copy of a sample Delegation of Authority is in the RMNP Wildland Fire Transition Package (Appendix H)

4.4 Burned Area Emergency Response

Large wildland fires that involve protection actions or resource damage may necessitate rehabilitation efforts. Rehabilitation will conform to agency management policies. Rehabilitation efforts may be required where the fire or associated management actions have impacted human life, physical improvements, cultural resources, and threatened or endangered species

significantly and where those efforts have a high likelihood of success in mitigating those impacts. There are two separate phases of rehabilitation: emergency stabilization (ES) and burned area rehabilitation (BAR). These phases are described below in sections 4.4.3 and 4.4.4.

If the minimum impact actions are used, only minimal rehabilitation should be necessary. The management objectives for emergency stabilization and burned area rehabilitation in the park are to:

- Determine the potential for an emergency condition after a fire.
- Alleviate emergency conditions to help stabilize soil; control water, sediment and debris movement; prevent impairment of ecosystems; mitigate significant threats to health, safety, life property and downstream values at risk.
- Monitor the implementation and effectiveness of emergency treatments.

4.4.1 Minimum Impact Tactics

All fire management activities in the park will rely on tactics which cause minimum resource damage while maintaining minimal risk to the safety of firefighters, the public, and other personnel. Tactical tools will be chosen based on a minimum requirement / minimum tool (MR/MT) analysis. Superintendent approval (delegated to FDO's) is required for aerial retardant application, off-road use of vehicles, and use of bulldozers. The Minimum Impact Techniques (MIT) Guide can be found in Appendix K.

When determining management actions and tactics on unplanned ignitions, collateral damage to park resources as a result of the proposed protection action must be considered. Least cost or minimum acres burned are not the primary determining factor in choosing tactics. Considering firefighter and public safety first, tactics selected are those which create the least collateral damage to park resources.

MIT is not intended to represent a separate or distinct classification of firefighting tactics but rather a framework for identifying ways to manage a wildfire while minimizing the long-term effects of the management action. Use of MIT must not compromise firefighter safety or the effectiveness of management efforts. Safety zones and escape routes must continue to be a factor in determining fire line location. In implementing MIT, follow these recommendations:

- Emphasize firefighter and public safety (safety cannot be compromised).

- Evaluate fire management tactics during planning and strategy sessions to ensure they meet agency administrator objectives and MIT. Include the agency resource adviser and/or designated representative.
- Communicate MIT where applicable during briefings and implement during all phases of operations.

4.4.2 Burned Area Emergency Response

Burned Area Emergency Response consists of two separate phases: emergency stabilization (ES) and burned area rehabilitation (BAR). ES and BAR are part of a holistic approach to post-wildfire issues, one which also includes management action damage repair and long-term (>3 years) restoration. The incident management team begins the process by repairing or mitigating management activity damage. ES consists of planned actions performed by burned area emergency response (BAER) teams within one year of wildfire containment in order to stabilize and preserve natural and cultural resources, to minimize threats to life or property resulting from fire, and/or to repair/replace/construct physical improvements necessary to prevent degradation of land or resources. BAR consists of efforts undertaken within three years of wildfire containment to repair or improve fire-damaged lands that are unlikely to return naturally to management approved conditions, and/or to repair or replace minor facilities damaged by fire. The process concludes with long-term restoration.

BAR and ES activities are an integral part of wildfire incidents, but are planned, programmed, and funded separately from each other. ES is part of the Emergency Operations appropriation and BAR is a separate non-emergency appropriation. All ES and BAR plans will be prepared in accordance with the Department of the Interior Departmental Manual, Part 620: Wildland Fire Management, Chapter 3: Burned Area Emergency Stabilization and Rehabilitation (2004), RM-18, the Interagency Burned Area Emergency Response Guidebook (USDI 2006a), and the Interagency Burned Area Rehabilitation Guidebook (USDI 2006b) and require approval by the Intermountain Regional READ coordinator.

4.4.3 Emergency Stabilization

Emergency stabilization efforts consist of planned actions to stabilize and preserve natural and cultural resources, to minimize threats to life or property resulting from fire, or to repair/replace/construct physical

improvements necessary to prevent degradation of land or resources. ES actions may be implemented concurrently while the fire is still being actively managed and must be taken within one year following containment of a wildland fire. ES plans will conform to the following objectives:

- Locate and stabilize burned conditions that pose a direct threat to human life, property, or critically important cultural and natural resources.
- Recommend post-fire emergency stabilization prescriptions that prevent irreversible loss of natural and cultural resources.
- Conduct immediate post-burn reconnaissance for fire management related impacts to threatened and endangered (T&E) species, riparian areas, water quality, flooding/debris flow, cultural sites and others as identified.
- Develop monitoring specifications designed to document whether emergency stabilization treatments were implemented according to plan specifications and the relative effectiveness of emergency stabilization treatments (did the treatments achieve their objectives?).

The ES plan will specify only emergency treatments and activities to be carried out within one year following containment of a wildland fire. If ES needs are unknown, the ES plan may contain specifications for completing assessments that will be used to later define and implement ES needs within one year following containment of a wildland fire. Generally, ES activities are prescribed only within the perimeter of a burned area. Acceptable treatments or activities outside a burn perimeter could include such things as emergency stream channel work to protect structures, roads, and other improvements from flood damage.

ES actions will be based on a plan developed immediately post-fire, or through plan amendments, except where programmatic plans are already in place. Programmatic plans include an environmental assessment, and are developed at the landscape level, with public input. The decision to develop the programmatic plan is based on the size and diversity of the ecosystems involved, fire history, resource values, and resource management objectives and decisions in land use plans. The development and implementation of an ES plan and its associated treatments and activities are the responsibility of the local Agency Administrator.

4.4.4 Burned Area Rehabilitation

Burned area rehabilitation (BAR) consists of non-emergency post-fire efforts (< 3 years) to repair or improve lands unlikely to recover to a management approved condition from wildland fire damage, or to repair or replace minor facilities damaged by fire. Restoration is the continuation of BAR beyond 3 years. BAR project management conforms with a bureau's normal resource management procedures.

A rehabilitation plan will be written as a separate plan, independent of an emergency stabilization plan. The rehabilitation plan will specify non-emergency treatments and activities which meet approved land management plans to be carried out within three years following containment of a wildland fire. Rehabilitation plans should be developed with full public involvement and cannot be completed until all assessments are concluded. The rehabilitation plans may use approved programmatic plans when amended for site specific conditions. Generally, rehabilitation activities are prescribed only within the perimeter of a burned area. The rehabilitation plan generally contains:

1. A discussion demonstrating how the specifications are consistent and compatible with approved land use plans, and how the proposed actions are related to damage or changes caused by the wildland fire
2. Provisions for monitoring and evaluation of treatments (including criteria for measuring a successful treatment) and techniques, and a procedure for collecting, archiving, and disseminating results
3. Clear delineation of funding and responsibilities for implementation, operation, maintenance, monitoring, and evaluation throughout the life of the project, including rehabilitation actions and follow-up actions beyond three years if necessary to ensure the effectiveness of initial investments. However, funding for such activities beyond three years may not be available from the wildland fire management account.

4.5 Management of Planned Fuels Treatments

Planned fuels treatments in wildland fire management include prescribed fire, manual treatments (work completed by hand tools, including chainsaws) and mechanical treatments (work completed using machinery). These fuels treatments are aimed at achieving hazardous fuels reduction, creating and/or maintaining desired landscapes or other site specific objectives. Limited application of chemicals may be utilized to limit exotic weed invasions

following planned fuels treatments. This application is under the scope of the Exotics Plant Management Plan.

