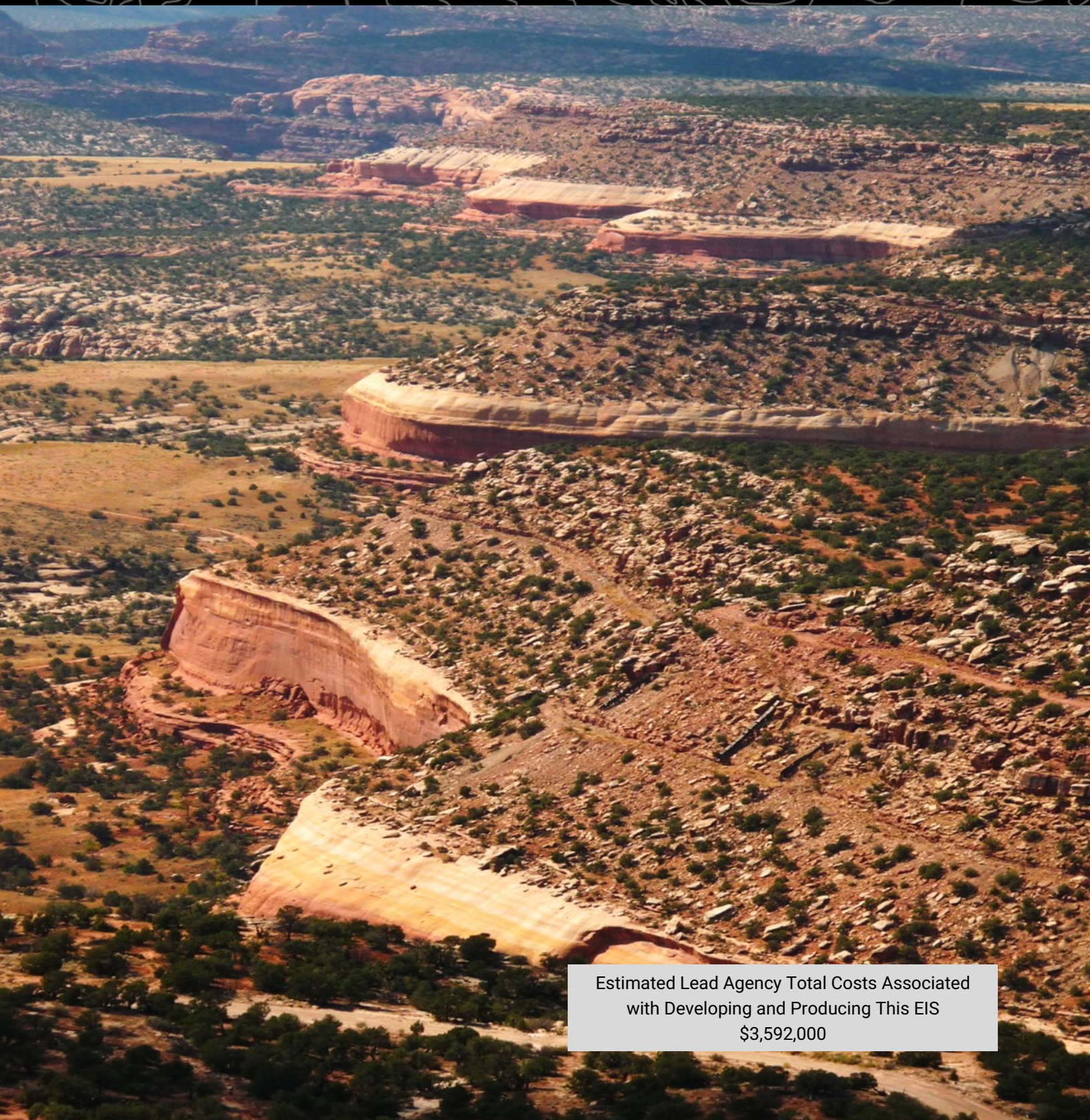
U.S. Department of the Interior
Bureau of Land Management

Volume I: Executive Summary, Chapters 1-3, Chapter 4 (part A)

June 2019

Uncompahgre Field Office

Proposed Resource Management Plan and Final Environmental Impact Statement



Estimated Lead Agency Total Costs Associated with Developing and Producing This EIS
$3,592,000

BLM MISSION

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

BLM/CO/PL-19/001

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Colorado State Office
2850 Youngfield Street
Lakewood, Colorado 80215-7210
www.co.blm.gov

In Reply Refer To:
1610 (COS050)

JUN 17 2019

Dear Reader:

Enclosed is the Proposed Resource Management Plan (RMP) and Final Environmental Impact Statement (FEIS) for the Bureau of Land Management (BLM) Uncompahgre Field Office (UFO). The BLM prepared the Proposed RMP/FEIS in consultation with cooperating agencies, taking into account public comments received during this planning effort. The Proposed RMP provides a framework for the future management direction and appropriate use of BLM-administered lands in Montrose, Ouray, Gunnison, Delta, San Miguel and Mesa counties, Colorado. The document contains both land-use planning decisions and implementation decisions to guide the BLM's management of these public lands.

The BLM developed the Proposed RMP/FEIS in accordance with the National Environmental Policy Act of 1969, as amended; and the Federal Land Policy and Management Act of 1976, as amended. The Proposed RMP is a reasonable combination of objectives and actions from the alternatives analyzed in the Draft RMP/EIS, released on June 3, 2016. The Proposed RMP/FEIS contains the Agency Proposed Alternative, a summary of changes made between the Draft RMP/EIS and Proposed RMP/FEIS, impacts of the Agency-Proposed Alternative, a summary of written and verbal comments received during the public review period for the Draft RMP/EIS and BLM's responses to the comments.

Pursuant to the BLM's planning regulations at 43 C.F.R. 1610.5-2, any person who participated in the planning process for the Proposed RMP/FEIS and has an interest that is or may be adversely affected by the planning decisions, may protest approval of the planning decisions within 30 days from the date the Environmental Protection Agency (EPA) publishes the Notice of Availability in the *Federal Register*.

The regulations specify the required elements of your protest. Take care to document all relevant facts. As much as possible, reference or cite the planning documents or available planning records (e.g. meeting minutes or summaries, correspondence, etc.).

Instructions for filing a protest with the Director of the BLM regarding the Proposed RMP and Final EIS may be found online at https://www.blm.gov/programs/planning-and-nepa/public-participation/filing-a-plan-protest and at 43 CFR 1610.5-2. All protests must be in writing and mailed to the appropriate address, as set forth below, or submitted electronically through the BLM e-Planning project website at https://go.usa.gov/xnpgD. Protests submitted electronically by any means other than the e-Planning project website protest section will be invalid unless a protest is also submitted in hard copy. Protests submitted by fax will also be invalid unless also submitted either through the e-Planning project website protest section or in hard copy. All protests submitted in writing must be mailed to one of the following addresses:

Regular Mail:
Director (210)
Attn: Protest Coordinator
P.O. Box 71383
Washington, D.C. 20024-1383

Overnight Delivery:
Director (210)
Attn: Protest Coordinator
20 M Street SE, Room 2134LM
Washington, D.C. 20003

Before including your address, phone number, email address, or other personal identifying information in your protest, please be advised that your entire protest, including your personal identifying information, may be made publicly available at any time. While you can ask us in your protest to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

The BLM Director will make every attempt to promptly render a decision on each protest. The decision will be in writing and will be sent to the protesting party by certified mail, with return receipt requested. The BLM Director's decision shall be the Department of the Interior's final decision on each protest. Responses to protest issues will be compiled and formalized in a Director's Protest Resolution Report made available following issuance of the decisions.

Upon resolution of all land-use plan protests, the BLM will issue an Approved RMP and Record of Decision (ROD). The Approved RMP and ROD will be mailed or made available electronically to all who participated in the planning process and will be available on the BLM Uncompahgre RMP revision eplanning website: https://go.usa.gov/xnpgD.

Unlike land-use planning decisions, implementation decisions in this Proposed RMP/FEIS are not subject to protest under the BLM planning regulations, but are subject to an administrative review process, through appeals to the Office of Hearings and Appeals, Interior Board of Land Appeals pursuant to 43 C.F.R., Part 4 Subpart E. Implementation decisions generally constitute the BLM's final approval, allowing on-the-ground actions to proceed. Where implementation decisions are made as part of the land-use planning process, they are still subject to the appeal process or other administrative review as prescribed by specific resource program regulations once the BLM resolves the protests to land-use planning decisions, and issues an Approved RMP and ROD. The Approved RMP and ROD will therefore identify the implementation decisions made in the plan that may be appealed to the Office of Hearings and Appeals.

Sincerely,

Jamie E. Connell
State Director

Attachment: 1 - Protest Regulations (1 p)

Protest Regulations

[CITE: 43CFR1610.5-2]

TITLE 43--PUBLIC LANDS: INTERIOR
CHAPTER 11--BUREAU OF LAND MANAGEMENT, DEPARTMENT OF THE INTERIOR PART 1600--PLANNING, PROGRAMMING, BUDGETING--Table of Contents
Subpart 1610--Resource Management
Planning Sec. 1610.5-2 Protest procedures.

(a) Any person who participated in the planning process and has an interest which is or may be adversely affected by the approval or amendment of a resource management plan may protest such approval or amendment. A protest may raise only those issues which were submitted for the record during the planning process.

(1) The protest shall be in writing and shall be filed with the Director. The protest shall be filed within 30 days of the date the Environmental Protection Agency published the notice of receipt of the final environmental impact statement containing the plan or amendment in the Federal Register. For an amendment not requiring the preparation of an environmental impact statement, the protest shall be filed within 30 days of the publication of the notice of its effective date.

(2) The protest shall contain:

(i) The name, mailing address, telephone number and interest of the person filing the protest;
(ii) A statement of the issue or issues being protested;
(iii) A statement of the part or parts of the plan or amendment being protested;
(iv) A copy of all documents addressing the issue or issues that were submitted during the planning process by the protesting party or an indication of the date the issue or issues were discussed for the record; and
(v) A concise statement explaining why the State Director's decision is believed to be wrong.

(3) The Director shall promptly render a decision on the protest.

(b) The decision shall be in writing and shall set forth the reasons for the decision. The decision shall be sent to the protesting party by certified mail, return receipt requested. The decision of the Director shall be the final decision of the Department of the Interior.

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Proposed Resource Management Plan and Final Environmental Impact Statement for the Uncompahgre Field Office, Colorado

BLM/CO/PL-19/001

1. Responsible Agency: United States Department of the Interior
   Bureau of Land Management

2. Type of Action: Administrative (X) Legislative ( )

3. Document Status: Draft ( ) Final (X)

4. Abstract: This Proposed Resource Management Plan and Final Environmental Impact Statement describes and analyzes five alternatives and one partial alternative for managing over 675,800 acres of BLM-administered lands and 971,220 acres of federal subsurface mineral estate in southwestern Colorado. The Uncompahgre Field Office spans portions of Delta, Gunnison, Mesa, Montrose, Ouray, and San Miguel counties. The plan alternatives are Alternative A (the "No Action" alternative or continuation of the 1985 San Juan/San Miguel Resource Management Plan and 1989 Uncompahgre Basin Resource Management Plan), Alternative B (resource conservation emphasis), Alternative C (resource use emphasis), Alternative D (the "balanced" and Agency-Preferred Alternative in the Draft Resource Management Plan and Environmental Impact Statement), and Alternative E (the Agency-Proposed Resource Management Plan). Planning issues addressed include categories such as travel management, energy development, recreation management, lands and realty, wildlife and fish, and special designations. The alternatives also address designation of Areas of Critical Environmental Concern and Wild and Scenic River suitability findings.

5. Protest Period: Protests on the Uncompahgre Proposed Resource Management Plan and Final Environmental Impact Statement must be postmarked or received 30 days from the date the US Environmental Protection Agency publishes a Notice of Availability in the *Federal Register*.

6. For further information contact:

   Mr. Matt Loscalzo, Project Manager, Uncompahgre Resource Management Plan
   Bureau of Land Management
   Uncompahgre Field Office
   2465 South Townsend Ave
   Montrose, CO 81401
   Telephone: (970) 240-5300
   FAX: (970) 240-5367
   Email: uformp@blm.gov
   Uncompahgre RMP revision eplanning website: https://go.usa.gov/xnpgD

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TABLE OF CONTENTS

Chapter Page

VOLUME I

TABLE OF CONTENTS *(continued)*

Chapter Page

TABLE OF CONTENTS *(continued)*

Chapter Page

TABLE OF CONTENTS *(continued)*

Chapter Page

TABLE OF CONTENTS *(continued)*

Chapter Page

TABLE OF CONTENTS *(continued)*

Chapter Page

TABLE OF CONTENTS *(continued)*

Chapter Page

TABLE OF CONTENTS *(continued)*

Chapter Page

VOLUME II

TABLE OF CONTENTS *(continued)*

Chapter Page

TABLE OF CONTENTS *(continued)*

Chapter Page

TABLES

Page

VOLUME I

TABLES *(continued)*

TABLES *(continued)*

TABLES *(continued)*

VOLUME II

TABLES *(continued)*

DIAGRAM (VOLUME I)

Page

APPENDICES

VOLUME II

VOLUME III

APPENDICES *(continued)*

VOLUME IV

FIGURE (VOLUME I)

FIGURES (APPENDIX A; VOLUME II)

Figures are available electronically on the CD-ROM enclosed with this RMP. They are also available on the Uncompahgre RMP revision eplanning website: https://go.usa.gov/xnpgD.

FIGURES (APPENDIX A) *(continued)*

FIGURES (APPENDIX A) *(continued)*

FIGURES (APPENDIX A) *(continued)*

ACRONYMS AND ABBREVIATIONS

	Full Phrase
ACEC	area of critical environmental concern
ATV	all-terrain vehicle
AUM	animal unit month
BLM	United States Department of the Interior, Bureau of Land Management
BMP	best management practice
BOR	United States Department of the Interior, Bureau of Reclamation
CARMMS	Colorado Air Resources Management Modeling Study
CFR	Code of Federal Regulations
CNHP	Colorado Natural Heritage Program
CPW	Colorado Parks and Wildlife
CSU	controlled surface use
Decision Area	public lands and federal mineral estate managed by the United States Department of the Interior, Bureau of Land Management
DOE	United States Department of Energy
DOI	United States Department of the Interior
EIS	environmental impact statement
EPA	United States Environmental Protection Agency
ERMA	extensive recreation management area
ESA	Endangered Species Act of 1973
federal mineral estate	subsurface mineral estate administered by the United States Department of the Interior, Bureau of Land Management
FLPMA	Federal Land Policy and Management Act of 1976
FMP	fire management plan
Forest Service	United States Department of Agriculture, Forest Service
FWFMP	Federal Wildland Fire Management Policy
GIS	Geographic Information Systems
IMPLAN	impact analysis for planning (model)
IMPROVE	Interagency Monitoring of Protected Visual Environments
ISA	instant study area
NCA	National Conservation Area
NEPA	National Environmental Policy Act of 1969
NGD	no ground disturbance
NHPA	National Historic Preservation Act of 1966
NL	no leasing
North Fork area	North Fork Alternative Plan area (63,400 acres of BLM-administered surface estate and 137,600 acres of federal mineral estate) (Figure 2-1)
NPS	United States Department of the Interior, National Park Service
NRHP	National Register of Historic Places
NSO	no surface occupancy
NWSRS	National Wild and Scenic Rivers System

ACRONYMS AND ABBREVIATIONS *(continued)*

	Full Phrase
OHV	off-highway vehicle
ORV	outstandingly remarkable value
PFC	proper functioning condition
PFYC	Potential Fossil Yield Classification
PILT	payment in lieu of taxes
Planning Area	Uncompahgre Field Office boundary, including all lands regardless of ownership, except Gunnison Gorge NCA Planning Area and Dominguez-Escalante NCA
$PM_{2.5}$	particulate matter smaller than 2.5 microns in effective diameter
PM_{10}	particulate matter smaller than 10 microns in effective diameter
RMA	recreation management area
RMP	resource management plan
ROD	record of decision
ROW	right-of-way
SRMA	special recreation management area
SRP	special recreation permit
SSR	site-specific relocation
TL	timing limitation
UFO	Uncompahgre Field Office
US	United States
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Department of the Interior, Fish and Wildlife Service
VRI	visual resource inventory
VRM	visual resource management
WSA	wilderness study area
WSR	wild and scenic river
WUI	wildland urban interface

Executive Summary

EXECUTIVE SUMMARY

ES.1 INTRODUCTION

The United States (US) Department of the Interior (DOI), Bureau of Land Management (BLM) prepared this Proposed Resource Management Plan (RMP) revision and Final Environmental Impact Statement (EIS) for the BLM Uncompahgre Field Office (UFO). The Approved RMP will replace the portions of the San Juan/San Miguel Planning Area RMP (BLM 1985) that are geographically applicable to the UFO and the entire Uncompahgre Basin RMP (BLM 1989a), as amended, and will guide management of decision area lands into the future. Information about the RMP/EIS process can be obtained on the Uncompahgre RMP revision eplanning website: https://go.usa.gov/xnpgD.

The Uncompahgre RMP Planning Area (Planning Area) includes over 3 million acres of land, including BLM; US Department of Agriculture, Forest Service (Forest Service); National Park Service; US Bureau of Reclamation; State of Colorado; and private lands in Delta, Gunnison, Mesa, Montrose, Ouray, and San Miguel counties in southwestern Colorado. A map of the Planning Area is provided as **Figure ES-1** (Uncompahgre RMP Planning Area).

ES.2 PURPOSE OF AND NEED FOR THE RESOURCE MANAGEMENT PLAN

The resource management planning process is a key tool that the BLM uses, in collaboration with interested public parties, to ensure a coordinated and consistent approach to managing BLM-administered lands. An RMP is a set of comprehensive long-range decisions concerning the use and management of resources administered by BLM. In general, the purpose of an RMP is twofold:

1. It provides an overview of goals, objectives, and needs associated with public lands management.
2. It resolves multiple-use conflicts or issues associated with those requirements that drive the preparation of the RMP.

Although the 1985 and 1989 RMPs have been subsequently amended, they do not satisfactorily address new and emerging issues. Laws, regulations, policies, and issues regarding management of BLM-administered lands have changed during the life of the plans. The BLM needs to revise the 1985 and 1989 RMPs to ensure compliance with current mandates and to address issues that have arisen since their preparation.

ES.3 PUBLIC INVOLVEMENT

The policy of the BLM is to provide opportunities for the public, various groups, other federal agencies, Native American Tribal Governments, and state and local governments to participate meaningfully and substantively by providing input and comments during the preparation of the RMP/EIS. The public scoping phase of the process has been completed. The public outreach and collaboration phases are ongoing. Public review of the Draft RMP/EIS occurred for 150 days following its publication, which includes a 60-day extension in response to public requests. Information about the RMP/EIS process can be obtained by the public at any time on the Uncompahgre RMP revision eplanning website at https://go.usa.gov/xnpgD. This website contains background information about the project, a public involvement and project timeline, maps and relevant GIS data of the Planning Area, and copies of public information documents released throughout the RMP/EIS process.

ES.4 ISSUES

Issue identification is the first step of the BLM planning process. A planning issue is a major controversy or dispute regarding management of resources or uses on BLM-administered lands that can be addressed in a variety of ways. Based on the lands and resources managed in the Planning Area, preliminary issues fell into six categories and a planning issue statement was developed for each category. Each planning issue statement summarizes the issues and concerns for each category raised during scoping. Refer to **Table 1-2** in **Chapter 1** for the planning issue statements.

ES.5 MANAGEMENT ALTERNATIVES

The basic goal of developing alternatives is to prepare different combinations of resource uses and protections to address the identified major planning issues, enhance or expand resources or resource uses, and resolve conflicts among resources and resource uses. Alternatives must also meet the purpose and need; be reasonable; provide a mix of resource protection, management use, and development; be responsive to the issues; meet the established planning criteria; and meet federal laws, regulations, policies, and standards, including the multiple-use mandates of the Federal Land Policy and Management Act (FLPMA).

A description of all decisions proposed for each alternative is included in **Chapter 2** (Alternatives, in Tables 2-1, Comparative Summary of Alternatives, and 2-2, Highlights of Alternatives) and **Appendix T** (Description of Alternatives).

ES.6 ENVIRONMENTAL CONSEQUENCES

The purpose of the environmental consequences analysis in this RMP/EIS is to determine and disclose the potential for significant impacts of the federal action on the human environment. Council on Environmental Quality regulations for implementing the National Environmental Policy Act (NEPA) states that the "human environment" is interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment (40 CFR, Part 1508.14). The "federal action" is the BLM's selection of an RMP on which future land use actions will be based for the UFO.

Chapter 4 objectively evaluates the likely direct, indirect, and cumulative impacts on the human and natural environment in terms of environmental, social, and economic consequences projected to occur from implementing the alternatives. Some types of impacts for resources or resource uses could be confined to BLM-administered lands (such as soil disturbance from recreational use), whereas some actions may have off-site/indirect impacts on resources on other land jurisdictions (e.g., private or state lands) overlying federal mineral estate (e.g., requirements to protect resources such as special status species and cultural resources on lands overlying federal minerals). Some BLM management actions might affect only certain resources and alternatives. The impact analysis identifies both enhancing and improving effects on a resource from a management action, as well as those that have the potential to diminish resource values.

