11-2005

Moab Fire District Fire Management Plan: Environmental Assessment

U.S. Department of the Interior, Bureau of Land Management

United States Department of the Interior
Bureau of Land Management

MOAB FIRE DISTRICT
FIRE MANAGEMENT PLAN
ENVIRONMENTAL ASSESSMENT

UT-063-04-02, UT-060-2005-042

November 2005

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

ENVIRONMENTAL ASSESSMENT (EA) # UT–063-04-02, UT-060-2005-042
Moab Fire District Fire Management Plan EA

This unsigned FONSI and the attached EA # UT–063-04-02 / UT-060-2005-042 for the Moab Fire District Fire Management Plan are available for public review and comment for 30 days beginning on January 17, 2006.

Based on the analysis of potential environmental impacts in the attached EA and consideration of the significance criteria in 40 CFR 1508.27, I have determined that with required and proposed protection measures the Moab Fire District Fire Management Plan would not result in significant impacts on the human environment. An environmental impact statement (EIS) is not required.

The decision to approve or deny the Moab Fire District Fire Management Plan, and if appropriate a signed FONSI with rationale, will be released after consideration of public comments and completion of the EA.

_____ _____

State Director Date

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Appendices

CHAPTER 1. PURPOSE AND NEED

1.1 INTRODUCTION

This Environmental Assessment (EA) has been prepared to document results of an analysis of proposed changes to current management of wildland fire and hazardous fuels for the Bureau of Land Management (BLM), Division of Fire Management. The Division of Fire Management oversees all fire-related activities for the Moab, Monticello, and Price Field Offices, referred to in this document as the Moab Fire District. Proposed revisions of the Moab Fire District Fire Management Plan (FMP) serve as the Proposed Action for this EA. The revised FMP incorporates current planning requirements associated with fire management on public lands, including wildland fire suppression and fuel treatments. The EA analysis is designed to ensure compliance with the National Environmental Policy Act (NEPA). It allows determinations to be made as to whether any "significant" impacts, as defined by the President's Council on Environmental Quality (CEQ) in regulation 40 CFR 1508.27, could result from the analyzed actions.

An EA provides evidence for determining whether preparation of an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI) statement is necessary. A Decision Record (DR) that includes a FONSI statement is a document that briefly presents reasons why implementation of the Proposed Action would not result in significant environmental impacts (effects) beyond those already addressed within other NEPA and BLM planning documents. If the decision-maker determines that this project would have significant impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a DR may be signed for the EA approving the alternative selected. The DR would identify fire management planning goals and objectives associated with the FMP and would provide language upon which future fire management planning and implementation actions could tier (as per 40 CFR 1502.20). Future site-specific projects would analyze issues in additional implementation-level NEPA documents.

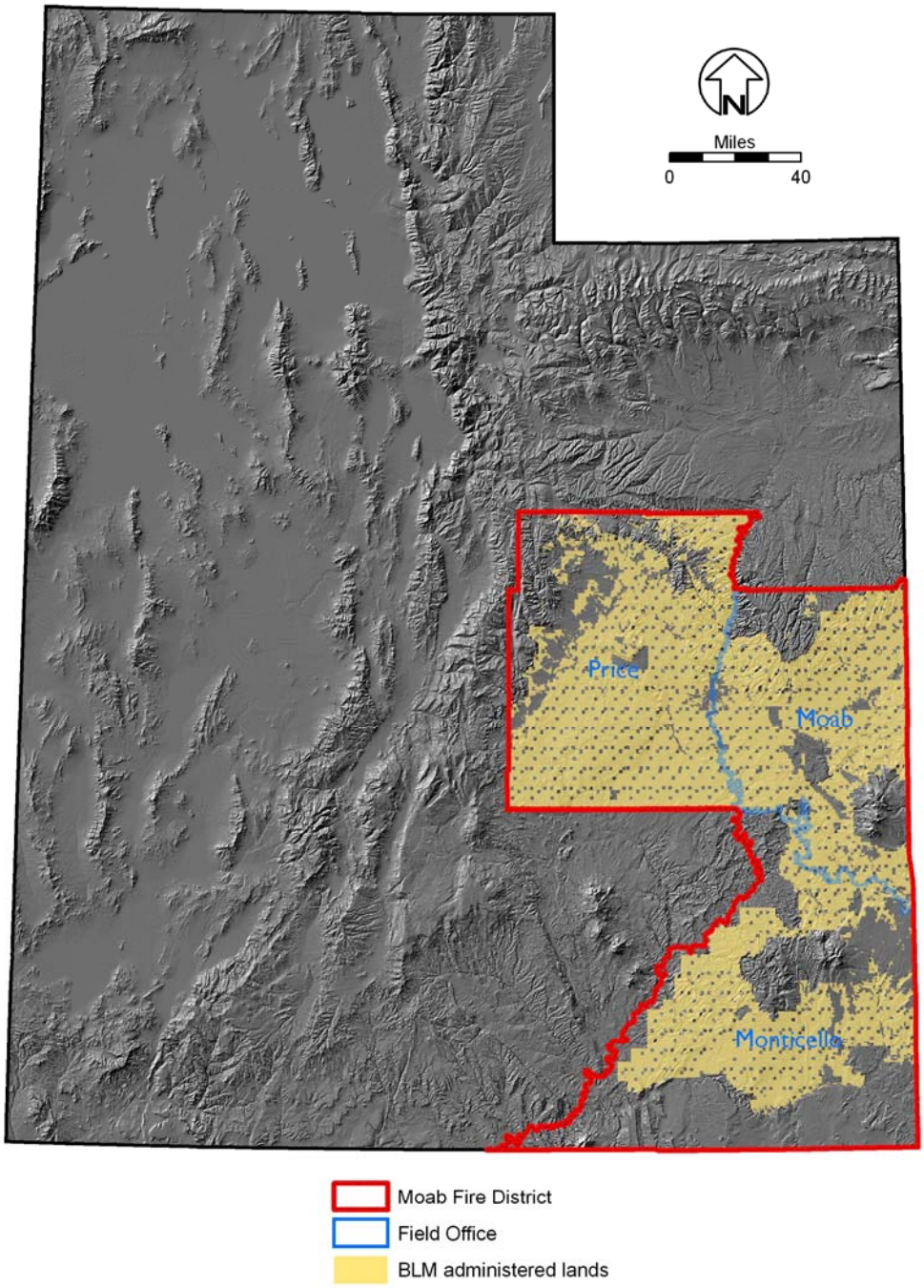
Issues identified for analysis within this EA are included as **Appendix A** (Interdisciplinary Team Analysis Record Checklist). This appendix includes resource concerns identified in the EA, those resources considered as Critical Elements of the Human Environment, and related issues derived from the BLM, affiliated agency resource reviews, and comments received during the public scoping process.

1.2 BACKGROUND

The Moab Fire District evaluated its current FMP and determined that an update of the plan would be essential to modify goals and objectives to meet national mandates for fire management. Mandates included in the National Fire Plan and Healthy Forest Restoration Act of 2003 such as number and types of fuel treatments and associated impacts, were not foreseeable during the compilation of the 1998 FMP. A revised and updated FMP would incorporate Federal policy management direction including the *Federal Wildland Fire Management Policy and Program Review* (USDI and USDA 1995); *Review and Update of the 1995 Federal Wildland Fire Management Policy* (USDI and USDA 2001a); and *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-year Comprehensive Strategy* (USDI and USDA 2001b).

The planning area for the Proposed Action encompasses approximately 8.3 million acres (6.1 million acres of BLM-administered land) within the jurisdiction of the Moab Fire District, as shown in **Figure 1.1**. The acreages presented in this EA are approximate due to slight variations in geographical information system data sets. The variations represent an insignificant quantity of land area (less than one percent of the total) and have a negligible effect on landscape-level fire management analyses.

FIGURE 1.1: MOAB FIRE DISTRICT AND BLM-ADMINISTERED LAND WITHIN THE PLANNING AREA



1.3 NEED FOR PROPOSED ACTION

National fire management policy has evolved in response to increased fatalities, property loss, local economic disruptions, risk to ecosystems associated with increasingly severe wildland fires, and increasing wildland urban interface (WUI) conflicts. National policy requires that federal fire management practices reflect protection of human life and safety and reduce risks to natural resources and private property. Advances in scientific understanding of the role of fire in natural ecological processes should be incorporated into management of fire across landscapes. Successful revision of the FMP would result in fire management direction that is compliant with national and interagency direction.

Federal Wildland Fire Management Policy and Program Review (USDI and USDA 1995) and *Update of the 1995 Federal Wildland Fire Management Policy* (USDI and USDA 2001a) directed FMPs be developed to provide fire management direction for all areas of burnable vegetation on federal lands. The FMP documents the fire management program for the Moab Fire District and is based on existing management framework plans (MFPs) and resource management plans (RMPs). Both MFPs and RMPs are more broadly known as land use plans (LUPs). FMPs are the fire manager's primary guide for planning and implementing fire-related direction on the ground. FMPs incorporate the broader LUP management direction.

The revised FMP would result in a document that provides for clear fire management direction that is compliant with national and interagency direction. A programmatic FMP could effectively guide fire management toward the ultimate goals of improving firefighter and public safety, reducing fuel loads, and maintaining the ecological functions of landscapes within the planning area.

1.4 PURPOSE OF THE PROPOSED ACTION

The Director of the BLM's Office of Fire and Aviation has instructed all fire management divisions to develop new FMPs or to revise existing FMPs for all public lands under the jurisdiction of the BLM to identify and integrate federal wildland fire management guidance within those FMPs. Accordingly, the Moab Fire District is developing a new FMP that covers the Moab, Monticello, and Price Field Offices to address all aspects of fire management including WUI, rural fire assistance, prescribed fire, and fuels management, prevention, and suppression.

The goals included in the FMP are to restore wildland fire to ecosystems and to minimize undesirable fire effects based upon scientific information and land, resource, and fire management objectives. Ecosystems have evolved with and adapted to specific fire regimes. Natural fires historically occurred during a typical season with characteristic intensity and severity. Control and suppression in some ecosystems have altered the natural frequencies and seasons of occurrence, which has resulted in fuel load buildups, increases in understory fuels, and increases in stand density (Wright 1990, Covington and Moore 1994). Due to these alterations, wildland fires have increased in size, intensity, and frequency.

Wildland fire, as a critical and necessary ecological process, must be maintained in natural systems. Where wildland fire cannot be safely reintroduced because unnaturally high fuel loads present a high risk to human life or property (as in many WUI areas), some form of hazardous fuels reduction must be considered. The objective of fuels reduction is to attain desired wildland fire conditions (DWFC) as described by Fire Regime Condition Class (FRCC). FRCC is a description of vegetation conditions based on the departure from natural fire regime; including the effects of fire suppression (fuel loading and encroachment) and species invasion. There are three FRCC categories:

- FRCC 1: A functioning, intact ecosystem within natural/historical range for fire return interval and vegetation attributes. The risk of losing key ecosystem components is low.
- FRCC 2: The ecosystem has been moderately altered from natural/historical range and vegetation attributes with a moderate risk of losing key components.

- FRCC 3: There has been a substantial alteration from natural/historical range and vegetation attributes with an accompanying high risk of key ecosystem component loss.

The following objectives directed the revision of the Moab Fire District FMP:

- Protection of human life would be the prime suppression priority. Priorities among protecting human communities and community infrastructures, other property and improvements, and natural and cultural resources would be based on the values to be protected, human health and safety, and costs.
- A wide range of fire management actions would be used to achieve ecosystem sustainability.
- Hazardous fuels would be reduced.
- Ecosystems would be restored.
- Communities at risk would be protected.

Specific components of the Proposed Action such as wildland fire suppression goals, fire and non-fire fuels treatments, wildland fire use and pertinent acreages, are based on achieving the above listed objectives.

1.5 CONFORMANCE WITH BLM LAND USE PLANS

The proposed FMP was reviewed for potential conflicts among existing LUPs. **Table 1.1** includes these relevant LUPs. The Proposed Action would replace existing management goals, objectives, and management actions with current direction at the FMP level. The proposed FMP was determined to be in conformance with the existing Moab and Monticello Field Office LUPs as amended by USO-EA-04-01, "Utah LUP for Fire and Fuels Management EA." The proposed FMP is not in conformance with the Price River MFP and San Rafael RMP. However, the proposed action would conform with the Price Field Office RMP Draft EIS (July 2004). The Decision Record for this FMP EA would implement management decisions specific to the Moab and Monticello Field Offices. Implementation of fire managmenet decisions for the Price Field Office would not occur until after the RMP Record of Decision is signed.

TABLE 1.1: OTHER RELEVANT BLM DOCUMENTS

Field Office	Land Use Plan	Year
Moab		
	Grand RMP	1985
Monticello		
	San Juan RMP	1991
Price		
	Price River MFP	1982
	San Rafael RMP	1991
	Price RMP (Draft)	2004

1.6 RELATIONSHIP TO STATUTES, REGULATIONS, OR OTHER PLANS

CEQ regulations for implementing NEPA (40 CFR Parts 1500-1508) detail the process of preparing EAs. CEQ regulations as well as the Utah BLM's internal guidance for conducting an EA-level analysis (*Utah BLM NEPA Guidebook* [BLM 2004a]), were followed in the preparation of this document. The BLM's *NEPA Handbook H-1790-1* (BLM 1988) provided additional guidance for preparation of an EA-level analysis.

The BLM planning process is governed by the Federal Land Policy and Management Act (FLPMA) of 1976 (43 U.S.C. 1711) and 43 CFR part 1600. As required by FLPMA and BLM policy, resource management planning must take into account the principles of multiple use and sustained yield. This is accomplished through the development of resource management goals and objectives within an LUP, the primary mechanism for guiding BLM activities to achieve the mission and goals outlined in the BLM Strategic Plan. The *BLM Land Use Planning Handbook H-1601-1*, as amended (BLM 2004b) contains planning implementation guidance. The Proposed Action addresses requirements of fire management planning described in IM-WO-2004-007 (Land Use Plan and Implementation Plan Guidance for Wildland Fire Management); complies with the intent and requirements of FLPMA; and has been developed in consideration of multiple resource goals and objectives as outlined in the planning handbook.

In addition to meeting the goals, objectives, and management actions of IM-WO-2004-007, other applicable fire management planning goals, policy statements, and specific fire management decisions considered and addressed by the Proposed Action include: *Federal Wildland Fire Management Policy and Program Review* (USDI and USDA 1995); *Review and Update of the 1995 Federal Wildland Fire Management Policy* (USDI and USDA 2001a); and, *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-year Comprehensive Strategy* (USDI and USDA 2001b).

Federal wildland fire management policy mandates that firefighter and public safety are the first priority in any fire management action. For fire suppression activities, protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources would be based on the values to be protected, human health and safety, and the costs of protection. *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-year Comprehensive Strategy* (USDI and USDI 2001b) identifies the reduction of hazardous fuels and the restoration of ecosystems as goals to be considered when preparing FMPs. In meeting these requirements, a wide range of fire management activities could be used to achieve ecosystem sustainability.

While adhering to specific planning and fire management requirements, the Proposed Action also complies with other applicable environmental laws, policies, and executive orders (EOs). These authorities include but are not limited to: Healthy Forests Restoration Act of November, 2003 (HFRA); Clean Air Act of July 14, 1955 (CAA) [69 Stat. 66; 42 USC 1856a, 42 USC 1856]; Clean Water Act of 1987, as amended (CWA) [33 USC 1251]; Wild and Scenic Rivers Act (WSRA) [PL 90-542]; Endangered Species Act of 1973 (ESA) [16 USC 1531]; National Historic Preservation Act of 1966, as amended (NHPA) [16 USC 470]; Archaeological Resource Protection Act (ARPA); and, the Colorado River Basin Salinity Control Act.

The Proposed Action complies with Utah air pollution laws and regulations and is also consistent with Utah Rangeland Health Standards and Guidelines and Native American Trust Resource policies. Planning and resource management considerations incorporated into development of the Proposed Action include those associated with public land orders for a variety of lands and realty actions within the state, and with a variety of EOs. Some of these EOs include EO 11514 (Protection and Enhancement of Environmental Quality), EO 11593 (Protection and Enhancement of the Cultural Environment), EO 11988 (Management of Floodplains), EO 11990 (Management of Riparian and Wetlands), EO 12866 (Regulatory Planning and Review), EO 12898 (Consideration of Environmental Justice Issues), EO 13112 (Management of Invasive Species), and EO 13186 (Management of Migratory Birds). Specific land management and wildland fire management policies are shown in **Appendix B**.

The Proposed Action would be consistent with adjacent federal land agency, State of Utah, and affiliated Native American tribal planning. Decisions made by BLM through the implementation-level planning process could also reduce risks to resources on lands adjacent to BLM lands. For wildland fire use, fire management would be as consistent as possible to the fire management of adjacent lands administered by other federal, state, and Native American tribal authorities. The role of fire to protect resources on adjacent non-BLM-

administered lands is considered in the Proposed Action as criteria for making wildland fire use decisions. Resources managed by other federal, state, and tribal agencies were also taken into consideration during the development of resource protection measures (RPMs) in conjunction with the Proposed Action.

The Proposed Action has been developed in consideration of statewide local government planning considerations and is consistent with the goals and objectives defined within these plans.

1.7 IDENTIFICATION OF ISSUES

The proposed FMP would not conflict with other resource goals and objectives in the existing LUPs. However, the potential for impacts on resources in the planning area raises issues that must be addressed by this EA. **Appendix A** presents the issues that were identified. These issues influenced development of the Proposed Action. Those resources that are either not present within the planning area or would not be affected by the Proposed Action are identified in **Appendix A** and are not included for analysis in this document. This section presents a summary of potentially affected resource issues.

1.7.1 ISSUES IDENTIFIED FOR ANALYSIS

Air Quality

- Impacts from wildfire on Class I or other sensitive airsheds.

Areas of Critical Environmental Concern

- Impacts on the relevance and importance values determined in ACEC identification.

Cultural Resources

- Impacts on innumerable sites of cultural and archaeological value.

Environmental Justice

- Impact on subsistence level wood gathering in Cedar Mesa and Montezuma Creek watershed areas, and on pinyon nut gathering in any pinyon and juniper woodlands in the Monticello Field Office.

Floodplains

- Impacts on floodplain resources on-site and/or downstream from wildland fire suppression activities, mechanical treatments, and/or prescribed burns.

Invasive, Non-Native Species

- Potential for increased infestation/introduction following prescribed and wildland fire.
- Flammability of invasive, non-native species.

Native American Religious Concerns

- Impacts on traditional use of vegetation and cultural or religious sites.

Threatened, Endangered, or Candidate Plant Species

- Impacts on listed/candidate plant species from fire and surface disturbing activities.

Threatened, Endangered, or Candidate Animal Species

- Impacts on listed/candidate animal species and potential/occupied or designated critical habitat.

Water Quality

- Impacts on water quality may result on-site and/or downstream from fire suppression activities, mechanical treatments, and/or prescribed burns, and are tied closely to soils and floodplain impacts.

Riparian-Wetlands Areas

- Impacts on riparian areas from suppression and fuels management actions.

Wild and Scenic Rivers

- Impacts on outstanding remarkable values tentative classification.

Wilderness Study Areas

- Impacts on naturalness, opportunities for solitude, and opportunities for primitive recreation in the wilderness study areas (WSA).

Livestock Grazing

- Impacts on allotment use.

Woodlands and Forestry

- Impacts on availability of forest-related products (including posts, fuel wood collection, Christmas trees, pine nuts, etc).
- Impacts on availability of biomass (ecosystem standpoint).
- Potential for vegetation conversion.

Vegetation, including Special Status Plant Species

- Impacts on plant species, special status species (SSS), and culturally sensitive plants from wildland fire use and surface disturbing activities.

- Potential for vegetation conversion.

Fish and Wildlife, including Special Status Species

- Impacts on fish and wildlife species, including SSS, and potential/occupied habitat.

Soils

- Impacts on soils may result on-site and/or downstream from fire suppression activities, mechanical treatments, and/or prescribed burns and are closely tied to water quality and floodplain impacts.

Recreation

- Impacts on developed recreation sites/facilities.

Visual Resources

- Impacts on visual resources from fire suppression activities and treatment projects. Long-term, positive impacts from fuel reduction treatments.

Paleontology

- Direct impacts from unplanned fire on paleontological resources.

Fire and Fuels Management

- Fire and fuels management considerations form the basis for the Proposed Action. Therefore, fire and fuels management impacts are considered and addressed in full in this EA. The objective of the Moab Fire District FMP is to provide management direction for this resource, in consideration of other resources. As such, there is no separate section in Chapters 3 or 4 for this resource.

Socioeconomics

- Impacts on socioeconomics.

Wild Horses and Burros

- Impacts on herd management areas (HMAs).

Wilderness Characteristics

- Surface-disturbing impacts from fire management activities to the naturalness, opportunity for solitude, primitive recreation, and any supplemental values.

CHAPTER 2. DESCRIPTION OF ALTERNATIVES

2.1 INTRODUCTION

This chapter describes and compares the Proposed Action and No Action Alternative, and alternatives considered but dismissed. The Proposed Action complies with Federal Wildland Fire Management Policy (USDI and USDA 2001a). It emphasizes protection of life and resources through wildland fire and fuels management, and incorporates current scientific principles regarding the benefits of wildland fire in the ecosystem while implementing cost-effective fire management techniques. Management direction is organized within the FMP by 22 land area subdivisions called fire management units (FMUs).

The No Action Alternative represents current fire management direction as outlined in the 1998 Moab Fire District FMP (BLM 1998). Although the 1998 plan prioritizes protection of life and resources, it contains fewer fuels management goals and opportunities for wildland fire to benefit ecosystems. In addition, the 1998 FMP does not comply with current Federal Wildland Fire Management Policy.

Moab Fire District boundaries are identical for both alternatives. The planning area is divided into 22 FMUs in the Proposed Action as compared to 51 polygons in the No Action Alternative. The delineation of polygons in the No Action Alternative focuses on risks, values, and hazards within the Moab Fire District. FMU discussions in the Proposed Action are based on management objectives and constraints, topographic features, access, values to be protected, political boundaries, fuel types, FRCC, and other distinguishing characteristics.

Wildland fire management goals for both alternatives allow for classification of the Moab Fire District into suppression levels for comparative analysis purposes in Chapter 4. The location and magnitude of these suppression levels define where and to what degree wildland fire is appropriate. Greater detail regarding fire management actions and suppression levels is presented in Section 2.2.2.

2.2 PROPOSED ACTION

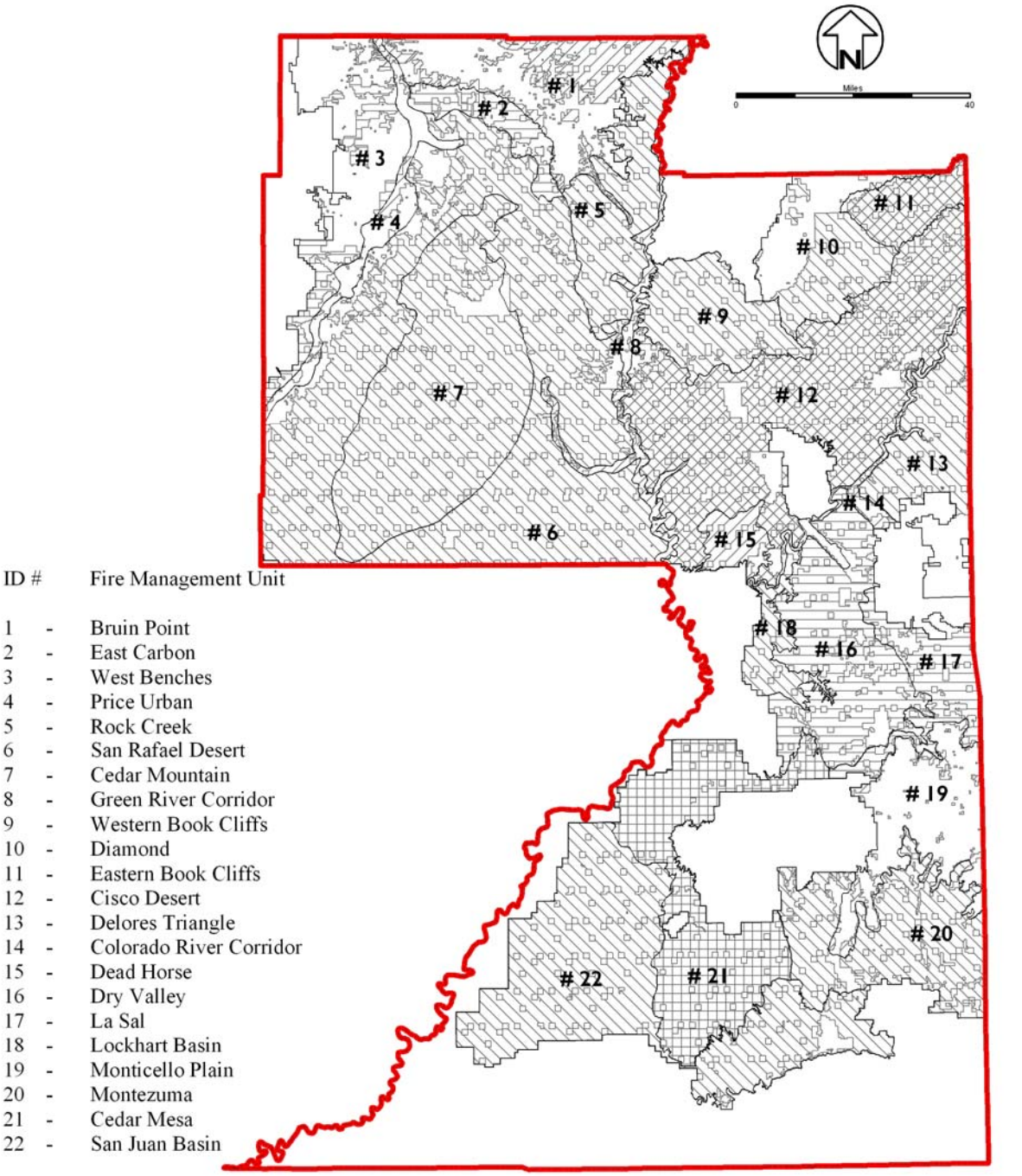
The 22 FMUs that make up the planning area for the Proposed Action are presented in **Figure 2.1**. In order to more clearly compare the Proposed Action with the No Action Alternative, **Figure 2.1** also shows the Moab Fire District separated into fire suppression management categories, as defined above. Overall goals are discussed in Section 2.2.1. Fire management actions are presented in Section 2.2.2, and RMPs are discussed in Section 2.2.3.

2.2.1 OVERALL GOALS

The Proposed Action emphasizes strategic fire management planning that integrates resource management goals, objectives, and concerns with fire management activities. Overall criteria for development of the Proposed Action are:

- Provide for firefighter and public safety.
- Work collaboratively with communities at risk within the WUI to develop plans for risk reduction.
- Allow fire to function in its ecological role, when appropriate for the site and situation, to help protect, maintain, and enhance public resources.
- Create an integrated approach to fire and resource management across landscape and agency boundaries.
- Provide a program that fosters interagency interaction, cooperation, and effectiveness for all fire management activities.

FIGURE 2.1: FIRE MANAGEMENT UNITS WITH FIRE MANAGEMENT OBJECTIVES FOR THE PROPOSED ACTION



ID #		Fire Management Unit
1	-	Bruin Point
2	-	East Carbon
3	-	West Benches
4	-	Price Urban
5	-	Rock Creek
6	-	San Rafael Desert
7	-	Cedar Mountain
8	-	Green River Corridor
9	-	Western Book Cliffs
10	-	Diamond
11	-	Eastern Book Cliffs
12	-	Cisco Desert
13	-	Delores Triangle
14	-	Colorado River Corridor
15	-	Dead Horse
16	-	Dry Valley
17	-	La Sal
18	-	Lockhart Basin
19	-	Monticello Plain
20	-	Montezuma
21	-	Cedar Mesa
22	-	San Juan Basin

CATEGORY:

- Fires would be suppressed at 5 to 100 acres or less
- Fires would be suppressed at 200 to 300 acres or less
- Fires would be suppressed at 500 acres or less
- Fires would be suppressed at 1,000 acres or less
- Fires would be suppressed at 2,000 acres or less

2.2.2 FIRE MANAGEMENT ACTIONS FOR THE PROPOSED ACTION

The four fire management actions considered in the Proposed Action are: 1) wildland fire suppression; 2) wildland fire use; 3) fire fuel treatments; and, 4) non-fire fuel treatments. Wildland fire suppression and wildland fire use are considered "unplanned" actions and do not undergo site-specific NEPA analysis due to unknown location, size, and timing. Prescribed fire and non-fire fuel treatments are "planned" actions and undergo site-specific NEPA review and analysis prior to implementation. **Appendix C** presents fire suppression, fire use, prescribed fire, and non-fire fuel treatments acre goals and objectives for FMUs. The four proposed fire management actions are summarized below.

Wildland Fire Suppression

Fire suppression goals stated in the Proposed Action are designed to protect resource values at risk while allowing wildland fire to function in its ecological role when appropriate for the site and situation. Priorities for a quick suppression response include providing for public and firefighter safety; preventing wildland fires from spreading to private land; protecting cultural resources, riparian areas, or other sensitive resources; and protecting improvements on BLM lands. For any type of response, minimizing cost must be considered.

The suppression objectives outline the acreage-per-fire-event to which wildland fires must be contained in some FMUs. Once the pre-defined decadal burn target from unplanned ignitions for a unit is met, a review of objectives and strategies would be initiated to develop new suppression criteria on all wildland fires within that FMU. Considerations for suppression objectives in FMUs with target acreages are:

- Fire intensity level
- Acreage of public land
- Level of public use
- Proximity to private residences, communities, and private in-holdings
- Wilderness values
- Historic fire regimes
- Unique biological, cultural, historical, archeological or paleontological resources

Appropriate management response (AMR) procedures are required to meet suppression objectives (BLM 2003e). An AMR can include any specific action suitable to meet FMU objectives (BLM 2003e). For the Proposed Action, an AMR may include the following actions:

- *Monitor from a Distance*: Fire situations where inactive fire behavior and low threats require only periodic monitoring.
- *Monitor On-site*: Fire situations that require the physical placement of monitors on the fire site to track the fire's spread, intensity, and/or characteristics.
- *Confinement*: Actions taken when fires are not likely to have resource benefits, but threats from the fire do not require costly deployment of large numbers of suppression resources.
- *Monitor plus Contingency*: Fires are monitored, but contingency actions are prepared to ensure adequate preparation for possible undesirable developments.
- *Monitor plus Mitigation*: Fires are monitored, yet pose real, but not necessarily immediate, threats. These fires are monitored, but plans are developed and implemented to delay, direct, check fire spread, or contain fire, and to ensure public safety.
- *Initial Attack*. Initially, suppress wildland fires to protect people or resource values at risk.

- *Suppress Large Fires*: A combination of tactics such as direct attack, indirect attack, and confinement by natural barriers are utilized to accomplish protection objectives as directed in a wildland fire situation analysis.
- *Control and Extinguish*: Sufficient resources are assigned to achieve control of the fire, generally minimizing acres burned, depending on management objectives.

Following wildland fire suppression, areas may undergo emergency stabilization and/or rehabilitation (ES&R) as appropriate. ES&R activities may include obliteration of firelines, erosion control, and seeding. ES&R treatments would be designed and implemented using an interdisciplinary team (IDT) approach, utilizing resource and fire staff to develop site-specific ES&R plans. Site-specific ES&R plans may be tiered to a normal year fire rehabilitation plan (NFRP).

Wildland Fire Use

Management of naturally ignited wildfires to accomplish specific pre-determined resource management goals would be determined on an occurrence-by-occurrence basis for each FMU where wildland fire use has been identified for potential use. An examination of the current fire situation, determination of probable fire cause, and an estimation of the potential for fire spread would be conducted to determine the possibility of accomplishing resource management objectives. If a fire were determined to be suitable for management as a wildland fire use incident, the ignition would be managed in accordance with the procedures and requirements outlined in the Interagency Strategy for the Implementation of Federal Wildland Fire Management Policy (USDA/USDI 2003) and Wildland Fire Use Implementation Procedures Reference Guide (May, 2005).

Prescribed Fire

The use of prescribed fire would be used to achieve DWFCs. Prescribed fire treatment would be considered for an FMU if it could benefit ecosystems and reduce hazardous fuels. Suitability of specific areas for introduction of prescribed fire would be determined through an interdisciplinary process. NEPA requirements must be followed for site-specific prescribed fire projects.

The prescribed burn season would typically be in the spring or fall. Hand pile burning is generally done in the winter months, but could occur at any time. The fire management staff would initiate prescribed fire projects and burn plans with input from resource specialists. Prescribed burn bosses would be required to evaluate and assess results and effectiveness of the burn. Prescribed fire treatment could be utilized for any of the following purposes:

- WUI area fuels reduction
- Areas with fuel loading that could potentially result in the loss of ecosystem components from wildland fire
- Resource management goals and objectives
- Fuels conversion or maintenance to achieve or maintain a lower FRCC

Non-fire Fuel Treatments

Non-fire fuel treatments (mechanical, chemical, biological, and seeding) may be considered as needed by a site-specific plan. Mechanical treatments include hand thinning, hand piling, brush crunching, mowing, disking, and mechanical mastication such as bullhog thinning. Seeding or chemical maintenance is also often used in conjunction with these types of treatments. While not all FMUs are shown to have specific acreage targets for non-fire fuel treatments at this time, future treatment plans could include non-fire treatment in other FMUs as the fuels treatment program for the Moab Fire District progresses over time. Similar to prescribed

fire, non-fire fuel treatments are considered planned actions and the suitability of treatments for specific areas would be determined through NEPA review prior to implementation.

Non-fire fuel treatments could be used for the same purposes as prescribed fire (see the Prescribed Fire section) and may or may not be used in conjunction with prescribed fire.

2.2.3 RESOURCE PROTECTION MEASURES

The Proposed Action has the potential to adversely impact other resources. To mitigate potential impacts, protective measures have been incorporated into the Proposed Action as presented as **Appendix D**.

2.3 NO ACTION ALTERNATIVE

The current Moab Fire District FMP comprises the No Action Alternative. Fire management direction includes suppression goals and acres, identification of values at risk, and general fuels treatment guidance, including prescribed fire use and acre estimates. **Figure 2.2** illustrates fire management objectives for the No Action Alternative on BLM-administered land.

Although the No Action Alternative has three of the same goals as the Proposed Action—protection of life, protection of resources, and cost efficiency—it does not incorporate use of the latest scientific information, particularly related to DWFC, FRCC, and rehabilitation and stabilization measures, nor does it include resource protection measures. In general, the role of wildland fire in the ecosystem is minimal as managed within the existing FMP.

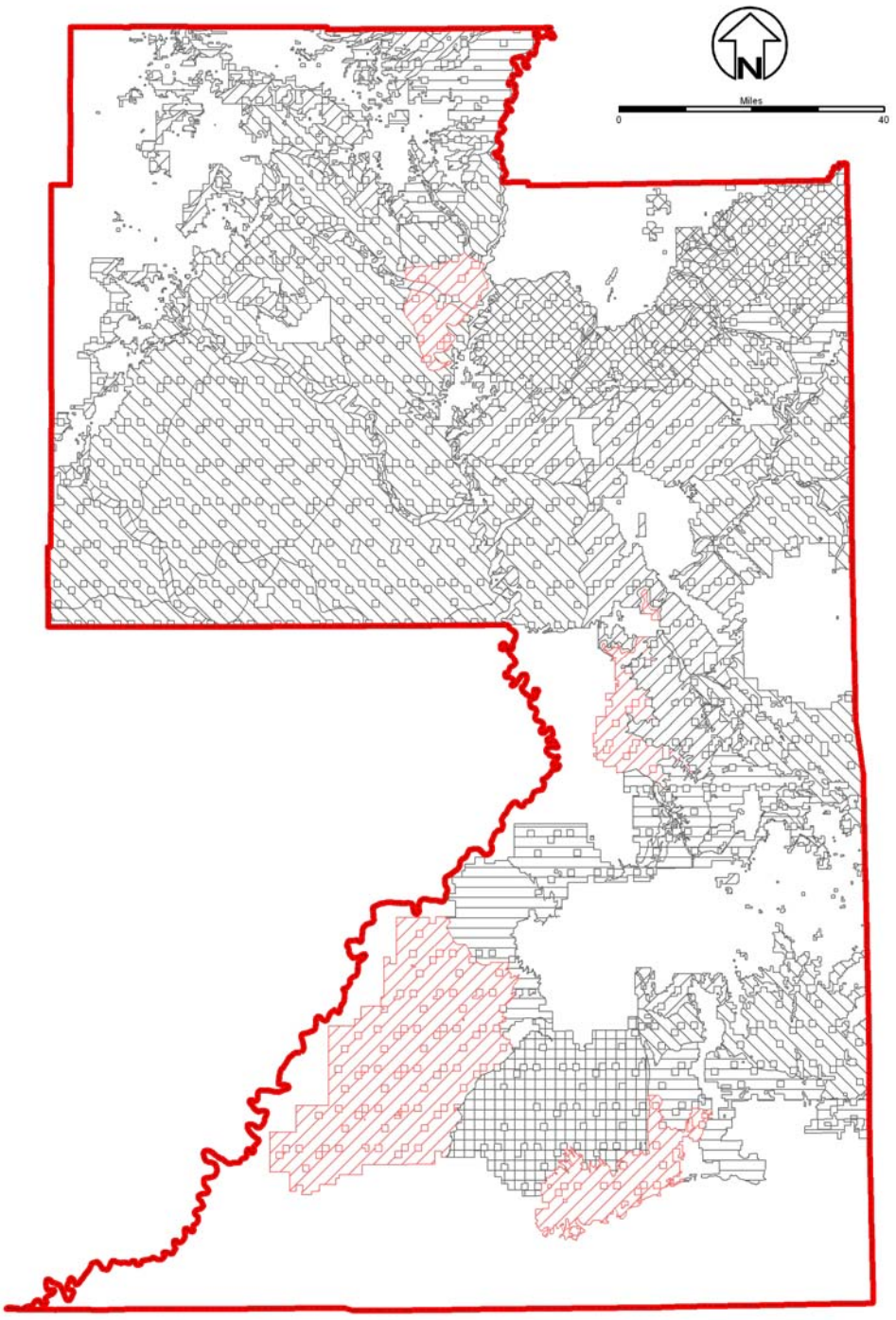
Continuation of the existing direction would be out of compliance with federal and state regulations because the plan does not conform to current guidelines and would have less fire management action alternatives than available under new LUP fire management direction. In addition, the goals and strategies of the No Action Alternative would be inconsistent with those included in other fire management plans in effect throughout Utah.

The goals, objectives, and estimated target acres for fire management direction in the No Action Alternative are summarized in **Table 2.1.** The No Action Alternative uses different management boundary subdivisions, a different format, and with a different organization of content than the Proposed Action, so direct comparisons are impractical. Comparisons can be drawn where area-wide planning elements are common to both alternatives such as the role and applicability of wildland fire, and fire and non-fire fuel treatments.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

Two additional fire management alternatives—the historical fire management alternative and the non-fire treatment alternative—were considered and eliminated from formal analysis because they either did not meet policy guidelines or were not ecologically or fiscally practical. The two dismissed alternatives are described below.

FIGURE 2.2: POLYGONS WITH FIRE MANAGEMENT OBJECTIVES FOR THE NO ACTION ALTERNATIVE



CATEGORY:

- Fires will suppressed at 5 to 100 acres or less
- Fires will be suppressed at 200 acres or less
- Fires will be suppressed at 500 acres or less
- Fires will be suppressed at 1,000 acres or less
- Fires will be suppressed at 2,000 acres or less
- Fires will be suppressed at 5,000 acres or less

TABLE 2.1: COMPARISON OF THE NO ACTION ALTERNATIVE TO THE PROPOSED ACTION

	Proposed Action	No Action Alternative
Goals	▪ Provide for firefighter and public safety. ▪ Work collaboratively with communities at risk within the wildland urban interface to develop plans for risk reduction. ▪ Allow fire to function in its ecological role when appropriate for the site and situation to help protect, maintain, and enhance public resources. ▪ Create an integrated approach to fire and resource management across the landscape and agency boundaries. This approach would be designed to meet the desired outcomes of LUPs and RMPs. ▪ Provide a program that fosters interagency interaction, cooperation, and effectiveness for all fire management activities.	Protection of life, property, and a reduction in fire suppression costs are cited within polygon goals.
Organization of Alternatives	The Proposed Action divides the Moab Fire District into **22** FMUs. FMUs are based on management objectives and constraints, topographic features, access, values to be protected, political boundaries, fuel types, FRCC, and other distinguishing characteristics.	The Moab Fire District is divided into **51** polygons. Polygons are based on types of activities and uses. Units have specific objectives and suppression constraints.
Wildland Fire Suppression	For comparative purposes, the acreage of BLM-administered land with similar wildland fire suppression goals have been combined for the Moab Fire District. The Proposed Action is to contain fires at the acreages listed below (or less) during high burning conditions. The FMP contains additional goals for wildland fires burning in moderate to low intensity conditions. Approximate total FMU acres for each goal or level are also summarized. ▪ Suppress fires at **five to 100** acres or less: **404,322** acres ▪ Suppress fires at **200 or 300** acres or less: **868,532** acres ▪ Suppress fires at **500** acres or less: **641,030** acres ▪ Suppress fires at **1,000** acres or less: **3,720,734** acres ▪ Suppress fires at **2,000** acres or less: **461,076** acres ▪ Suppress fires at **5,000** acres or less: **0** acres	Similar to the Proposed Action, for comparative purposes, the acreage of BLM-administered land with similar wildland fire suppression goals or levels have been combined for the entire Moab Fire District. The No Action Alternative is to contain fires at the acreages listed below (or less) during high burning conditions. The FMP contains additional goals for wildland fires burning in moderate to low intensity conditions. Approximate total FMU acres for each goal or level are summarized in parenthesis: ▪ Suppress fires at **five to 100** acres or less: **1,013,533** acres ▪ Suppress fires at **200 or 300** acres or less: **540,030** acres ▪ Suppress fires at **500** acres or less: **855,120** acres ▪ Suppress fires at **1,000** acres or less: **2,630,283** acres ▪ Suppress fires at **2,000** acres or less: **314,858** acres ▪ Suppress fires at **5,000** acres or less: **735,767** acres

	Proposed Action	No Action Alternative
Wildland Fire Use	**18,000/100,000** (per year/ten year cumulative maximums)	None stated.
Prescribed Fire	Approximately **53,600** acres of fuel treatments using prescribed fire are projected to be accomplished in the fire management plan (FMP) area over the next 10 years. The majority would occur in pinyon and juniper woodland fuel types.	Approximately 174,200 general acres were estimated in areas where prescribed fire **or** non-fire treatment could be beneficial. No specific-acre target goals were identified. Approximately **5,900** acres were actually treated with prescribed fire between 1994 and 2004. Approximately **3,400** acres were actually treated in non-fire treatments between 1994 and 2004.
Non-fire Treatments	Approximately **52,200** acres of fuel treatments using mechanical or chemical methods are projected to be accomplished in the FMP area over the next 10 years.	

2.4.1 HISTORICAL FIRE MANAGEMENT ALTERNATIVE

The historical fire management alternative was considered but eliminated from formal analysis because it would not be ecologically or fiscally feasible. This alternative is considered the Historical Fire Management Alternative as it sets treatment targets that mimic acres burned historically, while considering the restoration of natural fire regime. These acres were determined from simple vegetation and fire return interval analysis. The primary distinctions between this alternative and the Proposed Action are differences in treatment acres and differences in treatment types to achieve DWFC. This alternative would include larger treatment acreages than the Proposed Action, and only prescribed fire treatments and wildland fire use would be utilized.

The premise on which development of this alternative was based is that restoration of natural fire regime is desirable and attainable. This premise is faulty in that, as a result of past management and the extent of anthropogenic ecosystem alteration, natural conditions no longer occur. While it is known that there have been significant vegetation alterations since historical times, the extent or severity of most of these alterations remains uncertain. As a result of ecosystem change, passive restoration techniques (such as the restoration of naturally occurring fire) may not achieve the same ecosystem benefits as in the past.

The BLM manages scattered parcels of land in many areas; allowing fires to burn in these multiple-ownership areas would increase risk to private and state lands. This alternative is unlikely to be adequately funded. Despite increases in fire management funding over the past five years, current and expected budgets for implementing fire management actions do not provide the necessary resources for accomplishing the identified treatment acres.

2.4.2 NON-FIRE TREATMENT ALTERNATIVE

Another alternative considered would have prioritized non-fire fuel treatments above all other types of treatments. However, this alternative did not meet the Purpose and Need and was therefore eliminated from further analysis. Federal wildland fire policy directs that fire be restored as a natural part of the ecosystem.

CHAPTER 3. AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter includes a description of the environment and resources with potential to be affected by the Proposed Action and No Action Alternatives as described in Chapter 2. It provides the environmental resource baseline information for comparing potential impacts from the Proposed Action and No Action Alternative, which are then analyzed in Chapter 4.

Resources that were identified and carried forward for analysis in this planning effort and those that have been dismissed from further analysis are addressed in **Appendix A**. The following resources were determined to have no affect from the Proposed Action and No Action Alternatives: Farmlands (prime or unique), wastes (hazardous or solid), wilderness, rangeland health standards and guidelines, geology, mineral resources, and lands and access. No further analysis of these resources will be included in this EA.

3.2 GENERAL SETTING

The Moab Fire District is located within the Colorado Plateau physiographic province of the western United States. Elevations in the Moab Fire District range from 4,000 to 12,700 feet above mean sea level. Most of the fire district is located between 4,000 to 8,000 feet above sea level.

Climatic zones throughout the region can be classified under three climate types: desert, steppe, and undifferentiated highlands. Each has distinct weather patterns, temperatures and precipitation patterns (Pope and Brough 1996). Elevation, topography, location with respect to storm paths over the region and proximity to mountain ranges help create the varied climate types (Garwood 1996). Precipitation varies from an average of less than 10 inches per year to more than 35 inches per year.

The Moab Fire District is comprised of approximately 6.1 million acres of BLM-administered land. This represents approximately 11 percent of all lands in Utah and 27 percent of all BLM-administered land in Utah.

3.3 CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT AND OTHER RESOURCES BROUGHT FORWARD FOR ANALYSIS

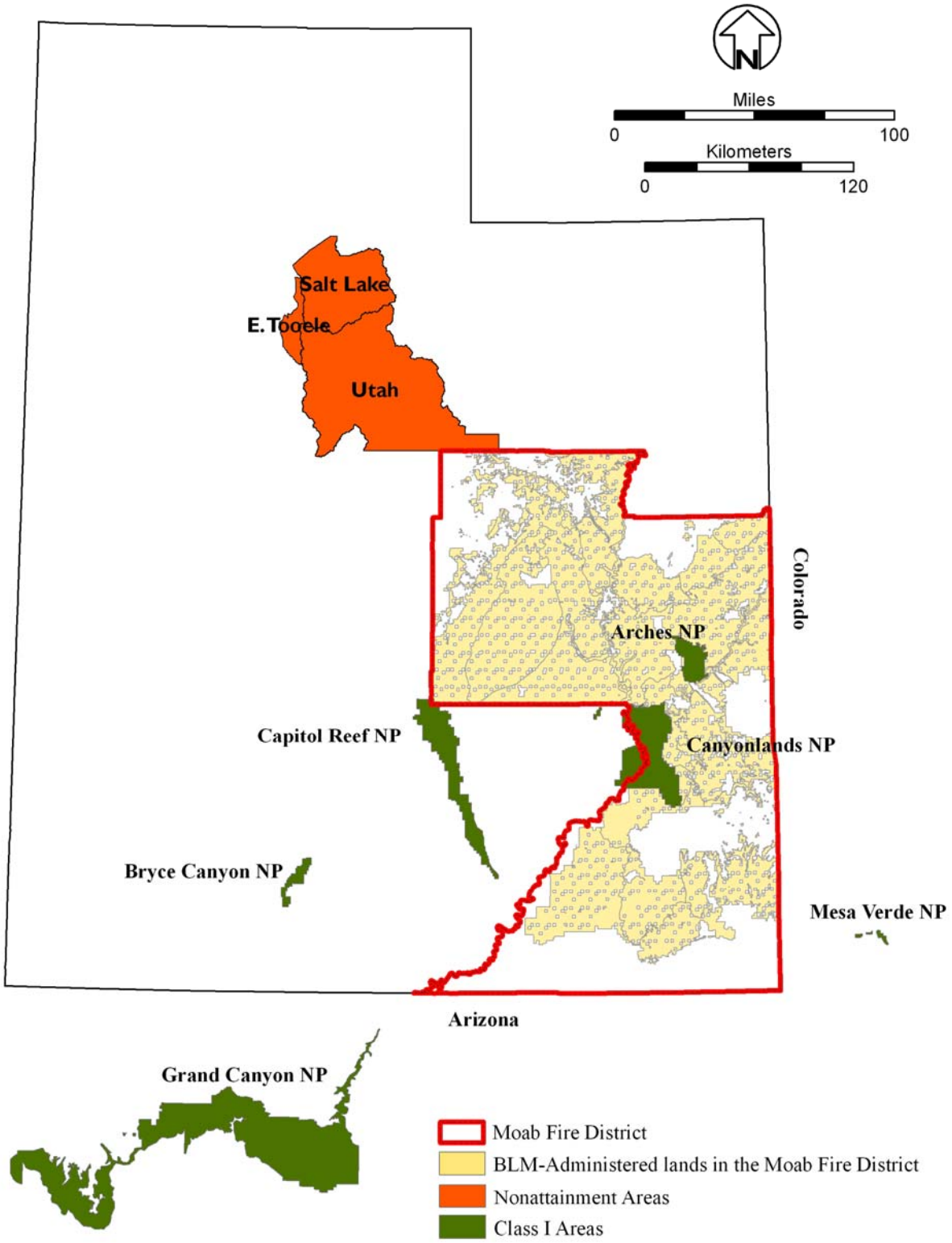
3.3.1 AIR QUALITY

An activity that impacts air quality also has the potential to affect the air quality of the airshed where the activity is conducted and to potentially impact other airsheds. An airshed is defined as a geographic area (usually with distinct topographic features, such as a valley) associated with a given air supply. Four airsheds have been identified within the Moab Fire District (including Utah Airshed 16, which is located at elevations greater than 6500 feet above sea level throughout the state). In many cases, airsheds are shared with adjacent planning areas and states.

In accordance with U.S. Environmental Protection Agency (EPA) air quality permitting system directives (EPA 1992), the area of consideration for air quality impacts includes airsheds over lands within the Moab Fire District as well as lands within a 100-kilometer radius of the fire district (62.1 miles).

Figure 3.1 presents a map of the planning area and identifies areas sensitive to air quality located within the area of consideration.

FIGURE 3.1: NON-ATTAINMENT AND CLASS I AREAS WITHIN 100 KM OF THE MOAB FIRE DISTRICT



Air Quality Standards

Air quality within the Moab Fire District is governed by federal laws administered by Utah under the authority of the EPA. The framework for the Utah air quality program is based on the Clean Air Act (1970). Air quality within Utah is regulated by the Utah Division of Air Quality (UDAQ) within the Utah Department of Environmental Quality (UDEQ). Administrative rules governing air quality can be found in Utah Administrative Code R307, including emissions standards for general burning (R307-202), smoke management (R307-204), and fugitive emissions and fugitive dust (R307-205).

National Ambient Air Quality Standards (NAAQS) are defined in the CAA as levels of pollutants high enough to have detrimental effects on human health and welfare. EPA established NAAQS for six criteria pollutants—carbon monoxide (CO), nitrogen dioxide, ozone, lead, sulfur dioxide (SO_2), and categories of particulate matter; fine particulates with an aerodynamic diameter of 10 micrometers or less (PM_{10}); and fine particulates with an aerodynamic diameter of 2.5 micrometers or less ($PM_{2.5}$). Particulate emissions are the primary NAAQS concern with respect to fire.

When an area exceeds an ambient air quality standard, it may be designated as a non-attainment area (NAA). It is possible for a geographic area to be an attainment area for one criteria pollutant and a NAA for another.

Another provision of the CAA is the prevention of significant deterioration. There are different permissible increments for criteria pollutant emissions for different areas (termed "classes"). Class I areas in the Moab Fire District include National Parks. All other areas of the state have been designated as Class II.

Class I areas are the most protected and have the least allowable degradation of air quality. Regulations address the potential for impacts including visibility, odors, and impacts to flora, fauna, soils, water, and geologic and cultural structures and set forth a national goal for visibility. The 1999 Regional Haze Rule calls for states to establish goals and emission-reduction strategies for improving visibility in all mandatory Class I area national parks.

In cooperation with other federal land managers, states and tribes, EPA issued the Interim Air Quality Policy on Wildland and Prescribed Fires (EPA 1998). One of the goals of the policy is to allow fire to function as a disturbance process on federally managed lands while protecting public health and welfare. The National Wildfire Coordination Group has also published additional guidance for air quality management related to fire in the *Smoke Management Guide for Prescribed and Wildland Fire* (NWCG 2001a).

Smoke emissions resulting from annual prescribed burning projects or treatments within the Moab Fire District are conducted and managed in compliance with guidelines found in the Utah Smoke Management Plan (SMP) and interagency group program. Active group participants include various federal and state agency land managers, as well as the UDAQ. The purpose of this program and the SMP is to ensure that mitigation measures are taken to reduce impacts on public health, safety and visibility from wildland fire, wildland fire use, and prescribed fire. Utah submitted the SMP to the EPA in 1999 and received certification for the plan under the Interim Air Quality Policy on Wildland and Prescribed Fires (Utah Interagency Smoke Management 2000).

Compliance with the Utah SMP is the primary mechanism for land managers to implement wildland fire use and prescribed burns while ensuring compliance with CAA. Burn plans written under this program include actions to minimize fire emissions, exposure reduction procedures, a smoke dispersion evaluation, and an air quality monitoring plan. Proposed burns are reviewed on a daily basis by the program coordinator, and burns are approved or denied based on current climatic and air quality conditions.

Air Quality Class I Areas

There are three mandatory Class I visibility areas completely or partially contained within the Moab Fire District (EPA 2002): Arches National Park, Canyonlands National Park, and Capital Reef National Park. There are also three Class I areas (Bryce Canyon National Park, Grand Canyon National Park, and Mesa Verde National Park) located within the 100-kilometer area of consideration in **Figure 3.1**.

Sensitive Areas

Other areas that have been identified as sensitive to air quality include locations such as NAAs, hospitals, airports, major transportation corridors, mines, and population centers. Five NAAs have been designated within the 100-kilometer radius area of consideration relative to the Moab Fire District and are listed (with their associated NAAQS criteria) below. No NAAs have been designated within the Moab Fire District.

- Salt Lake County (PM_{10})
- Utah County (PM_{10})
- Salt Lake County (SO_2)
- East Tooele County (SO_2)
- Provo/Orem (CO)

All FMUs in the planning area are located within 100 kilometers of one or more NAAs or Class I areas.

Several operational coal mines are located within the Price Field Office. Mine Safety and Health Administration guidelines require fans to be continuously operated to provide constant ventilation to underground mine areas. Mine fans serve a vital role in providing ventilation to prevent methane accumulations and possible explosions and provide a healthy working environment for the miners. Regulations require ventilation conditions that maintain the composition of the air in the pertinent mine workings so that tolerable limits are not exceeded.

Several major transportation corridors run through the planning area and the area of consideration. They include U.S. Interstate 15, U.S. Interstate 70, U.S. Interstate 80, and numerous U.S. highways.

Numerous airports are located throughout the Moab Fire District and surrounding area of consideration. Eight airports registered with the Federal Aviation Administration are located within the Moab Fire District (Blanding, Bluff, Green River, Halls Crossing, Huntington, Moab, Monticello, and Price). There are also several hospitals and medical facilities located in towns with larger populations such as Moab, Monticello, and Price.

3.3.2 AREAS OF CRITICAL ENVIRONMENTAL CONCERN

BLM regulations (43 CFR Part 1610) define an ACEC as an area where "special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources or other natural systems or processes; or to protect life and safety from natural hazards."

Figure 3.2 identifies the ACECs within the planning area. **Table 3.1** lists ACECs totaling approximately 827,884 acres located on BLM-administered lands within the planning area.

FIGURE 3.2:AREAS OF CRITICAL ENVIRONMENTAL CONCERN

TABLE 3.1: AREAS OF CRITICAL ENVIRONMENTAL CONCERN

Areas of Critical Environmental Concern	Approx. Acreage	Areas of Critical Environmental Concern	Approx. Acreage
Alkali Ridge	41,314	Middle San Rafael Canyon	30,629
Big Flat Tops	282	Muddy Creek	25,866
Bowknot Bend	1,087	Muddy Creek Tomsich Butte Emphasis Area	2,923
Bridger Jack Mesa	6,307	Pictographs	43
Butler Wash	17,898	San Rafael Reef North	53,853
Cedar Mesa	296,285	San Rafael Reef South	30,166
Copper Globe	128	Scenic Highway Corridor	79,820
Dark Canyon	61,555	Segers Hole	7,919
Dry Lake Archaeological District	22,258	Shay Canyon	5,489
Hovenweep	1,819	Sid's Mountain	61,380
I-70 Scenic Corridor	45,594	Swasey Cabin	60
Indian Creek	,6438	Temple Mountain Historic District	2,444
Lavender Mesa	649	Upper San Rafael Canyon	13,048
Lower San Rafael Canyon	10,425		313,640
APPROX. TOTAL ACREAGE: 825,679			

3.3.3 CULTURAL RESOURCES

The BLM is required to identify, evaluate, and protect cultural resources on public land under its jurisdiction, and to ensure that BLM-initiated or authorized actions do not inadvertently affect non-federal cultural resources. These requirements are mandated by the Antiquities Act of 1906; the NHPA of 1966, as amended; NEPA of 1969; EO 11593; and FLPMA of 1976. Procedures for compliance with these mandates are outlined in 36 CFR 800, BLM Manual Section 8100, and Utah BLM State Office guidelines.

A "site" as defined in the National Register Bulletin No. 16A is the "location of a significant event, a prehistoric occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archaeological value regardless of any existing structure." This definition also encompasses artifacts, records, and remains related to such properties. In addition, cultural resources include traditional cultural properties and religious use areas that are important to modern Native American tribes. Compliance with Section 304 of the National Historic Preservation Act (NHPA) of 1966, as amended, prohibits disclosure of the description, location, and or land ownership of archaeological remains to the general public.

Cultural resources occur nearly everywhere in the MFD, and include a wide range of prehistoric, historic and traditional cultural/religious sites. LUPs for each individual field office describe types and general distributions of known sites throughout the planning area.

Section 106 of NHPA requires federal agencies to consider the effects of their undertakings on historic properties. Compliance with Section 106 is completed on a project-specific basis before decisions are made to carry out fire management activities. Prior to any potentially ground-disturbing activity, BLM is required to conduct cultural resource inventories for the purpose of identifying and evaluating cultural resource sites that may be affected by the proposed action. BLM cultural resource specialists can then use these evaluations to determine appropriate mitigation for each site.

Ten ACECs within Moab Fire District have been designated entirely or partly to provide management and protection of cultural resources as follows:

- Alkali Ridge (approximately 35,890 acres), prehistoric archaeological
- Cedar Mesa (approximately 323,790 acres), prehistoric archaeological
- Hovenweep (approximately 1,500 acres), archaeological
- Shay Canyon (approximately 1,770 acres), archaeological
- Copper Globe (approximately 128 acres), mining
- Dry Lake Archaeological District (approximately 22,225 acres), prehistoric archaeological
- Muddy Creek (approximately 28,769 acres), historic mining
- Pictographs (approximately 43 acres), prehistoric archaeological
- Swasey Cabin (approximately 60 acres), historic ranching
- Temple Mountain Historic District (approximately 2,444 acres), historic mining

Lands administered by BLM in Moab Fire District currently include National Register of Historic Places (NRHP) listings. These properties are listed in **Table 3.2:**

TABLE 3.2: NATIONAL REGISTER OF HISTORIC PLACES LISTINGS

National Register of Historic Places Properties	
Alkali Ridge	Julien, Denis, Inscription
Desolation Canyon	Old Spanish Trail
Flat Canyon Archeological District	Pinhook Battleground
Black Dragon Canyon Pictographs	Hole-in-the-Rock Trail
Buckhorn Wash Rock Art Sites - 42Em42, 42Em1122	Lathrop Canyon Mine I
Denver and Rio Grande Lime Kiln	Owachomo Bridge Trail (Zeke's Trail)
Rochester-Muddy Creek Petroglyphs Site - 42Em629	

BLM LUPs describe site types and general distribution throughout the individual planning areas. It is important to note that these represent known sites only, given that relatively small portions of the planning areas have been surveyed for cultural resources.

3.3.4 ENVIRONMENTAL JUSTICE

In 1994, EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Population,* was issued.. The purpose of this EO is to avoid the disproportionate placement of adverse environmental, economic, social, or health effects from federal actions and policies on minority and low-income populations. The first step in analyzing this issue is to identify the populations that might be affected by implementation of the Proposed Action or the No Action Alternative. Demographic information on ethnicity, race, and economic status is provided in this section as the baseline against which potential effects can be identified and analyzed.

Minority and Low-Income Populations

For purposes of this section, minority and low-income populations are defined as follows:

- *Minority populations* are people of Hispanic or Latino origin of any race, Blacks or African Americans, American Indians or Alaska Natives, Asians, and Native Hawaiian and other Pacific Islanders.
- *Low-income populations* are people living below the poverty level. In 2000, the poverty-weighted average for a family of four was $17,603 and $8,794 for an unrelated individual (U.S. Census Bureau 2002).

Estimates of these two populations (based on 2000 census data) in **Table 3.3** were developed and compared to census data available for the State of Utah. Environmental justice populations are determined to exist when minority or low-income populations in the region of influence (ROI) exceed the overall minority and low-income populations for the state as a whole by 120 percent.

TABLE 3.3: MINORITY POPULATIONS AND LOW-INCOME POPULATIONS

	Combined Region of Influence Counties[1]	State[1]
Total population	54,180	2,233,169
Percent minority	23.3	13.5
Persons of Hispanic or Latino origin	3,676	200,985
Black or African American persons	115	17,865
American Indian or Alaska Native persons	8,640	29,031
Asian persons	149	37,964
Native Hawaiian or other Pacific Islander	29	15,632
Percent below poverty	18.0	9.4

Notes: [1] U.S. Census, 2001.

In 2000, the ROI contained 54,180 people, of which approximately 23 percent were minorities. Approximately 9,800 (18 percent) were living below the poverty level. An environmental justice population exists in this ROI because of the following factors:

- The percentage of minority populations in the ROI was almost twice that for the State of Utah. Just over one percent of the state population is Native American, compared to 16 percent of the ROI population. The Navajo Nation is located in San Juan County, where over 55 percent of the residents are Native American.
- The percentage of persons living below the poverty level in the ROI is almost twice that of entire State of Utah.

3.3.5 FLOODPLAINS

Floodplains play an important role in basin hydrology and ecosystem health. Floodplain geomorphology exerts influence on stream peak flow lag time (time between peak precipitation and peak runoff) and serves as temporary storage for sediment eroded from the watershed (Ritter et al. 1995). Floodplains are also often associated with riparian-wetlands areas (discussed the Riparian-Wetlands Zones Section).

The recurrence of various flood stages (river elevations) is defined as 10-year, 100-year, and 500-year floods where, for example, a 100-year flood has a one percent statistical chance of occurring in any given year. The National Flood Insurance Program, overseen by Federal Emergency Management Agency (FEMA), has mapped 100-year floodplain areas throughout the country, including areas within the Moab Fire District (FEMA 2005). The U.S. Army Corps of Engineers (USACE) also assessed floodplain areas in Carbon, Emery, Grand, and San Juan Counties (USACE 2003). Floodplains identified in these studies include areas along the Price River and tributaries, Pleasant Valley (Mud) Creek, Pack Creek, Mill Creek, Green River, Colorado River and tributaries, Castle Creek and tributaries, and San Juan River and tributaries.

In 1977, EO 11988 was issued to reduce "adverse impacts associated with the occupancy and modification of floodplains" and "direct or indirect support of floodplain development" associated with federal actions (42 FR 26971, 3 CFR, 1977). Requirements of EO 11988 include reducing the risk of flood loss; minimizing the impact of floods on human safety, health and welfare; and restoring and preserving the natural and beneficial values served by floodplains. The EO also requires consideration of alternatives to avoid adverse effects and incompatible development in floodplains. Federal actions proposed in floodplains areas must conform to EO 11988.

3.3.6 INVASIVE AND NON-NATIVE SPECIES

Invasive and non-native species, sometimes referred to as weeds, are an increasing problem on BLM-administered lands. These plants were introduced either accidentally (such as cheatgrass in contaminated crop seed or livestock forage) or intentionally (such as tamarisk and Russian olive for windbreaks and streambank stabilization). These invasive and non-native species are likely to have spread mainly through cross-country travel (e.g., off-highway vehicle [OHV] use), hiking and camping activities, movement of wildlife and/or livestock, and road construction. They may readily establish in highly disturbed areas (e.g., where the cumulative impacts of fire, grazing, and recreation activities are compounded). The spread of invasive non-native species poses a hazard to vegetation communities on BLM rangelands because they are aggressive, broadly adaptive, and lack the natural predators found in their native habitat. They can also displace native plants as they compete for space, sunlight, water, and nutrients. These native communities provide habitat for wildlife and forage for livestock. Furthermore, some invasive non-natives are poisonous and/or carcinogenic to wildlife, livestock, and people. As such, these invasive non-natives can cause drastic changes in the composition, structure, and productivity of vegetation communities.

Of the many weed species of concern in the Moab Fire District, cheatgrass and tamarisk pose the greatest challenge for fire and fuels management and for ES&R.

Cheatgrass

Introduced from Eurasia in the late 1800s, cheatgrass is an opportunistic winter annual that filled the void left vacant by the reduction of herbaceous vegetation by livestock grazing at the turn of the century (Pellant 2002). It germinates between autumn and spring, when temperatures and soil moisture are suitable. Cheatgrass, as a winter annual, can begin growth in late fall and does not have to wait for temperatures to warm up, utilizing all the available moisture as it actively grows (it may even green up under a blanket of snow). Other reasons for its success are that its seed never goes dormant; it produces a large number of seeds per plant; and because of its long awns, it is fairly resistant to grazing. Cheatgrass may be present in

relatively undisturbed plant communities, but usually becomes dominant on disturbed sites (Fielding and Brusven 2000). Although it does occur, cheatgrass has been less successful in dominating sites that are above 7,000 feet because there is more soil moisture available to native perennial grasses.

The process of shrub loss and conversion to annual grasslands is a key management problem that affects nearly every use of public rangelands. The lack of adequate shrub cover leads to poor-quality wildlife habitat, so annual grasslands have diminished plant and animal diversity. Cheatgrass is also inferior livestock forage.

The criteria for determining when cheatgrass poses an invasive or fire concern are site-specific. Limbach (2004) has offered unofficial guidance of five percent cover as an invasive concern and 15 to 20 percent cover as a fire/fuels concern (both percentages relative to associated understory species). Degraded sites are most susceptible to annual grass invasion after fire. An abundance of cheatgrass in the understory enhances the likelihood of fire spread and conversion of sagebrush steppe or salt desert shrub to annual grassland (Howard 1999). Cheatgrass poses a serious fire hazard, particularly during wet years. Currently, estimates are that cheatgrass dominates approximately 23,000 acres within the Moab Fire District. In spite of restoration efforts, the current trend is cheatgrass expansion due to wildland fire and other disturbance.

Tamarisk and Russian Olive

Tamarisk and Russian olive have become well established or dominant in riparian communities and are slowly replacing native vegetation across much of the Moab Fire District. They out-compete many native species, often forming monotypic stands with low biodiversity. Because of its extensive root system, tamarisk is difficult to eradicate once established. This species invades senescent cottonwood riparian sites that have dried out as a result of infrequent flooding.

3.3.7 NATIVE AMERICAN RELIGIOUS CONCERNS

The Utah BLM is in the process of consulting with 23 tribal groups who have expressed an interest in places of traditional religious or cultural importance located on all or part of BLM lands within the State of Utah. This consultation is being carried out to provide an opportunity for tribes to identify places of traditional religious or cultural importance relevant to the proposed FMP. Many Native American belief systems require that the identity and location of traditional religious and cultural properties not be divulged. BLM has a commitment to keep specific information regarding such resources confidential to the fullest extent allowed by law.

Within the context of National Historic Preservation Act (NHPA), a traditional cultural property (TCP) is a property that may be eligible for inclusion on the National Register of Historic Places due to its association with the cultural practices or beliefs of a living community. It should be noted that eligibility is also dependent upon these practices or beliefs having been passed down through the generations and that they are important in maintaining the cultural identity and integrity of that group. Native American TCPs frequently have religious significance, and they are not usually recognizable to an outsider through archeological or historical investigations. The existence and locations of TCPs may often only be identified through consultation with members of the groups who ascribe value to those places. Hunting or gathering plants for food or medicinal use may be a value ascribed to these locations.

3.3.8 SPECIAL STATUS SPECIES

For this analysis, special status plant and animal species have been broken out into two parts: ESA-related species and BLM sensitive species.

ESA-related species include those listed as endangered, threatened, and proposed under the ESA of 1973, as amended, some of which have designated or proposed critical habitat, as well as candidate and petitioned

species. Threatened, endangered, and proposed species are under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS). Candidate and petitioned species are not under the jurisdiction of the USFWS; however, because they are given recognition as candidates or species petitioned for federal listing, they are discussed under the ESA-related heading.

ESA-Related Species

Seven endangered, four threatened, three candidate (two of which have been petitioned for listing), and two petitioned-only species are known to occur on or adjacent to the planning area. These 16 federally listed species can be grouped as follows: three plants, six birds, three mammals, and four fishes. These species are listed in **Appendix E**, along with their scientific name, federal status, associated vegetation community/habitat type, and field office(s) having jurisdiction over potentially suitable habitat.

Five of the 16 federally protected species (one bird and four fish species) have designated critical habitat on BLM-administered lands in Utah. One bird species has proposed critical habitat, although this proposed designation is found in southern Washington County, outside of the Moab Fire District. These designations and this proposal are presented in **Table 3.4**.

It should be noted that the California condor, although considered to have no known occupied habitat in the Moab Fire District, have historical habitat in the area and are found within neighboring Utah counties. An experimental, non-essential population [ESA, Section 10(j)] of the condor has been established with a designated 10(j) use area reaching into two counties within the Moab Fire District.

TABLE 3.4: FEDERALLY LISTED SPECIES AND THEIR CRITICAL HABITAT

Species	Critical Habitat	General Location
Southwestern willow flycatcher	Proposed	Southern Washington County
Mexican spotted owl	Designated	Southern and eastern Utah in nine counties
Humpback chub	Designated	Eastern Utah in seven counties
Bonytail	Designated	Eastern Utah
Colorado pikeminnow	Designated	Eastern Utah in seven counties
Razorback sucker	Designated	Eastern Utah

BLM Sensitive Species

Twenty-three wildlife species of concern, 25 sensitive plant species, and four conservation agreement species are known to occur on or adjacent to the Moab Fire District. These 52 BLM sensitive species can be grouped as follows: 25 flowering plants, nine birds, eight mammals, three fish, two invertebrates, one amphibian, and four reptiles. These species are listed in **Appendix G** along with their scientific name, federal status, associated vegetation community/habitat type, and field office(s) having jurisdiction over potentially suitable habitat.

Species Habitat

Habitats associated with each SSS, and their distribution, are widely variable. Some species are found throughout the planning area, while others are endemic to a single location. The Utah Gap Analysis Program (GAP) was used to identify cover types pertaining to this project. Utah GAP provides an indicator of vegetation coverage and habitat types at the large scale, but is not particularly accurate on the ground for

site-specific projects. Consequently, it is possible that the expanse (acres or boundary) of a cover type could be inaccurate, and that cover types, and species associated with these cover types, may not actually be present at the project-specific level.

Cover types identified include salt desert shrub, pinyon and juniper woodland, sagebrush, grassland, blackbrush, mountain shrub, mixed conifer, ponderosa pine, wetland-riparian, and miscellaneous. The remaining vegetation types within the Moab Fire District include blackbrush, ponderosa pine, creosote/bursage, and aspen. The blackbrush and creosote/bursage cover types have similar dominant species and, therefore, provide similar habitat for the species discussed in this section. Consequently, for the purposes of this and the Fish and Wildlife section 3.3.16, the blackbrush and creosote/bursage cover types have been condensed into one general wildlife habitat type hereafter referred to as blackbrush. Because it is not comprised of burnable vegetation, the water cover type was not previously listed. However, because water is a valuable habitat, and has the potential to be impacted by the proposed project, it is included in this section, and Fisheries and Wildlife Section, as a habitat type.