The intent of fuels treatments is multi-faceted, including to reduce the risks to firefighters and the public, help protect communities, infrastructure, natural and cultural resources, and to restore and maintain fire adapted ecosystems. Fuels treatments at RMNP are NOT intended to stop wildfires by themselves. Wildfires burn at varying intensities and few fuels reduction projects can stop the most intense.

Fuels reduction treatments increase the likelihood of firefighters implementing management actions on unplanned ignitions that:

- Provide for the safety of firefighters and the public in potential ingress/egress situations around communities and roadways.
- Reduce potential fire intensity in and around communities, infrastructure, natural and cultural resources. This allows firefighters a better chance at protecting these values. In addition, it increases the survivability of these values in the absence of firefighters.
- Provide firefighters with defensible area to work from when initiating burnout operations when fighting wildfires, ensuring greater safety for firefighters.
- Promote the ability to restore and maintain fire adapted ecosystems.

This is not an all-inclusive list, but provides examples of the relationship between fuels treatments to managing wildfires and resource stewardship.

4.5.1 Fuels Planning and Documentation

The fuels management program will implement fire management policies and help achieve resource management and fire management goals as defined in:

- Federal Wildland Fire Management Policy and Program Review
- Managing Impacts of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire Adapted Ecosystems – A Cohesive Strategy (USDA 2001)
- A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan.

a. Fuels Planning Participants

Fuels Planning Group will be comprised of the FMO, Fire Ecologist, and Fuels Specialist at a minimum. Others will be brought in to aid planning as needed.

b. Identifying Candidate Projects:

In general, fuels treatments are selected due to their proximity to values at risk, prioritized using the Fire Decision Framework. The 2011 “Long Term Fuels Treatment Plan” (LTFTP) (Figure 4) has been approved in the 2011 EA, (Appendix D). The LTFTP provides approved areas where fuels treatments may occur over the life of the EA, approximately 20 years. Within the identified areas of the LTFTP, a “Multi-Year Fuels Treatment Plan” (MFTP) identifies a short term (up to five years) schedule of planned fuels projects and is updated annually (Appendix E).

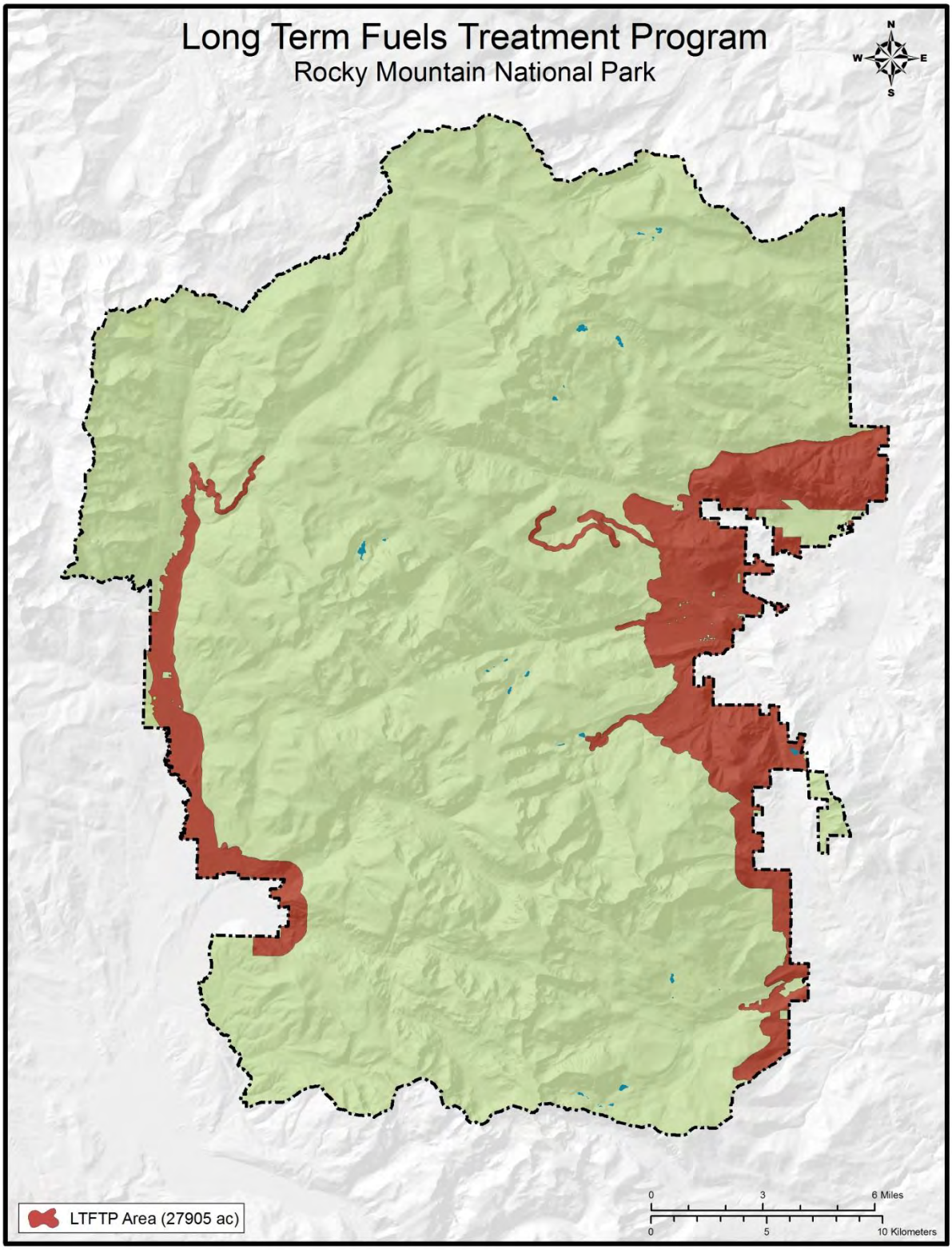

Figure 4. Treatment Areas Included in the Long-Term Fuels Treatment Plan.

Individual projects will be identified and implemented within the boundary of the LTFTP area. These project boundaries will be determined on a project by project basis and prioritized by their ability to meet the Fire Decision Framework. This prioritization will also include consideration of the ecological benefits from the treatments. Projects will be implemented as planning efforts and budget allow.

c. Project Prioritization

RMNP fire managers will use a variety of tools, models, and decision support systems to prioritize treatment projects utilizing the Fire Decision Framework. Fire and fuels management analysis tools and systems continue to evolve to reflect improvements in technology, advances in fire science, and changes in fire policy. Fire managers at RMNP will use the currently accepted fuels management analysis tools available at the time a treatment project is proposed.

Fuels treatments are identified and prioritized based on:

- Proximity to values at risk (prioritized by the Fire Decision Framework) and the degree of risk
- Practicality of implementation
- Effectiveness of treatments
- Cost effectiveness
- Logical project sequence (e.g. there may be a logical sequence to implementing linked or adjacent projects that suggests a priority)

Spatially, many of these projects are located along the park boundary near and /or adjacent to the communities of Estes Park, Allenspark, and Grand Lake and other properties next to the park that have values at risk. Other projects are located throughout the park, protecting site specific values. Projects will also occur along the park boundary, roads and trails.