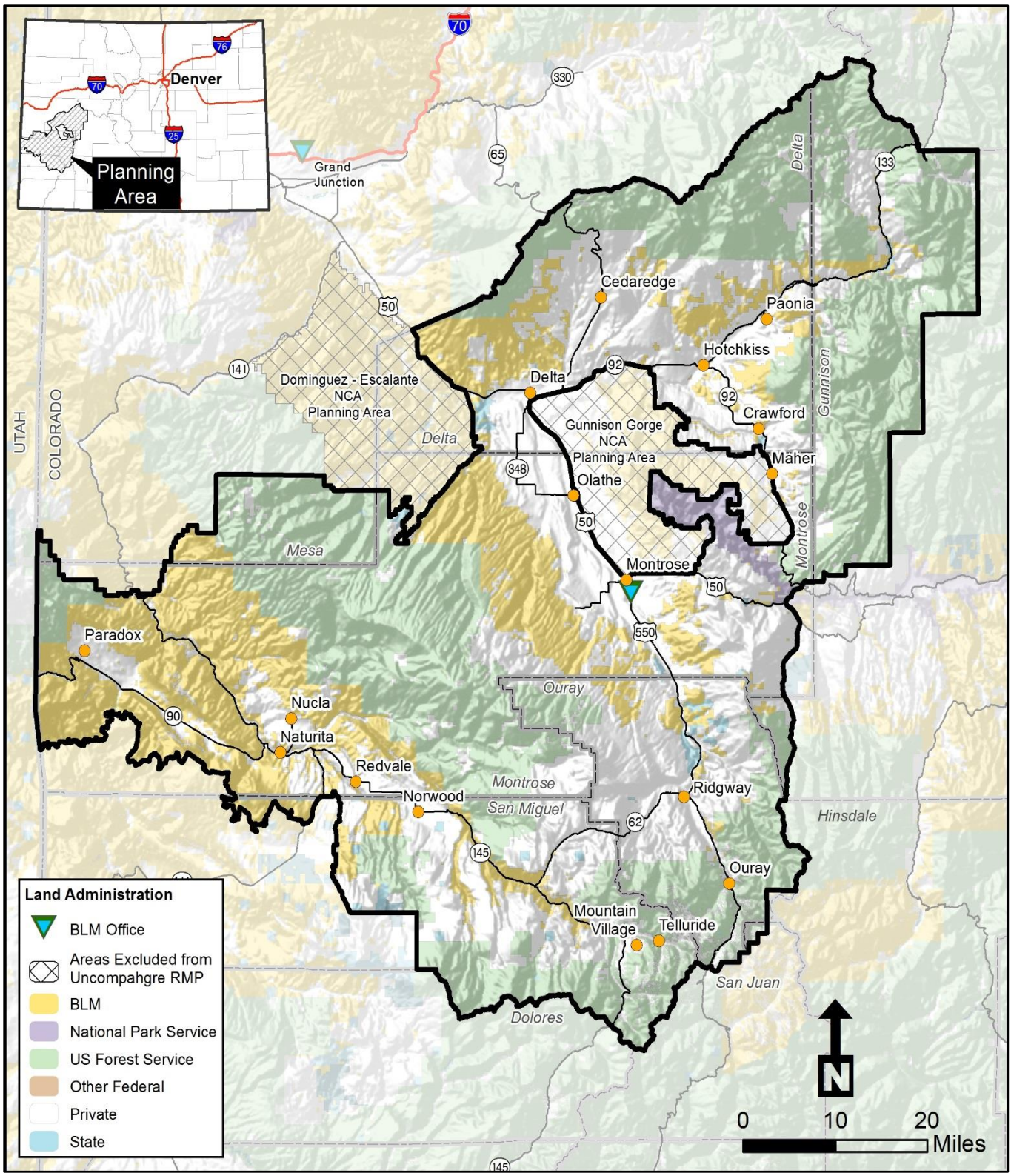

Figure ES-1: Uncompahgre RMP Planning Area

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Chapter 1
Introduction

CHAPTER 1
INTRODUCTION

Shaded text in this document identifies changes between the Draft RMP/EIS and this Proposed RMP/Final EIS.

The United States (US) Department of the Interior (DOI), Bureau of Land Management (BLM) has prepared this Proposed Resource Management Plan (RMP) revision and Final Environmental Impact Statement (EIS). This document provides direction for managing public lands and federal mineral estate under the jurisdiction of the BLM Uncompahgre Field Office (UFO) in Colorado and analyzes the environmental effects that could result from implementing the alternatives addressed in the RMP. The affected lands are currently managed under two separate land use plans and plan amendments: portions of the San Juan/San Miguel Planning Area RMP (BLM 1985) and the entire Uncompahgre Basin RMP (BLM 1989a).

1.1 PURPOSE OF AND NEED FOR THE RESOURCE MANAGEMENT PLAN

The resource management planning process is a key tool that the BLM uses, in collaboration with interested public parties, to ensure a coordinated and consistent approach to managing BLM-administered lands. An RMP is a set of comprehensive long-range decisions concerning the use and management of resources administered by BLM. In general, the purpose of an RMP is twofold:

1. It provides an overview of goals, objectives, and needs associated with public lands management.
2. It resolves multiple-use conflicts or issues associated with those requirements that drive the preparation of the RMP.

Although the 1985 and 1989 RMPs have been subsequently amended, they do not satisfactorily address new and emerging issues. Laws, regulations, policies, and issues regarding management of BLM-administered lands have changed during the life of the plans. The BLM needs to revise the 1985 and 1989 RMPs to ensure compliance with current mandates and to address issues that have arisen since their preparation.

1.2 DESCRIPTION OF THE PLANNING AREA AND DECISION AREA

The Uncompahgre RMP Planning Area (Planning Area) includes BLM; US Department of Agriculture (USDA), Forest Service (Forest Service); US DOI, National Park Service (NPS); State of Colorado lands; and private property. It totals approximately 3.1 million acres in Delta, Gunnison, Mesa, Montrose, Ouray, and San Miguel counties in southwestern Colorado. The Planning Area also includes 2,234,670 acres of federal mineral estate.

The Gunnison Gorge and Dominguez-Escalante National Conservation Areas, while within the UFO boundary, are not within the Planning Area and are not part of this planning effort. **Table 1-1** (Surface Land Status within the Uncompahgre RMP Planning Area) and **Figure 1-1** (Uncompahgre RMP Planning Area) highlight the ownership pattern of the Planning Area. This RMP does not make any decisions for the BLM Gunnison Gorge or the Dominguez-Escalante National Conservation Areas, which are

Table 1-1
Surface Land Status within the Uncompahgre RMP Planning Area

Agency	Acres
Bureau of Land Management	675,800
Forest Service	1,248,390
National Park Service	27,130
State (including Colorado Parks and Wildlife)	20,110
Private	1,125,350
City	680
Total	3,097,460

Source: BLM 2012a

managed under separate RMPs. The Curecanti National Recreation Area is withdrawn to the US DOI, Bureau of Reclamation (BOR) and managed by the NPS under a Memorandum of Understanding between NPS and BOR. Curecanti National Recreation Area is within the planning boundary until legislation supersedes; BOR's withdrawn lands with the boundary are withdrawn from appropriation under the US mining laws, and the area is not closed to fluid minerals leasing or mineral materials disposal.

The Uncompahgre RMP Decision Area (Decision Area) includes 675,800 acres of BLM-administered lands (surface estate), which includes withdrawn lands. While there are over 2.2 million acres of federal mineral estate in the Planning Area, there are 916,030 acres of federal mineral estate in the Decision Area[1] (**Figure 1-2** [Federal Mineral Estate]). Management direction and actions outlined in the RMP apply only to BLM-administered lands and to federal mineral estate under BLM jurisdiction within the Decision Area.

Federal mineral estate within the Decision Area includes mineral estate underlying BLM-administered lands, privately owned lands, city lands, and State-owned lands. The BLM typically adopts the leasing requirements determined by other federal surface-managing agencies when leasing the mineral estate (while within the Planning Area, it is outside of the Decision Area). To lease minerals beneath surface lands administered by the Forest Service, the BLM must receive consent to lease from the Forest Service, and incorporate any accompanying stipulations required by forest land use plans or forest-wide programmatic leasing analyses.

All proposed actions to access or recover federal mineral estate in the Decision Area, regardless of surface estate ownership, will be managed consistent with all proposed actions to access federal mineral estate from federal lands.

1.3 PLANNING PROCESS

The process for developing, approving, maintaining, and amending or revising the RMP was initiated under the authority of Section 202(f) of FLPMA and Section 202(c) of the National Environmental Policy Act (NEPA). The process is guided by BLM planning regulations codified in 43 CFR 1600 and Council on Environmental Quality regulations codified in 40 CFR 1500 and has two tiers: 1) the land use planning tier; and 2) the implementation tier.

[1] Although minerals beneath National Forest System lands are part of the federal mineral estate, they are not part of the RMP decision area.

In the land use planning tier, the BLM develops the RMP. The RMP prescribes the allocation of and general future management direction for the resources and land uses of BLM-administered lands in the Planning Area. The RMP then guides the implementation tier, which includes site-specific implementation planning and daily operations. Activity or implementation planning converts the resource and land use decisions of the RMP into site-specific implementation decisions for smaller geographic units of BLM-administered land within the Decision Area. Implementation decisions identified as a result of the implementation plan require site-specific planning and NEPA analysis. Implementation planning includes elements such as recreation area management plans, fluid mineral development activities, and interdisciplinary or coordinated activity plans that issue various land and resource use authorizations. Implementation planning can also include identification of specific mitigation needs and development and implementation of other similar plans and actions.

As part of this RMP revision, published documents include a Draft RMP/EIS, a Proposed RMP/Final EIS, and an Approved RMP/Record of Decision (ROD). The Approved RMP/ROD will describe the following:

- Resource conditions goals, objectives, and related management actions.
- Allowable resource uses and related levels of production or use to be maintained.
- Land areas to be managed for limited/restricted, or identified for potential disposal, including exchange.
- Resource program constraints and general management practices and protocols.
- Intervals and standards for monitoring the RMP.

1.4 PUBLIC INVOLVEMENT AND PLANNING ISSUES

The policy of the BLM is to provide opportunities for the public, various groups, other federal agencies, Native American Tribal Governments, and state and local governments to participate meaningfully and substantively by providing input and comments during the preparation of the RMP/EIS.

Public involvement for the Uncompahgre RMP/EIS includes the following four methods:

- Public scoping before NEPA analysis begins to determine the scope of issues and alternatives to be addressed in the RMP/EIS.
- Public outreach via newsletters, news releases, and Uncompahgre RMP revision eplanning website (https://go.usa.gov/xnpgD) updates.
- Collaboration with cooperating agencies (participating federal, state, and local governments), tribal governments, and the BLM Colorado Southwest Resource Advisory Council.
- Public review of and comment on the Draft RMP/EIS, which analyzes likely environmental effects and identifies the BLM's Preferred Alternative.

1.4.1 Scoping Process

The BLM began the scoping process with seven open houses in January and February 2010 to provide the public with opportunities to become involved, to learn about the project and the planning process, to meet the Uncompahgre RMP BLM Interdisciplinary Team, and to offer comments. Scoping meetings were held in an open house format to encourage participants to discuss concerns and questions with BLM Interdisciplinary Team. The scoping meetings were attended by 369 individuals. Refer to the Uncompahgre RMP revision eplanning website for more information about the scoping process and to view the *Final Scoping Summary Report* (BLM 2010a).

Also refer to **Section 1.6** (Collaboration) and **Chapter 5** (Consultation and Coordination) for additional information on other public participation opportunities.

1.4.2 Issue Identification

Issue identification is the first step of the BLM planning process. A planning issue is a major controversy or dispute regarding management of resources or uses on BLM-administered lands that can be addressed in a variety of ways.

In September 2008, the BLM completed a preparation plan for the RMP revision/EIS. This plan, used by the BLM Interdisciplinary Team to initiate the planning process, highlighted anticipated planning issues developed by the team internally. Based on the lands and resources managed in the Planning Area, preliminary issues fell into six categories. The comments received during the public scoping process were analyzed, and a scoping summary report was finalized in July 2010 (BLM 2010a). Issues raised during scoping were consistent with the planning issues developed during the internal, preplanning phase. A planning issue statement was developed for each of the six planning issue categories. Each planning issue statement summarizes the issues and concerns heard for each category during scoping. The six planning issue statements are presented in **Table 1-2** (Planning Issue Statements).

Table 1-2
Planning Issue Statements

Issue	Resource Category	Planning Issue Statement
1.	• Soil, air, and water resources • Special management areas • Vegetation (including riparian and wetland areas and noxious weeds) • Fish and wildlife • Special status species • Drought management and climate change	How will vegetative resources, terrestrial and aquatic habitat, water resources, and special management areas be managed, while maintaining biological diversity and native species populations?
2.	• Non-renewable energy development • Renewable energy development • Minerals and mining	How will energy and minerals resources be managed?
3.	• Recreation • Travel management • Livestock grazing • Visual resources • Noise • Forestry • Wildland fire management	How will human activities and uses be managed?
4.	• Lands and realty	How will land tenure, withdrawals, and utility/energy corridors be managed or adjusted?
5.	• Cultural resources • Paleontological resources • Native American religious concerns	How will cultural, historical, and paleontological resources and Native American Religious Concerns be managed and protected?
6.	• Socioeconomic and environmental justice concerns • Public health and safety	How do population growth and an expanding urban interface affect the management of BLM-administered lands and resources, including authorized permitted land uses, while considering community values and needs?

1.4.3 Issues Considered but Not Further Analyzed

During scoping, several concerns were raised regarding issues that would not be addressed in the RMP, including administrative/policy issues, implementation issues, issues outside the scope of the RMP, and issues that have already been addressed through other BLM activities. The Uncompahgre RMP Scoping Summary Report (BLM 2010a) provides a comprehensive list of issues outside the scope of the RMP.

The largest proportion of public comment during scoping centered around three issues: special designation areas (30.5 percent), notably wilderness, wilderness study areas (WSAs), and wild and scenic rivers; recreation and travel management (25 percent); and non-renewable energy development (10.3 percent).

1.5 PLANNING CRITERIA AND LEGISLATIVE CONSTRAINTS

Planning criteria are the standards, rules, and guidelines that help guide data collection and alternative formulation and selection in the RMP development process. In conjunction with the planning issues, planning criteria ensure that the planning process is focused. The criteria also help guide the final plan selection and provide a basis for judging the responsiveness of the planning options.

The BLM developed preliminary planning criteria before public scoping meetings to set the sideboards for focused planning of the Uncompahgre RMP revision and guide decision making by topic. These criteria were introduced to the public for review in January and February 2010 at all scoping meetings. The public was encouraged to comment on, and suggest additions to, these criteria at the meetings, through written correspondence, and at the Uncompahgre RMP revision eplanning website (https://go.usa.gov/xnpgD). The planning criteria are:

- The proposed RMP will comply with FLPMA and all other applicable laws, regulations, and policies.
- Impacts from the management alternatives considered in the revised RMP will be analyzed in an EIS developed in accordance with regulations at 43 CFR 1610 and 40 CFR 1500.
- Lands covered in the RMP will be public land and split estates managed by the BLM. No decisions will be made relative to non-BLM administered lands (except when decisions regard federal mineral estate).
- For program-specific guidance of land use planning level decisions, the process will follow the Land Use Planning Manual 1601 (BLM 2000a) and Handbook H-1601-1, Appendix C (BLM 2005a), as amended.
- Broad-based public participation will be an integral part of the planning and EIS process.
- The BLM Interdisciplinary Team will work cooperatively with the State of Colorado, tribal governments, county and municipal governments, other federal agencies, the BLM Colorado Southwest Resource Advisory Council, cooperating agencies, and all other interested groups, agencies, and individuals.
- Decisions in the RMP will strive to be compatible with existing plans and policies of local, state, and federal agencies within the Planning Area, as long as the decisions are consistent with the purposes, policies, and programs of federal law, and regulations applicable to public lands.
- The BLM will consult with Colorado Parks and Wildlife (CPW). The RMP will recognize the State's responsibility and authority to manage wildlife.
- The BLM will recognize the Office of Surface Mining's responsibility and authority to regulate coal activities.
- The BLM will recognize the State's responsibility for permitting related to oil and gas activities and in regulating air quality impacts.

- The BLM will recognize the State's responsibility for permitting related to uranium, coal, and sand and gravel activities, and in regulating water quality impacts.
- The BLM National Sage-grouse Habitat Conservation Strategy (BLM 2004a) requires impacts on sagebrush habitat and sagebrush-dependent wildlife species be analyzed and considered in BLM land use planning efforts for public lands with sagebrush habitat in the Planning Area.
- The RMP will recognize valid existing rights.
- The planning process will incorporate BLM Colorado Standards for Public Land Health and Guidelines for Livestock Grazing Management (BLM 1997; **Appendix C**).
- Wilderness study areas (WSA) will continue to be managed according to BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012b) until Congress either designates all or portions of the WSA as wilderness or releases the lands from further wilderness consideration. It is no longer policy of the BLM to designate additional WSAs through the RMP process or to manage any lands other than existing WSAs in accordance with BLM Manual 6330 (BLM 2012b).
- The planning process will involve Native American Tribal Governments and will provide strategies for the protection of recognized traditional uses.
- Any location-specific information pertaining to cultural resources (either map, description, or photo) is proprietary to the BLM and will not become the property of any contractors working on the EIS or attached to any document (paper or electronic), nor is this information subject to any public release or Freedom of Information Act requests (36 CFR 7.18).
- The RMP will include adaptive management criteria and protocol to deal with future issues.
- A reasonable foreseeable development scenario for fluid minerals, mineral potential reports for coal and other minerals, and a renewable energy potential report will be developed from analysis of past activity, production, and other sources, which will aid in developing alternatives and in the environmental consequences analysis.
- Data in the Colorado Plateau Rapid Ecological Assessment will be considered as appropriate.

Additional planning criteria received in public scoping comments included incorporation of the Conservation Agreement or Strategy for Colorado River Cutthroat Trout.

All management direction and actions developed as part of the BLM planning process are subject to valid existing rights and must meet the objectives of BLM's multiple-use management mandate and responsibilities (FLPMA Section 202[c] and [e]). Valid existing rights include all valid lease, permit, rights-of-way, or other land use rights or authorizations in effect on the date of approval of this RMP. Although the courts may recognize adjudicated Revised Statute 2477 rights-of-way as valid existing rights, BLM does not consider RS 2477 claims as part of the land use planning process.

1.5.1 Relationship to BLM Policies, Plans, and Programs

Since the San Juan/San Miguel RMP (BLM 1985) and Uncompahgre Basin RMP (BLM 1989a) were developed and approved, it has been necessary to amend them to provide additional land management direction. As the land use plan guidance is put into practice on the ground, implementation-level planning is directed by BLM policy and program-specific guidance. **Table 1-3** (RMP Amendments and Other Documents Considered for Implementation-level Planning) identifies approved plan amendments incorporated into the existing land use plans. These plan amendments provide a perspective of the many management considerations pertinent to the Decision Area.

Table 1-3
RMP Amendments and Other Documents Considered for Implementation-level Planning

Amendments to the San Juan/San Miguel 1985 RMP
Colorado Oil and Gas Development EIS (BLM 1991a)
EA for the Proposed Area of Critical Environmental Concern and Special Recreation Management Area on the San Miguel River (BLM 1993a)
EA for Off-highway Vehicle Area Designations (BLM 2010b)
Amendments to the Uncompahgre Basin 1989 RMP
EA for Fire Management (BLM 1992a)
EA for Land Disposal (BLM 1994a)
EA for Gunnison Travel Interim Restrictions (Forest Service and BLM 2001)
EA for Dry Creek Travel Management Plan (BLM 2009a)
EA for Off-highway Vehicle Area Designations (BLM 2010b)
Record of Decision for Implementation of a Wind Energy Development Program and Associated Land Use Plan Amendments (BLM 2005b)
Final Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States Programmatic EIS (BLM 2007a)
Record of Decision and RMP Amendments for Geothermal Leasing in the Western US (BLM 2008b)
Approved RMP Amendments/Record of Decision for Designation of Energy Corridors on BLM-Administered Lands in the 11 Western States (US Department of Energy and BLM 2009)
Approved RMP Amendments/Record of Decision for Solar Energy Development in Six Southwestern States (BLM 2012c)
Implementation-level Plans
Final Wilderness EIS for the Uncompahgre Basin (BLM 1989b)
Wilderness Study Report: Montrose District (BLM 1991b)
Mesa Creek Coordinated RMP and EA (BLM 1993b)
EA for Withdrawal for Protection of Townsend's Big-eared Bat Maternity Roosting Sites (BLM 2008c)
Fire Management Plan, Implementation Guide (BLM 2008d)

1.6 COLLABORATION

Information regarding collaboration with governments, agencies, and tribal representatives is provided in **Chapter 5**.