The following is a list of SSS generally associated with each of the 11 vegetation communities/habitat types found within the Moab Fire District. It should be noted that special status plant species are not necessarily associated with vegetation community types, but are more closely associated with substrate type. Therefore, plant species listed in the vegetation community associations below do not infer an actual association, but rather indicate the vegetation community surrounding each plant species.

Salt Desert Shrub

- *ESA-Related:* Jones cycladenia, Uinta Basin hookless cactus, Graham's beardtongue, White River beardtongue, California condor.
- *BLM Sensitive:* Chatterley's onion, Cronquist milk-vetch, Peabody's milk-vetch, Cisco milk-vetch, Creutzfeldt-flower, bluff buckwheat, Cataract gilia, Canyonlands lomatium, entrada rushpink, Shultz blazing star, Trotter oreoxis, Tuhy's breadroot, alcove rock daisy, bluff phacelia, Jones indigo-bush, Jones' globemallow, psoralea globemallow, spotted bat, fringed myotis, kit fox, common chuckwalla.

Pinyon and Juniper Woodland

- *ESA-Related:* Jones cycladenia, Uinta Basin hookless cactus, Graham's beardtongue, California condor, Mexican spotted owl.
- *BLM Sensitive:* Chatterley's onion, Peabody's milk-vetch, basalt milk-vetch, pinnate spring parsley, Canyonlands lomatium, Dolores rushpink, entrada rushpink, Book Cliffs blazing star, Trotter oreoxis, Tuhy's breadroot, psoralea globemallow, Cedar Mountain flame-flower, Lewis' woodpecker, fringed myotis, Eureka mountainsnail.

Sagebrush

- *ESA-Related:* Uinta Basin hookless cactus, California condor, bald eagle, Mexican spotted owl, Gunnison sage grouse, black-footed ferret, white-tailed prairie dog, Gunnison prairie dog.
- *BLM Sensitive:* Ferruginous hawk, greater sage grouse, Eureka mountainsnail, smooth greensnake.

Grassland

- *ESA-Related:* Graham's beardtongue, black-footed ferret, white-tailed prairie dog, Gunnison prairie dog.
- *BLM Sensitive:* Jones indigo-bush, short-eared owl, burrowing owl, ferruginous hawk, silky pocket mouse, Mexican vole, Eureka mountainsnail.

Blackbrush

- *ESA-Related:* None.
- *BLM Sensitive:* Cronquist milk-vetch, hole-in-the-rock prairieclover, Dolores rushpink, desert night lizard.

Mountain Shrub

- *ESA-Related:* None.
- *BLM Sensitive:* Chatterley's onion, pinnate spring parsley, Lewis's woodpecker, Townsend's big-eared bat, spotted bat, Allen's big-eared bat, big free-tailed bat, Eureka mountainsnail, Yavapai mountainsnail.

Mixed Conifer

- *ESA-Related:* Bald eagle.
- *BLM Sensitive:* Northern goshawk, Lewis's woodpecker, three-toed woodpecker, Townsend's big-eared bat, spotted bat, Allen's big-eared bat, fringed myotis, big free-tailed bat, Eureka mountainsnail, Yavapai mountainsnail.

Ponderosa Pine

- *ESA-Related:* Uinta Basin hookless cactus.
- *BLM Sensitive:* Chatterley's onion, basalt milk-vetch, pinnate spring parsley, Kachina daisy, Cedar Mountain flame-flower, Lewis's woodpecker, spotted bat, Allen's big-eared bat.

Riparian-Wetlands Areas

- *ESA-Related:* Southwestern willow flycatcher, bald eagle, Mexican spotted owl, western yellow-billed cuckoo.
- *BLM Sensitive:* Kachina daisy, Alcove bog-orchid, northern goshawk, bobolink, Lewis's woodpecker, American white pelican, Arizona toad, cornsnake, smooth greensnake.

Aspen

- *ESA-Related:* None.
- *BLM Sensitive:* Kachina daisy, three-toed woodpecker, Eureka mountainsnail, Yavapai mountainsnail.

Water

- *ESA-Related:* Humpback chub, bonytail, Colorado pikeminnow, razorback sucker.
- *BLM Sensitive:* Roundtail chub, bluehead sucker, flannelmouth sucker.

3.3.9 WATER QUALITY

Surface Water

Watersheds, aquifers, rivers and stream are ecologically dynamic interfaces of atmosphere, soils, and water. Healthy watersheds capture precipitation and runoff, store water in the soil (or bedrock) profile, and release it slowly back into the landscape surface waters. Most of the water supply to these watersheds comes from snowmelt during the spring and early summer months and precipitation from high-intensity convective storms throughout the spring, summer and fall. There are also many ephemeral drainages throughout the watershed that flow periodically during the year.

The major watershed management units identified in the planning area are the Colorado River Southeast and portions of Colorado River West and Uinta Basin (UDEQ 2005a). Major river and watershed systems located in the planning area include the Price, San Rafael, Colorado, Green, Dirty Devil, and San Juan Rivers.

Surface water within the planning area is used for domestic, recreational, aesthetic, agricultural, stock-watering, and industrial purposes. They also are habitat for aquatic and water-oriented wildlife and fish.

Federal Water Pollution Control Act of 1972 and CWA of 1977 and subsequent amendments/revisions are the predominant federal legislations that direct management of water quality on BLM-administered lands. CWA mandates restoration and/or maintenance of the chemical, physical, and biological integrity of our nation's waters, while Section 303 primarily dictates further compliance to state and local water quality standards. BLM must also comply with UDEQ water quality standards.

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

Nineteen streams or river segments and one reservoir (Recapture Reservoir) have been identified by UDEQ Division of Water Quality within the Moab Fire District as 303(d)-listed waterbodies (UDEQ 2004), totaling approximately 539 miles of streams or rivers. **Figure 3.3** presents locations of 303(d)-listed waters identified within the planning area. TMDLs have been completed for 303(d)-listed sections of Price River, San Rafael River, Muddy Creek, Castle Creek, South Cottonwood Wash, Mill Creek, Ken's Lake, Onion Creek, and Scofield Reservoir (UDEQ 2005b). The design of vegetative buffer strips along stream floodplains, drainages, and washes during fire planning provide natural filters to reduce sediment and ash contribution into waterways, further reducing potential water quality impacts.

Groundwater

Primary recharge areas generally occur along mountain fronts where basin-fill materials erode from mountain bedrock (Baskin et al. 2002). Groundwater accumulates in these areas and flows down-gradient. Further away from the mountain fronts, groundwater discharge areas occur where groundwater collects (e.g., to form playas) or flows to surface waterbodies.

Groundwater recharge areas could be particularly vulnerable to surface sources of pollution because groundwater movement is typically pulled downward by gravity and primary recharge areas may not have protective, fine-grained layers (such as typically found in basin valleys) that serve to filter out the pollutants. In addition, groundwater could be sensitive to total dissolved solids in aquifer media (soil or bedrock) types.

Groundwater is part of the developed water supply for numerous municipalities in the Moab Fire District, as well as supplying private water wells used for drinking water and irrigation. The location of water wells and underground water diversion rights can be obtained from the Utah Division of Water Rights at http://www.waterrights.utah.gov.

3.3.10 RIPARIAN-WETLANDS AREAS

A riparian area is generally defined as the area alongside perennial or ephemeral stream that is influenced by the presence of shallow groundwater. USACE (Federal Register 1982) and EPA (Federal Register 1980) jointly define wetlands as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and which, under normal circumstance do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. BLM Manual 1737 (BLM 1992), *Riparian-*

wetlands Areas Management, includes marshes, shallow swamps, lakeshores, bogs, muskegs, wet meadows, estuaries, and riparian areas as wetlands.

Riparian and aquatic areas comprise only a small portion of the lands managed by the BLM; however, their ecological significance is far greater than their limited physical scope as these systems form some of the most dynamic and ecologically rich portions of the landscape (Elmore and Beschta 1987).

Riparian-wetlands areas play a significant role in restoring and maintaining the chemical, physical, and biological integrity of the nation's water. Wildlife use in riparian-wetlands areas is disproportionately more than any other type of habitat. In addition, riparian-wetlands areas are highly prized for their economic values and other uses such as livestock production and recreation (BLM 1994).

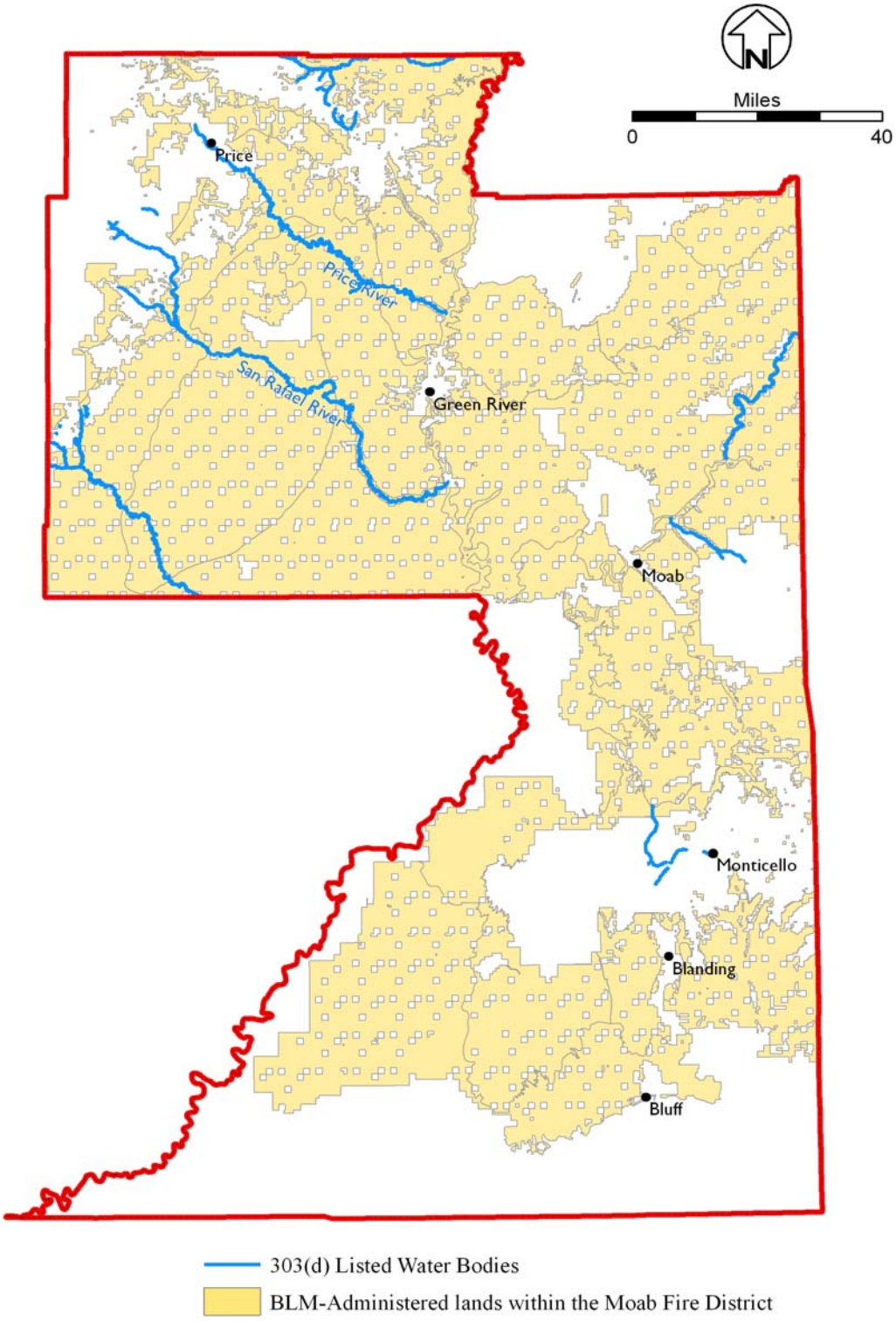
Under natural conditions, riparian and aquatic ecosystems have a high degree of structural complexity, reflective of past disturbances such as floods, fire, ice floes, wind storms, grazing, disease and insect outbreaks (Gregory et al. 1991).

Humans have altered stream aquatic and riparian environments by direct modification including channelization, wood removal, diversion, dam building, and irrigation de-watering; and, through indirect impacts such as timber harvest, ski areas, mining, grazing, and road building. These activities have altered channels by changing the rate at which sediment, water, and wood enter and move through streams. Anthropogenic activities have also affected the incidence, frequency and magnitude of the natural disturbance events described above (McIntosh et al. 1991; Wissmar et al. 1994).

Invasive species such as tamarisk, tall whitetop, Russian knapweed, and Russian olive have become well established in riparian communities and are slowly replacing the native vegetation across much of Utah. The increase in tamarisk/Russian olive within this community type has altered the intensity and size of unplanned fires due to increased understory fuel loads that provide ladder fuels to the large cottonwood trees. The vigorous post-fire re-sprouting ability of these invasive species gives them a long-term ecological edge over cottonwoods.

Riparian areas are also included in the discussion found in the Vegetation Section (Section 3.3.15).

FIGURE 3.3: 303(D)-LISTED STREAMS



3.3.11 WILD AND SCENIC RIVERS

The Wild and Scenic Rivers Act (16 USC 1271-1287) established a National Wild and Scenic Rivers System and prescribed methods and standards through which additional rivers may be identified and added to the system. The purpose of the National Wild and Scenic Rivers System is to preserve the free-flowing state of rivers that have outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values. The WSRA established a method for providing federal protection for certain of our country's remaining free-flowing rivers, preserving them and their immediate environments for the use and enjoyment of present and future generations (NPS and USDA 1982). It also established requirements affecting management decisions to ensure protection of both the eligible river, or river segment, and the lands immediately surrounding them.

To be eligible, a river or river segment must be free-flowing and possess at least one outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historical, cultural, or other similar value. Eligible segments are classified as wild, scenic, or recreational based on established criteria, including existing water quality, the amount of development along the river corridor, and accessibility. No rivers in Utah are included in the National Wild and Scenic Rivers System. However, Section 5(d)(1) of the WSRA directs federal agencies to consider potential Wild and Scenic Rivers in their land and water planning processes. The WSRA provides that rivers be administered in such a way as to protect and enhance the values that made it eligible for the national system, but not to limit other uses that do not substantially interfere with public use and enjoyment of these values (Interagency Wild and Scenic Rivers Coordinating Council 2004).

Inventories in the Moab, Monticello, and Price Field Offices have identified Wild and Scenic River segments in **Figure 3.4** and **Table 3.5** as eligible for designation. Protective management is in place until the eligible river or river segment is determined, during the study phase, to be suitable or unsuitable. Similarly, suitable segments are managed to protect the free flow, outstandingly remarkable values, and recommended classification until Congressional action regarding designation is taken.

FIGURE 3.4: ELIGIBLE WILD AND SCENIC RIVERS

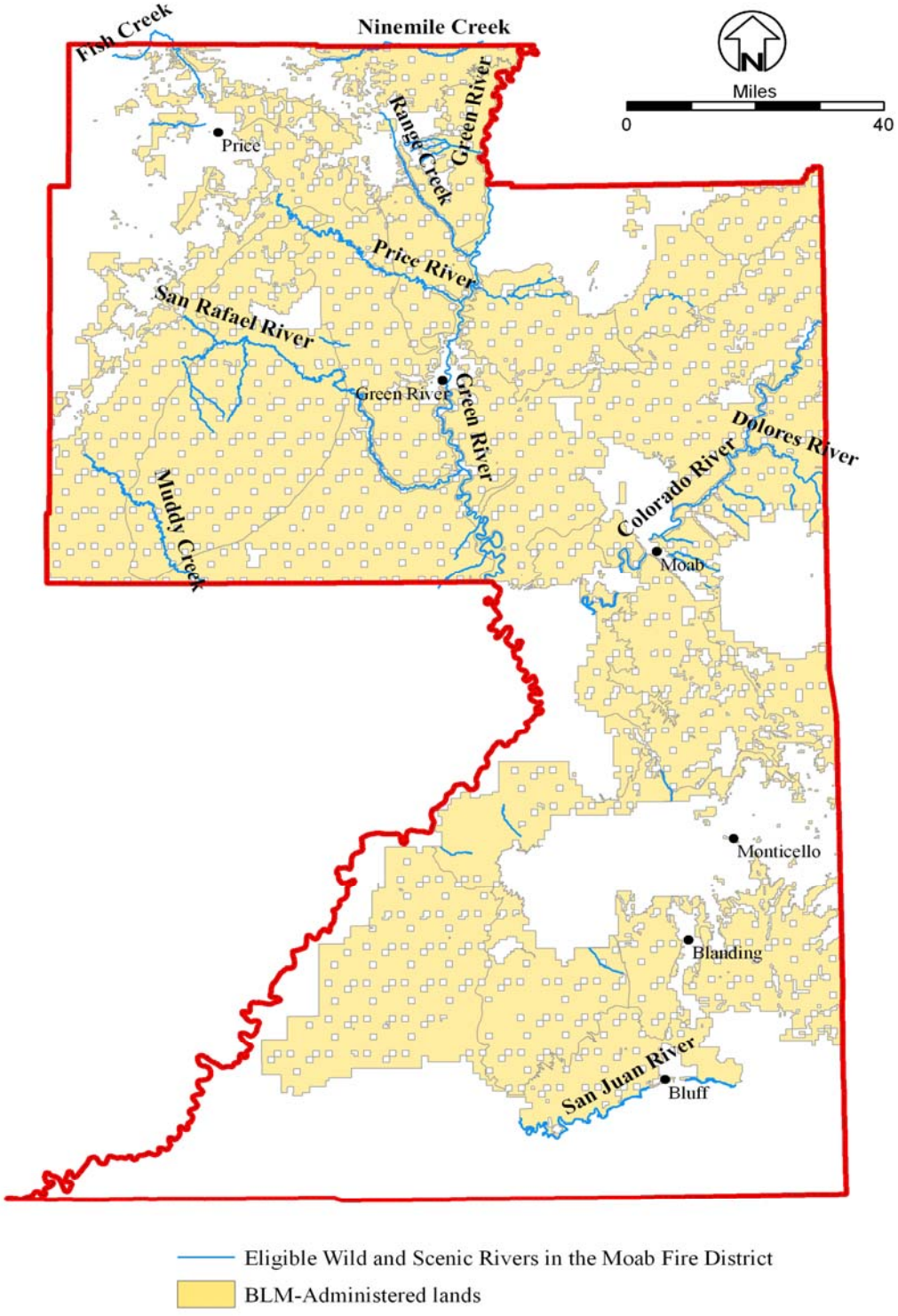


TABLE 3.5: ELIGIBLE WILD AND SCENIC RIVER SEGMENTS

Segment Name	Segment Description	Outstandingly Remarkable Value(s)	Tentative Classification
Price Field Office			
Barrier Creek	Canyonlands National Park (NP) boundary to mouth at Green River	Scenic, recreation, cultural, ecologic	Wild
Bear Canyon Creek	Headwaters to mouth at Rock Creek	Fish	Wild
Buckskin Canyon Creek	Headwaters to mouth at Rock Creek	Fish	Wild
Cane Wash	Head of wash to mouth at San Rafael River	Cultural, scenic, recreation	Scenic
Coal Wash	Confluence of north and south forks of Coal Wash to mouth at North Salt Wash	Recreation, scenic, cultural, historic	Recreational
Cottonwood Wash	Head of wash to county road at T. 20 S., R. 13 E., Sec. 14	Scenic, cultural	Wild
Fish Creek	Scofield Reservoir to confluence with White River	Fish	Scenic
Gordon Creek	Confluence of Bob Wright and Mud Water Canyons to mouth at Price	Cultural, historic	Scenic
Green River*	1. County line near Nine Mile Creek to Chandler Canyon	1. Scenic, recreation, wildlife, historic, cultural, fish, geologic, ecologic	1. Wild
	2. Chandler Creek to Florence Creek	2. Scenic, recreation, wildlife, historic, cultural, fish, geologic, ecologic	2. Scenic
	3. Florence Creek to Nefertiti boat ramp	3. Scenic, recreation, wildlife, historic, cultural, fish, geologic, ecologic	3. Wild
	4. Nefertiti boat ramp to Swasey's boat ramp	4. Scenic, recreation, wildlife, historic, cultural, fish, geologic, ecologic	4. Recreational
	5. Swasey's boat ramp to I-70 bridge	5. Scenic, recreation, wildlife, historic, cultural, fish, geologic, ecologic	5. Recreational
	6. I-70 bridge to mile 91 below Ruby Ranch	6. Scenic, recreation, historic, cultural, fish, paleontologic	6. Scenic
	7. Mile 91 below Ruby Ranch to Hey Joe Canyon	7. Scenic, recreation, historic, cultural, fish	7. Wild
	8. Hey Joe Canyon to Canyonlands NP boundary	8. Scenic, recreation, historic, cultural, fish	8. Scenic
Keg Spring Canyon	Head of canyon to mouth at Green River	Scenic, cultural, recreation	Wild
Muddy Creek	1. I-70 to Lone Tree Crossing	1. Scenic, recreation, geologic, historic, cultural	1. Wild
	2. Lone Tree Crossing to South Salt Wash	2. Scenic, recreation, geologic, historic, cultural	2. Scenic
	3. South Salt Wash to county road below San Rafael and North Caineville	3. Scenic, recreation, geologic, historic, cultural	3. Wild
Nine Mile Creek	1. Minnie Maude Creek to Bulls Canyon	Historic, cultural, scenic	Recreational
	2. Bulls Canyon to mouth at Green River	Historic, cultural, scenic	Wild

Segment Name	Segment Description	Outstandingly Remarkable Value(s)	Tentative Classification
North Fork Coal Wash	1. Head of wash to Fix It Pass route 2. Fix It Pass route to confluence with South Fork Coal Wash	1. Recreation, scenic, cultural, historic 2. Recreation, scenic, cultural, historic	1. Wild 2. Recreational
North Salt Wash	Confluence with Horn Silver Gulch to mouth at San Rafael River	Scenic, wildlife, recreation, cultural	Wild
Price River	1. Confluence of Fish Creek and White River to Poplar Street bridge in Helper 2. Mounds Bridge Book Cliffs escarpment 3. Book Cliffs escarpment to mouth at Green River	1. Fish, recreation 2. Cultural, historic 3. Scenic, cultural, geologic, wildlife, fish, recreation	1. Recreational 2. Scenic 3. Wild
Range Creek	1. Headwaters to Trail Canyon 2. Trail Canyon to drill holes at T. 17 S,. R. 16 E., Sec. 27 3. Drill holes at T. 17 S., R. 16 E., Sec. 27 to mouth at Green River	1. Cultural, scenic, historic, wildlife 2. Cultural, scenic, historic, wildlife 3. Cultural, scenic, historic, wildlife	1. Wild 2. Recreational 3. Wild
Rock Creek	North Fork headwaters to mouth at Green River	Scenic, recreation, cultural, historic, fish	Wild
San Rafael River	1. Confluence of Ferron and Cottonwood Creeks to Fuller Bottom 2. Fuller Bottom to Johansen corral 3. Johansen corral to Lockhart Wash	1. Cultural, scenic, recreation, geologic, historic, fish, wildlife, ecologic 2. Cultural, scenic, recreation, geologic, historic, fish, wildlife, ecologic 3. Cultural, scenic, recreation, geologic, historic, fish, wildlife, ecologic	1. Scenic 2. Wild 3. Scenic
San Rafael River (continued)	1. Lockhart Wash to Tidwell Bottom 2. Tidwell Bottom to mouth at Green River	1. Cultural, scenic, recreation, geologic, historic, fish, wildlife, ecologic 2. Cultural, scenic, recreation, geologic, historic, fish, wildlife, ecologic	1. Wild 2. Scenic
South Fork Coal Wash	1. Head of wash to Eva Conover route 2. Eva Conover route to confluence with North Fork Coal Wash	1. Recreation, scenic, cultural, historic 2. Recreation, scenic, cultural, historic	1. Wild 2. Wild
Monticello Field Office			
Colorado River	State lands near River Mile (RM) 44 to Canyonlands NP near RM 31 (13 miles)	Fish, recreation, wildlife, cultural, ecological	Wild
White Canyon	Forest boundary to Glen Canyon National Recreation Area (NRA). Passes through Natural Bridges NM (30 miles)	Scenic, recreation	Scenic
Indian Creek	Forest boundary to Donnelly Canyon (5 miles)	Cultural	Recreational
Fable Valley	Source to mouth (11 miles)	Wildlife	Wild
Dark Canyon	Forest boundary to Glen Canyon NRA (13 miles)	Scenic, recreation, wildlife	Wild

Segment Name	Segment Description	Outstandingly Remarkable Value(s)	Tentative Classification
San Juan River	1. W. Montezuma Creek to RM 9 (24 miles) 2. RM 9 to RM 23 above Mexican Hat formation (14 miles) 3. RM 23 to RM 28 (5 miles) 4. RM 28 to Glen Canyon NRA RM 45 (17 miles)	1. Fish, recreation, wildlife, historic, cultural 2. Scenic, fish, recreation, geology, wildlife 3. Scenic, fish, recreation, wildlife 4. Scenic, fish, recreation, geologic, wildlife	1. Recreational 2. Wild 3. Recreational 4. Wild
Grand Gulch	Gulch and tributaries inside Instant Study Area (52 miles)	Scenic, recreation, wildlife, historic, cultural	Wild
Slickhorn	Source to Glen Canyon NRA (8 miles)	Scenic, recreation, wildlife, cultural	Wild
Lime Creek-East & West Forks	Sources east and west forks to confluence with main stream to mouth (31 miles)	Recreation, cultural	Scenic
Comb Wash	Source to mouth (24 miles)	Cultural	Recreational
Mule Canyon	North and south forks to east of County Road 263 and State Highway 95 (10 miles)	Recreation, cultural	Recreational
Arch Canyon	Forest boundary to mouth (8 miles)	Fish, recreation, wildlife, cultural, ecological	Recreational
Fish, Owl, McLeod Creeks	Source to mouths (30 miles)	Scenic, recreation, wildlife, cultural	Wild
Moab Field Office			
Colorado River	1. Colorado/Utah Stateline to Westwater Canyon (1 mile) 2. Westwater Canyon, Mile 125, to RM 112 (11.8 miles) 3. RM 112 to confluence with the Dolores River (11.2 miles) 4. Confluence with the Dolores River to mile 49 near Potash (32.6 miles) 5. RM 44.5 to Mile 38.5 State land boundary (6.1 miles) 6. RM 37.5 State land to Mile 34 Canyonlands NP (3.8 miles)	1. Scenery, recreation, wildlife, fish, cultural, ecological 2. Scenery, recreation, wildlife, fish, cultural, geology, ecological 3. Recreation, wildlife, fish, cultural, ecological 4. Scenery, recreation, wildlife, fish, cultural, geology, ecological 5. Scenery, recreation, wildlife, fish, cultural, ecological 6. Scenery, recreation, wildlife, fish, cultural, ecological	1. Scenic 2. Wild 3. Scenic 4. Recreational 5. Scenic 6.Wild
Cottonwood Canyon	Source near Cottonwood Point to private land boundary, including first 0.5 mile of Horse Canyon (10.4 miles)	Scenery, wildlife, ecological	Scenic
Salt Wash	Arches NP boundary to the Colorado River (.33 miles)	Scenery, recreation, wildlife, fish, geology	Wild
Onion Creek	1. Source to Onion Creek road (3.5 miles) 2. Beginning of Onion Creek road to Colorado River (9 miles)	1. Scenery, geology, ecological 2. Scenery, geology	1. Wild 2. Recreational
Professor Creek (Mary Jane Canyon)	U.S. Forest Service and State line boundary to diversion near private land (7.4 miles)	Scenery, recreation	Wild
Negro Bill Canyon	1. From state land to below rim to ¼ mile from Colorado River (7.2 miles) 2. Last 0.25 mile to Colorado River (0.25 mile)	1. Scenery, recreation, ecological 2. Scenery, recreation, ecological	1. Wild 2.Recreational

Segment Name	Segment Description	Outstandingly Remarkable Value(s)	Tentative Classification
Mill Creek (Upper) (Middle)	1. Forest boundary to private property below the diversion (1.4 miles) 2. T.26 S. R. 23 E., Sec. 19 to Power Dam (4.6 miles)	1. Scenery, recreation, fish, cultural, ecological 2. Scenery, recreation, fish, cultural, ecological	1. Recreational 2. Scenic
North Fork Mill Creek	1. Forest boundary near Wilson Mesa to Mill Creek (11.2 miles)	1. Scenery, recreation, cultural, ecological	1. Wild
Rattlesnake Canyon	Source to Green River (including Flat Nose George Tributary) (31.6 miles)	Scenery, wildlife, geology, ecological	Wild
Dolores River	1. Colorado-Utah Stateline to Fisher Creek (5.9 miles) 2. Fisher Creek to Bridge Canyon (6.2 miles) 3. Bridge Canyon to Colorado River (9.9 miles)	1. Scenery, recreation, wildlife, fish, geology, ecological 2. Scenery, recreation, wildlife, fish, geology, ecological 3. Recreation, wildlife, fish, geology, ecological	1. Scenic 2. Wild 3. Scenic
Beaver Creek	1. Forest boundary to 1 mile from Dolores River (6.7 miles) 2. One mile to Dolores River (1 mile)	1. Scenery, recreation, fish, ecological 2. Scenery, recreation, geology	1. Wild 2. Scenic
Thompson Canyon	1. Source of Thompson to Fisher Creek (Cottonwood Canyon) (5.5 miles)	1. Scenery, ecological	1. Wild
Green River	1. Coal Creek to Nefertiti Boat Ramp (6 TRM*) 2. Nefertiti Boat Ramp to Swasey's Boat Ramp (8 TRM*) 3. Swasey's Boat Ramp to I-70 bridge (13 TRM*) 4. I-70 Bridge to river mile 91 below Ruby Ranch (28 TRM*) 5. Mile 91 below Ruby Ranch to Hey Joe Canyon (15 TRM*) 6. Hey Joe Canyon to Canyonlands NP boundary (29 TRM*)	1. Scenery, recreation, wildlife, fish, cultural/historic, geology, ecology 2. Scenery, recreation, wildlife, fish, cultural/historic, geology, ecology 3. Scenery, recreation, wildlife, fish, cultural/historic, geology, ecology 4. Scenery, recreation, fish, cultural/historic, paleontology 5. Scenery, recreation, fish, cultural/historic 6. Scenery, recreation, fish, cultural/historic	1. Wild 2. Recreational 3. Recreational 4. Scenic 5. Wild 6. Scenic

3.3.12 WILDERNESS STUDY AREAS

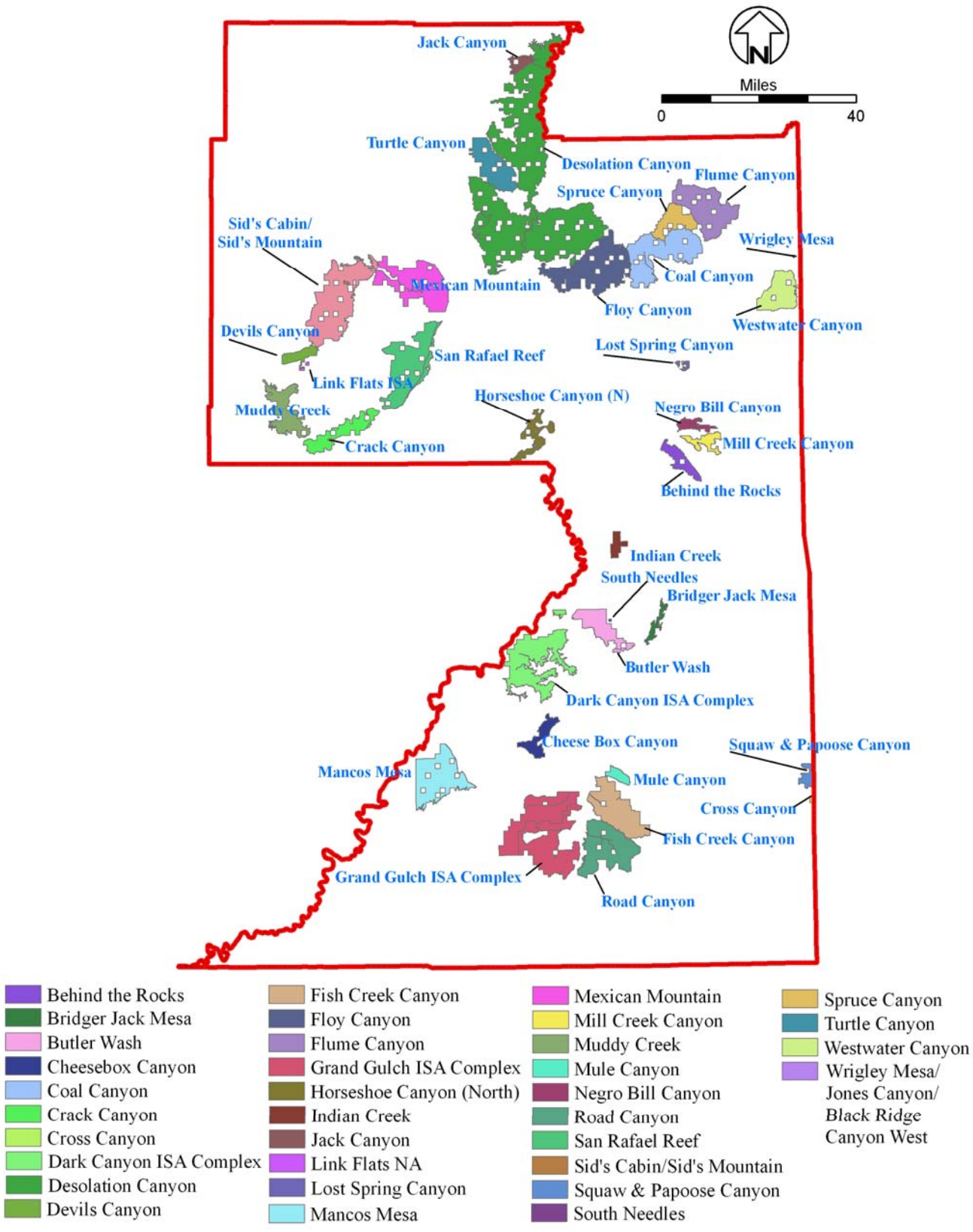
The Wilderness Act of 1964 (16 U.S.C. 1131-1136, 78 Stat. 890) established the National Wilderness Preservation System and established guidelines for the designation and management of wilderness. Wilderness, as defined in the Wilderness Act, is an area where, in contrast with those areas where man and his works dominate the landscape, the earth and its community of life are untrammeled by man, and where man himself is a visitor who does not remain. An area of wilderness is further defined to mean an area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which; (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; (4) and may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value. In October of 2000, Colorado legislation created the 75,550 acre Black Ridge Canyons Wilderness area on the Uncompahgre Plateau. A portion of this wilderness area falls within Grand County, Utah, and is managed by the Moab Field Office under Public Law 106-353, which outlines specific management constraints for the wilderness area.

A Wilderness Study Area (WSA) is an administrative designation designed to allow areas to be studied and considered by Congress for possible designation as wilderness. WSAs are managed to prevent impairment of their suitability for congressional designation as wilderness. By policy, management of WSAs is generally less restrictive than management of wilderness areas, but activities that would impair wilderness suitability are prohibited. Section 603 of the FLPMA requires the BLM to protect the wilderness character of each WSA until Congress makes its decision, regardless of its recommendation. There are approximately one million acres that have been designated for WSAs within the planning area. These areas are identified in **Figure 3.5**. **Table 3.6** lists and identifies the size of each of the WSAs.

TABLE 3.6: WILDERNESS STUDY AREAS ON BLM-ADMINISTERED LANDS

Wilderness Study Area	Approx. Acreage	Wilderness Study Area	Approx. Acreage
Behind The Rocks	12,635	Link Flats NA (Unit was originally a Natural Area)	912
Bridger Jack Mesa	5,290	Lost Spring Canyon	3,880
Butler Wash	24,190	Mancos Mesa	51,440
Cheesebox Canyon	15,410	Mexican Mountain	59,600
Coal Canyon	61,430	Mill Creek Canyon	9,780
Crack Canyon	25,335	Muddy Creek	31,400
Cross Canyon	949	Mule Canyon	5,990
Dark Canyon Instant Study Area (ISA) Complex	68,030	Negro Bill Canyon	7,620
Desolation Canyon	290,845	Road Canyon	52,420
Devils Canyon	9,610	San Rafael Reef	59,170
Fish Creek Canyon	46,440	Sid's Mountain/Sid's Cabin (202)	80,970
Floy Canyon	72,605	South Needles	160
Flume Canyon	50,800	Spruce Canyon	20,350
Grand Gulch ISA Complex	105,520	Squaw and Papoose Canyon	6,678
Horseshoe Canyon (North)	20,500	Turtle Canyon	33,690
Indian Creek	6,870	Westwater Canyon	31,160
Jack Canyon	7,500	Wrigley Mesa/Jones Canyon/Black Ridge Canyon West	5,200
TOTAL: 1,284,379			

FIGURE 3.5: WILDERNESS STUDY AREAS



3.3.13 LIVESTOCK GRAZING

Allotments

Livestock grazing is permitted on approximately 98 percent (6,042,413 acres) of BLM-administered lands in the Moab Fire District. For administrative purposes, the Moab Fire District is divided into 532 allotments. **Figure 3.6** presents the location of livestock grazing allotments in the Moab Fire District.

Grazing allotments are geographically unique and can range in size from over 600,000 acres to small isolated parcels of less than one acre. The unique size of each allotment can directly affect how that allotment is managed. Allotments with large blocks of contiguous BLM land are minimally impacted by surrounding private land. The isolated tracts are often a small component of a larger private land holding. Administrative access to these small tracts of public land sometimes exists only because of the grazing permit or lease. Allotments may be joined with private, state, other federal lands or a combination thereof, in addition to BLM-administered lands. Allotments may be permitted to one (individual allotment) or more (common allotment) operators. More than one permit may be issued to a particular individual or company. Grazing use by livestock is measured in terms of animal unit months (AUMs). One AUM is equal to the amount of forage used to support one cow and calf for one month (approximately 800 pounds of forage). Grazing permits convey no right, title, or interest in the public lands and their resources. Grazing allotments typically contain improvements constructed by the permittee or by BLM. These improvements include water troughs, guzzlers, rainwater catch basins, and other water storage structures; fences, corrals, and other similar structures necessary for the successful use of the allotment; and land treatments such as seedings.

Grazing Systems

Seasons of use vary on each allotment throughout the Moab Fire District from a few-week season to a year-long season. Each allotment may have a number of pastures that are grazed in a rotation system. A deferred rotation grazing system rotates livestock use (e.g., livestock start and end in different pastures each year) through several pastures. A rest rotation grazing system includes a full year or more of rest for one or more pastures within the allotment. Each grazing system may include periodic rest depending upon the specific management concerns and needs for that allotment. The season of use for each allotment is described in the operator's grazing permit. Season-long use entails grazing one pasture from spring or early summer to late summer or fall. Some movement of livestock use may occur within the pasture (e.g., from canyon to canyon). Deferred rotation is a technique that uses the entire allotment by rotating pasture use (e.g., livestock start in a different pasture each year). Rest-rotation of pastures is a technique that involves grazing during certain periods and resting during other periods, with some pastures rested for the entire grazing season.

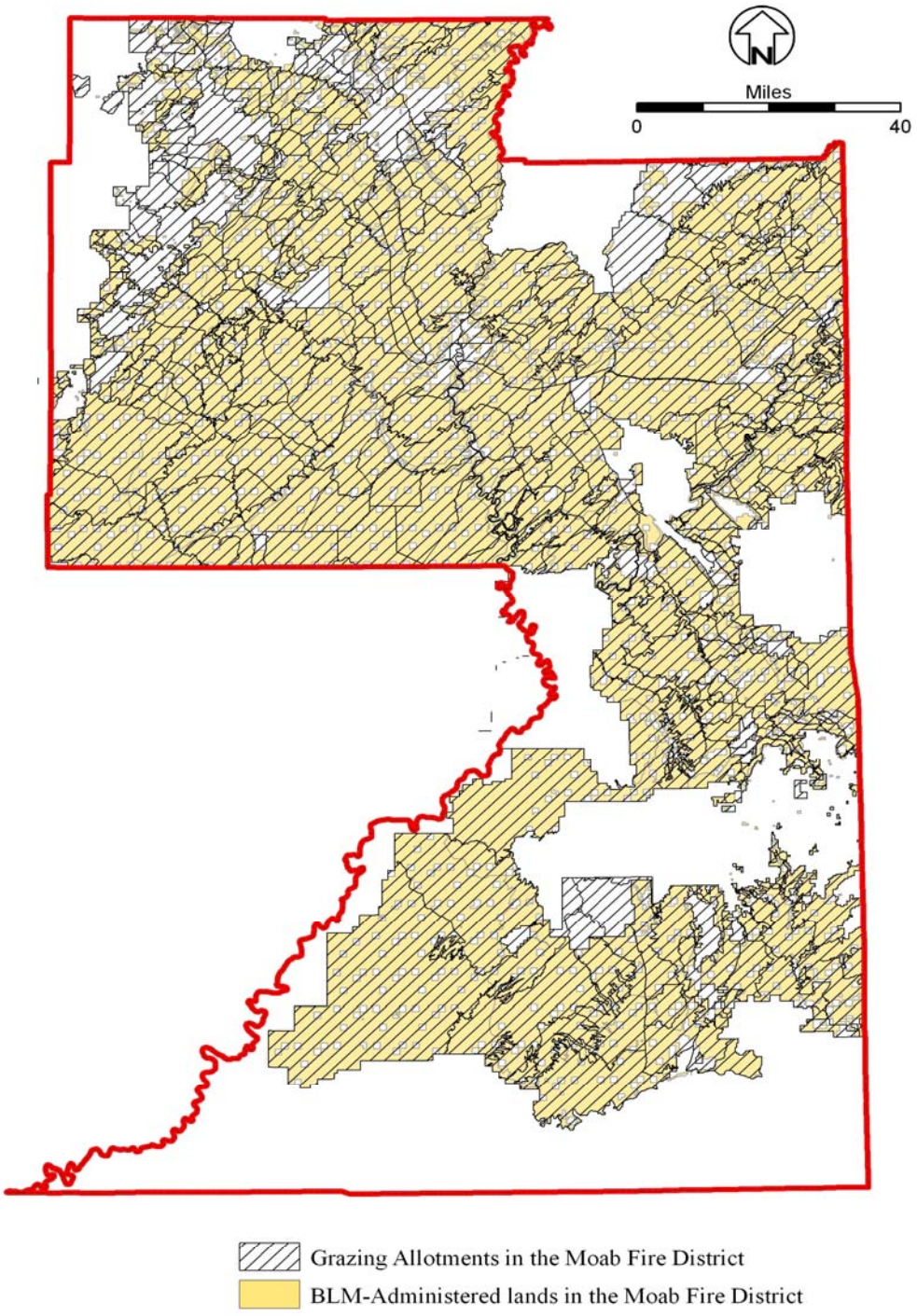
Grazing systems are designed based on the requirements of key forage species in the allotment, the resources of concern on the allotment, and the needs of the livestock producer and their livestock. These periods of use are referred to as "treatments" and are rotated so that no pasture receives the same use every year.

Rangeland Health Standards

In 1997, Standards for Rangeland Health of BLM land in Utah were approved by the Secretary of the Interior and adopted as decisions in all BLM land use plans. The Standards relate to all uses of public land and describe natural resource conditions that are needed to sustain public land health (CFR 43 Subpart 4180, Utah BLM IM-97-73). Assessments are periodically conducted on parcels of public land to determine where conditions are meeting established BLM Standards related to soil, watershed, riparian/wetlands, floodplains, vegetative and wildlife species diversity, and water quality resources. Specific guidelines for livestock and recreation management have been developed within Utah which identify management actions or best

management practices to help implement the Standards. Assessments could indicate that changes in management may be needed to meet appropriate standards or other multiple use objectives.

FIGURE 3.6: LIVESTOCK GRAZING ALLOTMENTS



3.3.14 WOODLANDS AND FORESTRY

Most existing wood product use is for firewood, Christmas tree, pine nut gathering, and fence posts with a minor component of lumber and associated products. **Table 3.7** shows the occurrence of woodland/forest types (corresponding to the compressed Utah GAP classes used in Section 3.3.15, Vegetation) acreages for the planning area, and primary uses of the woodlands and forests.

As shown in **Table 3.7**, the predominant category in the Moab Fire District is the pinyon and juniper woodland. This is the most extensive woodlands vegetative type in Utah, exceeding in acreage all other woodlands/forests combined (Lanner 1984). On lower edges of this woodland zone, Utah juniper is frequently the only tree species. Pinyon pine occurs throughout the planning area. Efforts have been made to encourage non-commercial thinning of pinyon and juniper woodland for firewood. The mixed conifer is comprised of fir, pine and spruce species.

TABLE 3.7: WOODLANDS AND FOREST TYPES, ACREAGES, AND PRIMARY USES

Type	Approx. Acreage	Uses
Pinyon and Juniper Woodland	2,172,411	Firewood, specialty lumber, pine nuts, biomass
Mixed Conifer/Aspen Forest	112,144	Mixed conifer used for firewood, Christmas trees, pulp, lumber, log home construction, and fence posts. Aspen used for packing material (dunnage), pallets, erosion blanket, swamp cooler filters, matches, specialty lumber, fuel, fence posts, and pulp.

3.3.15 VEGETATION

Fire Regime Condition Class

Vegetative species response (and recovery) to the presence or non-presence of a disturbance (fire) over time is referred to as succession. The stages of vegetation types or communities required to reach this recovery are referred to as seral stages, with the end result referred to as climax. This recovery is predictable over time. For example, a proper functioning ecosystem consisting of grassland, sagebrush, pinyon, and juniper may require approximately 35 years in its historical, natural fire regime until another disturbance (fire) pushes it back to another earlier seral (grass) stage. The presence of non-natives (and loss of native species) can affect the climax community of succession. A good example is the non-native, cheatgrass, which is a species that did not evolve with the natural fire regime and may perpetuate through time and appear as climax. This altered (shortened) fire return interval can be as little as five years in some cases and may allow the species to dramatically expand its range and coverage after fires. Cheatgrass communities may facilitate expansion of other invasive species that further displace native species. Invasive species may have lower biological resource values than natives and may pose increased fire hazards by adding to the fuel load.

FRCC is an interagency, standardized tool for determining the degree of departure from historical vegetation and disturbance regimes. Assessing FRCC can help guide management objectives and set priorities for treatments. FRCC was assigned through review of vegetation types identified by Utah GAP (Edwards et al. 1998) and elevation ranges. The resulting acreages for the combined vegetation types found on the Moab Fire istrict are shown on **Table 3.8**.

TABLE 3.8: APPROXIMATE CURRENT FIRE REGIME CONDITION CLASS FOR BLM LANDS IN THE MOAB FIRE DISTRICT

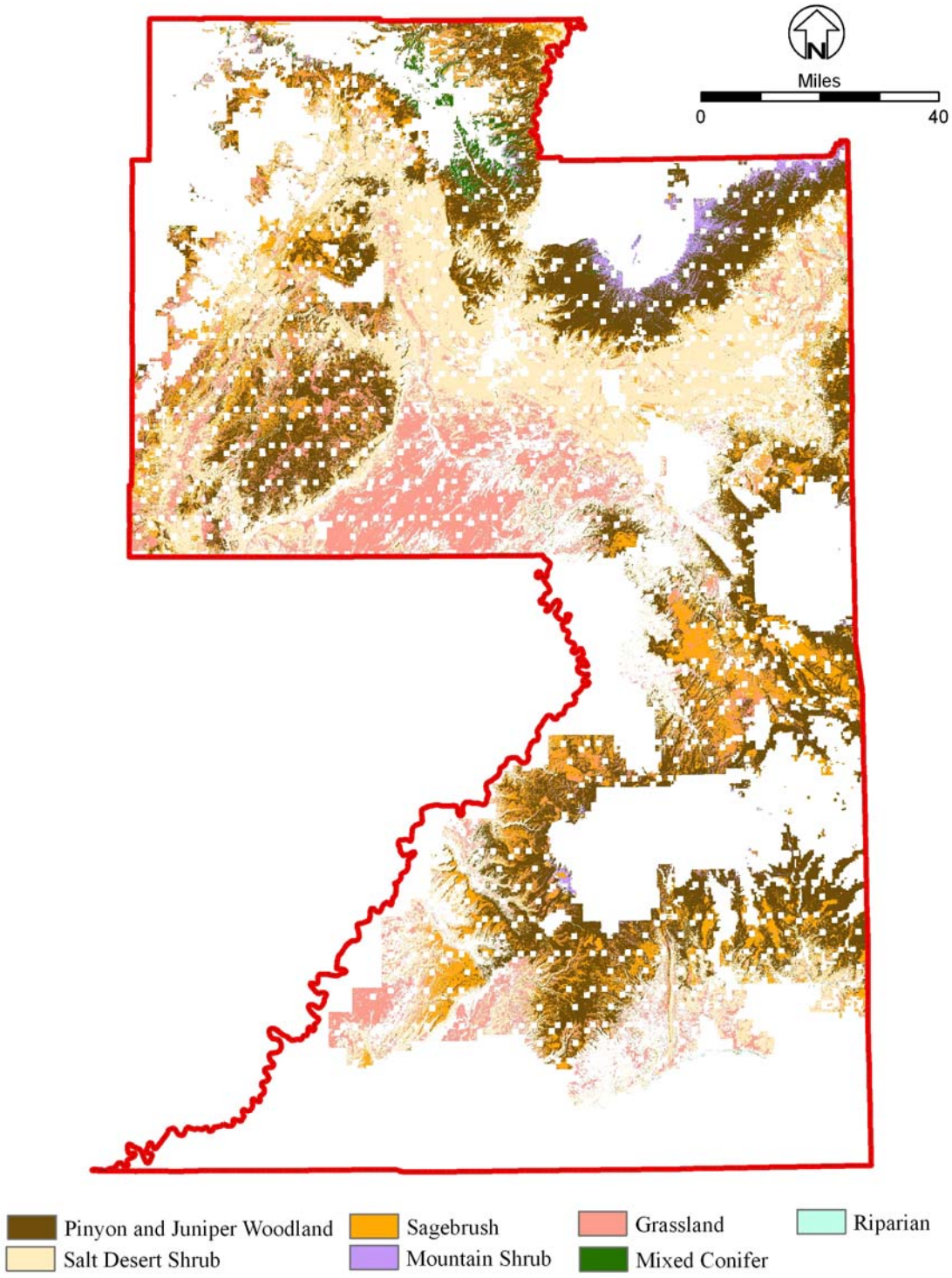
Fire Regime Condition Class	Description	Approx. Acreage
1	Within the natural (historical) range of variability of vegetation characteristics; fuels composition; fire frequency, severity and pattern; and other associated disturbances.	35,411 **<1 %**
2	Moderate departure from the natural (historical) range of variability of vegetation characteristics; fuels composition; fire frequency, severity and pattern; and other associated disturbances.	1,052,552 **18 %**
3	High departure from the natural (historical) range of variability of vegetation characteristics; fuels composition; fire frequency, severity and pattern; and other associated disturbances.	4,825,822 **82%**

For the purposes of the Proposed Action, vegetation in the Moab Fire District is grouped into seven "vegetation types" with similar fire ecology. **Table 3.9** indicates vegetation type, acreage and the percentage of the planning area they cover. Locations of the types on BLM-administered land within the Moab Fire District are shown on **Figure 3.7**.

TABLE 3.9: VEGETATION TYPE ACRES

Vegetation Type	Approx. Acreage	Percent (BLM and Other Ownership)	Fire Regime	Fire Regime Condition Class
Pinyon and Juniper Woodland	2,172,411	37	II or V(old growth)	2 (4%) and 3 (96%)
Salt Desert Shrub	1,747,319	30	V	2 and 3
Sagebrush	1,087,305	18	II	3
Mountain Shrub	622,904	11	I, II and IV	2 (3%) and 3 (97%)
Grassland	114,441	2	II	3
Mixed Conifer	112,144	2	III and IV	1 (17%), 2 (24%) 3 (59%)
Riparian	57,261	1	IV	3

FIGURE 3.7: VEGETATION TYPES ON BLM-ADMINISTERED LANDS



Pinyon and Juniper Woodlands

Trees that are less than 33 feet in height characterize this vegetation type. They can comprise an open or closed woodland. The overstory includes Colorado pinyon pine and Utah juniper as a common associate. In open woodlands, the understory typically consists of shrub species such as big sagebrush and native bunchgrasses including bluebunch wheatgrass. Closed woodlands (greater than 60 percent canopy cover) are dominated by the same overstory species; however, due to competition for sunlight, water and nutrients, the understory is drastically reduced.

On lower edges of the woodland zone, Utah juniper is frequently the only tree species; a mixture of pinyon and juniper will occur in the middle elevations. Pinyon with little or no juniper is typical in the upper elevations. Elevation varies from 5,000 to 8,000 feet between the lower elevation, more xeric, cool desert shrub community that is dominated by sagebrush, and the higher elevation, more mesic, mountain brush community (Welsh et al. 1993).

Utah juniper is more xeric than pinyon, and they often serve as nurse trees for pinyon in well-developed forests. Junipers are considered climax species for a number of pinyon and juniper woodlands, sagebrush, and shrub steppe habitats. Because Utah juniper is the more xeric of the two, often serving as nurse trees for pinyon in well-developed forests. sagebrush improves soil fertility, a microclimate can be created under sagebrush that favors establishment of young juniper trees. In some situations, an increase in sagebrush cover following livestock grazing has created a more favorable environment for juniper establishment (Knight 1994). Consequently, Utah juniper increases with grazing and has spread from thin substrates along ridges and mountain slopes to deeper valley soils. Areas where juniper encroachment has occurred have also been invaded by cheatgrass in the understory, which raises concerns of further cheatgrass expansion following fire.

The pinyon and juniper in the planning area is in FRCC 2 and 3 due to cheatgrass invasion, historically uncharacteristic dense stands, and lack of native species in the understory.

Salt Desert Shrub

This vegetation type is perhaps the most arid vegetation type in the Intermountain West (Wood and Brotherson 1986). Salt desert shrub occurs in valleys at the lowest elevation. This vegetation type grows in areas characterized by accumulations of salt in poorly developed soils. Associated vegetation includes salt-tolerant, succulent shrubs like greasewood, ephedra, shadscale, four-wing saltbush, and threadleaf rubber rabbitbrush. Common grasses include inland saltgrass, alkali sacaton, bottlebrush squirreltail, and Indian ricegrass. Forbs are numerous but seldom are any one species abundant. Biological crusts are usually present and cover most of the interspaces between shrubs in intact, native species-dominated salt desert shrub types. Salt desert shrub generally has low productivity, naturally sparse understory vegetation, and light fuels.

In the past 40 years, large expanses of salt desert shrub have been overtaken by invasive annual grasslands. Currently, cheatgrass has invaded all of the salt desert type found on the Moab Fire District and approximately 82 percent of this vegetation type now provides sufficient fuel loading to support large, fast-moving fires. Where cheatgrass has invaded, native salt desert shrub communities have been permanently lost or are at high risk of loss. Due to the risk of losing key ecosystem components and greatly increased fire regimes as invasive annual grasses dominate, salt desert shrub is typically classified as FRCC 2 or FRCC 3, depending on the relative departure from its historic fire regime (**Table 3.9**).

Sagebrush

Unlike the salt desert shrub type, which grows as mixed stands in poor soils, big sagebrush grows in non-saline well-drained valleys and on slopes, and mostly forms monotypic stands. It is generally found above the valley bottoms, immediately above and below the pinyon and juniper woodland type (Harper et al. 1978).

Because sagebrush develops in seral stages, many of the acres of native, perennial grasslands shown in **Table 3.9** may be considered early seral sagebrush communities. In addition, at the scale of mapping for this environmental assessment, many areas identified as annual and perennial grasslands may contain inclusions of remnant sagebrush communities.

Healthy sagebrush consists of a patchwork mosaic of seral communities that can range from recovering perennial grass-shrublands following natural fire to old growth, decadent sagebrush steppe with high canopy cover and reduced herbaceous understory (Wyoming Interagency Vegetation Committee 2002). Most of the sagebrush in the planning area is in Condition Class 3 due to the prevalence of invasive species, including cheatgrass and juniper.

The two main subspecies of big sagebrush (*Artemisia tridentata*) found on the Moab Fire District are as follows:

- Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) is the most common shrub in the intermountain basins (Knight 1994). It grows in pinyon and juniper woodland and below on plains and foot-hills at elevations of 5,000 feet to 7,000 feet. Associated grasses are often scarce in this big sagebrush type.
- Basin big sagebrush (*Artemisia tridentata tridentata*) grows with Wyoming big sagebrush but is confined to valley bottoms in deep, well-drained sandy to loamy soils at 4,000 feet to 7,300 feet in elevation. Basin big sagebrush grows taller (up to six feet) and blooms later than Wyoming big sagebrush.

On drier sites, much of the sagebrush communities have degraded with extensive conversion to cheatgrass-dominated understories. Management actions, cheatgrass invasion, juniper encroachment, and drought are all considered to be responsible for a decrease in the range of sagebrush.

Mountain Shrub

This vegetation type consists of four main vegetation types: Gambel oak, maple, mountain mahogany, and mixed mountain shrub. Mixed mountain shrub is a highly diverse community made up in part of chokecherry, serviceberry, currant, snowberry, elderberry, bitterbrush, mountain big sagebrush, nine-bark, buckbrush and others. This vegetation type occurs as a transition vegetation type between mid-elevation sagebrush and conifer types. It is found at moderately high elevations (7,000 to 8,500 feet). The mountain shrub type is usually found on north and east slopes that tend to be cooler and moister than south and west aspects (the exception is mountain mahogany and oak, which can occur on south aspects).

Grasslands

Grassland types include native perennial grasslands, seedings of native species, exotic perennial grasses (primarily crested wheatgrass), and some cheatgrass.

Native perennial grasslands are an intermediate successional stage that would eventually return to a diverse sagebrush steppe habitat after extended periods (20 to 70 years) without impacts from wildland fires. Native perennial grass species include bluebunch wheatgrass, Indian ricegrass, bottlebrush squirreltail, Sandberg bluegrass, Nevada bluegrass, thickspike wheatgrass, western wheatgrass, galleta grass, blue grama, needle-and-thread grass, great basin wildrye, sheep fescue and others.

Due to increased fire intervals and subsequent loss of topsoil, perennial grasslands dominated by crested wheatgrass and/or other non-native species are stable communities that do not trend toward recovery to sagebrush steppe habitat as quickly as native perennial grasslands. Historically, native perennial grasslands would have formed part of the seral mosaic of the sagebrush steppe habitat, although it is unclear how widespread they once may have been represented across the landscape. In addition to cheatgrass, the grassland vegetation type is prone to invasion by other species such as knapweed.

Large areas of perennial grasslands are now dominated by sagebrush as a result of fire suppression and historical livestock grazing practices. Range improvement and fire rehabilitation efforts have converted a significant amount of these sagebrush-invaded grasslands to non-native seedings like crested wheatgrass.

Mixed Conifer

This vegetation type may include Douglas fir, white fir, Engelmann spruce, and sub-alpine fir. This type occupies less than one percent of the BLM-managed lands on Moab Fire District, mostly occurring at elevations above 7,000 feet. As a result of fire suppression and grazing, species like Douglas-fir could invade lower communities.

Because there are numerous community types associated with this vegetation type, conditions and trends vary. In mixed conifer types, the trend is toward a greater representation of climax conifer vegetation with a corresponding loss of early seral stage aspen. In other conifer community types that lack the aspen component, the increasing density of shade-tolerant species can place greater stress on large older trees; mostly due to between-tree competition for water, which results in a greater susceptibility to insect and disease attack (Keyes et al. 2003). In many sites, the stocking index is 15 times greater than pre-settlement times (Baker 2001), resulting in an increased likelihood of catastrophic stand-replacing fire.

Riparian

Riparian vegetation is typically comprised of narrow communities along both sides of rivers and streams. Native riparian communities in the Moab Fire District may be dominated by Fremont cottonwoods with understories of shrubs (e.g., sandbar willow) and herbaceous species. Fremont cottonwood communities are not fire tolerant, and are extremely susceptible to fire loss. However, narrow leaf cottonwood communities located in higher elevations can better tolerate fire exposure and may survive through root suckers. The life history and ecology of cottonwoods are intimately tied with flooding, erosion, and deposition on the flood plains. Cottonwoods release their seed that corresponds with the flood season because the seeds only germinate and establish on freshly deposited, moist alluvium (point bars). This frequently creates bands of trees that provide a living record of flooding patterns and channel migration with younger age classes near the waters' edge (green-line) and older trees occurring some distance from the channel in the flood plain (Knight 1994).

Due to altered stream flows in native cottonwood communities, the trend is toward a greater representation of mature to decadent communities (late seral stage) with a lack of recruitment by younger age classes, as well as possible mortality to older individuals. In many areas, native riparian communities have been converted to exotic tamarisk and Russian olive and/or invasive, non-native weed communities. More information on riparian is included in Section 3.3.10 (Riparian-Wetlands Areas).

3.3.16 FISH AND WILDLIFE

For the purpose of this document, general fisheries and wildlife refers to species and groups of similar species that do not have federal status (as defined in the BLM Manual 6840, including ESA-related species), but may have other federal and/or state protection (e.g., under the federal Migratory Bird Treaty Act or Utah State Code) and are of concern to management authorities, Native American tribes, the general public, or groups (e.g., birders, hunters, etc.) with particular interest in a species or group of species.

General fisheries and wildlife groups considered in this document include fisheries, non-game (raptors, migratory birds, small mammals, carnivores and predators, and amphibians and reptiles), and big game (mule deer, Rocky Mountain elk, moose, desert bighorn sheep, Rocky Mountain bighorn sheep, and pronghorn). ESA-related and BLM sensitive species are discussed separately. Scientific names and habitat associations for each of the species mentioned in this section are presented in **Table 3.10**. The water cover type is valuable

wildlife habitat and has the potential to be impacted by the proposed project, so it has been included in addition to the vegetation types.

TABLE 3.10: HABITAT ASSOCIATIONS FOR GENERAL FISH AND WILDLIFE SPECIES

Species	Common Name	Habitat
Fisheries		
Rainbow trout	*Oncorhyncus mykiss*	W
Brown trout	*Salmo trutta*	W
Brook trout	*Salvelinus fontinalis*	W
Lake trout	*Salvelinus namaycush*	W
Birds		
Ferruginous hawk	*Buteo regalis*	SDS, S, PJ, S, G, B
Red-tailed hawk	*Buteo jamaicensis*	SDS, PJ, S, G, MS, MC, A
Northern goshawk	*Accipiter gentiles*	MC, A
Golden eagle	*Aquila chrysaetos*	SDS, PJ, G, MS, MC, RW, A, W
American kestrel	*Falco sparverius*	MC, PP, RW, A
Osprey	*Pandion haliaetus*	RW, W
Northern harrier	*Circus cyaneus*	G, RW
Turkey vulture	*Cathartes aura*	SDS, PJ, S, G, B, MS, MC, PP, RW, A, W
Lewis' woodpecker	*Melanerpes lewis*	MS, PP, RW
Abert's towhee	*Pipilo abertii*	RW
American avocet	*Recurvirostra americana*	RW
Mountain plover	*Charadrius montanus*	SDS
Lucy's warbler	*Vermivora lucidae*	SDS, RW
Sage grouse	*Centrocercus urophasianus*	S
American white pelican	*Pelecanus erythrorhynchos*	RW, W
Bobolink	*Dolichonyx oryzivorus*	RW
Virginia's warbler	*Vermivora virginae*	PJ, MS
Gray vireo	*Vireo vicinior*	PJ, MS
Bell's vireo	*Vireo bellii*	RW
Black rosy finch	*Leucosticte atrata*	G
Long-billed curlew	*Numenius phaeopus*	G
Sharp-tailed grouse	*Tympanuchus phasianellus*	S, G
Brewer's sparrow	*Spizella breweri*	SDS, S
Black swift	*Cypseloides niger*	RW

Species	Common Name	Habitat
Black-necked stilt	*Himantopus mexicanus*	RW
Broad-tailed hummingbird	*Selasphorus platycercus*	RW
Yellow-billed cuckoo	*Coccyzus americanus*	RW
Black-throated gray warbler	*Dendroica nigrescens*	PJ, MS
Three-toed woodpecker	*Picoides tridactylus*	MC
Sage sparrow	*Amphispiza belli*	SDS, S
Gambel's quail	*Callipepla gambelii*	SDS, RW
Flammulated owl	*Otus flammeolus*	MC, PP, RW, A
Tree swallow	*Tachycineta bicolor*	MC, PP, RW, A
Black-capped chickadee	*Parus atricapillus*	MC, PP, RW, A
Mountain chickadee	*Parus gambeli*	MC, PP, RW, A
Mammals		
Silver-haired bat	*Lasionycteris noctivagans*	MC, PP, RW, A
Ringtail	*Bassariscus astutus*	MC, PP, RW, A
Black bear	*Ursus americanus*	MS, MC, PP, RW, A
Mountain lion	*Felis concolor*	PJ, MS, MC, PP
Coyote	*Canis latrans*	SDS, PJ, S, G, B, MS, MC, A
Mule deer	*Odocoileus hemionus*	S, MS
Rocky Mountain elk	*Cervus elaphus*	G, MS, MC, A
Moose	*Alces alces*	G, MS, MC, RW, A
Desert bighorn sheep	*Ovis canadensis nelsoni*	S, G, MS
Rocky Mountain bighorn sheep	*Ovis canadensis canadensis*	S, G, MS
Pronghorn	*Antilocapra americana*	SDS, S, G

Habitat Codes: SDS = salt desert shrub, PJ = pinyon and juniper woodland, S = sagebrush, G = grassland, B = blackbrush, MS = mountain shrub, MC = mixed conifer, PP = ponderosa pine, RW = riparian-wetlands area, A = aspen and W = water

Fisheries

Seventy-three fish species and numerous species of mollusks and other macro invertebrates are found on BLM-administered lands in Utah. The four Federally listed native fish species are listed in **Appendix E**, along with their scientific name, federal status, associated vegetation community/habitat type, and field office(s) having jurisdiction over potentially suitable habitat.

Fish species found on BLM-administered lands that are not ESA-related or BLM sensitive include rainbow, brown, brook, and lake trout, suckers, shiners, dace, chub, sculpins, and a variety of lesser known or less-abundant species.

Native fish demonstrate a wide variety of life histories, including resident populations that inhabit small headwater streams with shorter migratory ranges, populations that use larger streams and main rivers, populations that are found in lake habitats, and populations that spawn in rivers or streams.

BLM-administered lands within the planning area provide the following approximate values of aquatic habitat resources: elevation, latitude, topography, substrate, water quality and chemistry, vegetative structure, flow regimes, and patterns and disturbance regimes. The quality of aquatic habitat varies widely across the state. Generally, aquatic habitat has declined since settlement of the region began in the 1850s. Disturbances contributing to decline of habitat have included logging, grazing, mining, recreation, water diversion for irrigation and domestic supply purposes; other surface-disturbing activities; introduction of non-native species; wildland fire; insect infestation; as well as disease, wind, floods, landslides, avalanches, and other surface-disturbing activities. These disturbances have resulted in loss of riparian vegetation and subsequent changes in vegetation species composition.

Non-game Species

For the purposes of this document, non-game species are identified as raptors, migratory birds, small mammals, carnivores and predators, and amphibians and reptiles.

Raptors

Raptors (birds of prey) found in and adjacent to the Moab Fire District include several species of hawks (e.g., ferruginous hawk, red-tailed hawk, and northern goshawk), eagles (e.g., golden and bald eagle), falcons (including the American kestrel), owls, ospreys, northern harriers, and turkey vultures. These species inhabit various ecosystems and consume a wide range of prey.

During the breeding season, raptors are particularly sensitive to disturbance. Behavior during and following disturbance could result in nest abandonment or reduced productivity. Accordingly, raptors are provided with protection designed to prevent disturbance under the following federal acts: Migratory Bird Treaty Act of 1918, Eagle Protection Act of 1962 (as amended), and, for federally listed species only, the ESA of 1973 (as amended). In addition, the Utah field office of the USFWS has issued guidelines for establishment of disturbance-free buffer zones around raptor nests and identification of mitigation techniques available for use when management or development activities conflict with the buffer zones. In Utah, the largest buffer zone suggested for any raptor nest is one mile (Romin and Muck 2002).

Migratory Birds

Migratory birds travel from one region to another, usually periodically, for breeding or feeding purposes. Generally, they nest in temperate North America and over-winter in portions of Mexico and Latin America. Migratory birds represent a diversity of species, including shorebirds, waterfowl, passerines (perching birds), and raptors, and may nest in any or all of the vegetation types within the Moab Fire District.

The Utah Division of Wildlife Resources (UDWR) has prepared the Partners in Flight Avian Conservation Strategy, a document evaluating the status of 231 bird species, many of which are migratory, that breed in Utah (Parrish et al. 2002). Twenty-four bird species have been prioritized for management and protection, and occur mostly within four habitat types that have been designated by UDWR as priority habitats. These habitats correlate with Utah GAP cover types and include salt desert shrub, pinyon and juniper woodlands, sagebrush, and riparian-wetlands areas (Parrish et al. 2002). The 24 priority bird species include the Lewis'

woodpecker, Abert's towhee, American avocet, mountain plover, Lucy's warbler, sage grouse, American white pelican, bobolink, Virginia's warbler, gray vireo, Bell's vireo, black rosy finch, long-billed curlew, sharp-tailed grouse, Brewer's sparrow, black swift, black-necked stilt, broad-tailed hummingbird, ferruginous hawk, yellow-billed cuckoo, black-throated gray warbler, three-toed woodpecker, sage sparrow, and Gambel's quail.

Some migratory birds are cavity nesters and may be found in forested habitat of varying elevation throughout the state. Cavity-nesting birds include several species of woodpecker. Woodpeckers are considered primary cavity nesters because they typically excavate their own nest cavities. Secondary cavity nesters are often incapable of excavating their own nest cavities and, therefore, rely upon existing cavities that have been previously established by woodpeckers. Secondary cavity nesters include species such as the American kestrel, flammulated owl, tree swallow, and black-capped and mountain chickadees. While cavities may be excavated in live trees, standing dead trees (e.g., snags) are typically preferred by primary cavity nesters and may be easier for secondary cavity nesters to access. Trees in the mixed conifer, ponderosa pine, aspen, and riparian-wetlands habitat types each contain important nesting resources for cavity-nesting species.

Small Mammal

Small mammals include species groups such as prairie dogs, bats, squirrels, mice, and rabbits. Because these groups fill a variety of niches, small mammals are found in most habitat types within Moab Fire District. Although the term "cavity nester" typically refers to bird species, it may also include small mammals that use tree cavities for denning purposes. Small cavity-nesting mammals include species such as the silver-haired bat and ringtail.

Carnivores and Predators

These species are generally large, long-lived, solitary species. Although they are considered to be non-game species, a variety of carnivores are managed by UDWR. More plentiful carnivores are often hunted for food, sport, or as a management technique to allow prey species to thrive. Utah predators include species such as the black bear, mountain lion, and coyote. Although the black bear and mountain lion tend to remain more secluded in the mountain shrub and mixed conifer communities of mountains and foothills, the coyote may venture into urban and agricultural areas as a means of finding vulnerable prey. In general, where there is a prey source, there are predators. Because predators consume birds and small mammals and often travel over large distances, they may be found anywhere within the Moab Fire District.

Amphibians and Reptiles

Because the majority of Utah's wildlife habitats are arid or semi-arid and such a small percentage of habitat is associated with water, reptiles are more prominent than amphibians. Reptiles are found throughout the planning area and may occur in any habitat type. Amphibians are found in and adjacent to wetlands, rivers and streams, mountain lakes, runoff pools in rock formations, and both ephemeral and permanent livestock watering ponds.

Big Game Species

Big game species include large, hunted animals such as mule deer, the Rocky Mountain elk, and pronghorn. Given the economic importance of big game, this group is typically managed more closely than other wildlife groups. Accordingly, the BLM has identified crucial seasonal use ranges within Moab Fire District for mule deer, Rocky Mountain elk, moose, desert bighorn sheep, and pronghorn antelope.

Mule Deer

Mule deer occupy most ecosystems, but are characteristically found in shrublands with rough, broken terrain and abundant browse and cover. Mule deer winter diets consist primarily of browse in the form of sagebrush, bitterbrush, mountain mahogany, and other shrubs, as well as a small amount of grasses and pinyon or juniper. During the other three seasons, there is much wider distribution of nutritional resources. Mule deer summer use habitat primarily consists of mixed conifer, aspen, wetland-riparian, and grassland, while winter habitat primarily consists of low-elevation sagebrush or sagebrush and mountain shrub habitats on south-facing slopes.