Individual priorities are set during the yearly update of the MFTP. During winter meetings with various park staff, priorities for the year are discussed and forwarded to the Superintendent for approval as part of the yearly FMP update.

d. Updating the Fuels Treatment Plan

The park has two working documents related to long-term fuels planning. In the EA, the LTFTP was identified. Within this document,

areas are identified that allow fuels treatments for the life of the EA, estimated at 20 years. If the LTFTP needs to be updated or changed, an Environmental Screening Form (ESF) will be completed and direct any further NEPA.

Within the LTFTP, the MFTP identifies specific areas for individual projects. The MFTP is updated annually and is revised to include new projects and drop or revise previously proposed projects. This process occurs during the yearly review of the FMP and is approved by the Superintendent. Each project goes through the parks "Project Proposal" process which includes Management Team concurrence and approval by the Superintendent.

4.5.2 Fuels Management Implementation Procedures

a. Guidance

All fuel reduction activities (prescribed fire, mechanical reduction, and manual reduction) will be planned and implemented in accordance with RM-18 chapter 7 Fuels Management, the Interagency Standards for Fire and Fire Aviation Operations, and the Interagency Prescribed Fire Implementation Procedures Reference Guide

b. Annual Actions

Fuels reduction as a management tool requires that certain annual activities be performed to implement the program. The funding cycle associated with fuels activity requires that project funds for the next fiscal year be requested the spring before the end of the current fiscal year. This cycle requires that on-the-ground project assessment and planning must be completed 6 to 12 months prior to the intended project implementation. Additional annual needs for fuels reduction activities include:

- Update previous fuels data to include previous year fuels reduction accomplishments, fires, and other forest disturbances to reflect the current state of fuels and vegetation.
- Complete surveys and acquire knowledge of planned project areas. These surveys include a suite of sensitive wildlife, cultural, historic, prehistoric, and vegetation.
- Establish highest fuel reduction priorities.
- Involve known stakeholders.

- Submit project proposals.
- Complete an annual Fuels Treatment Plan and submit for funding, usually by March.
- Contract solicitation/advertisement by January.
- Complete the pre-implementation process by April.
- Implement

c. Implementation Standards

All work proposed in the FMP will be planned and implemented in accordance with RM-18, and the Interagency Standards for Fire and Fire Aviation Operations, and the Interagency Prescribed Fire Implementation Procedures Reference Guide. Manual fuels reduction will comply with park policies regarding chainsaw use. Standards to minimize other adverse impacts are generally included in each project proposal, but include: minimum stump heights, rehabilitation requirements, actions to reduce or remove saw cuts, and actions to minimize the spread of exotic invasive plants. In general, fuels management activities are implemented in such a manner to remove any obvious evidence of work performed when feasible, and, when it does not compromise the effectiveness of the treatment.

d. Planning & Reporting Requirements

Reporting and documentation requirements contained in RM-18 will be used as a guide for tracking fuel reduction activities. Additional year-end reporting requirements will include internal accomplishment updates for park management and regional fiscal and project accomplishment reports detailing activities. The overall cost accounting for projects will be tracked using the National Fire Plan Operations and Reporting System (NFPORS). Prescribe Fire Burn Plans will adhere to the Interagency Prescribed Fire Planning and Implementation Procedures Guide.

e. Monitoring

Monitoring data is essential to evaluate whether projects are achieving objectives, to understand the changes in vegetation structure and composition, and to detect undesirable effects from project implementation. The data is also used as a basis to improve future projects for better effects.

All prescribed fires will be monitored in accordance with guidance in the NPS Fire Monitoring Handbook (2003b) and the RMNP Wildfire and Prescribed Fire/Fuels Treatment Monitoring Plan (Appendix F). Monitoring will seek to record and analyze fire weather and fire behavior during project implementation, as well as, short- and long-term fire effects on vegetation and fuels. The intensity and character of monitoring will vary with the complexity and purposes of the burn. This monitoring will allow managers to document basic information, revealing trends and ensuring that actions are meeting fire and resource management objectives.

To measure success within manual or mechanical treatment areas, plots will be installed that can capture changes in fuel loads and fuel arrangements. These plots may also provide information on vegetation composition for the pre-treatment and post-treatment environment. Permanent photo points may also be used to meet these monitoring objectives and will be an additional source of information.

f. Historic Treatment Map

A map of past treatments is located in Appendix E and is maintained in conjunction with the park's GIS office and the Fuels Management Specialist. The GIS data layers should be maintained annually to include each treatment's location, the type of treatment, and the date of completion.

4.5.3 Prescribed Fire Treatments

a. Guidance

Prescribed fire planning and implementation will be in accordance with RM-18, and Interagency Standards for Fire and Fire Aviation Operations, and the Interagency Prescribed Fire Implementation Procedures Reference Guide. In addition, prescribed fire must conform to the Colorado Air Pollution Control Division's permitting process. This process is being constantly refined and improved; the most current description of the permit standards and permitting process can be found at: http://www.cdphe.state.co.us/ap/smoke/.

b. Prescribed Fire Treatment Reviews

After post burn monitoring plots are read, a written analysis of the burn will be prepared. Quantifiable results will be used to determine if burn objectives were met and to make recommendations for prescription

refinement. This evaluation is part of the adaptive management process as described in RM-18.

4.5.4 Non-Fire Fuels Treatments

Scope and Description

Comprised of manual or mechanical fuels reduction, non-fire fuels treatment will be designed to reduce fire behavior to levels that can be managed in a safer manner and that significantly reduce the threat to adjacent or incorporated values. Such treatments are not stand-alone defenses, but rather are designed to improve or augment protection objectives during wildfires or prescribed burning efforts. Goals of treatments would include, but are not limited to reducing flame length, reducing burn duration, reducing torching or crowning potential, reducing spotting potential, reducing resistance to control, increasing fire line safety, and reducing potential for fire damage or fire management impact. Specific objectives to meet these goals would include, but are not limited to limbing trees, removing brush or ladder fuels, removing dead and down material from the forest floor, removing dead snags, thinning to increase crown spacing, reducing canopy cover, and manipulating vegetation to favor fire resistant species or fire-adapted species (e.g. increasing aspen density, retaining ponderosa, removing Douglas-fir or spruce).

Limited application of chemicals for exotic weed control following fuels treatments is expected and falls within the scope of the Exotic Plant Management Plan.

a. Guidance

   The planning and implementation of non-fire fuels management projects will be in accordance with RM-18.

b. Planning

   Non-fire treatments will follow RM-18 on Non-Fire fuel treatment requirements.

c. Treatment Review

   Immediately after treatments have been implemented, monitoring data will be recorded and a written analysis of the treatment will be prepared. Quantifiable results will be used both to determine if

objectives were met and to make recommendations for prescription refinement. This evaluation is part of the adaptive management process as described in RM-18.

4.6 Prevention, Mitigation & Education

4.6.1 Prevention/Mitigation

The fire prevention program is intended to provide for the safety of employees and the public, and to protect communities and infrastructure, natural and cultural resources. This is accomplished by working with interagency cooperators implementing fire restrictions, public outreach and implementing hazard fuels reduction projects.

Public outreach on the natural role of fire and the prevention of human caused wildfires is the focus of the prevention program as well as the overall mission of the NPS and RMNP specific Fire Management Programs. Fire prevention specific messaging is addressed in the park's communication and education strategy.