1.7 RELATED PLANS AND AUTHORITIES

The BLM's planning regulations require RMPs be consistent with officially approved or adopted resource-related plans of other federal, state, local, and tribal governments, so long as the RMPs are also consistent with the purposes, policies, and programs of federal laws and regulations applicable to BLM-administered lands. Plans formulated by federal, state, local, and tribal governments related to management of lands and resources have been reviewed and considered as the RMP/EIS has been developed. These plans include:

1.7.1 City and County Plans

- Town of Cedaredge Master Plan (Town of Cedaredge 2005)
- City of Delta Comprehensive Plan Update (City of Delta 2008)
- Delta County Master Plan (Delta County 1996)
- Gunnison County Land Use Resolution (Gunnison County 2006)
- Gunnison County Energy Action Plan (Gunnison County 2009)
- Mesa County Master Plan (Mesa County 2000)
- Mesa County Noxious Weed Management Plan (Mesa County 2009)
- City of Montrose Comprehensive Plan (City of Montrose 2008)
- Montrose County Master Plan (Montrose County 2010)
- Town of Norwood Land Use Code (Town of Norwood 2008)
- Ouray Community Plan (City of Ouray 2004)
- Ouray County Master Plan (Ouray County 1999)
- Ouray County Land Use Code (Ouray County 2005)
- Ridgway Comprehensive Plan (Town of Ridgway 2012)
- Northwest Area Master Plan (Town of Ridgway 2008a)
- Ridgway Municipal Code (Town of Ridgway 2008b)
- San Miguel County Comprehensive Development Plan (San Miguel County 2008)

1.7.2 State Agency Plans

- Colorado's Comprehensive Wildlife Conservation Strategy (CPW 2006)

1.7.3 Federal Agency Plans

National Park Service

- Curecanti National Recreation Area Final Resource Protection Study and Environmental Impact Statement (NPS 2008)

Forest Service, Colorado

- Forest Service Roadless Inventory and associated EIS (Forest Service 2001)
- Proposed Forest Plan for Grand Mesa, Uncompahgre, and Gunnison National Forests (Forest Service 2007)

Neighboring BLM Offices

- Colorado River Valley Field Office RMP revision (BLM 2015f)
- Grand Junction Field Office RMP revision (BLM 2015a)
- Gunnison Field Office RMP (BLM 1993c)
- Moab Field Office RMP (BLM 2008e)
- Monticello Field Office RMP (BLM 2008f)
- San Juan National Forest Land and Resource Management Plan (BLM and Forest Service 2015a)
- Tres Rios Field Office Approved Resource Management Plan/Record of Decision (BLM and Forest Service 2015a)

1.7.4 Other

- Dolores River Riparian Action Plan: Recommendations for Implementing Tamarisk Control and Restoration Efforts (Tamarisk Coalition 2010)
- San Miguel Watershed Plan (San Miguel Watershed Coalition 1998)
- San Miguel Basin Gunnison Sage-grouse Conservation Plan (San Miguel Basin Gunnison Sage-grouse Working Group 2009)

- Migratory Bird Status Literature Review (Lambeth and Reeder 2009)
- Gunnison Sage-grouse Rangewide Conservation Plan (Gunnison Sage-grouse Rangewide Steering Committee 2005)
- Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats (Connelly et al. 2004)
- Colorado Sagebrush: A Conservation Assessment and Strategy (Boyle and Reeder 2005)
- Ecoregion-Based Conservation Assessment of the Colorado Plateau and Southern Rocky Mountains (Marshall et al. 2006)
- San Miguel/Lower Dolores River Project: Measures of Conservation Success (The Nature Conservancy 2008)
- Colorado Rare Plant Conservation Strategy (Neely et al. 2009)

1.7.5 Authorities

BLM establishment of protective land use designations as part of the land use planning process create commitments only for the BLM. Examples of such designations include Areas of Critical Environmental Concern (ACEC) and river segments suitable for inclusion in the National Wild and Scenic Rivers System (NWSRS). These commitments are binding only on the BLM even when the basis for the protective designation includes water-dependent values, such as native fish habitat on rivers. An administrative action by the BLM cannot be used to change existing legal and contractual obligations fulfilled by other agencies that operate along the same stream.

No other federal agency, including the BOR, has an obligation to change its management practices because the BLM establishes a protective designation along a river corridor. The BLM is granted operational authority by the FLPMA, while BOR is granted operational authorities by the Reclamation Act of 1902. Congress has not granted any authority to the BLM that would allow the agency to dictate how a BOR project is operated.

1.8 CHANGES BETWEEN DRAFT RMP/EIS AND PROPOSED RMP/FINAL EIS

Changes to create the Proposed RMP and Final EIS were made in response to public comment on the Draft RMP/EIS, cooperating agency input, US Fish and Wildlife Service consultation, and extensive internal BLM reviews of the Proposed RMP/Final EIS. The Draft RMP/EIS was available for a 150-day comment period, including a 60-day extension, ending on November 1, 2016. The BLM held six public comment open houses for the Draft RMP/EIS between June 20 and 30, 2016, in six Planning Area communities. **Chapter 5, Section 5.3** (Draft RMP/EIS Availability, Distribution, and Public Comment) summarizes the public comment process. Excerpted substantive comments from individual submissions, as well as summaries of and the BLM's responses to those substantive comments, are in **Appendix R**, Comment Summary and Response Report.

In total, 2,566 unique substantive comments were received on the Draft RMP/EIS. The BLM considered all substantive comments and used many of them to assist in making changes or clarifications to this Proposed RMP/Final EIS. Other factors contributed to the development of Alternative E (Proposed RMP). These include changes in policy and guidance and cooperating agencies' input and special expertise.

The Proposed RMP includes management actions and allowable uses from Alternatives A, B, C, and D with consideration given to public comments, corrections, and rewording for clarification of purpose and intent. When developing the Proposed RMP, the BLM focused on addressing public comments on the Draft RMP/EIS, while continuing to meet its legal, regulatory, and policy mandates. Redundant text in the Draft RMP/EIS was removed from the PRMP/FEIS in an effort to improve readability and can be

viewed in the Draft RMP/EIS on the Uncompahgre RMP revision eplanning website (https://go.usa.gov/xnpgD).

Chapter 2
Alternatives

CHAPTER 2 ALTERNATIVES

This chapter highlights a range of reasonable management approaches the BLM could implement to meet the purpose of and need for the Uncompahgre Proposed Resource Management Plan/Final Environmental Impact Statement (Proposed RMP/Final EIS). This chapter and Appendix T detail Alternatives A through E, including the Proposed RMP, and include references to maps (in **Appendix A** [Figures]) identifying where actions would be applicable. The alternatives were formulated in response to issues and concerns identified through public scoping and in an effort to resolve deficiencies with current management strategies and explore opportunities for enhanced management of resources and resource uses.

A glossary providing definitions of terms is in **Volume 2** following the **References** section. A list of acronyms and abbreviations is at the beginning of the document.

2.1 INTRODUCTION TO RMP ALTERNATIVES

This chapter provides information on alternatives the BLM considered and those alternatives not analyzed in detail. For the alternatives analyzed in detail, this chapter identifies common management, provides a general description of each alternative, and presents each alternative's highlights. Refer to **Table 2-2** (Highlights of Alternatives) for a summary of alternatives and to **Appendix T** (Description of Alternatives) for a complete comparison of the goals, objectives, allowable uses, and management actions for all alternatives analyzed in this RMP/EIS. **Table 2-6** at the end of this chapter presents the BLM's comparison of environmental consequences by program area.

RMP decisions consist of identifying and clearly defining goals and objectives (desired outcomes) for resources and resource uses, followed by developing allowable uses and management actions necessary for achieving the goals and objectives. These critical determinations guide future land management actions and subsequent site-specific implementation actions to meet multiple use and sustained yield mandates while sustaining land health.

2.1.1 Purpose of Alternative Development

Alternative development is the heart of the RMP/EIS process. Land use planning and National Environmental Policy Act of 1969

Components of Alternatives

Goals are broad statements of desired (RMP-wide and resource or resource-use specific) outcomes and are not quantifiable or measurable. **Objectives** are specific measurable desired conditions or outcomes intended to meet goals. While goals are generally the same across alternatives, objectives typically vary, resulting in different allowable uses and management actions for some resources and resource uses.

Management actions and allowable uses are designed to achieve objectives. **Management actions** are measures that guide day-to-day and future activities. **Allowable uses** delineate which uses are permitted, restricted, or prohibited, and may include stipulations or restrictions. Allowable uses also identify lands where specific uses are excluded to protect resource values, or where certain lands are open or closed in response to legislative, regulatory, or policy requirements.

Implementation-level decisions are site-specific on-the-ground actions and typically are not addressed in RMPs.

Planning Issues

Planning issues express concerns, conflicts, and problems with existing management of public lands. Issues are frequently based on how land uses affect resources. Some issues are concerned with how one land use can affect other land uses, or how resource protection affects land uses. Planning issues involve levels of use, productivity, and other related management practices. The most effective planning issues are well defined, topically discrete, and elicit a range of different approaches for resolution.

(NEPA) regulations require the BLM to formulate a reasonable range of alternatives. Alternative development is guided by established planning criteria (as outlined in 43 CFR Section 1610).

The basic goals of alternative development are to produce distinct potential management scenarios that:

- Address the identified major planning issues
- Explore opportunities to enhance management of resources and resource uses
- Resolve conflicts among resources and resource uses
- Meet the purpose of and need for the RMP
- Are feasible

Pursuit of these goals provide the BLM and public with an appreciation for the diverse ways in which conflicts regarding resources and resource uses might be resolved, and offers the BLM State Director a reasonable range of alternatives from which to make an informed decision. The components and broad aim of each alternative considered for the Uncompahgre RMP are discussed below.

2.2 ALTERNATIVE DEVELOPMENT PROCESS FOR THE UNCOMPAHGRE RMP

2.2.1 Analyze the Management Situation

BLM resource specialists assessed existing RMP goals, objectives, and actions in relation to measurement tools (such as land health assessments, human impact studies, biological assessments, NEPA actions, and fuel monitoring data) to gauge successes and deficiencies in addressing the planning issues. In June 2010, this detailed assessment was compiled and released in the Analysis of the Management Situation for the Uncompahgre RMP Planning Area (Planning Area), providing information useful to the BLM in:

- Summarizing existing conditions
- Explaining the need for change
- Identifying management opportunities

2.2.2 Develop a Reasonable Range of Alternatives for the Draft RMP/EIS

Between June 2010 and May 2011, the BLM Uncompahgre Field Office (UFO) Interdisciplinary Team met to develop management goals, and small teams met to identify objectives and actions to address the goals within their field(s) of expertise. The various groups met numerous times throughout this period to refine their work. Using a three-step process, the Interdisciplinary Team:

1. Developed one no action alternative (A) and four preliminary action alternatives. The action alternatives were designed to:
    - Address the six planning issues
    - Fulfill the purpose and need for the RMP (outlined in **Section 1.1** [Purpose of and Need for the Resource Management Plan])
    - Meet the multiple-use mandates of the Federal Land Policy and Management Act (FLPMA) of 1976 (43 US Code 1716)
2. Refined the four preliminary action alternatives, identified obvious similarities among the goals, objectives, and actions of each, and consolidated these into two philosophically distinct alternatives (B and C).
3. Blended goals, objectives, and actions from the action alternatives and the no action alternative to formulate an Agency- (BLM) Preferred Alternative (D) in the Draft RMP/EIS that strives for balance among competing interests and has the greatest potential to effectively address the planning issues.

2.2.3 Develop the Proposed RMP

The Proposed RMP is a compilation of elements from the alternatives analyzed in the Draft RMP/EIS. In developing the Proposed RMP, the BLM made modifications based on its internal review, new information and best available science, the need for clarification in the RMP, and ongoing coordination with stakeholders. The BLM also received many substantive public comments on the Draft RMP/EIS (**Appendix R**), which greatly informed the BLM's development of the Proposed RMP. Changes in BLM regulations, policy, and guidance were also considered.

2.3 ALTERNATIVES CONSIDERED FOR DETAILED ANALYSIS

The three action alternatives (B, C, and D) and the partial alternative (B.1) in the Draft RMP/EIS, and the Proposed RMP, in the Proposed RMP/Final EIS, offer a range of possible management approaches for responding to planning issues and resolving user conflicts. While the goals are generally the same across alternatives, each alternative, including the no action alternative (A), contains a discrete set of objectives, allowable uses, and management actions constituting a separate RMP. Resource program goals are met in varying degrees, with the potential for different long-range outcomes and conditions.

The relative emphasis given to particular resources and resource uses differs as well, including allowable uses, restoration measures, and specific direction pertaining to individual resource programs. When resources or resource uses are mandated by law or are not tied to planning issues, there are typically few or no distinctions between alternatives.

Meaningful differences among the five alternatives and one partial alternative are described in **Table 2-1** (Comparative Summary of Alternatives). **Table 2-2** (Highlights of Alternatives) summarizes the full alternatives matrix in **Table T-1** of **Appendix T** (Description of Alternatives)**. Appendix T** provides a complete description of proposed decisions for each alternative, including goals, objectives, management actions, and allowable uses for individual resource programs. Figures in **Appendix A** provide a visual representation of differences between alternatives. In some instances, varying levels of management from different resource programs overlap. For example, BLM guidance directs that wilderness study areas (WSAs) be managed as visual resource management (VRM) Class I, the highest standard for VRM. At the same time, management for the Adobe Badlands ACEC/Outstanding Natural Area, which overlaps the Adobe Badlands WSA, prescribes VRM Class II for the ACEC. Because of the overlap, the ACEC would be managed as VRM Class I unless and until Congress releases the WSA from wilderness consideration and the BLM prescribes other management. In such instances where varying management levels overlap, the stricter management prescriptions would apply. If such prescriptions were excepted, then the less strict management would prevail.

Geographic information systems (GIS) have been used to perform acreage calculations and to generate the figures in **Appendix A**. Calculations are dependent upon the quality and availability of data, and most calculations in this RMP are rounded to the nearest 10 acres or 0.1 mile. Given the scale of the analysis, the compatibility constraints between datasets, and lack of data for some resources, all calculations are approximate, and serve for comparison and analytic purposes only. Likewise, the figures in **Appendix A** are provided for illustrative purposes and subject to the limitations discussed above. The BLM may receive additional or updated data; therefore, acreages may be recalculated and revised at a later date.

In the Chapter 4 environmental effects analysis, the proposed uses and restrictions discussed in this chapter were analyzed to determine where restrictions for one resource might provide indirect protection for another resource not expressly described in this chapter. Conversely, resource protections could inadvertently restrict resource uses.

2.3.1 Management Common to All Alternatives

Allowable uses and management actions from the existing RMPs that remain valid and do not require revision have been carried forward to Alternatives B, C, D, and E (Proposed RMP). Other decisions are common only to action Alternatives B, C, D, and E (Proposed RMP).

Although each alternative emphasizes a slightly different mix of resources and resource uses, all alternatives contain some common elements, which are included at the beginning of **Table T-1** in **Appendix T** (Description of Alternatives). Additional management actions common to Alternatives A, B, C, D, and E (as indicated by a single cell across the table row) specific to certain resources or resource uses are listed under the respective program in **Appendix T**.

Adaptive Management

The systematic process of adaptive management (planning, implementation, monitoring, and evaluation) would be used to determine the success of management actions in achieving objectives, as described in the alternatives, and would be conducted within the framework of the RMP. Adaptive management would be guided by Adaptive Management, the US Department of the Interior Technical Guide (Williams et al. 2007). The RMP revision is based on current scientific knowledge and best available data. To be successful, the implementation of the RMP must have the flexibility to adapt and respond to new information. Under the concept of adaptive management, new information or changing conditions would be evaluated and a decision would be made as to whether to make implementation adjustments or changes. The adaptive management approach enables resource managers to determine how well implementation actions achieve the objectives and steps needed to modify or cease implementation to increase success or improve results.

2.3.2 Alternative A: No Action

Alternative A meets the requirement that a No-Action Alternative be considered. This alternative continues current management direction and prevailing conditions derived from existing planning documents. Goals and objectives for resources and resource uses are based on the portions of the San Juan/San Miguel RMP (BLM 1985) that are geographically applicable to the UFO and the entire Uncompahgre Basin RMP (BLM 1989a), along with associated amendments, activity and implementation level plans, and other management decision documents. Laws, regulations, and BLM policies that supersede RMP decisions would apply.

Goals and objectives for BLM-administered lands and mineral estate would not change. Appropriate and allowable uses and restrictions pertaining to activities such as mineral leasing and development, recreation, timber harvesting, construction of utility corridors, and livestock grazing would also remain the same. The BLM would not modify existing or establish additional criteria to guide the identification of site-specific use levels for implementation activities.

2.3.3 Alternative B

Alternative B emphasizes improving, rehabilitating, and restoring resources and sustaining the ecological integrity of habitats for all priority plant, wildlife, and fish species, while allowing appropriate development scenarios for allowable uses (such as mineral leasing, locatable mineral development, recreation, rights-of-ways (ROW), and livestock grazing). It particularly targets the habitats needed for the conservation and recovery of federally listed, proposed, or candidate threatened and endangered plant and animal species. Goals and objectives focus on environmental and social outcomes achieved by sustaining relatively unmodified physical landscapes and natural and cultural resource values for current and future generations. This alternative would establish the greatest number of special designation areas such as ACECs and special recreation management areas, with specific measures designed to protect or

enhance resource values. Appropriate and allowable uses and restrictions would be contingent on minimizing impacts on natural and cultural resources.

2.3.4 Alternative B.1

Alternative B.1 is a partial alternative specific to oil and gas leasing and development in the North Fork and Smith Fork drainages of the Gunnison River (referred to as North Fork), primarily in portions of Delta and Gunnison counties (**Figure 2-1**). Alternative B.1 is a resource-based set of recommendations provided by a community group (Citizens for a Healthy Community 2013). This partial alternative is treated as a subset of Alternative B (Alternative B.1 is most closely related to Alternative B) and applies only to the North Fork Alternative Plan area, herein referred to as the "North Fork area." The North Fork area has 63,390 acres of BLM-administered surface estate and 159,820 acres of federal mineral estate (underlying BLM surface and split-estate), 139,540 acres of which are federal fluid minerals. The North Fork Alternative Plan would close certain areas to oil and gas leasing and impose development setbacks with strict surface use restrictions, including no surface occupancy (NSO), controlled surface use (CSU), and timing limitations (TLs), in places where leasing may be allowed. Management actions and allowable uses under Alternative B not superseded by those in Alternative B.1 would also apply to the North Fork area.

2.3.5 Alternative C

Appropriate and allowable uses and restrictions would emphasize maximizing utilization of resources, while mitigating impacts on land health. Management direction would recognize and expand existing uses and accommodate new uses to the greatest extent possible. The appropriate development scenarios for allowable uses (such as mineral leasing, locatable mineral development, ROWs, renewable energy, and livestock grazing) would emphasize maximizing resource production in an environmentally responsible manner, while maintaining the basic protection needed to sustain resources.

2.3.6 Alternative D

Alternative D is the Agency-Preferred Alternative from the Draft RMP/EIS, which emphasizes balancing resources and resource use among competing human interests, land uses, and the conservation of natural and cultural resource values, while sustaining and enhancing ecological integrity across the landscape, including plant, wildlife, and fish habitat. This alternative incorporates a balanced level of protection, restoration, enhancement, and use of resources and services to meet ongoing programs and land uses. Goals and objectives focus on environmental, economic, and social outcomes achieved by strategically addressing demands across the landscape.

2.3.7 Alternative E: Agency-Proposed RMP

Alternative E is the Agency's Proposed RMP, which is a reasonable combination of objectives and actions from the four alternatives (A, B, C, and D) presented in the Draft RMP/EIS. **Section 2.2.4** (Develop the Proposed RMP) outlines the Proposed RMP development process.