Rocky Mountain Elk

The Rocky Mountain elk is a generalist, feeding on forbs and grasses during the spring and summer and grasses and shrubs throughout the fall and winter. These feeding relationships are variable and depend largely on location. Various habitats include winter ranges, calving areas, and summer ranges. Calving areas are used from mid-May through June. They are typically located at higher elevations than wintering grounds; consist of grassland, mountain shrub, mixed conifer and aspen; and occur near cover, forage and water resources (Fitzgerald et al. 1994).

Moose

The moose in Utah is typically associated with wetland-riparian and mountain shrub habitats. It feeds on leafy plants as well as trees and shrubs, including aspen, birch, and willow. Before 1918, moose did not readily occur in Utah. Since that time, moose populations have increased, and they are found throughout the northern portions of Utah, in places closely associated with mixed conifer, aspen, mountain shrub, riparian-wetlands, and grassland habitats (Zeveloff and Collette 1988).

Desert and Rocky Mountain Bighorn Sheep

Rocky Mountain bighorn sheep can be found in several mountain ranges in central and northern Utah and have seasonal use areas in remote mountain and canyon locations within the Price Field Office area. They typically inhabit only remote, mountain and desert locations, and are often found on cliffs and rocky slopes in rugged canyons. Bighorn sheep are most closely associated with sagebrush, grassland, and mountain shrub habitats (Chapman and Feldhamer 1982). They are active during the daytime and feed on grasses, trees, and shrubs, and are highly dependent upon vegetation availability, succulence, and nutrient content. Two subspecies of bighorn have important seasonal use areas within the planning area: desert and Rocky Mountain. The desert bighorn sheep is found in the central and southern part of the state, as well as some of the west desert mountain ranges. Rocky Mountain bighorn sheep can be found in several mountain ranges in central and northern Utah (UDWR 2004a).

Pronghorn

The pronghorn is typically associated with salt desert shrub, sagebrush, and grassland habitats throughout its entire range (UDWR 2004b). It is most active during the daytime and consumes sagebrush, thistle, cacti, grasses, and forbs (UDWR 2004b). There are 24 pronghorn management units within the state of Utah. Pronghorn population levels are subject to drought, and most units have suffered a substantial population decline during the current six-year drought. The pronghorn population is expected to rebound as the drought subsides.

3.3.17 SOILS

Soils in the planning area have developed from bedrock, volcanic activity, rocks and minerals deposited by rivers and glacial activity, windblown silt, and sand. They are derived primarily from the sedimentary, metamorphic, and volcanic rocks of the mountain ranges and highlands in the region. Weathered substrates from these source materials have chemical and physical characteristics that may favor certain vegetation types, and, combined with climatic influences, can provide habitat for various plant species. Soil source materials or substrates found in the planning area fall into soil types such as alluvium, calcareous, clay, conglomerate, duff, granitic, gravelly loam, gypsiferous, igneous, limestone, loam, quartzite, sandstone, sandy, and shale.

The presence of biological crusts in arid and semi-arid lands influences the soil environment by reducing soil erosion (from both wind and water), fixing atmospheric nitrogen, retaining soil moisture, and providing living organic surface mulch. This crust consists of a variety of cyanobacteria, green algae, lichens, mosses, microfungi and other bacteria (Belnap and Lange 2003). A crust's development is strongly influenced by soil texture, soil chemistry and successional colonization by crustal organisms. In some ecosystems, such as those characterized by highly erosive marine sediments and little vegetative cover, physical crusts such as vesicular chemical crusts and desert pavement can also provide protection from wind erosion.

Erosion and Run-off

Soils may be eroded by water or wind. Water erosion is influenced by the intensity and duration of precipitation, soil texture, soil organic matter, permeability, topography, and vegetative (or artificial) cover. Areas with soils on steep slopes with low infiltration rates and minimal vegetative cover have the highest erosion hazard. Physical evidence of water erosion includes features such as rills, gullies, pedestals, or larger sedimentation features such as landslides or choked stream channels. Wind erosion also has the potential to move large volumes of soil; this is primarily a function of wind velocity and grain size. Physical evidence of wind erosion includes ventifacts, ripples, and dunes (Ritter et al. 1995).

Erosion may decrease soil productivity, expose plant roots, impede revegetation efforts, and increase salinity downstream. Many soils throughout the planning area have features that make reclamation and revegetation difficult. These limiting features involve salinity, sodium content, clayey and sandy textures, drought conditions, alkalinity, low organic matter content, shallow depth to bedrock, stones and cobbles, propagule-rich soil, and high wind-erosion potential. Certain geological formations, such as the Mancos shale, tend to form soils that are highly erosive. The hazard for soil erosion by water and wind is rated at the county level through soil surveys conducted by the Natural Resources Conservation Service.

Soil Quality and Health

The capacity of a soil to sustain plant and animal productivity is related to its inherent physical, biological, and chemical properties as well as its current health or condition. Three key attributes of soil and rangeland health have been identified that may assist in assessing the status or health of an area: site stability, hydrologic function, and biotic integrity. Site stability relates to the ability of the soil to resist erosion (and loss of nutrients) by wind and water. Hydrologic function is the capacity of the site to capture, store, and safely release water from rainfall and snowmelt. Biotic integrity is the capacity of a site to support both functional and structural plant, animal, and soil biological communities within the range of variability for that site (BLM 2000a).

Effects of soil health and erosion are often associated with riparian-wetlands areas (Section 3.3.10) and water quality (Section 3.3.9).

3.3.18 RECREATION

Recreation is one of the major resource uses within Moab Fire District. The term "recreation" includes a variety of activities that affect and are affected by resources and other resource uses. The planning area offers a wide variety of recreational opportunities, especially for dispersed use requiring undeveloped open space. These activities include wildlife viewing, hunting, hiking, backpacking, horseback riding, off-highway vehicle (OHV) use, fishing, bicycling, photography, camping, orienteering, river running, rock climbing, mountain biking, and sightseeing.

Recreational use is counted as visitor use and is measured in visitor days. A visitor day represents one person doing an activity for all or part of one day. For example, if one person spent one night camping on public lands, it is counted as two visitor days. More than seven million visitor days occurred on Utah public lands in 2002 (BLM 2003f).

Recreation resources include recreation sites and dispersed public lands, wildlife resources, visual resources, waterways, lakes, and other resources (physical, historical, etc.), each of which provides different recreational opportunities. In areas where recreation resources receive heavy use, developed recreation sites are often constructed to aid in managing impacts. Consequently, developed recreation sites are primarily located near high-use recreation attractions. These developed recreation areas may include such permanent features as:

- Picnic tables
- Drinking water facilities
- Vault toilets/shower facilities
- Shade structures
- Parking lots with traffic flow controls such as striping, islands, boulders, and rope fences
- Water drainage systems
- Signage; including maps, brochures, speed limits, recreation safety, wildlife and invasive, non-native weed information
- Bulletin boards and visitor registration/fee stations
- Traffic counters

Growth in the use of OHVs on public land has substantially increased over the past few years. In 1999 alone, sales of all-terrain vehicles in Utah jumped more than 30 percent. More than 575,000 OHV visitor days occurred on BLM lands in 2002. The Utah BLM takes a balanced approach to managing OHV use, placing priority on protecting public land resources, while providing diverse opportunities for the responsible use of OHVs (BLM 2001).

During the RMP process, public lands may be designated as open, limited, or closed to OHV use. An open designation allows intensive OHV use where there are no compelling resource protection needs, user conflicts, or public safety issues. An area designated as limited use restricts OHV travel to meet specific resource management objectives. Limitations may occur on number or type of vehicles, time and season of use, or specific roads. An area may be designated as closed to protect resources, to ensure visitor safety, or to reduce user conflicts.

Recreation sites present within the Moab Fire District are shown in **Table 3.11**.

TABLE 3.11: RECREATION SITES

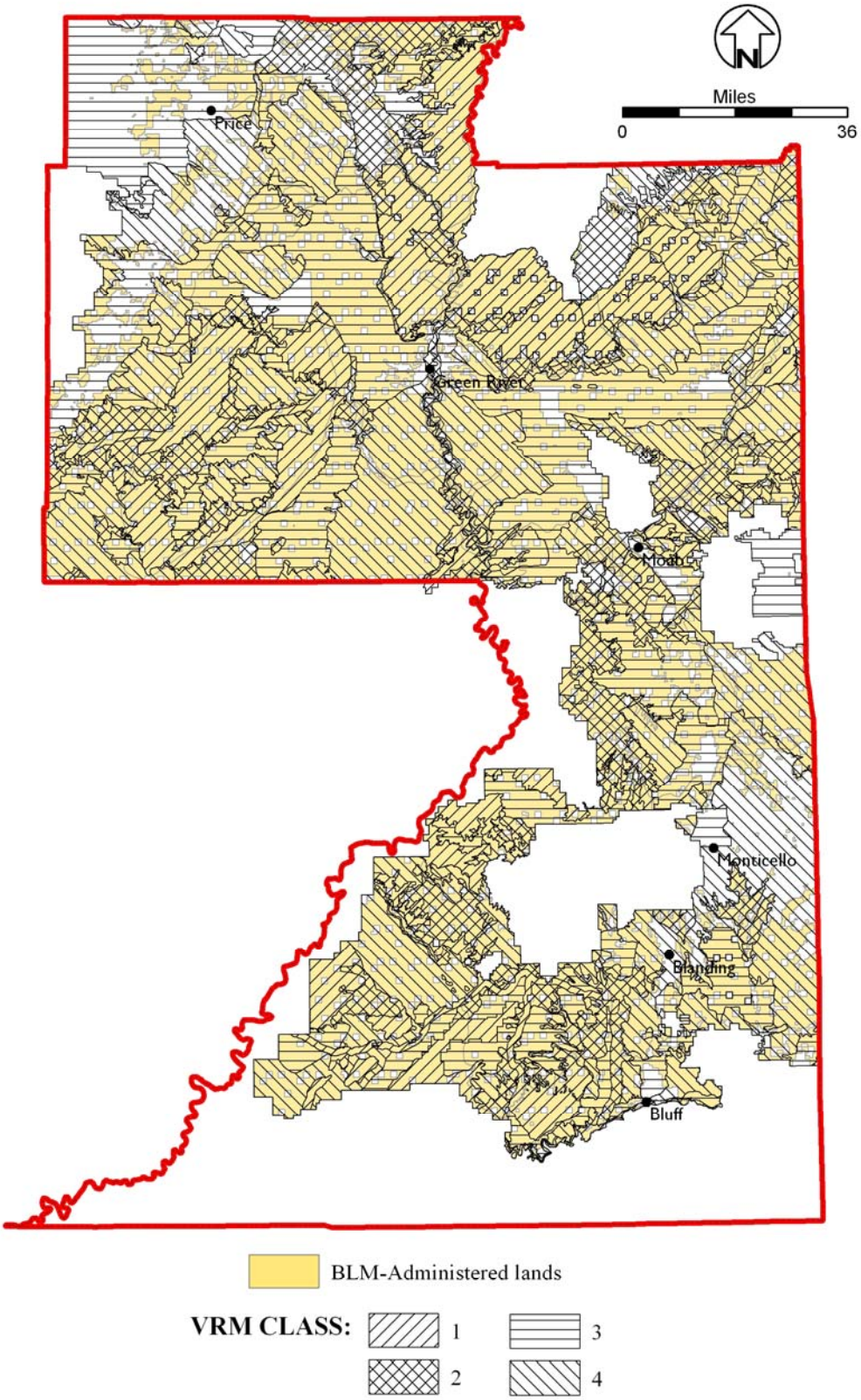
Recreation Sites		
Amasa Back Parking & Trailhead	Hatch Point Campground	Onion Creek Camping Area/Trailhead
Anticline Overlook	Hidden Valley Trailhead	Picture Frame Arch
Bar M Loop Trailhead	Hideout Canyon Camping Area	Poison Spider Mesa Trailhead
Big Bend Recreation Site	Hittle Bottom Recreation Site	Porcupine Rim Trailhead
Big Mesa Camping Area	Hunter Canyon Camping Area	Pritchett Arch
Bitter Creek Camping Area	Huntington	Road Shed
Blue Hill Trailhead	Indian Creek Falls Recreation Site	Rock Castle Camping Area
Buckhorn	J.C. Park Recreation Site-Portal Trail	Rocky Rapid River Access
Butler Canyon River Access	Jestesen Flat	San Rafael
Butler Wash Ruin Overlook	Kane Creek Parking & Pritchett Trailhead	Sand Island Campground and Ranger Station
Canyon Rims Kiosk	Kane Gulch Ranger Station	Sand Flats Recreation Area
Canyonlands Overlook	Ken's Lake Recreation Area	Sandy Beach River Access
Cisco Takeout	Kings Bottom Recreation Site	Sego Canyon Rock Art Interpretive Site
Cliffline Interpretive Site	Lions Park	Sevenmile Camping Area/ Interpretive/Recreation Site
Collins Camp	Long Canyon Trailhead	Slickrock Bike Trail Trailhead
Comb Wash Campground	Looking Glass Rock Interpretive Site	Spring Camping Area
Copper Ridge Dinosaur Tracks Trailhead	Lower Onion Creek Camping Area	Swasey's Cabin
Corona Arch Trailhead	Mexican Hat Boat Launch Site	Swasey's Takeout
Cowboy Camp Camping Area	Mill Canyon Dinosaur Trailhead	Takeout Beach River Access
Cowskin Camping Area	Mill Creek/Power Dam Trailhead	The Knoll View Area
Dewey Bridge Recreation Site	Mineral Bottom Camping Area/River Access	The Meadow Interpretive Site
Drinks Canyon Recreation Site	Mineral Point Camping Area	Three Kiva Ruin
Echo Park Camping Area	Minor Overlook	Tomsich Butte
Fish Ford Camping Area/River Access	Moab Rim Trailhead	Trough Springs Canyon Trailhead
Fisher Towers Recreation Site/ Photo Viewpoint	Monitor-Merrimac Trailhead	Upper Big Bend Camping Area
Fisherman's Point Recreation Site	Moonflower Canyon Camping Area	Wedge
Gemini Bridges Trailhead	Mule Canyon Ruin	Westwater Ranger Station
Gold Bar Recreation Site	Needles Overlook	William's Bottom Camping Area
Goose Island Campground	Nefertiti Takeout	Wilson Arch
Hal Canyon Campground	Negro Bill Canyon Camping Area/Trailhead	Windwhistle Campground
Hall's Bridge	Newspaper Rock National Historic Site	
Hamburger Rock Campground	Oak Grove Campground	

3.3.19 VISUAL RESOURCES

Visual Resource Management Classes

Visual resources on BLM-administered lands in the planning area are classified according to BLM Handbook H-8410-1 guidelines governing visual resource management (VRM) (BLM 2004d). Total acreages for each VRM class within the Moab Fire District include approximately 1,322,719 Class I acres (21 percent of total), 1,067,014 Class II acres (17 percent of total), 1,822,022 Class III acres (30 percent of total), and 1,944,748 Class IV acres (32 percent of total). **Figure 3.8** presents a map identifying the various VRM class areas within the planning area.

FIGURE 3.8: VISUAL RESOURCE MANAGEMENT CLASSES



Determination of classes is based on aesthetic quality, viewing distances and public sensitivity to changes in the landscape. VRM quality is managed according to objectives in the following VRM class descriptions:

- *Class I:* The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes and some management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
- *Class II:* The objective of this class is to retain the character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color and texture found in the predominant natural features of the characteristic landscape.
- *Class III:* The objective of this class is to partially retain the existing character of the landscape. The level of activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
- *Class IV:* The objective of this class is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. Every attempt should be made, however, to minimize the impact of these activities through careful location, minimal disturbance and repeating the basic elements.

Because they are the most scenic and sensitive, Class I areas generally include special designation management areas such as WSAs or ACECs. Management in these areas is typically consistent with the objectives set forth for VRM Class I areas. Class II areas generally include canyon and mountain vistas of particular importance, as well as less strictly managed special designation management areas. Class III areas generally act as a buffer to protect more sensitive areas or important vistas. They are typically found along major travel corridors or adjacent to Class I and II areas. Areas that do not fit into Classes I, II, or III are considered Class IV areas.

3.3.20 PALEONTOLOGICAL RESOURCES

Paleontological resources (fossils and tracks) are the remains or traces of prehistoric life. They generally occur in sedimentary rocks and can range from several billion to a few thousand years old. Fossils are preserved as unaltered soft and/or hard parts, altered hard parts, and/or as trace fossils such as tracks and scats. Unaltered fossils are rare, and have undergone little or no chemical or physical change since the death of the organism. Tracks of vertebrates can be found as one individual track or as sites with thousands of tracks. Preservation and study of tracks may help identify the track-maker and, at multiple track sites, is important for identifying track ways (three or more tracks). Tracks are also important in the study of individual animals, their behavior, and the environment at the time the animals were in existence. In some cases, tracks are the only evidence of that animal in a formation.

There are four groups of fossils: vertebrates (animals with back bones or vertebrae), invertebrates (animals without back bones), plants, and trace fossils (either vertebrate or invertebrate animals). Geological formations containing fossils occur throughout the Moab Fire District. The Morrison Formation is important for dinosaur fossils while dinosaur track trace fossils are present extensively in the Entrada and Kayenta formations. In some formations, all four types of fossils are represented.

Table 3.12 shows the paleontologically sensitive formations with Moab Fire District.

TABLE 3.12: PALEONTOLOGICALLY SENSITIVE FORMATIONS

Vertebrates	Invertebrates	Plants	Trace Fossils
Uinta Formation	Morrison Formation	Cedar Mt./Burro Canyon	Green River Formation
Morrison Formation	North Horn Formation	Blackhawk Formation	Blackhawk Formation
Green River Formation	Hermosa Formation	Dakota Formation	Navajo Sandstone
North Horn Formation	Chinle Formation	Green River Formation	Uinta Formation
Chinle Formation	Madison/Red Wall Ls.	Morrison Formation	Kayenta Formation
Moenkopi Formation	Elephant Cn./Cutler Gp.	Chinle Formation	Moenkopi Formation
Wasatch Formation	Flagstaff Formation	Cutler Group	Morrison Formation
Kayenta Formation	Uinta Formation		Entrada Formation
Cedar Mountain Formation	Cedar Mt./Burra Canyon		Chinle Formation
Mancos Formation	Carmel Formation		Wingate Sandstone
Colton Formation	Dakota Formation		Carmel Formation
Blackhawk Formation	Green River Formation		Cutler Group
Castlegate Formation	Mancos Formation		
Dakota Formation	Tunuck Shale		
Flagstaff Formation	Honaker Trail Formation		
Mesa Verde Formation	Elephant Canyon Formation		
Curtis Formation			
Entrada Formation			
Elephant Canyon Formation			

Note: May not be a complete list, roughly ranked highest to lowest, based on Madison 1979 and Hintze 1988.

3.3.21 SOCIAL AND ECONOMIC CONDITIONS

Region of Influence

The Moab Fire District, which encompasses Carbon, Emery, Grand, and San Juan Counties, represents the Region of Influence (ROI) for social and economic activities pertaining to the Moab Fire District. The ROI is defined as the geographical area in which the principal direct and indirect socio-economic effects on the Moab Fire District are likely to occur.

Population and Employment

Baseline data for the Moab Fire District ROI includes population and demographic data as well as current business and economic statistical information for the state obtained from the Bureau of Labor Statistics and Bureau of the Census, based on 2000 census data. Additional information was obtained from population, employment, earnings, and personal income trends-derived data compiled from the Sonoran Institute database prepared for the BLM (Sonoran Institute 2005). These data are available in the project file and are summarized below.

The ROI counties collectively had a total population in 2000 of 54,180. The primary population centers include the towns of Price, Moab, Monticello, Blanding, Huntington, and Helper. There are also numerous other small communities in the ROI. Price is the largest town in the ROI, with a population of approximately 8,229 (U.S. Census Bureau 2003). The ROI is predominantly rural, and most residents in each ROI county

live on farms, ranches, or on unincorporated county land. State, federal, and Indian reservation lands make up the majority of the land area of the ROI.

Collectively, the majority of the employment in the ROI counties is in the services and professional industry sector, which represented approximately 58.4 percent of the total employment in the ROI in 2000. Most of the jobs in this category are related to either tourism (particularly in Grand and San Juan Counties) or mining (in Carbon and Emery Counties). Government jobs represented approximately 20.5 percent of the total employment, followed by mining (7.4 percent) and farm and agriculture (5.2 percent). Most of the farm and agricultural-related activities are associated with livestock. Livestock grazing relies heavily on federal grazing allotments, as discussed in Section 3.3.13, Livestock Grazing.

Local Native American populations rely on public lands in the ROI for the harvesting of woodlands products for firewood and posts and poles. Pinyon nuts are collected for individual use and to sell or trade. Commercial harvesters provide local employment opportunities in the ROI. Pinyon nut harvesting and other subsistence activities at risk from the Proposed Action are also discussed in Section 3.3.3, Cultural Resources, Section 3.3.7, Native American Religious Concerns, and Section 3.3.4, Environmental Justice.

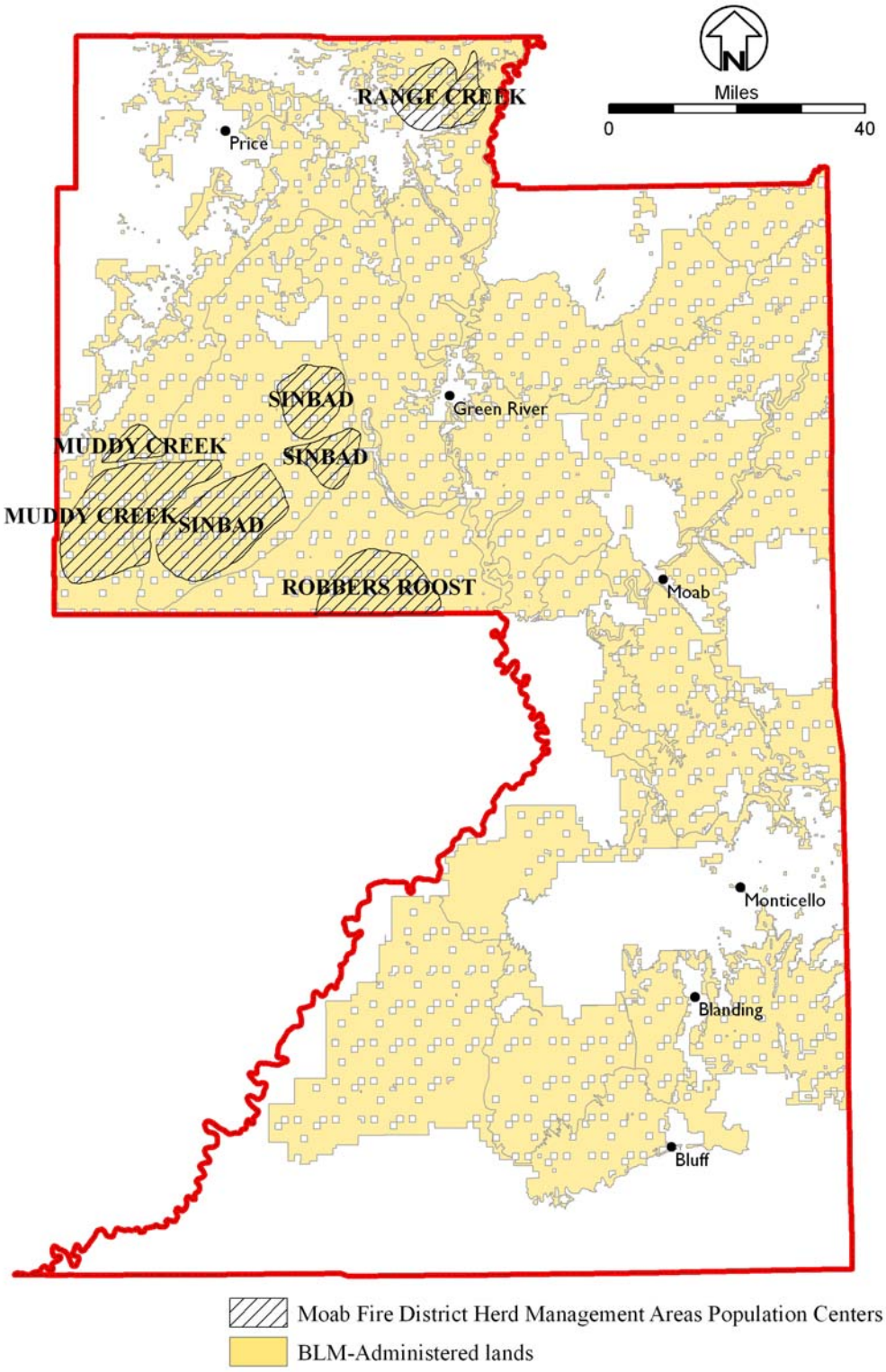
3.3.22 WILD HORSES AND BURROS

In 1971, Congress passed legislation to protect, manage, and control wild horses and burros on the public lands. The Moab Fire District contains four Herd Management Areas (HMA), which are all located in the Price Field Office. Current HMA boundaries within the Moab Fire District are shown in **Figure 3.9**. The appropriate management level for each HMA is presented in **Table 3.13.**

TABLE 3.13: HERD MANAGEMENT AREAS AND APPROPRIATE MANAGEMENT LEVELS

Herd Management Areas	Appropriate Management Level		Current Estimated Population	
	Horses	*Burros*	*Horses*	*Burros*
Range Creek	75-125	0	115	0
Muddy Creek	30-50	0	49	0
Sinbad	30-50	78	45	78
Robbers Roost	15-25	0	19	0
TOTAL	**150-250**	**78**	**228**	**78**

FIGURE 3.9: CURRENT HERD MANAGEMENT AREA BOUNDARIES



3.3.23 WILDERNESS CHARACTERISTICS

Non-Wilderness Study Areas with Wilderness Characteristics

Wilderness characteristics are defined as features of the land associated with the concept of wilderness (see Section 3.3.12, Wilderness Study Areas for the definition of wilderness) that may be considered in land use planning when the BLM determines that those characteristics are reasonably present, of sufficient value (condition, uniqueness, relevance, importance) and need (trend, risk), and are practical to manage (USDI 2003).

There are 55 areas, totaling approximately 1,485,587 acres that have been identified as having wilderness characteristics within the planning area (BLM 1999). Statewide, these areas total about 2.6 million acres of public land. **Table 3.14** lists non-WSAs with wilderness characteristics and acreages. These areas are shown on **Figure 3.10**.

Non-Wilderness Study Area Lands Likely to Have Wilderness Characteristics

The public has submitted information to the BLM suggesting that areas not specifically identified during the 1999 inventory have wilderness characteristics and, therefore, should be managed to preserve those values. The BLM evaluated and assessed the information and determined that 13 areas, totaling approximately 364,656 acres, may have wilderness characteristics. These areas are also shown on **Figure 3.10**. **Table 3.15** describes the acreage found likely to have wilderness characteristics.

TABLE 3.14 NON-WILDERNESS STUDY AREAS WITH WILDERNESS CHARACTERISTICS

Name	Approximate Acreage
Beaver Creek	29,114
Behind the Rocks	3,883
Bridger Jack Mesa	32,504
Butler Wash	3,713
Cedar Mountain	17,200
Cheesebox Canyon	15,966
Coal Canyon	18,954
Comb Ridge	14,566
Cripple Cowboy	1,032
Cross Canyon	1,752
Dark Canyon	73,034
Desolation Canyon	116,715
Devils Canyon	12,206
Fish and Owl Creeks	29,803
Fisher Towers	18,763
Floy Canyon	18,576
Flume Canyon	6,960
Fort Knocker Canyon	13,230
Goldbar	7,889
Gooseneck	4,442
Grand Gulch	55,208
Granite Creek	4,998
Gravel & Long Canyon	41,283
Harmony Flat	10,171
Harts Point	28,882
Hatch Wash	13,644
Hondu Country	22,311
Hunter Canyon	5,682
Indian Creek	21,801
Jack Canyon	3,884
Labyrinth Canyon	57,379
Limestone Cliffs	1,066
Lost Spring Canyon	12,601
Mancos Mesa	70,572
Mary Jane Canyon	27,081
Mexican Mountain	51,284
Mill Creek Canyon	4,657
Muddy Creek-Crack Canyon	156,832
Mussentuchit Badland	26,926
Negro Bill Canyon	3,196
Nokai Dome	102,478
Price River	110,355
Road Canyon	16,592
San Juan River	14,866
San Rafael Reef	53,748
Shafer Canyon	1,853
Sheep Canyon	4,638
Sid's Mountain	42,773
Spruce Canyon	4,947
Squaw and Papoose Canyon	4,839
Turtle Canyon	8,920
Upper Muddy Creek	20,074
Westwater Canyon	2,683
Westwater Creek	10,153
Wildhorse Mesa	26,908
APPROX. TOTAL ACREAGE	**1,485,587**

FIGURE 3.10: LANDS WITH OR LIKELY TO HAVE WILDERNESS CHARACTERISTICS

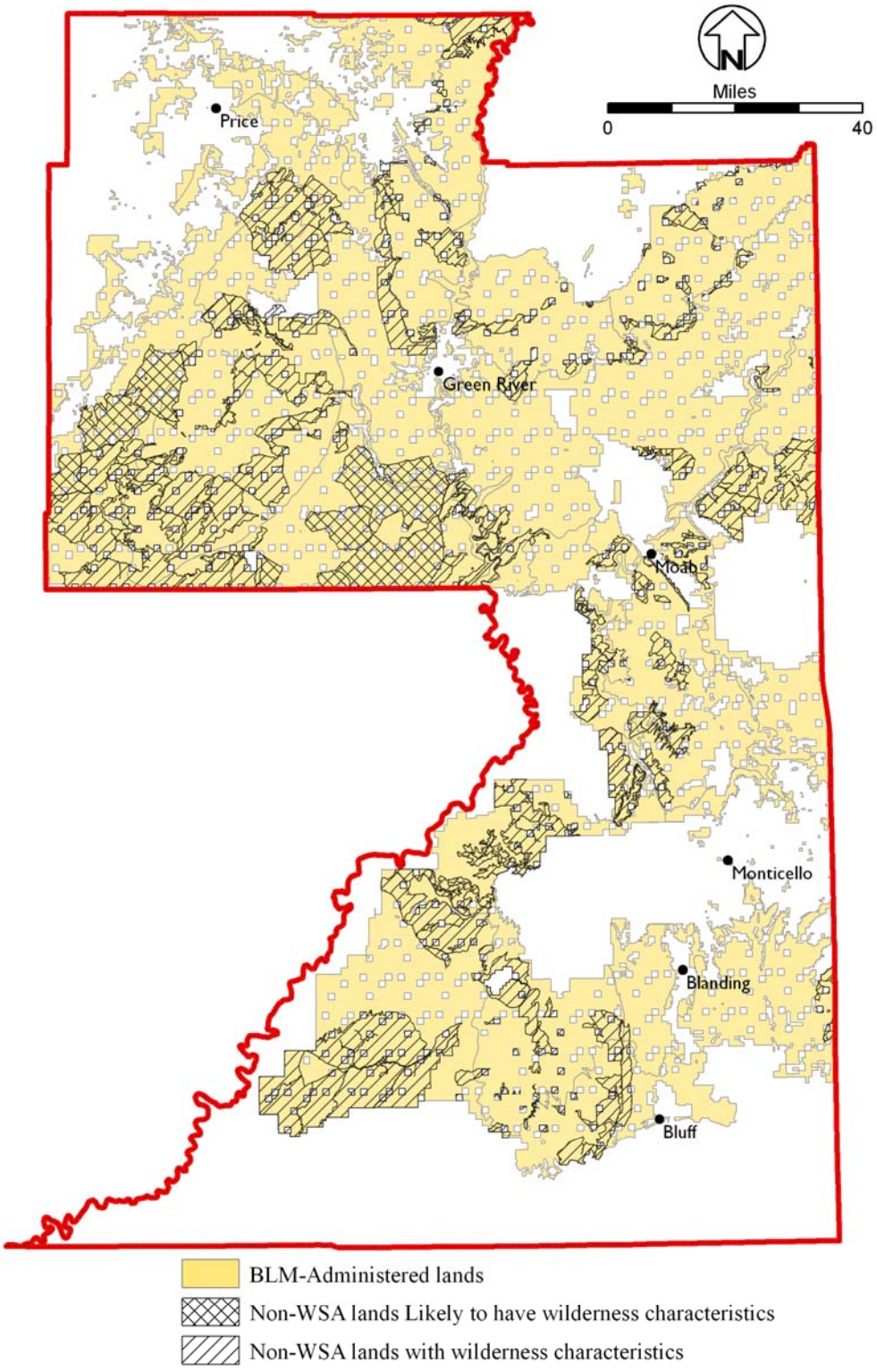


TABLE 3.15: NON-WILDERNESS STUDY AREA LANDS LIKELY TO HAVE WILDERNESS CHARACTERISTICS

Name	Approx. Acreage
Dome Plateau	15,600
Eagle Canyon	43,815
Flat Tops	7,638
Hatch Point Canyons	12,000
Hells Hole	3,180
Hideout Canyon	12,600
Mexico Point	14,600
Molen Reef	38,260
Rock Canyon	17,786
San Rafael River	117,736
Sweet Water	575
Sweet Water Reef	72,351
Wildhorse Mesa	8,515
APPROX. TOTAL ACREAGE	**364,656**

CHAPTER 4. ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter discloses predicted direct, indirect, and cumulative effects of alternatives described in Chapter 2 and **Appendices C and D**. This chapter is organized with discussions of direct and indirect impacts on each resource (as defined in BLM Land Use Planning Handbook H-1601-1, as amended; BLM 2004b) under both the Proposed Action and No Action Alternative. Analyses of impacts of fire management actions on each resource are discussed in short and long-term contexts. The cumulative effects section of this chapter (Section 4.4) analyzes the effects of past, present and reasonably foreseeable actions as combined with the effects of the Proposed Action and No Action Alternative.

To provide additional context in the analysis of impacts from fire management actions associated with both alternatives, a general description of fire's effects on each resource is presented as **Appendix G**. These general effects would occur regardless of what alternative is selected.

Locations, exact geographic area, and intensity of future wildland fire events and fuel treatments are not known. Therefore, the effects analysis is focused on impacts across the entire Moab Fire District and not on particular sites or FMUs. Additional environmental analyses for site-specific proposals would occur prior to implementation of management actions. The following assumptions were used in the effects analysis:

- Fire management actions that were analyzed for potential impacts on resources of concern are: (1) wildland fire suppression, (2) wildland fire use, (3) prescribed fire, and (4) non-fire treatments (mechanical, biological, seeding, and chemical).
- Short term is defined as less than five years, and long term is defined as six to 15+ years.
- If the Proposed Action were implemented, a measurable reduction in occurrence, severity, and/or size of wildfires would not be expected in the short term across the entire planning area. However, certain areas have the potential for different wildland fire impacts by alternative, based on proposed changes in suppression goals. The differences in impacts between the alternatives would be primarily in the long term.
- References to impacts from wildland fire suppression include post-suppression ES&R treatments.
- Wildland fire use is not included in the No Action Alternative.
- Planned fuel treatments include prescribed-fire, mechanical, biological, and chemical treatments.
- Treatments involving prescribed burns are implemented for long-term resource benefits.
- Planned actions are implemented only in areas with a low risk of invasive, non-native weed infestation or when the action includes a component (e.g., seeding) to reduce the risk of infestation.
- Based on the premise that future treatments in the No Action Alternative would be similar to those over the past ten years, planned fuel treatments in the No Action Alternative would be fewer than in the Proposed Action.
- The No Action Alternative outlines several measures to protect resources, however, the practices are outdated and not as well defined as those included in the Proposed Action Alternative.
- The MFD could use chemical and biological treatments as part of non-fire fuel treatments. However, less than 5,220 acres would be deemed appropriate over ten years. Impacts from chemical or biological treatments would be discussed in greater detail in subsequent, site-specific analysis.

4.2 PROPOSED ACTION

4.2.1 AIR QUALITY

Short-term Impacts

The Proposed Action includes several air quality RPMs to minimize air quality impacts, including visibility, to sensitive areas such as NAAs and Class 1 areas. Potential impacts would be minimized through action-specific analysis and by adherence to and coordination with the Utah Interagency Smoke Management Program to ensure compliance with all local, state, and federal regulations as described in Chapter 3. With these laws and protection measures in place, fire management activities would not unlawfully exceed air quality standards or impact NAAs or other sensitive areas in Utah due to the Proposed Action. Circumstances beyond the BLM's control such as uncontrollable wildland fire could have an impact on air quality, but these acts of nature are outside the scope of the Proposed Action. Suppression efforts would take into consideration coal mine areas in the northern portion of the planning area to avoid smoke impacts to ventilation systems.

Figure 4.1 presents the location of NAAs and Class I areas with BLM-administered lands categorized by proposed fire management levels. Under the Proposed Action, approximately 4.2 million acres are identified for moderate suppression efforts (1,000- and 2,000-acre suppression goals) that are also within 100 kilometers of areas sensitive to air quality. Smoke from fires on adjacent lands may affect air quality in sensitive areas such as Class I National Park areas. Although suppression acreage levels in the Proposed Action represent an increase in burned acres in the vicinity of sensitive areas, impacts to air quality in these areas (sensitive and non-sensitive) would be negligible with the use of AMR, RPMs, and coordination with the Utah Interagency Smoke Management Program. In addition, coordination with the Utah Interagency Smoke Management Program would also minimize impacts where regulations are not specifically applicable or where broader goals are in place, such as transportation corridors and Class I areas, respectively.

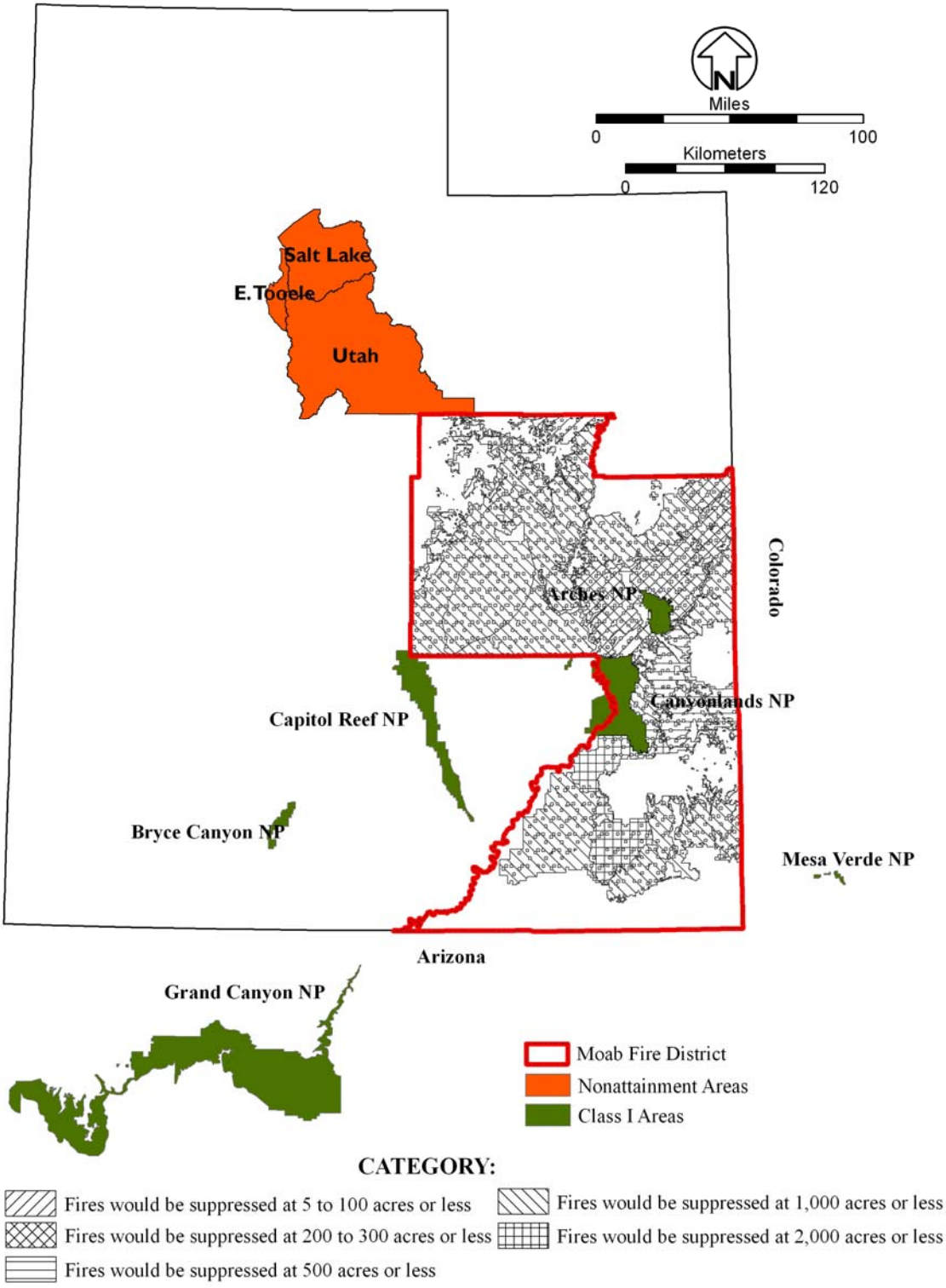
Prescribed fire and non-fire fuel treatments can be effective methods for reducing heavy fuel loads that would otherwise adversely impact air quality during a wildland fire. Managed fires are typically smaller and occur when weather conditions and fuel characteristics are optimal to enhance efficient air pollutant dispersion (NWCG 2001b). Prescribed fire would be coordinated with the SMP program coordinator to meet air quality standards and to minimize impacts to NAAs and other sensitive areas (Utah Interagency Smoke Management 2000). Potential impacts from the proposed increase in prescribed fire treatments would rise from current management, but each event would undergo site-specific analysis to quantify and minimize impacts. Utilizing non-fire options for fuels reduction would negate potential air quality impacts from prescribed fire fuel treatments.

Long-term Impacts

The Proposed Action would decrease the potential for the occurrence of severe and uncontrollable wildland fires and would create a trend toward a more "natural" fire occurrence on BLM-managed lands. These efforts would enable the agency to manage wildland fire and associated emissions more effectively, thereby decreasing the potential for negative impacts to air quality.

The use of planned fire and mechanical treatments would continue to have a minor impact on air quality. The planned nature of these events would allow BLM to schedule and locate treatments for optimal control of emissions. As discussed above, the major impact from these actions is the trend toward a decreased FRCC and fewer severe and uncontrollable wildfires.

FIGURE 4.1: NON-ATTAINMENT AREAS, CLASS I AREAS, AND FIRE MANAGEMENT CATEGORIES FOR THE PROPOSED ACTION



4.2.2 AREAS OF CRITICAL ENVIRONMENTAL CONCERN

As shown in **Figure 4.2**, less than one percent of ACEC lands are found within 100-acre suppression goal FMUs, less than one percent are found within 500-acre suppression goal FMUs, approximately 63 percent are found within 1,000-acre suppression goal FMUs, and approximately 37 percent are found within 2,000-acre suppression goal FMUs. In all categories, management activities would be carried out in a manner that would minimize impacts to the values of each ACEC.

Short-term Impacts

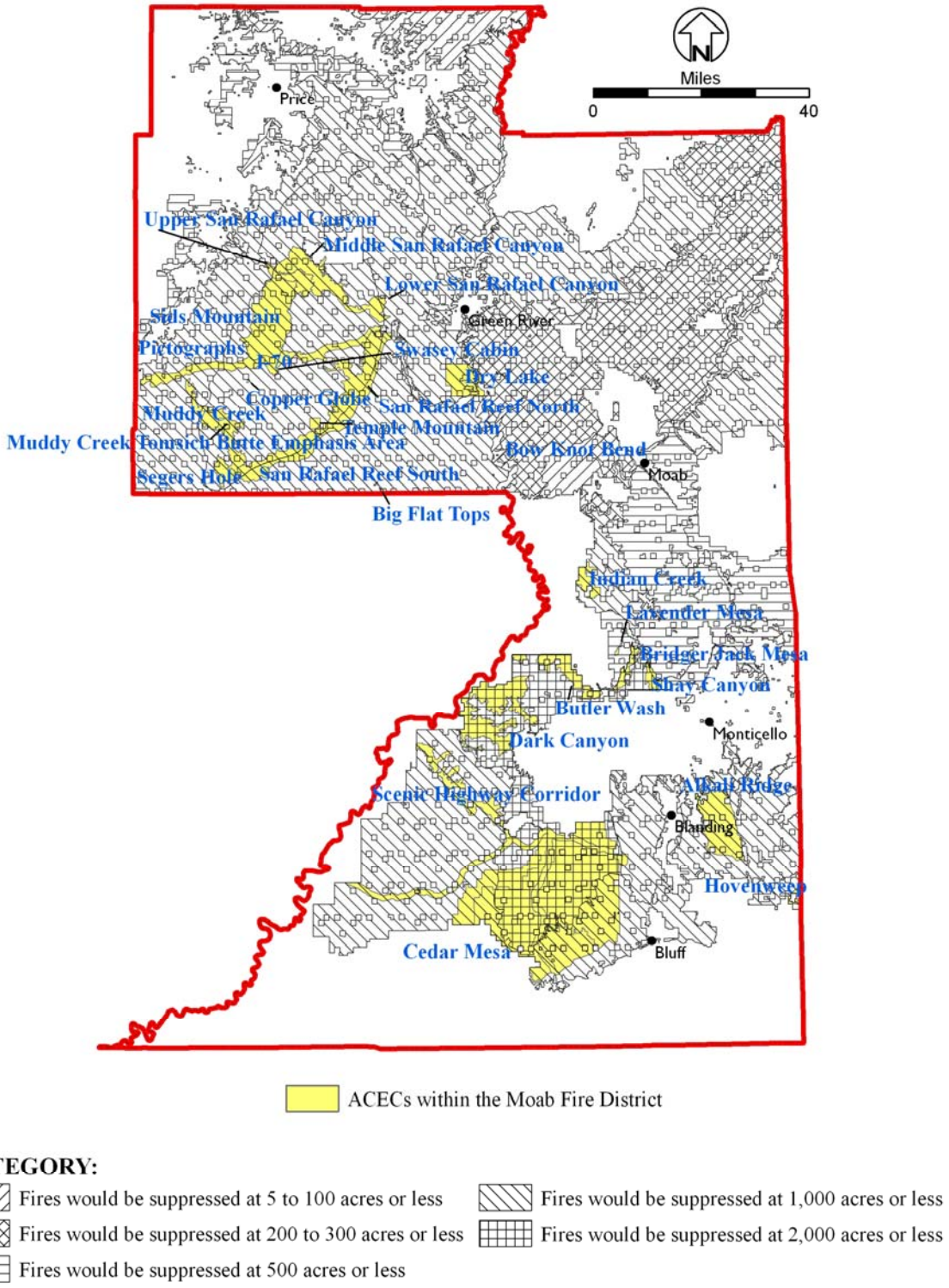
Under the Proposed Action, full suppression of wildland fires may be implemented to control fire size and severity in order to protect resource values in ACECs and on adjacent lands. Likewise, naturally-ignited fires may occur in areas identified as appropriate for allowing fire to play a more natural role. Any degree of suppression efforts could potentially have adverse impacts on ACECs.

Short-term impacts would be minimized by following management guidelines for ACECs, although ground disturbance could occur due to suppression and control efforts (e.g. hand lines and spike camps). Short-term impacts from suppression efforts would likely be much less than allowing fire to harm the natural, scenic, or biological values ACECs were designated to protect. Short-term and limited impacts for wildland fire suppression could include disturbance to physical resources such as soils, watershed functions, vegetation conditions, and habitats for SSS and fish and wildlife. Impacts to physical resources are discussed in their respective sections. To minimize impairment, RPMs have been built into the Proposed Action to protect ACEC values and physical resources. Due to the increased emphasis on suppression, ACECs within FMUs assigned lower per-fire event suppression goals (five to 100 acres and less than 500 acres) would likely see more short-term impacts from suppression activities than those ACECs in FMUs with higher per-fire event suppression goals (less than 1,000 acres and less than 2,000 acres). AMR during a wildland fire would seek to minimize, when possible, adverse impacts or impairment of the values inherent to each ACEC including limiting the use of mechanical suppression activities, recommending smaller fire camps, and removing tracks and traces of fire suppression actions. Suppression would be prioritized to protect the unique values threatened by wildland fire and designed, when possible, to avoid impairment of values.

Impacts could also be minimized by post-fire rehabilitation efforts. ES&R activities, including seeding, would be prioritized to stabilize wildland fire areas, to minimize the threat from establishment of invasive and invasive/non-native weed species, and to preserve the natural and unique values inherent to each ACEC. ES&R efforts may be noticeable after fire events as the areas become re-vegetated. Restoration efforts would be designed, when possible, to avoid impairment of the relevant and important values the ACECs were designated to protect.

Wildland fires may be managed by what is deemed an appropriate response (including wildland fire use) to naturally-ignited wildland fires to accomplish specific resource management objectives that may be identified in predefined designated portions of these management areas. Objectives are generally designed to have positive long-term impacts (as described below) with short-term impacts that may include impaired air quality adjacent to or within ACECs. Also, a burned or modified landscape and limited visibility may be aesthetically displeasing to recreationists, but these impacts to the quality of visitor experience would be limited to the duration and area of the fire and would not likely affect overall use and appreciation of the unique values present within other portions of these designations.

FIGURE 4.2: AREAS OF CRITICAL ENVIRONMENTAL CONCERN AND FIRE MANAGEMENT CATEGORIES FOR THE PROPOSED ACTION



Prior to approval, prescribed fire and non-fire fuel treatment plans would undergo site-specific environmental evaluation to determine potential impacts to the resource. Methods used to implement these fire management actions would be of minimal impact to the resource. Prescribed fire would help maintain the naturalness of ACECs by allowing wildfire to play a more natural role in the ecosystem.

Long-term Impacts

The Proposed Action would result in modification of the current condition to a DWFC more historically representative of natural vegetation conditions. Long-term impacts associated with the use of an AMR to wildland fire suppression and wildland fire use, as well as planned prescribed fire and non-fire fuel treatments are the decreased risk of large severe wildland fire events. The trend away from these unwanted events would be a direct result of the removal of hazardous fuels over time. The removal of hazardous fuels and reduced risk of severe wildland fire events would benefit ACECs by preserving their relevant and important values.

Implementing the proposed fire management goals of reducing hazardous fuels to restore natural ecosystems and allowing fire to function in its natural ecological role would enhance and preserve natural conditions and the array of supplemental values contained within these management areas. Likewise, restoration of the historic natural condition would enhance the values associated with specific ACECs.

4.2.3 CULTURAL RESOURCES

Short-term Impacts

Direct effects of fire suppression efforts, wildland fire use, prescribed fire, non-fire treatments, and ES&R actions could impact the thousands of cultural resource sites on BLM-administered lands within the planning area.. RPMs incorporated into the Proposed Action such as pre-treatment surveys and subsequent avoidance, would minimize impacts to cultural resources. However, not all cultural resources are easily detectable or avoidable, and the potential for impacts on cultural resources, particularly historic properties, does exist throughout the planning area (including those resources in recognized congressional and administratively designated areas of importance).

Often, cultural resources are at greater risk of impacts from fire suppression activities than from wildland fire itself. Suppression efforts (e.g., establishment of firelines, helicopter bases, safety zones, and fire camps), may be ground-disturbing and could destroy artifacts and the integrity of cultural resource sites. Water, foam detergents, fire, and fire retardants could damage artifacts and features by causing swelling and subsequent contraction. Other potential short-term impacts would include rapid cooling and subsequent damage (e.g., breakage, spalling, corrosion, staining, rusting) of archaeological materials. Discoloration or warping of metallic surfaces could also occur. Rock art is particularly sensitive to retardants.

In contrast to current wildland fire management direction, the Proposed Action would decrease the impact on cultural resources through its emphasis on resource protection. These protections are incorporated into the Proposed Action through RPMs. The Proposed Action has the potential to have smaller but more wildland fires and more wildland fire use acres than the No Action Alternative. Historic-aged resources such as the Swasey Cabin or Muddy Creek historic sites are more susceptible to impacts from wildland fire relative to prehistoric-aged resources (SHPO 2005). Consultation with a cultural resource specialist during suppression and ES&R activities in areas containing sensitive resources would help to minimize impacts.

Following suppression, ES&R and other planned actions with potential to effect cultural resources are subject to the requirements of Section 106 of NHPA, as amended (36 CFR 800; consultation with Utah State Historic Preservation Officer). Areas affected by surface disturbance would be subject to a cultural resource inventory to lower the potential for impacts on cultural resources.

Wildland fire use has the potential to have minor impacts on cultural resources. By limiting wildland fire use to areas where there is minimal potential impact and/or where lower temperature and durations of fire are expected, impacts would be mitigated.

Prescribed fire treatments are designed to burn for a short duration at lower temperatures and potential impacts from these methods would typically be less than in wildland fire. In site-specific situations, prescribed fire treatment may be preceded by non-fire fuels reduction actions to obtain a smaller, more manageable, and less severe burn. Non-fire fuel treatments and related ground-disturbing activities could directly impact cultural resources, depending upon location and treatment method. The potential for proposed prescribed fire, non-fire fuel treatments, and ES&R actions to impact cultural resources would be considered during all phases of planning and implementation on a project-by-project basis. The most commonly selected method for the management of cultural resources located in an area of potential effect is complete avoidance of known resources. Because of the effectiveness of pre-treatment planning, the potential for impacts to cultural resources is negligible for prescribed fire and non-fire fuel treatments.

Long-term Impacts

The continued trend toward a decrease in fuel loads in the Proposed Action would result in fewer occurrences of large, severe wildland fires and a concurrent reduction in suppression levels. Less suppression effort would in turn, result in a long-term decrease in potential cultural resource impacts from ground disturbing and other suppression activities. Although heat- and duration-related impacts would be reduced over time, the potential would remain for rapid cooling and subsequent damage (e.g., breakage, spalling, corrosion, staining, rusting) of archaeological materials, discoloration or warping of metallic surfaces, and rock art damage from fire and fire retardants.

Wildland fire use and prescribed fire typically burn at a lower temperature and duration than large wildland fire events, and therefore the potential impacts from the former would typically have less long-term impacts than those from an unmanaged wildland fire event. This advantage would continue as soils and vegetation move to an FRCC that further supports planned actions and treatments. Though loss of or damage to cultural resources during all planned fuel treatments is possible, proper planning and consultation with a cultural resource specialist would reduce these impacts to a minimal level. The long-term impact under the Proposed Action would be protection of cultural resources that would, under the No Action Alternative, be more susceptible to damage or destruction.

4.2.4 ENVIRONMENTAL JUSTICE

Short-term Impacts

Under the Proposed Action, negligible disproportionate impacts to minority or low income populations are anticipated for all planned and unplanned management actions. Potential impacts to all populations would be related to the loss of pinyon nut and fuelwood harvesting opportunities, although collection of partially burned or fire-killed fuelwood may be enhanced where access is allowed. The amount of wildland fire and suppression efforts vary in many cases, but impacts would be similar between the Proposed Action and No Action Alternatives in the important pinyon nut and fuelwood harvesting areas of Cedar Mesa and the Montezuma Creek watershed.

One of the DWFCs for juniper and pinyon woodlands is to break up continuous stands of the woodlands with a mosaic of sagebrush grasslands. Prescribed fire and non-fire fuel treatments would consider site-specific impacts to pinyon nut and fuelwood harvesting areas, which would minimize disproportionate impacts to minority or low income populations.

Long-term Impacts

Long-term impacts from the Proposed Action would trend toward a decrease in fuel loads in juniper and pinyon woodlands. Decreased fuels loads would result in less likelihood of severe fire events that cause direct loss of pinyon nut harvesting opportunities. Fewer severe fire events would offset the overall decrease in pinyon and juniper woodlands due to planned actions.

4.2.5 FLOODPLAINS

Effects of fire management activities on floodplain resources are closely associated with effects to soil, water, wildlife, SSS, and riparian-wetlands resources. Additional analysis of the impacts to the components of floodplains can be found in their respective resource sections.

Short-term Impacts

Impacts on floodplain resources would be lessened through use of an AMR, RPMs, and conformance to existing guidelines (EO 11988). These measures would be implemented during wildland fire suppression activities, and prescribed fire and non-fire fuel treatments, to address ground-disturbing actions, loss of stream channel stability, and increased erosion due to vegetation loss. Under the Proposed Action, wildland fires in floodplain habitats (e.g., riparian-wetlands areas) would generally be suppressed. This would minimize impacts to floodplains and riparian functions and values. Impacts to the functional characterization of floodplains are possible during wildland fire use events. These impacts include stream channel instability and increased erosion due to vegetation loss (see General Short-term Effects on ESA-related and BLM Sensitive Species in Section 4.2.8).

Long-term Impacts

Over time, as fire returns to a more natural pattern, there would be fewer indirect impacts from large, severe wildfires including potential sedimentation of streams and reservoirs from wind and water erosion and fugitive dust from wind erosion. With a decrease in severe wildland fires, a corresponding decrease in suppression related impacts (ground disturbance and erosion) would occur. Wildland fire use impacts would become more prevalent, and with a decrease in the severity of wildland fire events the impacts to channel stability and erosion from vegetation loss would decrease. Planned actions would re-establish more native vegetative species to floodplains. A decrease in root structure erosion control from riparian vegetation would occur. The decrease in fire severity due to the removal of this species would decrease the potential for erosion.

The burning of floodplain areas would generally be avoided. However, low severity fires could be allowed to burn if benefits to native vegetation and/or floodplain stability would be realized. A trend toward fewer severe wildland fires would increase soil stability, enhance overall bank and channel stability and increase functionality of floodplains, including a decrease in impacts from flash floods. Floodplains would have fewer disturbances from severe wildfires, which would allow greater stability and increased functionality of floodplains, including decreasing the impact of flashfloods.

4.2.6 INVASIVE, NON-NATIVE SPECIES

Short-term Impacts

Invasive and non-native weed populations often multiply after wildfires because seed banks in the soil use the flush of nutrients created by fires and there is a sudden lack of competition from native vegetation. Aggressive seeding, rehabilitation, monitoring, and weed treatment after wildland fire events would help minimize the impacts of weed invasion.

Prescribed fire and non-fire treatments would be planned to aid in the removal of invasive, non-native weeds. In some cases where weeds have been identified as an issue, seeding would follow planned fire and non-fire fuel treatments. Under the Proposed Action, the spread of invasive, non-native weeds following these types of actions would be minimal.

After any surface disturbing treatment, proper rehabilitation is essential to deter the reestablishment of weeds. Implementation may include seeding desirable native and non-native species. Application of seed at appropriate times would quickly establish vegetation and would not allow weed seedlings to take root. Encouraging the growth and productivity of desirable vegetation typically inhibits the re-establishment of invasive weeds. The degree and type of rehabilitation management required would depend on the nature and severity of the weed treatment and the severity of the invasion prior to the treatment.

Long-term Impacts

The appropriate application of wildland fire use, prescribed fire and the likelihood of less severe or smaller wildfires would lower the potential for post-fire weed increases. Following wildland fire, rehabilitation measures that included seeding, weed treatment and monitoring could adequately control the spread of weeds.

4.2.7 NATIVE AMERICAN RELIGIOUS CONCERNS

Short-term Impacts

Often, the facets of a landscape valued in Native American religious beliefs and practices such as Traditional Cultural Properties (TCP) are at greater risk of impacts from fire suppression activities than from the wildland fire itself. Suppression efforts (e.g., establishment of firelines, helicopter bases, safety zones, and fire camps), may be ground disturbing and could impact the integrity of sites and vegetation used by Native Americans in their religious practices.

In contrast to current fire management practices, the Proposed Action (with suppression actions following the AMR) would reduce the total land area targeted for aggressive wildland fire suppression with a resulting decrease in potential disturbance of TCPs from suppression activities.

The Proposed Action's less aggressive suppression response could lead to a short-term increase in wildland fire size, and would increase the exposure of Native American plant use areas and religious sites to heat and associated impacts.

Many areas used traditionally for hunting would likely be revegetated following a wildfire event. In localities where food, medicinal, or raw plant materials are traditionally gathered, the threat of invasive species occupying those areas would be a concern. ES&R actions would minimize these impacts following wildland fire.

Planned use of wildland fire would tend to moderate potential landscape impacts. However, wildland fire use would be allowed only in areas where impacts to vegetation and other resources would be acceptable, and associated impacts would be minor. Ground-disturbing actions (including seeding) are not associated with wildland fire use, thereby eliminating the potential for associated impacts.

The Proposed Action includes an increase in the implementation of planned fuel reduction treatments. Prescribed fire treatments are often preceded by non-fire fuels reduction activities to assure smaller, more manageable and less severe prescribed fires, which would reduce potential impacts from treatments. Because treatments are planned, appropriate Native American consultation would occur prior to implementation to minimize potential impacts.

Non-fire fuel treatments and associated ground-disturbing activity, could directly impact TCPs, depending upon their location and type. Similar to prescribed fire events, the potential for non-fire fuel treatments to affect TCPs would be considered on a site-specific basis during all phases of planning as well as prior to implementation, thereby minimizing the potential for impacts.

Long-term Impacts

The trend toward a decrease in fuel loads (toward DWFC) would reduce the number of large, severe fires, which in turn would result in the need for fewer future suppression activities. Impacts to TCPs from ground-disturbing fire suppression would subsequently be reduced.

The occurrence of wildland fire use in appropriate areas creates the potential for impacts on a landscape scale. However, those impacts would be in conformity with natural processes that have been interacting with Native American historic religious experiences and sites. As more vegetation trends toward a lower FRCC, opportunities may exist to expand wildland fire use. Ground-disturbing actions (including seeding) are not associated with wildland fire use, thereby removing the potential for associated long-term impacts to vegetation use and religious sites.

Negative impacts from prescribed fire and non-fire fuel treatments would be minor. Consultation with Native American entities would be conducted prior to planned actions. Wildland fire use and prescribed fire may result in beneficial effects in the long term for places of traditional cultural importance by returning native vegetation to a more historically representative condition. Because Native American places of religious importance could be compromised if culturally important native plant species were replaced by non-native species, site-specific planning for treatment in TCPs would include consideration of native plants and shrubs.

4.2.8 SPECIAL STATUS SPECIES

Short-term Impacts

ESA-Related Species

In accordance with Section 7(a) 2 of the ESA of 1973, as amended, the Utah BLM State Office engaged in formal Section 7 consultation with the USFWS. This process involved preparing a BA that included impact analyses and subsequent determinations for all federally listed and proposed species, and considered potential project-related effects (direct and indirect) to each species and their habitat (including those areas designated as critical habitat) from the fire management actions presented in the Moab FMP Proposed Action.

Effects determinations within the BA include May Affect, Not Likely to Adversely Affect (NLAA); May Affect, Likely to Adversely Affect (LAA); and Not Contribute to Federal Listing (NCL). Each determination was based on a combined analysis of potential effects from the Proposed Action for the Draft Utah LUP Amendment for Fire and Fuels Management EA, and the five FMP EA Proposed Actions (for the Salt Lake, Vernal, and Richfield fire planning areas, the Moab Fire District, and the Southern Utah Support Area). For any species with designated or proposed critical habitat, the determination for effects to that habitat was combined with the determination for effects to the species. In this EA, we only present determinations for species that occur or have potential to occur within the Moab Fire District. Determinations take into consideration potential short-term, long-term, and cumulative impacts from wildland fire suppression, wildland fire use, prescribed fire, and non-fire fuel treatments.

Ten species were given a determination of LAA, one species was given a determination of NLAA, and five species were given a determination of NCL. See **Appendix E**. The ten species that were given a determination of LAA include the following: black-footed ferret, southwestern willow flycatcher, California condor, bald eagle, Mexican spotted owl, humpback chub, bonytail, Colorado pikeminnow, razorback sucker,

and Uinta Basin hookless cactus. Designated critical habitats have been finalized (and effects to them analyzed) for the following species: the Mexican spotted owl, humpback chub, bonytail, Colorado pikeminnow, and razorback sucker. The one species that was given a determination of NLAA was the Jones cycladenia. The five species that were given a determination of NCL include the following candidate or petitioned species: the white-tailed prairie dog, Gunnison prairie dog, western yellow-billed cuckoo, Gunnison sage grouse, and Graham's beardtongue. For detailed discussion on the effects determinations for each ESA-related species and the two BLM sensitive species that were included in the BA, refer to the BA and the USFWS Biological Opinion associated with this project.

Additional consultation with the USFWS would still be required for all implementation-level fire management activities if they could occur within suitable or potentially suitable habitat for federally listed species. When appropriate, the Alternative Consultation Agreement to Implement Section 7 Counterpart Regulations may be employed for consultation on projects that support the National Fire Plan.

RPMs incorporated into the Proposed Action have been designed to protect ESA-related species. Additional protection measures for ESA-related species have been identified by the USFWS and are included in **Appendix I**.

BLM Sensitive Species

In addition to RPMs designed to protect ESA-related species and their habitat, RPMs to protect BLM sensitive species have been designed and built into the Proposed Action. These RPMs include the review and inclusion of appropriate management and conservation directions into project proposals as well as adherence to BLM guidance for the management of SSS. The RPMs would also assure that any proposed project would conserve BLM sensitive species and their habitats, and that any action authorized, funded, or carried out by the BLM would not contribute to the need for any SSS to become listed. RPMs would be implemented during wildland fire suppression, wildland fire use, prescribed fire, and non-fire fuel treatment activities, as applicable.

General Short-term Effects on ESA-Related and BLM Sensitive Species

Some of the goals of the Proposed Action are to restore historical habitats and native plant species, and to enhance, maintain, and protect ecological resources. The potential for short-term adverse impacts from suppression or wildland fire use would be offset by long-term beneficial effects of rehabilitation activities (built into the Proposed Action for soil disturbing activities), protected ecological resources (remaining after a suppression event), and reduction of fuels (following implementation of wildland fire use, prescribed fire, or non-fire fuel treatments).

Despite the particular life history and habitat requirements of each SSS, some potential short-term effects can be generalized based on the types of fire management activities being proposed and general ecological principles. The items presented below include potential general impacts that could occur following implementation of the Proposed Action, including application of RPMs. In some cases, depending upon the severity or scope of an effect or recovery rates of a particular species or habitat component, specific effects could be short- or long-term and are, accordingly, listed as such. Typically RPMs are designed to minimize negative effects and prevent them from becoming long term.

Wildland fire suppression has the highest potential for negative effects on SSS because of the emergency nature of suppression actions that sometimes require quick response without detailed, site-specific data or analysis. In some cases, RPMs may not necessarily be fully implemented due to risks to firefighter or public safety. Wildland fire use and prescribed fire could have similar short-term effects as wildland fire suppression. However, because of the application of RPMs and the more planned nature of these actions, short-term effects from wildland fire use and prescribed fire would be reduced compared to wildfire

suppression. Similar effects could also occur from non-fire fuel treatments, but because these actions follow precise and predictable application methods, impacts would be further reduced compared to wildland fire use and prescribed fire.

Short-term impacts may include:

- Visual or auditory disturbance or displacement of individuals (affecting foraging, roosting, and/or reproductive behavior) resulting from vehicles, heavy equipment, firefighters, and low-flying aircraft in the area.
- Mortality or injury of adults, young, or eggs from smoke inhalation during firing operations, or from vehicles or equipment operating in the area.
- Mortality of adults, young, or larvae of aquatic species from using occupied water sources for fire suppression operations.
- Nest/den abandonment or mortality of young or eggs, resulting in the loss of one year's recruitment.
- Injury or mortality due to inadvertent strikes during aerial drops of fire retardant.
- Illness or mortality due to inadvertent chemical contamination of terrestrial species' or aquatic species' habitats, and/or species themselves (e.g., prey species) during aerial applications of fire retardant.
- Heat stress or mortality to special status plants from firing operations.
- Crushing of special status plants from foot traffic or use of vehicles/heavy equipment, resulting in damage or mortality to plants.
- Damage to the seedbank of special status plants from severe fire or mechanical disruption.
- Removal of key habitat components for nesting, denning, foraging, roosting, or cover due to equipment use or firing operations, including the following:
  - Snag removal for safety reasons;
  - Tree and shrub removal and associated soil disturbance during fireline construction or mechanical treatments;
  - Vegetation removal and associated soil disturbance during creation of project support locations (helibases, camps, etc.);
  - Vegetation removal and associated soil disturbance during temporary road construction for access; and
  - Decreased water quantity for aquatic species from dewatering during low-flow periods.
- Damage or loss of riparian or upland vegetation or downed woody debris, and increased surface run-off from fire suppression operations (including ES&R actions), firing operations or mechanical treatments, resulting in the following:
  - Decreased channel stability and alteration of channel morphology;
  - Increased erosion, sediment, and ash levels within and adjacent to the stream channel;
  - Increased water temperatures;
  - Degraded water quality (based on nutrient levels, temperature, and sediment levels);
  - Reduced riparian habitat, in-stream habitat cover, and woody debris that is typically necessary for properly functioning riparian areas and aquatic habitat;
  - Altered water velocities and substrate composition; and
  - Altered composition and decreased abundance of aquatic and terrestrial food sources.

- Increased risk of predation from removal of cover.
- Changes in foraging habitats and/or food and prey quality and quantity.
- Spread of disease or non-native, predatory species within previously uninfected water sources.
- Soil erosion of special status plant habitat.
- An increase in invasive plant species that could out-compete special status plant species.

Short-term Effects on ESA-Related and BLM Sensitive Species Habitat

SSS have suitable habitat and are known to occur within all eight vegetation types within the Moab Fire District. Habitat for these species would be vulnerable to any of the impacts that are discussed in Section 4.2.14 (Vegetation). Although fire management activities would vary among vegetation communities, they could affect species and species habitat to varying degrees within all of the vegetation/habitat types. Two of the largest habitat types within the Moab Fire District (pinyon and juniper woodland and salt desert shrub) would have higher suppression thresholds than the other habitat types within the planning area. Approximately 67 percent of land that would be designated as 1,000-acre or 2,000-acre suppression goal FMUs, are comprised of pinyon and juniper woodland or salt desert shrub habitat. Therefore, species found in these habitats would be more likely to incur short-term adverse impacts, such as mortality, habitat degradation or loss, and temporary or permanent displacement, from large-scale fire suppression efforts than species found in the remaining habitat types with smaller suppression acre goals.

Since species occurrence records do not account for areas that have not been surveyed, unknown individuals or populations of a particular species may exist within any of these vegetation communities. RPMs and USFWS terms and conditions would be followed that would address unknown populations and areas of potentially suitable habitat in many of the vegetation types. This would reduce impacts to unknown populations of ESA-related and sensitive species.

The goals and objectives of the proposed fire management actions are based on the types and condition of the various vegetation communities within the Moab Fire District. In turn, these vegetation communities provide the key habitat components for the various SSS. Many habitats have been altered within Utah by human-caused changes in the structure or composition of the vegetation communities, resulting in a change in the historical fire regime. Some habitats that are fire-adapted have had fire excluded, while invasive/non-native weed infestations now carry wildland fires in some non-fire-adapted habitats. Heavy fuel loads or invasive/non-native plant species put these vegetation communities and the species that inhabit them at greater risk from severe fires.

These changes in vegetation structure and composition can alter both the quality and quantity of various habitats for the federally protected species that occupy them. Section 3.3.15, Vegetation, of this EA describes the FRCC, fire ecology, and status of the vegetation communities on BLM-administered lands in Utah that provide the basis for analysis of the Proposed Action. The list of habitat associations in Chapter 3 of this EA links the SSS that could be affected by the Proposed Action with each vegetation community.

Pinyon and Juniper Woodlands: Because this habitat is relatively removed from a natural fire regime and is likely to be targeted for fire management actions, species found within pinyon/juniper woodland habitat would be more likely than those in other habitats to incur short-term project-related impacts. In addition, species in this habitat would incur greater impacts than those in other habitats because the expanse of this habitat type would decrease due to targeted treatments. Short-term impacts from implementation of fire management activities would include habitat loss and possible species mortality and/or temporary displacement.

Salt Desert Shrub: Species found within salt desert shrub habitat would likely incur short-term project-related impacts. Short-term impacts from implementation of fire management activities could consist of species mortality, temporary displacement, or habitat loss.

Sagebrush: Species in sagebrush habitat would be more likely than those found in other habitats to incur short-term project-related impacts because this habitat is relatively removed from its natural fire regime. Short-term impacts from implementation of fire management activities could consist of species mortality, temporary displacement, or habitat loss.

Mountain Shrub: Species within mountain shrub habitat could incur short-term project-related impacts from fire management actions designed to maintain or lower the current FRCC. Short-term impacts to mountain shrub-dependent species could include species mortality, temporary displacement, or habitat loss.