4.6.2 Communications/Education

RMNP is located along the heavily populated Colorado Front Range in close proximity to the Denver metropolitan area. The park has an annual visitation of over three million people. These two factors – proximity to a heavily populated urban area and high levels of park visitation – contribute to an intense amount of public interest in events occurring within or near RMNP. It is therefore very important that all fire management activities be proactively and accurately communicated to the public.

The Fire Management Public Information and Education program is committed to the expansion of ongoing efforts to educate employees and the public about the scope and effect of wildland fire management, including the response to unplanned ignitions, incident management, fuels management, resource protection, prevention, hazard/risk assessment, mitigation and rehabilitation, and fire's role in ecosystem management. RMNP is dedicated to providing fire information and education for a variety of audiences while maintaining a level of service that is consistent with the park's professionalism.

The Fire Management Officer, working in conjunction with the Public Affairs Officer (PAO) will be responsible for informing the public and the media about the park's fire management program. As there is no permanently funded fire information officer in the park, employees with an

interest in fire information are encouraged to pursue further training and experience in this area.

Communications plans will be developed as required, identifying objectives, audiences, messages or talking points, communication methods and tools, organization, and assignments.

- The objectives of fire information are to proactively provide the public, media, and park staff with accurate and timely information and to enlist public support for professional fire management practices.
- Audiences may include local residents, the local business community, park visitors, park in-holders, park management, employees and volunteers, regional or national office staff, cooperating agencies, legislators, media, etc.
- Messages or talking points may include such topics as prescribed fire, fuels management activities, management of wildfires, wildland-urban interface issues, fire safety and prevention, fire wise and defensible space concepts, and implementation of fire restrictions, etc.

Communication Methods

Personal Services

Interpretive Programs – Fire management will work with the Interpretive Division to integrate fire messages into hikes, tours, displays, site bulletins, and campfire programs. Relevant fire literature and information will be shared with the interpretive staff.

Employee Training - Fire management will offer an overview of the fire management program to be presented annually at new employee and seasonal trainings to give NPS employees a basic understanding of fire management in the park.

Education Programs -Fire management will work with the park's Education Specialist to develop programs and incorporate fire ecology concepts into curriculum-based education programs, summer day camp programs, and teacher workshops as requested and available.

Roving - During fire operations, park employees (including temporary hires, interns, interagency partners) will be stationed when possible at strategic locations to answer questions about the current fire activity and/or explain the fire management program.

Special Events - Fire management staff, when possible, will participate in local events to promote the fire management program and fuels management practices.

Non-Personal Services

Media Stories - The Fire Management Office will communicate with print, radio, and television outlets through press releases and interviews. This will be coordinated with the park's Public Affairs Office.

Visitor Center Exhibits, Waysides, and Bulletin Boards - The Fire Management Office will work with other divisions in the park to provide interpretive information in visitor centers and wayside exhibits as requested.

Step Up Activities

Public Information Step-Up Activities, that will be used to increase awareness of fire danger, may include the following:

Interagency Coordination of Fire Danger Levels - Interagency fire managers work together to coordinate the implementation of partial or full fire restrictions.

"Trapline" for Fire Information - A list of park and concession facilities notes locations where fire information updates, posters, maps, etc. should be distributed when appropriate.

Sign Boards – Park staff will post sign boards with fire information updates, press releases, maps, etc. in field locations.

Staff Email - Regular staff updates on park fire activities keep internal audiences informed and give them updated, accurate information to share with park visitors and local residents.

Roving Contacts - During fire incidents, available personnel may be stationed when possible at strategic locations to answer questions about the current fire activity.

Special Events - Fire Management staff occasionally participates in local community events to promote the fire management program and fuels management practices. If one of these scheduled events coincides with a local fire incident, current fire information will be incorporated into the display area.

4.7 Air Quality & Smoke Management

Clean air and visibility are important natural resource values of RMNP. The park has been designated as a Class I area by the 1977 amendments to the Clean Air Act (Public Law 95-217), which requires the prevention of significant deterioration in air quality and gives added protection to areas of unique scenic value. In addition the park is required to protect public health by managing planned smoke emissions so that specific air pollutants (e.g., smoke, PM 2.5, PM 10, sulfur oxides, carbon monoxide, and other pollutants from fires) do not exceed established unhealthy limits as established by the National Ambient Air Quality Standards (NAAQS) both inside and outside unit boundaries. To ensure these limits are not exceeded the Colorado Department of Public Health and Environment has been delegated the authority to establish regulatory procedures for the discharge of air pollutants produced by prescribed fire. These can be found at http://www.cdphe.state.co.us/ap/smoke/. The NPS is required to follow these regulatory procedures along with all applicable federal, state, interstate, and local air pollution control requirements, as specified by Section 118 of the Clean Air Act, as amended (42 USC 7418).

Smoke emissions from a healthy and naturally functioning fire-adapted ecosystem are an inevitable and a necessary occurrence. The objective is not to eliminate or reduce these emissions, but rather to manage them in frequency, duration, and size so that emissions do not adversely impact air quality. When managing planned emissions (prescribed fire), the park has the ability and expectation to prevent any adverse impacts. In the case of unplanned emission (wildfire) the ability to manage the emission may be restricted. However, when available, the park should use any means available to reduce adverse impacts that may occur. DO #41 reflects this concept when it provides the following direction: “Managers will be responsible for reducing the impacts of smoke from wildland fires on visibility in Class I wilderness, while understanding and promoting the need to re-introduce the natural role of fire into wilderness ecosystems.” It is important to understand that some adverse impacts on air quality from wildfires is inevitable, but are relatively infrequent and of short duration.

The management of smoke must recognize the influence of offsite pollutant sources impacting the park and the effects of smoke leaving the park and impacting other receptors. Often it is the combination of several emissions from different sources that can generate unacceptable impacts. The number, close proximity, and valley locations of communities both east and west of the park play a significant role in managing air quality associated with fire.

4.7.1 Air Quality Issues

- As previously noted, the park in its entirety is a class I air shed.
- Smoke-sensitive areas can best be defined as the public property within 5 miles of the park and all major roads and highways within 5 miles of the park
- At times the park experiences non-attainment for ozone. During such times prescribed burning is not permitted.
- As previously noted smoke management restrictions and procedures are defined by the Colorado Department of Public Health and Environment. These can be found at http://www.cdphe.state.co.us/ap/smoke/.

4.7.2 Smoke Management Program

To the greatest extent possible the park will manage the inevitable and necessary smoke events in a manner that avoids or lessens impacts to air quality and public health and in a manner that protects the class I air shed as one of the park's many natural resources.

The Colorado Air Pollution Control District's (APCD) prescribed burn permitting process is designed to ensure that these values are protected. The mitigation measures often outlined in the permits include but are not limited to the following:

- Burning under fair or better smoke dispersion
- Terminating ignitions several hours before sunset
- Burning under wind speed and wind direction constraints
- Notifying the public in advance
- Limiting the volume of material ignited on any given day
- Limiting the frequency of heavy ignitions within a one week period
- Monitoring smoke density and locations prior to dissipation
- Preplanning methods to shut down or reduce smoke emission if it becomes problematic
- Utilizing past smoke experiences to understand and tailor future emissions

In the arena of unplanned emissions associated with wildfires, protection of life is the number one priority and objective of the NPS fire programs. As such, if smoke emissions reach threatening levels, the park would seek to reduce or eliminate emission to the best of the parks ability without putting fire fighter safety at risk. Such actions could include but are not limited to the following:

- Direct attack on all sides to limit growth and the volume of smoke produced
- Actively mopping up to reduce smoldering
- Temporarily checking an edge or side to reduce the daily growth rate
- Spreading the smoke out over time
- Actively lighting sides or sections when dispersion and other variables are favorable, thus reducing the impacts of the smoke produced.