Table 2-1
Comparative Summary of Alternatives

Resource or Resource Use	Alternative A *Current Management (No Action)*	Alternative B		Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
Visual Resource Management (VRM) (acres)	***Figure 2-5***	***Alt B*** ***Figure 2-6***	***Alt B.1*** ***Figure 2-7***	***Figure 2-8***	***Figure 2-9***	***Figure 2-87***
BLM Surface/Federal Minerals						
VRM Class I	44,220	53,870	53,860	44,220	46,440	46,440
VRM Class II	21,930	176,010	181,650	31,260	112,540	105,490
VRM Class III	280,520	427,580	421,290	431,330	398,410	370,600
VRM Class IV	9,260	18,340	19,000	168,990	118,410	153,260
Undesignated	319,870					
Private and State Surface/Federal Minerals[2]						
VRM Class I	20	100		20	20	
VRM Class II	10	135,030	142,710	69,040	94,250	92,680
VRM Class III	243,410	139,390	131,720	196,120	173,300	172,500
VRM Class IV	420	13,050		22,230	20,000	30,250
Undesignated[3]	51,560	7,850		8,010	7,850	0
Lands Managed to Protect Wilderness Characteristics (acres)		***Figure 2-10***			***Figure 2-10***	***Figure 2-88***
Adobe Badlands WSA Adjacent		6,180				
Camel Back WSA Adjacent		6,950			6,950	
Dolores River Canyon WSA Adjacent		550				
Dry Creek Basin		7,030			7,030	
Lower Tabeguache/Campbell Creek		11,060				
Roc Creek		5,480			4,340	
Shavano Creek		4,900				
Total	**0**	**42,150**		**0**	**18,320**	**0**

Resource or Resource Use	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
Lands Managed to Minimize Impacts on Wilderness Character, while Managing for Other Uses (acres)					***Figure 2-88***
Camel Back WSA Adjacent					6,950
Roc Creek					4,340
Dry Creek Basin					7,030
Total	**0**	**0**	**0**	**0**	**18,320**
Ecological Emphasis Areas (acres)[1]		***Figure 2-2***	***Figure 2-3***	***Figure 2-4***	
Adobe		40,730		24,170	
Dry Creek		20,320		10,790	
Jumbo Mountain / McDonald Creek		17,220		15,630	
La Sal		22,350	13,270	22,350	
Monitor / Potter / Roubideau		27,320	10,880	27,320	
Naturita Canyon		15,620		1,510	
Ridgway		16,700		9,070	
San Miguel		25,520		17,840	
Sims Mesa		19,650		19,650	
Spring Canyon		3,380		3,380	
Tabeguache		31,540		23,760	
Terror Creek		2,230		2,230	
Total	**0**	**242,580**	**24,150**	**177,700**	**0**
Livestock Grazing[4]	***Figure 2-11***	***Figure 2-12***	***Figure 2-13***	***Figure 2-14***	***Figure 2-89***
Allocated acres available for all classes of livestock grazing[5]	619,500	517,580	653,270	617,140	616,640
Unavailable to all classes of livestock grazing (acres)[5]	56,300	158,220	22,530	58,660	59,160
Available animal unit months (AUMs)	35,520	28,958	36,950	35,558	35,520
Available for sheep grazing (acres)	619,500	121,870	653,270	617,140	616,640
Unavailable to sheep grazing (acres)		395,800			

Resource or Resource Use	Alternative A *Current Management (No Action)*	Alternative B		Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
Coal (acres)	***Figure 2-15***	***Figure 2-16***		***Figure 2-17***	***Figure 2-18***	***Figure 2-90***
Coal Resource Development Potential Area	145,850	421,500				
BLM Surface / Federal Minerals	34,370	261,080				
Private and State Surface / Federal Minerals	111,480	160,420				
Unsuitable for surface mining and surface mining operations	490	2,500				
BLM surface/federal minerals	490	2,170				
Private or State surface/federal minerals		330				
Unacceptable for Coal Leasing	0	96,650		11,860	45,690	44,570
BLM surface/federal minerals	0	88,890		7,960	43,510	42,530
Private or State surface/federal minerals		7,760		3,900	2,180	2,040
Congressionally Closed to Coal Leasing	580	1,910				
BLM surface/federal minerals	0	1,330				
Private or State surface/federal minerals	580	580				
Acceptable for Coal Leasing	144,780	320,440		405,230	371,400	371,250
BLM surface/federal minerals	33,880	168,700		249,620	214,070	215,050
Private or State surface/federal minerals	110,900	151,740		155,610	157,330	156,200
Fluid Mineral Leasing (acres)[6]	***Figure 2-19*** ***Figure 2-24***	***Alt B*** ***Figure 2-20*** ***Figure 2-25***	***Alt B.1*** ***Figure 2-21*** ***Figure 2-25***	***Figure 2-22*** ***Figure 2-26***	***Figure 2-23*** ***Figure 2-27***	***Figure 2-91***
Closed to fluid mineral leasing	44,220	219,580	306,670	44,220	50,060	44,220
Closed to Leasing – BLM surface/Federal minerals	44,220	181,220	221,570	44,220	48,510	44,220
Closed to Leasing – Private or State surface/federal minerals	0	38,360	85,100	0	1,550	0
Open to fluid mineral leasing *(refer to Appendix B)*	871,810	696,450	609,360	871,810	865,970	871,810
Open to leasing – BLM surface/federal minerals	631,580	494,580	454,230	631,580	627,290	631,580
Open to leasing – Private or State surface/federal minerals	240,230	201,870	155,130	240,230	238,680	240,230

Resource or Resource Use	**Alternative A** *Current Management (No Action)*	**Alternative B**		**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
Open to leasing subject to standard terms and conditions *(i.e., not subject to no surface occupancy [NSO] or controlled surface use [CSU] stipulations)*[7]	726,340	5,510	5,510	392,390	294,500	381,620
Open to leasing subject to standard terms and conditions (i.e., not subject to no surface occupancy [NSO] or controlled surface use [CSU] stipulations) – BLM surface/federal minerals	496,510	50	60	251,090	174,590	266,210
Open to leasing subject to standard terms and conditions (i.e., not subject to no surface occupancy [NSO] or controlled surface use [CSU] stipulations) – Private or State surface/federal minerals	229,830	5,460	5,450	141,300	119,910	115,410
Open to leasing subject to No Surface Occupancy (NSO)	25,610	452,930	404,690	22,300	238,140	103,460
Open to leasing subject to No Surface Occupancy (NSO) – BLM surface/federal minerals	24,890	354,970	318,630	14,680	187,560	74,580
Open to leasing subject to No Surface Occupancy (NSO) – Private or State surface/federal minerals	720	97,960	86,060	7,620	50,580	28,880
Open to leasing subject to Controlled Surface Use (CSU)	119,860	238,010	199,170	457,120	333,330	386,820
Open to leasing subject to Controlled Surface Use (CSU) – BLM surface/federal minerals	110,180	139,560	135,550	365,810	265,140	290,880
Open to leasing subject to Controlled Surface Use (CSU) – Private or State surface/federal minerals	9,680	98,450	63,620	91,310	68,190	95,940
Open to leasing subject to Timing Limitations (TL)	501,100	696,450	609,360	582,390	865,970	635,460
Open to leasing subject to Timing Limitations (TL) – BLM surface/federal minerals	423,900	494,580	454,230	475,220	627,290	494,340
Open to leasing subject to Timing Limitations (TL) – Private or State surface/federal minerals	77,200	201,870	155,130	107,170	238,680	141,090

Resource or Resource Use	Alternative A *Current Management (No Action)*	Alternative B		Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
Restrictions for Surface-disturbing Activities (acres) *(refer to Appendix B)*	***Figure 2-24 Figure 2-28***	***Alt B***	***Alt B.1*** ***Figure 2-25 Figure 2-29***	***Figure 2-26 Figure 2-30***	***Figure 2-27 Figure 2-31***	***Figure 2-92 Figure 2-93***
No ground disturbance (NGD)	36,450		445,720	42,660	36,180	36,180
Site-specific relocation (SSR)			230,020	241,400	512,570	307,450
Timing limitations (TL)		494,580	454,230	475,220	627,290	494,340
Locatable Minerals, Mineral Materials, and Nonenergy Solid Leasable Minerals (acres)	***Figure 2-32 Figure 2-36 Figure 2-40***	***Figure 2-33 Figure 2-37 Figure 2-41***		***Figure 2-34 Figure 2-38 Figure 2-42***	***Figure 2-35 Figure 2-39 Figure 2-43***	***Figure 2-94 Figure 2-95 Figure 2-96***
BLM Surface/Federal Minerals[8]						
Withdrawn from locatable mineral entry	28,060		28,060	28,060	28,060	28,060
Recommend for withdrawal from locatable mineral entry	27,690		382,900	9,550	54,090	15,790
Open to locatable mineral exploration or development	620,050		280,390	638,190	593,650	633,070
Closed to mineral materials disposal	102,190		499,960	56,350	132,520	121,740
Open for consideration for mineral materials disposal	573,610		175,840	619,450	543,280	554,060
Closed to nonenergy solid leasable mineral exploration and development	44,220		387,020	55,570	168,130	163,300
Open for consideration of nonenergy solid leasable mineral exploration or development	631,480		289,400	620,230	507,670	512,500
Private, State, or BOR Project Lands Surface/Federal Minerals						
Withdrawn from locatable mineral entry						
Recommend for withdrawal from locatable mineral entry			4,370	1,700	1,790	
Open to locatable mineral exploration or development	220,390		216,020	218,690	218,600	220,390
Closed to mineral materials disposal	2,500		68,310	2,260	2,850	4,040
Open for consideration for mineral materials disposal	217,890		152,080	218,130	217,540	216,350

Resource or Resource Use	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
Closed to nonenergy solid leasable mineral exploration and development		9,500	1,820	2,360	4,030
Open for consideration of nonenergy solid leasable mineral exploration or development	220,390	210,890	218,570	218,030	216,360
Special Recreation Management Areas (SRMAs) (acres)	***Figure 2-44***	***Figure 2-45***		***Figure 2-47***	***Figure 2-97***
Burn Canyon		9,160			
Dolores River Canyon	13,380	13,380		13,380	13,410
Dry Creek		42,180		42,180	42,180
Jumbo Mountain		5,020		1,360	1,600
Kinikin Hills		11,320			
North Delta		8,520			3,950
Paradox Valley		86,990			
Ridgway Trails		1,130		1,130	1,130
Roubideau		25,350		25,350	25,350
San Miguel River	35,940	36,020		36,020	29,530[9]
Spring Creek		4,980		4,980	4,980
Youngs Peak		2,710			
Total	**49,320**	**246,760**	**0**	**124,400**	**122,130**
Extensive Recreation Management Areas[10] (ERMAs) (acres)			***Figure 2-46***	***Figure 2-47***	***Figure 2-97***
Adobe Badlands			6,370		
Burn Canyon			9,160	9,160	9,160
Dolores River Canyon			13,380		
Dry Creek			41,290		
Jumbo Mountain			5,020		
Kinikin Hills			11,310	10,810	10,810
North Delta			8,520	8,520	
Paradox Valley			44,820	44,820	44,820
Ridgway Trails			1,130		
Roubideau			25,350		

Resource or Resource Use	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
San Miguel River Corridor			36,020		
Spring Creek			13,510		
Total	**0**	**0**	**215,880**	**73,310**	**64,790**
Comprehensive Trails and Travel Management (acres)	***Figure 2-48***	***Figure 2-49***	***Figure 2-50***	***Figure 2-51***	***Figure 2-98***
Open to cross-country motorized travel	8,560		16,070		3,950
Closed to motorized travel *(mechanized travel limited to designated routes)*	11,950	12,180		1,160	880
Closed to motorized and mechanized travel	44,200	102,790	45,170	57,400	55,770
Limited to existing routes for motorized and mechanized travel	465,790				
Limited to designated routes for motorized and mechanized travel	145,300	560,830	614,560	617,240	615,200
Lands and Realty (acres)	***Figure 2-52*** ***Figure 2-56*** ***Figure 2-59***	***Figure 2-53*** ***Figure 2-57*** ***Figure 2-60***	***Figure 2-54*** ***Figure 2-56*** ***Figure 2-58*** ***Figure 2-61***	***Figure 2-55*** ***Figure 2-57*** ***Figure 2-62***	***Figure 2-99*** ***Figure 2-57*** ***Figure 2-62***
ROW exclusion areas	85,080	431,040	44,550	53,700	53,040
ROW avoidance areas	22,780[11]	195,460	210,390	276,500	66,030
Designated utility corridors	26,880[12]	64,180	26,880	64,180	64,180
Identified for disposal	9,850	2,650	9,850	1,930	1,930
Areas of Critical Environmental Concern (ACECs) (acres)	***Figure 2-63***	***Figure 2-64***	***Figure 2-65***	***Figure 2-66***	***Figure 2-100***
Adobe Badlands	6,370		6,370	6,370	6,370
Biological Soil Crust				1,900	390
Coyote Wash		2,100			
Dolores River Slickrock Canyon				9,780	
Dolores Slickrock Canyon		10,670			
East Paradox		7,360			
Fairview South	210		210		
Fairview South (BLM Expansion)				610	610

Resource or Resource Use	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
Fairview South (Colorado Natural Heritage Program [CNHP] Expansion)		4,250			
La Sal Creek		10,490			
Lower Uncompahgre Plateau		31,810			
Needle Rock	80	80	80	80	80
Paradox Rock Art		1,080		1,080	1,080
Roubideau-Potter-Monitor		20,430			
Roubideau Corridors				8,720	
Salt Desert Shrub Ecosystem		34,510			
San Miguel Gunnison Sage-Grouse		470			
San Miguel River	22,780		22,780	22,780	21,660
San Miguel River Expansion		35,480			
Sims-Cerro Gunnison Sage-Grouse		25,620			
Tabeguache Creek	560				
Tabeguache Pueblo and Tabeguache Caves		26,400			
West Paradox		5,190			
Total	**30,000**	**215,940**	**29,440**	**51,320**	**30,190**
Wilderness and Wilderness Study Areas (WSAs) (acres)	***Figure 2-67***				
Tabeguache Area	8,060				
Subtotal	**8,060**				
Adobe Badlands	10,320				
Camel Back	10,680				
Dolores River Canyon	13,340				
Needle Rock Instant Study Area (ISA)	80				
Sewemup Mesa	1,740				
WSA Subtotal	**36,160**				
Total Wilderness and WSA	**44,220**				

Resource or Resource Use	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
Eligible (Alternative A) or Suitable (Alternatives B, D, E) Wild and Scenic River Study Segments (miles crossing BLM-administered land)	***Figure 2-68***	***Figure 2-68***		***Figure 2-69***	***Figure 2-69***
Gunnison River Segment 2	0.4	0.4			
Monitor Creek	9.4	9.4		9.4	9.4
Potter Creek	9.8	9.8		9.8	9.8
Roubideau Creek Segment 1	10.0	10.0		10.0	10.0
Roubideau Creek Segment 2	3.5	3.5			
Deep Creek	0.6	0.6			
West Fork Terror Creek	0.5	0.5			
Beaver Creek	14.2	14.2		14.2	14.2
Dry Creek Segment 1	10.4	10.4			
Naturita Creek	10.0	10.0			
Saltado Creek	4.1	4.1		4.1	4.1
San Miguel River Segment 1	17.3	17.3		17.3	17.3
San Miguel River Segment 2	3.6	3.6		3.6	3.6
San Miguel River Segment 3	5.3	5.3		4.5	4.5
San Miguel River Segment 5	2.6	2.6		1.3	1.3
San Miguel River Segment 6	2.3	2.3		2.1	2.1
Tabeguache Creek Segment 1	3.6	3.6		3.4	3.4
Tabeguache Creek Segment 2	7.9	7.9			
Lower Dolores River	6.9	6.9		4.2	4.2
North Fork Mesa Creek	5.8	5.8			
Dolores River Segment 1a	8.7	8.7		8.7	8.7
Dolores River Segment 1b	0.9	0.9			
Dolores River Segment 2	5.4	5.4		5.3	5.3
Ice Lake Creek Segment 2	0.3	0.3			
La Sal Creek Segment 1	0.6	0.6			
La Sal Creek Segment 2	3.8	3.8		3.3	3.3
La Sal Creek Segment 3	3.4	3.4		3.4	3.4

Resource or Resource Use	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
Lion Creek Segment 2	1.3	1.3			
Spring Creek	1.5	1.5			
Total	**154.1**	**154.1**	**0**	**104.6**	**104.6**
Watchable Wildlife Viewing Sites (acres)		***Figure 2-70***			***Figure 2-70***
Uncompahgre Riverway		20			20
Billy Creek		2,990			2,990
San Miguel River ACEC		22,780			22,780
Total	**0**	**25,790**	**0**	**0**	**25,790**

Source: BLM 2012a, 2018a

Cell shading indicates zero acres or miles under that alternative.

[1]Refer to **Appendix D** (Ecological Emphasis Areas) for more information.

[2]VRM on split-estate is a recommendation and would be used as a tool for designing and siting development of energy projects. Acres are estimates only and have been updated since the Draft RMP/EIS, as appropriate, based on improved mapping.

[3]Private edge-holdings and inholdings on National Forest System lands that do not have a Visual Resource Inventory.

[4]All allotments in the UFO were reevaluated between the Draft RMP/EIS and Proposed RMP/Final EIS, which revealed minor clerical errors of allotment acres and AUMs, and corrected any overlap with the Gunnison Gorge and Dominguez–Escalante NCAs in Alternative D.

[5]Allocated acres "available" and Available AUMs may include areas that are unallotted; see **Appendix E** (Livestock Grazing Allotments and Allotment Levels).

[6]Acres include both BLM and private or state surface/federal minerals

[7]Some TLs could overlap this area but were not excluded due to the temporal nature of the TL stipulation.

[8]Includes BOR-withdrawn non-project lands.

[9]The San Miguel River SRMA boundary was adjusted in Alternative E to create a more easily defined boundary (i.e., based on topography, roads, and similar on-the-ground definition), as opposed to jurisdictional boundaries, to aid the public's understanding of the boundary.

[10]Planning guidance in place when the San Juan/San Miguel and Uncompahgre Basin RMPs were written directed that all BLM-administered land not designated as an SRMA should be designated as an ERMA. Under today's recreation guidance, what was formerly the Uncompahgre ERMA would be considered "undesignated" (i.e., neither an ERMA nor an SRMA). As such, the terminology has been updated to reflect more closely the recreation guidance under which this RMP was written to avoid nonequivalent comparisons.

[11] Includes the existing San Miguel River ACEC

[12] Includes slight overlap between the West Wide Energy Corridor and South Canal, North Delta, and Highway 141 corridor

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

The following alternatives were considered but eliminated from detailed study.

2.4.1 Implement Exclusive Resource Use or Protection

As outlined in **Section 1.1**, the purpose of this RMP is to ensure public lands are managed in accordance with the intent of Congress, as stated in the FLPMA, under the principles of multiple-use and sustained yield. Alternatives promoting exclusive use or maximum development, production, or protection of one resource at the expense of other resources or resource uses were eliminated from further consideration. This eliminates alternatives such as closing all BLM lands to livestock grazing (discussed further in **Section 2.4.7**, Close Entire Decision Area to Livestock Grazing) or wood harvest, or managing those lands only for fish, wildlife, and wilderness values at the exclusion of other resource considerations. Each proposed alternative allows for some level of support, protection, or use of all resources in the Planning Area. In some instances, the alternatives include various considerations for eliminating or maximizing individual resource values or uses in specific areas where conditions warrant.

2.4.2 Open or Close Entire Decision Area to Off-highway Vehicle Use

Alternatives that open or close all BLM-administered lands within the Uncompahgre RMP Decision Area (Decision Area) to year-round off-highway vehicle (OHV) use, regardless of current travel restrictions, were considered and eliminated from further consideration. Opening the entire Decision Area to OHV use would conflict with policy and legislation. All of the alternatives propose closure of areas to OHV use based on policy, legislation, or conflict with resources or uses. Restrictions are needed to address travel concerns and recreation demands, and also to protect resource values. However, resource values that can only be protected by prohibiting OHV use throughout the entire Decision Area have not been identified.

2.4.3 Prohibit Fluid Mineral Leasing throughout Decision Area

All of the alternatives propose closure of areas to fluid mineral leasing based on policy or legislation, or when is has been determined that resource values cannot be adequately protected even with restrictive lease stipulations. Resource values that can only be protected by prohibiting all fluid mineral leasing throughout the Decision Area have not been identified. Although greenhouse gas emissions and associated climate change impacts were considered as an issue that could reflect a resource conflict; a full closure to fluid mineral leasing alternative was not carried forward because the BLM has no suitable thresholds or standards to measure and compare the significance of impacts related to greenhouse gas emissions under that alternative relative to other alternatives. An alternative prohibiting fluid mineral leasing throughout the Decision Area would not meet the purpose of and need for the RMP (detailed in **Section 1.1**), part of which is management direction in accordance with principles of multiple-use and sustained yield. Leasing of public lands for fluid mineral exploration and production is authorized and directed by the FLPMA, BLM Land Use Planning Handbook (H-1790-1), Mineral Leasing Act of 1920 (as amended), and the Energy Policy Act of 2005 (Public Law 109-58). Current BLM policy directs field offices to apply the least restrictive management constraints necessary to achieve resource goals and objectives for principal uses of public lands.

2.4.4 Prohibit Coal Leasing throughout Decision Area

All of the alternatives propose closure of areas to coal leasing based on policy, legislation, or protecting resource values. Resource values that can only be protected by prohibiting all coal leasing throughout

the Decision Area have not been identified. Although greenhouse gas emissions and associated climate change impacts were considered as an issue that could reflect a resource conflict; a full closure to coal leasing alternative was not carried forward because the BLM has no suitable thresholds or standards to measure and compare the significance of impacts related to greenhouse gas emissions under that alternative relative to other alternatives. An alternative prohibiting coal leasing throughout the Decision Area would also not meet the purpose of and need for the RMP (detailed in **Section 1.1**), part of which is management direction in accordance with principles of multiple-use and sustained yield. In addition, the BLM has no available method to measure residual impacts after mitigation. Coal leasing on public lands is authorized by the Mineral Leasing Act of 1920 (as amended) and the Mineral Leasing Act for Acquired Lands of 1947 (as amended). An RMP-level decision to open lands to leasing represents BLM's determination, based on the information available at the time, that it is appropriate to allow development of a parcel consistent with the terms of the lease, laws, regulations, and orders, and subject to reasonable conditions of approval. When applying leasing restrictions, current BLM policy directs field offices to apply the least restrictive management constraints necessary to meet the resource protection objective.