Grassland: Species that are found within grassland habitat would be more likely than those found in some other habitats to incur short-term project-related impacts because this habitat is relatively far-removed from its natural fire regime. Short-term impacts could result in species mortality, temporary displacement, or habitat loss.

Mixed Conifer: Species in mixed conifer habitat could incur short-term project-related impacts during fire management actions designed to maintain or lower the current FRCC. Short-term impacts associated with fire management actions could include species mortality, temporary displacement, or habitat loss.

Riparian-wetlands: Species within riparian-wetlands habitat could incur short-term project-related impacts during fire management actions including mortality, temporary displacement and/or habitat loss.

Water: Proposed Action impacts could adversely impact water quality of various fisheries and aquatic life throughout the Moab Fire District. The collective short-term impacts of increased erosion and sedimentation could have watershed-wide effects including changes in temperature, loss of wildlife habitat, thermal control and water chemistry changes including fire ash contributions, and contamination by fire suppression retardants, fuel, or petroleum products. RPMs developed for both riparian-wetlands habitat and specific SSS would minimize the potential for short-term adverse impacts to aquatic species and their habitat. Because RPMs would impose acreage and other constraints on prescribed fire and non-fire fuel treatments in and adjacent to riparian-wetlands and water habitats, short-term adverse impacts from these fire management activities would be minimized or eliminated.

Long-term Impacts

General Long-term Effects on ESA-Related and BLM Sensitive Species

With suppression implemented only when necessary and wildland fire use, prescribed fire, and non-fire fuel treatments utilized to minimize fuel loading, vegetation communities and wildlife habitats would transition over time to reflect conditions associated with a habitat's natural fire regime. This transition would create a more balanced (diverse) and stable ecosystem with a reduced threat of severe wildland fire. Long-term beneficial effects would provide for more species diversity in a fire-tolerant ecosystem. Because both wildland fire use and prescribed fires are planned to be less severe than wildland fire, and because rehabilitation is implemented as necessary and appropriate following prescribed fire and wildfire suppression, mortality or long-term displacement of species would likely be avoided. If management activities were implemented repeatedly within the same treatment area such as mechanical treatment followed by prescribed fire followed by biological treatment, populations could be displaced over the long term.

Because of specific operational prescriptions for wildland fire use and prescribed fire, RPMs would be incorporated into site-specific project plans for prescribed fire, and the identification of areas suitable for

wildland fire use would be mapped. By incorporation of RPMs and the fact that the purpose of wildland fire use and prescribed fire is to enhance ecosystems, wildland fire use and prescribed fire would have a greater potential for positive long-term benefits to SSS and their suitable habitat (including designated and critical habitat), than wildland fire suppression. Thus, the short-term effects on SSS that could occur from wildland fire use and prescribed fire are the same as those listed above for wildland fire suppression.

Implementation of RPMs and USFWS Terms and Conditions would minimize or prevent negative long-term effects to habitat quality or quantity. For many species, long-term negative effects could be greater from wildland fire itself, rather than from wildland fire suppression operations. The following beneficial effects on SSS could occur from wildland fire suppression:

- Federally protected species and their designated critical habitat could benefit from wildland fire suppression actions that would prevent the loss of designated critical habitat or suitable habitat from severe wildland fires.
- Federally protected species and their designated critical habitat could experience positive effects of post-fire ES&R efforts.

In contrast, suppression-related actions also have the highest potential of all fire management actions to negatively affect SSS. During fire suppression activities, it may not be possible to fully implement RPMs due to risks to firefighter or public safety. In addition, the emergency nature of suppression action sometimes requires immediate response without detailed, site-specific data or analysis. During emergency suppression actions, long-term adverse impacts to federally protected species and their designated critical habitat could occur from inadvertent mortality of individuals or long-term changes (alteration, removal, damage, or fragmentation) of suitable habitat components.

For situations where extensive or aggressive fire suppression would be appropriate, or when species or habitat components would have a long recovery rate, long-term negative effects could occur. For example, short-term effects could become long-term effects when a species has relatively few individuals, is extremely localized, is specialized in its habitat, or has a slow reproductive rate. Furthermore, direct mortality of individuals in small or endemic populations, or alteration of potentially suitable habitat, could cause long-term negative effects. Because wildland fire suppression operations are typically localized even under extreme conditions, this activity would generally not affect wide-ranging species in the long term, unless they have a low reproductive rate.

Long-term impacts on key habitat components that could affect the ability of a federally protected species to continue occupying a site, could include the following:

- Damage, removal, or fragmentation of nesting, roosting, foraging, dispersal, or cover habitats for terrestrial wildlife (particularly in pinyon and juniper woodlands, mixed forest, or sagebrush habitats).
- Long-term changes in water quality or quantity; removal of riparian or upland vegetation, or downed woody debris; increased surface run-off; or introductions of disease or non-native, predatory species (in reference to fish and other aquatic species and their habitats).
- Extensive or severe damage to seedbanks, substrates, vegetative composition, or structure of habitats for plant species.
- Long-term changes in prey populations when key habitat components are slow to recover.
- An increase in invasive plant species that could out-compete federally protected plant species or alter sensitive (or non-fire adapted) habitats of terrestrial wildlife species following fire suppression. RPMs or ES&R activities would typically mitigate this potential effect to prevent it from becoming a long-term impact.

Characteristic planning activities such as project surveys and consultation with the USFWS as well as the implementation of RPMs and USFWS Terms and Conditions, would typically prevent mortality of individual species during prescribed fire and non-fire fuel treatment activities. Additionally, identification of areas suitable for wildland fire use would prevent mortality of individual species. These actions would minimize or prevent alteration of, damage to, removal of, or fragmentation of key habitat components within designated critical or suitable habitat for SSS. As a result, negative long-term effects to species or suitable habitat would generally be avoided or limited in scope and/or intensity.

Conversely, if key habitat components were targeted for permanent change in structure or composition by fire management or resource objectives, long-term effects could be negative or beneficial for a species, depending on its particular habitat needs. Long-term effects could occur from wildland fire use, prescribed fire, or non-fire fuel treatment. Short-term effects could become long-term effects when a species has relatively few individuals, is extremely localized, is specialized in its habitat, or has a slow reproductive rate. Furthermore, direct mortality of individuals in small or endemic populations or alteration of potentially suitable habitat could cause long-term negative effects.

Long-term impacts on key habitat components due to wildland fire use, prescribed fire and non-fire fuels treatment are similar to those listed above for wildland fire suppression. In some cases, long-term beneficial effects could potentially benefit species' reproduction, numbers, or distribution, facilitating the return of a species to its historic range. Long-term beneficial effects to species could result from (1) decreased risk for large, severe fire events through fuels reduction and the gradual transition to a more natural fire regime, or (2) restoration of habitats that have been altered by either invasion of non-native species or long-term exclusion of fire (in fire-adapted vegetation communities).

Long-term Effects on ESA-Related and BLM Sensitive Species Habitat

Pinyon and Juniper Woodlands: Long-term beneficial effects would include the transition to a more stable ecosystem (habitat) with less risk of severe wildland fire.

Salt Desert Shrub: Long-term beneficial effects would include stabilization of the ecosystem (habitat), with a decreased risk of severe wildland fire.

Sagebrush: Because sagebrush habitat can take as long as 30 years to recover from prescribed fire, long-term effects could include a loss of habitat. Habitat loss would be offset by an expanded acreage of high-elevation sagebrush habitat (from removal of pinyon and juniper woodlands) and an overall transition to a lower FRCC within both low- and high-elevation sagebrush habitats. Because this transition would indicate a lower risk for severe wildland fire, species associated with sagebrush habitat would experience long-term beneficial effects.

Mountain Shrub: Wildland fire use, prescribed fire, non-fire fuel treatments, and post-fire seeding would begin to restore a more diverse mountain shrub ecosystem, trending it toward a lower FRCC with lower risk for severe wildfire.

Grassland: The establishment of a lower FRCC would produce the long-term beneficial effect of a lower risk for severe wildfire. Because this habitat would eventually be expanded by reduction of pinyon and juniper woodlands, SSS that utilize grasslands would benefit from increased habitat acreage.

Mixed Conifer: The long-term effects of the proposed project would eventually produce a more stable ecosystem with a lower FRCC, enhancing species diversity and creating a lower risk for severe wildland fire. Mixed conifer habitats and the species associated with them would experience a long-term beneficial effect.

Riparian-wetlands: Long-term effects would include a more diverse ecosystem and a reduced risk of severe wildland fire.

Water: The long-term effect of the Proposed Action on water and aquatic inhabitants would be beneficial. With a reduced risk for severe wildland fire in upstream and adjacent habitats, the ecosystems would be less likely to incur such large-scale adverse impacts from fire as to decimate any entire aquatic population.

4.2.9 WATER QUALITY

Short-term Impacts

Surface Water

Under the Proposed Action, wildland-fire-impacted acres (including wildland fire use), in combination with an increase in prescribed fire and non-fire fuel treatments, could increase runoff, erosion, and stream temperatures. Increased erosion and runoff, which carry nutrients, ash, and excess sediment into water courses from burned areas, could result in nutrient concentration and turbidity increases in surface water. Disturbance associated with prescribed fire and non-fire fuel treatments would be evaluated through an environmental planning and review process that would minimize impacts related to increases in surface runoff, soil loss, and sediment input to surface water. Often these impacts are short term and conditions return to pre-fire levels once vegetation is re-established.

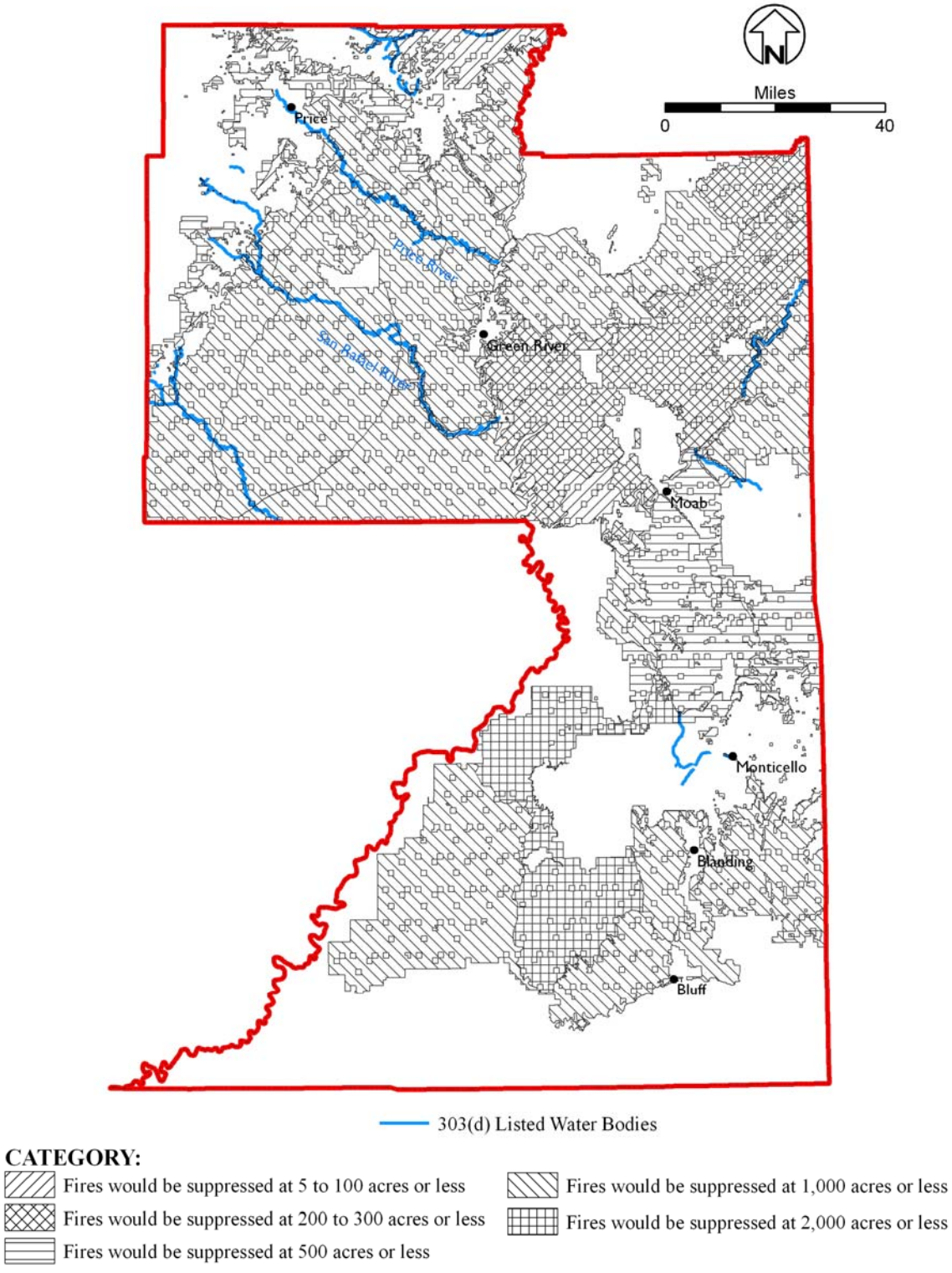
Figure 4.3 presents the location of 303(d)-listed waterbodies identified in the planning area with the BLM-administered lands categorized by proposed fire management levels. Wildland fire suppression efforts and planned fuel reduction projects would have minimal impacts on impaired water as a result of compliance strategies for restoring or maintaining the restoration of water quality impaired [303(d) listed] waterbodies. Proposed RPMs would restrict activities in the vicinity of sensitive areas such as impaired waterbodies (i.e. 303(d)-listed) to reduce further degradation of the surface water conditions.

The Proposed Action would allow more flexibility in planned activities to manage fuel loads and would implement RPMs to reduce potential effects to water resources. Potential impacts to water resources would be considered before implementing prescribed burns, non-fire fuel treatments, or ES&R efforts.

Groundwater

Minor impacts on groundwater quality from the Proposed Action are possible due to altered water infiltration patterns from a decrease in vegetation cover following wildland fire or fuel treatments and from soil compaction due to mechanical equipment. Additionally, infiltration could temporarily decrease after a fire due to the formation of a hydrophobic soil layer. Altered water infiltration rates could also potentially temporarily increase or decrease the chemical levels (i.e., dissolved solids) in shallow aquifers (Allison et al. 1994). The impact to groundwater would be dependent on the depth to groundwater below ground surface and the type of sediments or bedrock it passes through. The change in the infiltration capacity of the soil would be dependent on the fire severity, soil type, and the vegetation's ability to re-occupy a site following fire.

FIGURE 4.3: 303(D)-LISTED WATERBODIES AND FIRE MANAGEMENT CATEGORIES FOR THE PROPOSED ACTION



Long-term Impacts

Surface Water

Wildland fires would be smaller and less severe resulting in fewer impacts to stream flows and nutrient and sediment loads. A trend toward fewer severe wildland fires would increase soil stability and enhance overall stream bank and channel stability as well as health and functioning of the watershed. Some areas would see a more sustainable supply of woody debris or stream bank vegetation, which would also increase bank stability.

Planned fire actions and eventual restoration of natural fire regimes, under the Proposed Action, would improve water resources by reducing the risk of high-severity wildfire and promoting native vegetation types. The Proposed Action would also reduce erosion potential in the long term by fostering a healthy, native understory. The Proposed Action would allow more flexibility in implementing and timing planned actions that would protect water resources.

Groundwater

The Proposed Action would encourage a trend toward fewer severe wildland fires that otherwise could cause damage to soil resources with resultant impacts to groundwater. Positive long-term effects of a reduced number of extreme wildland fires are related to a reduction in the alteration of infiltration rates, which would be realized through a long-term increase in vegetation surface cover and root zone presence with less fire-caused hydrophobicity.

4.2.10 RIPARIAN-WETLANDS AREAS

Short-term Impacts

The Proposed Action includes RPMs that would help protect riparian-wetlands resources, although the potential does exist for impacts from wildland fire suppression and other fire management actions. Riparian areas are found throughout the planning area and in all suppression categories. To minimize impacts on riparian health and function, fires in riparian areas would generally be suppressed. However, low-intensity fires could be allowed to burn with some control when riparian area enhancement and stand diversity would be improved. Periodic low-intensity fires may also reduce the likelihood of a severe fire, which would cause greater damage to riparian-wetlands areas.

Proposed RPMs would restrict ground-disturbing suppression activities in the vicinity of riparian-wetlands areas. Short-term impacts of suppression activities could include vegetation damage or loss, increased streambank and shore erosion, and increased sedimentation in streams (resulting in loss of fish habitat and compromised water quality). The loss of streamside vegetation could increase stream temperature, resulting in loss of fish and other aquatic species' habitat. Additionally, non-native plant species found in the planning area generally recover faster than native plant species after a disturbance**,** increasing fire susceptibility. Potential impacts on riparian areas from heavy equipment would be minimized through initial resource specialist consultation, which would continue throughout the fire event. In addition, ES&R actions would lessen potential impacts from erosion and invasive species.

More acres are identified as appropriate for prescribed fire and non-fire fuel treatments under the Proposed Action compared to what has been performed over the past 10 years. Treatments may be utilized in riparian areas to reduce invasive tamarisk and Russian olive, and to restore native vegetation. Vegetation disturbances associated with treatment would be evaluated through an environmental planning and review process to minimize impacts related to vegetation loss and increased erosion, and to address potential restoration of native species.

Long-term Impacts

Potential for long-term benefits to riparian-wetlands areas would be greater under this alternative in comparison to current management. Overall, conditions would improve through the removal of undesirable vegetation, which would lessen the chances of high-severity wildfire and promote the growth and natural succession of native vegetation types.

Wildland fires would be smaller and less severe, resulting in fewer impacts on vegetation and sediment loads, and fewer altered wildlife habitats. Low-intensity fires may be allowed to burn with some suppression control to reduce the likelihood of a severe fire, which would cause greater damage to these areas. A trend toward fewer severe wildland fires would increase soil and channel stability as well as promote health and functioning of the watershed. Some areas would see an increase in sustainable woody debris and/or streambank vegetation, which would also increase bank stability. Riparian areas would have fewer disturbances from severe wildfires, promoting stability and increased functionality of floodplains, including a lowered impact from flashflooding.

Proposed fire management and fuels reduction actions would improve riparian resources and reduce erosion potential in the long term by fostering a healthy, native understory. The Proposed Action would allow more flexibility in the implementation and timing of planned management actions designed to protect riparian-wetlands resources.

4.2.11 WILD AND SCENIC RIVERS

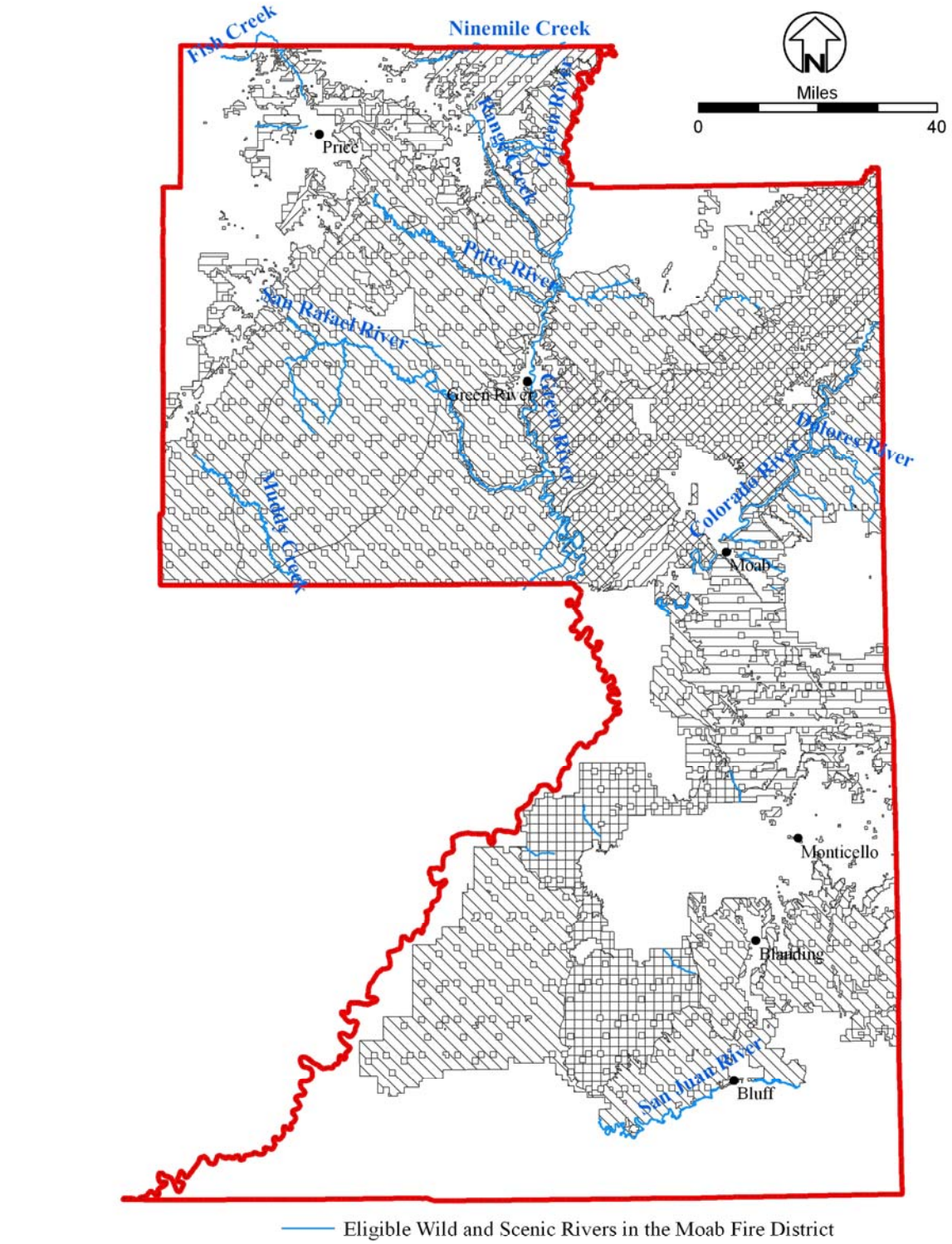
Figure 4.4 shows eligible Wild and Scenic Rivers under the Proposed Action.

Short-term Impacts

Minimized by following management guidelines for Wild and Scenic Rivers (including eligible segments), short-term impacts on eligible river segments resulting from wildland fire suppression efforts may still include ground disturbances (e.g., hand lines and spike camps). The short-term impacts from suppression efforts would likely be much less than allowing fires to potentially burn and harm native ecosystems, natural, scenic, or recreational values of river segments. Short-term and limited impacts for wildland fire suppression could include disturbance to soils, surface and groundwater, watershed functions, vegetation conditions and habitats for SSS and fish and wildlife. To minimize the impairment of values associated with all Wild and Scenic Rivers eligibility, RPMs have been built into the Proposed Action to protect the physical resources that comprise a Wild and Scenic River (e.g., soil, water, SSS, and cultural resources). Impacts to these physical resources are discussed in their respective sections.

Due to the increased emphasis on suppression, those river segments within FMUs with lower per fire event suppression goals (five to 100 acres and less than 500 acres) would likely see more short-term impacts from suppression activities than those river segments in FMUs with higher per fire event suppression goals (less than 1,000 acres and less than 2,000 acres). AMR during a wildland fire would seek to minimize, when possible, adverse impacts or impairment of the values inherent to each river segment; which may include limiting the use of mechanical suppression activities, recommending smaller fire camps and removing tracks and traces of fire suppression actions. Suppression would be prioritized to protect the unique values threatened by wildfire and designed, when possible, to avoid impairment of values. These efforts would not likely impact or impair the eligibility of river segments.

FIGURE 4.4: ELIGIBLE WILD AND SCENIC RIVERS FOR THE PROPOSED ACTION



CATEGORY:

- Fires would be suppressed at 5 to 100 acres or less
- Fires would be suppressed at 200 to 300 acres or less
- Fires would be suppressed at 500 acres or less
- Fires would be suppressed at 1,000 acres or less
- Fires would be suppressed at 2,000 acres or less

ES&R activities, including seeding, would be prioritized to stabilize wildfire areas, minimize the threat of invasive/non-native weed species becoming established, reduce erosion, and preserve inherent natural and unique values. ES&R efforts may be noticeable after fire events as the areas become re-vegetated. Suppression and restoration efforts would be designed, when possible, to avoid impairment of outstandingly remarkable values. Therefore, they would not likely impact or impair the segment's suitability for designation as wild, scenic, or recreational.

Fires may be managed by what is deemed an appropriate response (including wildland fire use) to naturally-ignited wildland fires to accomplish specific resource management objectives in predefined designated portions of these management areas. Objectives are generally designed to have positive long-term impacts (as described below) with short-term impacts that may include impaired air and water quality near or in river segments. Also, a burned or modified landscape and limited visibility may be aesthetically displeasing to recreationists, but these impacts on the quality of visitor experience would be limited to the duration and area of the fire and likely would not affect overall use and appreciation of the unique values present within other portions of these designations.

More acres are identified as appropriate for prescribed fire and non-fire fuel treatments under the Proposed Action than was performed in the preceding 10 years. All planned management activities, including prescribed fires and non-fire fuel treatments, would undergo a site-specific environmental evaluation to determine potential impacts to the resource prior to being approved. Methods used to implement these fire management actions would be of minimal impact to the resource. Prescribed fire would help maintain the naturalness of river segments by bringing FRCC to a point that would allow wildfire to play a natural role in the ecosystem.

Long-term Impacts

The Proposed Action would result in modification of the current condition to a DWFC that would be more historically representative of the natural vegetation cover. Long-term impacts associated with the use of an AMR to wildfire suppression, wildland fire use and the planned actions of prescribed fire and non-fire fuel treatments are the decreased risk of large severe wildfire events. The trend away from these unwanted events is due to the metered removal of hazardous fuels over time. The removal of hazardous fuels and reduced risk of severe wildland fire events would beneficially affect river segments by preserving their remarkable values.

By implementing the proposed fire management goals of reducing hazardous fuels to restore natural ecosystems and allowing fire to function in its natural ecological role, natural conditions, and the array of supplemental values contained within these management areas would be enhanced and preserved. Likewise, visitor experience and opportunities may be enhanced by the restoration of the historical natural condition.

4.2.12 WILDERNESS STUDY AREAS

As shown in **Figure 4.5**, approximately four percent of WSA lands are found within 100-acre suppression goal FMUs, less than one percent are found within 200 and/or 300-acre suppression goal FMUs, approximately two percent are found within 500-acre suppression goal FMUs, approximately 75 percent are found within 1,000-acre suppression goal FMUs, and approximately 18 percent are found within 2,000-acre suppression goal FMUs. In all categories, management activities would be carried out in a manner that would minimize impacts to the wilderness suitability of each WSA.

Short-term Impacts

Short-term impacts resulting from wildland fire suppression could include ground disturbances (e.g. hand lines and spike camps). Potential impacts to other resources occurring within WSAs are discussed throughout this chapter in their respective sections.

Due to the increased emphasis on suppression, WSAs within FMUs that have lower per-fire event suppression goals (five to 100 acres and 200 to 300 acres) would likely see more short-term impacts from suppression activities than those WSAs in FMUs with higher per-fire event suppression goals (less than 1,000 acres and less than 2,000 acres). AMR during a wildland fire would seek to minimize, when possible, adverse impacts or impairment to WSA values; which may include limiting the use of mechanical suppression activities, recommending smaller fire camps, and/or minimum impact suppression tactics. Suppression would be prioritized to protect unique values threatened by wildland fire and would be designed, when possible, to avoid impairment of values.

Impacts would also be minimized by post-fire rehabilitation efforts. The least damaging ES&R activities, including seeding, would be used within these areas to stabilize wildfire areas, minimize the threat of invasive, non-native weed species becoming established, reduce erosion, and preserve the natural and unique values inherent to each WSA. Suppression and restoration efforts would be designed with resource specialist input, when possible, to avoid impairment of a WSA's suitability for wilderness designation.

Naturally-ignited wildland fires may be managed as wildland fire use to accomplish specific resource management objectives identified in portions of these management areas. Objectives are generally designed to have positive long-term impacts (as described below) with short-term impacts that may include impaired air quality near or in WSAs. Also, a burned or modified landscape and limited visibility may be aesthetically displeasing to recreationists, but these impacts on the quality of visitor experience would be limited to the duration and area of the fire and would not likely affect overall use and appreciation of the unique values present within other portions of these designations.

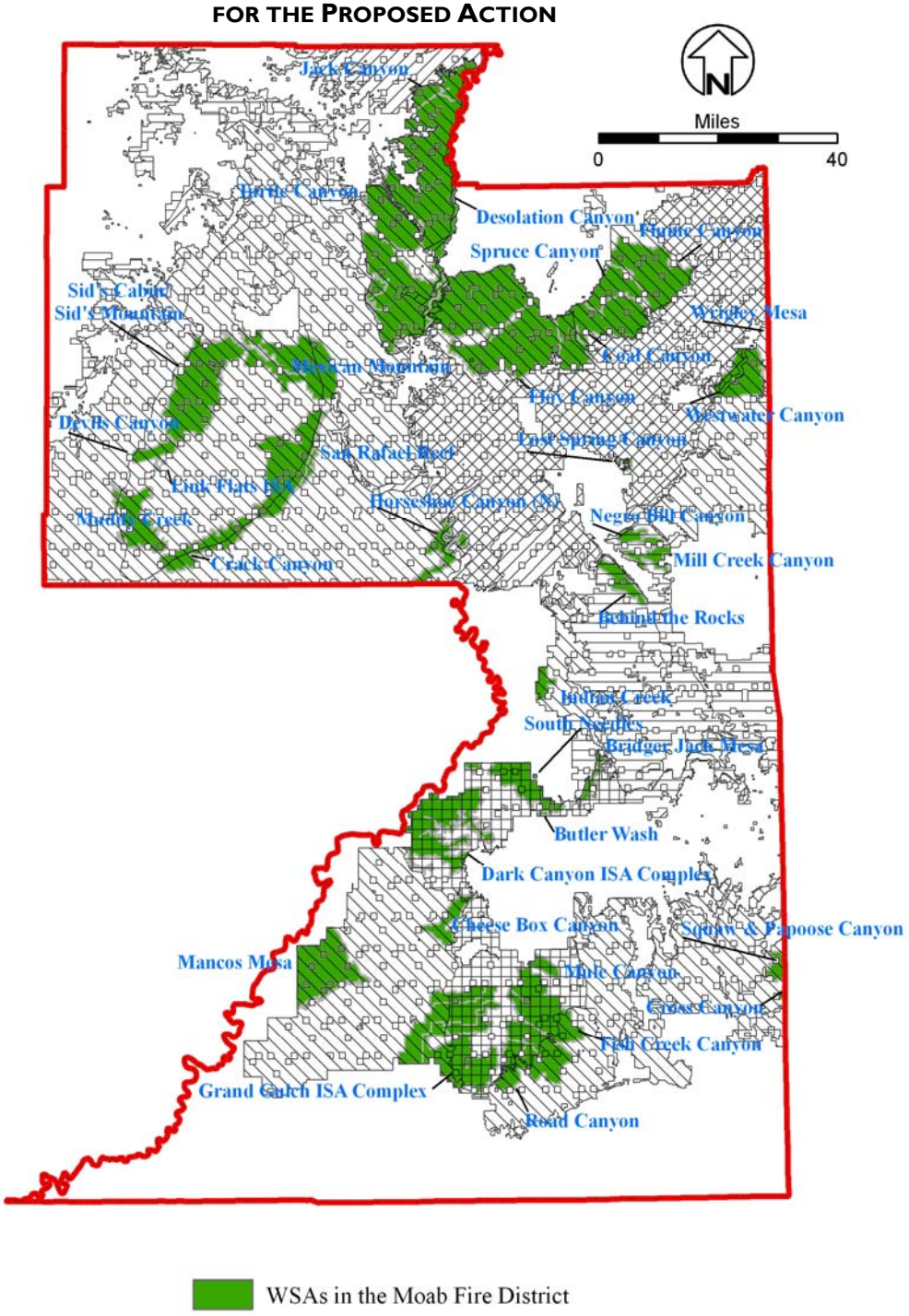
Prior to approval, all planned management activities, including prescribed fires and non-fire fuel treatments, would undergo site-specific analysis to determine potential impacts and to mitigate activities to ensure minimal impact to the resource. Non-fire fuel treatments would be used minimally, if at all, within WSAs.

Long-term Impacts

The Proposed Action would result in modification of the current condition to a DWFC that would be more historically representative of natural vegetation conditions. Long-term impacts associated with the use of an AMR to suppress wildfire, the implementation of wildland fire use, and planned actions such as prescribed fire and non-fire fuel treatments, are the decreased risk of large severe wildfire events. The trend away from unwanted catastrophic wildland events is due to the removal of hazardous fuels over time. The removal of hazardous fuels and reduced risk of severe wildland fire events would beneficially affect WSAs by preserving their wilderness suitability and opportunities for solitude and primitive recreation.

Restoration of natural ecosystems could be achieved by accomplishing proposed fire management goals such as hazardous fuels reduction and allowing wildland fire to function in its natural ecological role. Successful restoration would enhance the natural conditions of WSAs and preserve the array of supplemental values contained within these management areas.

FIGURE 4.5: WILDERNESS STUDY AREAS AND FIRE MANAGEMENT CATEGORIES FOR THE PROPOSED ACTION



CATEGORY:

- Fires would be suppressed at 5 to 100 acres or less
- Fires would be suppressed at 200 to 300 acres or less
- Fires would be suppressed at 500 acres or less
- Fires would be suppressed at 1,000 acres or less
- Fires would be suppressed at 2,000 acres or less

4.2.13 LIVESTOCK GRAZING

Short-term Impacts

The primary purpose of fire management actions on rangelands within the Moab Fire District is to reduce fuels and the cover of encroaching undesirable vegetation species. Multiple benefits would be obtained by low intensity and duration wildland fire events as well as planned fuel reduction treatments. Increased production, nutrient quality and diversity, and palatability of herbaceous plants are observed after a burn. Fire breaks up large tracts of sagebrush and pinyon and juniper dominated landscapes and establishes a mosaic of vegetation types. The creation of openings and more nutritious, palatable forage would attract livestock concentration and result in minor to moderate shifts in livestock utilization and distribution patterns.

The most substantial impact on grazing after a wildland fire is the temporary loss of allotment use. The impact on grazing allotments would be a decrease in forage over large areas (possibly up to 2,000 acres) where rest periods are required. This could cause negative economic impact on the permittee and the need to find alternative grazing or feeding arrangements. The need for management of livestock use on a burned area is most critical in the first growing season after fire, particularly in plant communities of arid and semiarid regions (Trlica 1977). If livestock have premature access to the burn, the full benefits of fire may not be realized and negative impacts to soil and vegetation could occur (Bunting et al. 1987).

Under the Proposed Action, approximately six percent of grazing allotments fall into the 100-acre suppression goal category, 14 percent are found in the 200- and/or 300-acre suppression goal category, 11 percent are in the 500-acre suppression category, 61 percent are in the 1,000-acre suppression category, and eight percent are in the 2,000-acre suppression goal category. As indicated by this distribution, the majority of grazing allotments are located in areas where wildland fire management goals are focused on moderate suppression efforts (suppression at 1,000 acres or less). **Figure 4.6** presents the location of grazing allotments relative to fire management categories.

Prescribed fire and non-fire fuel treatment actions would be coordinated with permittees to reduce impacts from loss of grazing use on allotments that fall within treatment areas. The need for management of livestock use on a burned area is most critical in the first growing season after fire, particularly in plant communities of arid and semiarid regions (Trlica 1977).

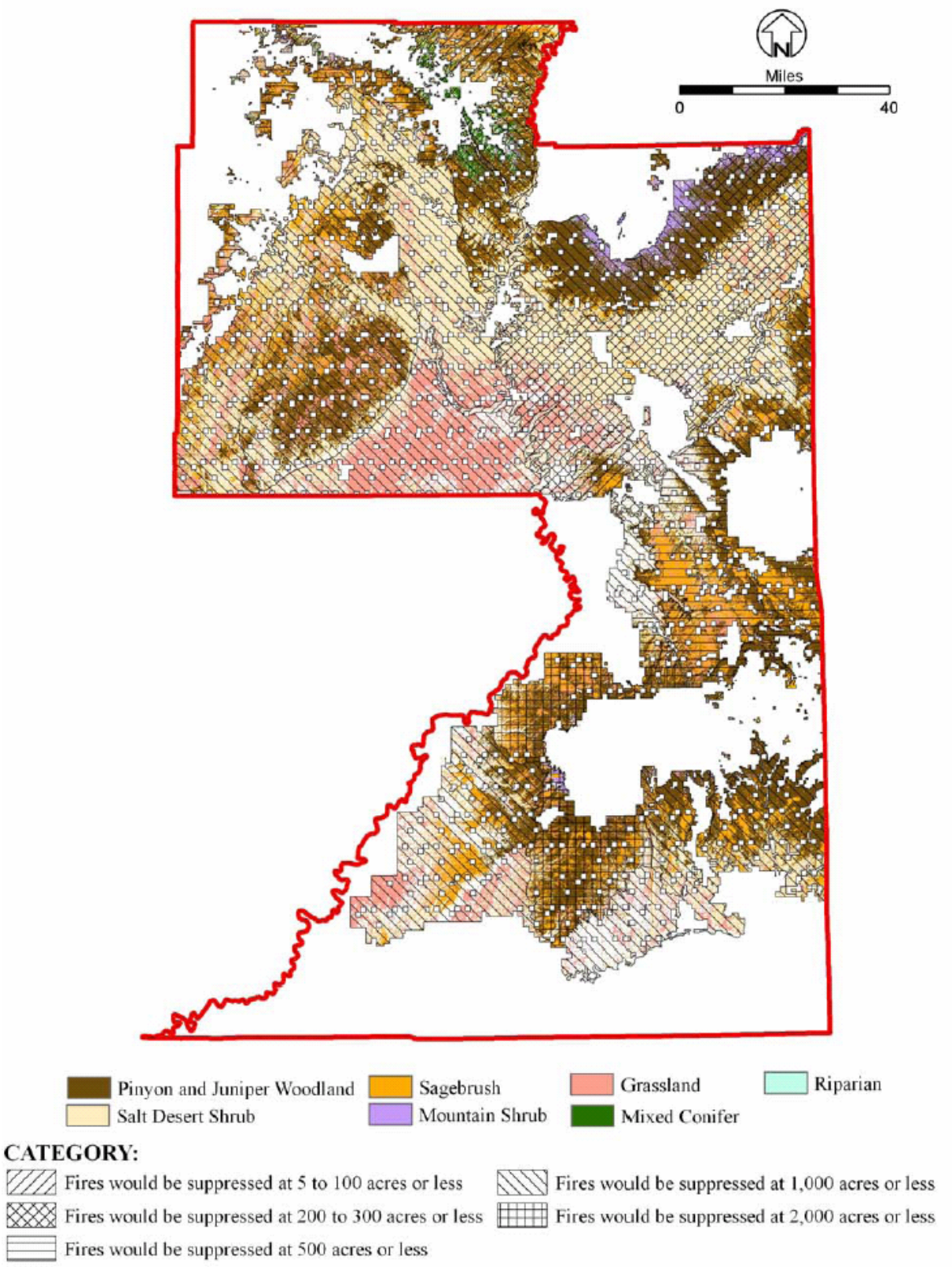
A net benefit to desirable vegetation composition following prescribed fire would occur following the recovery period. Pre-fire rest from grazing is required on many range sites to allow the accumulation of enough fine fuel to carry a prescribed fire. This pre-fire management is important in the shrub type, grasslands, and in pinyon and juniper. It is also important in forested areas, particularly aspen ecosystems where grass and shrub litter may be the main carrier fuels (Jones and DeByle 1985).

Non-fire fuel treatments (including mechanical and chemical treatments and seeding where a vegetation composition change is desired) would impact permittees by eliminating grazing from an allotment for two or more growing seasons. Post recovery use of the grazing allotment would benefit through improved forage composition.

Long-term Impacts

An increase in wildland fire suppression acreage goals in the Proposed Action Alternative are expected to create a more productive and stable grazing resource as a whole. The removal of hazardous fuels would reduce the risk of severe wildfire, which would decrease the likelihood that such an event would result in longer recovery periods for impacted allotments. Prescribed fire and non-fire fuel treatments would affect a similar trend toward increases in ecosystem health and stability.

FIGURE 4.6: GRAZING ALLOTMENTS AND FIRE MANAGEMENT CATEGORIES FOR THE PROPOSED ACTION



4.2.14 WOODLANDS AND FORESTRY

Short-term Impacts

The Proposed Action would decrease the amount of biomass, timber, firewood, and pinyon nut harvesting opportunities in the areas affected by wildland fire events, particularly in ponderosa pine forests and pinyon and juniper woodlands. In the Moab Fire District, these vegetation types are currently experiencing departure from natural conditions, and would be the most likely types targeted for less aggressive suppression, or fuel treatments to benefit the vegetation condition. In the short term, the change in suppression efforts would not be expected to greatly reduce the acreage of pinyon and juniper woodlands that have moved out of historic range.

Use of prescribed fire in mature forests may be combined with non-fire treatment methods to bring the forests to a lower FRCC and reduce associated fire severity. In the short term, this may increase the opportunity for the harvesting of biomass and firewood.

The use of non-fire treatment methods to reduce the occurrence of younger age classes in areas of old growth could increase the survivability of old growth forests during fire events (Howard 2003). This could increase the availability of higher economic value forest products, particularly in mixed conifer and ponderosa stands. Seeding and the planting of seedlings following prescribed fire or non-fire treatment would increase the occurrence of desirable forest and woodland species. However, since this remains a small part of the MFD's forestry program, impacts would be negligible.

Long-term Impacts

Long-term impacts from increasingly larger wildland fires (resulting from less aggressive fire suppression and from wildland fire use) would decrease the acres of pinyon and juniper encroaching on land outside historic range and within historic range where they are the dominant species. This would directly decrease the availability of biomass and firewood collection in this vegetation type. This impact would be less pronounced in higher-elevation forested areas.

Prescribed fire and non-fire treatments would initially result in an increase in the opportunity for the harvesting of biomass and firewood, however, a trend toward less biomass availability would eventually occur. The use of non-fire treatment methods to reduce the occurrence of ladder fuels in areas of desirable old growth forests, particularly ponderosa stands, would also decrease the fire severity and increase the survivability of old growth forests during fire events (Howard 2003) in the long term. This would increase the availability of higher economic value forest products, particularly in mixed conifer and ponderosa stands. Seeding and planting of seedlings following prescribed fire or other treatments would increase the occurrence of desirable forest and woodland types.

4.2.15 VEGETATION

Short-term Impacts

Figure 4.7 shows vegetation types and fire management categories. Effects are described for each vegetation type.

Pinyon and Juniper Woodlands: Fire suppression can potentially disturb this vegetation type as a result of fireline construction. Disturbance from suppression actions would be in addition to the actual effects of the burning of vegetation. Cheatgrass and other invasive weeds could be reduced and/or prevented from the implementation of RPMs, post-treatment/post-fire seeding actions, and from ES&R treatments following wildfire.

This vegetation type is largely in FRCC 3 (96 percent) mainly due to encroachment of P/J into grassland or sagebrush types from fire suppression. Wildland fire use, prescribed fire, and non-fire fuel treatments would reduce the number of acres of P/J encroachment and would also decrease the density of pinyon and juniper woodlands. Wildland fire use and prescribed fire would probably be lethal to many small or young juniper trees. Non-fire fuel treatments would reduce densities of pinyon and juniper, improve understory vegetation, and would consequently decrease fuel loads as well as reduce cheatgrass and other invasive species.

Salt Desert Shrub: Although wildland fire can be highly destructive in this vegetation type, fire suppression also has the potential to disturb Salt Desert Shrub due to vegetation removal for fireline construction. Prescribed fire and wildland fire use would not be considered under the Proposed Action because of the damaging effects of fire in this vegetative type and because fire was historically rare. ES&R seeding to establish native grasses and forbs could be implemented to potentially reduce cheatgrass establishment following wildland fire.

Sagebrush: Fire suppression has the potential to disturb this vegetation type due to fireline construction, in addition to the impacts from the fire itself. ES&R treatments and RPMs for the prevention of invasive species (see **Appendix D**) would reduce potential for cheatgrass and other invasive species establishment. Although sagebrush does not re-sprout with fire, it is a prolific seeder and if a seed source is present, re-establishment after fire is quite rapid.

Wildland fire use, prescribed fire, and non-fire fuel treatments may be used in this type and would reduce crowded and decadent sagebrush, encourage seedlings to sprout, and promote native grass and forb understories (Paysen et al. 2000). RPMs are in place to reduce potential for invasive, non-native weeds following prescribed fire. Non-fire fuel treatments would be used to reduce the cheatgrass invasions occurring in these vegetation types, reducing hazardous fuels and thereby lowering the FRCC.

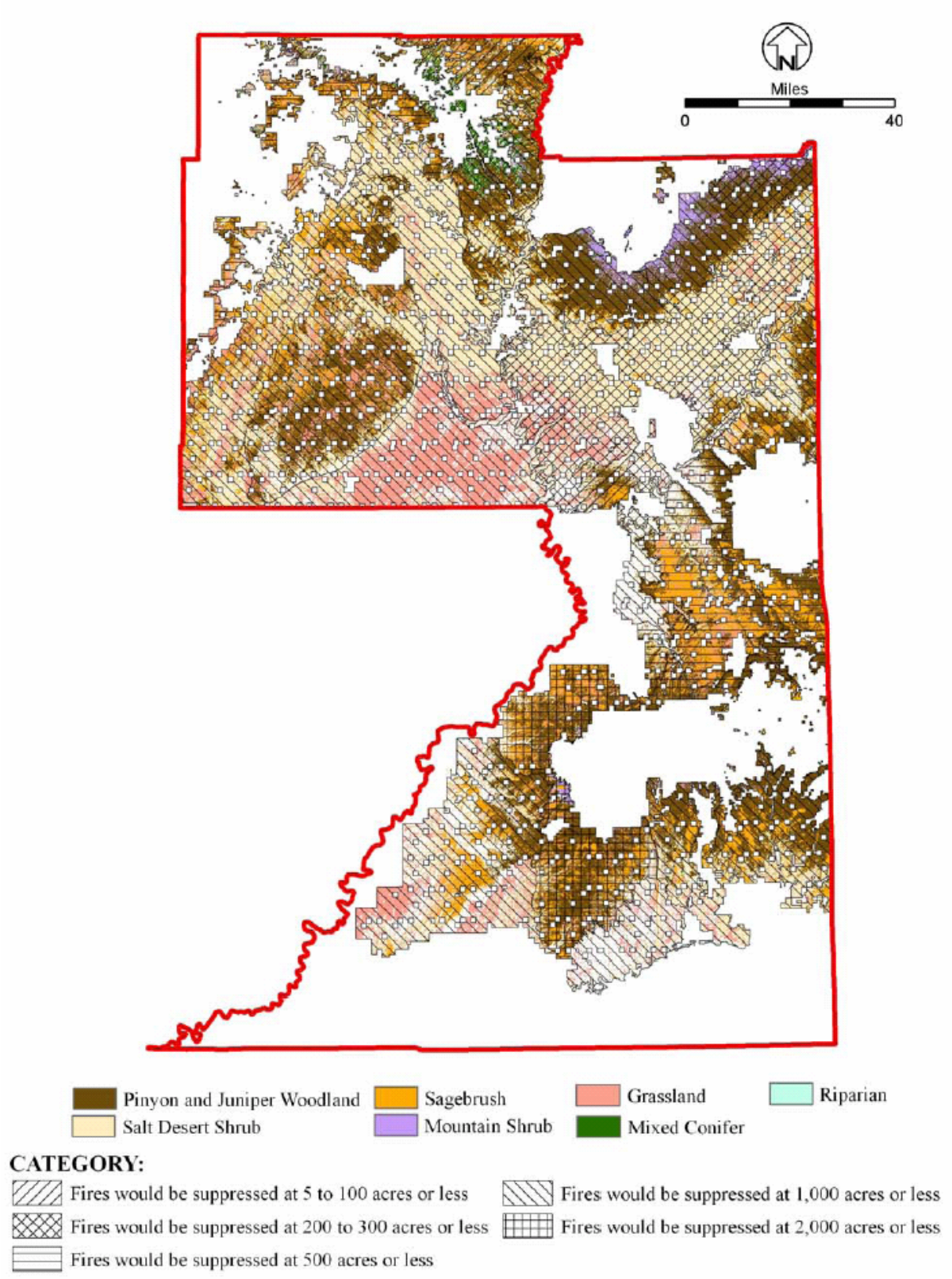
Mountain Shrub: Fire suppression has the potential to disturb mountain shrub species due to fireline construction in addition to the impacts from the fire itself. Mountain shrub types at lower elevations are at high risk of cheatgrass invasion following fire. ES&R actions would reduce the risk of cheatgrass invasion following fire. Most mountain shrub species re-sprout or re-seed following fire, and effects of fire on the vegetation type would be a reduction of available fuels and an increase in age-class diversity.

Effects from prescribed fire and wildland fire use would be much the same as wildland fire suppression. RPMs designed for invasive species would reduce the risk of cheatgrass invasions and would lower FRCC. Non-fire fuel treatments would also reduce fuel loadings in mountain shrub, reduce the risk of cheatgrass invasion, and lower FRCC.

Grasslands: In the short term, wildfire suppression in grasslands with existing or potential invasive species would limit further cheatgrass invasion and expansion. ES&R efforts would further help to limit cheatgrass invasion and expansion and start to trend these areas toward lower FRCC (100 percent is currently considered to be in FRCC 3). Allowing wildfire use and prescribed fire in areas of this vegetation type with low potential for cheatgrass invasion would help lower FRCC and reduce encroachment by pinyon and juniper and sagebrush. Non-fire fuel treatments would also help to prevent further expansion of juniper and sagebrush and trend this vegetation type toward a lower FRCC.

Mixed Conifer: Fire suppression has the potential to disturb this vegetation type due to fireline construction in addition to the impacts from the fire itself. Mixed conifers frequently benefit from fire, including a reduction in fuel loadings and density. These reductions increase the nutrients and water available to remaining plants, and reduce the severity of future fires. ES&R actions would be available to reduce impacts to vegetation from erosion.

FIGURE 4.7: VEGETATION TYPES AND FIRE MANAGEMENT CATEGORIES FOR THE PROPOSED ACTION



Wildland fire use, prescribed fire, and non-fire fuel treatements are very effective at reducing fuel loadings and densities on mixed conifer sites. Effects from prescribed fire would be much the same as wildland fire suppression. Further, aspen typically regenerates from fire. Non-fire fuel treatments would reduce fuel loadings in this vegetation type, and decrease the risk of invasive, non-native weed and cheatgrass invasion.

Long-term Impacts

All vegetation types would see long-term reductions in fuel loadings, a lowered risk of invasion from invasive/ non-native weeds and cheatgrass, and decreased densities. Overall, this would result in a reduction in FRCC and trends toward DWFCs.

4.2.16 FISH AND WILDLIFE

Fire management activities have the potential to directly and indirectly affect fisheries and wildlife throughout the Moab Fire District, depending upon treatment timing, extent, location, elevation, duration, fuel, and severity of fires, as well as habitat type or vegetation community and soil types. Effects to vegetation communities are discussed separately in Section 4.2.15. Any effects to vegetation have the potential to directly or indirectly affect the fish and wildlife species that inhabit them or areas adjacent to (or downstream from) them.

Several RPMs (**Appendix D**) were built into the Proposed Action to minimize or eliminate adverse effects to species and habitat for the fire management actions proposed. RPMs are generally related to timing, habitat, and restoration. Goals within the Proposed Action include the restoration of historical habitats and native plant species and the enhancement, maintenance, and protection of ecological resources. These goals would likely be accomplished through the implementation (post-wildland fire or post-treatment) of rehabilitation activities where practical and applicable, thereby resulting in long-term, beneficial effects.

Direct impacts would be short term and less adverse over time. In the long term, overall hazardous fuels reduction would gradually reduce the risk of a severe fire event and restore an ecosystem that reflects a more natural fire regime. Therefore, the net effects of the Proposed Action on fisheries and wildlife would be beneficial.

Short-term Impacts

Fish

RPMs included in the Proposed Action would limit the potential for impacts to fisheries and aquatic resources. Direct effects that could occur from the Proposed Action include the introduction of fire retardant, aviation fuel, or lubricants into streams and wetlands; erosion of exposed soil and ash from wildland fires, planned treatments, or from fireline construction on steep slopes adjacent to streams; loss of riparian vegetation; erosion from the use of heavy equipment and establishment of fire camps; and, reduced natural stream flow during drafting and pumping. These direct effects could adversely impact water quality of the various fisheries throughout the Moab Fire District. The collective short-term impacts of increased sedimentation (from erosion) could have watershed-wide effects including changes in temperature, turbidity, and water chemistry.

Because RPMs would ensure limited acres and severity of prescribed fire as well as place constraints on non-fire fuel treatments in and adjacent to riparian-wetlands and water habitats, short-term adverse impacts from these fire management activities would be minimized.

Non-game and Big Game Species

Short-term adverse impacts (e.g., direct species mortality, habitat destruction, and habitat displacement) to non-game and big game species would be minimized by RPMs as well as by the beneficial effects of treatments. However, fire management activities could still result in short-term adverse impacts. These impacts would likely affect suitable habitat utilized by raptors, migratory birds, small mammals, carnivores and predators, amphibians and reptiles, and a variety of habitats associated with big game species.

Direct effects to habitat from the Proposed Action could include damaged vegetation (including forage resources) and/or weed invasion from the use of heavy equipment and establishment of fire camps; an increase in the size of an undesirable habitat type; inhibited leaf production and/or leaf death; a decrease in understory diversity and overall species richness; shoot damage; an increase in insect herbivory; and suppressed flowering from the introduction of fire retardant or foam (Adams and Simmons 1999). These effects could cause species displacement and potential mortality.

In addition to direct impacts, indirect impacts could include habitat modification such as changes in the survival or successful reproduction of aquatic or insect prey species for bird and carnivore populations due to increased sedimentation caused by upstream erosion.

Approximately 67 percent of the total lands within FMUs targeted for 1,000-acre or 2,000-acre suppression goals are comprised of pinyon and juniper woodlands or salt desert shrub habitat. Species utilizing habitat within these FMUs would be more likely to incur short-term adverse impacts from large-scale wildland fire. Impacts could include mortality, habitat loss, and/or temporary displacement to suitable nearby habitat. Species found only in sagebrush, mountain scrub, grassland, mixed conifer, or riparian-wetlands would be less likely to incur short-term adverse impacts relating to large-scale wildland fire, but could be more likely to incur short-term impacts associated with aggressive fire suppression. ES&R actions following wildland fire could be implemented to encourage the growth of native species, discourage establishment of non-native species, and preserve wildlife habitat. Direct effects from prescribed fire and non-fire fuel treatments could include mortality to individual animals, modification or loss of forage or prey resources, habitat alteration or damage, and species displacement.

Raptors and Migratory Birds: Raptors that are found in mountainous and forested habitats and migratory birds that generally breed at higher elevations, would likely incur few short-term impacts. These habitats currently reflect a more natural fire regime and, therefore, would likely be a lower priority for wildland fire use, prescribed fire, and non-fire fuel treatments. Raptors and migratory birds that are found within salt desert shrub and riparian-wetlands habitats would be more likely to incur impacts from wildland fire use, prescribed fire, and non-fire fuel treatments because these habitats are relatively far-removed from their natural fire regime and would likely be prioritized for fire management activities. However, because RPMs would be considered and implemented, as appropriate, for wildland fire use, prescribed fire, and non-fire fuel treatments, direct impacts would be limited to those associated with wildland fire suppression. Impacts could include mortality, habitat loss, and displacement. Indirect impacts could include a short-term reduction in available prey sources.

Small Mammals: Because various habitats utilized by small mammals would be prioritized for fire management actions based on how closely they reflect a natural FRCC, small mammals would be affected differently throughout the planning area. Vegetation communities for which RPMs have been developed (e.g., sagebrush and riparian-wetlands), would likely maintain viable populations of small mammals during the short term. Vegetation communities for which RPMs have not been explicitly developed could see a decrease in populations in the short term (i.e., for the duration of a fire event or non-fire fuel treatment).

Carnivores and Predators: Because the mountainous and forested habitats (in which carnivores and predators are generally found) more closely reflect a natural fire regime, they would be a lower priority for prescribed

fire and non-fire fuel treatments. As a result, carnivores and predators would be less likely to incur short-term adverse impacts than species found in some other habitats, although short-term impacts from wildland fire suppression or other fire management activities could include mortality, habitat alteration or loss, displacement, and/or a reduction in food sources.

Amphibians and Reptiles: The habitats upon which amphibians and reptiles rely are relatively far-removed from their natural FRCC. Because those habitats could be prioritized for wildland fire use, prescribed fire, and non-fire fuel treatments, these species groups could incur short-term adverse impacts including mortality, habitat loss, and displacement. However, because RPMs would be considered and implemented in riparian-wetlands habitat, direct impacts to amphibians would be limited to those associated with wildland fire suppression activities.

Big Game: Approximately 65 percent of mule deer habitat, 65 percent of Rocky Mountain elk habitat, 71 percent of desert bighorn sheep habitat, 60 percent of Rocky Mountain bighorn sheep habitat, and 57 percent of pronghorn habitat associated with critical seasonal use areas would be more likely to incur short-term adverse impacts. Impacts would result more from large-scale wildland fire events than from aggressive fire suppression, and could include mortality, habitat loss, and/or temporary or permanent displacement. Moose habitat associated with seasonal use areas would not be likely to incur impacts from large-scale wildland fire events. All critical seasonal use areas could be affected by fire suppression activities, wildland fire use, prescribed fire, and non-fire fuel treatments.

Long-term Impacts

Fish

Long-term adverse impacts to fisheries and aquatic resources would be minimized or avoided by implementation of RPMs. An incremental reduction in the risk of severe wildland fire would be beneficial to species, as would successful ES&R treatments post-wildland fire and/or prescribed fire or non-fire treatments that enhanced fisheries habitat. Beneficial effects could include a decrease in temperature, turbidity, and chemistry impacts following wildland fires and management actions.

Non-game and Big Game Species

The long-term effects of the Proposed Action on wildlife species found within the Moab Fire District would be similar to the long-term effects described for special status animal species (see Section 4.2.8). Because long-term effects to non-game and big game species groups (raptors and migratory birds, small mammals, carnivores and predators, amphibians and reptiles, and big game) would be common to all, they are summarized below.

With suppression implemented only when necessary and wildland fire use, prescribed fire, and non-fire fuel treatments utilized to decrease existing fuel loads, the vegetation communities and wildlife habitats within the Moab Fire District would transition over time to a more natural fire regime. A more stable ecosystem minimizes the threat of unnaturally severe wildland fire.

Because wildland fire use and prescribed fire would not likely consist of large fires and because rehabilitation treatments would be implemented as necessary and appropriate, mortality or long-term displacement of species would likely be avoided. If management activities were implemented repeatedly within the same treatment area (e.g., mechanical treatment followed by prescribed fire followed by chemical treatment), populations could be displaced for longer periods of time. The availability of suitable habitat nearby would reduce displacement impacts, and the beneficial reinstatement of a natural fire regime in the long term would help offset the effects of displacement on species.

The establishment of invasive/non-native weed populations would be minimized or eliminated due to the implementation of RPMs and stipulations in the Proposed Action that allow for ground disturbing activities only in areas where the threat of invasive/non-native weeds is minimal or where reseeding would likely be successful. Therefore, the long-term effects on habitat would include a gradual increase in species diversity that would more closely reflect association with a natural fire regime, as opposed to a monoculture or species composition consisting only of invasive/non-native weeds.

Regardless of species or associated habitat, overall long-term effects to non-game and big game species, and their habitat, would be beneficial.

4.2.17 SOIL

Short-term Impacts

Under the Proposed Action, an increasing number of acres of BLM-managed land would be affected by wildland fire, prescribed fire, and non-fire fuel treatments. An increase in the loss of vegetative cover due to wildland fire could affect soil quality through the loss of soil structure and temporarily reduced porosity of soils in impacted areas. This reduction in porosity and structure could result in a change in infiltration rates and increased erosion and runoff (Ralston and Hatchell 1971). RPMs associated with wildland fire suppression and fuels treatments would minimize direct effects to soil health, such as loss of structural stability or compaction. RPMs would also address indirect impacts associated with soil loss and the potential for sediment loading and sedimentation. Erosion control and revegetation may be proposed as ES&R post-fire treatments or as planned actions that would serve to contain and control soil and stabilize these sites.

Wildland fire response would be subject to an AMR, and an aggressive initial attack would be considered where expected fire severity could adversely impact sensitive soils. Ground-disturbing activities associated with wildland fire suppression, prescribed fire and non-fire fuel treatments would still be likely to occur. Indirect impacts could also include potential soil loss from wind and water erosion.

Long-term Impacts

A trend toward less severe wildfires would result in fewer impacts to soil quality, including microbial populations, soil temperatures and the chemical and physical structure of the soil. The flexibility of the Proposed Action would continue to allow for high levels of suppression in areas where fire has not played a significant role in the past and in areas with sensitive soil.

Fire management and fuel reduction actions planned under the Proposed Action would improve soil resources and reduce erosion potential in the long term by fostering a healthy, native understory. A decrease in the potential for destruction of biological crusts due to severe fire events would also reduce the erosion potential and increase the fixation of atmospheric nitrates. Planned actions of prescribed fire and non-fire fuel treatments under the Proposed Action would continue to reduce the likelihood of severe wildfires that result in soil structure loss and altered porosity and infiltration rates. Over time, as fire returns to a more natural pattern, there would be fewer potential indirect impacts from large, severe wildfires such as sedimentation of streams and reservoirs from wind and water erosion, and fugitive dust from wind erosion

4.2.18 RECREATION

Short-term Impacts

Recreation occurs throughout the planning area and in all suppression categories. Because the Proposed Action includes RPMs that would preferentially protect developed special recreation management areas

(SRMAs) and recreation site infrastructure, wildland fire that presents a threat to a developed recreation site would be fully suppressed.

Developed recreation sites and infrastructure most likely to be damaged by wildfire and suppression efforts include trails and OHV routes, interpretive and directional signage, and camping areas with developed sanitation facilities. Visitor experience may also be impacted by degradation of air quality from smoke, and road, trail, and route closures during and following wildfire suppression. Other impacts might include noise and visual impacts from ground equipment, helicopters and air tankers, and personnel. Indirect impacts of wildland fire at developed facilities may include increased erosion as well as hazards associated with dead standing vegetation. ES&R and revegetation efforts may temporarily close areas to use.

OHV users may be tempted to use firelines to access new areas. RPMs included in the Proposed Action would require the obliteration of vehicle tracks created off established routes in order to reduce unauthorized OHV travel. Some areas may be temporarily closed to allow for revegetation and to prevent the expansion of OHV trails.

Additional impacts would be lost visitor days at developed facilities. The RPMs would decrease the potential for impacts to developed facilities. Higher value sites and facilities would take precedence for protection. However, under an AMR the emphasis for protection is placed on other resources, with human health and safety of firefighters and the public being the most important.

Prescribed fire and non-fire fuel treatments could have a temporary negative affect on the aesthetic quality of developed recreational sites and facilities. However, no impacts to the infrastructure or natural features at these sites would be anticipated due to the planning required prior to implementation of projects. Additional impacts could include temporary facility or site closures and the presence of crews performing the action. Projects would include the removal of fuels, which would directly reduce wildland fire danger at sites and facilities.

Long-term Impacts

Wildland fire suppression management direction may impact developed recreation sites and facilities by allowing more burned acreage and creating aesthetic changes to the landscape. However, a trend toward a DWFC and the associated reduced likelihood of severe fire events would make the potential for the loss of these resources and visitor use days less likely.

The movement of vegetation toward a DWFC would lessen the potential for intense, uncontrollable wildland fire and would enable the control and/or exclusion of fire in areas not suitable for wildland fire.

Prescribed burns as well as non-fire fuel treatments would reduce excess fuels in the planning area, which lowers the risk for large, severe wildland fire and associated impacts to the use and characteristics these sites are intended to offer (NPS 2000). The reduced fuel load would make it less likely that wildland fires would burn an entire site, increasing both the level of safety for recreationists as well as assuring maximum available visitor days.

4.2.19 VISUAL RESOURCES

Short-term Impacts

Wildland fires generally have obvious and extensive visual impacts, such as blackened and charred areas. These types of visual impacts are a historical and natural part of the environment. The severity of wildfire, however, can have a visual impact on an area by making it more susceptible to indirect impacts such as erosion or soil sterilization. Visual impacts of suppression efforts may include scarring from access roads,

firelines and reseeding efforts. Wildland fire use and prescribed burning could have short-term impacts similar to wildland fire (charred areas, smoke etc.). Non-fire fuel treatments, such as thinning and selective cutting, could be implemented to reduce hazardous fuels while adding to the character or scenic quality of the treatment area. Other non-fire fuel treatments may have a more negative impact on visual resources, such as leaving a pitted landscape with dispersed uprooted trees.

Figure 4.8 presents a map of the planning area with designated VRM class areas and BLM-administered lands categorized by proposed fire suppression levels. VRM classes I and II (35 percent of the total planning area) are the most sensitive to visual impacts. The proposed acreages where moderate suppression efforts (1,000- and 2,000-acre suppression) would be implemented in VRM Class I and II areas would increase by approximately 18 percent from current suppression levels (1,000 to 5,000-acre suppression). Fuel hazards may not be reduced in some VRM Class I and II areas due to VRM guidelines designed to protect scenic quality and wilderness objectives. In these areas the most effective methods of suppression that are least damaging to wilderness values and the environment would be used. If vegetation conditions allow, wildland fire use would be ideal in eliminating impacts from human ground-disturbing activities, while lessening the risk of large, more severe wildfire in the longer term.

VRM classes III and IV (approximately 65 percent of the planning area) allow flexibility in implementing more aggressive fuel treatments. The proposed acreages where moderate suppression efforts (1,000- and 2,000-acre suppression) would be implemented in VRM Class III and IV areas would increase by approximately 17 percent from current levels. Indirectly, these treatments could protect the more sensitive VRM Class I and II areas.

Long-term Impacts

Long-term effects to visual resources from wildland fire suppression, wildland fire use, prescribed fire and non-fire fuel treatments are anticipated to trend landscapes away from impacts due to aggressive suppression and to minimize indirect impacts to visual resources. An example of a reduced indirect impact resulting from smaller and less severe wildfire events would be fewer areas with sterilized, non-vegetative supporting soil from post-fire erosion. The planned action of prescribed fire and non-fire fuel treatments would allow analysis of potential visual impacts prior to the implementation of site-specific treatments. The Proposed Action could restore a more natural visual landscape where wildland fire and its associated visual impacts are accepted as a more natural process.

4.2.20 PALEONTOLOGICAL RESOURCES

Short-term Impacts

Paleontological resources could be damaged during wildland fire suppression under the Proposed Action primarily from ground disturbing activities on the geological formations presented in Chapter 3. The potential for these impacts to occur would be minimized by the utilization of standards and procedures presented as RPMs in the Proposed Action. The more aggressive suppression goals of five to 100 acres are reduced in the Proposed Action relative to the No Action Alternative. Secondary effects, such as spalling and fracturing could occur from fire and/or heat on surface bone and tracks.

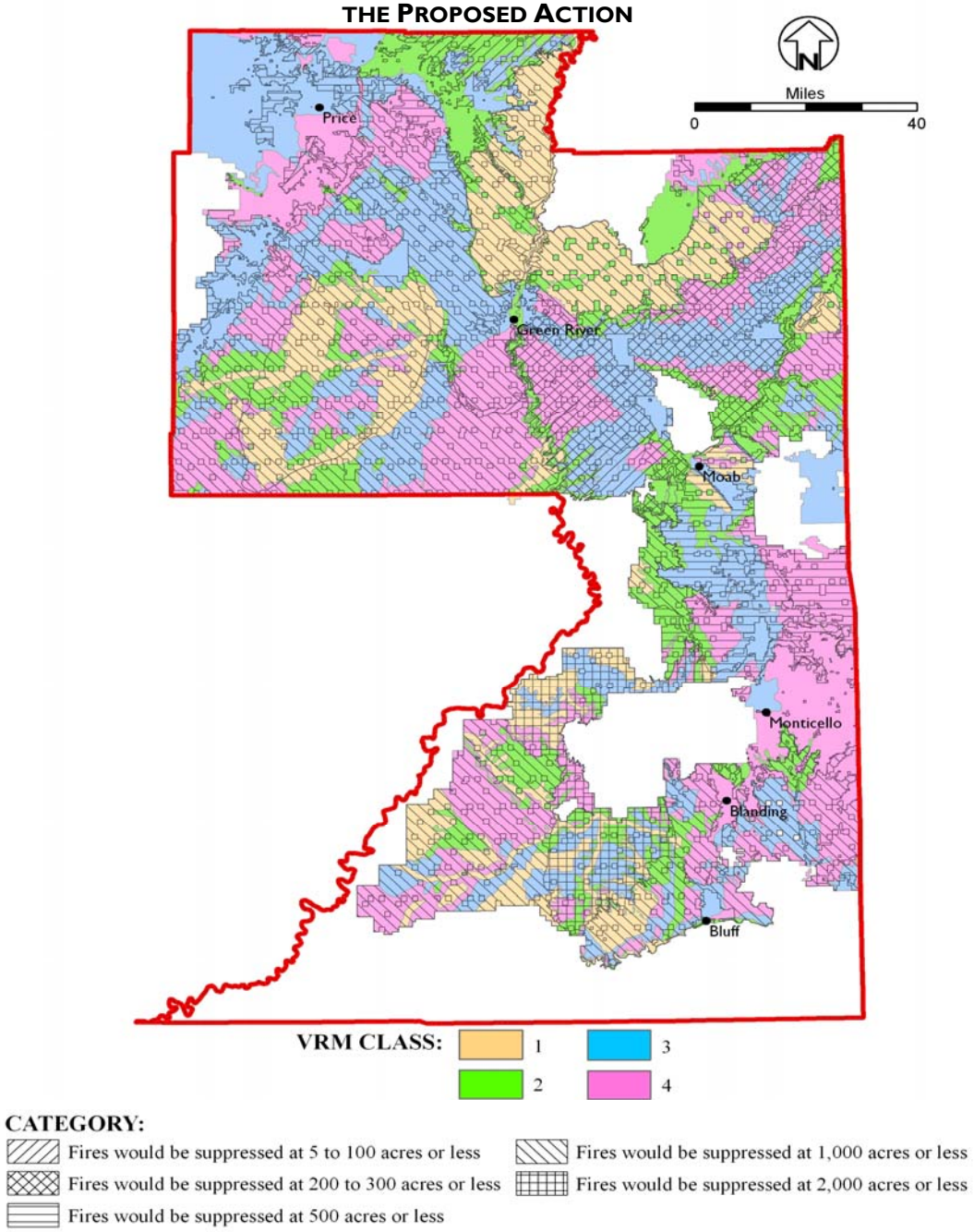
Ground-disturbing actions (including seeding) are not associated with wildland fire use, thereby eliminating the potential for associated impacts. Prescribed fire events may be preceded by non-fire fuels reduction actions to obtain a smaller, more manageable and less severe prescribed fire. Because prescribed fire and non-fire fuel reduction projects are planned, areas containing important paleontological resources would be identified for avoidance to minimize potential impacts.

Long-term Impacts

The trend toward a decrease in fuel loads would lessen the number of large severe fires. This would lower the level of suppression required on an average wildfire, with a resultant long-term decrease in impacts to paleontological resources from ground-disturbing and other suppression activities. The potential for indirect erosion-related impacts would similarly lessen over time.

The increased occurrence of wildland fire use creates the potential for indirect impacts. However, those impacts would be in conformity with natural fire processes that have been interacting with paleontological resources. As more vegetation trends toward a lower FRCC, opportunities may exist to expand wildland fire use.

FIGURE 4.8: VISUAL RESOURCE MANAGEMENT CLASSES AND FIRE MANAGEMENT CATEGORIES FOR THE PROPOSED ACTION



4.2.21 SOCIAL AND ECONOMIC CONDITIONS

Short-term Impacts

Suppression efforts would continue to provide income for support services in the local community. Prescribed fires and wildland fires would create temporary decreases in air quality, and displace livestock from foraging areas. A temporary loss of allotment use could affect permittees by decreasing revenue during the time that they are unable to utilize their allotment(s). In addition, short-term impacts could include altered transportation routes, disruption of subsistence activities, and temporary increases in noise. Planned fuel treatments have the potential to generate income in the local community.

Long-term Impacts

Long-term beneficial effects could include a reduction in the cost of suppression, an increase in payroll benefits for non-fire fuel reduction treatments, and more protection for communities at risk, WUI areas, and their associated infrastructures and resource values. A decreased long-term potential for severe wildland fire would lead to increased firefighter and public safety and a likely reduction in loss of property (from a severe fire event) and suppression expenses.