Over the duration of a wildfire all of these techniques may be utilized as appropriate for keeping smoke levels to acceptable levels.

In addition to specific techniques that are employed at the time of the smoke event, the park will also utilize strategic fuels reduction prior to fire events to reduce the impacts of inevitable smoke emissions near sensitive receptors. Using prescribed fires or mechanical fuels reduction to remove an acceptable volume of fuel and burning it during favorable conditions reduces the volume of smoke produced later during the inevitable, unplanned wildfire.

4.8 Data & Records Management

Considerable time and effort is dedicated to acquiring and managing fire program information and data. Information is used by the park, regional, and national offices for a variety of purposes.

Data and recordkeeping represent a significant investment and must be well managed to be readily available for use when needed, and must be safeguarded from damage or destructions.

Required reports, timeframes, and responsible individuals are outlined in the table below.

Required Report	Timeframe	Physical Location	Employee Responsible
Final Budget Data Call	July prior to next fiscal year	PDS	FMO, FPMA
Fiscal Reporting	"Budget calls" throughout the year, determined by ROMO and IMR admin	AFS3, PDS, etc.	FMO, FPMA

FMP Review	Annually, prior to fire season and comprehensively every 5 years	Hardcopy in FMO Digital copy on ROMO public drive	FMO, all fire branch personnel
Incident Reporting (Fire Reports, Treatment Plans, Monitoring Reports)	Within 10 days of declaring a fire "out"	WFMI, hardcopies in FMO, digital copies on ROMO public drive	FMO, FPMA, Incident Commander, Fire Ecologist
Pre-season Budget Submissions	April prior to next fiscal year	PDS	FMO, FPMA
Pre-season Preparedness Planning	Annually, prior to fire season	Hardcopy in FMO. Digital copy on ROMO public drive	FMO, Fire Staff, FPMA
Program Accomplishments	Decided upon by FMO staff	Various	FMO, all fire branch staff
Project Fiscal Reports	After all projects costs have hit the account.	NFPORS	Fuels Specialist
Project Proposals	2 or more years prior to proposed project start	NFPORS	Fuels Specialist

4.9 Organizational & Budgetary Parameters

The park is located within the Intermountain Region of the NPS and is supported by the Intermountain Regional Office – Division of Visitor and Resource Protection, Branch of Wildland Fire and Aviation Management. The RMNP Wildland Fire Branch is positioned within the Division of Resource Stewardship, a science-based division. The Wildland Fire Branch hosts a fuels crew, a type 6 engine crew and the Alpine Interagency Hotshot Crew. (See Organizational Chart – Appendix G).

For organizational roles and responsibilities, refer to the Interagency Standards for Fire and Fire Aviation Operations (the "Red Book", USDI and USDA 2011), Chapter 3-"National Park Service Program Organization and Responsibilities."

Budget and Funding

The budget of the Wildland Fire Branch at RMNP is allocated through appropriations directly for wildland fire through the Department of the Interior. This funding includes monies for preparedness and fuels related activities. In 2010, the total was roughly $1.3 million and was based on the obsolete

outputs from the now extinct FIREPRO budget analysis system. This is exclusive of extended wildland fire operations or any other emergency type funds. The Alpine Hotshots account for nearly $700k of that funding.

Fire Duty Officer (FDO)

The FMO is responsible for assigning FDO coverage during any period when a wildfire is conceivable or when field operations are occurring. The FDO's responsibilities may be performed by any individual qualified as an Incident Commander Type 4 (ICT4) and will be assigned by the FMO who has been delegated that authority from the park superintendent. At a minimum, the required duties for all FDOs are:

- Monitor unit incident activities for compliance with NPS safety policies.
- Coordinate and set priorities for wildland fire unit response actions and resource allocation.
- Keep agency administrators, fire resources, and information officers informed of the current and expected situation.
- Plan for and implement actions required for future needs.
- Document all decisions and actions.

FDOs provide operational oversight of these requirements as well as any specific duties assigned by fire managers through the fire operating plan. FDOs do not fill any ICS incident command functions connected to any incident. In the event that the FDO is required to accept an incident assignment, the FMO will ensure that another authorized FDO is in place prior to the departure of the outgoing FDO. (See Appendix G-Duty Officer Manual.)

Agreements

Interagency coordination is an integral aspect of wildland fire management in the Northern Colorado Front Range. The park itself resides within three counties: Boulder, Larimer and Grand counties. In Colorado, the County Sheriff has wildland fire authority on all wildland fires on private land; therefore close coordination with each county entity is required. Furthermore, the park requires response assistance from and delegates structure fire response responsibilities to Estes Park Volunteer Fire District on the east side and Grand Lake Volunteer Fire District on the west side. Lastly, the park is surrounded by its largest neighbor and cooperative partner, the Arapaho and Roosevelt National Forests and Pawnee Grasslands. This environment is rich with cooperation and agreements.

Title of Agreement	Cooperators	Purpose of Agreement	Annual Update Required?
Colorado Cooperative Agreement	Bureau of Land Management/Colorado, National Park Service/IMR, Bureau of Indian Affairs/SW Region, Fish and Wildlife Service/Mountain Prairie Region, Bureau of Reclamation/Great Plains and Upper Colorado Region, Forest Service/Rocky Mountain Region	The purpose of this Cooperative Fire Management Agreement (hereinafter referred to as the Agreement) is to document agreement and commitment to fire management assistance and cooperation.	NO
Boulder County Annual Operating Plan	Boulder County Sheriff's Office, Colorado State Forest Service, US Forest Service, Bureau of Land Management, Rocky Mountain National Park	The purpose is to set forth standard operating procedures, agreed procedures and responsibilities to implement cooperative wildland fire protection on all lands within Larimer County.	YES
Larimer County Annual Operating Plan	Larimer County Sheriff's Office, Colorado State Forest Service, US Forest Service, Bureau of Land Management, Rocky Mountain National Park	The purpose is to set forth standard operating procedures, agreed procedures and responsibilities to implement cooperative wildland fire protection on all lands within Larimer County.	YES
Grand County Annual Operating Plan	Grand County Sheriff's Office, Colorado State Forest Service, US Forest Service, Bureau of Land Management, Rocky Mountain National Park	The purpose is to set forth standard operating procedures, agreed procedures and responsibilities to implement cooperative wildland fire protection on all lands within Larimer County.	YES
Interagency Agreement for Wildland Fire Management	Bureau of Land Management, Bureau of Indian Affairs, National Park Service, Fish and Wildlife Service, and the Forest Service	Provide a basis for cooperation, resource and equipment exchange among the agencies on all aspects of wildland fire management, and in all hazard emergency support function activities as requested and authorized under the Robert T. Stafford Disaster Relief and Emergency Assistance Act.	NO

Adaptive Management Strategy

As described in Adaptive Management: the U.S. Department of the Interior Technical Guide (Williams et al. 2009), adaptive management is a decision process that:

"promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increases scientific knowledge, and reduces tensions among stakeholders."