2.4.5 Prohibit Herbicide Use throughout Decision Area

The BLM adheres to an integrated vegetation management program, using fire, mechanical and manual methods, biological treatments, and herbicides. Each of these management tools have different strengths and weaknesses and should be available for use, enabling the BLM to select the control method or combination of methods that optimizes the effectiveness of vegetation management while minimizing costs and environmental impacts. Eliminating the use of pesticides could lead to increases in noxious and invasive species and decreases in native species, in conflict with BLM Colorado Public Land Health Standard 3 (outlined in **Appendix C**). In addition, the UFO adheres to the Vegetation Treatments Using Herbicides Plan (BLM 2007a). The EIS for the plan analyzed an alternative that considered not using herbicides (Alternative C). For these reasons, a separate alternative that prohibits the use of pesticides was considered but dismissed.

2.4.6 Designate Additional Wilderness Study Areas

The authority for BLM to designate WSAs ended in 1993. Consequently, additional WSAs were not considered during development of this RMP. The BLM does have an obligation under FLPMA sections 201 and 202 to maintain an inventory of all public lands and their resources, including wilderness characteristics, and to consider such information during land use planning. Plan alternatives include allocations and actions that protect lands with wilderness characteristics. **Appendix F** (Summary of Uncompahgre Planning Area Wilderness Characteristics Inventory: 2015 Update) details results of the BLM inventory of non-WSA lands (excluding the Tabeguache Area) for wilderness characteristics. Only areas with inventoried wilderness characteristics have been brought forward for further analysis.

2.4.7 Make Entire Decision Area Unavailable to Livestock Grazing

An alternative proposing to make all BLM-administered lands within the Decision Area unavailable for livestock grazing was considered but dismissed from detailed analysis.

Management of livestock grazing in the RMP, which includes proposed reductions and closures, considered many issues, including existing and potential ACECs, selenium/saline soils, riparian issues, water supplies, disturbed areas (e.g., wildfire), private land conflicts, recent use (e.g., 10 years or longer since it was used or permitted), special use areas (e.g., special status species), domestic sheep/bighorn sheep interaction, and the precipitation zone (16 inches) where salts and carbonates are present in the Mancos shale soil profile.

During this planning process, including public scoping, the BLM did not identify issues or conflicts that could only be resolved through the elimination of all livestock grazing throughout the Decision Area. Where appropriate, the preclusion or adjustment of livestock use within an allotment or area was incorporated into the alternatives to address the issues noted above. This resulted in a reduction in AUMs and the amount of BLM-administered land available for livestock grazing in all action alternatives, with the largest reduction in Alternative B (approximately 16 percent reduction, as compared with the no action alternative [A]).

Land health has been assessed across the Decision Area using the BLM Colorado Standards for Public Land Health (BLM 1997; **Appendix C**). Standards describe conditions needed to sustain public land health and relate to all uses of BLM lands. Most lands are meeting land health standards.

The cumulative evaluation for Land Health Standard 1 (upland soils exhibit infiltration and permeability rates that are appropriate) and for Land Health Standard 3 (healthy, productive plant and animal communities of native and other desirable species) showed that 93 percent of the Decision Area is meeting Land Health Standard 1, and 84 percent of the Decision Area is meeting Land Health Standard 3. The most common resource issues were: 1) historic grazing; 2) noxious and invasive weeds; 3) roads; and 4) OHVs.

Only 1.1 percent of the Decision Area was determined not to be meeting Land Health Standard 1, and 1.8 percent of the Decision Area was determined not to be meeting Land Health Standard 3, with livestock grazing noted as a significant contributing factor. Alternative B makes grazing unavailable in some areas that have land health problems. When considering allotments that would be available for livestock grazing in Alternative B, 1 percent of the Decision Area was determined not to be meeting Land Health Standard 1, and 0.7 percent of the Decision Area was determined not to be meeting Land Health Standard 3, with livestock grazing noted as a significant contributing factor.

Alternative B would make livestock grazing unavailable on selenium/saline soils and the precipitation zone (16 inches), below which salts and carbonates are present in the Mancos shale soil profile, and would avoid some sensitive resources associated with ACECs. Alternative B would also exclude livestock grazing for three years on disturbed areas, such as after a fire or vegetation treatment project.

Closure to grazing is not the only available mechanism to reduce grazing-related impacts. If livestock grazing is identified as a significant factor for not achieving or moving toward achieving BLM Colorado Public Land Health Standards, or if monitoring shows an adjustment is needed, then implementation-level management changes can be made in coordination with the permittees and interested public. Such actions can include adjusting AUMs, changing the season or length of grazing use, implementing vegetation treatments, and adjusting grazing management practices. Permit terms and conditions could also be modified.

In addition, making the Decision Area unavailable to livestock grazing would be inconsistent with planning criteria, which established the parameters for the alternatives and provided guidance by program. No comments were received on the preliminary planning criteria related to livestock grazing during the scoping period.

For these reasons, the no grazing alternative for the entire Planning Area was dismissed from further consideration in this EIS.

2.5 SUMMARY OF MANAGEMENT GUIDANCE FOR ALTERNATIVES A, B/B.1, C, D, AND E

Table 2-2 (Highlights of Alternatives) summarizes the full alternatives matrix in **Appendix T** (Description of Alternatives). In Table 2-2, implementation-level decisions are identified in Alternative E, the Agency-Proposed RMP, by an asterisk (*) following the decision. **Appendix T** includes a description of all decisions proposed for each alternative, including goals and objectives.

Table 2-2
Highlights of Alternatives

Resources	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
Management Common to All Alternatives					
Comply with state and federal laws, regulations, policies, and standards, including FLPMA multiple use mandates.					
Implement actions originating from laws, regulations, and policies and conform to day-to-day management, monitoring, and administrative functions not specifically addressed.					
Preserve valid existing rights, which include any leases, claims, or other use authorizations established before a new or modified authorization, change in land designation, or new or modified regulation is approved. Existing fluid mineral leases are managed through conditions of approval outlined in the RMP.					
Apply conditions of approval, best management practices (BMPs), standard operating procedures (shown in **Appendix G**), other site-specific mitigation, and/or off-site mitigation measures to all resource uses to promote rapid reclamation, maximize resource protection, and minimize soil erosion.					
Seek to enhance collaborative opportunities, partnerships, and communications with other agencies and interested parties to implement the RMP, including education and outreach and project-specific activities (such as monitoring and trail development).					
Resources					
Air Quality	Limit air quality degradation from authorized activities on BLM-administered lands through appropriate analyses of impacts on air quality.				Limit air quality and related values degradation from authorized activities on BLM-administered lands (or related to BLM subsurface mineral development) through appropriate analyses of impacts on air quality.

Resources	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
	• Participate in, conduct, or require air modeling analyses as described in the Colorado BLM Comprehensive Air Resource Protection Protocol (Appendix H). • Attach Lease Notice CO-56 to new oil and gas leasing agreements. • Develop Conditions of Approval for project-specific surface-disturbing activities.				
	Work cooperatively with local, state, federal, and tribal agencies to enhance air-monitoring efforts.				Same as Alternative D, plus: • Conduct air quality and meteorological monitoring siting analyses. • Include mitigation requirements in project approval decisions if determined to be appropriate.
	Implement the adaptive management strategy for protecting air resources as described in the Colorado BLM Comprehensive Air Resource Protection Protocol (Appendix H).				Same as Alternative D, plus: include mitigation requirements in project approval decisions if determined to be appropriate.
Climate	No similar action	Manage native vegetation and wildlife species, soil and water resources, and wildlife habitats to maintain productivity, viability, and natural processes.			
		• Address climate change effects on soil and water resources, vegetation, and habitats and apply appropriate	• Seed local native species into new habitats where needed.	• Address climate change effects on soil and water resources, vegetation, and habitats and apply appropriate	• Address climate change effects on soil and water resources, vegetation, and habitats and apply appropriate

Resources	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
		management to protect these resource values. • Plant 1- to 2-year old seedlings or seed local native species into new habitats where needed • Emphasize providing habitat for pollinators and butterflies, especially monarchs. • Minimize unnatural (e.g., size and intensity) soil and vegetation disturbance in ecological emphasis areas.		management to protect these resource values. • Plant 1- to 2-year old seedlings or seed local native species into new habitats where needed. • Emphasize providing habitat for pollinators and butterflies, especially monarchs. • Minimize unnatural (e.g., size and intensity) soil and vegetation disturbance in ecological emphasis areas.	management to protect these resource values. • Plant 1- to 2-year old seedlings or seed local native species into new habitats where needed. • Emphasize providing habitat for pollinators and butterflies, especially monarchs.
Land Health Land Health Standards (BLM 1997) are in **Appendix C**.	No similar action	Apply land and stream health improvement projects in areas likely to be stabilized or improved to a higher health condition, regardless of land health status.	Apply land and stream health improvements on lands, streams, and wetlands rated as *not meeting* BLM Colorado Public Land Health Standards.	Same as Alternative B in ACECs, WSAs, lands managed to minimize impacts on wilderness characteristics, areas with exemplary, ancient, or rare vegetation, and Wild and Scenic River segments with a vegetation ORV. Elsewhere, same as Alternative C.	
	No similar action	Close, limit, or modify the causes, where an activity has been	Same as Alternative B except for no closure and apply action to	Same as Alternative B except for no closure and including consideration of recreation activities.	

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		demonstrated to be causing land health problems, to improve the health of lands, streams, and wetlands rated as *not meeting* the BLM Colorado Public Land Health Standards.	areas rated as *meeting* the BLM Colorado Public Land Health Standards *with problems* with a downward trend.		
	No similar action	Unless it can be demonstrated that new projects and land use authorizations do not reduce the opportunity to improve the health of lands, streams, and wetlands rated as *not meeting* the BLM Colorado Public Land Health Standards, apply: • ROW avoidance. • Stipulation: CSU-1/SSR-1.	Same as Alternative A	Require that new projects and land use authorizations identify BMPs or conditions of approval that minimize conflicts with health-improvement measures for lands, streams, and wetlands rated as *not meeting* the BLM Colorado Public Land Health Standards.	
Soils and Geology	Make management units available for erosion and salinity control objectives and projects that do not conflict with primary objectives of each unit.	Manage activities in the Colorado River Basin to minimize the yield of sediment, salt, and selenium contributions from BLM-administered lands to water resources.			

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	Allowable Use Stipulations: • TL-UB-1 (BLM1989a) • CSU-CO-27 (BLM 1991a) (Refer to Appendix B for details.)	Allowable Use Stipulations: • NSO-1/NGD-1 • CSU-4/SSR-4 • NSO-4/NGD-2 • TL-1 North Fork Area Only Stipulation: • NL-1 • NSO-2 • NSO-3 • NSO-5 • CSU-7 (Refer to Appendix B for details.)	Allowable Use Stipulations: • CSU-2/SSR-2 • CSU-5/SSR-5 • CSU-8/SSR-7 (Refer to Appendix B for details.)	Allowable Use Stipulations: • CSU-3/SSR-3 • CSU-6/SSR-6 • CSU-9/SSR-9 • NSO-6/SSR-8 • TL-2 (Refer to Appendix B for details.)	Allowable Use Stipulations: • CSU-3/SSR-3 • CSU-6/SSR-6 • CSU-8/SSR-7 • CSU-9/SSR-9 (Refer to Appendix B for details.)
	Locate and assess nonfunctional, eroding, earthen check dams in the Mancos Shale areas north of Delta.	Inventory and assess stock ponds, check dams, and contour furrows and rehabilitate, repair, or remove those structures that are eroding soils with the highest salinity and selenium concentrations and containing severe weed infestations.	No similar action	When feasible, inventory and assess stock ponds, check dams, and contour furrows and rehabilitate, repair, or remove those structures with severe/active erosion. Combine efforts with other projects where feasible.	
	No similar action.	Manage 7,360 acres of potential biological soil	Manage 360 acres of rare biological soil	Manage 1,900 acres of rare biological soil	Manage 390 acres of rare biological soil

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		crust in East Paradox ACEC as ROW exclusion area.	crust in East Paradox as ROW exclusion area.	crust in the Biological Soil Crust ACEC as a ROW exclusion area. Exception: Allow ROWs for private edge-holdings for reasonable access and utilities only if other access is not possible.	crust in the Biological Soil Crust ACEC as a ROW avoidance area.
	No similar action	Protect rare biological soil crust in East Paradox Area by pursuing private parcel acquisition from willing sellers.	Same as Alternative A	Same as Alternative B	Same as Alternatives A and C
	No similar action	Manages slopes of 30 percent or greater (174,540 acres) as ROW exclusion area.	Manager slopes of 40 percent or greater (115,080 acres) as ROW avoidance areas.	Manage slopes of 30 percent or greater (174,540 acres) as ROW avoidance areas.	No similar action
	No similar action	Manage saline/selenium soils as ROW exclusion areas.	Manage saline/selenium soils as ROW avoidance areas.	No similar action	
Water Resources	No similar action	Manage lands to improve water quality and promote the delisting of state impaired water bodies (303[d]-listed and Monitoring and Evaluation list) in areas	Manage lands to improve water quality and promote the delisting of state impaired water bodies (303[d]-listed water bodies only) in areas where BLM management actions are contributing to impaired water quality.		

Resources	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
		where BLM management actions are contributing to impaired water quality.			
		No Similar Action.	Develop a water and aquatic monitoring plan using the BLM aquatic AIM protocol, if necessary, to determine areas where adaptive management is needed.		
	No similar action	Apply the restrictions or closures specified below on the following lands: • ROW exclusion area: Within 2,640 feet (0.50-mile) on either side of a classified surface water-supply stream segment (as measured from the average high-water mark) for a distance of 5 miles upstream of a public water supply intake classified by the State as a "water supply." • Within a 2,640-foot (0.50-mile) buffer of all public water supplies that use a	Apply the restrictions or closures specified below on the following lands: ROW avoidance area: • Within 1,000 feet on either side of a classified surface water-supply stream segment (as measured from the average high-water mark) for a distance of 5 miles upstream of a public water supply intake classified by the State as a "water supply." (Refer to Appendix T for details.) • Within a 1,000-foot buffer of all public water supplies that use a groundwater well or spring.	• Within a 1,000-foot buffer of all public water supplies that use a groundwater well or spring. • Designate as ROW avoidance areas a 0.25-mile buffer along the Gunnison, North Fork Gunnison, San Miguel, Uncompahgre, and Dolores river corridors. • Manage a 325-foot buffer along perennial streams	• Within a 2,640-foot (0.50-mile) buffer of all public water supplies that use a groundwater well and groundwater under the direct influence of surface water. • Designate as ROW avoidance areas a 400-foot buffer along the Gunnison, North Fork Gunnison, San Miguel, Uncompahgre, and

Resources	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
		groundwater well or spring. • Designate as ROW avoidance areas a 0.25-mile buffer along the Gunnison, North Fork Gunnison, San Miguel, Uncompahgre, and Dolores river corridors. • Manage a 325-foot buffer along perennial streams as ROW exclusion areas. (Refer to Appendix T for details.)		as ROW exclusion areas. • Apply the following requirements to oil and gas well bores that are within 305 meters (1,000 feet) of a domestic water well, beginning at the ground surface and extending through the freshwater aquifer: • Extend surface casing through the freshwater aquifer. • Require freshwater mud for drilling the surface casing.	Dolores river corridors. • Manage a 50-foot buffer along perennial streams as ROW avoidance areas.
		Apply the following restrictions or closures on the lands identified above: • Close to mineral materials disposal (e.g., sand and gravel). • Close to nonenergy solid mineral leasing (e.g., potash, sodium, and phosphate).			
		• Close to coal leasing. • Close to livestock grazing. • Recommend to the Secretary of the Interior withdrawal from locatable minerals (e.g., gold, uranium, and other hard rock).		• Minimize impacts from livestock grazing on these lands. • Recommend to the Secretary of the Interior withdrawal from locatable minerals (e.g., gold,	• Minimize impacts from livestock grazing on these lands. • Require a Plan of Operations for locatable mineral development.

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
				uranium, and other hard rock).	
	Allowable Use Stipulations: • NSO-CO-7 (BLM 1991a) • LN-UB-1 (Refer to Appendix B for details.)	Allowable Use Stipulations: • NL-2/NGD-3 • NL-6 • NSO-10/NGD-4 • NSO-14 • NGD-5 (apply if public water providers develop source water protection plan) North Fork Area Only Stipulation: • NL-3 • NL-4 • NL-5 • NL-7 • NL-9 • NSO-7 • NSO-8 • NSO-12 • NSO-15 • NSO-16 (Refer to Appendix B for details.)	Allowable Use Stipulations: • CSU-10/SSR-10 • CSU-11/SSR-12 • NSO-13 • NSO-13b (apply if public water providers develop source water protection plan) (Refer to Appendix B for details.)	Allowable Use Stipulations: • NSO-9/SSR-11 • NSO-11/SSR-13 • CSU-12 • NL-8 (apply if public water providers develop source water protection plan) (Refer to Appendix B for details.)	Allowable Use Stipulations: • CSU-10/SSR-10 • CSU-12/SSR-13 • CSU-13 • CSU-59 • NSO-69 (Refer to Appendix B for details.)
	No similar action	Protect soil, water, and vegetation resources during periods of drought (guidelines - Appendix I).			
	Maintain current water rights, including groundwater (e.g.,	Provide sufficient water quantity on BLM-administered lands for multiple use management and functioning, healthy riparian, and aquatic ecosystems.			

Resources	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
	wells and springs), to benefit wildlife and livestock, including: • 54 surface water rights • 2 ditches • 1 well • 15 reservoirs • 121 springs/seeps Work with Colorado Water Conservation Board to ensure a sufficient instream flow to benefit warm and cold water fish species on: • 23 existing instream flow rights held by the Colorado Water Conservation Board and • Streams where Colorado Water Conservation Board applications for instream flow water rights are pending, such as the Lower San Miguel River and Tabeguache Creek.	• Maintain current water rights to benefit wildlife and livestock. • Object to proposals that could jeopardize existing rights. • File for new surface water rights on perennial and seasonal streams and new water rights for groundwater sources (i.e., springs/seeps, wells, reservoirs, streams) in adequate quantities to protect Planning Area resource needs and sustainability.			
		Make recommendations to the Colorado Water Conservation Board for protection or enlargements of instream flows on appropriate stream segments. Assist the Conservation Board in instream flow assessments and monitoring of current BLM instream flow stream reaches for compliance.	No similar action	Same as Alternative B	

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	No similar action	Protect groundwater resources and recharge areas to maintain functioning condition of all parameters within the hydrologic cycle, including groundwater quantity and quality.			
Vegetation	Allowable Use Stipulations: • CSU-CO-28 (Refer to Appendix B for details.)	Allowable Use Stipulations: • NSO-17/NGD-6 • NSO-18/NGD-7 North Fork Area Only Stipulation: • NL-4 (Refer to Appendix B for details.)	Allowable Use Stipulations: • CSU-15/SSR-15 (Refer to Appendix B for details.)	Allowable Use Stipulations: • NSO-19/SSR-16 • CSU-16 • CSU-14/ SSR-14 (Refer to Appendix B for details.)	Allowable Use Stipulations: • CSU-12/SSR-13 (Refer to Appendix B for details.)
	• Use locally derived native species or noninvasive species for revegetation. • Implement Integrated Weed Management Strategy.	• Maximize (and/or minimize) loss of native vegetation and natural processes (varies by alternative). • Maintain, protect, or improve aquatic/riparian/wetland habitat in specified areas. • Restore areas of degraded vegetation. • Revegetate areas impacted by wildfire or resource use and development. • Use locally derived native species or noninvasive species for revegetation. • Manage lands under Integrated Weed Management strategies to support BLM Colorado Public Land Health Standards. • Require weed-free certification for all hay, straw, or mulch used or stored on BLM-administered lands.			
	No similar action	Manage exemplary, ancient, and rare vegetation communities as ROW exclusion areas.	Manage exemplary, ancient, and rare vegetation communities as ROW avoidance areas.		Same as Alternative A
	No similar action	Provide the public with commonly available and renewable native plant materials through the sale of collection permits (with certain species, area, and purpose restrictions).			
		Make 444,160 acres available.	Make 631,060 acres available.	Make 582,950 acres available.	Make 631,060 acres available.

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	Coordinate forestry and woodland products management to ensure riparian resources are protected.	Close riparian areas to mineral materials disposal (500 foot buffer), wood products collection and harvest, plant products collection (100 ft buffer). No recreation activities or events permits.	Limit mineral materials disposal, wood products collection and harvest, and other plant products collection within riparian areas to locations where they would have the least impact.	Close riparian areas to mineral materials disposal, wood products collection and harvest, and other plant products collection, except for research, invasive species control, and revegetation (with a 100-foot buffer). Require additional riparian stipulations for commercial special recreation permits (SRPs) and restrict use to designated routes in locations where they would have the least impact for organized group and event permits.	No similar action
	Maintain, protect, or improve aquatic/riparian habitat in specified areas.				
	On 15,350 acres protect riparian/aquatic zones with up to 0.25-mile wide.	Manage naturally occurring riparian and wetland areas, seeps, and springs, as well as a 100-foot buffer from their edge, as ROW exclusion areas, unless it can be determined	Require that new ROW authorizations in naturally occurring wetlands and riparian areas, seeps, and springs identify effective measures to maintain Proper	Manage naturally occurring riparian and wetland areas, seeps, and springs, as well as a 325-foot buffer from their edge, as ROW avoidance areas unless it can be	Manage naturally occurring riparian and wetland areas, seeps, and springs, as well as a 50-foot buffer from their edge, as ROW avoidance areas unless it can be determined

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		that the project would not diminish site integrity.	Functioning Condition.	determined that the project would not diminish hydrologic or vegetation conditions.	that the project would maintain Proper Functioning Condition.
	Require that all seed slated for BLM reclamation projects meet the Colorado Noxious Weed Seed requirements of prohibited and restricted seed. Seed lots shall contain no more than 0.5 percent by weight of other weed seed (BLM 1997).	Require that all seed used on BLM-administered lands meet the Colorado Noxious Weed Seed requirements of prohibited and restricted seed. In addition to BLM policy of weed-free seed use, seed lots shall contain less than 250 seeds per pound of cheatgrass and/or Japanese brome (in combination). Other species determined to be noxious or invasive may be added to this list. All seed must be of certified quality or source identified.	Same as Alternative A	Same as Alternative B	
	No similar action	Require all hay, straw, or mulch that is used or stored on BLM-administered lands be certified as weed free.			