Impacts from fire or treatment procedures would result in an increase in the quantity and quality of forage, reducing costs for livestock owners to supplement feed or move stock as frequently. Over time, there would likely be fewer economic losses in the Moab Fire District from severe wildland fires. The subsequent decrease in fires that would otherwise cross land ownership boundaries onto private and county-owned land would result in an overall increase in safety for the general public.

4.2.22 WILD HORSES AND BURROS

Short-term Impacts

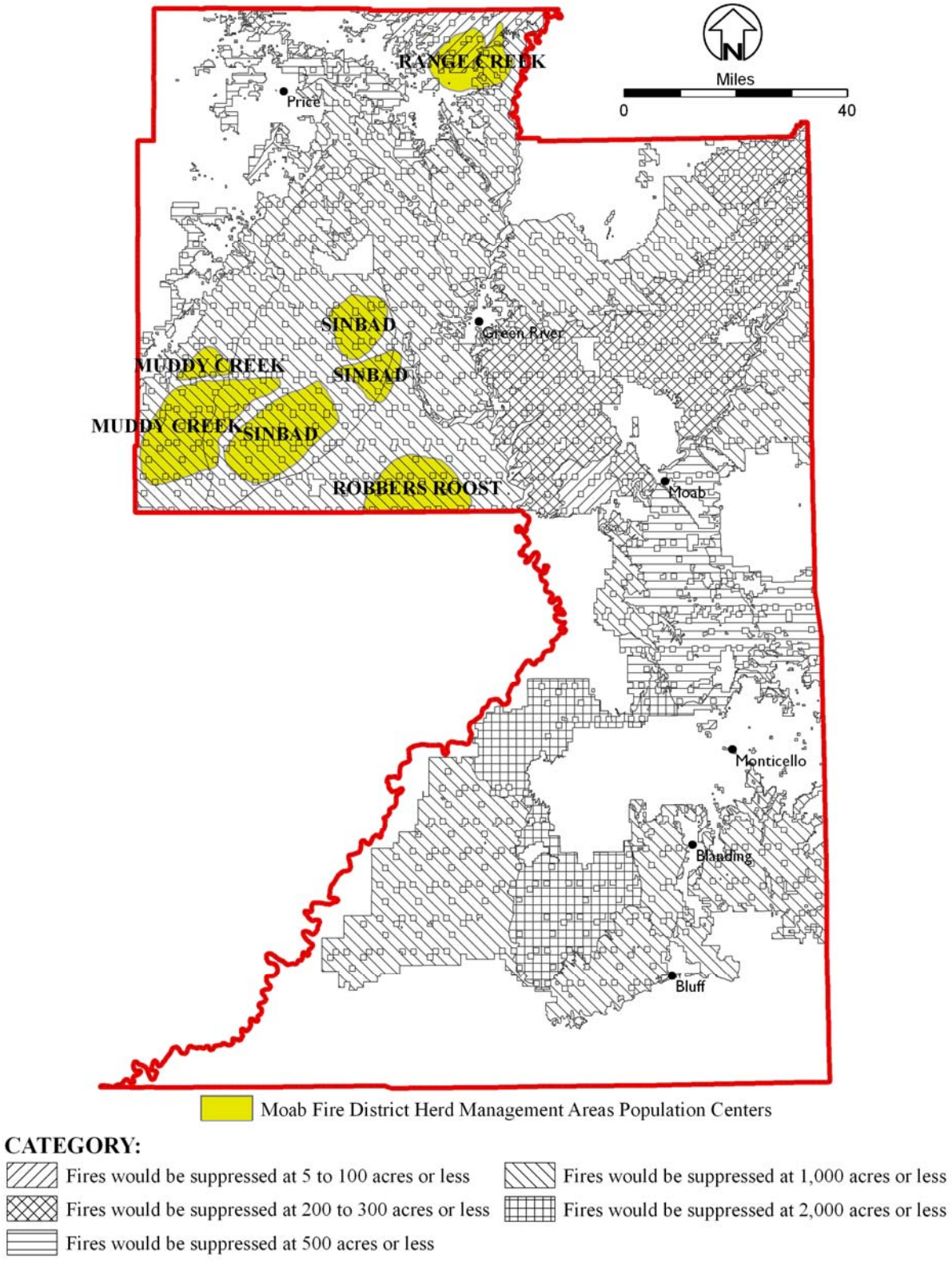
Proposed Actions could cause a temporary loss of resources such as forage and watering areas following wildland fires. High-severity fires in or around any of the four HMAs could cause the displacement of herds and might force the herds to seek food, water, and shelter outside of the HMAs. For all fire management actions, a temporary increase in noise from trucks, machinery, and people and altered landscapes during or immediately after fire management actions could temporarily displace wild horses and alter migration routes and usual foraging and watering areas.

Under the Proposed Action Alternative, approximately seven percent of the HMAs (approximately the northwest half of the Range Creek HMA) fall into the 100-acre suppression goal category, and 93 percent are in the 1,000-acre suppression goal category. As indicated by the category breakouts, the majority of HMA acres are located in areas where wildland fire management goals are focused on moderate suppression efforts (suppression at 1,000 acres or less). **Figure 4.9** presents the location of HMAs relative to fire management categories.

Long-Term Impacts

Impacts from fire or treatment procedures would result in an increase in the quantity and quality of forage over the long term. Over time, there would be less wild horse and burro habitat lost to large, unplanned wildland fires due to the reduction in fuels from planned treatments.

FIGURE 4.9: HERD MANAGEMENT AREAS AND FIRE MANAGEMENT CATEGORIES FOR THE PROPOSED ACTION



4.2.23 WILDERNESS CHARACTERISTICS

As shown in **Figure 4.10**, approximately four percent of lands with wilderness characteristics are found within 100-acre suppression goal FMUs, approximately four percent are found within 200 and/or 300-acre suppression goal FMUs, approximately five percent are found within 500-acre suppression goal FMUs, approximately 76 percent are found within 1,000-acre suppression goal FMUs, and approximately 10 percent are found within 2,000-acre suppression goal FMUs. In all categories, management activities would be carried out in a manner that would minimize impacts to the wilderness characteristics of each area.

Short-term Impacts

Short-term impacts resulting from management response to wildland fire may include ground disturbances associated with suppression and control (e.g. hand lines and spike camps). The short-term impacts from suppression efforts would likely be much less than allowing catastrophic fires to burn uncontrolled in areas with uncharacteristic fuel conditions. Short-term and limited impacts for wildland fire suppression could include disturbance to soil, watershed functions, vegetation conditions, and habitats for fish and wildlife.

To minimize the impairment of wilderness characteristics, RPMs are built into the Proposed Action to protect the values and the physical resources (e.g., soil, water, SSS, and cultural resources) within these areas. Impacts to these physical resources are discussed in their respective sections.

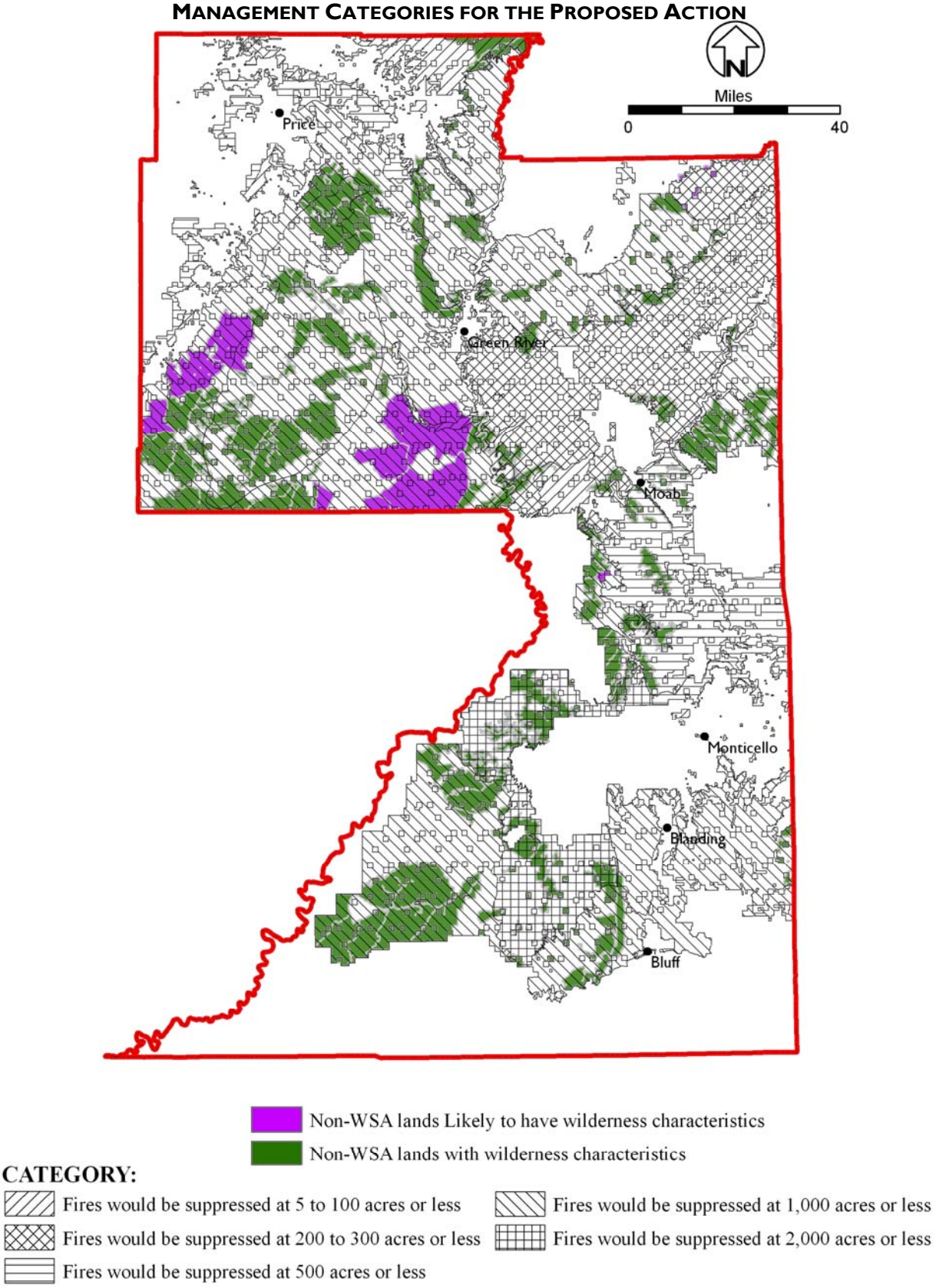
Due to the increased emphasis on suppression, those lands within FMUs with lower per fire event suppression goals (5-100 acres and less than 500 acres) would likely see more short-term impacts from suppression activities than those lands in FMUs with higher per fire event suppression goals (less than 1,000 acres and less than 2,000 acres). Impacts would be related to impairment of naturalness and opportunities for solitude and primitive recreation.

Impacts would be related to ES&R activities such as seeding, which would stabilize wildfire areas, minimize the threat of invasive, non-native weed species becoming established, and to preserve the natural and unique values inherent to these areas. ES&R efforts may be noticeable after fire events as the areas become re-vegetated. A short-term, minor impairment of wilderness characteristics would occur due to suppression-related activities.

A burned or modified landscape and limited visibility may be aesthetically displeasing to recreationists, but these impacts on the quality of visitor experience would be limited to the duration and area of the fire and would not likely affect overall use and appreciation of the unique values present within other portions of these designations.

All planned management activities, including prescribed fires and non-fire fuel treatments, would undergo a site-specific environmental evaluation to determine potential impacts to the resource prior to being approved. Methods used to implement these fire management actions would be of minimal impact to the resource being protected. Prescribed fire would help maintain the naturalness of these areas by allowing wildfire to play a more natural role in the ecosystem.

FIGURE 4.10: LANDS WITH OR LIKELY TO HAVE WILDERNESS CHARACTERISTICS AND FIRE MANAGEMENT CATEGORIES FOR THE PROPOSED ACTION



Long-term Impacts

The Proposed Action would result in modification of the current condition to a DWFC that would be more historically representative of the natural vegetation cover. Long-term impacts associated with the use of an AMR to wildfire suppression, wildland fire use and the planned actions of prescribed fire and non-fire fuel treatments are the decreased risk of large severe wildfire events. The trend away from these unwanted events is due to the metered removal of hazardous fuels over time. The removal of hazardous fuels and reduced risk of severe wildland fire events would beneficially affect lands with or likely to have wilderness characteristics by preserving their wilderness suitability and opportunities for solitude and primitive recreation.

By implementing the proposed fire management goals of reducing hazardous fuels, restoring natural ecosystems, and allowing fire to function in its natural ecological role, natural conditions and the array of supplemental values contained within these management areas would be enhanced and preserved. Likewise, visitor experience and opportunities may be enhanced by the restoration of the historical natural condition.

4.2.24 MITIGATION MEASURES

RPMs under the Proposed Action are designed to minimize or avoid impacts to resources. No additional mitigation measures would be necessary because of the protection already afforded by the RPMs.

4.2.25 RESIDUAL IMPACTS

No mitigation measures are proposed with the Proposed Action, therefore, no residual impacts from mitigation measures would be present.

4.2.26 MONITORING AND COMPLIANCE

To ensure an adaptive management response to fire planning needs within the state, monitoring measures and compliance with the goals and objectives of this plan would be maintained. This would be achieved through future planning associated with fire management implementation actions. These fire management actions would be evaluated for adherence to the goals and objectives established by this Proposed Action, as well as specific resource requirements contained within the LUP. Wildland fire impacts would be compared to FMP goals and, if necessary, revisions to the FMP would be incorporated to reflect the impact of non-planned wildland fire events. Implementation-level fire management actions would be developed to meet all resource requirements and may include additional monitoring to evaluate and ensure conformance to plan-level decisions. The frequency and duration of monitoring would be determined on a case-by-case basis.

4.3 NO ACTION ALTERNATIVE

4.3.1 AIR QUALITY

Short-term Impacts

Figure 4.11 presents the location of NAAs and Class I areas located in the area of consideration for the planning area with BLM-administered lands categorized by current fire management levels. Under the No Action Alternative, approximately 3.7 million acres are located in areas where moderate suppression efforts (1,000-, 2,000- and 5,000-acre suppression goals) are planned and are within 100 kilometers of a Class I area or NAA. Short-term impacts of the No Action Alternative such as smoke from unplanned wildland fire and fugitive dust from emergency suppression efforts would continue at current levels.

Similar to the Proposed Action, the No Action Alternative dictates the use of standard operating procedures including participation in the Utah Interagency Smoke Management Program, and would minimize potential air quality impacts. Applicable federal, state, tribal, and local air quality regulations would not be violated due to activities planned by BLM.

Long-term Impacts

Under the No Action Alternative, a trend toward more severe and uncontrollable wildland fire is anticipated. These fires have the potential to create more smoke emissions than smaller controlled fires and cannot be timed to minimize impacts on air quality conditions. Increased pollutant concentrations and impacts on NAAs and other sensitive areas could increase because of these fires. Impacts on human health would also increase, particularly from exposure to particulate matter, with some events likely requiring the public to take special precautions to protect the health of sensitive people. The No Action Alternative's minimal use of prescribed fire and non-fire fuel treatments would lower the potential for uncontrollable wildland fire in some areas.

4.3.2 AREAS OF CRITICAL ENVIRONMENTAL CONCERN

As shown in **Figure 4.12**, approximately five percent of ACEC lands are found within 100-acre suppression goal FMUs, approximately 12 percent are found within 500-acre suppression goal FMUs, approximately 34 percent are found within 1,000-acre suppression goal FMUs, approximately 34 percent are found within 2,000-acre suppression goal FMUs and approximately 14 percent are found within 5,000-acre suppression goal FMUs.

Short-term Impacts

Short-term impacts from the No Action Alternative would be similar to those described under the Proposed Action. Impacts to ACECs from the No Action Alternative, in the short term, could be less than those from the Proposed Action in these instances:

- The southern portion of the planning area could potentially have less suppression impacts due to the larger suppression goals (5,000 acres), but more direct and indirect impacts due to wildland fire.
- Fewer acres were treated with prescribed fire and non-fire fuel treatments under the No Action Alternative compared to treatment goals contained in the Proposed Action. If the number of completed fuel treatment projects continued to be consistent with those accomplished in the past 10 years, fewer fuel treatments would occur with a commensurate decrease in impacts to ACEC attributes in the short term.

FIGURE 4.11: SENSITIVE TO AIR QUALITY AREAS AND FIRE MANAGEMENT CATEGORIES FOR THE NO ACTION ALTERNATIVE

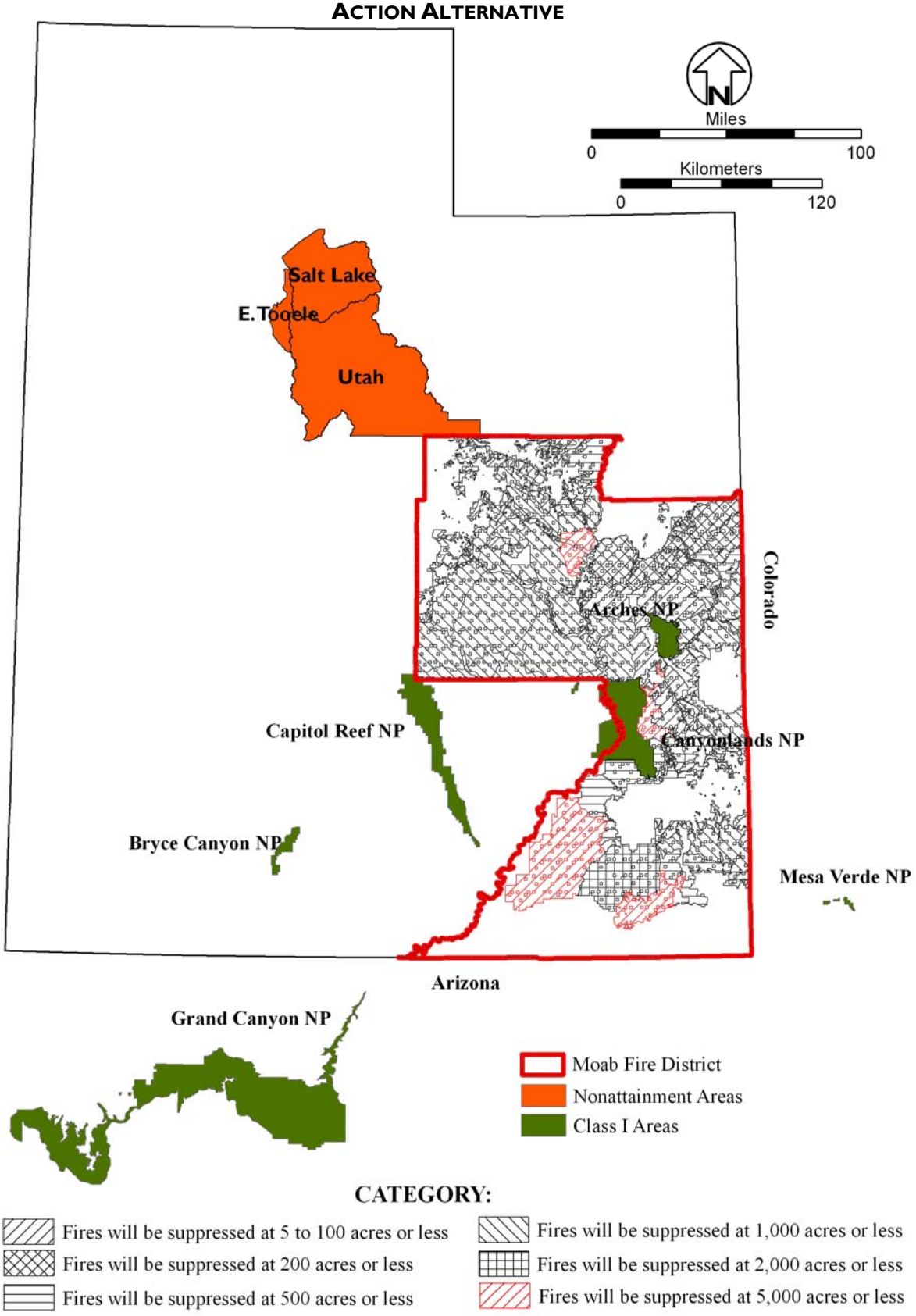
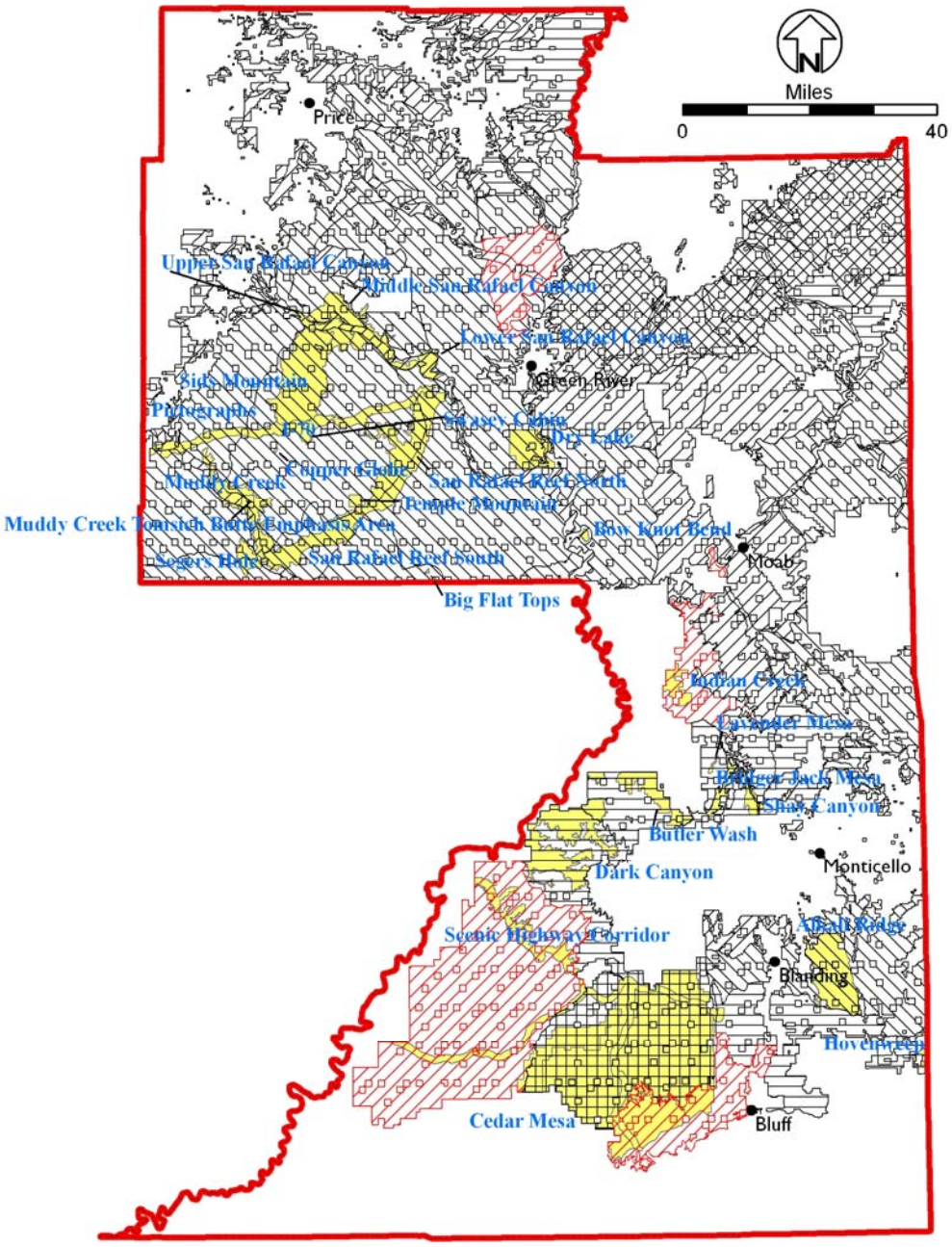


FIGURE 4.12: AREAS OF CRITICAL ENVIRONMENTAL CONCERN AND FIRE MANAGEMENT CATEGORIES FOR THE NO ACTION ALTERNATIVE



CATEGORY:

- Fires will be suppressed at 5 to 100 acres or less
- Fires will be suppressed at 200 acres or less
- Fires will be suppressed at 500 acres or less
- Fires will be suppressed at 1,000 acres or less
- Fires will be suppressed at 2,000 acres or less
- Fires will be suppressed at 5,000 acres or less

The increased emphasis on suppression in the lower suppression goal category could lead to more suppression-related impacts than those anticipated by the Proposed Action. Additionally, the greater focus on suppression efforts in many areas could potentially decrease the amount of ACEC acres that burn. The lower amount of burned acres may give the impression of a more natural environment to the public when the lack of fire events actually leads to the build up of unnatural and unsustainable fuel loads.

Long-Term Impacts

This alternative would likely continue to trend vegetation toward larger fuel buildups in or around ACECs. High-severity fire resulting from the continued fuels buildup could damage historic, cultural, scenic, or other relevant and important values both directly and indirectly. Suppression efforts to protect these areas may increase impacts on the values present. Excluding fire from playing its natural role in ecosystems, as set forth in the No Action Alternative, is counter to managing areas for naturalness. The small amount of planned actions would likely not be significant enough to keep pace with increases in fuel loads.

4.3.3 CULTURAL RESOURCES

Short-Term Impacts

Under the No Action Alternative, short-term impacts from fire management activities would be similar to the Proposed Action. However, a larger suppression acreage goal for wildland fire suppression in the southern portion of the planning area would increase the potential for heat-related impacts. Assuming prescribed fire and non-fire fuel treatments are performed on similar acreages as the past 10 years, less potential for impacts from these actions would occur relative to the Proposed Action.

Long-term Impacts

Under the No Action Alternative, less land area would trend toward a more natural FRCC. This trend away from DWFCs would move vegetation fuel loads toward high severity wildland fire events which would require aggressive suppression efforts to contain. The long-term impact from the No Action Alternative would be moderate to major. These impacts could consist of direct destruction of resources by suppression equipment in areas where cultural resources have not been previously identified and from heat-related effects. Indirect impacts from the No Action Alternative include exposing previously hidden cultural features to collectors and increased levels of damage and erosion to soils containing features.

4.3.4 ENVIRONMENTAL JUSTICE

Short-term Impacts

Under the No Action Alternative negligible disproportionate impacts to minority or low income populations are anticipated. Potential impacts would be related to the loss of pinyon nut harvesting opportunities and improved or decreased opportunities for fuelwood harvest (improved if access is improved, but decreased if fuelwood is mostly consumed by fire), particularly in the important pinyon nut and fuelwood harvesting areas of Cedar Mesa and the Montezuma Creek watershed.

Prescribed fire and non-fire fuel treatments would be planned with consideration of site-specific impacts to pinyon nut and fuelwood harvesting areas. These future planning efforts would minimize disproportionate impacts to minority or low income populations.

Long-term Impacts

Long-term impacts from the No Action Alternative would continue the trend toward an increase in fuel loads in pinyon and juniper woodlands. This would increase the likelihood of severe fire events and the resultant direct impact of the loss of pinyon nut harvesting opportunities.

4.3.5 FLOODPLAINS

Short-term Impacts

Short-term direct effects to floodplains would be similar to those seen under the Proposed Action. However, under the No Action Alternative, there would potentially be fewer acres affected by wildland fire in many areas because of larger suppression goals. The use of federally mandated procedures, such as EO 11988, in the vicinity of sensitive areas such as floodplains would likely result in limited impacts on water quality, similar to those anticipated in the Proposed Action. However, the No Action Alternative may provide less guidance and fewer protections with respect to planned activities such as prescribed fire and non-fire fuels treatment.

Long-term Impacts

Under the No Action Alternative, a larger percentage of BLM-administered lands would be subject to more aggressive fire suppression levels with exception of some areas in the south of the planning area. Efforts to more aggressively suppress wildfire are expected to lead to an increase in fuel loads. This may result in a trend toward uncontrollable high-severity fires, which would degrade floodplain health and the functioning condition of watersheds. This would be apparent by a measurable loss of vegetative cover and organic matter, degradation of sustainable stream banks, and increased erosion.

The use of already established guidelines in the vicinity of sensitive areas such as floodplains would likely result in limited impacts to water quality, similar to the Proposed Action's planned management actions. However, the expected increase in severe and uncontrollable wildland fires would make the ability to follow these guidelines less probable, resulting in a decrease in natural and beneficial use during and following these events.

4.3.6 INVASIVE, NON-NATIVE SPECIES

Short-term Impacts

There would likely be minimal change in effect from the No Action Alternative relative to the Proposed Action on invasive/non-native weeds in the short term. Fewer fuels reduction treatments in sensitive areas could lessen the effectiveness of tamarisk control. The No Action Alternative would continue the current practice of ES&R after severe wildland fire incidents in sensitive areas, which would minimize the effects of wildland fire on invasive/non-natives in the short term. However, RPMs designed to reduce the use of suppression vehicles within riparian areas would not be implemented in the No Action Alternative, which could potentially increase the spread of invasive weeds.

Long-term Impacts

A dramatic increase in the number and range of invasive weeds is expected to continue. The likelihood of larger and more severe wildfires under the No Action Alternative would allow invasive weeds like cheatgrass to progressively colonize new areas. More aggressive seeding and rehabilitation programs would be required to control infestations. Management actions must comply with EO 13112 (Invasive Species), however, that compliance would be much more difficult in response to fire suppression than under the management action

in the Proposed Action. Less focus would be placed on planned action treatments within invasive tamarisk, decreasing opportunities for improved ecological health and functioning.

4.3.7 NATIVE AMERICAN RELIGIOUS CONCERNS

Short-term Impacts

Under the No Action Alternative, fuel loads would likely continue to increase. The potential for severe wildland fires is similar to that described in the short term under the Proposed Action. However, a more concerted effort to suppress wildland fires under the No Action Alternative would occur in most of the planning area, increasing the likelihood of impacts to Native American religious concerns from suppression activities. This includes the potential for moderate suppression-related impacts to vegetation use areas and sites used for religious and ceremonial purposes. The exception to this would be in the extreme southern and southwestern portion of the planning area where a 5,000-acre suppression goal would be in place. Assuming initial suppression efforts are successful, follow up restoration and rehabilitation actions would be smaller in acreage than under the Proposed Action in most of the planning area, subjecting Native American religious concerns to fewer widespread impacts.

Wildland fire use is not addressed in the No Action Alternative, so suppression-related impacts would increase where a fire might otherwise be allowed to burn under the Proposed Action. Prescribed fire and non-fire fuel treatment methods would be conducted on a smaller scale if current management is continued. This could potentially decrease, in the short term, the impact to Native American religious concerns from ground-disturbing activities.

Long-term Impacts

With the continued buildup of hazardous fuel loads, wildland fire is expected to trend toward larger and more severe events. The impact of these severe events would likely include major impacts to Native American religious concerns, such as alteration of vegetation composition in use areas and increased direct and indirect impacts to religious and ceremonial sites. The lack of wildland fire use goals and a low amount of planned fuel reduction treatments would exacerbate this trend. These events would have a greater likelihood of impacting Native American religious concerns than the Proposed Action. In addition, aggressive suppression efforts would be required to control impacts from severe events, increasing the potential for impacts to Native American religious concerns from ground-disturbing activities. Extensive restoration and rehabilitation actions would be required following these events, potentially altering the religious value of the impacted area.

The Proposed Action would likely increase prescribed fire and non-fire fuel treatments over current management in the No Action Alternative. Fewer treatments would potentially decrease the impact to Native American religious concerns from ground-disturbing activities, but would also exacerbate the trend toward an increase in dangerous fuel loads. This trend would result in larger, more severe fires and more aggressive suppression/containment efforts with the potential to impact Native American religious concerns.

4.3.8 SPECIAL STATUS SPECIES

Short-term Impacts

Under the No Action Alternative, the BLM would continue current fire management practices. As in the Proposed Action, the BLM would be required to conduct timely or emergency Section 7 consultation with USFWS prior to site-specific fire management activities implemented within suitable or potentially suitable habitat for federally listed species. The Alternative Consultation Agreement to Implement Section 7

Counterpart Regulations could be employed (to "enhance the efficiency and effectiveness of the consultation process") for consultation on projects that support the National Fire Plan.

Impacts from wildland fire suppression would be similar to those described under the Proposed Action. However, because wildland fire suppression under the No Action Alternative would consist of aggressive suppression in most cases, short-term impacts from burning could be less than under the Proposed Action where some acres would be considered appropriate for wildland fire use or less-aggressive suppression activities. Short-term impacts (e.g., habitat modification, plant mortality, and/or displacement of animal individuals or populations) from actual suppression activities would be similar.

Short-term impacts from fuels treatment actions under the No Action Alternative would be similar to those in the Proposed Action. Both alternatives would require consultation with the USFWS prior to implementation activities, which would likely ensure protection of species and their habitat. Accordingly, few adverse impacts to species (plant and animal) and their habitat would be anticipated.

For non-fire fuel treatments, RPMs are either nonexistent or out-dated under current fire management direction. Therefore, short-term impacts associated with ground disturbance could occur.

Long-term Impacts

Long-term, ecosystem-wide beneficial effects of the Proposed Action on SSS and their habitat would not be attained under the No Action Alternative. With implementation of full suppression efforts in many cases, fuel loading would continue to increase and, subsequently, the risk of severe wildland fire. Indirect adverse effects (from changes in vegetation composition and structure caused by aggressive fire suppression and potentially severe wildland fires) to individuals, populations, and habitats would continue.

4.3.9 WATER QUALITY

Short-term Impacts

Surface Water

Surface water would be at risk from soil disturbance and increased erosion potential related to fire suppression activities such as fireline construction, road construction and other uses of heavy equipment. These fire suppression activities increase when wildland fire is suppressed in an aggressive and focused manner. Because of the large amount of acreage managed for suppression under the No Action Alternative, potential impacts to surface water would be greater than in the Proposed Action acreage alternatives.

Figure 4.13 presents the location of 303(d)-listed waterbodies located in the planning area with the BLM-administered lands categorized by current fire management levels. The use of federally mandated procedures in the vicinity of sensitive areas such as 303(d)-listed impaired water would likely result in similarly limited impacts on water quality as described in the Proposed Action.

Groundwater

Short-term effects to groundwater would be similar to those seen under the Proposed Action for all management actions.

Long-term Impacts

Surface Water

A trend toward greater impact to surface water would occur in this alternative. Under the No Action Alternative, aggressive full suppression of wildfires would remain the principal response to wildland fires on more acres than in the Proposed Action. The increased effort to suppress wildland fire would lead to an increase in fuel loads. This may result in the increase of uncontrollable high-severity fires, which could increase the loss of vegetation cover and organic matter, degrade sustainable stream banks and widths, and cause erosion. Effects could also include increases in dissolved and suspended solids, nutrients, and temperature variations outside of normal conditions.

The use of already established procedures in the vicinity of sensitive areas such as 303(d)-listed impaired waters and municipal watersheds would likely result in limited impacts to water quality similar to those in the Proposed Action. However, the expected increase in severe and uncontrollable wildland fires would make the ability to follow these guidelines less feasible, potentially resulting in a decrease in water quality during and following these events.

Groundwater

The increasing occurrence of high-severity fires could decrease the amount of precipitation able to infiltrate into the subsurface. Water that does infiltrate to the subsurface could have an increased nutrient load obtained as it passes through burned vegetation and physiochemically altered shallow soils.

4.3.10 RIPARIAN-WETLANDS AREA

Short-term Impacts

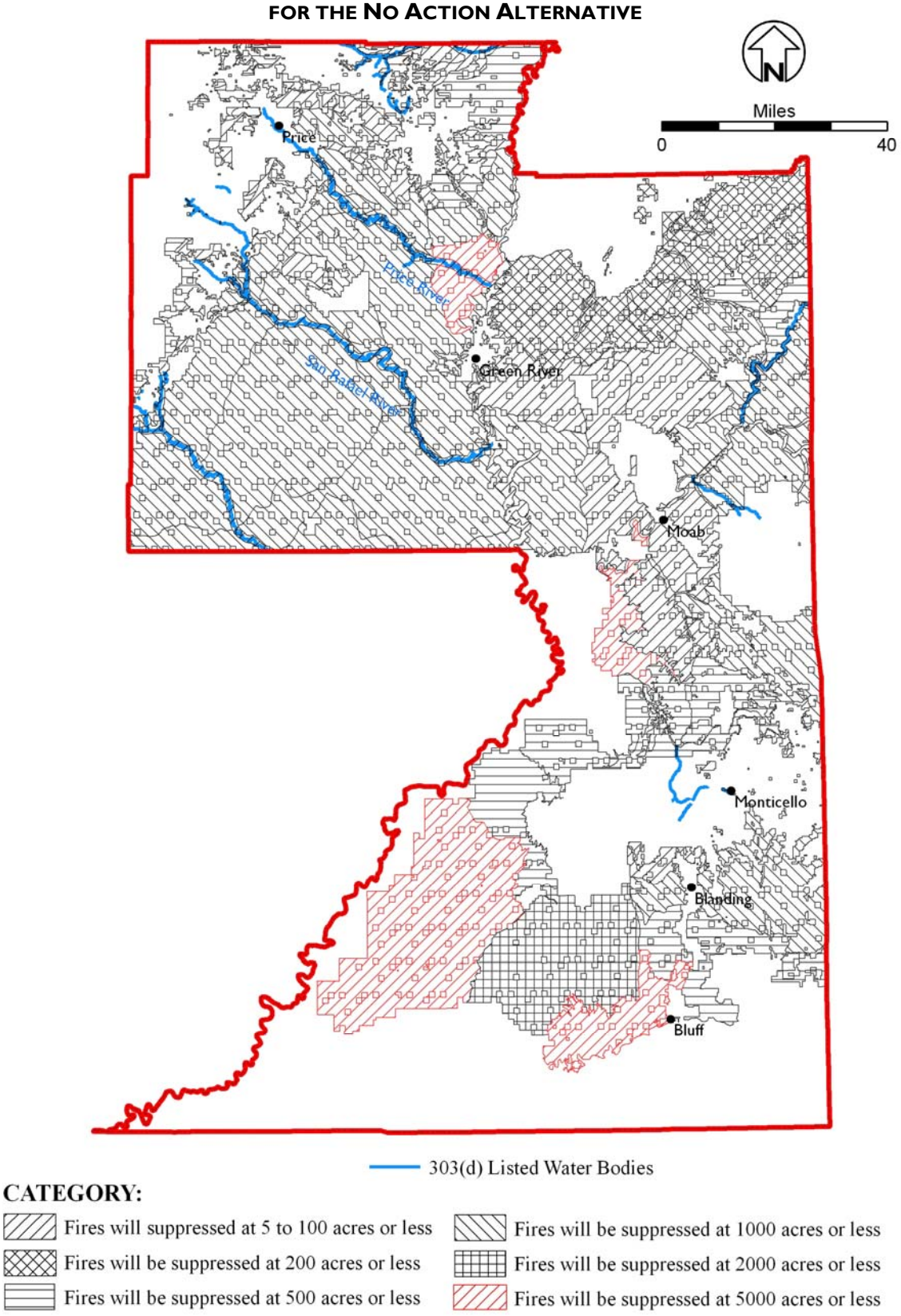
Short-term affects to riparian-wetlands resources would be similar to those described under the Proposed Action.

The No Action Alternative lacks specific RPMs for riparian-wetlands areas, thereby increasing the likelihood of negative impacts to riparian-wetlands areas. Short-term impacts of suppression activities could include vegetation damage or destruction, increased stream bank and shore erosion, and increased sedimentation in streams that degrades fish and wildlife habitat and water quality. The loss of streamside vegetation could also increase stream temperature and degrade fish and other aquatic species habitat. ES&R actions would be available to stabilize soil and vegetative conditions.

The No Action alternative would allow for more riparian-wetlands acres to burn during wildland fires, potentially increasing loss to native vegetation and reducing ecosystem health and diversity due to the loss of vegetation cover and organic matter, degradation of banks, and increased erosion rates.

Fewer planned treatments to restore native functioning would be implemented than in the Proposed Action. Vegetation disturbances associated with planned treatments would be evaluated through an environmental planning and review process to minimize potential impacts from vegetation loss and increased erosion and to evaluate restoration of native species.

FIGURE 4.10: 303(D)-LISTED WATERBODIES AND FIRE MANAGEMENT CATEGORIES FOR THE NO ACTION ALTERNATIVE



Long-term Impacts

Under the No Action Alternative, a trend away from DWFCs would occur. Larger wildland fires would be allowed to occur, resulting in increased potential for loss of native vegetation with consequent reduced channel stability, erosion, and health and functioning of the ecosystem.

4.3.11 WILD AND SCENIC RIVERS

Figure 4.14 shows eligible Wild and Scenic Rivers for the No Action Alternative.

Short-term Impacts

Short-term impacts from the No Action Alternative would be similar to those described under the Proposed Action. The increased emphasis on suppression in the lower suppression goal category could lead to more suppression-related impacts than those anticipated by the Proposed Action. However, the southern portion of the planning area could potentially have less suppression impacts due to the larger suppression goals (5,000 acres) but more direct and indirect impacts due to fire.

Additionally, the greater focus on suppression efforts in many areas could potentially decrease the amount of river segment acres that burn. Fewer planned treatments along stream corridors may give the impression of a more natural environment to the public when actually, the health and functioning of the ecosystem and associated outstanding values are at greater risk to fire loss or alteration from invasive species.

If the amount of planned fuel treatments continues as it has in the past 10 years under current fire management direction, fewer prescribed fire and non-fire fuel treatments would occur. This would translate into a decrease in impacts to Wild and Scenic River values in the short term.

Long-term Impacts

This alternative would likely continue to trend vegetation toward larger fuel buildups in or around eligible river segments. High-severity fire resulting from the continued fuels buildup could damage outstandingly remarkable values through both direct and indirect effects. Suppression efforts to protect stream corridors may increase impacts to the values present. Excluding fire from playing its natural role in ecosystems, as set forth in the No Action Alternative, is counter to managing areas for the health and functioning of river ecosystems. The small amount of planned actions would likely not be significant enough to keep pace with increases in fuel loads that lead to extreme loss of river ecosystems and associated values.

4.3.12 WILDERNESS STUDY AREAS

As shown in **Figure 4.15**, approximately 10 percent of WSA lands are found within 100-acre suppression goal FMUs, approximately 22 percent are found within 200 and/or 300-acre suppression goal FMUs, approximately 15 percent are found within 500-acre suppression goal FMUs, approximately 27 percent are found within 1,000-acre suppression goals, approximately 15 percent are found within 2,000-acre suppression goal FMUs and approximately 11 percent are found within 5,000-acre suppression goal FMUs.

Short-Term Impacts

Short-term impacts from the No Action Alternative would be similar to those described under the Proposed Action. The increased emphasis on suppression in the lower suppression goal category could lead to more suppression-related impacts than those anticipated by the Proposed Action. However, the southern portion of the planning area could potentially have less suppression impacts due to the larger suppression goals (5,000 acres), but more direct and indirect impacts due to fire. Additionally, the greater focus on suppression

efforts in many areas could potentially decrease the amount of WSA acres that burn. The lower amount of burned acres may give the impression of a more natural environment to the public when the lack of fire events actually leads to the build up of unnatural and unsustainable fuel loads.

If the acreages of planned fuel treatments remain consistent with those accomplished over the past 10 years, fewer fuel treatments would occur in the No Action Alternative than in the Proposed Action. This would translate into a decrease in impacts to ACEC attributes in the short term.

FIGURE 4.14: ELIGIBLE WILD AND SCENIC RIVERS FOR THE NO ACTION ALTERNATIVE

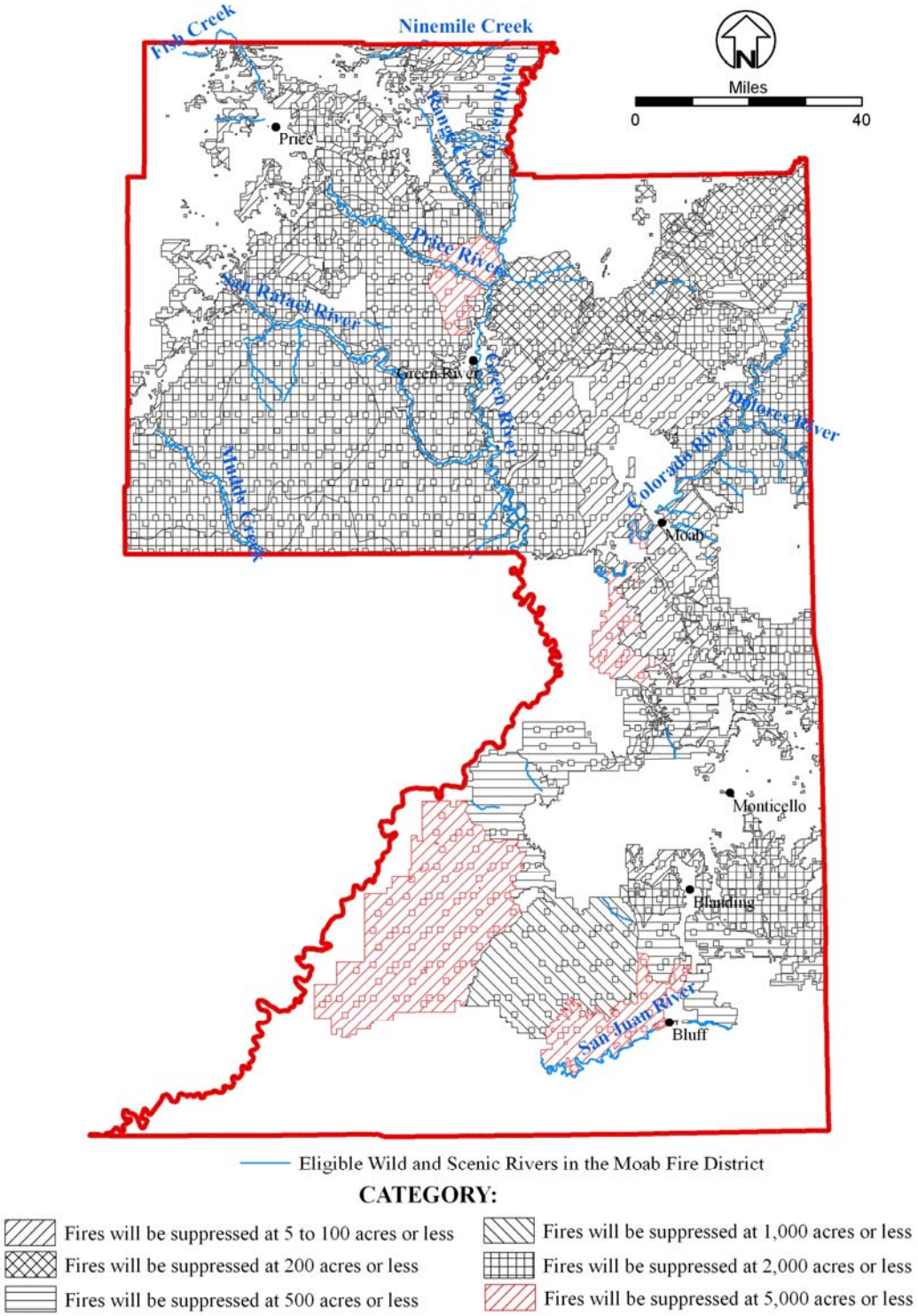
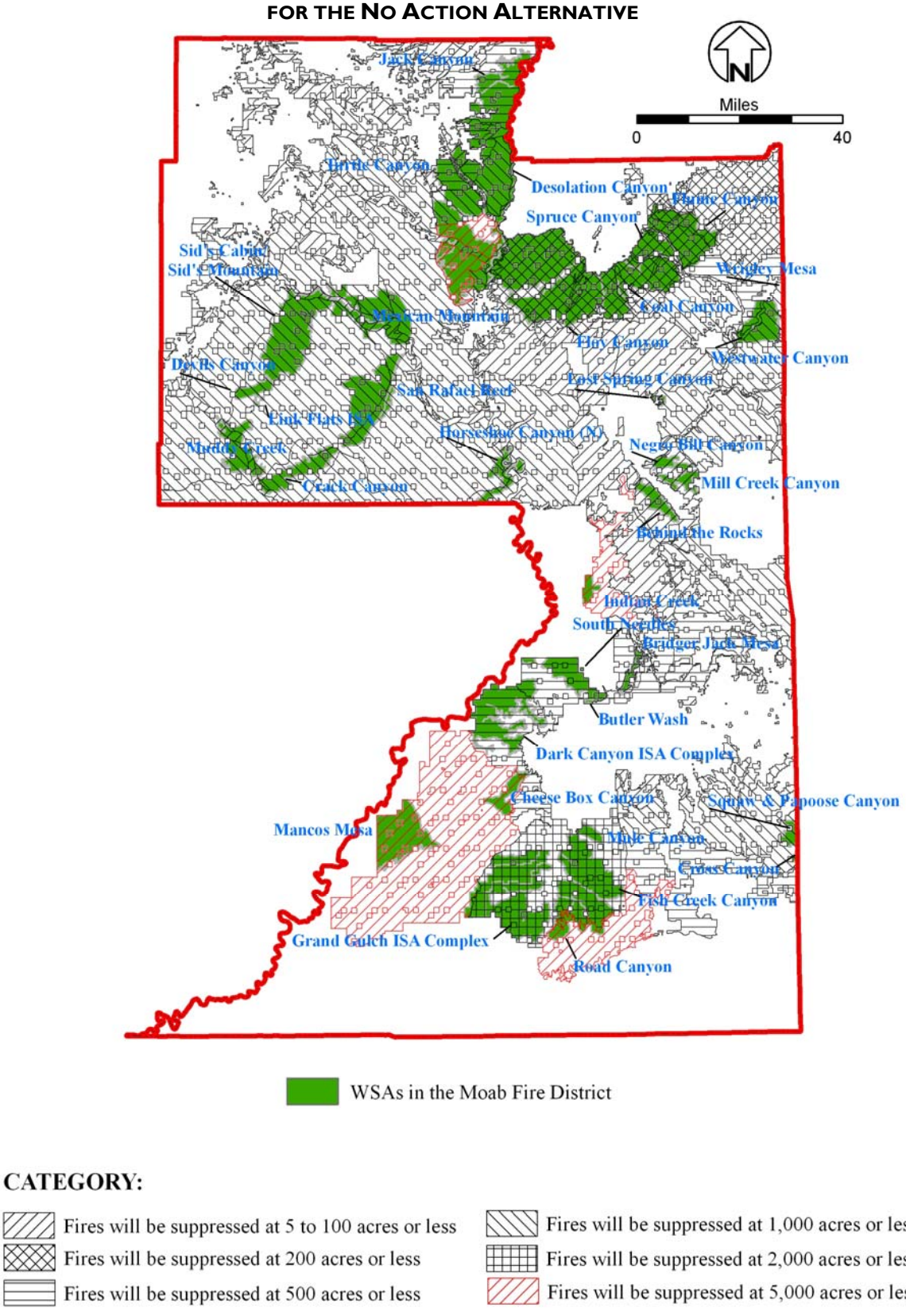


FIGURE 4.15: WILDERNESS STUDY AREAS AND FIRE MANAGEMENT CATEGORIES FOR THE NO ACTION ALTERNATIVE



Long-term Impacts

This alternative would likely continue to trend vegetation toward larger fuel buildups in or around WSAs. High-severity fire resulting from the continued fuels buildup would damage naturalness, opportunities for solitude and primitive recreation, and important values through both direct and indirect effects. Suppression efforts to protect these areas may increase impacts to the values present depending on site specifics and suppression methods.

Excluding fire from playing its natural role in ecosystems, as set forth in the No Action Alternative, is counter to managing areas for naturalness. The number of fuels treatment acres would likely not be significant enough to keep pace with increases in hazardous fuel loads.

4.3.13 LIVESTOCK GRAZING

Short-term Impacts

Under the No Action Alternative, approximately 16 percent of grazing allotments fall into the 100-acre suppression goal category, nine percent are found in the 200- and/or 300-acre suppression category, 14 percent are in the 500-acre suppression category, 43 percent are in the 1,000-acre suppression category, five percent are in the 2,000-acre suppression category, and 12 percent are in the 5,000-acre suppression goal category. **Figure 4.16** presents the locations of the grazing allotments relative to fire management categories and their associated impacts from wildland fire suppression and wildland fire.

Under the No Action Alternative, the short-term impacts of fire management activities would be more than the Proposed Action in the southern portion of the planning area where 5,000-acre suppression goals are present. Short-term impacts would be related to the loss of large areas of forage due to wildland fire, and indirectly from erosion of burned soil. Loss of forage may result in longer resting periods prior to allowing livestock back on the allotment. In contrast, more protection is afforded some areas in this alternative with less potential for fire to play a positive role. Suppression-related impacts could potentially be larger due to the more aggressive goal of suppressing wildland fires at a smaller acreage in several locations in the planning area. ES&R actions would offset some of these impacts by encouraging the growth of forage. Fewer fuel treatments relative to the Proposed Action could reduce impacts from forage loss due to treatments and concurrently could have less of an impact on allotment use.

Long-term Impacts

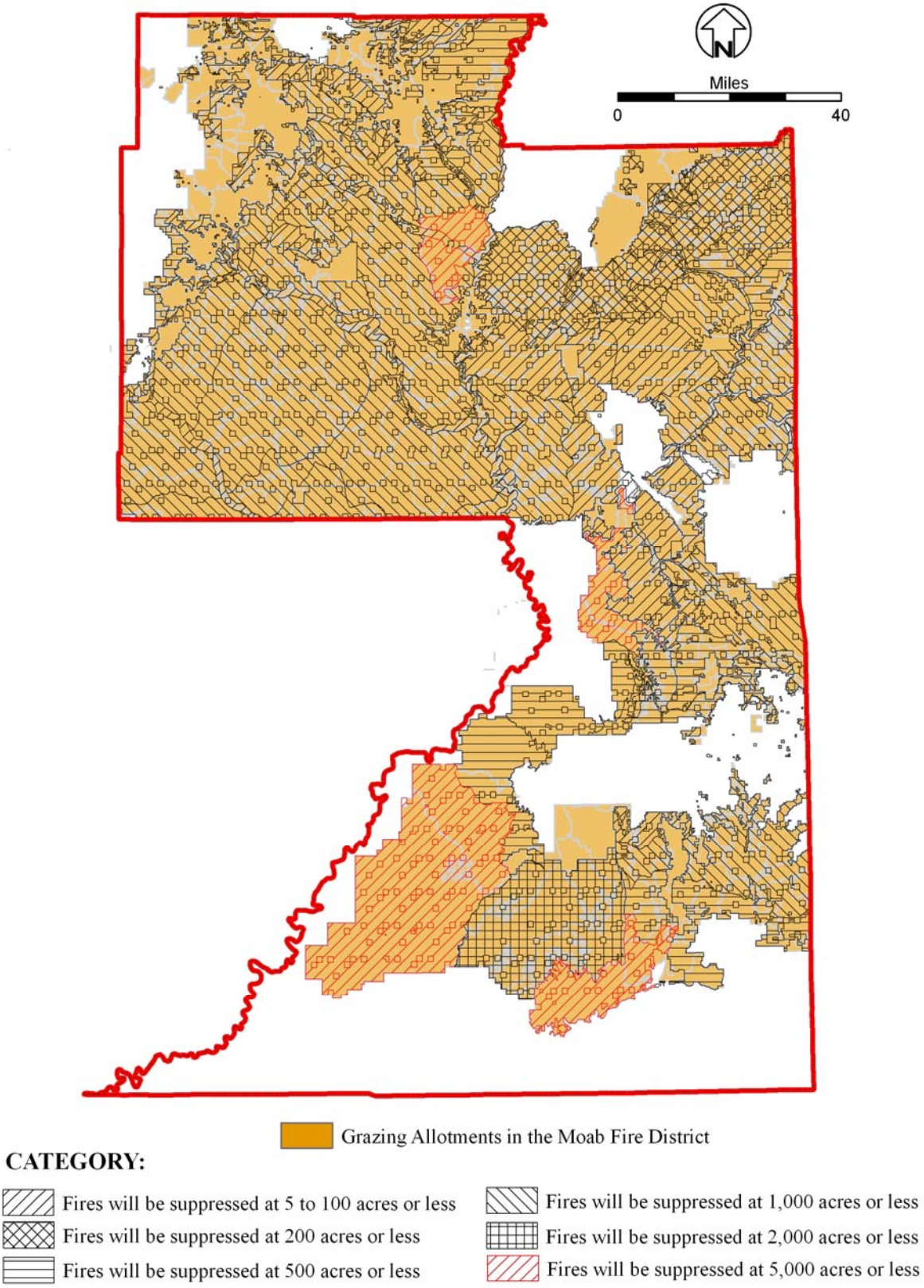
Under the No Action Alternative, less land area would trend toward a more natural FRCC. The trend away from DWFC would result in vegetation fuel loads more conducive to higher severity wildland fire. Because the loss of seed banks and physical and chemical degradation of soil reduces its ability to recover after wildfire, loss of allotment use could be greater than under the Proposed Action Alternative. Long-term impacts from the No Action Alternative could be moderate to major, dependent upon climatic conditions, fuel moisture, and other factors.

4.3.14 WOODLANDS AND FORESTRY

Short-term Impacts

The No Action Alternative would allow the current level of fuel accumulation and juniper encroachment to continue. Wildland fire would decrease the amount of biomass, timber, firewood, and pinyon nut harvesting opportunities in the areas affected by these events. Forested areas would experience similar impacts to current conditions.

FIGURE 4.116: GRAZING ALLOTMENTS AND FIRE MANAGEMENT CATEGORIES FOR THE NO ACTION ALTERNATIVE



In the short term, prescribed fire, when used, would increase the opportunity for the harvesting of biomass and firewood. Non-fire treatment methods used to reduce the occurrence of younger age classes in areas of old growth (in particular, ponderosa, aspen and mixed conifer) could increase the survivability of old growth forests during fire events (Howard 2003). This could increase the availability of higher economic value forest products, particularly in mixed conifer and ponderosa stands. The use of seeding and the planting of seedlings would increase the occurrence of desirable forest types.

Long-term Impacts

Long-term impacts from continuing wildfire suppression efforts would increase the potential for severe wildland fire in pinyon and juniper woodlands on lands outside of its historic range and within its historic range where they have become the dominant species. Severe wildland fire would directly decrease the availability of biomass and firewood collection in this vegetation type, an impact that could be less pronounced in other forested areas.

The low level of prescribed fire and non-fire treatments and the lack of wildland fire use would not lower the amount of fuel loading or move vegetation toward DWFC in an appreciable way. However, the focused use of non-fire treatment methods to reduce the occurrence of ladder fuels in areas of desirable old growth forests would decrease fire severity and increase survivability during fire events (Howard 2003).

4.3.15 VEGETATION

For all vegetation groups, the effects of the No Action Alternative would generally be the same as described under the Proposed Action. In many sensitive areas, fires would be suppressed at smaller sizes under the No Action Alternative, with the exception of the southern portion of the planning area. Fewer acres of planned prescribed fire and non-fire fuel projects have been accomplished over the past ten years than were estimated for treatment. Because the Proposed Action includes specific treatment goals and objectives, it can be assumed that the No Action Alternative would result in lower acreages of treatment, especially when combined with fewer fire management actions such as wildland fire use. The result would be fewer acres moved to a lower FRCC.

The No Action Alternative does not contain the RPMs established for invasive and non-native weeds in the Proposed Action, but these measures would be considered part of No Action Alternative due to EO 13112 (Invasive Species) and the effects would be the same as the Proposed Action.

Effects are described under each type (mountain shrub and oak discussions are together due to similarity of treatments and effects on the types).

Short-term Impacts

Pinyon and Juniper Woodlands: Effects from wildfire suppression under the No Action Alternative would be common to those described for the Proposed Action. Because approximately 96 percent of this vegetation type is in FRCC3, the larger amount of suppression acres established in the No Action Alternative would slow progress toward an improved condition class.

Although RPMs are not in place for the prevention of invasive species, prescribed fire and non-fire fuel treatments could reduce densities of pinyon/juniper, improving understory vegetation and potentially reducing cheatgrass invasion. ES&R actions, when approved, could be designed to reduce cheatgrass and invasive/non-native weed invasion.

Salt Desert Shrub and Sagebrush: Effects from wildland fire suppression under the No Action Alternative would be similar to those described under the Proposed Action, although the higher acreages targeted for

suppression could have the potential to disturb this vegetation type due to initial attack action, especially with no RPMs in place. Fewer non-fire fuel treatments could result in higher levels of cheatgrass invasion into sagebrush areas.

Because wildland fire use targets were not established for the No Action Alternative, potential benefits in decadent sagebrush areas would not be realized. ES&R actions, when approved, could be designed specifically for this vegetative type to reduce cheatgrass and invasive/non-native weed invasion.

Mountain Shrub: Effects of the No Action Alternative would be common to those described for the Proposed Action, although no RPMs would be in place to reduce invasive species invasion or spread. Fewer acres of prescribed fire and non-fire fuel treatments would result in less fuels reduction and may hinder FRCC goals. ES&R actions, when approved, could be designed specifically for this vegetative type to reduce cheatgrass and invasive/non-native weed invasion.

Grassland: Effects of the No Action Alternative would be similar to those described for the Proposed Action, although no acreage defined for wildland fire use may delay the accomplishment of FRCC goals. Fewer prescribed fire and non-fire treatment acres may decrease the number of areas in which reduction of pinyon/juniper encroachment into grasslands could be achieved.

Mixed Conifer: Effects from wildland fire suppression under the No Action Alternative would be similar to those described under the Proposed Action, although the higher acreages targeted for suppression could have the potential to disturb this vegetation type due to initial attack action, especially with no RPMs in place. Because wildland fire use is very effective at reducing fuel loadings in mixed conifer vegetation types, the lack of defined wildland fire use targets in the No Action Alternative could impede achievement of DWFC goals.

Long-term Impacts

A slow trend in vegetative conditions away from DWFC in all vegetative types would continue due to elevated suppression efforts in many portions of the planning area as well as fewer prescribed fire and non-fire treatments and no targets for wildland fire use. Wildland fires could increasingly inhibit vegetative recovery and could increase vegetative conversion to invasive species. ES&R actions would cover large areas and may require the use of non-native species to stabilize soil.

4.3.16 FISH AND WILDLIFE

Short-term Impacts

Because wildland fire suppression under the No Action Alternative would consist of full suppression in most cases, short-term impacts from burning could be less than under the Proposed Action, where many acres would be considered appropriate for wildland fire use or less aggressive suppression. Short-term impacts (e.g., introduction of fire retardant or foam into the ecosystem, habitat modification, plant mortality, and/or displacement of animal individuals or populations) from actual suppression activities would be similar.

Fewer acres of planned fire and non-fire treatment would reduce the health and functioning of wildlife ecosystems, although short-term impacts associated with ground disturbance and the potential for noxious weed infestation (i.e., alteration of habitat, particularly habitat used for foraging) could be less than under the Proposed Action.

Fish

Direct effects could occur from wildland fire suppression, including the introduction of fire retardant, aviation fuel, or lubricants into streams and wetlands; erosion of exposed soils from fireline construction on steep

slopes adjacent to streams; damaged riparian vegetation and soils (resulting in erosion) from the use of heavy equipment and establishment of fire camps; and reduced natural stream flow during drafting and pumping. Impacts from large suppression acreages targeted in the No-Action Alternative could adversely affect water quality of the various fisheries throughout the Moab Fire District. The collective short-term impacts of increased sedimentation (from erosion) could have watershed-wide effects including changes in temperature, turbidity, and water chemistry.

Outdated or non-existent RPMs in the No Action Alternative may allow short-term adverse impacts from prescribed fire and non-fire fuel treatments in and adjacent to riparian-wetlands and water habitat (see Section 4.2.9 for additional discussion regarding watershed impacts).

Non-game and Big Game Species

Direct effects from larger targeted acres of wildland fire suppression could include damaged vegetation (including forage resources) from the use of heavy equipment and establishment of fire camps; weed introduction; increase in the size of undesirable habitat types; preferential grazing; inhibited leaf production and/or leaf death; a decrease in understory diversity and overall species richness; shoot damage; an increase in insect herbivory; and suppressed flowering from the introduction of fire retardant or foam (Adams and Simmons 1999). Direct effects from prescribed fire and non-fire fuel treatments could include mortality to individual animals, modification, or destruction of forage or prey resources, habitat alteration or damage, and species displacement, although fewer treated acres in the No Action Alternative would lessen impacts.

In addition to direct impacts, indirect impacts could include changes in the survival or successful reproduction of aquatic prey species (e.g., for birds and carnivores) due to increased sedimentation and subsequent habitat modification as a result of upstream erosion from wildland fire suppression efforts or from fuels treatments. With RPMs either outdated or non-existent in the No Action Alternative, impacts could be increased over those detailed in the Proposed Action.

Long-term Impacts

Extensive wildland fire suppression and a lack of applicable and up-to-date RPMs could increase the potential for invasive/non-native weed establishment over time, modifying wildlife habitat that would otherwise provide forage resources. Additionally, a greater risk of severe wildland fire could result from increased fuel loading (suppression) and smaller numbers of actual fire and non-fire fuels treatments. Adverse impacts from long-term changes in vegetation composition and structure caused by aggressive fire suppression could occur to individuals, populations, and habitats.

Fish

Long-term adverse impacts to fisheries and aquatic resources could include alteration of habitat quality from high fuel loads resulting in repeated high-severity wildland fire events. An increase in temperature, turbidity, and chemical alteration to aqueous habitats would likely occur more frequently.

Non-game and Big Game Species

The long-term effects of the No Action Alternative on fish and wildlife species found within the Moab Fire District would be similar to the long-term effects described for special status animal species. Increases in suppression-related impacts to control severe wildland fires would be likely. Severe wildland fire events would remove forage and potentially contribute to undesirable vegetation conversions in critical habitats including winter range.

Because prescribed fire and non-fire fuel treatments would not likely consist of large treatment areas, the overall condition of the landscape would continue to trend away from its natural fire regime. The lack of wildland fire use and a smaller quantity of planned actions may worsen FRCC conditions in the planning area.

4.3.17 SOIL

Short-term Impacts

Effects on soil quality and health resulting from fire management actions are generally not addressed in the MFPs and RMPs currently in use in the planning area. Therefore, the No Action Alternative would provide minimal guidance for most of the planning area with respect to soil erosion as it relates to fire actions. Due to limited or non-existent RPMs and mitigation guidance under the No Action Alternative, soils would be at greater risk from soil disturbance and compaction related to intensive fire suppression activities such as fireline construction, road construction and other uses of heavy equipment.

Short-term direct and indirect effects to soils would be similar to those seen under the Proposed Action. However, under the No Action Alternative, there would potentially be little or no acreage directly affected by wildland fire use and fewer treatment impacts from prescribed fire and/or non-fire methods.

Long-term Impacts

Wildland fires under the No Action Alternative would become increasingly larger and more severe resulting in a greater occurrence of negative impacts to soil resources. High-severity fires would remove more of the vegetation cover and organic matter, reducing nutrient cycling. Increases in physiochemical alteration and decreases in plant-available moisture in shallow soils could occur. High-severity wildfires are also more likely to adversely affect soil microorganisms, decreasing biological crusts that prevent erosion and fix nitrogen from the atmosphere. High-severity fires may also result in the formation of water-repellent soil layers (Robichaud et al. 2000). The degree of water repellency in post-fire soils is correlated with fire severity. Repellency can decrease infiltration, increase the rate and quantity of runoff, accelerated erosion, and cause potentially dangerous debris flows. These impacts would decrease the soils' ability to foster the beneficial uses of natural vegetative growth and wildlife habitat.

4.3.18 RECREATION

Short-term Impacts

The impact to recreational sites and facilities from wildland fire suppression under the No Action Alternative would be similar to the Proposed Action. The management goal of suppression of wildland fire would increase the preservation of recreation infrastructure. Fewer acres of prescribed fire and non-fire fuels treatments would be completed under the No Action Alternative. If focused on sites and facilities, fuels treatments could help control hazardous fuel loads and minimize fire risks to developed sites and facilities.

Long-term Impacts

Under the No Action Alternative, the lack of wildland fire use and fewer fuels reduction would continue the current trend of increasing hazardous fuel loads. Heavy fuel loads could result in a greater risk of large or severe wildfires, threatening developed sites and facilities. In addition, many of the developed sites have numerous potential ignition sources (campfires, improper disposal of cigarettes, vehicle exhaust systems, fireworks, and others), creating a situation where impacts to infrastructure and public safety could increase with time.

4.3.19 VISUAL RESOURCES

Short-term Impacts

Under the No Action Alternative, current management would be continued. **Figure 4.17** presents a map of the planning area with designated VRM class areas and BLM-administered lands categorized by current fire suppression levels. Current fire management mandates aggressive suppression of wildland fires in approximately one million acres of the planning area, with wildland fire use not specifically addressed. The continued suppression of wildland fire would increase hazardous fuels accumulation and could increase the risk of a severe wildland fire. Short-term effects of full fire suppression activities could change the landscape to appear altered by man. For example, a bladed fireline may create a visual contrast that would make human intervention apparent. Potential visual effects from a severe wildland fire could include loss of living timber, blackening of the landscape, blackened deadfall, and the disruption of line and form from ground disturbing activities. Large areas, including areas in VRM classes I and II, could be blackened and charred and large amounts of smoke produced.

The use of prescribed fire and non-fire fuel treatments is currently limited. Regardless, the short-term effects of specific prescribed fire and non-fire fuel treatments are likely to be similar to the effects of these activities in the Proposed Action only on a smaller scale in the No Action Alternative.

Long-term Impacts

Under this alternative the trends of increased risk and hazard due to the accumulation of fuels would likely continue for all VRM classes, with large and severe wildland fires potentially burning and charring visually sensitive areas. Long-term effects to visual resources from wildland fire suppression, prescribed fire and mechanical treatments are anticipated to trend toward more ground disturbing activities from increasingly aggressive suppression and more potential soil sterilization and erosion from larger and more severe wildfires.

4.3.20 PALEONTOLOGICAL RESOURCES

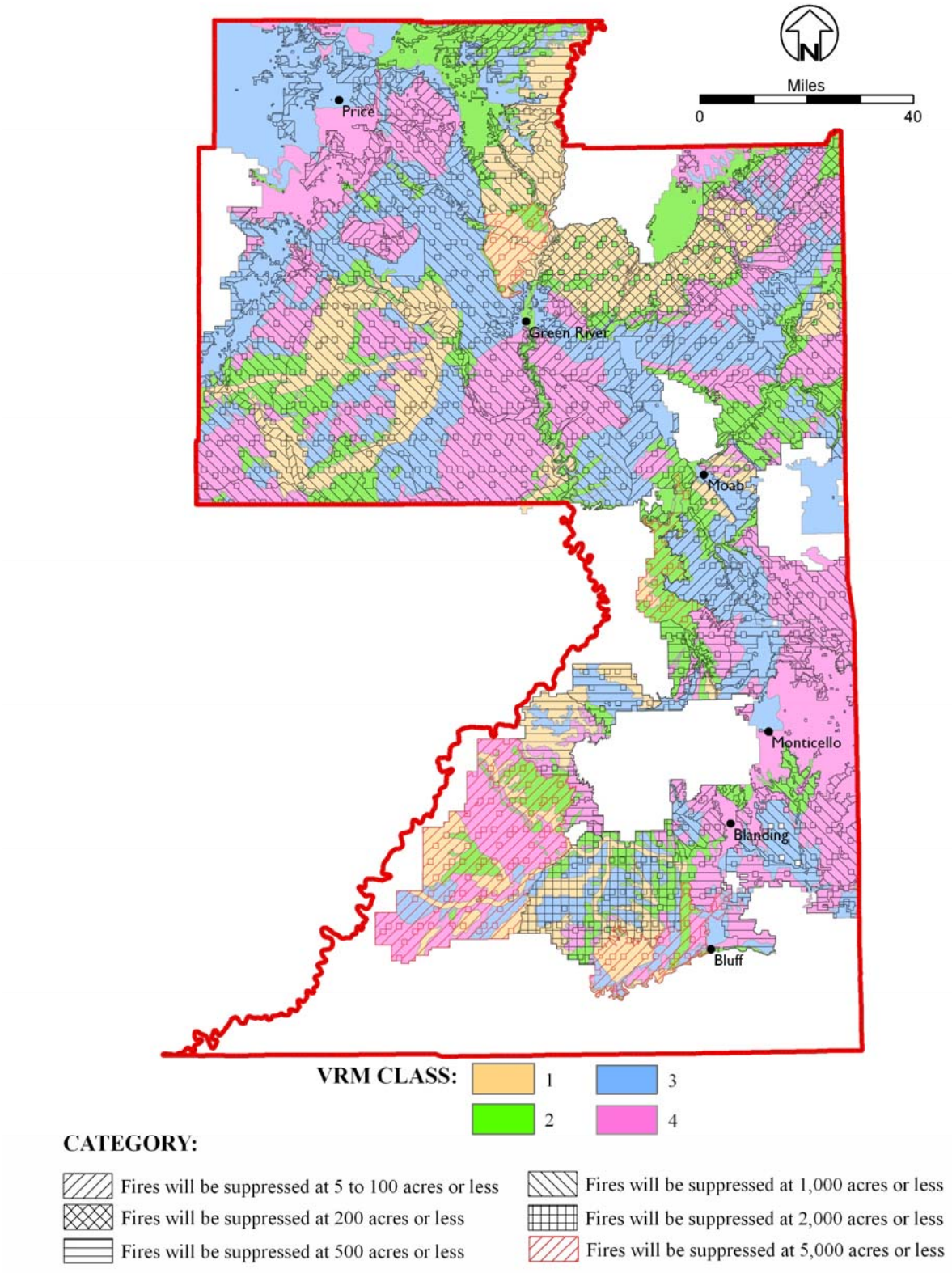
Short-term Impacts

Paleontological resources could be damaged during wildland fire suppression in the No Action Alternative, primarily from ground disturbing activities on the geological formations presented in Chapter 3. More acreage would be subject to an aggressive suppression goal of five to 100 acres in the No Action Alternative as compared to the Proposed Action. This would increase the likelihood that more acres would undergo ground-disturbing suppression efforts and that less time would be available to determine if important resources were present where suppression activities would occur. The impact from ground disturbance in these areas would be offset by a large number of acres where a 5,000-acre suppression goal would result in fewer ground-disturbing impacts. ES&R actions that incorporate ground-disturbing activities present a similar risk of impact to paleontological resources. The No Action Alternative contains the largest acre suppression goal (5,000 acres per ignition) in several areas, which increases potential for ES&R treatment and associated impacts.