Adaptive management requires stated management objectives to guide decisions about what actions to take and to make unambiguous assumptions about expected outcomes to compare against actual outcomes. Adaptive management is a learning process as well as a structured approach to decision making that emphasizes accountability and explicitness in decision making. Key points of the adaptive management approach:

- Adaptive management openly acknowledges uncertainty about how ecological systems function and how they respond to management actions.
- Adaptive management is designed to improve understanding of how a system works so as to achieve management objectives.
- Adaptive management is about taking action pursuant to desired outcomes
- Adaptive management requires the participation of stakeholders.

An adaptive management approach to all fire management activities will be applied within the framework of the FMP. This approach would account for unanticipated changes in environmental conditions, inaccurate predictions, and/or subsequent information that might affect the original environmental predictions. This approach is critical to meeting the desired outcomes.

The basic steps of the adaptive management process include:

1. Plan – Develop plan of action based on current management goals and objectives.

2. Predict – Predict the outcome of the action based on current information and understanding.
3. Mitigate – Mitigate for any anticipated impacts.
4. Implement – Implement the plan of action.
5. Monitor – Monitor the resources prior to, during, and following the action.
6. Adapt – Revise plans based on new information and understanding as well as monitoring results and begin adaptive management process again.

The development of the FMP for RMNP will accomplish steps 1- 3 in the adaptive management process. Following the NEPA process, fire management activities would be implemented, as described in steps 4 and 5. The FMP will be evaluated on an annual basis (step 6) and fire management activities may be revised or changed based on monitoring information and as new information from research and other sources becomes available. If such revisions or changes to the fire management activities are outside the original scope of the FMP and NEPA documentation, then additional NEPA analysis would be required.

5.1 Fire Management Objectives

The purpose, goals and objectives of the park's fire management program are derived from agency mandates, policy statements, environmental laws and park planning documents. The FMP must respond to direction provided in Federal and NPS policy statements such as the 2001 Review and Update of the 1995 Federal Wildland Fire Management Policy (USDA and USDI 2001). Fire management action must also comply with laws such as the National Park Service Organic Act, Endangered Species Act, Clean Air Act, Clean Water Act, Wilderness Act, National Historic Preservation Act and Archeological Resources Protection Act, and other laws related to the NPS.

Within the framework of larger agency policy and environmental law, the Park's staff has identified six goals for the fire management program. Each goal is further refined through associated objectives which aid managers in measuring the success of fire management actions. An adaptive approach will allow the fire program to refine prescriptions and fire applications to assure that desired outcomes are achieved.

Please see Chapter 3.11 for the fire management goals and objectives

Desired Future Conditions

There is general consensus among scientists and the research community that the majority of ecological systems within the RMNP landscape are thought to be within or close to their natural range of variability with respect to

fire. For millennia fire has played an important role in maintaining and creating conditions suitable for native flora and fauna in the park's varied ecosystems. This plan therefore, seeks to maintain natural fire regimes to the greatest extent possible so that ecosystems can continue to function and the interactions between fire and the environment can occur essentially unimpaired by human interference. Utilizing fire as a dynamic ecosystem process to maintain ecosystem structure, composition, and function provides our best opportunity to conserve biological diversity in the park.

The definition of precise structural or compositional targets for desired future conditions is complicated by the spatial and temporal variability inherent in plant communities as influenced by site conditions, climate, disturbance response, and individual species recruitment and mortality patterns. Process oriented, functional definitions for target conditions (e.g. historic fire frequency and fire behavior) may be more practical since they acknowledge the inherent variability in natural systems.

This process oriented, coarse-filter approach will maintain ecosystem structure, composition, and function within the historic range of variability, thus preserving conditions suitable for the majority of species that have evolved with these ecosystems. However, this approach may not be suitable for some special status species and rare habitats. In these instances, habitat- or species-specific plans may need to be implemented to address particular concerns. Additionally, there are some areas, such as those within the wildland urban interface, where the use of naturally occurring fire may not be practical due to safety or smoke concerns. In these areas, manual or mechanical fuel treatment methods may be used in addition to prescribed fire to reduce hazardous fuels.

Please see the "Vegetation" section in Chapter 3 (Affected Environment) of the EA for detailed descriptions of the major vegetation communities in the park and associated disturbances.

5.2 Monitoring

Monitoring is not only part of the adaptive management process, but also a fundamental NPS management policy to be fulfilled. Monitoring provides an avenue for evaluating whether management goals and objectives are being met and whether undesired effects are occurring. When goals and objectives are not being met, monitoring data can be used to facilitate management changes. This practice is part of the adaptive management cycle that the NPS fire management program uses to improve land management practices and is

required under NPS Management Policies(2006)(2006)(2006)(2006)(2006)(2006)(2006) (2006). A monitoring plan has been developed to fulfill this requirement (Appendix F). The following provides a brief description of the monitoring levels and activities that will be used to monitor fire management activities:

Short and Long-Term Fire Effects Monitoring Programs

Short and long-term fire effects monitoring programs will be developed to assess wildland fire management accomplishments and to determine the effects of fire management activities on cultural and natural resources. Monitoring the fire effects on natural and cultural resources will allow managers to determine whether fire management objectives are being met and if, not, when fire management strategies need revision. Monitoring fire efforts will be incorporated into the FMP adaptive management process.

The primary aim of these monitoring programs is to provide information to fire and resource managers, which allows them to determine whether treatment objectives (prescribed fire, wildfire, or non-fire) are being met or to identify and correct deficiencies. Fire effects monitoring involves the systematic collection, documentation, and analysis of a variety of data such as fuel loading, vegetation structure and composition, topography, weather conditions, air quality, and fire behavior. Monitoring should, whenever possible, result in digital data including GIS compatible data.

Wildland fire and resource staff will follow appropriate fire effects monitoring protocols to meet fire objectives. One example is the National Park Service Fire Monitoring Handbook (2003b). However, when appropriate, other monitoring protocols may be used [for alternative fire monitoring protocols see (Coulloudon et al. 1996, Elzinga et al. 1998, Hall 2002a, b)]. Depending on treatment type, resource objectives, and variables to be monitored, a variety of monitoring techniques may be used.

Fire Monitoring Levels

Fire management activities will be monitored at the appropriate level with relation to the type and scale of each project. The NPS Fire Monitoring Handbook identifies four fire monitoring levels.

These levels include:

Level 1: Environmental Conditions

This level of monitoring provides baseline data that is collected in preparation for the fire season or prescribed fire projects. Environmental monitoring data provide the background information needed to make fire management decisions. The following are examples of environmental data that may be collected by fire management:

- Local Weather
- Fire Danger Rating
- Fuel Conditions
- Values at Risk

Level 2: Fire Observations

Fire observation monitoring provides a basic overview of the physical aspects of a fire event or fuels management activity. The following are examples of monitoring variables; the level of data collection may vary with the fire management activity:

- Fire cause, fire location, fire date
- Fire or project size
- Fuels and vegetation description
- Fire regime and condition class
- Current and predicted fire behavior
- Current and forecasted weather
- Smoke volume and movement

Level 3: Short-term Change

Monitoring for short-term changes provides information on the immediate or short-term effects of a fire or fire management activity, at a level sufficient to evaluate whether stated project or program-level management objectives are achieved. Monitoring provides information on identified variables of interest either in a specific predefined vegetation and fuel complex (monitoring type or monitoring unit) or for a specific project. Data are collected through sampling of permanent monitoring plots, temporary plots, Composite Burn Index (CBI) plots or photo points. Monitoring is implemented at varying intervals -- pre-burn, during the burn, and immediately post-burn -- and continues for up to two years post-burn. Level 3 monitoring requires a data stewardship plan to ensure effective long-term management and use of data.