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
Fish and Wildlife	Allow augmentation and reintroduction to expand the current range of:				
	• Native or naturalized wildlife species (excluding federal or state-listed endangered, threatened, or candidate species) following environmental analysis in management units 3, 5, 8, 9, 13-15.	• Native species in response to partner or stakeholder proposals and requests and in coordination with CPW.	• Desired game species and species of economic importance, in coordination with CPW.	• Aquatic and terrestrial species or to expand population numbers to improve genetic viability of native terrestrial and aquatic species, in coordination with CPW.	• Aquatic and terrestrial species or to expand population numbers to improve genetic viability of native terrestrial and aquatic species, in coordination with CPW.
	• Transplant bighorn sheep into the Winter Mesa area (if they will not conflict with livestock) to reestablish in historically occupied habitat, increase total population numbers, and ensure species viability in the region.	• Allow for restoring wild sheep populations in suitable and historic wild sheep habitat not currently stocked with domestic sheep and goats.	• No Similar Action. (Restoration of wild sheep would not be pursued.)	• Allow for restoring wild sheep populations in areas where 1) the Domestic/Bighorn Sheep Probability of Interaction Assessment depicts existing sheep allotments are not at a high or moderate risk for disease transmission and 2) in suitable and historic wild sheep habitat not currently stocked with domestic sheep and goats.	• Allow for restoring wild sheep populations in areas where 1) the Domestic/Bighorn Sheep Risk of Contact (RoC) model, or currently accepted model depicts existing sheep allotments are not at a high or moderate risk for disease transmission and 2) in suitable and historic wild sheep habitat not currently stocked with domestic sheep and goats.

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	To protect elk calving areas, prohibit motorized and mechanized travel from May 15 to June 15 in the area.	• To protect elk calving areas, prohibit motorized and mechanized travel from April 15 to June 30 in elk production/calving areas. • Add other areas as appropriate through future site-specific travel management analyses. • Where needed, extend seasonal closures to include pedestrian or equestrian traffic.	• To protect elk calving areas, prohibit motorized and mechanized travel from May 15 to June 15 in elk production/calving areas. • Add other areas, as appropriate, through future site-specific travel management analyses. • Where needed, extend seasonal closures to include pedestrian or equestrian traffic.	No similar action.	Same as Alternative B and C, except dates are May 15 to June 30 and the Field Manager may modify the size and timeframes upon consultation with CPW if monitoring information indicates that plant seasonal cycles or animal use patterns are inconsistent with dates established.*
	Give special management consideration to all perennial streams that could provide quality fisheries through the activity planning process and monitoring system to maintain, improve, or enhance resource conditions associated with aquatic/riparian habitat.	Annually enhance, protect, or restore at least 5 miles of aquatic habitat, including modification or removal of special status fish migration barriers, in consultation with the CPW, and structural and vegetation improvements to benefit primarily	Annually improve at least 2 miles of aquatic habitat, including structural and vegetation improvements to benefit primarily game species and popular fisheries.	Pursue opportunities to enhance, protect, or restore native aquatic species habitats, in consultation with the CPW, including modification or removal of special status fish migration barriers and structural and vegetation improvements	Same as Alternative D plus Quantity and quality of aquatic habitats are maintained or enhanced to provide for the long-term sustainability of biological diversity and population viability of all native and/or desired nonnative vertebrate species.

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		nongame native species.		commensurate with other resource objectives.	
	Monitor, maintain, or improve known active fisheries habitat in priority listed areas.	Maintain or improve fisheries habitat where consistent with maintaining native species populations. Prioritize systems based on CPW conservation and management objectives.	Maintain or improve sports fisheries habitat where compatible with adjoining surface uses.	Same as Alternative B	
	Protect, maintain, and enhance critical and crucial habitats for big game, upland game birds, waterfowl, and state and federal nongame species of special interest or concern.	Designate specified areas (242,580 acres) as ecological emphasis areas and manage to preserve the continuity of habitats, vegetation communities, and native wildlife	Designate specified areas (24,150 acres) as ecological emphasis areas and manage to preserve as much as possible the continuity of habitats, vegetation communities, and native wildlife	Designate specified areas (177,700 acres) as ecological emphasis areas and manage to preserve the continuity of habitats, vegetation communities, and native wildlife within, while following vegetation mosaic objectives	Same as Alternative A
	No similar action	• Manage portions of specified ecological emphasis areas, totaling 186,080 acres, as ROW exclusion areas. • Manage portions of specified ecological	Manage all ecological emphasis areas totaling 24,150 acres as ROW avoidance	Manage all ecological emphasis areas totaling 177,700 acres as ROW avoidance areas.	Same as Alternative A

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		emphasis areas, totaling 56,500 acres, as ROW avoidance.			
	Implement habitat improvement projects where necessary to stabilize and/or improve unsatisfactory or declining habitat conditions. Identify such projects through habitat management plans or coordinated resource management plans.	Annually enhance or restore at least 500 acres of terrestrial habitat to benefit primarily native, nongame species, including birds, and to increase carrying capacity for native game species, emphasizing winter range and crucial habitat types.	Annually treat at least 3,000 acres of terrestrial habitat to increase carrying capacity for game species, including game birds, emphasizing winter range and crucial habitat types.	Restore, enhance, conserve, and promote aquatic and terrestrial species conservation and ecosystem integrity and values in consultation with the CPW. Emphasize the management of native species, including objectives and improvements for ensuring habitat diversity, productivity, viability, and natural processes throughout the ecosystem, and striving for stable, sustainable wildlife populations. Design land treatment projects and other facilities to improve the quality and quantity of wildlife habitats.	Same as Alternative D plus emphasis on consultation and coordination with CPW.

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	Habitat and Allotment plans should be developed and implemented. They should incorporate objectives, be closely coordinated with state and federal partners.	Coordinate with CPW during implementation to achieve desired habitat conditions for native species and to achieve BLM Colorado Public Land Health Standards (BLM 1997; Appendix C). Review this strategy every 5 years.			
	No similar action	Use adaptive management to conserve and avoid impacts on populations of Birds of Conservation Concern, Partners-in-Flight priority species, and other species of concern.			
	No similar action	Apply appropriate restrictions and mitigation to minimize impacts on migratory birds consistent with the MBTA of 1918. Focus these protection efforts on USFWS Birds of Conservation Concern, Partners-in-Flight species, and other conservation priority habitats.			Including the use of best available science, Same as Alternatives B-D.
	Allowable Use Notices and Stipulations: • TL-CO-9 • TL-CO-10 • TL-UB-05 • TL-CO-11 • TL-CO-12 • TL-CO-14 (Refer to Appendix B for details.)	Allowable Use Notices and Stipulations: • TL-3 • NSO-20/SSR-17 • CSU-17/SSR-18 • TL-6 • TL-9 • CSU-18/SSR-19 • TL-12 • TL-13 North Fork Stipulation Only: • NSO-21 (Refer to Appendix B for details.)	Allowable Use Notices and Stipulations: • TL-4 • CSU-17/SSR-18 • TL-7 • TL-10 (Refer to Appendix B for details.)	Allowable Use Notices and Stipulations: • TL-5 • CSU-17/SSR-18 • TL-8 • TL-11 • CSU-18/SSR-19 • TL-12 • TL-13 (Refer to Appendix B for details.)	Allowable Use Notices and Stipulations: • TL-5 • TL-8 • TL-11 • CSU-18/SSR-19 • TL-12 • LN-UFO-1 (Refer to Appendix B for details.)

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
Special Status Species	• Recognize key/priority habitats for terrestrial, fish, and aquatic wildlife.				
	Maintain or improve historically occupied or potentially suitable threatened and endangered species habitat. Maintain or improve habitat for sensitive plant species and wildlife species of high federal interest.	Restore and enhance special status species and habitats. Preserve and promote special status species conservation.	Maintain special status terrestrial and aquatic species populations and habitats. Maintain special status plant populations and habitats while maximizing land use activities and commodity production.	Restore, enhance, preserve, and promote special status species conservation and ecosystem integrity and values. Emphasis is on special status species habitat and population.	Restore, enhance, preserve, and promote special status species conservation and ecosystem integrity and values. Emphasis is on special status species habitat and population. Striving for stable, sustainable wildlife populations.
	Require in all land use activity plans measures designed to protect threatened and endangered species and their habitat.	Manage all federally threatened, endangered, candidate, and BLM sensitive species as key/priority species.	Manage all federally threatened, endangered, and candidate species as key/priority species.	No similar action	Manage all federally threatened, endangered, candidate, and BLM sensitive species as key/priority species.
	No similar action	Pursue opportunities to enhance, protect, or restore federally threatened and endangered species habitats, including structural and vegetation improvements.	Pursue opportunities to improve habitat, including structural and vegetation improvements, to benefit primarily game species and popular fisheries.	Pursue opportunities to enhance, protect, or restore federally threatened and endangered species habitats.	
	Conduct on-site biological surveys by qualified individuals.	Surveys conducted by qualified individuals may be required during the period appropriate to the species and before surface disturbance, habitat treatments, or similar activities.			

Resources	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
	• Maintain the Cory Lode Mine (17.7 acres) as withdrawn from locatable mineral entry to protect sensitive bats.	• Designate known federally threatened and endangered species habitat as ROW exclusion. • Close all federally threatened, endangered, proposed, and candidate plant species' occupied habitat (plant with a 200 meter/656 foot buffer) to mineral materials disposal and non-energy solid mineral leasing. • Maintain the Cory Lode Mine (17.7 acres) as withdrawn from locatable mineral entry to protect sensitive bats. Recommend locatable mineral withdrawal to DOI Secretary. • Manage Gunnison sage-grouse lek habitat (lek area plus 0.6-mile radius) and critical habitat as	• Designate occupied habitat of known populations of federally threatened and endangered species as ROW avoidance. • Close all federally threatened, endangered, and proposed plant species' occupied habitat (plant with a 200 meter/656 foot buffer) to mineral materials disposal and non-energy solid mineral leasing. Maintain the Cory Lode Mine (17.7 acres) as withdrawn from locatable mineral entry to protect sensitive bats.	• Maintain the Cory Lode Mine (17.7 acres) as withdrawn from locatable mineral entry to protect sensitive bats. Recommend locatable mineral withdrawal to DOI Secretary. • Manage Gunnison sage-grouse lek habitat (lek area plus 0.6-mile radius) (1,330 acres) as ROW avoidance.	• Maintain the Cory Lode Mine (17.7 acres) as withdrawn from locatable mineral entry to protect sensitive bats. Recommend locatable mineral withdrawal to DOI Secretary. • Manage Gunnison sage-grouse lek habitat (lek area plus 0.6-mile radius) (1,330 acres) as ROW exclusion and critical habitat as ROW avoidance (12,840 acres).

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		ROW exclusion (12,840 acres).			
	Allowable Use Notices and Stipulations: • LN-CO-34 • LN-UB-2 • NSO-UB-2 • NSO-CO-8 <u>Grouse</u> • TL-CO-15 • NSO-CO-2 • LN-CO-30 <u>Raptors</u> • TL-CO-18 • TL-CO-19 (Ferruginous Hawk) • TL-CO-20 (Osprey) • NSO-CO-3 <u>Bald Eagle</u> • TL-CO-22 • TL-CO-23 • TL-SJ-7 • TL-UB-3 <u>Peregrine Falcon</u> • TL-CO-24 • NSO-CO-5	Allowable Use Notices and Stipulations: • NSO-22/NGD-8 • NSO-23/NGD-9 • CSU-21/SSR-23 (Occupied Native Cutthroat Trout) • CSU-26/SSR-30 (Canada Lynx Habitat) • NSO-28/NGD-10 • NSO-30/NGD-11 (Yellow-Billed Cuckoo Habitat) • CSU-36/SSR-42 (Kit Fox) • NSO-43/NGD-19 (Bats) • NL-2/NGD-3 <u>Gunnison Sage-Grouse</u> • TL-15 • TL-17 • NL-10 • NGD-12 • NL-10 • NSO-32/NGD-13 <u>Raptors</u> • TL-19	Allowable Use Notices and Stipulations: • CSU-10/SSR-10 • CSU-22/SSR-24 (Occupied Native Cutthroat Trout Habitat) • CSU-24/SSR-27 • TL-14 (Yellow-Billed Cuckoo Habitat) • CSU-31 (Raptors) • TL-26 (Kit Fox) • CSU-38/SSR-44 (Bats) • NSO-42/NGD-18 (Gunnison and White Tailed Prairie Dogs) <u>Gunnison Sage-Grouse</u> • NSO-31/SSR-32 • CSU-28/SSR-33	Allowable Use Notices and Stipulations: • CSU-19/SSR-20 • CSU-20/SSR-21 • CSU-25/SSR-29 (Yellow-Billed Cuckoo Habitat) • CSU-27/SSR-31 (Canada Lynx Habitat) • NSO-9/SSR-11 • NSO-24/SSR-22 • NSO-26/SSR-25 (Occupied Native Cutthroat Trout Habitat) • NSO-29/SSR-28 <u>Raptors</u> • CSU-32/SSR-37 • NSO-36/SSR-36 <u>Gunnison Sage-Grouse</u> • TL-16 • TL-18 • NSO-31/SSR-32 • CSU-29/SSR-34	Allowable Use Notices and Stipulations: • Exhibit CO-34 • CSU-10/SSR-10 • CSU-19/SSR-20 • CSU-25/SSR-29 (Yellow-Billed Cuckoo Habitat) • CSU-27/SSR-31 (Canada Lynx Habitat) • NSO-22/SSR-21 • NSO-24/SSR-22 • NSO-26/SSR-25 (Occupied Native Cutthroat Trout Habitat) • NSO-29/SSR-28 <u>Gunnison Sage-Grouse</u> • TL-16 • TL-18 • NSO-31/SSR-32 • CSU-29/SSR-34 <u>Raptors</u> • TL-20 • NSO-36/SSR-36 • CSU-32/SSR-37

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	Mexican Spotted Owl • TL-CO-21 • NSO-CO-6 Waterfowl/Shorebirds • NSO-CO-7 • TL-CO-17 (White Pelican) • TL-UB-6 (Refer to Appendix B for details.)	• NSO-34/NGD-14 • CSU-30/SSR-35 • NSO-39/NGD-16 (Mexican Spotted Owl) Bald Eagle • NSO-37/NGD-15 • CSU-33/SSR-38 • TL-22 Gunnison and White Tailed Prairie Dogs • NSO-41/NGD-17 • TL-24 North Fork Area Stipulation Only: • NSO-25 (Occupied Native Cutthroat Trout) • NSO-27 (Leopard Frog) • NSO-33 (Gunnison Sage-Grouse) • NSO-35 (Raptors) (Refer to Appendix B for details.)		Mexican Spotted Owl • TL-23 • CSU-34/SSR-40 • NSO-40/SSR-41 Bald Eagle • NSO-38/SSR-38 • CSU-33/SSR-38 • TL-21 • TL-22 Gunnison and White Tailed Prairie Dogs • CSU-35/SSR-42 • TL-25 Kit Fox • CSU-37/SSR-43 • TL-27 Bats • NSO-44/SSR-45 • CSU-39/SSR-47 (Refer to Appendix B for details.)	Bald Eagle • NSO-38/SSR-38 • CSU-33/SSR-38 • TL-21 • TL-22 Mexican Spotted Owl • TL-23 • CSU-34/SSR-40 • NSO-40/SSR-41 Gunnison and White Tailed Prairie Dogs • CSU-35/SSR-42 • TL-24 Kit Fox • CSU-37/SSR-43 • TL-27 Bats • CSU-39/SSR-47 (Refer to Appendix B for details.)
Wild Horses	Continue herd area designation for Naturita Ridge and maintain the closure to wild horses.				

<table>
<tr><th>Resources</th><th>Alternative A
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Agency-Preferred in Draft RMP</th><th>Alternative E
Agency-Proposed</th></tr>
<tr><td rowspan="4">Wildland Fire Ecology and Management</td><td colspan="5">• Collaborate with other federal agencies; state, county, and city governments; and fire protection districts regarding prevention, mitigation, and fire suppression or management activities.
• Maintain an FMP that supports interagency fire management across the Planning Area.
• Utilize fire-protection and fuels-management activities to prevent or reduce negative impacts on social and resource values, including human life, private property and improvements, infrastructure, developed recreation sites, cultural resources, special status species habitat, areas with mineral and energy development, renewable energy projects, municipal watersheds, public water supplies, and, to the extent practical, air quality.
• Manage fire and fuels/vegetation to achieve specific resource management objectives.</td></tr>
<tr><td>No similar action</td><td colspan="4">In all fire-management activities, utilize appropriate strategies and tactics commensurate with values at risk and while considering risks to firefighters.</td></tr>
<tr><td colspan="2"></td><td colspan="2">Manage lands affected by wildland fire to maintain successional pathways capable of achieving the climax vegetation community.</td><td>Revegetate or manage lands affected by wildland fire to maintain vegetation appropriate to ecological site potential within the natural range of variability.</td></tr>
<tr><td colspan="2"></td><td colspan="3"></td></tr>
<tr><td rowspan="2">Cultural Resources</td><td rowspan="2">Emphasize management and develop cultural management plans on the following cultural sites/areas (BLM 1985):
• Dolores Cave
• Hamilton Mesa
• Hanging Flume
• Indian Henry’s Cabin
• Tabeguache Canyon
• Tabeguache Pueblo

In recreation emphasis areas, develop and protect suitable</td><td colspan="4">Evaluate all cultural resources for use allocation and desired outcome.</td></tr>
<tr><td>Prioritize the following areas for inventory and evaluation:
• Roc Creek (Anasazi rock art)
• Uravan historic mining district
• Paradox Valley
• Dolores River Canyon
• Uncompahgre Plateau
• Tabeguache/Dolores Canyons
• Hanging Flume</td><td>No Similar Action.</td><td>Prioritize the following areas for inventory and evaluation:
• Roc Creek (Anasazi rock art)
• Uravan historic mining district
• Paradox Valley
• Dolores River Canyon
• Uncompahgre Plateau
• Tabeguache/Dolores Canyons
• Hanging Flume

Develop and protect suitable cultural resource properties for public enjoyment through such practices as interpretive signing and stabilization. Priority areas include the Hanging Flume, Paradox Valley Rock Art Complex, and Roc Creek rock art.</td></tr>
</table>

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	cultural resource properties for public enjoyment through such practices as interpretive signing and stabilization.	Develop and protect suitable cultural resource properties for public enjoyment through such practices as interpretive signing and stabilization. Priority areas include the Hanging Flume, Paradox Valley Rock Art Complex, and Roc Creek rock art.			
	Protect and interpret unique and significant values in the Dolores River Canyon WSA (BLM 1985).	Identify, inventory, and evaluate prioritized individual sites and areas within the Dolores River Canyon WSA for nomination to the NRHP.	Identify, inventory, and evaluate known sites within the Dolores River Canyon WSA for eligibility for listing on the NRHP.	Identify, inventory, and evaluate individual sites within the Dolores River Canyon WSA for interpretation and public enjoyment.	Identify, inventory, and evaluate individual sites within the Dolores River Canyon WSA for eligibility for listing on the NRHP.
	No similar action	• Allocate cultural resources currently recorded, or projected to occur on the basis of existing data synthesis, to use allocations according to their nature and relative preservation value (BLM Manual 8110.42). • Assign use category allocations to all current and newly discovered cultural resource sites and/or areas upon completion of site evaluation, and apply appropriate management actions to achieve the desired outcome. • Use category allocations may be revised in response to changing site conditions or as additional data and information are obtained. • Prioritize Scientific Use sites and/or areas and Conservation Use sites for listing on the National Register of Historic Places (NRHP) and develop a Cultural Resource Plan for Scientific Use sites that outlines specific management objectives and actions for protection. • Prioritize Conservation Use sites for listing on the National Register of Historic Places. • Set aside cultural resource sites and/or areas (Traditional Use category) for long-term preservation because of their cultural and religious value to Native American Tribes.			