Because no wildland fire use goals are stated in the No Action Alternative, no impacts associated with wildland fire use would occur.

Prescribed fire events are frequently preceded by non-fire fuels reduction actions to obtain a smaller, more manageable and less-severe prescribed fire. Because prescribed fire and non-fire fuel reduction events are planned, areas containing important paleontological resources would be identified for avoidance to minimize potential impacts.

FIGURE 4.127: VISUAL RESOURCE MANAGEMENT CLASSES AND FIRE MANAGEMENT CATEGORIES FOR THE NO ACTION ALTERNATIVE



Long-term Impacts

The continuing trend toward increasing fuel loads could result in a greater number of large severe fires, requiring a higher level of suppression. There could be potential impacts to paleontological resources from ground-disturbing and other suppression activities in the long term. The potential for indirect erosion-related impacts would be similarly increased over time.

The lack of wildland fire use could also result in suppression-related impacts. Impacts from prescribed fire and non-fire fuel treatments would be minor, based on the planned nature of these fire actions and the assumption that the historically low treatment acres would continue under the No Action Alternative.

4.3.21 SOCIAL AND ECONOMIC CONDITIONS

Social and economic issues associated with the No Action Alternative include impacts to communities-at-risk from treatment projects, and economic impacts from forage loss due to wildland fires and treatment projects. Communities-at-risk are those WUI communities with economic activities that could be impacted by fire or fire management protocol. These communities could receive economic benefits by providing support services during fire suppression or fuels treatment projects. A change in fire severity could also affect the economy of WUI areas from the loss of tourism dollars during wildland fire.

Short-term Impacts

Short-term suppression-related impacts from the No Action Alternative would be similar to those possible in the Proposed Action. Due to the low level of planned fuel reduction treatments performed in the past, impacts could include wildland fire events that affect communities-at-risk. Livestock grazing allotment rest periods following wildland fire could force permittees to find alternative sources of pasture, with possible financial loss to permittees. However, these impacts would be temporary and could be partially offset by an increase in forage quality and quantity following post-fire rehabilitation. Short-term economic loss associated with a decrease in available forestry products from fuels treatment would be possible in both alternatives.

Long-term Impacts

The trend toward more severe wildland fire would require the utilization of larger numbers of fire crews, support personnel, and local or regional business. Increases in economic activities during these wildland fire suppression events could raise the income of those businesses and individuals involved on a local or regional basis. Some second-tier economic benefits would also be expected in local communities. ES&R activities could have a similar effect on the local economy.

Grazing allotment use and woodlands product harvesting opportunities could be impacted by more frequent and severe wildland fire events. Allotment impacts could include rest periods to improve burned allotments as well as replacement or repair of allotment improvements, which could create an economic hardship for permittees. Harvesting areas altered by large and/or severe wildland fire events could decrease opportunities for pinyon nut, post and pole, firewood, and other product harvests. Communities-at-risk and WUI areas could be increasingly impacted by wildland fire. Planned actions would likely focus on these areas due to limited funding.

4.3.22 WILD HORSES AND BURROS

Short-term Impacts

Under the No Action Alternative, approximately five percent of the HMAs fall into the 100-acre suppression goal category, 10 percent are located in the 500-acre suppression category and 85 percent are in the 1,000-

acre suppression goal category. **Figure 4.18** presents the locations of the HMAs relative to fire management category areas.

The short-term impacts of wildland fire suppression may be slightly more than the Proposed Action due to a smaller suppression goal on some of the HMA lands. ES&R activities would potentially be needed on less acres decreasing impacts from that action. Wildland fire use would not be used and no effects would occur. Planned actions have the potential to have some minor impacts, however, the use of planned actions is limited in the planning area and would likely be focused in other areas.

Long-term Impacts

Long-term effects from continued fire suppression would cause a long-term increase in severe wildfires and could decrease available forage and shelter for wild horses and burros. This could cause the herds to be displaced temporarily or even permanently if forage conditions are severely damaged due to these wildland fire events. Planned actions are not anticipated to appreciably affect HMAs.

4.3.23 WILDERNESS CHARACTERISTICS

As shown in **Figure 4.19**, approximately eight percent of land with wilderness characteristics are found within 100-acre suppression goal FMUs, approximately three percent are found within 200 and/or 300-acre suppression goal FMUs, approximately 12 percent are found within 500-acre suppression goal FMUs, approximately 47 percent are found within 1,000-acre suppression goal FMUs, approximately five percent are found within 2,000-acre suppression goal FMUs, and approximately 25 percent are found within 5,000-acre suppression goal FMUs.

As shown in **Figure 4.19**, approximately 22 percent of lands likely to have wilderness characteristics are found within 100-acre suppression goal FMUs, 47 percent are found within 200 and/or 300-acre suppression goal FMUs, approximately 20 percent are found within 1,000-acre suppression goal FMUs, and approximately 11 percent are found within 5,000-acre suppression goal FMUs.

Short-term Impacts

Short-term impacts from the No Action Alternative would be similar to those described under the Proposed Action. The increased emphasis on suppression in the lower suppression goal category could lead to more suppression-related impacts than those anticipated by the Proposed Action. However, the southern portion of the planning area could potentially have fewer suppression impacts due to large suppression goals (5,000 acres), with more direct and indirect impacts from wildland fire. Additionally, the greater focus on suppression efforts in many areas could potentially decrease the amount of wilderness characteristic acres that burn. The lower amount of burned acres may give the impression of a more natural environment to the public when the lack of fire events actually leads to the build up of unnatural and unsustainable fuel loads.

If the amount of planned fuel treatments continues as it has in the past 10 years, fewer fuel treatments would occur. This would translate into a short-term decrease in impacts to places likely to have wilderness characteristics.

FIGURE 4.138: HERD MANAGEMENT AREAS AND FIRE MANAGEMENT CATEGORIES

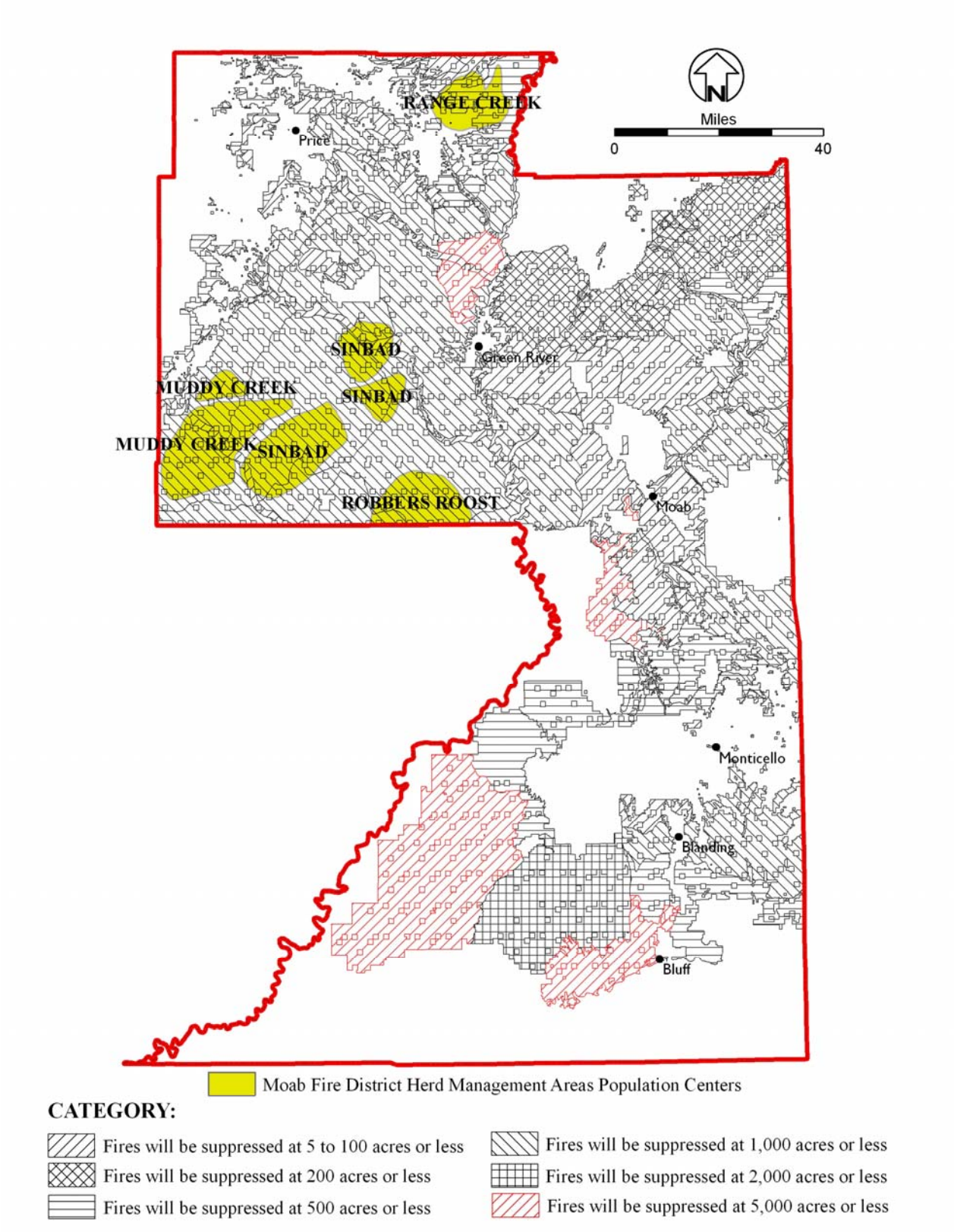
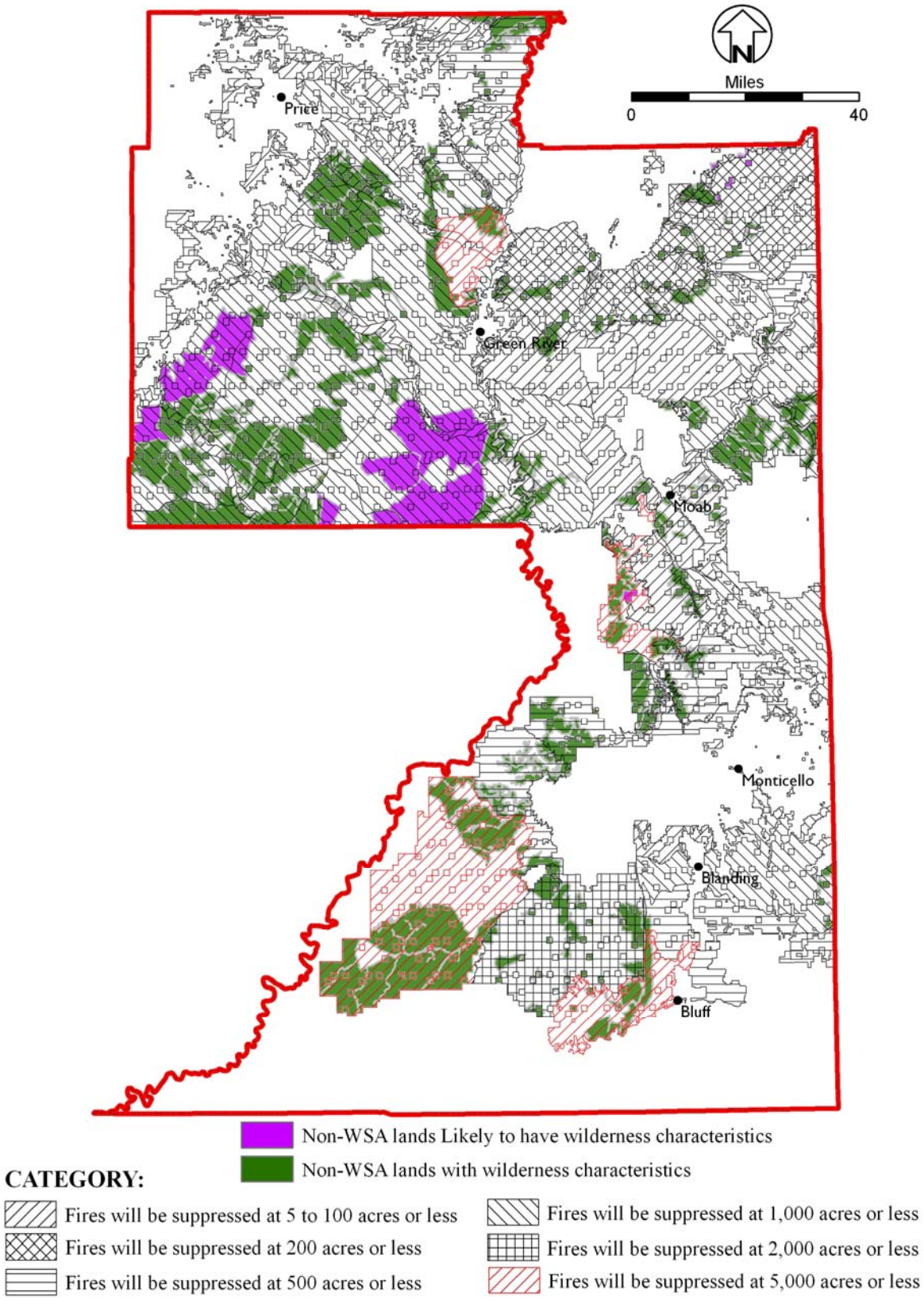


FIGURE 4.149: NON-WSA LANDS WITH OR LIKELY TO HAVE WILDERNESS CHARACTERISTICS AND FIRE MANAGEMENT CATEGORIES FOR THE NO ACTION ALTERNATIVE



Long-term Impacts

This alternative would likely continue to trend vegetation toward fuel buildups in or around places likely to have wilderness characteristics. High-severity fire resulting from the continued fuels buildup would damage naturalness, opportunities for solitude and primitive recreation, and/or other relevant and important values both directly and indirectly. Suppression efforts to protect these areas may increase impacts to the values present. Excluding fire from its natural role in ecosystems, as set forth in the No Action Alternative, is counter to managing areas for naturalness. The acreages estimated for planned fuels treatment activities in the No Action Alternative would likely not be significant enough to keep pace with increases in fuel loads.

4.4 CUMULATIVE EFFECTS

4.4.1 CUMULATIVE IMPACT ANALYSIS

Cumulative impacts are the effects on the environment that may result from the incremental impact of the Proposed Action or No Action Alternative in combination with other past, present, and reasonably foreseeable future actions on BLM managed lands, as well on those lands under other jurisdictions that are adjacent to or sometimes within BLM boundaries. Cumulative impacts must consider the likely effect of the Proposed Action or No Action Alternative when combined with these additional actions.

4.4.2 PAST AND PRESENT ACTIONS

The No Action Alternative would represent those past actions and the present continuation of activities that do not include fire as a natural process. Past and present MFD resource and fire management activities outlined in the No Action Alternative encourage aggressive fire suppression, minimal fuels treatments, and no wildland fire use. As summarized throughout this EA, scientists and natural resource specialists now agree that fire is a critical natural process that helps maintain healthy ecosystems. Past fire management policies and actions now appear to have contributed to overall pinyon/juniper expansion and the introduction of exotic annual weeds. Cumulative effects of past and present actions on resources include a buildup of hazardous fuels, a reduction in understory, declines in diversity and health of vegetative communities, and increased susceptibility of soils to erosion. Combined, these cumulative effects have compromised air, water, soil, and visual resources; have increased the threat of, and resulted in severe wildland fires; and have created a greater fire risk for communities. If fire management goals and objectives remain as they have in the past, these impacts could consistently multiply and would cumulatively affect resources already impacted by other actions such as increased recreation and visitation, oil, gas and coal exploration and development, and the spread of non-native/invasive weeds.

Cumulative effects of the No Action Alternative could also lead to more intense suppression actions, increasing the possibility of impacts to unique values associated with cultural resources, ACECs, Wild and Scenic River segments, Wilderness Study Areas and/or areas with wilderness characteristics. Long-term suppression of wildland fire in many areas could also contribute to the continuing trend of fuels buildup, exacerbating the threat of severe wildland fire and potentially damaging biologic, cultural, or scenic resources.

Large-scale implementation of the National Fire Plan by other agencies may reduce fuels buildup on adjacent lands, improve habitat, and reduce invasive/non-native weeds. This may include the introduction of wildland fire use in areas adjacent to BLM-administered lands. Because fire is a process that can operate on a large spatial scale, these types of fire management activities by other agency may affect entire landscapes that include BLM lands. Also, if compromised habitat and hazardous fuels continue to threaten the majority of BLM lands, treatments on adjacent lands could be less effective. Because public lands in southeastern Utah encompass lands managed by several entities, the effects of wildland fire, fuels treatments, and general fire management are very seldom boundary-specific. Critical watersheds affecting communities, wildlife

populations, grazing lands, multi-agency-managed forests, and valuable riparian areas can be compromised by severe wildland fire on private lands or on any of the agency-managed lands.

Cumulative impacts from severe wildland fires can include changes in vegetation composition and structure from both aggressive fire suppression and wildland fire itself. Large-scale events across agency boundaries generally have negative effects on water quality, increasing or reducing infiltration and affecting both runoff and groundwater.

Fire can also cause changes in the vegetative fuel load, particularly by increasing unpalatable species growth and introducing or encouraging the spread of invasives across boundaries. These impacts could result in the removal of wildlife habitat components including linkages, in a cumulative and in some cases permanent manner. Individuals and populations unable to adjust to or survive displacement and unable to adapt to the presence of man would be most severely impacted. The health and productivity of livestock grazing resources can be similarly affected from both the reduction in vegetative composition and possible spread of invasive/non-native weeds following fire.

4.4.3 REASONABLY FORESEEABLE ACTION SCENARIO

The following reasonably foreseeable action scenario (RFAS) identifies actions that could cumulatively affect the same resources as those included in the planning area for the Proposed Action and No Action Alternatives.

Reasonably Foreseeable Actions on BLM Lands

- **Vegetation treatments resulting from wildlife habitat and other restoration projects.**

The Great Basin Restoration Initiative (GBRI) is a BLM-spearheaded plan to develop strategies for the restoration of degraded lands. The scope of the initiative includes portions of five states with a priority for restoring fire-damaged or weed-infested rangelands.

In November of 2004 the BLM released a national strategy for managing sagebrush habitat on lands managed by the BLM that are also used for grazing, recreation, mining and energy developments. Strategies implemented to enhance sagebrush habitat through restoration and improvement of shrub-steppe ecosystems could overlap with the Proposed Action in specific vegetative communities. The Sagebrush Restoration and Management initiative is a multi-agency statewide coordinated treatment for sagebrush ecosystems that includes several thousand acres in the MFD. The initiative aims to restore sagebrush sites and provide habitat for key species through treatments implemented over the next decade.

The Utah Association of Conservation Districts formally organized a state-level organization entitled Utah Partners for Conservation and Development (UPCD) to strengthen coordination efforts and to link state and federal financial and technical resources in the implementation of conservation practices significant to watersheds, shrub-steppe ecosystems, endangered species, and others. The UPCD has prioritized potential projects, prepared conservation plans, and obtained federal, state, and private dollars to implement restoration treatments and maximize efforts to restore watershed health.

The BLM would continue to implement individual restoration projects on a local or watershed scale throughout the Moab Fire District on an annual or periodic basis to improve resource condition or to meet land use management objectives.

- **Continued increases in WUI populations and expanded WUI areas.**

The populations of the counties within the MFD have generally increased over the past ten years (while populations in Carbon and Emery counties have remained relatively stable, both Grand and San Juan county populations have increased by approximately thirty percent. Population projections anticipate that this trend will continue and that within the next twenty years, the number of people living in Utah will increase by over

six percent (Population Projections, LeRoy W. Hooton, Jr., 2002). Increases in population would result in corresponding areas where buildings, homes and other structures of human development are adjacent to or directly intermingling with undeveloped wildland and/or other fuel sources.

- **Standards for Rangeland Health**

In 1997, Standards for Rangeland Health of BLM land in Utah were approved by the Secretary of the Interior and adopted as decisions in all BLM land use plans. The Standards relate to all users of public land and describe natural resource conditions that are needed to sustain public land health. The standards set minimum requirements for proper nutrient/hydrologic cycling and energy flow relative to a system's ecological potential, and the guidelines directed significant progress towards meeting the standards. Ongoing efforts to move resources toward ecosystem health are expected to continue into the future.

- **Increased recreational use of BLM lands within the planning area.**

Southeastern Utah and BLM lands in particular experience heavy seasonal recreational visitation which has more than doubled in the past twenty years. Recreationists include those visiting the area to engage in personal recreational activities as well as those who attend many of the special events in the area and/or participate in an organized activity with a commercial outfitter. Recreational use includes camping, OHV use (ATV, dirt bike, and four-wheel driving), mountain biking, horseback riding, hiking, and river recreation including river corridor camping. There are developed recreation sites throughout the MFD with facilities including campgrounds and picnic areas (tables, dumpsters, shade shelters, fire grills, etc.), vault toilets, boat ramps, information boards, and parking lots.

Because visitation has increased every year since 1999, it is estimated that the number of visitors will continue to increase and that the demand for facility development will increase concurrently. Priorities for suppression of wildland fires include not only protecting firefighter and public safety, but also preventing damage to BLM improvements. In the MFD, the number of human-caused wildland fire ignitions has actually decreased with the development of more established campgrounds along the river corridor and the simultaneous closing of dispersed camping areas.

- **Continued expansion of mineral extraction activities associated with oil and gas, coal, copper, and uranium/vanadium.**

Oil, gas, and coal exploration and development will continue to expand throughout the planning area. Coal bed methane extraction is predominant in the Price Field Office area of the MFD and it is expected that development of this resource will continue over the next fifteen years. Oil and gas exploration and production has also been on the rise, and it is likely that resources will continue to be developed over the next fifteen years. The entire MFD area is open to mining claims, and there has recently been an increased interest in uranium and other mineral extraction. In 2005 a major copper mine located in Lisbon Valley began operations and the company has indicated an interest in expanding the area of the current development.

- **Transportation and utility corridor development, expansion, maintenance, and improvement.**

Cumulative impacts to the viewshed in the MFD are resulting from increases in recreation and visitation as well as from the development of utility corridors and other land use disturbances. The increasing number of two-track roads and routes allow OHV users, campers, and woodlands harvesters to access more backcountry areas. It is also possible that closures and/or road and route designations may decrease associated land disturbances and/or the possibility for human-caused ignitions.

- **Continued and increased invasive/non-native weed infestation.**

In addition to tamarisk and Russian olive encroachment along river corridors, major areas of uplands and rangelands are being converted to invasive annual grasses such as cheatgrass, halogeton, and Russian thistle. These species become a fire hazard in wet years, produce little forage in dry years, and prevent reestablishment of native species.

The Invasive Species Executive Order 13112 encourages all agencies, including the BLM, to research mechanisms to control the introduction and spread of invasive species. Invasive/non-native weed infestation can spread to BLM lands from adjacent public and private lands and vice versa. The BLM Noxious Weed Program has identified and documented populations of invasive/non-native/noxious weeds in the MFD area. These sites are monitored annually and controls and/or treatments are applied as dictated by time and budgetary constraints. This ongoing monitoring, documentation, and treatment program supports the achievement of DWFC goals by identifying potential treatment sites and reducing the likelihood of sites that may go un-noticed, uncontrolled, and that would spread further if untreated.

- **Continued human-caused and natural ignitions of wildland fire.**

Human-caused fires can increase along major highways in wet years when annual grasses have matured and dried. If these climatic conditions occur in combination with an increase in the number of visitors to an area, the occurrence of wildland fire can increase. Wildland fire as a result of natural ignitions can also depend on FRCC (vegetative conditions) and seasonal conditions. Extended periods of drought, low fuel moistures, and environmental influences, for example, can all affect human-caused wildland fire spread.

Reasonably Foreseeable Actions on Adjacent Lands

The Moab Fire District is comprised of a variety of vegetative communities that obviously spread beyond BLM jurisdictional boundaries. Vegetative communities overlap with thousands of acres under private ownership, under management direction of several different federal agencies (BIA, NPS, USFS), and under ownership of various divisions within the State of Utah (FFSL, SITLA). Management of lands under multiple jurisdictions adjacent to or within BLM FMUs may cumulatively affect BLM-managed lands in areas such as fire and fuels management; recreation management; invasive weed control; grazing and wildlife management; extractive industries; and/or private and commercial uses such as airports, highways, railroads, powerlines, campgrounds, etc. In addition, various communities-at-risk within the Moab Fire District boundaries may or may not have developed plans to manage growth and development extending into surrounding landscapes and to mitigate hazards within the communities, which could also have a cumulative effect on BLM fire management and BLM resources. For example, suppression within and adjacent to BLM lands is dependent upon factors such as location relative to populated areas, probability of spread, threats to public safety or private property, land status, and others. Increases in the number of WUI areas and expanding communities can result in a demand for higher suppression activities.

The National Park Service (NPS), Southeast Utah Group (SEUG), recently released a draft Fire and Fuels Management Plan outlining the focus and strategy for management of fire and fuels within the four SEUG parks and monuments (Arches and Canyonlands National Parks, Hovenweep and Natural Bridges National Monuments). All four of the NPS-administered parks and monuments in this portion of the state are adjacent to public lands under the jurisdiction of the BLM. The SEUG plan includes techniques to minimize fire suppression impacts and also outlines fire suppression and hazardous fuels reduction goals. No wildland fire use goals are included in the draft plan. Invasive weed control on NPS lands is addressed in the NPS integrated pest management program.

The State of Utah, Department of Natural Resources, Division of Forestry, Fire, and State Lands (FFSL) oversees fire-related activities on lands currently under State of Utah ownership as well as wildland fire and fuel mitigation on private lands within Carbon, Emery, Grand, and San Juan Counties. Lands that are managed by FFSL are both adjacent to and scattered within most of the FMUs outlined in the Proposed Action. FFSL oversees, plans, and implements fire suppression and fuels reduction on state lands as well as working directly with communities to establish community fire plans. Each of the Utah counties within the MFD either contracts with the BLM for the control of invasive species and noxious weeds, partners with a cooperative entity such as the Middle Colorado River Watershed Cooperative Weed Management Area, or

falls under the regulations of the Utah Division of Water Resources with respect to exotic and invasive vegetative management.

There are also many thousands of acres of public lands in southeastern Utah managed by the Department of Agriculture, Forest Service (USFS), and many are adjacent to BLM lands. The Manti-La Sal National Forest manages both fire and fuels management for these lands under several different Ranger Districts: Ferron Ranger District, Price Ranger District, Moab Ranger District, and Monticello Ranger District. The Manti-La Sal National Forest is currently in the process of a Forest Plan Revision to establish long-term management decisions which include fire and fuels management. Each of the Ranger Districts is involved in separate and/or combined multi-agency fire suppression activities and in ongoing fuels treatment projects. Weed control on USFS lands generally occurs through cooperation with individual counties.

Reservation lands adjacent to the area of the proposed action include the Uintah and Ouray Reservation to the north and the Navajo Reservation to the south. Fire and fuels management on lands within the reservation are overseen by the Bureau of Indian Affairs (BIA), which provides wildland fire protection for over 60 million acres of Indian reservations and other trust lands across the United States. The BIA's national wildland fire and aviation staff is headquartered at the National Interagency Fire Center, where BIA is one of many agencies who work together to exchange support, protection responsibilities, information, and training for wildland fire and fuels treatment. When fires occur on reservation lands adjacent to BLM lands, initial attack and suppression activities are coordinated between the cooperating agencies.

Private lands and management of those lands can affect resources such as vegetation, air quality, soils, watersheds, and water quality on adjacent BLM lands. Population growth, increases in WUI areas, community pro-activeness in fire and fuel management, recreation, industrial growth and/or extractive industries, and invasion or spread of non-native/invasive weeds are just a few examples of actions that may take place on adjacent private land that could contribute to resource effects from management actions on public lands.

Table 4.1 below identifies existing uses, services, management actions, practices, and/or future plans within each FMU that may have a cumulative effect on lands within the MFD when combined with activities outlined in the Proposed Action. A general discussion of cumulative resource effects follows in Chapter 4.2.1.

Table 4.1 Adjacent Lands Actions and Potential Cumulative Impact Considerations

FMU#	FMU Name	Land Status	Acres	Known Proposed Fire/Fuels Management Actions and/or Existing or Planned Uses	Special Considerations
1	**Bruin Point**	BLM	166,566	Suppression 100 acres or less; fuels treatment acres identified; WUI buffers.	T&E Birds/Sage Grouse Oil & Gas Development (150,000 acres Price FO)
		Private	194,858	Mining; ranching; oil & gas; hunting; recreation.	Bruin Point Communication Site Existing Coal Mine
		State	31,506	No communities at risk; ongoing fuels reduction activities.	Coal Mine Ventilation Development (Price FO)

FMU#	FMU Name	Land Status	Acres	Known Proposed Fire/Fuels Management Actions and/or Existing or Planned Uses	Special Considerations
2	**East Carbon**	BLM	65,944	Suppression 250-500 acres; fuels treatment acres identified; WUIs; previous chainings.	T&E Birds Oil & Gas Development (Price FO) Existing Coal Mine Proposed Coalbed Methane Project (Price FO) Carbon County Airport West Benches Sagebrush Restoration Project (Price FO)
		Private	22,018	Airport; railroad; oil & gas; mining; ranching; coal mine; major waste repository and burning facility; hunting; recreation.	
		State	10,984	Community fire plans: Kenilworth, East Carbon, Sunnyside, Columbia; ongoing fuels reduction activities.	
3	**West Benches**	BLM	92,738	Suppression 100-500 acres; fuels treatment identified; WUIs.	T&E Birds Winter ranges
		Private	142,844	Reservoir; coal mines; recreation; hunting; ranches.	
		State	116,385	Community fire plans: Scofield, Aspen Cove; ongoing fire management.	
		USFS	177	Skyline Coal Mine exploration project; National Fire Plan activities.	
4	**Price Urban**	BLM	24,121	Suppression 10 acres or less; fuels treatment identified; WUIs.	T&E Birds
		Private	89,234	Urban area; small Ranches; major highways; OHV use; other recreation; wood cutting.	
		State	4,573	Community fire plans: Price, Helper, Huntington, Castle Dale, Ferron, Emery, Wellington; ongoing Tamarisk treatment-Price; ongoing fuels management activities.	

FMU#	FMU Name	Land Status	Acres	Known Proposed Fire/Fuels Management Actions and/or Existing or Planned Uses	Special Considerations
5	**Rock Creek**	BLM Private State	249,026 1,288 26,367	Suppression 250-100 acres; fuels treatment identified; potential wildland fire use. Ranches; hunting; recreation. No ongoing activities.	WSA T&E Birds (MSO)
6	**San Rafael**	BLM NPS Private State	1,155,650 14 127,160 155,578	Suppression 1,000 acres or less; no fuels treatment identified; WUI buffers; no wildland fire use. No specific treatments identified. Ranches; highways; railroad; OHV use; other recreation. Bordering Price urban area (community fire plan); State Park recreation/visitation.	WSA Sage Grouse T&E Plants, Birds, Mammals Natural Gas Well Development (Price FO) Goblin Valley State Park
7	**Cedar Mtn.**	BLM Private State	653,527 8,053 105,729	Suppression 1,000 acres or less; no fuels treatment identified; potential wildland fire use (low fuels). Ranches; grazing. No ongoing activities.	WSA T&E Plants, Birds Cedar Mountain Recreation Site Cedar Mountain Communication Site I-70 Corridor
8	**Green River**	BLM Private State	85,798 18,592 6,862	Suppression 25 acres or less; fuels treatment identified; WUIs; no wildland fire use. Recreation sites; OHV use; river recreation; other recreation; campgrounds. Community fire plans: Green River; Green River Tamarisk Project; other fuels reduction activities.	Riparian T&E Fish, Birds WSA River Corridor/ recreation/ camping
9	**Western Book Cliffs**	BLM Private State	204,498 5,642 25,794	Suppression 200-1,000 acres; fuels treatment identified; potential wildland fire use. Possible storage site for tailings removal; grazing; hunting; recreation. No ongoing activities.	WSA T&E Birds Riparian Historic Town (Sego) I-70 Corridor

FMU#	FMU Name	Land Status	Acres	Known Proposed Fire/Fuels Management Actions and/or Existing or Planned Uses	Special Considerations
10	**Diamond**	BLM Private State	147,544 2,848 127,664	Suppression 500-1,000 acres; no fuels treatment identified; potential wildland fire use. Ranches; grazing; hunting; OHV use; other recreation. State Roadless Area	T&E Birds WSA State Roadless Area 90,000 Diamond Creek (Rattle Complex) Fire, 2002
11	**Eastern Book Cliffs**	BLM Private State	95,006 1,274 14,865	Suppression 200 acres or less; fuels treatment identified; no wildland fire use. Ranches; oil & gas existing and future development; hunting. No ongoing activities.	T&E Birds Numerous Oil & Gas Facilities
12	**Cisco Desert**	BLM NPS Private State	774,868 2,612 36,070 138,112	Suppression 300 acres or less; WUI; fuels treatment identified; Bitter Creek ES&R Project; Thompson Springs fuels reduction project; no wildland fire use. Tamarisk project ongoing – handcutting, pile burning. (Courthouse Wash/Wolfe Ranch) Highways; railroad; oil & gas Community fire plans: Thompson Springs.	T&E Birds, Mammals Arches N.P. Transmission Lines Existing Oil & Gas I-70 Corridor Proposed Natural Gas Plant (MFO)

FMU#	FMU Name	Land Status	Acres	Known Proposed Fire/Fuels Management Actions and/or Existing or Planned Uses	Special Considerations
13	**Dolores Triangle**	BLM	191,246	Suppression 500-1,000 acres; fuels treatment identified; WUI buffer; previous chainings; Beaver Mesa/Steamboat Resource fuels treatments; potential wildland fire use.	T&E Birds WSA Sage Grouse
		Private	44,530	Ranches; grazing; hunting; OHV use; other recreation.	
		State	46,939	Community fire plan: Willow Basin; ongoing fuels reduction activities.	
		USFS	80	Moab Face Vegetation Treatment Project; National Fire Plan Activities.	
14	**Colorado River Corridor**	BLM	35,651	Suppression 2 acres or less; WUI buffers; fuels treatment identified; Tamarisk fuels reduction resource project; no wildland fire use.	WSA Riparian W&SR Recreation/Campgrounds Canyonlands N.P. T&E Birds, Fish Westwater Ranger Stn.
		Private	21,585	Highways; urban areas; ranches; grazing; campgrounds; river recreation.	
		State	8,217	Community fire plans: Dewey, Castle Valley, Moab; boat launches, recreation areas, campgrounds.	
15	**Dead Horse**	BLM	54,664	Suppression 50 acres or less; fuels treatment identified; no wildland fire use.	Canyonlands N.P. (Island in the Sky District) Dead Horse Point State Park T&E Birds Recreation Sites Oil & Gas
		Private	804	Highways; recreation facilities; campgrounds; oil & gas; OHV use; other recreation.	
		State	10,476	Dead Horse Point State Park residential area.	

FMU#	FMU Name	Land Status	Acres	Known Proposed Fire/Fuels Management Actions and/or Existing or Planned Uses	Special Considerations
16	**Dry Valley**	BLM	347,351	Suppression 100-500 acres; WUIs; fuels treatments identified; East Coyote resource fuels treatment; Pack Creek, Black Ridge, and La Sal fuels treatments; no wildland fire use.	Sage Grouse T&E Birds, Mammals WSA Canyonlands N.P. (Needles District) Recreation Sites
		NPS	62	Ongoing tamarisk removal project (Salt Creek & Horse Creek) cutting, herbicide, pile burning.	
		Private	30,600	Ranches; highways; camp-grounds; recreation sites; OHV use; other recreation.	
		State	58,734	Community fire plans: Pack Creek, Wilson Arch; ongoing fuels treatment.	
17	**LaSal**	BLM	136,836	Suppression 300-500 acres; WUIs; fuels treatment identified; old chainings; Ray Mesa, Black Ridge fuels treatments; no wildland fire use.	Sage Grouse T&E Birds, Mammals Hart's Draw Sagebrush Restoration Project (Monticello FO)
		Private	26,328	Oil & gas; highway; hunting; industrial area; ranches; copper mine.	
		State	17,399	Community fire plans: Old La Sal/Ray Mesa, La Sal, Browns Hole, Peter's Canyon; ongoing fuels treatment activities.	
		USFS	22	Moab Face Vegetation Treatment Project; National Fire Plan Activities; Hang Dog Fire Salvage Project.	
18	**Lockhart Basin**	BLM	76,396	Suppression 1,000 acres or less; no fuels treatment identified; potential wildland fire use (low fuels).	T&E Birds Canyonlands N.P. WSA
		Private	538	Ranches; grazing; OHV use; other recreation.	
		State	13,069	No ongoing activities.	

FMU#	FMU Name	Land Status	Acres	Known Proposed Fire/Fuels Management Actions and/or Existing or Planned Uses	Special Considerations
19	**Monticello Plain**	BLM Private State	38,230 271,767 5,373	Suppression 10 acres or less; WUIs; fuels treatment identified; no wildland fire use. Highway; farms; ranches; hunting; OHV use; other recreation. Community fire plans: Monticello, Eastland, Blanding, Canyon Terrace, Ucolo, Cedar Point, Bug Point; ongoing fuels reduction activities.	Sage Grouse T&E Birds Transmission Lines
20	**Montezuma**	BLM NPS Private State USFS	335,398 402 34,268 38,009 211	Suppression 500-1,000 acres; WUIs; fuels treatment identified; old chainings; no wildland fire use. Hovenweep N.M. Cutting/Pile Burning for Defensible Space (7 acres) Farms; highway; ranches; hunting; OHV use; other recreation. Community fire plans: White Mesa, Montezuma Canyon; ongoing fuels reduction activities. Nizhoni Fire Salvage Project (Planning Stage); Milk Ranch Point Prescribed Fire.	T&E Birds, Mammals Oil & Gas Hovenweep N.M. WSA
21	**Cedar Mesa**	BLM NPS Private State USFS	461,659 492 2,486 39,798 518	Suppression 500-2,000 acres; WUI; fuels treatment identified; potential wildland fire use. Natural Bridges residential area "community-at-risk;" cutting/pile burning. Campgrounds; ranches; grazing; OHV use; other recreation. Ongoing fuels treatment planning. Ongoing fuels treatment planning.	T&E Birds WSA Recreation Sites Major Cultural Natural Bridges N.M.

FMU#	FMU Name	Land Status	Acres	Known Proposed Fire/Fuels Management Actions and/or Existing or Planned Uses	Special Considerations
22	**San Juan Basin**	BLM	709,270	Suppression 1,000 acres or less; WUI; small previous chained areas; no fuels treatment identified; potential wildland fire use (low fuels).	T&E Birds WSA Oil & Gas Recreation Sites
		NPS	402	Glen Canyon NRA	
		Private	8,502	Campgrounds; Highway; OHV use; other recreation; river recreation.	
		State	82,572	Community fire plans: Bluff, Mexican Hat; ongoing fuels reduction activities.	

4.4.4 POTENTIAL CUMULATIVE RESOURCE IMPACTS

Impacts to specific resources and local communities that could result from the Proposed Action or No Action Alternative are included in each of the resource discussions in Chapters 4.2 and 4.3.

In general, the goals and objectives of the Proposed Action are designed to create intentional, long-term beneficial cumulative impacts to most BLM resources. Management considerations concerning the use of wildland fire, utilizing appropriate AMR goals, implementing fuels treatments, and working with local partners as well as communities-at-risk are all objectives developed with the underlying long-term goal of restoring wildland fire as an integral and beneficial ecosystem tool. Fuels management objectives include the protection of human life and property through the reduction of hazardous fuels, but also focus on moving landscapes toward desired future condition. Utilizing the Proposed Action to integrate the Wildland Fire Management Goals stated in Chapter 2.2.2 into current management practices would advance resources toward a desired future condition and would result in long-term cumulative benefits to public land.

As referenced in Table 4.1 above, lands adjacent to and oftentimes within lands under BLM jurisdiction are managed by cooperating federal or state agencies, private owners, or other private entities. Table 4.1 lists each FMU with a brief synopsis of land ownership within the general boundaries of the MFD. Also listed are potential actions or known planned actions and/or treatments by FMU that may be ongoing or scheduled for implementation in the near future by BLM and other agencies. Management priorities and/or activities considered by federal and state agencies on lands under their jurisdiction and by the public on adjacent private lands have the potential to augment or to detract from activities taking place on BLM lands. Potential cumulative impacts are discussed below in conjunction with the resources that may be affected.

In addition to the effects of the uses summarized in Table 4.1, cumulative effects could result from incremental impacts of the proposed action when combined with one or more of the reasonably foreseeable future actions on BLM lands discussed in Chapter 4.4.2 above. Because of the general nature of the information contained in Chapter 4.4.2, a more detailed list of potential and planned actions for each of the field offices within the MFD follows. The list was compiled from notices posted on the 2005 environmental bulletin board and, for the purposes of the cumulative effects analyses, the listed activities represent a

snapshot of the number and types of projects or actions proposed in an average year on lands within the MFD.

Moab Field Office	Monticello Field Office	Price Field Office
Special Recreation Permit (SRP) Mule Deer Hunt - Book Cliffs	New recreational corridor w/ campgrounds and all other facilities	West Benches Sagebrush Restoration Project FMU 2
SRPs for a wide range of recreation events with varying numbers of participants throughout FO	Sagebrush restoration project Hart's Draw – FMU 17	Proposed full field development of natural gas resources over 40 year period (750 wells, roads, access routes, production facilities and utilities. FMU 1
SRP Big Game Hunt – Dolores Triangle	(4) Notices of Staking to Drill Oil & Gas Wells	Four proposals from different companies/corporations for development of an average of ten oil and/or gas wells per company FMUs 1, 2 and 6
Natural Gas Pipeline – Eastern Book Cliff area	SRPs for several recreation events and/or uses	Proposed coalbed methane drilling project (14 wells) FMU 2
Natural Gas Plant and Pipeline – FMU 12	SRP Commercial ATV Tours	Construction of Flood Control Structures (Emery Co.)FMU 4

Potential Cumulative Impacts from Wildland Fire Suppression Activities

Depending on fire severity, suppression activities for wildland fire on BLM and adjacent lands are coordinated between agencies and sometimes private entities that oversee management of those lands. The goal of coordination is to synchronize initial attack as well as to identify and implement essential mitigation. All initial attack activity for the BLM and cooperating agencies is coordinated through the Moab Interagency Fire Center dispatch team. In determining initial attack priorities, consideration is given to: 1) threats to life and property; 2) potential for wildland fire to impact high-value resources such as critical or crucial wildlife habitat; 3) potential impacts to cultural or riparian resources; and 4) other factors such as possible social impacts.

The unplanned nature of wildland fire and resultant initial attack and suppression activities have more potential for cumulative impacts to the BLM resource than planned management programs such as prescribed fire and non-fire fuels treatment. Even though restrictions are in place to protect valuable resources, because of the emergency nature of wildland fire inadvertent impacts can occur. Continued expansion in WUI areas, recreational use of BLM-administered lands, and resource development throughout the Moab Fire District would put more pressure on the BLM to protect resources from wildland fire both inside and outside of WUI areas. An increase in public use would expose a greater number of people to impacts from fire management actions on, and adjacent to, BLM-administered lands. Severe wildland fire and/or suppression activities on adjacent lands with different or non-existent resource protection measures in place could also impact natural and/or cultural resources on BLM lands.

Cumulative impacts from wildland fire suppression activities could include increased erosion-susceptibility of burned or compacted soils, and/or direct damage to soils and vegetation. Wildland fire that occurs on adjacent lands could impact BLM lands by damaging soils and vegetation to the extent that remaining native

vegetation could fail to serve as a seed source for BLM lands or to provide cover for wildlife species. In areas where escaped wildland fire moves onto BLM lands from adjacent lands, impacts could be addressed in analysis and planning for post-fire ES&R activities.

Cumulative impacts to specific resources from the goals and objectives contained in the proposed action related to wildland fire suppression and/or severe wildland fire may include the following:

1) A general reduction in large-scale events of uncontrolled wildland fire is expected from the effects of implementing the National Fire Plan on BLM lands as well as on lands under the jurisdiction of other agencies. Fewer severe fires on BLM and adjacent lands would result in a cumulative decrease in smoke emissions during the months when vegetation is most susceptible to wildland fire.

2) Reasonably foreseeable actions include increased oil, gas, and mineral development activities, utility corridor development, adjacent vegetation treatments, increased recreational use, and WUI expansion adjacent to BLM-administered lands. Potential impacts to cultural resources from these actions could include an associated increase in vandalism to cultural sites, artifact collection, or damage and/or destruction of historic/cultural sites as a direct result of a particular action. Inadvertent damage from emergency suppression activities could add to the disturbance and/or possible destruction of sites.

3) The reduced number of acres managed for suppression could have a temporary cumulative impact on recreation growth, recreation uses such as backcountry travel and hunting, and special use permits for guided activities. Wildland fires that occur in areas in which these activities are ongoing or planned could impact use limits until desired future conditions were met.

4) The potential cumulative effects of the proposed action on floodplain resources are closely associated with and similar to potential soil, water, and riparian-wetlands resource impacts. Impacts from activities such as land development, OHV and other recreational uses, as well as encroachment of invasive/non-native weeds would continue, and the effects of these activities on the above listed resources could be increased if a wildland fire occurred on previously impaired lands. RPMs designed specifically to mitigate the effects of suppression could alleviate these cumulative effects, and ES&R treatments following fire could have a positive cumulative effect on these areas by mitigating damage that has previously occurred from other activities.

5) Development and activities on privately-owned lands such as highway and utility corridor improvements, OHV use, wood cutting, hunting, other recreation, and oil/gas/mining expansion, could have a cumulative effect on the number of wildland fire starts in the MFD. Although human-caused fires are normally limited to specific times of the year when climatic and vegetation conditions are optimum, the probability is that an increase in any of the above listed activities could result in a higher fire occurrence.

6) Reasonably foreseeable actions such as oil and gas development, increased visitation and backcountry recreational use, new or improved utility corridors, and invasive/non-native weed infestation and spread could subject wildlife to temporary or permanent displacement and habitat alterations. Wildland fire and suppression actions could further impact displaced wildlife. However, hazardous fuel reductions associated with the large scale implementation of the National Fire Plan on BLM and adjacent lands would gradually reduce severe wildland fire events. The restoration of habitats that are more consistent with natural fire regimes would mitigate long-term and cumulative impacts to wildlife from wildland fire and associated suppression activities.

Potential Cumulative Impacts from Fuels Treatment (Prescribed Fire and Non-Fire Treatments)

Fuels treatment acreage goals are designed to move each of the vegetative communities toward desired future conditions. Approximately three to five thousand acres each year are expected to be treated in the MFD by either prescribed fire or non-fire fuels treatments. Wildland fires will continue to occur in treated

areas as part of the natural cycle, however, the anticipated cumulative change in plant communities resulting from ongoing and long-term fuels treatments would be expected to decrease the threat of large fires and reduce the rate of spread of new fires.

In addition to BLM fuels treatment goals and objectives, the USDA Forest Service, NPS, and State of Utah FFSL have identified fuels treatment goals in current, drafted, and planned fire and fuels management plans as directed by the National Fire Plan. Fuels treatment activities completed on adjacent lands in a particular vegetation type could contribute toward achievement of desired future conditions on BLM lands. The interagency fire and fuels group for southeastern Utah (Desert Edge Fire and Fuels) meets quarterly to discuss fuels treatment goals and to prioritize treatment activities. When possible, fuels treatments on BLM lands are coordinated and planned to coincide with those on adjacent lands to maximize beneficial cumulative effects. Through cooperation, prioritization of goals, and combined planned treatments, long-term environmentally beneficial impacts to entire ecosystems on public lands that cross agency boundaries are anticipated.

Cumulative impacts to specific resources from the goals and objectives contained in the proposed action related to fuels treatment may include the following:

1) The overall effect of the proposed action when combined with fuels treatments on adjacent lands would be to reduce potential cumulative impacts from severe wildland fire, which would help maintain the naturalness of ACECs, WSAs, W&SR segments and areas with wilderness characteristics. Eventually allowing wildland fire to resume its natural role in the ecosystem could help to protect the qualities of special areas and also to protect areas from the spread of invasive/non-native weeds. Fuels treatments planned for areas adjacent to previously burned lands would be analyzed on a site-specific basis to consider special areas and to include actions that may be warranted to assist in protection. Treatment plans could also include cooperative agreements for treatment on adjacent lands to maximize beneficial cumulative impacts. Additional human pressure on rivers and river corridors (crossing jurisdictional boundaries) could lead to increased invasive/non-native weed introduction and spread and the possibility of increased human-caused fires.

2) In the past ten years, BLM-managed lands as well as public and private lands surrounding the planning area have experienced a significant increase in energy and minerals development, recreational activities, backcountry road use and off-road vehicle use. This increase, along with other multiple use activities such as livestock grazing and hunting, as well as the incremental impacts of the proposed action, may result in a cumulative impact to Federally listed, special status wildlife species. Because fuel treatment activities are anticipated to improve overall ecosystem health and diversity, providing additional livestock forage and habitat for wildlife in the long term, cumulative effects are expected to affect but are not likely to adversely affect federally listed species. The subsequent, gradual return to a more natural fire regime would result in long-term beneficial cumulative effects including a reduced risk of severe, habitat-altering wildland fire events.

3) Because planned fuels treatment would be timed to avoid and minimize impacts on critical habitat and breeding seasons, treatments in areas that also involved vegetation or restoration activities listed as reasonably foreseeable actions (i.e. FMU 17, which is part of the sagebrush restoration project and would also receive fuels treatment actions in portions of the FMU), would not create cumulative negative impacts. It is anticipated that these combined actions would encourage long-term beneficial effects to species that would include increased biodiversity and the elimination or minimizing of invasive/non-native introduction and spread. Positive impacts from fire management actions alone are not anticipated to offset impacts from reasonably foreseeable actions such as increased mineral/oil/gas development or an increase in recreation and backcountry travel.

4) The cumulative effects of the proposed action on water quality could include improvements in watershed health, such as an increased supply of woody debris or stream bank vegetation, and increased stream bank

and channel stability. Implementation of the National Fire Plan on adjacent lands could also contribute to improved water quality when combined with the long-term effects of MFD fuels treatments. Impacts from increased recreational use, off-road vehicle use and invasive/non-native weeds would continue to have negative sediment load effects, oftentimes on lands that have received fuels treatments.

5) Past management and environmental actions, including changes in vegetation conditions and the resulting modification of fire role and regime, have resulted in an existing riparian environment much different than the historical condition on BLM lands as well as on adjacent lands managed by other entities. Water diversion, impoundment, channelization, dewatering, timber and grazing practices, and invasive/non-native vegetation species have cumulatively altered riparian conditions and created non-functioning systems and those with limited functioning capability. Cumulative effects from increased development and expanded recreational use could continue to adversely impact riparian areas. However, the implementation of fuels treatments could contribute to the overall improvement of health within riparian communities by off-setting high sediment loads and increasing resistance to invasive, non-native weeds. Cumulative effects to riparian resources could include an increase in soil stability, a more sustainable supply of woody debris or stream bank vegetation, overall improvement in native vegetation composition, overall improvement in bank and channel stability, and increased functionality of riparian areas.

6) Increases in WUI, development of oil/gas/mining infrastructure, and an upsurge in recreational activities may eventually put more demands on local sources of biomass, timber, firewood, and pinyon nuts. Proposed fuels treatments when combined with treatments on adjacent lands, could cause a loss of forest harvesting opportunities.

7) As discussed in the proposed action, the beneficial effects of successful fuels treatment can include a long-term reduction in soil loss, erosion, compaction, and damage to soil crusts. Potential impacts to livestock forage from invasive/non-native weed spread and introduction resulting from increased recreational use and future development could be offset by fuels treatment over the next ten years. Cumulative vegetative changes including an increase in palatable forage would improve the health of grazing resources and increase resistance to invasive/non-native weeds.

8) Reasonably foreseeable actions and activities on lands adjacent to BLM fuels treatments may result in a decrease in high value visual resources in some areas. In addition, increased recreational use, development of lands for resource extraction, utility corridors, and WUI development are expected to expand road networks on BLM lands as well as on adjacent lands. These actions could magnify impacts to visual resources from fire management-related activities. However, treatments would be consistent with fire management goals to reduce the risk of severe wildland fire that could potentially affect all visual classes and that could result in significant impacts on visual scenic quality. Fuels treatments would help offset cumulative impacts from the current fire management trend toward less-natural landscapes.

9) Reasonably foreseeable actions include increased recreational use, utility corridor development, and resource activities associate with oil, gas, coal and other mineral development. These activities could be associated with an increase in ground disturbance in areas containing paleontological, cultural, or historical resources. Cumulative effects associated with fuels treatments in areas that may have experienced ground disturbance from other activities would be mitigated through implementation of RPMs and also through the site-specific planning associated with prescribed fire and non-fire fuels treatments.

10) Increased OHV use, coal, oil, and natural gas development could put future pressure on HMAs in the Price Field Office area by increasing human presence and decreasing forage availability. The long-term trend of smaller and more natural wildland fire that would result from incremental fuels treatment, ongoing management of activities such as grazing, and invasive/ non-native weed control could help offset impacts from increased recreational use and development.

Potential Cumulative Impacts from Wildland Fire Use (WFU)

The Proposed Action maintains that suitability of naturally-ignited wildland fires to accomplish resource management goals and objectives could be determined on a future case-by-case basis. There are several FMUs in which wildland fire use has been determined to be potentially practical. Adjacent lands managed by other agencies may or may not plan for and utilize wildland fire use. For example, because WFU is a relatively new concept and scientific evidence is incomplete regarding park-specific fire history, the SEUG (NPS) has not incorporated it into their draft fire and fuels management plan at this time. The State of Utah FFSL is in the planning stages for a comprehensive fire management plan that will set up policy and procedure for WFU on SITLA lands and possibly on adjacent private lands with signed landowner agreement.

The USDA Forest Service Fire Management Program has chosen to combine the elements of fire prevention, fire suppression, and WFU. The Forest Service has taken the lead in the philosophy that the wise use of fire will approximate the historical role of fire to enhance long-term resource and social values, although Forest Service policy also dictates that wildland fire must be suppressed to meet resource and social objectives. The implementation of WFU on Forest Service lands could adversely impact air quality far outside Forest Service boundaries and could have short-term cumulative effects to BLM-managed areas. In contrast, decisions by BLM and other agencies to suppress ignitions that start outside Forest Service boundaries could affect areas managed for WFU by the Forest Service and could cumulatively affect other fire management activities on public lands administered by the Forest Service.

CHAPTER 5. CONSULTATION AND COORDINATION

5.1 INTRODUCTION

Issues identified for analysis within this EA are included in **Appendix A**, which includes the resource concerns identified, including those resources considered as Critical Elements of the Human Environment and related issues derived from the BLM, affiliated agency reviews, and comments received. A thorough consultation and coordination effort among agencies and public parties with interests in the process was planned and conducted to ensure the opportunity for involvement throughout the EA process.

5.2 PERSONS, GROUPS, AND AGENCIES CONSULTED

The BLM coordinated and collaborated with numerous federal, state, tribal, and local government agency representatives as well as private organizations and individuals wishing to participate in the LUP amendment and FMP revision processes. The BLM contacted more than 60 federal representatives; 40 Utah state agency representatives and state agency representatives in the neighboring states of Arizona, Nevada, and Colorado; and 100 county and city governments across Utah.; and more than 40 tribes and tribal representatives.

Meetings were held among representatives of the BLM and several different tribes to discuss land use planning issues with respect to Moab and Monticello RMP development. These conversations included a discussion of fire management and the FMP and at each of the meetings, tribal representatives were encouraged to become "cooperating agencies" for the various planning processes. Although no tribes have offered comments to this date, the meetings are documented as follows:

February 11, 2004 – Navajo Utah Commission Dennehotso Chapter House
March 2, 2004 – Santa Clara NAGPRA Committee, Santa Clara Administrative Offices
March 3, 2004 – Laguna Pueblo NAGPRA Committee, Laguna Pueblo Administrative Offices
March 3, 2004 – Zia Pueblo, Zia Pueblo Administrative Offices
March 3, 2004 – Zuni Pueblo, Zuni Pueblo Administrative Offices
March 30, 2004 – Southern Ute NAGPRA, Southern Utah Administrative Offices.

See **Appendix H** for a list of tribal governments and other interested Native American groups that were also contacted. Each contact received public scoping meeting notices and planning bulletins informing them of the purpose, schedule, and progress of the project. The mailing list, containing all agency points of contact, is contained in the Administrative Record within the project documentation. **Table 5.1** lists other persons, agencies, and organizations consulted for purposes of the FMP EA.

TABLE 5.1: LIST OF PERSONS, AGENCIES, AND ORGANIZATIONS CONSULTED

Name	Purpose and Authorities for Consultation or Coordination	Findings and Conclusions
U.S. Environmental Protection Agency (EPA), Region 8	Consultation for responsibilities under National Environmental Policy Act (NEPA) and Section 309 of the Clean Water Act	EPA provided formal comments to the BLM during public scoping on May 17, 2004 and identified concerns that included the need to develop broad fire planning to protect local ecology, recreation, and commodity production. EPA requested that BLM consider management needs for local fuel hazards; that fire management planning would conform to interim air quality policy and local smoke management plans; and that management be developed to protect aquatic resources from adverse impacts on soil and water. The EPA also identified analysis considerations associated with livestock grazing and invasive, non-native weed control. BLM considered EPA's

Name	Purpose and Authorities for Consultation or Coordination	Findings and Conclusions
		comments and incorporated them into the Proposed Action and the analysis of the alternatives.
U.S. Fish and Wildlife Service (USFWS)	Consultation under Section 7 of the Endangered Species Act (ESA) (16 USC 1531) and Biological Assessment (BA) Review	USFWS is a participating party who is consulting under an agreement that tiers off the BLM and USFWS November 1, 2001 consultation agreement and March 3, 2004 alternative consultation agreement for land use planning. USFWS has provided comment and analysis recommendations for the species list prepared by the BLM. USFWS has also reviewed, provided additional RPMs, and concurred with the species findings within the BA, completed on March 4, 2005. The Biological Opinion was completed in September, 2005.
Tribes and Tribal Representatives within Utah and Surrounding States	Consultation as required by the American Indian Religious Freedom Act of 1978 (42 USC 1531) and National Historic Preservation Act (NHPA) (16 USC 1531)	Planning bulletins were provided to approximately 50 tribes by BLM on June 21, 2004. In addition, individual letters were sent to each tribal government on June 29, 2004 regarding BLM's intent to conduct this EA and requesting their participation and cooperation. Tribes were also invited to public scoping meetings that took place from July 6-14, 2004. To date, no tribal government has agreed to participate or formally consult on this project.
Utah Governor's Office of Planning and Budget—Resource Development Coordinating Committee (RDCC)	Consultation regarding on-going multi-agency planning actions and associated federal planning actions	BLM and Maxim Technologies (Maxim) met with the RDCC on June 23, 2004 to discuss the scope of proposed fire management planning and to seek input from associated state agencies that may be affected by the proposed federal actions. Utah Division of Wildlife Resources (UDWR) and Utah Division of Forestry, Fire, and State Lands (FFSL) indicated their desire to be involved in federal fire planning discussions (see proceeding comments). RDCC also responded to the BLM with a formal letter on July 15, 2004, which outlined the UDWR's considerations.
Utah Department of Community and Economic Development—Utah State Historic Preservation Office (SHPO)	Consultation on proposed fire management as required by the NHPA (16 USC 470)	BLM and Maxim staff met with SHPO (in June 2004 and July 2004) to discuss scope of planning and the possibility of SHPO acting as a participating party in the FMP process. SHPO had determined at these meetings not to act as a participating party, but they did provide feedback on the scope and analysis of the Proposed Action. In a meeting on January 25, 2005, BLM and SHPO agreed to develop a programmatic agreement specifically addressing wildland fire use on public lands within Utah.
Utah Division of Natural Resources—FFSL	Consultation on fire management planning on adjacent state lands	FFSL attended the BLM statewide interdisciplinary team (IDT) meeting on June 22, 2004 and June 23, 2004, and contributed to scope and analysis discussions. BLM met with FFSL on August 24, 2004 to discuss the proposed direction of statewide fire management on public lands, as well as the need to coordinate with local BLM field offices in the development of fire management planning. Maxim staff coordinated with FFSL staff in September and October 2004 to obtain resource data and historic wildland fire information to support BLM data and the development of the environmental assessment (EAs).

Name	Purpose and Authorities for Consultation or Coordination	Findings and Conclusions
Utah Division of Natural Resources—Division of Wildlife Resources (UDWR)	Consultation on impacts of fire management on fish and wildlife species	UDWR, in association with the Governor's Office of Planning and Budget, and RDCC, provided formal comments to the BLM on July 15, 2004, and requested to be included as a participating party. The BLM coordinated proposed fire management actions with UDWR. Maxim staff coordinated with a variety of UDWR personnel, from July through October 2004, in developing fish and wildlife resource data, GIS data, and scope of analysis within the EA. These meetings also included coordination with the UDWR Utah Natural Heritage Program.

5.3 SUMMARY OF PUBLIC PARTICIPATION

During preparation of the EAs, the public was notified of the Proposed Action. A Notice of Intent (NOI) invited participation of interested agencies, organizations, and members of the general public to assist the BLM in determining the scope of issues to be addressed. It was published in the Federal Register on April 2, 2004. The publication of this NOI initiated a public scoping comment period that ended on July 21, 2004.

A public involvement plan was prepared in June 2004 to ensure an effective, consistent, and open communication process among BLM and other federal, state, and local government agencies; Native American tribes; the public; and other stakeholders. This plan not only outlined the series of open house public meetings throughout the state that would allow for comment and discussion on current and proposed fire management, but also planned for continued public involvement opportunities throughout the project.

A planning bulletin was also developed to advise the public of fire management project. It also described the project, encouraged public participation at the public scoping meetings, and identified opportunities and methods for submitting comments throughout the NEPA process. In addition to providing background information, the bulletin outlined the public involvement process for the project; the schedule; a listing of public meetings; instructions on making comments and joining the mailing list, information about the project's public website; and contact information. On June 24, 2004, the bulletin was sent to 1,149 individuals, organizations, state, county and city government agencies, and tribal governments and groups on BLM's mailing list. BLM sent each tribal government an individualized letter (dated June 29, 2004) inviting them to consult on the project.

5.3.1 PUBLIC MEETINGS

On June 25, 2004, a public notice was delivered as a media advisory and press release to one Utah cable television station and newspapers and radio stations in Utah, Arizona, Colorado, and Nevada. The notice announced public scoping meeting dates, times, and locations, and invited the public to participate. Prior to the formal scoping process, BLM provided a number of opportunities for federal, state, and local agencies, interested organizations, and the general public to provide input for the planning process. These opportunities included early notification of the scoping process, a lengthy comment period, public meetings, and newspaper reminders of meeting times and locations. Comments were received from April 2, 2004 through July 21, 2004.

From July 6, 2004 through July 14, 2004, BLM conducted five open house meetings in Moab, Cedar City, Richfield, Vernal, and Salt Lake City, Utah. These meetings were announced in a Planning Bulletin that was mailed on June 24, 2004, to more than 1,100 individuals and organizations throughout the state as well as

through news releases. Further, the Utah BLM webpage advertised the meetings and scoping period. Approximately 700 subscribers of the Utah BLM electronic newsletter ("E-Briefs") received related information.. A series of public scoping meetings were held across the state according to the schedule in **Table 5.2.**

TABLE 5.2: PUBLIC SCOPING MEETINGS

Date	City	Facility	Address
July 6, 2004	Moab	BLM Field Office	82 East Dogwood
July 7, 2004	Cedar City	Heritage Center, Festival Hall 1	90 North Main
July 8, 2004	Richfield	BLM Field Office	150 East 900 North
July 13, 2004	Vernal	Western Park	302 West 200 South
July 14, 2004	Salt Lake City	BLM Field Office	2370 South 2300 West

An open house format was used for the scoping meetings, in which attendees could interact informally and individually with BLM representatives. Attendees signed a registration sheet and received an information packet with handouts including a comment form, state map depicting the planning areas, the NOI, and a list of project-related web resources.

5.3.2 PUBLIC COMMENTS

During the public scoping period, comment letters were received from the Resource Development Coordinating Committee (RDCC) and from UDWR in conjunction with RDCC. In addition, work was performed among the BLM, The Wilderness Society, and other environmental groups to address concerns raised following their review of a preliminary draft of the Proposed Action.

Responses to solicitations for public input resulted in letters that were received via fax, mail, email, and hand. A total of 20 letters were received with over 90 individual comments identified. A complete analysis of the comments, list of commenters, and response to public comment will be included as a part of this EA document once the public comment and review period is concluded.

5.4 LIST OF PREPARERS

BLM selected Maxim Technologies from a list of qualified environmental services contractors to support Utah BLM on this FMP EA. Therefore, the preparers of this EA included a combination of BLM and contract personnel.

5.4.1 BLM PREPARERS

BLM's IDT assisted in the preparation of this EA and with the development and evaluation of the proposed fire management direction. BLM participants and their responsibilities are listed in **Table 5.3**. BLM also assigned a contracting officer's representative and technical project lead with primary responsibilities for oversight of contractors, agency collaboration, and NEPA process.

TABLE 5.3: BUREAU OF LAND MANAGEMENT PREPARERS

Name	Title	Document Section Responsibility
Ann Marie Aubry	Hydrologist	Floodplains, Soils, Water Quality
Frank Bain	Geologist	Geology

Name	Title	Document Section Responsibility
Todd Berkenfield	Planning Assistant	Areas of Critical Environmental Concern (ACECs), Wild and Scenic Rivers
Scott Berkenfield	Lead Recreation Planner	Wilderness and Wilderness Characteristics
Raymon Carling	Natural Resource Specialist	Rangeland Health Standards and Guidelines, Livestock Grazing
Jean Carson	GIS Specialist	GIS Data, Coordination, Maps
Paul Curtis	Range Management Specialist	Floodplains, Wetlands and Riparian Zones, Rangeland Health Standards and Guidelines, Livestock Grazing
Maxine Deeter	Realty Specialist	Lands/Access
Stephanie Ellingham	Natural Resource Specialist	Wetlands and Riparian Zones, Water Quality
Dave Engleman	FMO	Coordination, Fire Management, Fire Management Plan (FMP) Quality Control, Fire Ecology, Proposed Action, Hazardous Wastes
Tom Gnojek	Recreation Planner	ACECs, Recreation, Wilderness and Wilderness Characteristics
Joan Hubert	Realty Specialist	Lands/Access
Karl Ivory	Range Management Specialist	Invasive, Non-native Species, Threatened and Endangered (T&E) Plants, Wetlands and Riparian Zones, Vegetation
Lynn Jackson	Resource Advisor	Woodlands and Forestry, Vegetation
Eric Jones	Petroleum Engineer	Mineral Resources, Oil and Gas
Kate Juenger	Planning Coordinator	Coordination among Field Offices, Editing
Brian Keating	Fuels Specialist	Fuels Treatment, Fire Management, Air Quality
Mike Leschin	Geologist	Paleontology
Ed Maloney	Fire Archaeologist	Cultural Resources/Fire, Native American Consultation
Blaine Miller	Archaeologist	ACECs, Cultural Resources, Native American Consultation
Marilyn Peterson	Recreation Planner	Wild and Scenic Rivers
Jolie Pollet, Matthew Higdon, S/O Resource Staff		Resource Protection Measures
Pam Riddle	Wildlife Biologist	Wildlife
Nick Sandberg	Assistant Field Manager	Farmlands, Rangeland Health Standards and Guidelines, Livestock Grazing, Environmental Justice
Summer Schulz	Range Management Specialist	Invasive, Non-Native Species, T&E Plants, Rangeland Health Standards and Guidelines, Livestock Grazing, Woodlands and Forestry, Vegetation
Nancy Shearin	Archaeologist	ACECs, Cultural Resources, Native American Consultation, Vegetation, Paleontology
Katie Stevens	Recreation Planner	ACECs, Recreation
Bill Stevens	Recreation Planner	Wilderness and Wilderness Characteristics
Rob Sweeten	Landscape Architect	Visual Resources
Daryl Trotter	Environmental Protection Specialist	Farmlands, T&E Plants, Invasive, Non-native species, Paleontology, Socio-Economics
Donna Turnipseed	Archaeologist	ACECs, Cultural Resources, Native American Consultation
Mike Tweddell	Rangeland Management Specialist	Wild Horses and Burros
Alex VanHemert	Recreation Planner	Recreation
Mary von Koch	Realty Specialist	Lands/Access
Tammy Wallace	Wildlife Biologist	Wildlife, Air Quality, Water Quality, T&E Animals
David Waller	Wildlife Biologist	Wildlife

Name	Title	Document Section Responsibility
Doug Wight	GIS Coordinator	GIS Coordination and Maps
Dave Williams	Range Management Specialist	Rangeland Health Standards and Guidelines, Livestock Grazing

5.4.2 MAXIM TECHNOLOGIES PREPARERS

Maxim assembled a team of managers and senior resource specialists who formed the Maxim Technologies IDT (**Table 5.4**, below). They worked with BLM's IDT to provide independent and objective NEPA compliance support and documentation, EAs of potentially affected resources, analysis of GIS data, and detailed maps.