Level 4: Long-term Change

Monitoring for long-term change involves identifying the long-term effects of management activities that can be used to guide management decisions. Long-term monitoring of prescribed fire in pre-defined vegetation/fuel complexes is required to document that overall programmatic objectives are being met and undesired effects are not occurring. It may entail the continuation of Level 3 monitoring over a longer period. Monitoring frequency is based on a predefined interval appropriate to both the vegetation and fuels complex and the anticipated duration of treatment impacts. Level 4 monitoring requires a data stewardship plan to ensure effective long-term management and use of data.

The following are the minimum monitoring requirements for fire management activities:

Wildfire	Levels 1, 2; Request burn severity assessments for fires > 500 acres
Prescribed Fire	Levels 1, 2, 3, 4; Request burn severity assessments for fires > 500 acres
Non-Fire Treatment	Documentation of treatment prescription, location, objectives, and evaluation of results

The Fire Monitoring Plan is included as Appendix F.

5.3 Evaluation

Monitoring data will be archived and reviewed for future refinement of target conditions and treatment prescriptions. Managers and staff will also use wildland fire and fuels treatment data to analyze program success and effectiveness by: evaluating the actions and effects of the previous fire seasons, examining monitoring results, and incorporating new information into the management strategy. Data collected will also be measured against the National Fire Plan and the 10-Year Comprehensive Strategy Implementation Plan.

Quantitative and measurable management objectives and proposed treatments with specific prescriptions are developed under the guidance found in resource management plans (RMPs) and the FMP. A monitoring design derived from the management objectives is developed and includes: defined monitoring units (what is being monitored and where), monitoring protocols (how and when monitoring is conducted), and monitoring objectives (why). The monitoring design is implemented prior to the proposed treatment

through the establishment of plots, or through other appropriate monitoring techniques (such as photo point documentation). Monitoring continues following the treatment. Analysis of monitoring data compares the post-treatment conditions with the pre-treatment conditions to assess whether the management objectives of the treatments are being met. Results from the analyzed monitoring data must be communicated to park resource and fire management staff so they can examine the results and evaluate the progress being made towards meeting objectives.

If management objectives are being met then treatments may continue as appropriate to achieve desired conditions. If management objectives are not being met then the following questions should be addressed:

- Are the objectives realistic?
- Should there be changes made to the treatment prescriptions?
- Are there other management actions that should be taken in conjunction with the treatment?
- Could other management actions be more effective than the actions prescribed in the treatment plan?
- Is additional research needed?

Adaptive management requires continual evaluation. As the monitoring is conducted and data are analyzed, refinements to the monitoring design may need to be made. Results from data analysis should be incorporated into planning documents. Objectives and treatments must also be re-evaluated as new information from research and other sources becomes available.

All wildland fires and fire-related incidents must be reviewed in accordance with RM-18, Wildland Fire and Program Reviews chapter 17 (NPS 2008c) and the Interagency Standards for Fire and Fire Aviation Operations (the "Red Book", USDI and USDA 2011). All prescribed fires will be reviewed as appropriate. Reviews are conducted for one or more of the following purposes:

- To examine the progress of an on-going fire incident and to confirm effective decisions or to correct deficiencies.
- To identify new or improved procedures, techniques, or tactics.
- To compile consistent and complete information to improve or refine park, regional, or national fire management programs.
- To examine anomalous fire-related incidents in order to determine cause(s), contributing factors, and where applicable, to recommend corrective actions; if negligence is indicated, the circumstances will be

reported and investigated in accordance with applicable regulations, policies, or guidelines.
- To determine the cost effectiveness of a fire operation.

5.4 Fire Research

The following is a summary of previous fire research directly related to RMNP or to Front Range ecosystems directly similar to those found in the park.

Of the many disturbance types found in natural systems, perhaps the most widespread is that of fire. The current structure, species composition, and dynamics of many ecosystems are often the direct result of past fires or in other cases, the result of other processes that have themselves been affected by fire. In general, fire regimes in the southern Rockies can be thought of as following an elevational gradient (Peet 1981, Romme and Knight 1981, Romme et al. 2003). The lower montane is often characterized by more frequent surface fires, while forests in the subalpine typically experience infrequent stand replacement fire events. However, fires of any intensity can occur in both elevational zones (Veblen 2000).

On the east side of the park, forest types in the montane zone include ponderosa pine, Douglas-fir, and lodgepole pine communities. These three species often intermingle in ecotonal areas, forming mixed stands. Ponderosa pine tends to dominate the lower portions of the montane, increasing in density with increased elevation and gradually giving way to Douglas-fir, particularly on moist north-facing slopes (Clements 1910, Marr 1961, Mast et al. 1998). Following disturbance, upper montane sites are often pioneered by dense even-aged stands of lodgepole pine on drier sites and aspen on more mesic sites. In the absence of further disturbance, these lodgepole and aspen stands may gradually be replaced by Douglas-fir at lower elevations and Engelmann spruce and subalpine fir at higher elevations (Clements 1910, Peet 1978a, Whipple and Dix 1979, Veblen et al. 1991). In contrast to the variety of forested communities found on the east side, montane forests on the west side of the park are composed almost exclusively of lodgepole pine.

There is an increasing body of evidence that suggests ponderosa pine and mixed conifer communities in the upper montane zone of RMNP are characterized by a mixed-severity fire regime, including both stand replacing and surface fire events (Laven et al. 1980, Veblen and Lorenz 1986, Brown et al. 1999, Arno 2000, Veblen 2000, Brown and Shepperd 2001, Ehle 2001, Sibold 2001, Romme et al. 2003, Sherriff and Veblen 2006). This highly variable fire regime results in a complex mosaic of stand ages, densities, and

structures. This complexity is reflected in reported fire return intervals for ponderosa pine (which frequently include a component of Douglas-fir and lodgepole pine in the upper montane), ranging from 1-125 years for low intensity fires and 200-300 years for stand replacing fires (Rowdabaugh 1978, Laven et al. 1980, Skinner and Laven 1982, Skinner and Laven 1983, Goldblum and Veblen 1992, Hadley 1994, Mast et al. 1998, Ehle and Baker 2003). This contrasts with the fire regime typical of ponderosa pine ecosystems at lower elevations on the Front Range and other areas of the west, in which stand replacement fires were rare and open “park-like” stand structures were maintained through frequent low intensity surface fires (Veblen et al. 2000). Comparison of fire scar and climatic evidence recorded in tree rings suggests that fire occurrence in the montane zone of the northern Colorado Front Range is strongly associated with climatic variation. Fires tend to occur in years with below average spring precipitation that are preceded by 2-3 years of above average spring precipitation (Veblen et al. 2000).

In a study of disturbance patterns and stand structure, Ehle and Baker (2003) found widespread evidence of small crown fires that resulted in the regeneration of dense even-aged ponderosa stands in the park. Over time, subsequent surface fires reduced overall tree density in these stands and created sites for post-fire seedling establishment. This process resulted in a highly variable mosaic of stand structures, densities, and ages across the landscape. Stand densities decreased for a period of about 200 years, after which tree density became relatively stable.