<table>
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Agency-Preferred in Draft RMP</th><th>Alternative E
Agency-Proposed</th></tr>
<tr><td></td><td></td><td colspan="4">• Assign historical sites in the Uravan Mining Belt, historical buildings that may be suitable for adaptive use, historical roads and trails, The Hanging Flume (NRHP) and select rock art sites (in Alternative E, after consultation with the appropriate tribal entities), to Public Use for environmental and heritage education.
• Identify traditional cultural properties and sacred sites in consultation with appropriate Native American Tribes.
• Develop and annually update a list of sites to allocate to the Discharge Use category; reevaluate as needed and compile supporting documentation. Submit for consultation with the State Historic Preservation Office.
• Manage sites listed on or eligible for listing on the NRHP as ROW avoidance.</td></tr>
<tr><td></td><td></td><td colspan="3">• Develop a Cultural Resource Management Plan that develops site-specific management actions for all Scientific, Conservation Use, Traditional Use, and Public Use sites.
• Develop a Cultural Resource Management Plan for allowable use on all Experimental Use sites.</td><td rowspan="2">Develop a Cultural Resource Project Plan that develops site-specific management objectives and actions for all Scientific, Conservation Use, Traditional Use, and Public Use (especially for cultural properties associated with the Paradox Rock Art Complex, Uravan Mineral Belt, Dolores Canyon, the Uncompahgre Plateau and other areas as determined by new information, research strategies and resource protection)
Develop a Cultural Resource Project Plan</td></tr>
<tr><td></td><td></td><td>Develop a cultural resource management plan to guide research and long term protection of cultural properties associated with the Paradox Rock Art Complex, Uravan Mineral Belt, Dolores Canyon, the Uncompahgre Plateau and other areas as determined by new information, research strategies and resource protection.</td><td>No similar action</td><td>Develop a cultural resource management plan to guide research and long term protection of cultural properties associated with the Paradox Rock Art Complex, Uravan Mineral Belt, Dolores Canyon, the Uncompahgre Plateau and other areas as determined by new information, research strategies and resource protection.</td></tr>
</table>

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
					for allowable use on all Experimental Use sites.
	No similar action	Nominate National Register Districts. Consider individual sites within each district for nomination to the State and/or National Registers of Historic Places. Potential National Register Districts are as follows: • Uravan Uranium Mining District • Paradox Valley Rock Art District • Tabeguache Pueblos District • Dolores River Rock Art District	Evaluate individual sites for eligibility for National or State Registers of Historic Places nominations. Do not consider individual sites for nomination to the NRHP unless such sites need additional protection that may be afforded by such listing.	Nominate individual sites to the National or State Registers of Historic Places. Individual sites with the potential for nomination are as follows: • Ute Wickiup Project • Uravan Uranium Mining District • Squint Moore Complex Harris site on the Uncompahgre Plateau • Paradox Valley Rock Art Complex • Also nominate other sites that meet the NRHP criteria.	Nominate individual sites that meet the NRHP criteria to the National or State Registers of Historic Places.
	No similar action	No similar action	Manage 1,080 acres in the Paradox Rock Art Complex area as a National Register District to protect unique cultural resource values		
	No similar action	Refer to the *Areas of Critical Environmental Concern* section, Paradox Rock Art ACEC.	• Manage for protection of the numerous prehistoric petroglyphs and	Refer to the *Areas of Critical Environmental Concern* section, Paradox Rock Art ACEC.	

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
			pictographs in the area. • Close to motorized and mechanized travel above the level of the Paradox Valley bottom; limit motorized and mechanized travel to designated routes in the Paradox Valley bottom. • Develop a system of public access trails to the various rock art panels. • Develop and implement an interpretive plan. • Conduct a complete inventory for cultural properties.		
	No similar action	Manage 31,870 acres in the area of the Lower Uncompahgre Plateau between the Dry Creek Basin and Roubideau Creek:			
		As a National Register District to protect unique cultural resource values. (Refer to Appendix T for details.)	As an area of archaeological significance. (Refer to Appendix T for details.)	As an area of archaeological significance. (Refer to Appendix T for details.)	As a National Register District to protect unique cultural resource values. (Refer to Appendix T for details.)

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	No similar action	Manage and protect cultural resources allocated to Public Use, including traditional cultural properties. with a secondary allocation to Public Use by implementing the following actions, including but not limited to: • Developing heritage tourism at sites designated • Interpreting sites • Organizing and conducting ongoing educational programs.	No Similar Action.	Same as Alternative B	Same as Alternative B and including Tribal consultation when appropriate.
	No similar action	Identify potential trails to link individual sites and develop an interpretive program.			Same as Alternative A
	In Wilderness Areas allow the use of cultural resource properties only for religious or research purposes, or for stabilization of "at risk" properties, and only when such use will not degrade	Same as Alternative A	In Wilderness Areas, allow the use of cultural resource properties only for religious purposes and only when such use will not degrade wilderness values.	Same as Alternative A	In Wilderness Areas and WSAs allow the use of cultural resource properties only for religious or research purposes, or for stabilization of "at risk" properties, and only when such use will not degrade wilderness values.

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	wilderness values (BLM 1985).				
	No similar action	Manage the Tabeguache Caves/Tabeguache Pueblos Area and Tabeguache Canyon as ROW exclusion.	No similar action	Manage the Tabeguache Caves/Tabeguache Pueblos Area and Tabeguache Canyon as ROW avoidance.	No similar action
	• Allowable Use Stipulation: • NSO-SJ-I (Refer to Appendix B for details.)	• Allowable Use Stipulation: • NSO-45/NGD-20 • NSO 47/NGD-21 • NSO 48/NGD-22 • NSO-50 (Refer to Appendix B for details.)	• Allowable Use Stipulation: • CSU-40/SSR-47 • CSU-42/SSR-51 • NSO-50 (Refer to Appendix B for details.)	• Allowable Use Stipulation: • NSO-46/SSR-48 • CSU-41/SSR-50 • NSO-49/SSR-52 • CSU-42/SSR-52 • CSU-44/SSR-54 • NSO-50 (Refer to Appendix B for details.)	• Allowable Use Stipulation: • NSO-46/SSR-48 • CSU-43/SSR-52 • NSO-50 (Refer to Appendix B for details.)
	• Attach standard stipulations to any BLM-issued permit in which there may be ground-disturbing activities or the potential for the inadvertent discovery or effects on any NRHP or otherwise eligible historic or archaeological cultural property defining and directing actions that must be immediately initiated if such discovery or effects are realized. • Seek to reduce imminent threats and resolve potential conflicts from natural or human-caused deterioration or potential conflict with other resource uses (FLPMA Sec. 103(c); National Historic Preservation Act Section 106, 110(a)(2)) by ensuring that all authorizations for land use and resource use will comply with Section 106 of the National Historic Preservation Act.				
Paleontological Resources	Manage paleontological resources according to their Potential Fossil Yield Classification (Paleontological	• Require that land use authorizations consider actions on public lands according to their Potential Fossil Yield Classification. • Where project development threatens significant paleontological resources, require proponents to avoid by project redesign or to conduct scientific data recovery excavation. • Require an accredited paleontologist approved by the BLM Authorized Officer to perform an inventory of areas of surface-disturbing activities in Potential Fossil Yield Classification Class 4 and 5 (previously known as Class I and II) paleontological areas.			

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	Resources Preservation Act of 2009).				
	Provide protective management of the unique fossils in the Placerville area through the use of stipulations on a case-by-case basis in environmental documents (BLM 1985).	Develop a Paleontological Site Management Plan for known localities, including: • Potter Creek • San Miguel Canyon • Placerville Jurassic Fish Locality • Dolores River Canyon • Atkinson Mesa/Mesa Creek area.	No similar action	Develop a Paleontological Site Management Plan for known localities, including: • Potter Creek • San Miguel Canyon • Placerville Jurassic Fish Locality • Dolores River Canyon • Atkinson Mesa/Mesa Creek area.	
	Inventory paleontological resources and develop appropriate protective measures if necessary; develop protective measures as this resource is discovered. As information is obtained, identify specific management.	In Potential Fossil Yield Classification Class 2, 3, 4, and 5 areas, conduct paleontological inventories to identify and document significant paleontological resources and potential threats.	In Potential Fossil Yield Classification Class 4 and 5 areas, conduct paleontological inventories to identify and document significant paleontological resources and potential threats.		
	Allowable Use Stipulations and Notices: • LN-CO-29	Allowable Use Stipulations and Notices: • CSU-45	No similar action	Allowable Use Stipulations and Notices: • CSU-45	Allowable Use Stipulations and Notices: **LEASE NOTICE** LN-UFO-3: *High*

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	(Refer to Appendix B for details.)	(Refer to Appendix B for details.)		(Refer to Appendix B for details.)	*Potential Paleontological Resources* (Refer to Appendices B and T for details.)
Visual Resources	Adopt the VRM classes as follows. Modify, relocate, mitigate, or deny proposed projects that conflict with the objectives of these classes. • BLM surface: o VRM Class I = 44,220 acres o VRM Class II = 21,930 acres o VRM Class III = 280,520 acres o VRM Class IV = 9,260 acres o Undesignated = 319,770 acres • Private or State surface/ federal mineral estate: o VRM Class I = 20 acres o VRM Class II = 10 acres o VRM Class III = 243,410 acres	Designate VRM classes as follows. • BLM surface: o VRM Class I = 53,870 acres o VRM Class II = 176,010 acres o VRM Class III = 427,580 acres o VRM Class IV = 18,340 acres • Recommend the following VRM classes for private or state surface/ federal mineral estate: o VRM Class I = 100 acres o VRM Class II = 135,030 acres o VRM Class III = 139,390 acres o VRM Class IV = 13,050 acres o Undesignated = 7,850 acres North Fork area only: Designate VRM classes as follows:	Designate VRM classes as follows. • BLM surface: o VRM Class I = 44,220 acres o VRM Class II = 31,260 acres o VRM Class III = 431,330 acres o VRM Class IV = 168,990 acres • Recommend the following VRM classes for private or State surface/ federal mineral estate: o VRM Class I = 20 acres o VRM Class II = 69,040 acres o VRM Class III = 196,120 acres o VRM Class IV = 22,230 acres o Undesignated = 8,010 acres (Refer to Appendix T for details.)	Designate VRM classes as follows. • BLM surface: o VRM Class I = 46,440 acres o VRM Class II = 112,540 acres o VRM Class III = 398,410 acres o VRM Class IV = 118,410 acres • Recommend the following VRM classes for private or State surface/ federal mineral estate: o VRM Class I = 20 acres o VRM Class II = 94,250 acres o VRM Class III = 173,300 acres o VRM Class IV = 20,000 acres o Undesignated = 7,850 acres (Refer to Appendix T for details.)	Designate VRM classes, as mapped, as follows. • BLM surface: o VRM Class I = 46,440 acres o VRM Class II = 105,490 acres o VRM Class III = 370,600 acres o VRM Class IV = 153,260 acres • Recommend the following VRM classes for private or State surface/ federal mineral estate: o VRM Class I = 0 acres o VRM Class II = 92,680 acres o VRM Class III = 172,500 acres o VRM Class IV = 30,250 acres o Undesignated = 0 acres

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	o VRM Class IV = 420 acres o Undesignated = 51,560 acres (Refer to Appendix T for details.)	• BLM surface: o VRM Class I = 53,860 acres o VRM Class II = 181,650 acres o VRM Class III = 421,290 acres o VRM Class IV = 18,990 acres • Recommend the following VRM classes for private or state surface/ federal mineral estate: o VRM Class I = 100 acres o VRM Class II = 142,710 acres o VRM Class III = 131,720 acres o VRM Class IV = 13,050 acres o Undesignated = 7,850 acres (Refer to Appendix T for details.)			(Refer to Appendix T for details.)
	No similar action	Allowable Use Stipulation: • NSO-51/NGD-23 • CSU-46/SSR-55	No similar action	No similar action	No similar action

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		North Fork Stipulations Only: • NL-11 • NSO-52 • CSU-47 (Refer to Appendix B for details.)			
	No similar action	Prohibit permanent artificial outdoor lighting in VRM Class I and II areas.	Prohibit permanent artificial outdoor lighting in VRM Class I areas.		
	No similar action	Require that permanent and temporary artificial outdoor lighting be shielded and downward-facing. An exception, with mitigation, may be granted for temporary lighting if the requirement will create a hazard.	No similar action	Require that permanent and temporary artificial outdoor lighting be shielded and downward-facing. An exception, with mitigation, may be granted for temporary lighting if the requirement will create a hazard.	
	No similar action	Require that permanent artificial outdoor lighting be turned off when it is not needed.			
Lands with Wilderness Characteristics	No similar action	Manage 42,150 acres in specified areas with wilderness characteristics. (Refer to Appendix F for details.)	No similar action	Manage 18,320 acres in specified areas with wilderness characteristics. (Refer to Appendix F for details.)	Manage 18,320 acres to minimize impacts on wilderness characteristics, while managing for other uses. (Refer to Appendix F for details.)

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	No similar action	Apply the following management to lands managed to protect wilderness characteristics: • VRM Class II • ROW exclusion • Exclusion area for wind, solar and hydropower projects • Closed to motorized and mechanized travel • Prohibit new or expanded range improvements • Prohibit target shooting *(see Recreation section for more information)* • Closed to wood product sales or harvest, mineral materials disposal, nonenergy solid mineral leasing, coal leasing • Recommend to the Secretary of the Interior withdrawal	No similar action	Apply the following management to lands managed to protect wilderness characteristics: • VRM Class II • ROW avoidance • Exclusion area for wind, solar and hydropower projects • Limit motorized and mechanized travel to designated routes • Allow route maintenance and improvements in a manner consistent with the long-term preservation of wilderness characteristics • Permit new range improvement projects to support land health objectives only if it can be shown that they will protect or enhance wilderness characteristics	Conserve wilderness characteristics where possible through relocation, design criteria, and/or mitigation.

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		from locatable mineral entry • Prohibit road maintenance • Issue no SRPs for competitive events		• Allow maintenance of existing range improvement facilities in a manner consistent with the long-term preservation of wilderness characteristics • Closed to: wood product sales or harvest, mineral materials disposal, nonenergy solid mineral leasing, coal leasing • Require a mine plan for locatable mineral development	
	No similar action	Allowable Use Stipulations: • NL-12/NGD-24 (Refer to Appendix B for details.)	No similar action	Allowable Use Stipulations: • NSO-53/SSR-55 (Refer to Appendix B for details.)	Allowable Use Stipulations: • CSU-60 (Refer to Appendix B for details.)
	No similar action	Inventory acquired lands for wilderness characteristics to:			
		• Manage for characteristics if found. • Consider characteristics of adjacent federal lands when making	• Maintain a current inventory.	• Determine whether to manage for characteristics if found. • Consider characteristics of adjacent federal	• Determine whether to manage for characteristics if found. • Consider characteristics of adjacent federal

Resources	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
		determination. If so, manage for characteristics there as well.		lands when making determination. If so, determine whether to manage for characteristics there as well.	lands when making determination. If so, determine whether to manage for characteristics there as well. • Existing RMP protections must be considered in making determination and actions.
Resource Uses					
Forestry and Woodland Products	• Make public land within forest management areas available for a full range of forest management activities. • Manage forest and woodlands where compatible to achieve other resource objectives. • Manage approximately 6,700 acres to provide woodland products. Provide an estimated allowable harvest of 6.4	• Designate 675,800 acres of forest management units. • Allow harvest of minor (noncommercial timber) forest and woodland products in specified forest management units. • Encourage, where feasible, the harvest of woodland products in areas of proposed or existing vegetative treatments to lessen the need for additional treatment or land disturbance and in areas that need restoration for ecological benefits. • Manage forest and woodlands where compatible to achieve other resource objectives. • Manage approximately 279,125 acres to provide minor (noncommercial timber) wood products. Provide an estimated allowable harvest of 6.4 MMBF (12,800 cords) per decade.	• Manage approximately 631,270 acres to provide minor (noncommercial timber) wood products. Provide an estimated allowable harvest of 9.6 MMBF (19,200 cords) per decade.	• Manage approximately 394,530 acres to provide minor (noncommercial timber) wood products. Provide an estimated allowable harvest of 6.4 MMBF (12,800 cords) per decade.	• Manage approximately 503,830 acres for commercial wood harvest and 444,220 acres for general wood cutting. • Allow commercial timber harvest of pinyon-juniper only; permit such harvest in all forest

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	MMBF (12,800 cords) per decade • Intensively manage 40,500 acres (management unit 3) for woodland product harvest within sustained yield production limits to increase available woodland products. • Provide reasonable opportunity to salvage forest products before and after range and wildlife habitat improvement treatments.	• Allow commercial timber harvest of pinyon-juniper only; permit such harvest in all forest management units. • Make byproducts from forest management activities available for biomass use or for insect and disease control.	• Allow commercial timber harvest of pinyon-juniper only; permit such harvest in all forest management units. • In appropriate forest cover types, allow biomass production where compatible with other uses.	• Allow commercial timber harvest of pinyon-juniper only; permit such harvest in all forest management units where consistent with land health and vegetation mosaic objectives. • In appropriate forest cover types, allow biomass production and use where compatible with vegetation mosaics and other resource uses. Make byproducts from forest management activities available for biomass use or for insect and disease control.	management units where consistent with land health and vegetation mosaic objectives. Exception: Commercial harvest activities may be used for other forest cover types to improve forest health, to restore ecology, or to meet identified resource objectives. • In appropriate forest cover types, allow biomass production and use where compatible with vegetation mosaics and other resource uses. Make byproducts from forest management activities and woodlands affected by insect and disease available for biomass.
	• Prohibit forest product disposal (i.e., wood product	• Close specified areas (397,160 acres) to wood product sales	• Close specified areas (44,530 acres) to wood	• Close specified areas (281,390 acres) to wood	• Close the following areas (171,970 acres) to

Resources	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
	sales and/or harvest) in specified areas.	and/or harvest. Exception: Allow wood product sales and/or harvest to enhance resource values for which a given unit is designated, to improve forest and land health conditions, or to achieve vegetation mosaic objectives. • Prohibit commercial and personal use firewood, post, and pole harvest during specified periods for winter habitat, big game and migratory bird reproduction, and saturated soils.	product sales and/or harvest. Exception: Allow wood product sales and/or harvest to enhance resource values for which a given unit is designated to improve forest and land health conditions or to achieve vegetation mosaic objectives. • Prohibit commercial and personal use firewood, post, and pole harvest during specified periods for winter habitat and big game reproduction.	product sales and/or harvest. Exception: Allow wood product sales and/or harvest to enhance resource values for which a given unit is designated, to improve forest and land health conditions, or to achieve vegetation mosaic objectives. • Prohibit personal use firewood and other special forest product harvest from December 31 to April 30. Subject commercial activities to spatial TLs, as described in Appendix B.	commercial wood product sales and/or harvest. Exception: Allow wood product sales and/or harvest to enhance resource values for which a given unit is designated, to improve forest and land health conditions, or to achieve vegetation mosaic objectives. • Prohibit personal use firewood and other special forest product harvest from December 31 to April 30.* Subject commercial activities to spatial TLs, as described in Appendix B.
	Allow for the sale or disposal of forest products or timber that could be lost in mineral development or that is needed for managing the resource. Meet demand without	Before removing any commercial or noncommercial woodland products as a result of permitted activities (e.g., mining, oil and gas production, sodium mining, and ROW), appraise and	Same as Alternative A.	Same as Alternative B	Before removing any commercial or noncommercial forest and woodland products as a result of permitted activities (e.g., mining, oil and gas production, sodium mining, and

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	degradation or conflict (BLM 1985).	require the proponent to purchase the woodland products. The BLM could waive this requirement if the quantity of woodland product is of a small enough quantity to make the requirement unfeasible.			ROW), appraise and require the proponent to purchase the woodland products. The BLM could waive this requirement if the quantity of woodland product is of a small enough quantity to make the requirement unfeasible.
	When carrying out projects using Healthy Forest Restoration Act authority, fully maintain or contribute toward the restoration of the structure and composition of old-growth stands according to the pre-fire suppression old-growth conditions characteristic of the forest type, taking into account the contribution of the stand to landscape fire adaptation and watershed health and retaining the large trees contributing to old-growth structure.				Same as Alternatives A-D with the inclusion of clarifying language: • Carrying out projects to restore forest and woodlands, • Composition of historic stand composition • Old-growth structure in appropriate forest/woodland types.