TABLE 5.4: MAXIM TECHNOLOGIES PREPARERS

Name	Title	Document Section Responsibility
Jim Melton	Project Manager	Planning, National Environmental Policy Act (NEPA)
David Steed	Asst. Project Manager	U.S. Fish and Wildlife Service (USFWS) Consultation, Planning, NEPA
Mike Egan	Asst. Project Manager	Planning, Cultural Resources, Grazing, Paleontology
Susan Hatch	Biologist	Special Status Species, Fish and Wildlife, Collaboration
Terry Grotbo	Senior NEPA & Planning Advisor	NEPA Review
Fred Gifford	GIS Coordinator	GIS, Database
Cameo Flood	Forester	Vegetation, Woodlands and Forestry
Valerie Waldorf	Lead GIS Specialist	GIS, Maps, Figures
Wynn John	Environmental Engineer	Soil, Water
Keith Clapier	Vegetation Specialist	Vegetation
Tennille Flint	Biologist	Wetlands and Riparian Zones, Wilderness Study Areas, Wilderness, Recreation, Chapter 1
Michael Polk (Sagebrush Consultants)	Cultural Specialist	Cultural and Paleontology
Nancy Linscott	Socioeconomics Specialist	Socioeconomics, Environmental Justice
Dale-Marie Herring	Technical Writer/Coordinator	Writing, Editing, Coordination

CHAPTER 6. ACRONYMS, GLOSSARY, AND REFERENCES

6.1 ACRONYMS

ACEC	Area of Critical Environmental Concern
AMR	Appropriate Management Response
BLM	Bureau of Land Management
CAA	Clean Air Act
CEQ	Council on Environmental Quality
DWFC	Desired Wildland Fire Condition
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
EO	Executive Order
ESA	Endangered Species Act
ES&R	Emergency Stabilization and Rehabilitation
FLPMA	Federal Land Policy and Management Act
FMP	Fire Management Plan
FMU	Fire Management Unit
FRCC	Fire Regime Condition Class
GAP	Gap Analysis Program
HMA	Herd Management Area
IDT	Interdisciplinary Team
ISA	Instant Study Area
LUP	Land Use Plan
MFP	Management Framework Plan
NAA	Non-attainment Area
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
OHV	Off-highway Vehicle
PM_{10}	Fine Particulates with an Aerodymanic Diamater of 10 Micrometers or Less
$PM_{2.5}$	Fine Particulates with an Aerodymanic Diamater of 2.5 Micrometers or Less
RMP	Resource Management Plan
ROI	Region of Influence
RPM	Resource Protection Measure
SMP	Smoke Management Plan
SSS	Special Status Species
TCP	Traditional Cultural Property
TMDL	Total Maximum Daily Load

UDEQ	Utah Department of Environmental Quality
UDWR	Utah Division of Wildlife Resources
USFWS	U.S. Fish and Wildlife Service
VRM	Visual Resource Management
WSA	Wilderness Study Area
WSRA	Wild and Scenic Rivers Act
WUI	Wildland Urban Influence

6.2 GLOSSARY

Agency	Any federal, state, or county government organization participating with jurisdictional responsibilities.
Air Quality	The characteristics of the ambient air (all locations accessible to the general public) as indicated by concentrations of the six air pollutants for which national standards have been established (e.g., particulate matter, sulfur dioxide, nitrogen dioxide, ozone, carbon monoxide, and lead), and by visibility in mandatory federal Class I areas. For the purposes of the Utah Smoke Management Plan, concentrations of particulate matter are taken as the primary indicators of ambient air quality.
Alternative	One of at least two proposed means of accomplishing planning objectives.
Ambient Air	Literally, the air moving around us; the air of the surrounding outside environment.
Analysis	The examination of existing and/or recommended management needs and their relationships to discover and display the outputs, benefits, effects, and consequences of initiating a proposed action.
Appropriate Management Response	Specific actions taken in response to a wildland fire to implement protection and fire use objectives. Responses range from full suppression to managing fire for resource benefits (fire use).
Area of Critical Environmer Concern	An area of public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and provide safety from natural hazards.
Aspect	Direction toward which a slope faces.
Assessment	The act of evaluating and interpreting data and information for a defined purpose.
Biological Treatment	Biological treatment of vegetation could typically employ grazing by cattle, sheep, or goats, but as technology progresses, it may also include insects, but would not include the use of invertebrates or microorganisms.
Biomass	The dry weight of plants in a unit area.

Brush	A collective term that refers to stands of vegetation dominated by shrublands, shrubby woody plants, or low-growing trees.
Buffer Zones	An area of reduced vegetation that separates wildland from vulnerable residential or business developments or other high-value areas. This barrier is similar to a greenbelt in that it is usually used for another purpose such as agriculture, recreation areas, parks, or golf courses.
Cabling	Same as chaining, except a cable is used instead of an anchor chain (see chaining).
Chaining	The process of modifying vegetation by pulling an anchor chain between two crawler tractors, thus reducing tall-growing, brittle vegetation and enhancing grasses, forbs, and sprouting shrubs.
Chemical Treatment	The use of herbicide to control herbaceous and woody species. BLM would use EPA-approved herbicides in accordance with EPA's Endangered Species Pesticide Program covered in BLM's *Vegetation Treatment on BLM Lands in Thirteen Western States FEIS* (May 1991).
Climax	A terminal stage of ecological succession in which the vegetation association remains stable over a relatively long period.
Closure	Legal restriction – but not necessarily elimination – of specified activities such as smoking, camping, or entry that might cause fires in a given area.
Collaboration	A cooperative process in which interested parties, often with widely varied interests, work together to seek solutions with broad support, for managing public and other lands.
Composition	The numbers and kinds of plants and animals in an area.
Condition Class	Condition Class is a classification of the amount of departure from the natural condition. The three classes are based on low (Condition Class 1), moderate (Condition Class 2), and high (Condition Class 3) departure from the central tendency of the natural (historical) regime. See: www.frcc.gov.
Critical Habitat	Federally-mandated (under the ESA of 1973, as amended) designation for threatened or endangered species that is proposed, designated, and managed by the U.S. Fish and Wildlife Service.
Critical Seasonal Use Area	Designation provided by the Utah Division of Wildlife Resources for the most important/valuable big game seasonal use areas in the state that they manage.
Crown Fire (Crowning)	The movement of fire through the crowns (top) of trees or shrubs more or less independently of the surface fire.

Cultural Resources	Those resources of historical, archaeological, or paleontological significance. Non-renewable elements of the physical and human environment including archaeological remains (evidence of prehistoric or historic human activities) and sociocultural values traditionally held by ethnic groups (sacred places, traditionally used raw materials, etc.).
Cumulative Effects	Cumulative effects result from the impacts of past, present, and reasonably foreseeable future activities combined with the projected direct and indirect effects of each alternative considered.
Direct Effects	Direct effects are those consequences that are expected to occur following implementation of an alternative. Direct effects are caused by the action and occur at the same time and place as the action.
Disturbance	Any relatively discrete event, either natural or human-induced that causes a change in the existing condition of an ecological system.
Ecosystem	An arrangement of organisms defined by the interactions and processes that occur between them. Ecosystems are often defined by their composition, function, and structure.
Ecosystem Sustainability	The ability to sustain diversity, productivity, resilience to stress, health, renewability, and/or yields of desired values, resource uses, products, or services from an ecosystem while maintaining the integrity of the ecosystem over time.
Emergency Stabilization and Rehabilitation	Planned actions to stabilize and prevent unacceptable degradation to natural and cultural resources after unplanned wildfires.
Endangered Species	Any animal or plant species in danger of extinction in a portion of its range. This is a federal designation (under the ESA of 1973 as amended). Most of these species fall under the jurisdiction of the U.S. Fish and Wildlife Service.
Endemic	A species restricted to a given geographical location and which is native to that locale.
Environment	All that surrounds an organism and interacts with it.
Environmental Assessment	EAs were authorized by NEPA of 1969. They are concise, analytical documents prepared with public participation that determine whether an Environmental Impact Statement (EIS) is needed for a particular project or action. If an EA determines an EIS is not needed, the EA becomes the document allowing agency compliance with NEPA requirements.
Environmental Impact Statement	EISs were authorized by NEPA of 1969. Prepared with public participation, they assist decision makers by providing information, analysis, and an array of action alternatives, allowing managers to see the probable effects of decisions on the environment. Generally, EISs are written for large-scale actions or geographical areas.

Environmental Justice — The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.

Ephemeral — A stream that flows only in direct response to precipitation, and whose channel is above the water table at all times.

Fine (Light) Fuels — Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which is less than ¼-inch in diameter and has a time lag of one hour or less. These fuels readily ignite and are rapidly consumed by fire when dry.

Fire Frequency (Fire Return Interval) — How often fire burns a given area, often expressed in terms of fire return intervals (e.g., fire returns to a site every 5-15 years).

Fire Intensity — A general term relating to the heat energy released by a fire.

Fire Management Plan — A FMP is a functional activity plan for the fire management program. The FMP is the primary tool for translating programmatic direction developed in the land management plan into on-the-ground action. The FMP synthesizes broad fire management goals and places them into a strategic context. Criteria for making initial action decisions must be a component of the FMP.

Fire Management Unit — Any land management area definable by objectives, topographic features, access, values-to-be-protected, political boundaries, fuel types, or major Fire Regimes, etc., that set it apart from management characteristics of an adjacent unit. FMUs are delineated in FMPs. These units have dominant management objectives and pre-selected strategies assigned to accomplish these objectives.

Fire Regime — The fire pattern across the landscape, characterized by occurrence interval and relative intensity. Fire Regimes result from a unique combination of climate and vegetation. Fire Regimes exist on a continuum from short-interval, low-intensity fires to long-interval, high-intensity fires. The five natural (historical) fire regimes are classified based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation. These five regimes include:

I – 0-35 year frequency and low (surface fires most common) to mixed severity (less than 75 percent of the dominant overstory vegetation replaced).

II – 0-35 year frequency and high (stand replacement) severity (greater than 75 percent of the dominant overstory vegetation replaced).

III – 35-100+ year frequency and mixed severity (less than 75 percent of the dominant overstory vegetation replaced).

IV – 35-100+ year frequency and high (stand replacement) severity (greater than 75 percent of the dominant overstory vegetation replaced).
V – 200+ year frequency and high (stand replacement) severity. (See www.frcc.gov).

Fire Return Interval The number of years between two successive fires in a designated area.

Fire Season 1) Period(s) of the year during which wildland fires are likely to occur, spread, and affect resource values sufficient to warrant organized fire management activities. 2) A legally enacted time during which burning activities are regulated by state or local authority.

Fire Severity Fire severity is a product of fire intensity and residence time at a site. Severity denotes the effects, from low to high, of fire on the soil and vegetation components of a site.

Fire Use The combination of wildland fire use and prescribed fire application to meet resource objectives.

Fireline A linear fire barrier that is cleared of fuels and scraped or dug to mineral soil. Also called control line, containment line or line.

Forage Vegetation of all forms available and of a type used for animal consumption.

Forbs Plants with soft, rather than permanent, woody stems that are not grass or grass-like plants.

Forest Products Woodland and timber products, such as posts, poles, firewood, Christmas trees, and sawlogs.

Fuel A combustible material, including vegetation such as grass, leaves, ground litter, plants, shrubs, and trees that feed a fire. (See Surface Fuels.)

Fuel Reduction Manipulation, including combustion and/or or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control.

Fuels Management The practice of evaluating, planning, and executing the treatment of wildland fuel to control flammability and reduce the resistance to control through mechanical, chemical, biological, or manual means, or by prescribed and wildland fire, in support of land management objectives.

Fuel Type An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that would cause a predictable rate of fire spread or difficulty of control under specified weather conditions.

Geographic Area	A political boundary designated by the wildland fire protection agencies, where these agencies work together in the coordination and effective utilization of resources. See www.fs.fed.us/fire/reports.shtml for a listing of and links to Geographic Area Coordination Centers.
Goal	A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad, general terms (usually not quantifiable) and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principle basis from which objectives are developed.
Grazing Permit	An authorization that allows grazing on public lands. Permits specify class of livestock on a designated area during specified seasons each year. Permits are of two types: preference (10 year) and temporary non-renewable (1 year).
Guideline	Actions or management practices that may be used to achieve desired outcomes, sometimes expressed in best management practices (BMPs). Guidelines may be identified during the land use planning process, but they are not considered a land use decision unless the plan specifies that they are mandatory. Guidelines for grazing administration must conform to 43 CFR 4180.2
Habitat	A specific set of physical conditions in geographical area(s) that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are food, water, cover, and living space.
Hazardous Fuels	A fuel complex defined by kind, arrangement, volume, condition, and location that forms a special threat of ignition or of suppression difficulty.
Implementation Plan	A sub-geographic or site-specific plan written to implement decisions made in a LUP. Implementation plans include both activity plans and project plans.
Incident	A human-caused or natural occurrence, such as wildland fire, that requires emergency service action to prevent or reduce the loss of life or damage to property or natural resources. Incident management teams also handle other non-fire emergency response, including tornadoes, floods, hurricanes, earthquakes, and other disasters or large events.
Indirect Effects	Indirect effects are those consequences, which are expected to occur following implementation of an alternative. Indirect effects are caused by the action and occur later in time or farther from the activity.
Interdisciplinary Team	A team representing several disciplines to ensure coordinated planning of the various resources.
Intermittent or Seasonal Stream	A stream that flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow in mountainous areas.

Ladder Fuels Fuels, which provide vertical continuity between strata and allow fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. They help initiate and assure the continuation of crowning.

Land Use Plan A set of decisions that establish management direction for land within an administrative area. An assimilation of land-use-plan-level decisions developed through the planning process outlined in 43 CFR 1600, regardless of the scale at which the decisions were developed. The term includes both RMPs and MFPs.

Landscape An area of interacting and interconnected patterns of habitats (ecosystems) that are repeated because of the geology, land form, soil, climate, biota, and human influences throughout the area. Landscape structure is formed by disturbance events, successional development of landscape structure, and flows of energy and nutrients through the structure of the landscape. A landscape is composed of watersheds and smaller ecosystems. It is the building block of biotic provinces and regions.

Large Fire 1) For statistical purposes, a fire burning more than 100 acres. 2) A fire burning with a size and intensity such that its behavior is determined by interaction between its own convection column and weather conditions above the surface.

Light (Fine) Fuels Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which is less than ¼-inch in diameter and has a time lag of one hour or less. These fuels ignite readily and are rapidly consumed by fire when dry.

Litter Top layer of the forest, scrubland, or grassland floor, directly above the fermentation layer, composed of loose debris of dead sticks, branches, twigs, and recently fallen leaves or needles, little altered in structure by decomposition.

Long Term Defined in this document as 10 years or more. This applies to any long-term use.

Management Concern An issue, problem, or condition that constrains the range of management practices identified by the Forest Service in the planning process.

Management Direction A statement of multiple-use and other goals and objectives, associated management prescriptions, and standards and guidelines for attaining them.

Management Framework Plan A LUP for public lands administered by BLM that provides a set of goals, objectives, and constraints for a specific planning unit or area; a guide to the development of detailed plans for the management of each resource. This form of plan is now being replaced with RMPs.

Management Practice A specific activity, measure, course of action, or treatment.

Mechanical Treatment Mechanical treatments of vegetation employ several different types of equipment to suppress, inhibit, or control herbaceous and woody vegetation. For the purposes of this plan, mechanical treatments may include employing the following: cabling, chaining, disking (or disk plowing), bulldozing, mowing, beating, crushing, chopping or shredding vegetation using a variety of mechanized equipment.

Moab Fire District Approximately 6.5 million acres of BLM-administered land covered by the Moab Fire Management Plan.

Monitoring (Plan Monitoring) The process of tracking the implementation of LUP decisions and collecting and assessing data and/or information necessary to evaluate the effectiveness of land use planning decisions.

National Ambient Air Quality Standards Standards for maximum acceptable concentrations of pollutants in the ambient air to protect public health with an adequate margin of safety, and to protect public welfare from any known or anticipated adverse effects of such pollutants (e.g., visibility impairment, soiling, materials damage, etc.) in the ambient air.

National Environmental Policy Act NEPA is the basic national law for protection of the environment, passed by Congress in 1969. It sets policy and procedures for environmental protection, and authorizes EISs and EAs to be used as analytical tools to help federal managers make decisions on management of federal lands.

Naturalness An area that "generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable". (Section 2[c], *Wilderness Act*).

Non-Fire Fuel Treatments Includes manual, mechanical, biological, chemical, and seeding actions.

Objective A concise, time-specific statement of measurable planned results that respond to pre-established goals. An objective forms the basis for further planning to define the precise steps to be taken and the resources to be used in achieving identified goals.

Off-road Vehicle Any motorized vehicle designated for or capable of cross-country travel over lands, water, sand, snow, ice, marsh, swampland, or other terrain excluding: (1) any non-amphibious registered motorboat; (2) any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes; (3) any vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved; (4) vehicles in official use; and (5) any combat or combat support vehicle used in national defense.

Old Growth — A wooded area, usually greater than 200 years of age, which has never been altered or harvested by humans. An old-growth forest often has large individual trees, a multi-layered crown canopy, and a significant accumulation of coarse woody debris including snags and fallen logs. Utah BLM would adopt the U.S. Forest Service (USFS) old-growth definitions and identification standards per the USFS document *Characteristics of Old-growth Forests in the Intermountain Region* (April 1993). In instances where the area of application in the previous document doesn't apply to specific species (e.g., *Pinus edulis*), use the document *Recommended Old-growth Definitions and Descriptions, UDSA Forest Service Southwestern Region* (Sept.1992).

Perennial — A stream that flows continuously. Perennial streams are generally associated with a water table in the localities through which they flow.

Planning Area — One or more planning units for which MFPs were prepared under previous BLM planning procedures.

Planning Unit — As used in previous BLM planning, a geographical unit within a BLM district. It included related lands, resources, and use pressure problems that were considered together for resource inventory and planning.

Preparedness - Activities that lead to a safe, efficient, and cost-effective fire management program in support of land and resource management objectives through appropriate planning and coordination.

Prescribed Fire — Any fire ignited by management actions under certain predetermined conditions to meet specific objectives related to hazardous fuels or habitat improvement. A written prescribed fire plan must exist, and NEPA requirements must be met prior to ignition.

Prescribed Fire Plan (Burn Plan) — This document provides the prescribed fire burn boss information needed to implement an individual prescribed fire project.

Prescription — Measurable criteria that define conditions under which a prescribed fire may be ignited, guide selection of AMRs, and indicate other required actions. Prescription criteria may include a combination of safety, economic, public health, environmental, geographic, administrative, social, or legal considerations.

Prevention — Activities directed at reducing the incidence of fires, including public education, law enforcement, personal contact, and reduction of fuel hazards.

Public Lands — Any lands or interest in lands outside of Alaska owned by the United States and administered by the Secretary of the Interior through the BLM, except located on the Outer Continental Shelf and lands held for the benefit of Indians.

Public Participation	The process of attaining citizen input into each planning document development stage. It is required as a major input into the BLM's planning system.
Range Improvements (Structural/Nonstructural)	Any activity or program on or relating to rangelands designed to improve forage production, change vegetation composition, control patterns of use, provide water, stabilize soil and water conditions, and enhance habitat for livestock, wildlife, and wild horses and burros. Rangeland improvements include non-structural land treatments (such as chaining, seeding, and burning), and structural (such as stockwater developments, fences, and trails).
Rangeland	Land dominated by vegetation that is useful for grazing and browsing by animals. "Range" and "rangeland" are used interchangeably.
Raptors	Birds of prey, such as the eagle, falcon, hawk, owl, or vulture.
Recreation Opportunities	Favorable circumstances enabling visitors' engagement in a leisure activity to realize immediate psychological experiences and attain more lasting, value-added beneficial outcomes.
Region	May be any geographical area larger than a planning area (socioeconomic profile area, sub-state, state, multi-state, or national), appropriate for comparative area analysis and for which information is available. Regions may be different for different resources or subject matter analysis.
Rehabilitation	The activities necessary to repair damage or disturbance caused by wildland fires or the fire suppression activity.
Resource Area	A geographic portion of a BLM district: An administrative subdivision whose manager has primary responsibility for day-to-day resource management activities and resource use allocations. In most instances it is the area for which RMPs are prepared and maintained.
Resource Management Plan	A document prepared by field office staff with public participation and approved by field office managers that provides general guidance and direction for land management activities at a field office. The RMP identifies the need for fire in a particular area and for a specific benefit.
Resources	1) Personnel, equipment, services, and supplies available or potentially available for assignment to incidents. 2) The natural resources of an area, such as timber, grass, watershed values, recreation values, and wildlife habitat.
Retardant	A substance or chemical agent that reduces the flammability of combustibles.
Riparian Habitat	A native environment growing near streams, reservoirs, ponds, etc. that provides food, cover, water, and living space (permanent or intermittent). It is usually unique or limited in arid regions and is, therefore, of great importance to a wide variety of wildlife.

Seeding (and Planting)	Involves the introduction of seeds and plants to a site that alters existing plant communities and influences successional processes.
Sensitive Species	Species not yet officially listed but that are undergoing status review for listing on the Fish and Wildlife Service official threatened and endangered list; species whose populations are small and widely dispersed or restricted to a few localities; and species whose numbers are declining so rapidly that official listing may be necessary.
Severity	Degree to which a site has been altered or disrupted by fire; loosely, a product of fire intensity and residence time (duration) of the fire. Severity denotes the effects, from low to high, of fire on the soil and vegetation components of a site.
Short Term	Defined in this document as one to five years. This applies to any "short-term" use.
Slash	Debris left after logging, pruning, thinning, or brush cutting; includes logs, chips, bark, branches, stumps, and broken understory trees or brush.
Smoke Management	Conducting a prescribed fire under fuel moisture and meteorological conditions, and with firing techniques that keep the smoke's impact on the environment within acceptable limits.
Soil Compaction	Increasing the soil bulk density, and concomitantly decreasing the soil porosity, by the application of mechanical forces to the soil.
Soil Disturbance	Physical disturbance of the vegetation or soil surface by any action, usually via mechanical or manual tools. Includes all activities except casual use, wildland fire, and prescribed fire treatments. See Surface Disturbance.
Special Recreation Management Areas	Recreation management areas that receive emphasis and priority in BLM's recreation planning and management efforts. The recreation resources in these areas require explicit management to provide specified recreation setting, activity, and experience opportunities. Recreation management objectives would provide explicit guidelines with respect to the existing opportunities and problems in these areas. RMPs would subsequently be prepared for special recreation management areas using RMP objectives for guidance.
Special Status Species	Includes proposed species, listed species, and candidate species under the ESA; state-listed species; and BLM state director-designated sensitive species (see BLM Manual 6840, Special Status Species Policy).
Standard	Forest plan standards describe a condition of land, normally a maximum or minimum condition, which is measurable. A standard can also be expressed as a constraint on management activities or practices. Deviation from compliance with a standard requires a forest plan amendment.
State Lands	Lands controlled or administered by the State of Utah.

Strategy	The science and art of command as applied to the overall planning and conduct of an incident.
Structure	The sizes, shapes, and/or ages of the plants and animals in an area.
Succession	Observed process of change in the species structure (and composition) of an ecological community over time.
Suppression	A management action intended to extinguish a fire or alter its direction of spread.
Surface Disturbance	Any surface disturbing activity (does not include fire).Disturbance of the vegetative or soil surface by any action. Includes all activities but casual use and wildland fire or fire treatments. See Soil Disturbance.
Surface Fuels	Loose surface litter on the soil surface, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches that have not yet decayed enough to lose their identity; also grasses, forbs, low and medium shrubs, tree seedlings, heavier branchwood, downed logs, and stumps interspersed with or partially replacing the litter.
Sustainability	The ability to maintain a desired condition or flow of benefits over time.
Tactics	Deploying and directing resources on an incident to accomplish the objectives designated by strategy.
Total Maximum Daily Load	An estimate of the total quantity of pollutants (from all sources: point, non-point, and natural) that may be allowed into waters without exceeding applicable water quality criteria.
Values At Risk	To rate according to a relative estimate of worth when exposed to a chance of loss or damage.
Vegetation Treatment	Changing the characteristics of an established vegetation type to improve rangeland forage or wildlife habitat resources. Treatments are designed for specific areas and differ according to the area's suitability and potential. The most common land treatment methods alter the vegetation by chaining, spraying with herbicides, burning, and plowing, followed by seeding with well adapted desirable plant species.
Vegetation	Plants in general or the sum total of the plant life above and below ground in an area.
Visibility	The greatest distance in a given direction where it is possible to see and identify with the unaided eye a prominent dark object against the sky at the horizon.
Wetlands	Lands including swamps, marshes, bogs, and similar areas, such as wet meadows. They also include River overflows, mud flats, and natural ponds.

Wilderness Area	An area officially designated as wilderness by Congress. Wilderness areas will be managed to preserve wilderness characteristics and shall be devoted to the public purposes of recreation, scenic, scientific, educational, conservation, and historical use.
Wilderness Study Area	Areas under study for possible inclusion as a wilderness area in the National Wilderness Preservation System.
Wilderness	An area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of undeveloped federal land retaining its primeval character and influence without permanent improvements or human habitations.
Wildfire	A free-burning fire requiring a suppression response.
Wildland	Any area under fire management jurisdiction of a land management agency.
Wildland Fire Management Program	The full range of activities and functions necessary for planning, preparedness, emergency suppression operations, and emergency rehabilitation of wildland fires, and prescribed fire operations, including natural fuels management to reduce risks to public safety and to restore and sustain ecosystem health.
Wildland Fire Situation Analysis	A decision making process that evaluates alternative management strategies against selected criteria (e.g., safety, environmental, social, political, economic), and resource management objectives.
Wildland Fire Suppression	An AMR to wildland fire that results in curtailment of fire spread and eliminates all identified threats from the particular fire. All wildland fire suppression activities provide for firefighter and public safety as the highest consideration, but minimize loss of resource values, economic expenditures, and/or the use of critical firefighting resources.
Wildland Fire	Any non-structure fire, other than prescribed fire, that occurs in the wildland.
Wildland Fire Use	The management of naturally ignited wildland fires to accomplish specific pre-stated resource management objectives in predefined geographic areas outlined in an FMP. Operational management is described in the WFIP. Wildland fire use is not to be confused with "fire use", a broader term encompassing more than just wildland fires.
Wildland Urban Interface	The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Because of their location these structures are extremely vulnerable to fire should an ignition occur in the surrounding area.

Woodland Forest lands stocked with other than timber species (i.e., pinyon, juniper, mountain mahogany, etc.). A plant community in which, in contrast to a typical forest, the trees are often small, and relatively short compared to their crown (i.e., pinyon, juniper). Uses of the woodland products are generally limited to firewood, posts, and harvest of fruit (pinyon nuts).

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APPENDIX A
Interdisciplinary Team Analysis Record Checklist

INTERDISCIPLINARY TEAM ANALYSIS RECORD CHECKLIST

Project Title: Moab Fire Management Plan Environmental Assessment

NEPA Log Number: UT-063-04-02, UT-060-2005-042

File/Serial Number:

Project Leader: Dave Engleman, Kate Juenger

FOR EAs/CXs: NP: not present; NI: resource/use present but not impacted; PI: potentially impacted

STAFF REVIEW OF PROPOSAL:

NP/NI/PI	Resource	Date Reviewed	Signature	Review Comments (required for all NIs and PIs. PIs require further analysis.)
CRITICAL ELEMENTS				
PI	Air Quality	10.21.2004	Brian Keating	**Issue: Impacts from wildfire on Class I or other sensitive airsheds**. Indicator: Reduction in particulate emissions due to fire suppression activities. Increased emissions in non-wildfire season due to prescribed fire activities. Indicator: Short-term impacts to air quality within non-sensitive airsheds.
PI- Price PI – Mont NP - Moab	Areas of Critical Environmental Concern	10.21.2004	Katie Stevens, Tom Gnojek, Todd Berkenfield, Nancy Shearin, Donna Turnipseed	**Issue: Impacts may be to the Relevance and Importance values that were determined in ACEC identification.** Indicators for designated ACECs would be Relevance and Importance values such as scenic, cultural, Native American consultation concerns, wildlife and/or natural systems and processes, etc. Treatment projects would take into account ACEC management plans and prescriptions.
PI	Cultural Resources	10.21.2004 11.04.2004	Ed Maloney, Blaine Miller, Donna Turnipseed, Nancy Shearin	**Issue: Impacts on innumerable sites of cultural and archaeological value in all three field offices.** Protection/mitigation measures identified during analysis for specific treatment projects would be incorporated into proposed action prior to project implementation. Protection/mitigation would be incorporated whenever possible in wildland fire situation analysis.
PI – Mont NI – Moab/Price	Environmental Justice	10.21.2004	Nick Sandberg Daryl Trotter	**Issue: Impact on subsistence level wood gathering in Cedar Mesa and Montezuma watershed areas, and on pinyon nut gathering in any pinyon and juniper woodland, in the Monticello field office.** Affected groups would not be disproportionately impacted by wildland fire or treatment projects compared with the general population in other parts of the planning area (Moab/Price).
NI	Farmlands (Prime or Unique)	10.21.2004	Darryl Trotter, Nick Sandberg	Rationale for NI: The BLM does manage land in the planning area that would qualify as prime or unique farmland, however, there is nothing in the proposed action that would irreversibly convert any BLM lands to non-agricultural use or result in the potential loss of prime farmlands, as defined by the Farmland Protection Policy Act. Monticello field office has designated Prime or Unique Farmlands on private lands, but they are generally irrigated and spread of wildfire from public lands is not likely, due to sparse fuels and/or higher moisture content of crops.
PI	Floodplains	10.21.2004	Ann Marie Aubry Paul Curtis	**Issue: Impacts to floodplain resources onsite and/or downstream may result from wildland fire suppression activities, mechanical treatments, and/or prescribed burns. Impacts may result from heavy equipment use, loss of vegetation buffers, high intensity burns, etc., and are closely tied to water quality and soil impacts.** Indicators: May include (but not limited to) heavy equipment usage, changes in floodplain geomorphology, loss of vegetation on banks and benches, increase in sediment transport rates (increased sediment movement on uplands or in floodplain), etc.
PI	Invasive, Non-native Species	10.21.2004	Darryl Trotter, Karl Ivory, Summer Schulz	**Issue 1. Potential for increased infestation/introduction following prescribed and wildland fire**. Indicator: Acreage of land infested **Issue 2. Flammability of invasive, non-native species - fire hazard.** (Tamarisk and cheatgrass pose hazards due to intensity of camping along river corridors where both species occur.)

NP/NI/PI	Resource	Date Reviewed	Signature	Review Comments (required for all NIs and PIs. PIs require further analysis.)
				Indicator: Acres of hazardous fuels reduced.
PI	Native American Religious Concerns	10.21.2004	Ed Maloney, Blaine Miller, Donna Turnipseed, Nancy Shearin	**Issue: Impacts to traditional use of vegetation and cultural or religious sites.** Indicator: Consultation to identify possible concerns (plants, minerals, trees, landscape features may be considered Traditional Cultural Places). Identification would dictate protection/mitigation measures.
PI	Threatened, Endangered or Candidate Plant Species	10.21.2004	Daryl Trotter Karl Ivory	**Issue: Impacts to listed/candidate plant species from fire and surface disturbing activities.** Indicator: Loss of habitat.
PI	Threatened, Endangered or Sensitive Animal Species	10.21.2004	Pam Riddle Tammy Wallace	**Issue: Impacts to listed/candidate animal species and potential/occupied or designated critical habitat**. Indicator: Displacement, disturbance of species and/or habitat degradation/loss/alteration.
NI	Wastes (hazardous or solid)	10.21.2004	Dave Engleman	Concerns of potential impacts from proposed action decisions on hazardous materials are addressed in the proposed action as resource protection measures (RPMs). See EA's RPM section.
PI	Water Quality (drinking/ground)	10.21.2004	Stephanie Ellingham Ann Marie Aubry	**Issue: Impacts to water quality may result onsite and/or downstream from fire suppression activities, mechanical treatments and/or prescribed burns and are closely tied to soils and floodplain impacts.** Indicators: Increased nutrient levels, increased sediment or ash levels, fire retardant chemicals in domestic water supplies or aquatic systems, etc. Any changes in stream or pond characteristics (clarity/turbidity, sediment loads, ash and debris, algal buildup, temperature, dissolved oxygen levels, etc.) and any changes in soils or floodplains would also be characteristic indicators of water quality impact.
PI	Riparian-wetlands Areas	10.21.2004	Stephanie Ellingham Karl Ivory Paul Curtis	**Issue: Impact to riparian from suppression and fuels management actions.** (Issue is primarily vegetation conversion--loss, change, improvement, or degradation). Indicator: Properly functioning condition / health and functioning Direct disturbance or removal of vegetation can result in beneficial improvements to watershed condition and quality. May be temporary impacts to watershed/channel/water quality from sedimentation/salinity. Benefits of exotic removal (hazardous fuel reduction) in riparian areas. Invasive and noxious Russian Knapweed, Russian Olive, Tamarisk
PI	Wild and Scenic Rivers	10.21.2004 11.4.2004	Marilyn Peterson Todd Berkenfield	**Issue: Impacts to outstanding remarkable values, tentative classification**. Issue is possible degradation to Outstandingly Remarkable Values of Scenery. Effects to scenery would be temporary and should not preclude a river segment from designation. Note: The proposed action would not alter the free-flowing nature of any river segment. Outstandingly remarkable values of geology, archaeology, recreation, fish, wildlife and ecology would not be affected by the proposed action.
NI – Moab	Wilderness	10.21.2004	Bill Stevens	Rationale for NI (Moab): The management prescription for the Black Ridge Wilderness area (within the Moab field office) would be adhered to in all fire management decisions (Colorado Canyons National Conservation Area Proposed Resource Management Plan, July 2004). NP- elsewhere
PI	WSAs	10.21.2004	Bill Stevens, Tom Gnojek, Scott Berkenfield	**Issue: Impacts to naturalness, opportunities for solitude, and opportunities for primitive recreation in the WSA**. Managed under interim management policies/guidelines.

NP/NI/PI	Resource	Date Reviewed	Signature	Review Comments (required for all NIs and PIs. PIs require further analysis.)
Other Resources / Concerns				
NI	Rangeland Health Standards and Guidelines	10.21.2004	Paul Curtis	Rationale for NI: Rangeland Health Standards and Guidelines would be followed and are incorporated into the proposed action (see RPMs for livestock and vegetation). Fire management decisions in the proposed action would not be contributing to any failure to meet Rangeland Health Standards.
PI	Livestock Grazing	10.21.2004	Karl Ivory, Raymon Carling, Paul Curtis (or Summer Schulz, Nick Sandberg)	**Issue: Impact to allotment use**. Both positive and negative impacts would be expected, such as change in vegetative type producing more herbaceous forage or generally a short-term loss of forage or damage to a structural range improvement or depletion of a livestock water supply used for fire suppression. Loss or increase of forage could be based on fire intensity/size, conversion of vegetation type.
PI	Woodlands and Forestry	10.21.2004	Lynn Jackson, Summer Schulz	**Issue: Impact to availability of forest-related products (including posts, fuel wood collection, Christmas trees, pine nuts, etc.).** **Issue: Availability of biomass (ecosystem standpoint).** **Issue: Potential for vegetative conversion.** Maxim: commodity,
PI	Vegetation including Special Status plant species	10.21.2004	Karl Ivory, Daryl Trotter, Nancy Shearin, Summer Schulz	**Impacts to plant species, special status species and culturally sensitive plants from wildland fire and surface disturbing activities.** Indicator: Modification of vegetation type (acreage). Based on Native American consultation, identification of culturally sensitive plant locations may require pre-defined mitigation/protection measures for specific projects.
PI	Fish and Wildlife including special status species	10.21.2004	Pam Riddle, Tammy Wallace	**Impacts to fish and wildlife (including SSS) species and potential/occupied habitat**. Indicator: Displacement, disturbance of species and/or habitat degradation/loss/alteration.
PI	Soils	10.21.2004	Ann Marie Aubry Paul Curtis	**Issue: Impact to soils may result onsite and/or downstream from fire suppression activities, mechanical treatments and/or prescribed burns and are closely tied to water quality and floodplain impacts.** Impacts could include loss of aggregate stability, compaction from heavy equipment, soil chemistry changes (i.e. loss of available nutrients, soil microbes), loss of ground cover, hydrophobic soils, ruts from heavy equipment, increased erosion rates, etc. Also, could include rills, gullies, pedestals, choked stream channels, poor vegetative recovery, etc.
PI	Recreation	10.21.2004	Katie Stevens, Tom Gnojek, Scott Berkenfield	**Issue: Impacts on developed recreation sites/facilities**. OHV RPMs regarding obliterations make up part of the proposed action. Campsite protection from fuel treatment projects (fuel breaks).
PI	Visual Resources	10.21.2004	Rob Sweeten (Maggie Wyatt)	**Issue: Impact on visual resources from fire suppression activities and treatment projects. Long-term, positive impacts from fuels reduction treatments.** Potential for short-term smoke impacts, and long-term changes in line and form, from possible visible firelines, etc.
NI	Geology	10.21.2004	Frank Bain	Rationale for NI: Fire management practices would be designed to avoid unique geologic features.
NI	Mineral Resources, including Oil & Gas	10.21.2004	Eric Jones	RPMs address suppression of wildland fire due to presence of oil and gas facilities. Mitigation measures may be added to proposed actions as a result of site-specific analysis during project-level planning for treatment.
PI	Paleontology	10.21.2004	Laurie Bryant (USO), Mike Leschin PFO Nancy Shearin, Donna Turnipseed	**Issue: Direct impacts from unplanned fire on paleontological resources**. RPMs are incorporated into stipulations for specific treatment projects. If possible and when practical, prior to prescribed fire activities and wildland fire suppression actions a review of known paleontological remains would be completed and specific mitigation/protection measures identified and implemented.
NI	Lands / Access	10.21.2004	Mary von Koch, Maxine Deeter, Joan Hubert	Rationale for NI: While lands and access concerns are present in the large planning area, fire management practices would be designed to avoid conflicts with authorized rights-of-way. Prior to planned activities, appropriate coordination would take place with holders of rights-of-way as well as with private and cooperating agency land owners, and additional RPMs would be incorporated into proposed actions as needed.

NP/NI/PI	Resource	Date Reviewed	Signature	Review Comments (required for all NIs and PIs. PIs require further analysis.)
PI	Fuels / Fire Management	10.27.2004	Brian Keating	Fire and Fuels Management considerations form the basis for the proposed action. Therefore, Fire and Fuels Management is considered and addressed in full in this EA. The objective of the fire management plan is to provide management direction for this resource, in consideration of other resources.
PI	Socio-economics	10.21.2004	Daryl Trotter	**Impacts to socioeconomics**. Positive impacts to Communities at Risk from treatment projects. Potential negative impact of forage loss from both wildland fire and some treatment projects.
PI – Price	Wild Horses and Burros	10.21.2004	Mike Tweddell	**Issue: Impact to Herd Management Area** (HMA) Of the four HMAs in the Price field office only the Range Creek HMA would be potentially impacted by wildland fire or treatment projects. Both actions create potential for displacement of horses and forage loss. Use of treatment projects would pose a temporary loss of resources, but would potentially benefit wild horses by reducing the size and frequency of large wildfires and modification of the vegetative community to more palatable species. The other three HMAs do not contain the fuels or potential to carry large fires as found within the Range Creek HMA.
PI	Wilderness characteristics	10.21.2004	Bill Stevens	**Impact: Surface disturbing impacts from fire mgmt activities to the naturalness, opportunity for solitude, primitive recreation, and any supplemental values.** **Fire suppression impacts would generally be temporary – presence of fire personnel, fire camp, etc.** **Fire can contribute to "naturalness," which could be considered a subjective argument. Any long-term effects would be analyzed in the context of other resource values such as IM275 [change, soils, water and air quality, visuals, etc.]**

FINAL REVIEW

Reviewer Title	Date	Signature	Comments
NEPA / Environmental Coordinator	11/2005	/s/ Kate Juenger	
Manager	11/2005	/s/ Maggie Wyatt	

NOTE: Review Comments should include information explaining how the specialist came to their conclusion - how does he/she know the element/resource is not present (site visit and date of visit, familiarity with location, etc.). For all 'NIs' give a brief explanation as to why that element/resource would not be impacted.

APPENDIX B
Wildland Fire Management Legislation

Wildland Fire Management Legislation

Authority: The statutes cited herein authorize and provide the means for managing wildland fires.

Policy	Authority
Protection Act of September 20, 1922 (42 Stat. 857; 16 USC 594)	Authorizes the Secretary of Interior to protect and preserve, from fire, disease, or the ravages of beetles, or other insects, timber owned by the United States upon the public lands, national parks, national monuments, Indian reservations, or other lands under the jurisdiction of the Department of the Interior owned by the United States.
Clark-McNary Act of 1928 (45 Stat. 221; 16 USC 487)	Authorized technical and financial assistance to the states for forest fire control and for production and distribution of forest tree seedlings. (Sections 1 through 4 were repealed by the Cooperative Forestry Assistance Act of 1978.)
Federal Property and Administrative Service Act of 1949 (40 USC 471 et seq.)	Provides the government an economical and efficient system for procurement and supply of personal property and non-personal services.
Reciprocal Fire Protection Act, Act of May 27, 1955 (69 Stat. 66; 42 USC 1856a, 42 USC 1856)	Authorizes agencies that provide fire protection for any property of the United States to enter into reciprocal agreements with other fire organizations to provide mutual aid for fire protection.
Clean Air Act, Act of July 14, 1955, as amended (42 USC 7401 et seq.)	This act provides for the protection and enhancement of the nation's air resources and applies to the application and management of prescribed fire.
Wilderness Act, Act of September 3, 1964 (16 USC 1131, 1132)	Provides for the designation and preservation of wilderness.
National Wildlife Refuge System Administration Act of 1966, as amended (80 Stat. 927; 16 USC 668dd through 668ee)	Provides guidelines and directives for administration and management of all areas in the National Wildlife Refuge System, including "wildlife refuges, areas for the protection and conservation of fish and wildlife that are threatened with extinction, wildlife ranges, game ranges, wildlife management areas, or waterfowl production areas."
National Environmental Policy Act of 1969 (42 USC 4321)	Requires the preparation of environmental impact statements for federal projects that may have a significant effect on the environment. It requires systematic, interdisciplinary planning to ensure the integrated use of the natural and social sciences and the environmental design arts in making decisions about major federal actions that may have a significant effect on the environment.
Endangered Species Act of 1973 (16 USC 1531)	Provides for the protection and conservation of threatened and endangered fish, wildlife, and plant species. Directs all federal agencies to utilize their authorities and programs to further the purpose of the Act.
Disaster Relief Act, Act of May 22, 1974 (88 Stat. 143; 42 USC 5121)	Provides the authority for the federal government to respond to disasters and emergencies. Established the Presidential declaration process and authorized disaster assistance programs.
Federal Fire Prevention and Control Act, Act of October 29, 1974 (88 Stat. 1535; 15 USC 2201)	Authorizes reimbursement to state and local fire services for costs incurred in firefighting on federal property.
Federal Land Policy and Management Act of 1976 (90 Stat. 2743)	Outlines functions of the BLM Directorate, provides for administration of public land through the BLM, provides for management of the public lands on a multiple use basis, and requires land-use planning including public involvement and continuing inventory of resources. The Act establishes as public policy that, in general, the public lands would

Policy	Authority
	remain in federal ownership, and also authorizes: ▪ Acquisition of land or interests in lands consistent with the mission of the Department and land use plans. ▪ Permanent appropriation of road use fees collected from commercial road users to be used for road maintenance. Collection of service charges, damages, and contributions and use of funds for specified purposes. ▪ Protection of resource values. ▪ Preservation of certain lands in their natural condition. ▪ Compliance with pollution control laws. ▪ Delineation of boundaries in which the federal government has right, title, or interest. ▪ Review of land classifications in land use planning and modification or termination of land classifications when consistent with land use plans. ▪ Sale of lands if the sale meets certain disposal criteria. ▪ Issuance, modification, or revocation of withdrawals; review of certain withdrawals by October 1991. ▪ Exchange or conveyance of public lands if in the public interest. ▪ Outdoor recreation and human occupancy use. ▪ Management of the use, occupancy, and development of the public lands through leases and permits. ▪ Designation of federal personnel to carry out law enforcement responsibilities. ▪ Determination of the suitability of public lands for rights-of-way purposes (other than oil and gas pipelines) and specification of the boundaries of each right-of-way. ▪ Recordation of mining claims and reception of evidence of annual assessment work.
Federal Grant and Cooperative Agreement Act of 1977 (PL 950224, as amended by PL 97-258, September 13, 1982, 96 Stat. 1003; 31 USC 6301 thru 6308)	Established criteria for a federal agency to use to determine whether a transaction is procurement or financial assistance. Established guidelines to bring about uniformity in the selection and use of procurement contracts, grants, and cooperative agreements.
Supplemental Appropriation Act, Act of September 10, 1982 (96 Stat. 837)	Authorized the Secretary of Agriculture and Secretary of Interior to enter into contracts with state and local governmental entities, including local fire districts, for procurement of services in the preparedness, detection, and suppression of fires on any units within their jurisdiction.
Wildfire Suppression Assistance Act, Act of April 7, 1989 (PL 100-428, as amended by PL 101-11, April 7, 1989; 42 USC 1856).	This act authorizes the Secretary of Agriculture to enter into agreements with fire organizations of foreign countries for assistance in wildfire protection.
Indian Self-Determination and Education Assistance Act (PL 93-638), as amended	Provide for the full participation of Indian tribes in programs and services conducted by the federal government for Indians and encouraged the development of human resources of the Indian people; established a program of assistance to upgrade Indian education.
National Indian Forest Resources Management Act (PL 101-630, November 28, 1990)	Required the Secretary of Interior to undertake management activities on Indian forestlands, in furtherance of the United States. trust responsibility for these lands. Activities must incorporate the principles of sustained yield and multiple use, and include tribal participation.
Tribal Self-Governance Act of 1994 (PL 103-413)	Provided for native tribes to enter into annual funding agreements with U.S. Department of Interior (USDI) "to plan, conduct, consolidate, and administer programs, services, functions, and activities" administered by USDI that are of special

Policy	Authority
	geographic, historical, or cultural significance.
Clean Water Act of 1987, as amended (33 USC 1251)	Establishes objectives to restore and maintain the chemical, physical, and biological integrity of the nation's water.
Executive Order (EO) 12898, Environmental Justice, February 11, 1994 (59 FR 7629)	Requires federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.
EO 13112, Invasive Species, February 3, 1999 (64 FR 6183)	Directs federal agencies to prevent the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species cause.
Migratory Bird Conservation Act of 1929, as amended (16 USC 715) and treaties pertaining thereto	Provides for habitat protection and enhancement of protected migratory birds.
EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, January 10, 2001 (66 FR 3853)	Directs agencies within the executive branch to take certain actions to further implement the Migratory Bird Treaty Act, with the goal of promoting the conservation of migratory bird populations.
Wild and Scenic Rivers Act (PL 90-542)	Provides a national policy and program to preserve and protect selected rivers because of their outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values.
Archaeological Resource Protection Act	Expands the protections provided by the Antiquities Act of 1906 in protecting archaeological resources and sites located on public and Indian lands.
EO 11514, Protection and Enhancement of Environmental Quality	Directs federal agencies to provide leadership in protecting and enhancing the quality of the nation's environment to sustain and enrich human life and to initiate measures to meet national environmental goals.
EO 11593, Protection and Enhancement of the Cultural Environment	Requires federal agencies to provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the nation by administering and initiating measures necessary to preserve, restore, and maintain federally owned sites, structures, and objects of historical, architectural, or archaeological significance.
EO 11988, Floodplain Management	Requires federal agencies to take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains.
EO 11990, Protection of Wetlands	Directs federal agencies to provide leadership and take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands.
EO 12866, Regulatory Planning and Review	The objectives of this executive order are to enhance planning and coordination with respect to both new and existing regulations; to reaffirm the primacy of federal agencies in the regulatory decision-making process; to restore the integrity and legitimacy of regulatory review and oversight; and to make the process more accessible and open to the public.
Colorado River Basin Salinity Control Act	Authorized the construction, operation, and maintenance of works in the Colorado River Basin to control the salinity levels of the Colorado River.
National Historic Preservation Act of 1966, as amended (16 USC 470)	Expands protection of historic and archaeological properties to include those of national, state, and local significance. It also directs federal agencies to consider the effects of proposed actions on properties eligible for, or included in, the National

Policy	Authority
	Register of Historic Places.
Healthy Forest Restoration Act of 2003	Crafted to reduce the threat of destructive wildfires while upholding environmental standards and encouraging early public input during review and planning processes.
Wild and Scenic Rivers Act of 1968 (PL 90-542, as amended) (16 USC 1271-1287)	Provides for a National Wild and Scenic Rivers System and other purposes.
These acts are codified (as referenced) in the United States Code which can be accessed at http://www4.law.cornell.edu/uscode	
Policy Documents	
Federal Wildland Fire Management Policy and Program Review, December 18, 1995, USDI and USDA Final Report. Federal Wildland Fire Management Policy and Program Review, March 23, 1996, USDI and USDA Implementation Action Plan Review and Update of the 1995 Federal Wildland Fire Management Policy, January, 2001, USDI, USDA, DOE, DOD, DOC, EPA, FEMA, and NASF.	The principles and policies in this plan, and subsequent reviews and amendments, provide a common approach to wildland fire by the USDI and U.S. Department of Agriculture. The plan encourages agencies to move the emphasis from fire suppression to integrating fire into the management of lands and resources consistent with public health and environmental quality considerations. Managers are encouraged to use fire as one of the basic tools for accomplishing resource management objectives.
Utah BLM Rangeland Health Standards and Guidelines, 1997.	BLM-generated standards that spell out conditions to be achieved on BLM lands in Utah and guidelines that would be applied to achieve the standards.
Western Governor's Association (http://www.westgov.org/)	
A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy, August 2001.	This plan outlined a comprehensive approach to the management of wildland fire, hazardous fuels, and ecosystem restoration and rehabilitation on federal and adjacent state, tribal, and private forest and rangelands in the United States, emphasizing measures to reduce the risk to communities and the environment
A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan, May 2002, 27p.	A set of core principles was developed to guide the identification of goals for this strategy. These principles include such concepts as priority setting, accountability, and an open, collaborative process among multiple levels of government and a range of interests. The end results sought by all stakeholders are healthier watersheds, enhanced community protection, and diminished risk and consequences of severe wildland fires. This community-based approach to wildland fire issues combines cost-effective fire preparedness and suppression to protect communities and the environment with a proactive approach that recognizes fire as part of a healthy, sustainable ecosystem.
National Academy of Public Administration (http://www.napawash.org/)	
Federal Fire Management: Limited Progress in Restarting	The report reiterated that fire is beneficial and even necessary to wildlands. Where fire has been a historic component of the environment it is essential to continue that influence, and that attempts to exclude fire from such lands could result in unnatural

Policy	Authority
the Prescribed Fire Program (GAO/RCED-91-42), December 5, 1990.	ecological changes and increased risks created by accumulation of fuels on the forest floor. Supported the use of prescribed burn to achieve management objectives, when the risks of such a burn have been analyzed.
State of Utah Regulations and Local Government Plans	
Utah Administrative Code R317	Utah's regulations concerning water quality.
Utah Administrative Code R307	Utah's regulations concerning air quality.
Southeastern Association of Government 2004	Natural Hazard Pre-Disaster Mitigation Plan for southeastern Utah's Carbon, Emery, Grand, and San Juan Counties.

APPENDIX C
Goals and Objectives by Fire Management Unit for the Proposed Action

Goals and Objectives by Fire Management Unit for Moab Proposed Action

Moab Fire Management Unit (FMU)	Approx. Total FMU Acres	Approx. Total BLM Acres in FMU	Wildland Fire Suppression (contain fire per Ignition at this acreage or less) Low Intensity/High Intensity Condition	Wildland Fire Use (acres per year/acres per 10 years)	Prescribed Fire (10-year acreage estimates in vegetation type)	Non-fire Treatment (10-year acreage estimates in vegetation type)	Other Goals and Objectives
#1 Bruin Pt	392,928	166,566	100 PJ	0	5,000 PJ	4,000 PJ	Some small planned burns could be done in the spring/fall to open dominant stands of sagebrush and to convert coniferous forests to aspen. Wildland fire use is not appropriate due to large private land holdings in FMU.
#2 E. Carbon	98,945	65,944	500/250 PJ	5,000/15,000	5,000 PJ	10,000 PJ	Low intensity fires are desirable up to 500 acres to perform maintenance on the chaining units, remove encroaching PJ and to increase high value browse and herbaceous production for winter wildlife habitat and spring/fall livestock forage. Ideal burn size blocks would be 200 to 400 acres in a mosaic pattern.
#3 W Benches	351,967	92,738	500/100 PJ	0	0	0	It is desirable to burn several thousand acres each decade through either planned or unplanned ignitions.
#4 Price Urban	117,926	24,120	(10)	0	100 PJ	500 PJ	The primary purpose of this FMU is to buffer the main highways and communities along them. Fires in this area should be aggressively fought. Suppress all fires within 1/2 mile of local communities and the highways at 10 acres or less, 90% of the time, under all burning conditions.
#5 Rock Creek	276,678	249,026	1,000/250 PJ	5,000/15,000	15,000 PJ	4,000 PJ	Fire is desired in open areas of mountain brush and PJ for improved wildlife habitat, however, large (1,000+) fires are undesirable due to severe erosion problems on the steep slopes and the private land holdings above. As fire would provide a diversity of forage and height classes, it is desirable to burn several thousand acres each decade through either planned or unplanned ignitions. This FMU has the potential for fire use areas. Further study should be done to identify potential locations. It is expected that many fires could be placed in a monitoring status. Firefighter safety is a major concern in this FMU due to the rugged terrain.
#6 San Rafael Desert	1,438,387	1,155,650	1,000/100 PJ	0	0	0	Fires rarely burn more than five acres. Most fires should be monitored only and allowed to burn out naturally.
#7 Cedar Mtn	767,308	653,527	1,000/100 PJ	0	0	0	Fire occurrence in this FMU is low and fires rarely reach even an acre in size. Fire would help to create and maintain a mosaic of open grass mesa tops and provide a diversity of PJ and shrubs in the rocky canyon areas. It would be acceptable to burn several thousand acres each decade, if the fuel loadings permit.

Moab Fire Management Unit (FMU)	Approx. Total FMU Acres	Approx. Total BLM Acres in FMU	Wildland Fire Suppression (contain fire per Ignition at this acreage or less) Low Intensity/High Intensity Condition	Wildland Fire Use (acres per year/acres per 10 years)	Prescribed Fire (10-year acreage estimates in vegetation type)	Non-fire Treatment (10-year acreage estimates in vegetation type)	Other Goals and Objectives
#8 Green R Corridor	111,254	85,797	(25)	0	0	0	Fire is generally undesirable in the riparian areas. Cottonwood and willow can tolerate low intensity fires, but when tamarisk is mixed in the fire often kills native species. However, small ground fires could improve natural stand diversity without significantly changing or degrading the riparian zone.
#9 Western Book Cliffs	235,932	204,497	1,000/200	2,000/20,000	0	0	Prescribed burns in selected canyon bottoms to eliminate dense tall stands of big sagebrush are especially beneficial.
#10 Diamond	275,207	147,543	1,000/500 PJ 100 Mountain Sage 0 Riparian	2,000/20,000	0	0	The large unburned areas within the boundaries of the two Diamond fires (Diamond Peak 1989 and Diamond Creek 2002) should be protected. This FMU has the potential for fire use areas. Further study should be done to identify potential locations. The area should be regularly monitored to determine if some treatment is needed in the future to maintain its Condition Class 1 status. Fires within the blocks of unburned land from the Diamond fires should be contained to smaller sizes when possible.
#11 E Book Cliffs	111,143	95,005	200 PJ 100 Mountain Sage 0 Riparian	0	400 PJ	100 PJ	Prescribed burns in selected canyon bottoms are especially beneficial to eliminate dense tall stands of big sagebrush.
#12 Cisco Desert	950,674	774,867	300 Cheatgrass 100 Mountain Sage 0 Riparian	0	2,000	700	Protection of remaining, remnant sagebrush and grassland communities within the FMU is the primary objective, with nearly total conversions of communities to exotic cheatgrass expected following wildfire events of any intensity. The 300 acres currently identified reflects suppression and response time rather than the resource objective for full suppression.
#13 Dolores Triangle	282,716	191,246	1,000/500 PJ 100 Mountain Sage 0 Riparian	2,000/20,000	3,000 PJ	800 PJ	Some fire is beneficial to eliminate encroaching pinyon and juniper woodland and enhance livestock and elk winter/spring ranges. Very large fires, though, are to be avoided. This FMU has the potential for fire use areas on some of the isolated mesa tops. Further study should be done to identify potential locations.
#14 Colorado R Corridor	65,452	35,650	(2)		100 tamarisk	100 tamarisk	Human safety issues re-associated with extensive recreational campgrounds along the river indicating full and immediate suppression. Fire is undesirable in riparian areas as these areas are extremely valuable wildlife habitat. Full suppression is to be initiated on most fires. Cottonwood, willow, and other native species should especially be protected from fire. Mechanical or small fire treatments could reduce tamarisk and restore native vegetation.

Moab Fire Management Unit (FMU)	Approx. Total FMU Acres	Approx. Total BLM Acres in FMU	Wildland Fire Suppression (contain fire per Ignition at this acreage or less) Low Intensity/High Intensity Condition	Wildland Fire Use (acres per year/acres per 10 years)	Prescribed Fire (10-year acreage estimates in vegetation type)	Non-fire Treatment (10-year acreage estimates in vegetation type)	Other Goals and Objectives
#15 Dead Horse	65,943	54,664	(50) 100 Mountain Sage 0 Riparian	0	0	0	Fire is undesirable in this area due to the proximity of the parks and the amount of recreational traffic in the area. While some fire would be good to open up the PJ, a large fire would be a threat to too many resources. Avoid fires within native grasslands, sagebrush, and blackbrush shrub areas as these ecosystems are rare and irreplaceable. Avoid fires in riparian areas that support endangered avian species.
#16 Dry Valley	436,684	347,350	500/100 PJ 100 Mountain Sage 0 Riparian	0	3,200 PJ	1,000 PJ	Large fires should be avoided to minimize loss of desirable forage species such as big sagebrush and four-wing saltbush. Avoid spread of fires in riparian canyons and wetlands. The sagebrush areas are important for deer, antelope, and several species of birds such as sage grouse and sage sparrow. Wildland fire use is not appropriate in most of this FMU due to the human activity throughout the FMU.
#17 La Sal	180,561	136,835	500/300 PJ 100 Mountain Sage 0 Riparian	0	8,000 PJ	5,000 PJ	Some fire would be desirable to open up the PJ stands and create additional diversity for livestock and wildlife, however, the proximity to the National Forest and extensive private land holdings would preclude allowing unplanned fire to burn except under low fire intensities. Low intensity fires up to 500 acres would not cause undue resource damage. Fire, used as a tool, could eliminate encroaching pinion-juniper trees and favor a diverse plant community composed of grasses, shrubs and forbs, which would enhance both livestock and elk winter/spring ranges. Chainings (seedings) could be allowed to burn up to the full acreage size of the chaining. Fires that threaten the national forest or state/private land should be suppressed unless appropriate officials determine an alternative fire management action is acceptable.
#18 Lockhart Basin	90,002	76,395	1,000 PJ 0 Riparian	0	0	0	Fires are not common and tend to be one to two tree events of less than one acre. If a larger fire does occur it probably would be beneficial. There would rarely be resource values threatened by fire in this area. Wildland fire use could be used in this FMU, however the lack of fuels to carry a fire does not warrant the use. Even though many of the fuels are in Condition Class two and three, the lack of fuel loads do not warrant fuels treatment projects. This area is not subject to large fires. Fires along the main highway into Canyonlands National Park should be suppressed.

Moab Fire Management Unit (FMU)	Approx. Total FMU Acres	Approx. Total BLM Acres in FMU	Wildland Fire Suppression (contain fire per Ignition at this acreage or less) Low Intensity/High Intensity Condition	Wildland Fire Use (acres per year/acres per 10 years)	Prescribed Fire (10-year acreage estimates in vegetation type)	Non-fire Treatment (10-year acreage estimates in vegetation type)	Other Goals and Objectives
#19 Monticello Plain	315,367	38,229	0	0	1,500 PJ	5,000 PJ	The proximity of this FMU to the towns of Monticello and Blanding and the national forest generally means fires must be suppressed; however, some acreage burned under low fire intensity conditions would be acceptable. The big Wyoming sagebrush areas are good sage grouse habitat and need to be protected. It is desirable to decrease PJ cover and allow the establishment of desirable herbaceous species. This would increase forage for livestock and wildlife and improve watershed conditions.
#20 Montezuma	420,492	336,345	1,000/500 PJ 100 Mountain Sage 0 to 25 Riparian	0	10,000 PJ	20,000 PJ	Some fire would be desirable to decrease PJ stands and allow establishment of herbaceous species for improved livestock, wildlife forage and watershed conditions, however, the proximity to private lands would preclude allowing unplanned fire to burn except under low fire intensities. Fires up to 1,000 acres would not cause undue resource damage except in crucial deer winter range areas where fires should be 500 acres or less. No more than 10,000 acres should be burned each decade, except in deer winter ranges where no more than 5,000 acres should be burned. Many of the chainings could be treated by burning or other treatment methods. Chainings (seedings) could be allowed to burn up to the full acreage size.
#21 Cedar Mesa	504,795	461,724	2,000/500 PJ 0 to 25 Riparian	2,000/10,000	300 PJ	1,000 PJ	Fire is desirable in most of the FMU to decrease continuity of the PJ canopy and to allow establishment of more desirable herbaceous vegetation. Fire could be utilized to maintain and increase the savannah aspect of the sagebrush-grass communities within the PJ woodland, to check the encroachment of PJ, and to maintain forage production in chainings. Individual fire sizes up to 2,000 acres would be beneficial; however, no more than 20,000 acres should be burned each decade. The exception is critical mule deer habitat where fires should be kept to less than 100 acres. Fuels treatments such as prescribed burning would help to create diversity and maintain the chainings.
#22 San Juan Basin	800,422	709,269	1,000 PJ 25 Riparian	no acres	0	0	Even though many of the fuels are in Condition Class two and three, the lack of fuel loads do not warrant fuels treatment projects. This area is not subject to large fires.
TOTAL	8,290,783	6,102,987		18,000/ 100,000	53,600	52,200	

Note: PJ - Pinyon and juniper woodland

APPENDIX D
Resource Protection Measures

Resource Protection Measures

(Note: Resource protection measures follow Interdisciplinary Team checklist order.)

Resource Protection Measure Number	Resource	No Action Alternative	Proposed Action
Air Quality			
A-1	Evaluate weather conditions, including wind speed and atmospheric stability, to predict impacts from smoke from prescribed fires and wildland fire use. Coordinate with Utah Department of Environmental Quality for prescribed fires and wildland fire use. (RX, WFU) (LUP A-1)	Applied in all FMZs	Applies to All FMUs
A-2	When using chemical fuels reduction methods, follow all label requirements for herbicide application. (NF) (LUP A-2)	Applied in all FMZs	Applies to All FMUs
Cultural Resources			
CR-1	Cultural resource advisors should be contacted when fires occur in areas containing sensitive cultural resources. (SUP) (LUP CR-1).	Applied in all FMZs	Applies to All FMUs
CR-2	Wildland fire use is discouraged in areas containing sensitive cultural resources. A Programmatic Agreement is being prepared between the Utah State Historic Preservation Office, BLM, and the Advisory Council to cover the finding of adverse effect to cultural resources associated with wildland fire use. (WFU) (LUP CR-2)		Applies to All FMUs
CR-3	Potential impacts of proposed treatment should be evaluated for compliance with the National Historic Preservation Act and the Utah Statewide Protocol. This should be conducted prior to the proposed treatment. (RX, NF, ES&R) (LUP CR-3)	Applied in all FMZs	Applies to All FMUs
Invasive, Non-Native Species			
INV-1	In areas known to have weed infestations, aggressive action should be taken in rehabilitating firelines, seeding and follow-up monitoring and treatment to reduce the spread of noxious weeds. Monitor burned areas and treat as necessary. All seed used would be tested for purity and for noxious weeds. Seed with noxious weeds would be rejected (ROD 13 Western States Vegetation Treatment EIS 1991). (SUP, WFU, RX, NF, ES&R) (LUP V-2)		Applies to All FMUs
Threatened, Endangered, or Candidate Species (plants and animals)			
END-1	Initiate emergency Section 7 consultation with United States Fish and Wildlife Service (USFWS) upon the determination that wildfire suppression may pose a potential threat to any listed threatened or endangered species or adverse modification of designated critical habitat. (SUP) (LUP SSS-1)	Applied in all FMZs	Applies to All FMUs
END-2	Prior to planned fire management actions, survey for listed threatened and endangered and non-listed sensitive species. Initiate Section 7 consultation with USFWS as necessary if proposed project may affect any listed species. Review appropriate management, conservation and recovery plans and include recovery plan direction into project proposals. For non-listed special status plant and animal species, follow the direction contained in the BLM 6840 Manual (BLM 1996). Ensure that any proposed project conserves non-listed sensitive species and their habitats and ensure that any action authorized, funded or carried out by BLM does not contribute to the need for any species to become listed. (RX, NF, ES&R) (LUP SSS-2).	Applied in all FMZs	Applies to All FMUs

Resource Protection Measure Number	Resource	No Action Alternative	Proposed Action
END-3	See site-specific conservation measures that would be identified in the Biological Assessment. See Appendix I for a list of binding Terms and Conditions as provided in the USFWS's Biological Opinion. (SUP, WFU, RX, NF, ES&R) (LUP SSS-3)	Applied in all FMZs	Applies to All FMUs
END-4	Prioritize wildfire suppression in sagebrush habitat with emphasis on minimizing wildfire size and frequency where Gunnison sage-grouse habitat objectives would not be met if a fire occurs.		Applies to All FMUs
Wastes (hazardous or solid)			
HW-1	Recognize hazardous wastes and move fire to a safe distance from dumped chemicals, unexploded ordnance, drug labs, wire burn sites or any other hazardous wastes. Immediately notify BLM field office hazmat coordinator or state hazmat coordinator upon discovery of any hazardous materials, following the BLM hazardous materials contingency plan. (SUP, WFU, RX, NF, ES&R) (LUP HW-1).	Applied in all FMZs	Applies to All FMUs
Water Quality (drinking/ground)			
SW-1	When using chemical fuel reduction treatments follow all label directions, additional mitigations identified in project NEPA evaluation and the Approved Pesticide Use Proposal. At a minimum, provide a 100-foot-wide riparian buffer strip for aerial application, 25 feet for vehicle application and 10 feet for hand application. Any deviations must be in accordance with the label. Herbicides would be applied to individual plants within 10 feet of water where application is critical (BLM ROD 13 Western States Vegetation Treatment EIS 1991). (NF) (LUP SW-6)	Applied in all FMZs	Applies to All FMUs
SW-2	Suppress wildfires consistently with compliance strategies for restoring or maintaining the restoration of water quality impaired [303(d) listed] waterbodies. Do not use retardant within 300 feet of waterbodies. (SUP, WFU) (LUP SW-9)	Applied in all FMZs	Applies to All FMUs
SW-3	Plan and implement projects consistent with compliance strategies for restoring or maintaining the restoration of water quality impaired [303(d) listed] waterbodies. Planned activities should take into account the potential impacts on water quality, including increased water yields that can threaten fisheries and aquatic habitat; improvements at channel crossings; channel stability; and downstream values. Of special concern are small headwaters of moderate to steep watersheds; erosive or saline soils; multiple channel crossings; at-risk fisheries; and downstream residents. (RX, NF, ES&R) (LUP SW-10)	Applied in all FMZs	Applies to All FMUs
Riparian-wetlands Area			
WET-1	Avoid heavy equipment in riparian-wetlands areas. During fire suppression or wildland fire use, consult a resource advisor before using heavy equipment in riparian-wetlands areas. (SUP, WFU, RX, NF, ES&R) (LUP SW-7)		Applies to All FMUs
WET-2	Limit ignition within native riparian-wetlands areas. Allow low-intensity fire to burn into riparian areas. (RX) (LUP SW-8)		Applies to All FMUs
Wilderness/Wilderness Study Areas			
WILD-1	The use of earth-moving equipment must be authorized by the field office manager. (SUP, WFU, RX, ES&R) (LUP WILD-1).	Applied in all FMZs	Applies to All FMUs

Resource Protection Measure Number	Resource	No Action Alternative	Proposed Action
WILD-2	Fire management actions would rely on the most effective methods of suppression that are least damaging to wilderness values, other resources and the environment, while requiring the least expenditure of public funds. (SUP, WFU) (LUP WILD-2).	Applied in all FMZs	Applies to All FMUs
WILD-3	A resource advisor should be consulted when fire occurs in Wilderness and WSA. (SUP, WFU) (LUP WILD-3).	Applied in all FMZs	Applies to All FMUs
Rangeland Health Standards and Guidelines			
R-1	Rangelands that have been burned, by wildfire, prescribed fire or wildland fire use, would be ungrazed for a minimum of one complete growing season following the burn. (SUP, WFU, RX) (LUP LG-2).	Applied in all FMZs	Applies to All FMUs
R-2	Rangelands that have been re-seeded or otherwise treated to alter vegetative composition, chemically or mechanically, would be ungrazed for a minimum of two complete growing seasons. (RX, NF, ES&R) (LUP LG-3).	Applied in all FMZs	Applies to All FMUs
Livestock Grazing			
LG-1	Coordinate with permittees regarding the requirements for non-use or rest of treated areas. (SUP, WFU, RX, NF, ES&R) (LUP LG-1).	Applied in all FMZs	Applies to All FMUs
Woodlands & Forestry			
WF-1	Planned projects should be consistent with HFRA Section 102(e) (2) to maintain or contribute to the restoration of old-growth stands to a pre-fire suppression condition and to retain large trees contributing to old-growth structure. (SUP, WFU, RX, NF) (LUP F-1)		Applies to All FMUs
WF-2	During planning, evaluate opportunities to utilize forest and woodland products prior to implementing prescribed fire activities. Include opportunities to use forest and woodland product sales to accomplish non-fire fuel treatments. In forest and woodland stands, consider developing silvicultural prescriptions concurrently with fuels treatment prescriptions. (RX, NF) (LUP F-2)		Applies to All FMUs
Vegetation			
V-1	When restoring or rehabilitating disturbed rangelands, non-intrusive, non-native plant species are appropriate for use when native species: (1) are not available; (2) are not economically feasible; (3) cannot achieve ecological objectives as well as non-native species; and/or (4) cannot compete with already established native species (Noxious Weeds Executive Order 13112 2/3/1999; BLM Manual 9015; BLM ROD 13 Western States Vegetation Treatment EIS 1991). (RX, NF, ES&R) (LUP V-1)	Applied in all FMZs	Applies to All FMUs
Fish and Wildlife			
FW-1	Avoid treatments during nesting, fawning, spawning, or other critical periods for wildlife or fish. (RX, NF, ES&R) (LUP FW-1)	Applied in all FMZs	Applies to All FMUs
FW-2	Avoid if possible or limit the size of, wildland fires in important wildlife habitats such as, mule deer winter range, riparian and occupied sage grouse habitat. Use resource advisors to help prioritize resources and develop wildland fire situation analyses and wildland fire implementation plans (WFIPs) when important habitats may be impacted. (SUP, WFU) (LUP FW-2)	Applied in all FMZs	Applies to All FMUs

Resource Protection Measure Number	Resource	No Action Alternative	Proposed Action
FW-3	Minimize wildfire size and frequency in sagebrush communities where sage grouse habitat objectives would not be met if a fire occurs. Prioritize wildfire suppression in sagebrush habitat with an understory of invasive, annual species. Retain unburned islands and patches of sagebrush unless there are compelling safety, private property and resource protection or control objectives at risk. Minimize burn-out operations (to minimize burned acres) in occupied sage-grouse habitats when there are no threats to human life and/or important resources. (SUP) (LUP FW-3).		Applies to All FMUs
FW-4	Establish fuel treatment projects at strategic locations to minimize size of wildfires and to limit further loss of sagebrush. Fuel treatments may include greenstripping to help reduce the spread of wildfires into sagebrush communities. (RX, NF) (LUP FW-4).		Applies to All FMUs
FW-5	Use wildland fire to meet wildlife objectives. Evaluate impacts to sage grouse habitat in areas where wildland fire use for resource benefit may be implemented. (WFU, RX) (LUP FW-5).		Applies to All FMUs
FW-6	Create small openings in continuous or dense sagebrush (>30% canopy cover) to create a mosaic of multiple-age classes and associated understory diversity across the landscape to benefit sagebrush-dependent species. (WFU, RX, NF) (LUP FW-6).	Applied in all FMZs	Applies to All FMUs
FW-7	On sites that are currently occupied by forests or woodlands, but historically supported sagebrush communities, implement treatments (fire, cutting, chaining, seeding etc.) to re-establish sagebrush communities. (RX, NF) (LUP FW-7).	Applied in all FMZs	Applies to All FMUs
FW-8	Evaluate and monitor burned areas and continue management restrictions until the recovering and/or seeded plant community reflect the desired condition. (SUP, WFU, RX, ES&R) (LUP FW-8).	Applied in all FMZs	Applies to All FMUs
FW-9	Utilize the Emergency Stabilization and Rehabilitation program to apply appropriate post-fire treatments within crucial wildlife habitats, including sage grouse habitats. Minimize seeding with non-native species that may create a continuous perennial grass cover and restrict establishment of native vegetation. Seed mixtures should be designed to re-establish important seasonal habitat components for sage grouse. Leks should not be re-seeded with plants that change the vegetation height previously found on the lek. Forbs should be stressed in early and late brood-rearing habitats. In situations of limited funds for ES&R actions, prioritize rehabilitation of sage grouse habitats. (ES&R) (LUP FW-9).	Applied in all FMZs	Applies to All FMUs
Soils			
S-1	Avoid heavy equipment use on highly erosive soils (soils with low soil loss tolerance), wet or boggy soils and slopes greater than 30%, unless otherwise analyzed and allowed under appropriate NEPA evaluation with implementation of additional erosion control and other soil protection mitigation measures. (SUP, WFU, RX, NF, ES&R) (LUP SW-1)		Applies to All FMUs
S-2	There may be situations where high intensity fire would occur on sensitive and erosive soil types during wildland fire, wildland fire use or prescribed fire. If significant areas of soil show evidence of high-severity fire, then evaluate area for soil erosion potential and downstream values at risk and implement appropriate or necessary soil stabilization actions such as mulching or seeding to avoid excessive wind and water erosion. (SUP,	Applied in all FMZs	Applies to All FMUs

Resource Protection Measure Number	Resource	No Action Alternative	Proposed Action
	WFU, RX) (LUP SW-2)		
S-3	Complete necessary rehabilitation on firelines or other areas of direct soil disturbance, including but not limited to waterbarring firelines, covering and mulching firelines with slash, tilling and/or subsoiling compacted areas, scarification of vehicle tracks, OHV closures, seeding and/or mulching for erosion protection. (SUP, WFU, RX) (LUP SW-3)	Applied in all FMZs	Applies to All FMUs
S-4	When using mechanical fuels reduction treatments, limit tractor and heavy equipment use to periods of low soil moisture to reduce the risk of soil compaction. If this is not practical, evaluate sites, post treatment and if necessary, implement appropriate remediation, such as subsoiling, as part of the operation. (NF) (LUP SW-4)	Applied in all FMZs	Applies to All FMUs
S-5	Treatments such as chaining, plowing and roller chopping shall be conducted as much as practical on the contour to reduce soil erosion (BLM ROD 13 Western States Vegetation Treatment EIS 1991). (NF, ES&R) (LUP SW-5)		Applies to All FMUs
Recreation			
REC-1	Wildland fire suppression efforts would preferentially protect Special Recreation Management Areas and recreation site infrastructure in line with fire management goals and objectives. (SUP) (LUP REC-1).	Applied in all FMZs	Applies to All FMUs
REC-2	Vehicle tracks created off of established routes would be obliterated after fire management actions in order to reduce unauthorized OHV travel. (SUP, WFU, RX, NF, ES&R) (REC-2)		Applies to All FMUs
REC-3	Helicopter use during wildland fire should be restricted to a minimum and should avoid canyons as much as possible. (SUP, WFU, RX)		Applies to FMU #14
Geology/Mineral Resources			
M-1	A safety buffer should be maintained between fire management activities and at-risk facilities. (SUP, WFU, RX) (LUP M-1).	Applied in all FMZs	Applies to All FMUs
Paleontology			
P-1	Planned projects should be consistent with BLM Manual and Handbook H-8270-1, Chapter III (A) and III (B) to avoid areas where significant fossils are known or predicted to occur or to provide for other mitigation of possible adverse effects. (RX, NF, ES&R) (LUP P-1).	Applied in all FMZs	Applies to All FMUs
P-2	In the event that paleontological resources are discovered in the course of surface fire management activities, including fires suppression, efforts should be made to protect these resources. (SUP, WFU, RX, NF, ES&R) (LUP P-2).	Applied in all FMZs	Applies to All FMUs
Lands/Access			
LR-1	Fire management practices would be designed to avoid or otherwise ensure the protection of authorized rights-of-way and other facilities located on the public lands, including coordination with holders of major rights-of-way systems within rights-of-way corridors and communication sites. (WFU, RX, NF, ES&R) (LUP LR-1).	Applied in all FMZs	Applies to All FMUs
LR-2	Fire management actions must not destroy, deface, change or remove to another place any monument or witness tree of the Public Land Survey System. (SUP, WFU, RX, NF, ES&R) (LUP LR-2)	Applied in all FMZs	Applies to All FMUs

Resource Protection Measure Number	Resource	No Action Alternative	Proposed Action
Wild Horses and Burros			
WHB-1	Avoid fencing that would restrict access to water. (RX, NF, ES&R) (LUP WHB-1).	Applied in all FMZs	Applies to All FMUs

APPENDIX E
Federally Listed, Candidate, and Petitioned Species Found in the Moab Fire District

APPENDIX E: FEDERALLY LISTED, CANDIDATE, AND PETITIONED SPECIES FOUND WITHIN THE MOAB FIRE DISTRICT

Common Name[a]	Scientific Name	Federal Status[b]	Veg. Community	Field Office	Determinations[c]
Flowering Plants					
Jones cycladenia	*Cycladenia jonesii (=humilis)*	Threatened	Salt Desert Scrub Pinyon / Juniper	Moab	NLAA
Uinta Basin hookless cactus	*Sclerocactus glaucus*	Threatened	Salt Desert Shrub Pinyon / Juniper Sagebrush Ponderosa Pine	Price	LAA
Graham's beardtongue	*Penstemon grahamii*	Candidate, Petitioned	Salt Desert Shrub Pinyon / Juniper Grassland	Price	NCL
Birds					
Southwestern willow flycatcher**	*Empidonax traillii extimus*	Endangered	Riparian-wetlands	Moab, Monticello	LAA
California condor (*H, Exp*)	*Gymnogyps californianus*	Endangered	Salt Desert Shrub Pinyon / Juniper Sagebrush	Moab, Monticello	LAA
Bald eagle (*Br*)	*Haliaeetus leucocephalus*	Threatened	Sagebrush Mixed Conifer Riparian-wetlands	Moab, Monticello	LAA
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	Pinyon / juniper Sagebrush Riparian-wetlands	Moab, Monticello	LAA
Western yellow-billed cuckoo	*Coccyzus americanus*	Candidate	Riparian-wetland	Moab, Monticello	NCL
Gunnison sage grouse	*Centrocercus minimus*	Candidate, Petitioned	Sagebrush	Moab, Monticello	NCL
Mammals					
Black-footed ferret (*H, Exp, Un*)	*Mustela nigripes*	Endangered, 10(j)	Sagebrush Grassland	Moab, Monticello	LAA
White-tailed prairie dog	*Cynomys leucurus*	Petitioned	Sagebrush	Moab	NCL
Gunnison prairie dog	*Cynomys gunnisoni*	Petitioned	Grassland	Moab, Monticello	NCL
Fish					
Humpback chub* (*H*)	*Gila cypha*	Endangered	Water	Moab, Monticello	LAA
Bonytail chub* (*H*)	*Gila elegans*	Endangered	Water	Moab, Monticello	LAA
Colorado pikeminnow* (*H*)	*Ptychocheilus lucius*	Endangered	Water	Moab, Monticello, Price	LAA
Razorback sucker* (*H*)	*Xyrauchen texanus*	Endangered	Water	Moab, Monticello, Price	LAA

[a] Definitions for notations:

Species with an asterisk (*) have designated critical habitat. Species with a double asterisk (**) have proposed critical habitat.