Although the study did not determine the spatial extent of crown fires in ponderosa, in only one instance did crown fires occur in separate plots in the same year. These two plots were located less than 2 miles apart. Study sites were located in Beaver Meadows, Upper Beaver Meadows, Hondius Park, and the south facing slopes of Deer Mountain and Eagle Cliff. This mixed severity fire regime is consistent with research conducted in ponderosa pine communities in the Wild Basin area (Sibold 2001). In contrast to the pattern of increased tree density following the adoption of fire suppression policies documented in the southwest, Ehle and Baker (2003) suggest that fire exclusion has greatly limited turnover (both mortality and recruitment) of ponderosa pine in the park.

The lodgepole pine dominated forests of the park are typically characterized by a stand replacement severity fire regime with fire return intervals in the 50-150+ year range (Clements 1910, Peet 1981). These stands tend to self-perpetuate in the presence of frequent disturbance. Depending on site conditions, lodgepole seedling reestablishment may take 30-100 years

following stand replacing fire (Peet 1981). Fire frequencies in lodgepole are often higher and may include low severity fire events where stands are in proximity to ponderosa pine or mixed conifer forests that experience more frequent fire (Peet 1981, Veblen and Lorenz 1991). Sibold et al. (2006) determined that all lodgepole stands in RMNP originated within the last 400 years following stand-replacing fires.

Although evidence of occasional surface fires also has been found in the Engelmann spruce and subalpine fir (spruce-fir) dominated subalpine zone, fires in this zone are typically “all or nothing” events. They are either single tree events that do not spread, or large, infrequent stand replacement fire events (Kipfmueller and Baker 2000, Veblen 2000, Sherriff et al. 2001, Sibold 2001, Romme et al. 2003, Buechling and Baker 2004, Sibold et al. 2006). These large fires typically coincide with regional-scale drought conditions and occur at intervals of well over a century (Veblen 2000). In Wild Basin, Sibold (2001) found spruce-fir stands that had not burned in over 400 years. Given the long-interval fire regime typical of the subalpine, it appears that these forests are still within their natural range of variability and have not been considerably impacted by fire suppression efforts in the last century (Clagg 1975, Sherriff et al. 2001, Sibold 2001, Romme et al. 2003, Veblen 2003).

Fire does not play a large role within alpine systems due to the cool, moist conditions and low fuel levels that are found within this elevation zone. However, over long time scales, fire may move into the alpine zone from the adjacent spruce-fir forests. Fire return intervals within alpine systems, therefore, are potentially similar to or longer than (i.e. greater than 300 years) the adjacent forest type.

Summary of ongoing fire-related research:

Sibold, Jason. (in progress) Investigation into relationships between disturbance history and mountain pine beetle outbreak severity and consequences in the lodgepole pine forest type of Rocky Mountain National Park, Colorado.

The primary objective of this study is to assess mortality and regeneration patterns in lodgepole pine stands on the west side of the park that have been affected by mountain pine beetle in relation to stand age, management activity, and other disturbance.

Preliminary results suggest that outbreak severity and stand-development trajectories were not influenced by differences in stand-replacing fire history (stand age), or the occurrence of past surface fires. In contrast, severity and

development trajectories were influenced by the occurrence of the 1970s mountain pine beetle outbreak, and ecosystem management treatments including tree thinning with and without subsequent burning of slash piles, and high-severity prescribed fire.

Rocca, Monique and William Romme. (in progress) Imagining landscapes of the future: predicting the impacts of climate change, insect outbreaks, and fire on Colorado lodgepole pine forests.

Stands will be sampled representing a range of beetle-caused mortality from light to heavy, to characterize changes in tree density, basal area, canopy fuels, and species composition. From these data, landscape patterns of change in forest structure, at multiple spatial scales, including percent tree mortality and patch sizes of various mortality classes will be characterized.

Fuels data will be applied to a variety of forest growth models (e.g., the Forest Vegetation Simulator, FVS), and fire behavior models (e.g., the FVS Fire Fuels Extension (FFE) and NEXUS) to explore future forest structure and potential fire behavior under a range of likely weather conditions.

In addition, the study will use planned, prescribed burning operations in beetle-impacted stands to investigate three important issues: the flammability of lodgepole pine crowns, the mechanisms of pine seed dispersal following beetle attack, and survival of beetle larvae following burning.

Preliminary results indicate that under typical late winter/early spring conditions, the crowns of green trees (whether attacked or unattacked) are not receptive to fire. Red-needled crowns are more receptive to fire, but, the period of increased risk is only about 2 years. Following the loss of 20% or more of the needles, the resulting lower crown bulk density limits fire spread in beetle-killed trees. Hence, the perception of increased fire risk due to mountain pine beetle activity may be exaggerated. Managers of landscapes that include lodgepole pine should keep in mind that it is a fire-adapted species and there will always be a risk of high intensity fire with or without the mountain pine beetle.

Allen, Craig D., Jessica Montag, and Jenny Briggs (in progress) Impacts of Mountain Pine Beetle infestation on forested ecosystems and social values in the Front Range, Colorado.

Faced with the potentially major disturbance of an MPB epidemic in ponderosa forests of the Front Range, neither managers nor researchers

have sufficient evidence from past studies or experience to predict its effects or plan appropriate responses.

Study objectives:

1. Evaluate and predict the potential transition of MPB between lodgepole and ponderosa pine ecosystems.
2. Assess the impacts of MPB on ponderosa pine forests with different management histories, and predict future changes in succession dynamics and fire hazard in this ecosystem.
3. Identify public perceptions of potential changes in ponderosa pine ecosystems and public support for mitigation of MPB impacts on public and private lands.

Research needed to implement or refine the wildland fire management program:

- Investigation of upland shrub establishment patterns and response to prescribed fire.

  Data regarding the immediate and long-term response of antelope bitterbrush (*Purshia tridentata*) and big sagebrush (*Artemisia tridentata*) to fire are sparse and often conflicting. Fire may be necessary to rejuvenate senescent shrub stands. However, current levels of ungulate herbivory following fire may result in a net loss of shrub habitat in the Park.

  Specifically, information is needed regarding post-fire shrub recovery rates, historic fire frequencies and burn severity in upland shrub habitat, as well as establishment patterns and historic extent of upland shrub habitat. This information would allow the development of sound prescribed fire objectives in upland shrub systems and shed light on the interaction between fire and ungulate herbivory.

- FARSITE landscape development: fuels map and fire history crosswalk

  Considerable effort has gone into the development of a detailed fuels map and associated FARSITE landscape of the park. However, during the Cow Creek fire of 2010, the FARSITE landscape did not adequately represent the surface fuels present within the fire. In older subalpine stands (> 250 since previous stand-replacing event), fuel models were changed to slash models

to better reflect the higher surface fuel loading present and to more accurately represent observed fire behavior.

The fire history of much of the forested subalpine of the park has been mapped in recent years (Buechling and Baker 2004, Sibold et al. 2006). We propose taking the GIS data associated with the existing fire history research and crosswalking that data with the park's vegetation map and fuels map. Correction factors could then be developed and applied to the fuels map based on vegetation type and time since last fire (e.g. within the same vegetation type, a stand that has not experienced fire in over 200 years will likely have higher surface loading than a stand that has experienced fire within the last 100 years). Predicted fire behavior utilizing such correction factors would better represent what fire management staff could expect (and have observed) on wildfires in the park.

Appendix A – Literature Cited

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