Br—Species known to nest or breed within the planning area.

H—Species or populations existed in historical locations (i.e., the current range or number of individuals or populations has decreased when compared to historical standards). For extirpated species, all management areas are considered historical.

Exp—Management areas contain designated use areas for experimental, nonessential populations designated under Section 10(j) of the Endangered Species Act (ESA), as amended.

Un—Management areas contain unconfirmed historical locations of the species.

[b] Definitions for species status:

Endangered species are those species or distinct populations listed by the USFWS that have a probability of worldwide extinction.

Threatened species are those species or distinct populations listed by the USFWS that are threatened with becoming endangered.

Candidate and petitioned species have no legal protection under the ESA, as amended. However, the USFWS has sufficient information on biological vulnerability and threats to candidate species that they are under active consideration by the USFWS for federal listing. For petitioned species, outside entities have submitted petitions to the USFWS to consider these species for federal listing. Candidate or petitioned species could be proposed or listed during the life of the proposed action for this project.

Species designated as "10(j)" are considered by the USFWS to be "experimental and non-essential populations" within designated use areas in Utah, as provided by Section 10(j) of the ESA, as amended. This designation provides greater management flexibility. For BLM, 10(j) populations of federally listed species are equivalent to a "proposed" status.

Species designated as "extirpated" are federally endangered, threatened, or candidate species that are considered by the USFWS to no longer occur in the planning area.

[c] Definitions for determinations:

LAA – Likely to Adversely Affect

NLAA – Not Likely to Adversely Affect

NCL – Not Contribute to Federal Listing

APPENDIX F
BLM Sensitive Species Found Within the Moab Fire District

APPENDIX F: BLM SENSITIVE SPECIES FOUND WITHIN THE MOAB FIRE DISTRICT

Common Name	Scientific Name	Federal Status	Vegetation Community (substrate type identified for flowering plants only)	Field Office
Flowering Plants				
Chatterley's onion	*Allium geyeri var. chatterleyi*	SPS	Pinyon and Juniper Woodland, Mountain Shrub, Ponderosa Pine (sandstone)	Monticello
Cronquist milkvetch	*Astragalus cronquistii*	SPS	Salt Desert Shrub (clay, sandstone, sandy)	Monticello
Peabody's milkvetch	*Astragalus pubentissimus var. peabodianus*	SPS	Salt Desert Shrub, Pinyon and Juniper Woodland (sandstone, shale)	Moab
Cisco milkvetch	*Astragalus sabulosus var. sabulosus*	SPS	Salt Desert Shrub (shale)	Moab
Basalt milkvetch (Silver milkvetch)	*Astragalus subcinereus var. basalticus*	SPS	Pinyon and Juniper Woodland, Ponderosa Pine (igneous)	Price
Creutzfeldt-flower	*Cryptantha creutzfeldtii*	SPS	Salt Desert Shrub (clay, shale)	Price
Pinnate spring parsley (Beck biscuitroot)	*Cymopterus beckii*	SPS	Pinyon and Juniper Woodland, Mountain Shrub, Ponderosa Pine (sandy)	Monticello
Hole-in-the-rock prairie clover	*Dalea flavescens var. epica*	SPS	Blackbrush (sandstone, sandy)	Monticello
Kachina daisy	*Erigeron kachinensis*	SPS	Ponderosa Pine, Riparian-wetlands, Aspen (sandstone)	Monticello
Bluff buckwheat	*Eriogonum racemosum var. nobile*	SPS	Salt Desert Shrub (sandy)	Monticello
Cataract gilia	*Gilia latifolia var. imperialis*	SPS	Salt Desert Shrub (sandstone, sandy)	Monticello
Alcove bog-orchid	*Habenaria zothecina*	SPS	Riparian-wetlands , (hanging gardens)	Price, Moab, Monticello
Canyonlands lomatium (Broad-leaved biscuitroot)	*Lomatium latilobum*	SPS	Salt Desert Shrub, Pinyon and Juniper Woodland (sandstone)	Moab, Monticello
Dolores rushpink	*Lygodesmia grandiflora var. doloresensis*	SPS	Pinyon and Juniper Woodland, Sagebrush Blackbrush (alluvium, sandy)	Moab
Entrada rushpink	*Lygodesmia grandiflora var. entrada*	SPS	Salt Desert Shrub, Pinyon and Juniper Woodland (sandy)	Moab
Book Cliffs blazing star	*Mentzelia multicaulis labrina*	SPS	Pinyon and Juniper Woodland, Sagebrush (clay, shale)	Price

Common Name	Scientific Name	Federal Status	Vegetation Community (substrate type identified for flowering plants only)	Field Office
Shultz blazing star	*Mentzelia shultziorum*	SPS	Salt Desert Shrub, (clay)	Moab
Trotter oreoxis	*Oreoxis trotteri*	SPS	Salt Desert Shrub Pinyon and Juniper Woodland (sandstone)	Moab
Tuhy's breadroot	*Pediomelum aromaticum var. tuhyi*	SPS	Salt Desert Shrub, Pinyon and Juniper Woodland (sandstone, sandy)	Monticello
Alcove rock daisy	*Perityle specuicola*	SPS	Salt Desert Shrub (sandstone)	Moab, Monticello
Bluff phacelia	*Phacelia indecora*	SPS	Salt Desert Shrub	Monticello
Jones indigo-bush (glandular indigo-bush)	*Psorothamnus polydenius var. jonesii*	SPS	Salt Desert Shrub, Grassland (sandy, shale)	Moab
Jane's globemallow	*Sphaeralcea janeae*	SPS	Salt Desert Shrub (sandy)	Moab, Monticello
Psoralea globemallow	*Sphaeralcea psoraloides*	SPS	Salt Desert Shrub, Pinyon and Juniper Woodland (conglomerate, gypsiferous, limestone, sandstone, shale)	Moab
Cedar Mountain flame-flower	*Talinum thompsonii*	SPS	Pinyon and Juniper Woodland, Ponderosa Pine (conglomerate)	Price
Birds				
Northern goshawk	*Accipiter gentiles*	CA	Mixed Conifer, Riparian-wetlands	Moab, Monticello
Short-eared owl	*Asio flammeus*	WSC	Grassland	Monticello
Burrowing owl	*Athene cunicularia*	WSC	Grassland	Moab, Monticello
Ferruginous hawk	*Buteo regalis*	WSC	Sagebrush , Grassland	Moab, Monticello
Bobolink	*Dolichonyx oryzivorus*	WSC	Riparian-wetlands	Monticello
Lewis's woodpecker	*Melanerpes lewis*	WSC	Pinyon and Juniper Woodland, Mountain Shrub, Mixed Conifer, Ponderosa Pine, Riparian-wetlands	Moab, Monticello
American white pelican	*Pelecanus erythrorhynchos*	WSC	Riparian-wetlands	Moab, Monticello
Three-toed woodpecker	*Picoides tridactylus*	WSC	Mixed Conifer, Aspen	Moab, Monticello
Greater sage grouse	*Centrocercus urophasianus*	WSC	Sagebrush	Moab, Monticello
Mammals				
Townsend's big-eared bat	*Corynorhinus townsendii*	WSC	Mountain Shrub, Mixed Conifer	Moab, Monticello
Spotted bat	*Euderma maculatum*	WSC	Salt Desert Shrub, Mountain Shrub, Mixed Conifer, Ponderosa Pine	Moab, Monticello
Allen's big-eared bat	*Idionycteris phyllotis*	WSC	Mountain Shrub, Mixed Conifer, Ponderosa Pine	Moab, Monticello
Fringed myotis	*Myotis thysanodes*	WSC	Salt Desert Shrub, Pinyon and Juniper Woodland, Mixed Conifer	Moab, Monticello

Common Name	Scientific Name	Federal Status	Vegetation Community (substrate type identified for flowering plants only)	Field Office
Big free-tailed bat	*Nyctinomops macrotis*	WSC	Mountain Shrub, Mixed Conifer	Monticello
Silky pocket mouse	*Perognathus flavus*	WSC	Grassland	Monticello
Mexican vole	*Microtus mexicanus*	WSC	Grassland	Monticello
Kit fox	*Vulpes macrotis*	WSC	Salt Desert Shrub	Moab, Monticello
Fish				
Roundtail chub	*Gila robusta*	CA	Water	Moab, Monticello
Bluehead sucker	*Catostomus discobolus*	CA	Water	Moab, Monticello
Flannelmouth sucker	*Catostomus latipinnis*	CA	Water	Moab, Monticello
Invertebrates				
Eureka mountainsnail	*Oreohelix eurekensis*	WSC	Pinyon and Juniper Woodland, Sagebrush Grassland, Mountain Shrub, Mixed Conifer, Aspen	Moab
Yavapai mountainsnail	*Oreohelix yavapai*	WSC	Mountain Shrub, Mixed Conifer, Aspen	Monticello
Amphibians				
Arizona toad	*Bufo microscaphus*	WSC	Riparian-wetlands	Monticello
Reptiles				
Common chuckwalla	*Sauromalus ater*	WSC	Salt Desert Shrub	Monticello
Desert night lizard	*Xantusia vigilis*	WSC	Blackbrush	Monticello
Cornsnake	*Elaphe guttata*	WSC	Riparian-wetlands	Moab
Smooth greensnake	*Opheodrys vernalis*	WSC	Sagebrush, Riparian-wetlands	Moab, Monticello

[a] *Species already represented as federally listed, candidate, or petitioned species are not repeated here. Sources of information: Utah Sensitive Species List, December 18, 2003 (State of Utah, Department of Natural Resources, Division of Wildlife Resources); Draft Bureau of Land Management Sensitive Plant Species List for Utah (August 2002).*

[b] *BLM sensitive species status designations are Conservation Agreement (CA), BLM Wildlife Species of Concern (WSC), and BLM Sensitive Plant Species (SPS). Conservation Agreement species receive special management under a Conservation Agreement in order to preclude the need for listing. Conservation Agreements are voluntary cooperative plans among resource agencies that identify threats to a species and implement conservation measures to proactively conserve and protect species in decline.*

APPENDIX G
Fire's Interaction with Resources

Fire's Interaction with Resources

Fire's Interaction with Air Resources

Wildland fires are a source of air pollutant emissions during combustion of vegetation. The major pollutant of concern in smoke from fire is fine particulate matter, both $PM_{2.5}$ (fine particulates with an aerodynamic diameter of 2.5 micrometers or less) and PM_{10} (fine particulates with an aerodynamic diameter of 10 micrometers or less) (Sandberg et al. 2002), which is specified in the Utah Smoke Management Program (SMP) as the primary indicator for ambient air quality (Utah Interagency Smoke Management Program 2000).

The amount of PM emissions depends on the size and intensity of the fire, the fuel types, moisture content, and available fuels load. The level of resulting air quality impact depends on the amount and duration of emissions, atmospheric dispersion conditions, and terrain. Although wildland fires may occur at any time, they are most likely to occur in the planning area during summer months (wildland fire season) due to higher temperatures, drier conditions, higher fuel loads such as dry grasses, and increased ignition sources, including lightning. The magnitude and extent of air quality effects resulting from the wildland fire and prescribed fire are too complex to quantify due to the variability of potential fire management activities and the period of time each could occur.

Fire's Interaction with Areas of Critical Environmental Concern

In many cases, fire is a natural part of the character of an area. Fire could protect and enhance or could destroy the relevant and important values for which each ACEC was originally designated (see the Fish and Wildlife, Special Status Species, Vegetation, Cultural Resources, and Visual Resources sections of Chapter 4). These disturbances, with some exceptions, would often be temporary and short-term, while relevant and important values are assessed on a long-term scale.

Fire's Interaction with Cultural Resources

The understanding of how fire affects cultural resources is necessary in order to analyze the impact of proposed management actions covered in Chapter 4. These interactions are context-dependent and vary by temperature and duration of exposure to heat. Generally, higher temperatures and/or longer duration of exposure to heat increase the potential for damage to cultural resources. Variables that affect temperature and duration include type of fuel, fuel load and distribution, fuel moisture, and soil type and moisture. As a general rule, fire does not affect buried cultural materials. Studies show that even a few centimeters of soil cover (10 cm) are sufficient to protect cultural materials (Oster n.d.). However, there are times when conditions do carry heat below the surface, with the potential to affect buried materials. Examples include stumps, heavy duff, surface logs, and roots that smolder and burn. Fires that burn hot and fast through a site may have less of an effect on certain types of cultural materials than fires that smolder in the duff or logs that burn for a period of time.

Prehistoric and historic resources potentially affected by fire may be inorganic (lithic, ceramics, cans, glass, rock art, etc.), organic (basketry, wooden structures, dendroglyphs, etc.), or certain resources that are important for dating archaeological sites. Generally, organic materials are more at risk as they tend to burn or alter at lower temperatures than inorganic items.

Fire can affect chipped and groundstone tools through changes in morphology rather than in chemistry. Exposure to heat and rapid cooling may cause fracturing, potlidding, crazing, shattering, and changes in color and internal luster, which might reduce an artifact's ability to render information about the past. Deal (n.d.), Buenger (2003), Loyd et al. (2002), Shackley and Dillian (2002), and Waechter (n.d.) provide data concerning the effects of temperature on obsidian, various silicates (including chert), basalt, and sandstone used for

groundstone. Generally, hotter temperatures and longer exposure to fire may affect lithic materials. It may be necessary to take protective measures when these materials are likely to be present.

Different types of clays, inclusions, and manufacturing techniques lead to different effects among distinct ceramic types. Heat damage is not as significant a consideration for this artifact type as it is for others. Generally, structural damage does not occur until temperatures exceed the original firing temperature. The main type of damage noted is to the surface decoration or glaze (Andrews 2004; Rude and Jones n.d.). Pyne et al. (1996) suggest that when fires remain below 500° C and occur within 30 minutes (as is typical for prescribed burns), little damage to artifacts and resources even at shallow depths is likely to occur.

Inorganic historic artifacts are generally safe from fire, but some artifacts such as soldered cans may experience solder melt at temperatures as low as 137° to 177° C (Haecker n.d). Can morphology may be damaged and ceramic artifacts may crackle or spall in lower temperature fires. Other materials, such as machinery utilized in historic mining, are less susceptible. Inorganic structures constructed of sandstone, adobe, cement-mortared fieldstone, firebrick, cinder block or cement aggregate are generally fire-resistant; however, fracturing and spalling may occur at 700° C (Buenger 2003). Wooden sub-structures (common in adobe structures) would be destroyed, possibly compromising the structure as a whole. Historic earthworks such as trails, roads, irrigation ditches, canals, etc. are less sensitive to fire.

Fire has the potential to damage rock art. Though there are no specific temperature guidelines for rock art, fire effects include soot smudging and discoloration from smoke, which obscure the rock art images; degradation of the rock surface from spalling, exfoliation and increased weathering; changes in organic paints due to heat; and damage to rock varnish, which may destroy its potential to date the art (Tratebas 2004; Kelly and McCarthy 2001).

Organic artifacts (e.g., basketry, digging sticks, clothing, textiles) and features (e.g., structures, bow-stave trees, wikiups, culturally modified trees, historic timber structures) made of or containing organics such as wood, leather and hide, or cordage would need protection or treatment before any fire burns through a site containing such items. Bone and shell can sustain some degree of burning without complete destruction (Buenger 2003). Plant and animal residues may survive exposure to fire. Pollen may be destroyed at temperatures greater than 300° C (572° F), but animal proteins survive to 800° C (1472° F).

Determining temporal context is an important part of archaeology. Fire has the potential to adversely impact the dating potential of archaeological data. Fire is likely to destroy organic material such as bone, wood or charcoal that yield radiocarbon dates. Fire can modify or destroy obsidian hydration rinds, thus compromising obsidian hydration dates (Deal n.d.; Buenger 2003; Loyd et al. 2002; Shackley and Dillian 2002; Solomon 2002). Finally, temperatures that exceed original firing temperatures (generally 400° C) would destroy the potential for thermoluminessence dating of ceramics (Rude and Jones n.d.).

Fire's Interaction with Minority and Low-Income Populations

Native American populations in the region of influence (ROI) rely for subsistence on pinyon pine nut harvesting and wood gathering in the woodlands of the Cedar Mesa, Montezuma Creek and areas elsewhere in the Moab Fire District. Nut gathering occurs on an individual basis for food or for selling and trading. Commercial harvesters provide employment to local populations as well. The effects of fire and fire suppression can have an adverse impact on populations who rely on these activities.

Fire's Interaction with Floodplain Resources

Direct effects of fire on floodplains are primarily associated with loss (burning) of vegetation that may be growing on the floodplain. Damage to vegetation may result in the loss of root structure, therefore resulting in reduced channel stability and changes in the stream flow paths and erosion rates. Indirect impacts to

floodplains from fire include the potential for increased sediment transport rates, deposition of soil, and changes to water quality due to upstream watershed events. These changes to floodplain geomorphology due to loss of vegetation, erosion, and sedimentation are likely to increase with fire severity. Impacts to floodplains due to fire are also closely associated with effects of fire on soil and water, as discussed in pertinent sections of this Appendix (**Appendix H**).

Fire's Interaction with Cheatgrass

Wherever cheatgrass dominates, the prevailing FRCC is 3 due to the loss of key ecosystem components such as native species. The presence of cheatgrass in a wildland community extends the time during which the community is susceptible to wildland fire ignitions. In the summer, cheatgrass dries out four to six weeks earlier than perennial grasses and forms a fine-textured, highly flammable fuel. Cheatgrass may also be susceptible to fire one to two months longer in the fall (Paysen et al. 2000).

Cheatgrass seed production can be impacted by prescribed fire when it is applied during the brief period between the purple stage and before seeds shatter (during the green stage, which occurs prior to the purple stage, cheatgrass is difficult to burn). After the purple stage, cheatgrass enters the straw-colored phase (early summer). It would readily burn during this phase, but there is risk of damaging desirable perennial grasses, if present. Studies show that in some fires the majority of cheatgrass seeds in the soil are killed because they tend to be found under shrubs that experience the greatest fire severity; seeds that are not killed would quickly come back and may actually thrive after fire due to the temporary increase in soil nutrients, especially inorganic nitrogen. This rapid nutrient cycling created by fire is necessary for fast-growing annuals like cheatgrass.

Soil moisture plays a role in cheatgrass germination. Therefore, cheatgrass seed can remain in the seedbank and fail to pose a threat to carry fire. Other species may or may not germinate in lieu of cheatgrass and cause their own threats. These include such species as halogeton during the warm seasons and tansy and tumble mustard during the cool seasons.

Fire's Interaction with Tamarisk and Russian Olive

Because it is considered a halophyte, tamarisk is better adapted to persist in an environment of frequent fires than native willows (soil salinity tends to increase following fire). Even though tamarisk foliage has a high salt and water content, making it somewhat inflammable, it builds up senescent woody material within its branches, resulting in increased flammability. This combined with repeated fire disturbance results in impenetrable thickets that shade-out native plants like willows, which require direct sunlight.

It is expected that as tamarisk continues to increase, desirable native communities such as willows and cottonwoods would decrease, resulting in lower biodiversity, inferior wildlife habitat, and shortened fire intervals. Tamarisk does provide streambank stability, however it is to the detriment of natural stream function and processes.

Fire's Interaction with Native American Religious Concerns

The presence of fire prehistorically and historically in the Moab Fire District (Moab Fire District) is an integral part of the landscape and, by association, the traditional belief system of Native Americans. Fire in its natural form, where the occurrence of more but lower severity events are more typical relative to current events, represent a continuation of the cycle of life intertwined in Native American beliefs. Both high- and low-severity fires have the potential to impact physical characteristics of features considered part of Native American religions. These may include destruction of constructed features and changes to visual characteristics of a place important to a Native American belief system. Occurrence of high-severity fires

would increase the chance that these changes would be longer lasting and alter the properties to a greater degree.

Fire's Interaction with Special Status Species

Effects of fire on SSS and their habitat vary widely depending upon the size and intensity of the fire, fuel type, location, topography, season, and duration. High-severity wind and fire can destroy large areas of habitat and make recovery of those habitats a long process. Both low- and high-severity wildland fire can destroy important habitat, displace animal species, and inflict direct mortality. However, low-severity fires have greater potential to enhance and sustain a more natural and beneficial habitat.

Fire's Interaction with Surface Water Resources

Watersheds denuded by wildland fire are subject to accelerated soil erosion, reduced soil moisture, poor plant growth, and loss of other ecosystem components. Wildland fire can also increase water temperature, alter stream channel morphology, affect floodplain functions and values, and increase nutrient and sediment loads to downstream waters. Sediment from accelerated soil erosion and elevated levels of nitrogen and phosphorous from ash are common in water after wildland fires (NWCG 2001b).

Wildland fires reduce vegetation cover, especially in the short term, which intercepts precipitation before it hits the soil surface. The lack of vegetation cover on burned areas could allow precipitation to increase surface runoff, soil loss, and sediment input to surface waters. These sites could also have lower soil-water infiltration rates, which increase surface runoff and decrease soil moisture available for plants. The seasonal timing, size, duration, and severity of fires significantly influence the magnitude of effects.

Burned watersheds generally respond to rainfall faster than unburned watersheds, potentially increasing the potential for flash flooding (Anderson et al. 1976). Water-repellent soils and cover loss could cause flood peaks to arrive faster, rise to higher levels, and entrain significantly greater amounts of bedload and suspended sediments.

Wildland fire could have many effects on stream habitats, including changes in soil erosion, turbidity, sediment loads, and nutrient loads, as well as indirect effects such as changes in dissolved oxygen concentrations and algal growth. Sediment input could reduce the area suitable for spawning or smother fish eggs with fine materials. Removal of streamside vegetation increases water temperatures, increases streambank erosion and the available streamside habitat (Monsen et al. 2004).

Fire's Interaction with Groundwater Resources

Fire can destroy accumulated forest floor material and vegetation, altering infiltration to groundwater by exposing soils to raindrop impact or creating short-term, water-repellent conditions (MacDonald and Huffman 2004). Burned areas could also be more susceptible to erosion, delivering minerals to recharge areas. Effects of fire on groundwater, however, are generally not substantial due to the common depth of useable groundwater (tens to hundreds of feet) in relation to the depth of fire effects on soil and recharge (inches to feet).

Fires interaction with Riparian-wetlands Areas

Natural fires within riparian and aquatic ecosystems have historically been infrequent. Fire disturbance within natural communities has varied from small fires that result in mosaics of vegetation due to high-moisture contents, to large catastrophic fires occurring during drought periods, which alter native ecosystems and processes.

Current fire frequencies have dramatically increased within riparian-wetlands ecosystems, altered through human disturbance, human occupation and fire protection services, as well as through the spread of invasive species such as tamarisk and Russian olive. These altered regimes have resulted in hazardous fuel load accumulations, increases in understory vegetation, and increases in stand density (Wright 1990, Covington and Moore 1994). Catastrophic loss of native riparian communities can occur as a result of intense fires within invasive tamarisk/Russian olive stands. The re-sprouting ability of invasive tamarisk species gives them a long-term ecological advantage over native species following fire recovery (Barrows 1996).

Direct effects of fires within wetland-riparian ecosystems include loss of stabilizing vegetation, thermal cover, wildlife habitat or community diversity (Minshall et al 1989; McMahon and de Clesta 1990; Rinne 1996; Benny and Parker 1998). Indirect effects can include changes in hydrologic functions, streambank erosion, debris flows, woody debris loading, and changes to riparian cover (Swanson and Lienkaemper 1978; Brown 1989; Megahan 1991; Bozek and Young 1994).

Vegetation species within riparian-wetlands ecosystems vary in their survival or recovery following fire. Wetland-riparian grasses and willows can contain sufficient moisture to avoid mortality, sprouting vigorously after fast moving fires. Other species such as Fremont cottonwoods (<7,000' elevations) are extremely susceptible to fire mortality when high temperature fire is in close proximity to tree canopies, roots or trunks. Conversely, narrowleaf cottonwoods, which exist at higher elevations (>5,000-9,000') can tolerate fire and resprout similar to aspen communities.

Please refer to the Vegetation Section (Section 3.3.15) for additional information regarding wetland-riparian ecosystems.

Fire's Interaction with Wild and Scenic Rivers Eligibility

Fire would have impacts to the resources within the eligible area (including vegetation, fish and wildlife, soils and water, etc). Temporary disturbances may occur to visual resources and scenic values, however these effects would be short-term, while outstanding remarkable values are assessed on a long-term scale. High-severity wildland fire would increase the likelihood that these effects would be longer lasting and more destructive to the values identified for protection. Additional discussion of fires interaction with visual resources may be found in the visual resources section of Chapter 4. Fire would likely have little effect on the eligibility or suitability of a river or river segment for Wild and Scenic River designation.

Fire's Interaction with Wilderness Study Areas

In many cases, fire is a natural part of the wilderness character of an area (BLM 1995). Fire would have impacts to the resources within the eligible area (including vegetation, fish and wildlife, soils and water, etc). Temporary disturbances may occur to resources and values, however these effects would be short-term while wilderness values are assessed on a long-term scale. Fire would have likely have little or no effect on the eligibility of a wilderness study area (WSA)

Fire's Interaction with Livestock Grazing

The burning of rangeland can result in an increase in the production of perennial grasses and grazing capacity. This is primarily accomplished by the removal of dense stands of sagebrush and other brush species (BLM 1991). However, a short-term loss of forage may occur following a fire event. A high-severity fire has the potential to extend the time frame and decrease the capability for the generation of forage on rangelands through soil sterilization and loss of the native seed bank. High-severity fires may also increase the potential for undesirable forage species to extent their distribution on a rangeland. The physical destruction of allotment improvements may also occur, restricting use of the allotment until they are rebuilt. The potential for this increases with higher severity fire events, due to increased heat or fire duration around both

combustible and non-combustible allotment improvement infrastructure. Mortality of livestock can occur due to the direct effects of fire. High-severity fires moving quickly would have a greater chance at causing mortality.

Fire's Interaction with Woodlands and Forestry

From a commodity standpoint, wildland fire would be an alternate use of commercial products. Depending on the degree of consumption, burned wood may or may not be useful commercially. Burned trees, if only partially consumed, can still be used for firewood, lumber, pulp and some other fiber products. Wildland fire can completely consume all woodland and forest products making them unavailable for commercial uses. Even low severity fire would consume pine nuts and render some fiber unusable for certain products. In the long term, frequent, low intensity fire would remove competing vegetation and lower branches of conifers, which would eventually produce a higher quality lumber product in the form of larger trees with fewer knots.

Fire's Interaction with Pinyon and Juniper Woodland

Most of the area where pinyon and juniper woodland currently dominate was historically characterized by fires burning every 15 to 50 years (Kitchen 2004; Miller and Tausch 2001). Below 7,000 feet elevation, these woodlands are characterized by dense closed stands of pinyon and juniper woodland, scarce understory, and high potential for cheatgrass invasion following fire, placing them in FRCC 3. Additionally, prolonged drought has predisposed many pinyon pine stands in the Monticello area to insect infestations, primarily several *Ips* species of beetles, whose larvae girdle the tree, resulting in tree mortality. This has increased the fuel load. Above 7,000 feet, these woodlands are characterized by encroached pinyon and juniper woodland. Because the woodlands are less dense than FRCC 3 and have a lower risk of cheatgrass invasion following fire, they are considered FRCC 2.

Old-growth pinyon and juniper woodland is estimated to be less than 10 percent of the current area classified as pinyon and juniper woodland (Miller and Tausch 2001). Old-growth pinyon and juniper woodland is often restricted to fire-safe habitats (e.g., steep, dissected, and rocky terrain, and in thin substrates along ridges) where they are considered climax. Fire frequency in these climax pinyon and juniper woodland sites has been estimated at 200 to over 300 years for old-growth pinyon and juniper woodland (Romme and Muck 2002; Goodrich and Barber 1999) and would be classified as Fire Regime V.

Because it is a non-sprouter and is thin-barked when young, fire was the major historical cause of destruction for young juniper trees. However, adult juniper trees in mature stands are difficult to burn since the understory is usually sparse (older trees succumb to fire when 60 percent of the crown is scorched). Pure juniper stands need 35 mph winds or greater to carry fire through the canopy (Winward et al. 1997). When they do ignite, these closed forests often support high intensity, stand-replacing crown fires covering large landscapes that can endanger firefighters and the general public (Keyes et al. 2003). It is generally agreed that fire was the most important natural disturbance that impacted distribution of juniper and/or pinyon and juniper woodland before the introduction of livestock in the 19th century (Miller and Rose 1999). Burkhardt and Tisdale (1976; Tirmenstein 1999) concluded that fire frequencies of 30 to 40 years would help keep juniper from expanding into mountain big sagebrush communities.

Fire's Interaction with Salt Desert Shrub Vegetation Type

Fire frequency has been estimated at 35 to more than 300 years and is historically classified as Fire Regime V. Most species of this type are not fire adapted and are considered climax the exception is threadleaf rabbitbrush (which is sensitive to competition when growing with other species but may dominate a post-burn site). Because rabbitbrush easily establishes from seed after fire, it is considered fire adaptable. Due to the risk of losing key ecosystem components and greatly increased fire regimes as invasive annual grasses

dominate, salt desert shrub is typically classified as FRCC 2 or FRCC 3, depending on the relative departure from its historic fire regime (**Table 3.1**).

A lack of continuous cover (fuels) made fire rare to non-existent in salt desert shrub communities. Historically, these types did not burn often enough or in large enough patches to support dominance of fire-adapted plants. Most salt desert shrub species do not readily regenerate following fire. Further expansion of invasive species following fire is a major concern for salt desert shrub communities.

Fire's Interaction with Sagebrush Vegetation Type

Pre-settlement, stand-replacing fire frequencies for low-elevation sagebrush are estimated to vary from 60 to 110 years (Fire Regime II) (Whisenant 1990; Peters and Bunting 1994; Miller et al. 2001). Because of the high risk of losing key ecosystem components following fire due to cheatgrass invasion on the Moab Fire District, 100 percent of the sagebrush type is in a FRCC 3 condition.

Wyoming and basin big sagebrush do not sprout after fire and low- to high-intensity fires kill most plants. Generally, the herbaceous understory composition does not determine the intensity and severity of wildland fires; sagebrush itself is the primary fire carrier. The high canopy cover associated with late, mature sagebrush stands likely facilitated historic stand-replacing fires. A sagebrush stand with a robust understory of native grasses and forbs would generally be replaced after fire with native perennial grassland, which would have eventually progressed through seral stages to sagebrush communities. Although sagebrush does not re-sprout with fire, it is a prolific seeder (a healthy, mature plant may produce 500,000 seeds), and if a seed source is present, re-establishment is quite rapid and dominance would occur within 20 years (Winward et al. 1997).

In the absence of fire, sage canopy cover increases. According to Winward (2004) the maximum canopy cover for sagebrush is 30 percent; anytime canopy cover reaches more than 15 percent, the sage individuals compete with each other. Because sagebrush is a relatively short-lived species, approximately 60 years, in the absence of fire there is no recruitment of younger individuals. Consequently, the stand has the tendency to become old and decadent.

Fire's Interaction with Mountain Shrub Vegetation Type

Stand-replacing fire frequency ranges from 25 years to 100 years in mountain shrub (Gruell and Loope 1974), though return intervals may vary widely with changes in elevation, aspect, site moisture, and the associated forest or woodland type. Mountain shrubs are classified as Fire Regimes I (e.g., Gambel oak), II (e.g., mixed mountain shrub or maple), and IV (e.g., mountain mahogany), depending on the dominant species and the site. The FRCC also varies depending on the dominant species and the understory. Mountain shrub communities at lower elevations (less than 6500 feet) are classified as FRCC 3 due to the high risk of cheatgrass invasion following fire. On the Moab Fire District, three percent of the mountain shrub vegetation type is in a FRCC 1, whereas 97 percent is in a FRCC 2. Some species, like oak, readily re-sprout after fire because they reproduce vegetatively. Others, like buckbrush, have specialized seed, which enable them to readily invade burns (Knight 1994), while some are intolerant of fire (e.g., curl-leaf mountain mahogany, mountain big sagebrush, and bitterbrush). This may cause a temporary shift in the species composition, however most mountain shrub communities generally recover rapidly following wildland fire and are considered to be fire tolerant.

In general, fire suppression in this vegetation type has shifted the seral balances toward greater representations of climax vegetation and older age classes, with a corresponding loss of early seral vegetation and younger age classes. Overall wildlife quality has declined, while acreage of decadent stands and the attendant fuel loadings have increased.

Fire's Interaction with Grassland Types

Perennial grasses respond vigorously to fires of various intensities by re-sprouting following fire. Fast, high-intensity fires have lower severity that seldom causes substantial mortality to native perennial bunchgrasses. Slow-backing fires have a greater severity; mortality to native perennial bunchgrasses may be high under these conditions. With most natural ignitions, the predominant fire spread would be as a fast-moving head fire.

Fire's Interaction with Mixed Conifer Vegetation Type

Fire frequencies in mixed conifer range from 100 to 300 years. These forests are characterized by a combination of understory and complete stand-replacement fire regimes (Arno 2000). Mixed conifer is classified as Fire Regime III or IV depending on the elevation and related dominant species. Fire Regime III would characterize conifer-shrub communities occurring at lower elevations that have pure conifer stands. Due to the longer historic fire return intervals and well-functioning vegetation attributes, mixed conifer is classified as FRCC 1 when associated with Fire Regime IV, and FRCC 2 when associated with Fire Regime III.

In recent years prolonged drought has predisposed species like Douglas-fir to insects (bark beetles) resulting in an increased fuel load. Dead woody fuels are accumulating with the greatest fuel loadings occurring on the most productive sites, which are predominantly stand-replacement fire regimes. This mixed-severity fire regime often results in a mosaic pattern of stand structure and fuels. Past stand burn mosaics tend to increase the probability that subsequent fires would also burn in a mixed pattern (Arno 2000). When fires do occur, they tend to be intense and often sterilize the ground, with some 30-year-old fire scars showing very little vegetation returning.

Fire's Interaction with Riparian Vegetation

Historically, fire in these riparian communities would have been infrequent, and varied from small size, with highly mosaic burn patterns as a result of the higher moisture content generally present in riparian areas/species, to stand replacing burns likely to have occurred only in extreme drought periods. Willow species typically sprout vigorously following a fast-moving fire because slow-moving fires are generally more damaging, presumably due to greater heat transfer to root crowns. The riparian vegetation type is classified as FRCC 3 mainly as a result of tamarisk invasion. Because of its high water and salt content and extensive root system, fire is ineffective in the control of tamarisk and may actually encourage its growth. Light (low temperature) fire encourages tamarisk to re-sprout and become even denser, whereas hot fire would sterilize the surrounding soil so that desirable shrubs and herbaceous species are unable to get established (Francis 2004).

Fire's Interaction with Fisheries and Wildlife Resources

Effects of fire on fisheries and wildlife and their habitat vary widely depending upon the size and intensity of the fire, fuel type, location, topography, season, and duration. High-severity wind and fire can destroy large areas of habitat and make recovery of those habitats a long process. Both low- and high-severity wildland fire and planned treatments can directly and indirectly impact fisheries and wildlife species or populations through habitat loss or alteration, displacement, or mortality. Of particular concern is downstream mortality from fire ash contributions within streams where SSS are present, and also from direct intake of fish species during drafting and pumping from water sources. However, low-severity fires have greater potential to enhance and sustain a more natural and beneficial habitat.

Fire's Interaction with Soil Resources

Fires affect soils primarily by consuming live or dead vegetation cover, litter, and organic soil layers and the resulting loss of soil stabilizing organic material such as root structure. Fire may also alter soil chemical properties, post-fire soil temperatures, microorganism populations and their activity rates, erosion rates, increase nutrient availability, sterilize soil, and increase soil water repellency (NWCG 2001b; Centers for Water and Wildland Resources 1996). The degree of short-term effect on these soil characteristics depends on amount of vegetation, and thickness and density of litter and organic layers. Soil texture and type, soil moisture at the time of burning, and depth and duration of heat penetration into soil horizons are also critical factors (NWCG 2001b). Soil water repellency (hydrophobicity) from severe fire may substantially increase runoff and erosion, but repellency has not been found to persist for more than one year after a wildland fire (MacDonald and Huffman 2004).

The single most important factor in soil health (topsoil and nutrient loss) is the timing of vegetation recovery with the severity of precipitation rates. The potential for significant post-fire erosion also depends on the soil type in the area of the burn, the amount of residual vegetation and organic matter, the rate and amount of vegetation recovery, and slope. If post-fire rains are relatively gentle, some nutrients released by a fire may be reabsorbed; however, these nutrients are generally lost during severe, erosive rainfall.

Soil microorganisms (biological crusts) may be affected by heating from fire, as well as surface disturbances that compact or disaggregate these features. Disturbance of biological crusts can increase the potential for both water and wind erosion.

Fire's Interaction with Recreation

Fires can partially or completely destroy developed facilities and pose concerns to public safety. Fires can temporarily change the landscape in a manner that degrades visual quality and recreation opportunities and experiences. The landscape may be blackened, or smoke could limit visibility. During periods of high fire danger and wildland fire activity, recreation use may be restricted or prohibited on large areas of public lands to protect public safety. Fires may expose areas to increased traffic from scarification of tracks by fire personnel during suppression actions or off-highway vehicle (OHV) users using fire lines as new trails.

Fire's Interaction with Visual Resources

Areas where wildland and prescribed fires have occurred may display short- or long-term visual changes depending on the severity of a fire. However, these impacts are a natural part of the environment. The severity of wildland fire can have an impact on an area by making it more susceptible to visible indirect impacts such as erosion or soil sterilization.

Fire's Interaction with Paleontological Resources

Fire can render overlying strata more susceptible to erosion, which is more pronounced in areas where high-severity fires have occurred. Intense fire could also cause spalling and shattering of surface resources. Fire can make the overlying strata or the resource more susceptible to erosion. Erosion following fire is generally more pronounced in areas where higher severity fires have occurred.

Fire's Interaction with Social and Economic Resources

The effects of fire in general to socioeconomic resources may include loss of potential income from harvesting of forest products; short-term displacement of game animals, resulting in decreased animal harvest; temporary loss of use of grazing allotments; permanent loss of range improvements such as water troughs, fences, and corrals; and increased costs to feed livestock and replace range improvements. The

economic impact of fire for grazing would likely be negative in the short term but can have positive economic returns due to a decrease in woody plant materials and an increase in the quality and quantity of forage for livestock and game animal consumption. Other examples of ways that fire interacts with local socioeconomic conditions may include temporary or permanent displacement from places of employment or residence, loss of personal safety and security, loss of property or reduction in property value, altered transportation patterns, health impacts due to impaired air quality, reduction in scenic quality, impacts to tourism, and direct costs to agencies tasked with suppression (which may be realized as income to firefighters and related support personnel).

Fire's Interaction with Wild Horses and Burros

Fires would likely pose a temporary loss of resources such as forage and watering areas. High-severity fires in or around any of the four herd management areas (HMAs) could cause displacement of herds and might force the herds to seek food, water, and shelter outside of the HMAs. High-severity fires have the potential to extend the time frame and decrease the capability for the generation of forage on HMAs through soil sterilization and loss of the native seed bank. Fire events may also increase the potential for undesirable forage species to extend their distribution on an HMA. Fires could benefit wild horses and burros by modifying the vegetative community to more appropriate forage. Mortality of horses or burros can occur due to the direct effects of fire.

Fire's Interaction with Wilderness Characteristics

In many cases, fire is a natural part of the wilderness character of an area (BLM 1995). Fire would have impacts to the resources within the eligible area (including vegetation, fish and wildlife, soils and water, etc). Temporary disturbances may occur to resources and values; however, these effects would be short-term while wilderness values are assessed on a long-term scale. Fire would likely have little or no effect on the wilderness characteristics of an area.

APPENDIX H
Tribal Governments and Other Interested Native American Groups

Tribal Governments and Other Interested Native American Groups

Southern Ute Tribal Council	Navajo Aneth Chapter	Santa Clara Pueblo
Ute Mountain Ute Tribe	Navajo, Mexican Water Chapter	Santa Ana Pueblo
The Ute Indian Tribe	Navajo, Navajo Mountain Chapter	San Juan Pueblo
Shoshone Business Council	Navajo, Dennehotso Chapter	San Ildefonso Pueblo
Fort Hall Business Council	Navajo, Red Mesa Chapter	San Felipe Pueblo
Shoshone-Bannock Tribes	Navajo, Oljato Chapter	Sandia Pueblo
Duck Valley Indian Reservation	Navajo Utah Commission	Projoaque Pueblo
Northwestern Band of Shoshone Nation	Paiute Tribe of Utah	Picuris Pueblo
Ely Colony Council	Hopi Tribe	Nambe Pueblo
Tribal Council of the Te-Moak	San Juan Southern Paiute Tribe	Laguna Pueblo
Western Shoshone	Kaibab Paiute Tribe	Jemez Pueblo
Duckwater Shoshone Tribe	Moapa Paiute Business Council	Isleta Pueblo
Goshute Indian Tribe	Cochitli Pueblo	Acoma Pueblo
Skull Valley Band of Goshute Indians	Taos Pueblo	Tesuque Pueblo
Santo Domingo Pueblo	Zuni Pueblo	Ysleta del Sur Pueblo
Zia Pueblo		

APPENDIX I
USFWS BIOLOGICAL OPINION TERMS AND CONDITIONS

NOTE: *These terms and conditions only apply to species and habitats found within the Moab fire district.*

INCIDENTAL TAKE STATEMENT

Section 9 of the Act, as amended, prohibits take (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering (50 CFR § 17.3). "Harass" is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR § 17.3).

No exemption from Section 9 of the Act is granted in this biological opinion. BLM's implementation of the Land Use Plan Amendment and Five Fire Management Plans is likely to adversely affect listed species. The likelihood of incidental take, and the identification of reasonable and prudent measures and terms and conditions to minimize such take, will be addressed in project level, and possibly programmatic level consultations. Any incidental take and measures to reduce such take cannot be effectively identified at the level of proposed action because of the uncertainty of wildland fire, broad geographic scope, and the lack of site specific information. Rather, incidental take and reasonable and prudent measures may be identified adequately through subsequent actions subject to section 7 consultations at the project and/or programmatic scale.

Even though actual take levels are unquantifiable, take will occur through harm and harassment. Therefore, we are providing the following Reasonable and Prudent Measures (RPMs) and Terms and Conditions to minimize overall take. Implementation of these RPMs and Terms and Conditions during project planning will also expedite site-specific section 7 consultation.

REASONABLE AND PRUDENT MEASURES

The U.S. Fish and Wildlife Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of black-footed ferret, Canada lynx, Utah prairie dog, Southwestern willow flycatcher, California condor, bald eagle, Mexican spotted owl, desert tortoise, Colorado pikeminnow, razorback sucker, humpback chub, bonytail, Virgin River chub, woundfin, Lahontan cutthroat trout, dwarf bear-poppy, Shivwits milk-vetch, Holmgren milk-vetch, Kodachrome bladderpod, San Rafael cactus, Siler pincushion cactus, shrubby reed-mustard, Uinta Basin hookless cactus, Ute ladies'-tresses, and last chance townsendia:

1. The Bureau of Land Management shall implement measures to minimize mortality or injury of the black-footed ferret, Canada lynx, Utah prairie dog, Southwestern willow flycatcher, California condor, bald eagle, Mexican spotted owl, desert tortoise, Colorado pikeminnow, razorback sucker, humpback chub, bonytail, Virgin River chub, woundfin, Lahontan cutthroat trout, dwarf bear-poppy, Shivwits milk-vetch, Holmgren milk-vetch, Kodachrome bladderpod, San Rafael cactus, Siler pincushion cactus, shrubby reed-mustard, Uinta Basin hookless cactus, Ute ladies'-tresses, and last chance townsendia due to proposed project activities; without placing firefighter personnel at risk.

2. The Bureau of Land Management shall implement measures to minimize harm to the black-footed ferret, Canada lynx, Utah prairie dog, Southwestern willow flycatcher, California condor, bald eagle, Mexican spotted owl, desert tortoise, Colorado pikeminnow, razorback sucker, humpback chub, bonytail, Virgin River chub, woundfin, Lahontan cutthroat trout, dwarf bear-poppy, Shivwits

milk-vetch, Holmgren milk-vetch, Kodachrome bladderpod, San Rafael cactus, Siler pincushion cactus, shrubby reed-mustard, Uinta Basin hookless cactus, Ute ladies'-tresses, and last chance townsendia through destruction of their suitable or designated critical habitats; without placing firefighter personnel at risk.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Bureau of Land Management must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary. The following terms and conditions apply to all species covered under this biological opinion, and are to be implemented in addition to the Applicant Committed Measures described in the Proposed Action:

General Terms and Conditions

1. To implement Reasonable and Prudent Measure 1:
    a. Before the beginning of each fire season, a threatened and endangered species education program will be presented to all personnel anticipated to be within federally listed species habitats during suppression activities. This program will contain information concerning the biology and distribution of listed species throughout the Fire Management Plan Planning Area, their legal status, fire suppression goals and restrictions within suitable and critical habitat. Following training, each individual will sign a completion sheet to be placed on file at the local BLM office.
    b. All project employees (including fire fighting personnel) shall be informed as to the definition of "take", the potential penalties (up to $200,000 in fines and one year in prison) for taking a species listed under the Endangered Species Act, and the terms and conditions provided in this biological opinion.
    c. A qualified Resource Advisor will be assigned to each wildfire that occurs in or threatens listed species habitat. The Resource Advisor's role is help define goals and objectives for fire suppression efforts and informs the Incident Commander (IC) of any restrictions, but does not get involved in specific suppression tactics. Resource advisors shall oversee fire suppression and suppression rehabilitation activities; to ensure protective measures endorsed by the Incident Commander are implemented.
    d. For pre-planned projects, the Authorized Officer shall designate an individual as a contact representative who will be responsible for overseeing compliance with the Applicant Committed Measures and terms and conditions contained in this biological opinion, and providing coordination with the U.S. Fish & Wildlife Service. The representative will have the authority to halt activities which may be in violation of these conditions, unless human health and safety or structures are at risk, in which case the Incident Commander overseeing the wildfire suppression actions will have the final decision making authority.
    e. Project related personnel shall not be permitted to have firearms or pets in their possession while on the project site. The rules on firearms and pets will be explained to all personnel involved with the project.
    f. If available, maps shall be provided to local dispatch centers showing general locations of listed species. Local BLM or UDWR biologists shall be consulted for specific locations if fires occur within or near the general locations delineated on the map.
    g. Conduct pre- and post- monitoring of the response to the treatments by federally listed species.
2. To implement Reasonable and Prudent Measure 2:

a. Fingers or patches of unburned vegetation within burned areas shall not be burned out as a fire suppression measure unless required for safety concerns.
b. Emergency Stabilization and Rehabilitation efforts must focus on areas in the spread of non-native species particularly within suitable habitat for federally listed species. The specific seed mix for use within suitable habitat for federally listed and sensitive species will be determined through coordination and section 7 consultation with the U.S. Fish and Wildlife Service.
c. Recovery of vegetation shall be monitored, including establishment and monitoring of paired plots, inside and outside of the burned area unless the BLM and the Service concur that monitoring is not required.
d. Site-specific projects under the Land Use Plan Amendment and Fire Management Plans shall specifically recognize the primary constituent elements necessary for functional critical habitats to ensure consistent application of measures to maintain these features in all implementation activities.
e. The effectiveness of suppression activities and threatened and endangered species conservation measures shall be evaluated after a fire in coordination with the U.S. Fish and Wildlife Service. Procedures shall be revised as needed.
f. Conduct pre- and post-monitoring of threatened or endangered species' habitat conditions.
g. Temporarily close off highway vehicle (OHV) trails after a fire event until vegetation and soils recover.
h. Obscure decommissioned trails and roads and illegal OHV trails after a fire event to prevent re-opening.

Black-Footed Ferret and Utah Prairie Dog

1. To implement Reasonable and Prudent Measures 1 and 2:
   a. Wildfires will be suppressed before they reach a prairie dog colony[1] or after they exit a colony. Active suppression efforts will not occur within a colony unless human health and safety or structures are at risk.
   b. Only hand lines will be authorized within colonies.
   c. Normally, only water shall be used on fires that occur within prairie dog colonies. If the fire Incident Commander decides that the situation requires use of chemical retardants in order to protect life and property, they may be used. The chemical composition will be supplied to the U.S. Fish and Wildlife Service during formal consultation.
   d. All vehicles shall stay on existing roads within colonies, except as stated in (e). Storage of equipment and materials shall not occur within ¼ mile of colonies. Vehicle maintenance shall not occur within these areas.
   e. If the situation would require vehicles to travel cross country within prairie dog colonies, this activity shall be cleared by an on-site biologist prior to occurring. Vehicles shall not exceed a speed of 10 miles per hour (cross country) in occupied Utah prairie dog colonies unless a higher speed is determined to be prudent for safety reasons.
   f. Within colonies, precautions shall be taken to ensure that contamination of the site by fuels, motor oils, grease, etc. does not occur and that such materials are contained and properly disposed of off-site. Inadvertent spills of petroleum based or other toxic materials shall be cleaned up and removed immediately.
   g. Camps associated with fire suppression activities shall be situated outside suitable habitat.

[1] "Prairie dog colony" refers to any occupied Utah prairie dog colony or any prairie dog colony within the range of the black footed ferret.

h. If a dead or injured Utah prairie dog is located, initial notification must be made to the Service's Division of Law Enforcement, Cedar City, Utah at telephone 435-865-0861 or to the Cedar City office of the Utah Division of Wildlife Resources at telephone number 435-865-6100. Instruction for proper handling and disposition of such specimens will be issued by the Division of Law Enforcement. Care must be taken in handling sick or injured animals to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible state.

i. For the black-footed ferret, avoidance and minimization measures that should be followed are included within the *Cooperative Plan for the Reintroduction and Management of Black-Footed Ferrets in Coyote Basin, Uintah County, Utah* published by the Utah Division of Wildlife Resources in September, 1996. These measures may be updated based on the best available scientific data as it becomes available.

Canada Lynx

1. To implement Reasonable and Prudent Measures 1 and 2:
   a. The Lynx Conservation Assessment and Strategy (LCAS) shall be incorporated into project plans as appropriate, and any applicable standards, guidelines, and objectives specifically related to linkage habitat would be followed during implementation of fire management activities.

Southwestern willow flycatcher

1. To implement the Reasonable and Prudent Measure 1:
   a. Prior to planned project activities, action areas will be surveyed according to U.S. Fish and Wildlife Service protocol.
   b. Except where fires are active in occupied habitat, minimize unnecessary low-level helicopter flights during the breeding season (April 1 – September 30). If safety allows, approach bucket dip sites at a 90-degree direction to rivers to minimize flight time over the river corridor and occupied riparian habitats. Locate landing sites for helicopters at least ¼ mile from occupied flycatcher habitat unless human safety or property dictates otherwise.
   c. Minimize use of chainsaws or bulldozers to construct fire lines through occupied or suitable habitat except where necessary to reduce the overall acreage of occupied habitat or other important habitat areas that would otherwise be burned.
   d. Implement activities to reduce hazardous fuels or improve riparian habitats (prescribed burning or vegetation treatments) within occupied or unsurveyed suitable habitat for southwestern willow flycatchers only during the non-breeding season (October 1 to March 31).
2. To implement Reasonable and Prudent Measure 2:
   a. Riparian fuel reduction actions shall be considered as experimental, and initially conducted only in unoccupied habitats until the success and ramifications are better understood. Efficacy of these actions as a fire management tool, and effects on bird habitat quality, shall be tested in a scientifically explicit, controlled fashion (Appendix L in U.S. Fish and Wildlife Service 2002).
   b. In occupied or suitable flycatcher habitat, creation of fire breaks might render the habitat unsuitable (Appendix L in U.S. Fish and Wildlife Service 2002). Therefore, fire breaks shall first be conducted only in unoccupied sites, outside of proposed critical habitat, or within the following situations, as long as human safety and property allows:
      i. Along grass-edged roadways;

ii. Where large areas of fire-prone vegetation, unsuitable for flycatcher breeding, separate a breeding site from potential ignition sources or high frequency fire areas; and
iii. Between agricultural "burn areas" and flycatcher sites to prevent brush-pile fires from spreading into breeding sites (Appendix L in U.S. Fish and Wildlife Service 2002).

c. Controlled burns shall be avoided in occupied habitat and considered only as experimental management techniques if dealing with suitable unoccupied habitat (Appendix L in U.S. Fish and Wildlife Service 2002).
d. Fires in occupied habitat and adjacent buffer zones shall be rapidly suppressed.

California Condor and Bald Eagle

1. To implement the Reasonable and Prudent Measure 1:
   a. If California condors or bald eagles are found inhabiting (nesting) within the action area, a buffer of 1 mile surrounding the nesting area will be designated as non-treatment zones (Romin and Muck 2002).
   b. Open water sources such as "pumpkin" inflatable water storage tanks will be covered when not in use.

Mexican Spotted Owl

1. To implement Reasonable and Prudent Measure 1:
   a. Pre-planned fuels reduction projects within Mexican spotted owl primary activity centers (PAC) shall be designed to enhance habitat requirements for the Mexican spotted owl as well as for the valuable prey species they rely upon. Any project within a PAC requires additional section 7 consultation.
2. To implement Reasonable and Prudent Measure 2:
   a. Fire suppression shall be considered for wildfires in PACs.

Desert Tortoise

1. To implement Reasonable and Prudent Measure 1:
   a. Campsites, aircraft landing and fueling areas, staging areas, and helicopter dip sites shall either be located outside of desert tortoise habitat or cleared by the Resource Advisor or tortoise biologist.
   b. Hand crews shall be used to build and defend fire lines. Engines can be used for support from roads. Wherever practical, fire engines must remain on roads and lay fire hose only along hand lines.
   c. The Resource Advisor, tortoise biologist, or biological monitor (someone who is either qualified with a biological background or has been trained by the Resource Advisor) ensures that tortoises, burrows, and shelter sites are protected or avoided by walking in front of engines, tracked vehicles, or other fire fighting related vehicles within the critical habitat.
   d. On-road travel shall be restricted to speeds (25 mph) that allow drivers to distinguish obstacles such as a rocks and tortoises.
   e. Firefighters shall note locations and condition of desert tortoises and carcasses, but must not attempt to touch or move them unless the animal is in immediate danger from fire or is on a road that is receiving traffic use. Firefighters shall be encouraged to provide notes to tortoise Resource Advisor or tortoise biologist.
   f. Garbage and trash must not be left in project vicinity.
2. To implement Reasonable and Prudent Measure 2:

a. Wildfires that occur in tortoise habitats shall be suppressed as soon as possible due to the habitat changes associated with wildfire that alter food availability and the availability of plants for protection from thermal extremes and predators.
b. Tracked vehicles have long-lasting impacts on desert soils and vegetation, and therefore their use shall be restricted to improving roads or constructing lines where a short distance of line might save a large area from fire.
c. Rehabilitation of suppression related actions must be coordinated with the Resource Advisor to avoid further impacts. For example, the rehabilitation of lines created on the sensitive desert soils may cause more damage than the initial suppression actions. Obliterate vehicle tracks at the point they leave existing roads to prevent those tracks from becoming future trails and roads.

Lahontan Cutthroat Trout

To implement Reasonable and Prudent Measures 1 and 2, we recommend full implementation of the Memorandum of Understanding (MOU) between the BLM, Service, Utah Division of Wildlife Resources, and Utah Division of Forestry, Fire and State Lands. The purpose of this MOU is to provide a framework of cooperation for interagency fire management between the Bureau of Land Management (Salt Lake and Elko Field Offices), U. S. Fish and Wildlife Service (Region 1 and Region 6), and the Utah Department of Natural Resources (Division of Wildlife Resources and Division of Forestry, Fire, and State Lands), within the Bettridge and Morrison Creek drainages of the Pilot Mountains. This MOU contains Standard Operating Procedures to be used for the protection of the threatened Lahontan cutthroat trout and their habitat during fire suppression and rehabilitation activities in these two drainages. The Standard Operating Procedures developed through the MOU are listed below.

1. Standard Operating Procedures for Suppression Activities:
    a. Avoid the application of retardant or foam within 600 feet of the stream channel or waterway. With the exception of restricting the use of retardants and foams to 600 feet from stream channels or waterways, aerial application and use of retardants and foams will be consistent with national policy guidelines established by the National Office of Fire and Aviation, as amended.
        i. The exceptions to this procedure are:
            1. When alternative line construction tactics are not available due to terrain constraints, congested area, life and property concerns or lack of ground personnel, it is acceptable to anchor the foam or retardant application to the waterway. When anchoring a retardant or foam line to a waterway, use the most accurate method of delivery in order to minimize placement of retardant or foam in the waterway (e.g., a helicopter rather than a heavy air tanker).
            2. Deviations from these guidelines are acceptable when life or property is threatened and the use of retardant or foam can be reasonably expected to alleviate the threat.
            3. When potential damage to natural resources outweighs possible loss of aquatic life, the unit administrator may approve a deviation from these guidelines. This determination will be made on a case-by-case basis by the Field Manager or the designated Field Manager representative in consultation with the Fire Management Officer, Incident Commander, Resource Advisor, and BLM Field Office Fisheries Biologist through development of the Wildfire Situation Analysis.
    b. Do not draft fill engines that have surfactant foam mixes in tanks, directly from the stream channel.

c. A containment barrier will be constructed around all pumps and fuel containers utilized within 600 feet of the stream channel to prevent petroleum products from entering the stream. The containment barrier will be of sufficient size to contain all fuel being stored or used on site.
d. Do not dump engines filled with surfactant foam mixes within 600 feet of the stream channel.
e. Do not conduct retardant mixing operations within 600 feet of the stream channel.
f. Stream flow will not be impounded or diverted by mechanical or other means in order to facilitate extraction of water from the stream for fire suppression efforts.
g. The intake end of the draft hose will be screened to prevent entrainment of fish species. Screen opening size will be a maximum of 3/16 inch.
h. Before each fire assignment in the Elko and Salt Lake Districts, all fire suppression equipment utilized to extract water from stream or spring sources (i.e. helicopter buckets, draft hoses and screens) will be thoroughly rinsed to remove mud and debris and disinfected with a chlorine solution (one part bleach to 32 parts water, or stronger). Rinsing equipment with disinfectant solutions will not occur within 600 feet of natural water sources (streams or springs).
i. Only water sources identified as specified dip sites will be used to control and/or contain fire with the Bettridge and Morrison Creek drainages. Water may be obtained from the pond on the TL Bar Ranch (Donner Springs). The coordinates of this dip site are: N 41 01 22.6 X W 113 58 04.3.
j. Water extraction from streams currently occupied by LCT (including beaver ponds) is restricted.
k. Fire control lines will not cross or terminate at the stream channel. Control lines will terminate at the edge of the riparian zone at a location determined appropriate to meet fire suppression objectives based on fire behavior, vegetation/fuel types, and fire fighter safety.
l. Access roads and/or fords will not be constructed across the stream channel.
m. New roads or mechanical fire control lines will not be constructed and existing roads will not be improved within 600 feet of the stream channel unless authorized by the Field Manager or the designated Field Manager representative.

2. Standard Operating Procedures for Rehabilitation Measures:
   a. An assessment of the impacts of fire and fire suppression activities to LCT habitat will be completed by an interdisciplinary team of resource specialists, including the Elko and Salt Lake BLM Field Office Fisheries Biologists and Hydrologists, representatives from the Service, representatives from the Utah Division of Wildlife Resources, and representatives from Utah Division of Forestry, Fire and State Lands. Based on this assessment, appropriate rehabilitation measures will be identified consistent with Departmental Emergency Stabilization and Rehabilitation Handbook guidance, including but not limited to some or all of the following:
      i. Where determined necessary by the interdisciplinary review team, a post-fire contingency plan for immediate and effective protection, rescue, and rehabilitation of, and minimization of risk of injury to LCT populations and their habitat will be created.
      ii. Close the affected watershed and/or stream channel to livestock grazing for two or more growing seasons to allow for recovery of riparian vegetation. The appropriate length of time for closure to livestock grazing will be determined on a site specific basis based on resource data, scientific principles, and experience. Site specific monitoring will determine when resource objectives have been achieved on specific burned areas. Site specific vegetative recovery objectives will be identified by the

interdisciplinary review team and included in the Notice of Closure to Livestock Grazing issued in accordance with 43 CFR 4110.3-3.

iii. Reconstruct damaged fences and/or construct new fences to ensure protection of the stream channel from grazing. In Wilderness Study Areas, fence construction and/or reconstruction will be in accordance with Interim Management Policy Guidelines.

iv. Monitor stream and riparian habitats to allow for comparison of post-fire impacts to existing baseline information.

v. Where determined necessary by the interdisciplinary review team, install appropriate erosion control structures (i.e. erosion matting and/or straw bale structures, straw wattles, etc.) to mitigate overland flow effects to the stream channel.

vi. Where determined necessary by the interdisciplinary review team, reseed and/or replant riparian/wetland areas with native plant species to facilitate re-establishment of perennial vegetation, minimize potential channel erosion, and allow for recovery of riparian functionality.

vii. Rehabilitate improved roads located within 600 feet of the stream channel as determined necessary to mitigate potential sedimentation into the stream channel.

viii. Implement appropriate integrated noxious weed control measures where determined necessary by the interdisciplinary review team and/or where determined appropriate through post-fire monitoring.

ix. Where determined necessary by the interdisciplinary review team, initiate temporary road closures for at least one year to protect and stabilize burned areas and associated watersheds. An interdisciplinary assessment will be conducted after the first year to determine if road closures are still needed.

Threatened or Endangered Plants

1. To implement Reasonable and Prudent Measure 1:
   a. Do not allow wildland fire use or prescribed fire activities within suitable, occupied habitat.
   b. When feasible (human life or property are not at risk) fire breaks shall be constructed down slope of plants and populations; if fire breaks must be sited upslope, buffers of 100 feet minimum between surface disturbances and plants and populations will be incorporated.
2. To implement Reasonable and Prudent Measure 2:
   a. Do not allow wildland fire use or prescribed fire activities within suitable, occupied habitat.
   b. For pre-planned projects within known or potential habitat, site inventories shall be conducted to determine habitat suitability prior to initiation of project activities, at a time when the plant can be detected, and during appropriate flowering periods, and will include, but not be limited to, plant species lists and habitat characteristics.
   c. For riparian/wetland-associated species, e.g. Ute ladies-tresses, avoid loss or disturbance of riparian habitats:
      i. Ensure that water extraction or disposal practices do not result in change of hydrologic regime.
   d. Limit disturbances to and within suitable habitat by staying on designated routes.
   e. Limit new access routes created by the project.
   f. Place signing to limit ATV travel in sensitive areas.
   g. All disturbed areas will be re-vegetated with native species comprised of species indigenous to the area.

Shivwits Milk-Vetch

1. To implement Reasonable and Prudent Measures 1 and 2:
    a. During wildland fire events, do not suppress wildland fire within the extremely sensitive soils (Chinle formation) unless another threatened or endangered species (i.e. desert tortoise), or life or property are at risk.
    b. Do not seed within the Chinle formation.
    c. Do not rehabilitate areas impacted by suppression activities, such as hand lines, areas that may have been trampled, or areas that may have been impacted by fire retardant drops.
    d. The effects of any fire or suppression activity within suitable habitat for the Shivwits milk-vetch will be monitored as these measures have not been tested. These measures are based on the sensitive nature of the soils that support the plant. Up-dating and fine-tuning methods to implement during wildland fire events and post emergency stabilization and rehabilitation activities shall rely upon adaptive management techniques.

Siler Pincushion Cactus

1. To implement Reasonable and Prudent Measures 1 and 2:
    a. Follow and implement the restrictions to pesticide use within suitable Siler pincushion cactus habitat developed by the Environmental Protection Agency (EPA). These limitations were excerpted from the EPA's Pesticides: Endangered Species Protection Program (http://www.epa.gov/oppfead1/endanger/arizona/cocon.htm#brady):
        i. If the active ingredient is 2, 4-D (all forms), ATRAZINE, CLOPYRALID, DICAMBA (all forms), DICHLORPROP (2, 4-DP), HEXAZINONE, MCPA (all forms), PARAQUAT, PICLORAM (all forms), or TEBUTHIURON, then do not apply this pesticide in the species habitat. For ground applications do not apply within 20 yards of the habitat, or within 100 yards for aerial applications.
        ii. If the active ingredient is OXYFLUORFEN (granular or non-granular), then do not apply this pesticide in the species habitat. For ground applications do not apply within 100 yards of the habitat, or within 1/4 mile for aerial applications.
        iii. If the active ingredient is either METRIBUZIN or SULFOMETURON METHYL, then do not apply this pesticide on rights-of-way in the species habitat.

Colorado River Fishes (Colorado Pikeminnow, razorback sucker, humpback chub, bonytail) and Virgin River Fishes (Virgin River Chub and woundfin)

The BLM has incorporated Applicant Committed Resource Protection Measures into their plan that will minimize mortality or infury to these listed fish species.

Closing

The Service believes that an unquantifiable amount of incidental take will occur in the form of harm and harassment as a result of the proposed actions. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed actions. If, during the course of the actions, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Bureau of Land Management must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

REPORTING REQUIREMENTS

Upon locating dead, injured, or sick listed species, immediate notification must be made to the Service's Salt Lake City Field Office at (801) 975-3330 and the Service's Division of Law Enforcement, Ogden, Utah, at (801) 625-5570. Pertinent information including the date, time, location, and possible cause of injury or mortality of each species shall be recorded and provided to the Service. Instructions for proper care, handling, transport, and disposition of such specimens will be issued by the Service's Division of Law Enforcement. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state.

The BLM shall submit a report to the Service on or before (December 1) of each year in which fire management activities occurred within occupied habitat. For the listed and candidate species covered under this consultation, the report shall include: 1) the amount of potential and/or occupied habitat affected by wildfire (i.e. stream miles burned, percentage of drainage burned, fire severity map); 2) to the extent possible, the number of individuals killed from direct and indirect effects of wildfire; 3) any habitat and/or population monitoring efforts from past wildfire events; 4) a copy of the burned area emergency stabilization and rehabilitation plan; 5) implementation and effectiveness monitoring of burned area emergency stabilization and rehabilitation treatments; 6) implementation and effectiveness monitoring of the standard operating procedures; 7) recommendations for enhancing the effectiveness of the standard operating procedures; and 8) any recommendations for additional standard operating procedures. The first report shall be due to the Service on (December 1**,** 2005). The address for the Utah Fish and Wildlife Office is:

Field Supervisor

U.S. Fish and Wildlife Service

2369 West Orton Circle, Suite 50

West Valley City, Utah 84119

Telephone: (801) 975-3330