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
Livestock Grazing	• Periodically evaluate acres available and active grazing permitted use (e.g., AUMs, periods of use, and class of livestock) and adjust as needed based on monitoring and land health conditions. Refer to Appendix E, Livestock Grazing Allotments and Allotment Levels. • Livestock forage should be made available commensurate with BLM Colorado Public Land Health Standards. • Adjust grazing management (e.g., AUMs, periods of use, allotments, class of livestock, and distribution) using an interdisciplinary process when the following data indicate that change is needed.				
	Base development of grazing systems on the following factors: allotment-specific management actions; resource characteristics, including vegetation's potential and water availability; general management actions; operator's needs; and implementation costs.	When developing grazing management strategies, place greater emphasis on:			
		Improving rangeland health. Include other considerations, such as water availability, vegetation potential, topography and elevation, and implementation costs.	Increasing available forage (AUMs) for domestic livestock and, where appropriate, increasing stocking rates, while maintaining land health standards. Include other considerations, such as water availability, vegetation potential, topography and elevation, operators' needs and capability, and implementation costs	Improving rangeland health and forage quality. Include other considerations, such as water availability, vegetation potential, topography and elevation, operators' needs and capability, and implementation costs or mitigation of resource conflicts.	
	No similar action	Periodically evaluate allotments or portions of allotments to identify grazing issues. Base potential closure to livestock grazing and/or reduction in permitted use on the	No similar action	Same Alternative as B	

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		specified criteria, when management is insufficient to remedy the problem.			
	• Make 619,500 acres available for livestock grazing. Provide 35,520 AUMs of livestock forage. • Make 56,300 acres of allotments, portions of allotments, and areas unavailable for livestock grazing. • Keep closed portions (2,680 acres) of the Camel Back pasture in the Winter-Monitor allotment.	• Make 517,580 acres available for livestock grazing. Provide 28,958 AUMs of livestock forage. • Make 158,220 acres unavailable for livestock grazing, which includes allotments, portions of allotments, and unallotted land. • Keep closed portions (2,680 acres) of the Camel Back pasture in the Winter-Monitor allotment.	• Make 653,270 acres available for livestock grazing. Provide 36,950 AUMs of livestock forage. • Make 22,530 acres unavailable for livestock grazing, which includes allotments, portions of allotments, and unallotted land. • Make approximately 2,680 acres available for cattle grazing by reactivating the previously closed Camel Back pasture in the Winter-Monitor allotment. Provide 75 additional AUMs of grazing permitted use.	• Make 617,140 acres available for livestock grazing. Provide 35,558 AUMs of livestock forage. • Make 58,660 acres unavailable for livestock grazing, which includes allotments, portions of allotments, and unallotted land. • Make approximately 2,680 acres available for livestock trailing by reactivating the previously closed Camel Back pasture in the Winter-Monitor allotment. This availability is for trailing only.	• Make 616,640 acres available for livestock grazing. Provide 35,520 AUMs of livestock forage. • Make 59,160 acres unavailable for livestock grazing, which includes allotments, portions of allotments, and un-allotted land. • Make approximately 2,680 acres available for livestock trailing by reactivating the previously closed Camel Back pasture in the Winter-Monitor allotment. This availability is for trailing only.

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	No similar action	Exclude livestock grazing for a minimum of 3 years on disturbed areas (e.g., a fire, reclamation of disturbed lands, seedings, and surface-disturbing vegetation treatments).	Exclude livestock grazing on disturbed areas (e.g., fire, reclamation of disturbed lands, seedings, and surface-disturbing vegetation treatments) to the extent needed to comply with BLM Colorado Standards for Public Land Health and Guidelines for Livestock Grazing Management.		
	Follow the general procedures in implementing typical range improvements, in accordance with current plan.	Prohibit new range improvement projects. Maintain existing range improvements to avoid major ecological damage.	Construct, modify, or remove range improvement projects and land treatments as appropriate to support livestock grazing management and other resource objectives.		
	On 121,710 acres • develop land treatment projects designed to improve livestock forage. • give wildlife first priority for all additional forage made available as a result of rangeland improvement projects On 92,180 acres divide additional forage equally between livestock grazing and wildlife to	Do not allocate additional forage to livestock.	Allocate increases in forage (AUMs) availability to livestock. These increases could come from, but are not limited to, wildfire rehabilitation areas, prescribed burn areas, and vegetation treatment areas.	Allocate increases in forage (AUMs) where applicable and feasible to livestock, wildlife, land health, or a combination of these. Consider sustainability, multiple use management objectives, and other pertinent information. These increases could come from, but are not limited to, wildfire rehabilitation areas, prescribed burn areas, and vegetation treatment areas.	

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	provide forage for both resources.				
	No similar action	Allow for establishment of forage reserves on vacated or relinquished allotments to provide for increased management options.	Evaluate combining vacated or relinquished allotments with active allotments where feasible to provide for increased management options.	To provide for increased management options, allow for establishment of forage reserves on vacated or relinquished allotments and evaluate combining vacated or relinquished allotments with active allotments, as guided by BLM Colorado Standards for Public Land Health and Guidelines for Livestock Grazing Management	
	On 3,720 acres (management unit 9), limit trailing use as much as possible and confine it to established roads; prohibit trailing livestock from bedding in riparian zones unless absolutely necessary	Limit livestock trailing use to established roads and trails to the extent possible.			
		Prohibit trailing livestock from overnighting or bedding in sensitive areas, such as riparian zones and occupied federally listed plant habitat.	Permit trailing livestock to overnight or bed in sensitive areas, such as riparian zones and in occupied federally listed plant habitat, only with prior approval from the BLM.	Permit trailing livestock to overnight or bed in riparian zones in areas identified by and only with prior approval.	
	No similar action	Until current science can mitigate risk associated with disease transmission:			
		• Cancel current and deny proposed domestic goat or sheep grazing and trailing permits within a 9-mile buffer of occupied desert and Rocky Mountain bighorn sheep habitat.	• Exclude domestic goat grazing within a 5-mile buffer of occupied desert and Rocky Mountain bighorn sheep habitat. • Manage to minimize contact between domestic sheep and desert	• Exclude domestic goat grazing in occupied and suitable desert and Rocky Mountain bighorn sheep habitat. • Manage domestic sheep grazing to minimize contact between domestic	• Exclude domestic goat grazing in occupied and suitable desert and Rocky Mountain bighorn sheep habitat. • Manage domestic sheep grazing to minimize contact between domestic

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		• Prohibit conversion of cattle grazing allotments to domestic sheep/goat grazing within a 9-mile buffer of occupied desert and Rocky Mountain bighorn sheep habitat.	and Rocky Mountain bighorn sheep within the 3-mile buffer of occupied desert and Rocky Mountain bighorn sheep habitat. • Prohibit conversion of cattle grazing allotments to domestic sheep/goat grazing within a 3-mile buffer of occupied desert and Rocky Mountain bighorn sheep habitat.	sheep and desert and Rocky Mountain bighorn sheep, in accordance with the completed Probability of Interaction Assessment. • Prohibit conversion of cattle grazing allotments to domestic sheep/goat grazing where Probability of Interaction Assessment depicts allotments are high probability for disease transmission.	sheep and desert and Rocky Mountain bighorn sheep using currently accepted peer-reviewed modeling techniques and best available data, in accordance with BLM policy (currently BLM Manual 1730, Management of Domestic Sheep and Goats to Sustain Wild Sheep [BLM 2016e]). • Prohibit conversion of cattle grazing allotments to domestic sheep/goat grazing unless effective separation results in a high confidence that there will be a low to no risk of contact with wild sheep.
	No similar action	Prohibit or manage domestic sheep and goat trailing to:			
		• Permits within a 9-mile buffer of occupied desert and Rocky Mountain	• Minimize contact between domestic sheep/goats and desert and Rocky Mountain bighorn	• Minimize contact between domestic sheep/goats and desert and Rocky Mountain bighorn	• Minimize contact between domestic sheep/goats and desert and Rocky Mountain bighorn

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		bighorn sheep habitat.	sheep in areas within a 3-mile buffer of occupied desert and Rocky Mountain bighorn sheep habitat. Limit trailing to 1 to 2 days.	sheep, in accordance with the completed Probability of Interaction Assessment in areas where the assessment shows high or moderate risk for contact with bighorn sheep. Limit trailing to 1 to 2 days.	sheep, in accordance with BLM policy (currently BLM Manual 1730, Management of Domestic Sheep and Goats to Sustain Wild Sheep [BLM 2016e]). Where allotments are predicted to have an unacceptable likelihood for disease transmission, limit trailing to 1 to 2 days.
	Develop 71 allotment management plans (332,340 acres; BLM 1985). Update existing allotment management plans as needed, and develop new allotment management plans.	Implement allotment management actions through "terms and conditions" on grazing permits, resource activity plans (such as joint management area plans, coordinated resource management plans, wildlife habitat management plans), and guidance from existing or new allotment management plans. Base actions on resource monitoring, Land Health Assessments, and the BLM Colorado Standards for Public Land Health and Guidelines for Livestock Grazing Management.			Same as Alternatives B-D, as well as including data provided via partners or cooperators (e.g., Colorado Cattlemen's and Colorado Wool Growers Associations, Colorado Department of Agriculture, and livestock grazing permittees/lessees). Other data may include BLM Land Health Assessments in

Resources	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
					compliance with the BLM Colorado Standards for Public Land Health and Guidelines for Livestock Grazing Management (BLM 1997; Appendix C).
Solid Leasable Minerals (Coal)	• Allow coal leasing on 1,480 acres in the Nucla Known Recoverable Coal Resource Area. • Identify 144,780 acres as acceptable for further coal leasing consideration on a site-specific basis after consultation with affected entities and formulation of mitigating measures designed to protect identified resources.	Manage 320,440 acres in the coal resource development potential area as acceptable for further consideration of leasing and development. • BLM surface/federal mineral estate: 168,700 acres. • Private or State surface/federal mineral estate: 151,740 acres.	Manage 405,230 acres in the coal resource development potential area as acceptable for further consideration of leasing and development. • BLM surface/federal mineral estate: 249,620 acres. • Private or State surface/federal mineral estate: 155,610 acres.	Manage 371,400 acres in the coal resource development potential area as acceptable for further consideration of leasing and development. • BLM surface/federal mineral estate: 214,070 acres. • Private or State surface/federal mineral estate: 157,330 acres.	Manage 371,250 acres in the coal resource development potential area as acceptable for further consideration of leasing and development. • BLM surface/federal mineral estate: 215,050 acres. • Private or State surface/federal mineral estate: 156,200 acres.
	• In the coal resource development potential area: • Manage 580 acres of split-estate as closed to coal leasing, in	• Manage 1,910 acres (including 580 acres of split-estate) in the coal resource development potential area as closed to coal leasing, in accordance with congressional mandates. • Manage 2,500 acres in the coal resource development potential area identified in Screen 2 criteria, set forth in 43 CFR, 3461.5, as unsuitable for surface mining and surface mining operations.			

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	accordance with congressional mandates. • Manage 490 acres of BLM surface/federal mineral estate identified in Screen 2 criteria, as unsuitable for surface mining and surface mining operations.				
	Manage the specified areas as unacceptable for further consideration of leasing and development, in accordance with Screen 3.	Manage 96,650 acres in the coal resource development potential area as unacceptable for further consideration of leasing and development, in accordance with Screen 3: • BLM surface/federal mineral estate: 88,890 acres • Private or State surface/federal mineral estate: 7,760 acres	Manage 11,860 acres in the coal resource development potential area as unacceptable for further consideration of leasing and development, in accordance with Screen 3: • BLM surface/federal mineral estate: 7,960 acres • Private or State surface/federal mineral estate: 3,900 acres	**Action:** Manage 45,690 acres in the coal resource development potential area as unacceptable for further consideration of leasing and development, in accordance with Screen 3: • BLM surface/federal mineral estate: 43,510 acres • Private or State surface/federal mineral estate: 2,180 acres	**Action:** Manage 44,570 acres in the coal resource development potential area as unacceptable for further consideration of leasing and development, in accordance with Screen 3: • BLM surface/federal mineral estate: 42,530 acres • Private or State surface/federal mineral estate: 2,040 acres
	No similar action	Prior to lease or modification, require the proponent of a	No similar action		

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		new federal coal lease or of a federal coal lease modification to evaluate the technical and economic feasibility (to be updated annually) of destroying, converting, capturing and using, or otherwise mitigating the release of coal mine methane to the atmosphere by all components of the mine ventilation system.			
	Allowable Use Notice and Stipulations: • NSO-CO-1 • CSU-CO-25 • LN-UB-10/CO-33 (Refer to Appendix B for details.)	Allowable Use Stipulations: • CSU-48 North Fork Stipulation Only: • NL-13 (Refer to Appendix B for details.)	Allowable Use Stipulations: • CSU-48 (Refer to Appendix B for details.)	Allowable Use Stipulations: • CSU-48 (Refer to Appendix B for details.)	Allowable Use Stipulations: • CSU-48 (Refer to Appendix B for details.)
	Allowable Use: **LEASE NOTICE** LN-UB-10/CO-33: *Coal Areas*. Within the Paonia-Somerset Known Recoverable Coal Resource Area, coal and oil and gas leasing and	The portions of the coal potential area where the overburden above the coal is less than 3,500 feet will be managed primarily for the exploration and development of coal resources. Oil and gas operators anticipating exploration or development operations are required to consult and coordinate their activities with the BLM Authorized Officer to first determine the status of the coal resource then what course of action is in the public's interest. Under no circumstances would the BLM approve any oil and gas operations that compromises maximum economic coal recovery or the safety of underground mining operations. Where the coal is in place but is neither licensed for exploration nor leased for mining, oil and gas operators may expect the BLM to scrutinize and adjust well placement and hydraulic fracturing activities to avoid ruining coal			

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	development will be managed consistent with land use plans and lease terms. More specifically, the portions of the Known Recoverable Coal Resource Area where the overburden above the B-Seam of the Mesaverde coals is less than 3,500 feet will be managed primarily for the exploration and development of the coal resources. Oil and gas operators anticipating exploration or development operations are encouraged to consult and coordinate their activities with the affected coal operators. In the event that the oil and gas and coal operators are unable to agree on proposed oil and gas exploration or development, the BLM	resources. Where the coal is either licensed for exploration or leased for mining the oil and gas, operators must consult with the affected coal operators on proposed oil and gas exploration or development. In the event that the oil and gas and coal operators are unable to agree on any proposal, the BLM Authorized Officer would intervene and use all pertinent lease terms, regulations, and policy to determine what course of action is in the public's interest. This applies even if actual exploration and mining has ceased. Where the BLM has determined the coal to be completely mined out and all licenses and leases terminated, the oil and gas operator is required to become informed about historic mine maps and mine-related drill holes.			

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	Authorized Officer would intervene and use all pertinent lease terms, regulations, and policy to determine what course of action is in the public's interest. However, under no circumstances will the BLM approve any oil and gas operations that compromise maximum economic coal recovery or the safety of underground mining operations. (Refer to Appendix B for details.)				
Fluid Leasable Minerals (Oil and Gas and Geothermal Resources)	**NO LEASING** (NL): *BLM Surface/Federal Mineral Estate.* Manage 44,220 acres of the federal mineral estate underlying BLM-administered surface as closed to fluid mineral leasing and geophysical exploration (Refer to Appendix B for details.)	**NO LEASING** (NL): *BLM Surface/Federal Mineral Estate.* Manage 181,220 acres of the federal mineral estate underlying BLM-administered surface as closed to fluid mineral leasing, geothermal leasing, and geophysical exploration • Same as Alternative A plus additional specified conditions.	Same as Alternative A	**NO LEASING** (NL): *BLM Surface/Federal Mineral Estate.* Manage 48,510 acres of the federal mineral estate underlying BLM-administered surface as closed to fluid mineral leasing, geothermal leasing, and geophysical exploration:	Same as Alternative A

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		(Refer to Appendix B for details.) North Fork area only: **NO LEASING** (NL): *BLM Surface/Federal Mineral Estate.* Manage 221,570 acres (51,370 acres of which are in the North Fork area) of the federal mineral estate underlying BLM-administered surface as closed to oil and gas leasing and geophysical exploration including additional specified conditions. (Refer to Appendix B for details.)		• Same as Alternative A plus additional specified conditions (Refer to Appendix B for details.)	
	LEASING: Manage 871,810 acres of the federal mineral estate as open to fluid mineral leasing and geophysical exploration, subject to standard lease terms and conditions (stipulations may apply) to protect existing resources:	**LEASING:** Manage 696,450 acres of the federal mineral estate as open to fluid mineral leasing, geothermal leasing, and geophysical exploration, subject to standard lease terms and conditions (stipulations may apply):	**LEASING:** Same as Alternative A (stipulations may apply).	**LEASING:** Manage 865,970 acres of the federal mineral estate as open to fluid mineral leasing, geothermal leasing, and geophysical exploration, subject to standard lease terms and conditions (stipulations may apply:	**LEASING:** • Same as Alternatives A and C

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	• BLM surface/federal fluid mineral estate: 631,580 acres • Private or State surface/federal fluid mineral estate: 240,230 acres.	• BLM surface/federal fluid mineral estate: 494,580 acres • Private or State surface/federal fluid mineral estate: 201,870 acres. North Fork area only): LEASING Manage 609,360 acres (34,790 acres of which are in the North Fork area) of the federal mineral estate as open to oil and gas leasing and geophysical exploration, subject to standard lease terms and conditions (stipulations may apply): • BLM surface/federal fluid mineral estate: 454,230 acres • Private or State surface/federal fluid mineral estate: 155,130 acres		• BLM surface/federal fluid mineral estate: 627,290 acres • Private or State surface/federal fluid mineral estate: 238,680 acres.	
	No similar action	**NO LEASING** (NL): *Split-estate.* Manage 38,360 acres of private and State	No similar action	**NO LEASING** (NL): *Split-estate.* Manage 1,550 acres of private and State	Same as Alternative A.

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		surface/federal fluid mineral estate as closed to fluid mineral leasing and geophysical exploration with specified conditions. North Fork area only: **NO LEASING** (NL): *Split-estate.* Manage 85,100 acres (53,380 acres of which are in the North Fork area) of private and State surface/federal fluid mineral estate as closed to oil and gas leasing and geophysical exploration with specified conditions		surface/federal fluid mineral estate as closed to fluid mineral leasing and geophysical exploration with specified conditions.	
	STIPULATION *NSO* (all NSOs): Prohibit surface occupancy on 25,610 acres of the federal mineral estate: • BLM surface/federal fluid mineral estate: 24,890 acres. • Private or State surface/federal fluid mineral estate: 720 acres that are open	**STIPULATION** *NSO* (all NSOs): Prohibit surface occupancy on 452,930 acres of the federal mineral estate: • BLM surface/federal fluid mineral estate: 354,970 acres. • Private or State surface/federal fluid mineral estate: 97,960 acres that	**STIPULATION** *NSO* (all NSOs): Prohibit surface occupancy on 22,300 acres of the federal mineral estate: • BLM surface/federal fluid mineral estate: 14,680 acres. • Private or State surface/federal fluid mineral estate: 7,620 acres that	**STIPULATION** *NSO* (all NSOs): Prohibit surface occupancy on 238,140 acres of the federal mineral estate: • BLM surface/federal fluid mineral estate: 187,560 acres. • Private or State surface/federal fluid mineral estate:	**STIPULATION** *NSO* (all NSOs): Prohibit surface occupancy on 103,460 acres of the federal mineral estate: • BLM surface/federal fluid mineral estate: 74,580 acres. • Private or State surface/federal fluid mineral estate: 28,880 acres that

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	to oil and gas leasing. (Refer to Appendix T for details.)	are open to fluid mineral leasing. North Fork area only: **STIPULATION** *NSO* (all NSOs): Prohibit surface occupancy on 404,690 acres (27,280 acres of which are in the North Fork area) of federal mineral estate: • BLM surface/federal fluid mineral estate: 318,630 acres. • Private or state surface/federal fluid mineral estate: 86,060 acres that are open to oil and gas leasing. (Refer to Appendix T for details.)	are open to fluid mineral leasing. (Refer to Appendix T for details.)	50,580 acres that are open to fluid mineral leasing. (Refer to Appendix T for details.)	are open to fluid mineral leasing. (Refer to Appendix T for details.)
	STIPULATION *CSU* (all CSUs): Apply CSU restrictions on 119,860 acres of the federal mineral estate within the San Juan/San Miguel RMP area:	**STIPULATION** *CSU* (all CSUs): Apply CSU restrictions on 238,010 acres of the federal mineral estate: • BLM surface/federal fluid mineral estate: 139,560 acres. • Private or State surface/federal fluid	**STIPULATION** *CSU* (all CSUs): Apply CSU restrictions on 457,120 acres of the federal mineral estate: • BLM surface/federal fluid mineral estate: 365,810 acres. • Private or State surface/federal fluid	**STIPULATION** *CSU* (all CSUs): Apply CSU restrictions on 333,330 acres of the federal mineral estate: • BLM surface/federal fluid mineral estate: 265,140 acres.	**STIPULATION** CSU (all CSUs): Apply CSU restrictions on 386,820 acres of the federal mineral estate: • BLM surface/federal fluid mineral estate: 290,880 acres.

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	• BLM surface/federal fluid mineral estate: 110,180 acres. • Private or State surface/federal fluid mineral estate: 9,680 acres that are open to oil and gas leasing. (Refer to Appendix T for details.)	mineral estate: 98,450 acres that are open to fluid mineral leasing. North Fork area only: **STIPULATION** *CSU* (all CSUs): Apply CSU restrictions on 199,170 acres (1,380 acres of which are in the North Fork area) of federal mineral estate: • BLM surface/federal fluid mineral estate: 135,950 acres. • Private or State surface/federal fluid mineral estate: 63,620 acres that are open to oil and gas leasing. (Refer to Appendix T for details.)	mineral estate: 91,310 acres that are open to fluid mineral leasing. (Refer to Appendix T for details.)	• Private or State surface/federal fluid mineral estate: 68,190 acres that are open to fluid mineral leasing. (Refer to Appendix T for details.)	• Private or State surface/federal fluid mineral estate: 95,490 acres that are open to fluid mineral leasing. (Refer to Appendix T for details.)
	Allowable Use: **STIPULATION** *TLs* (all TLs): Prohibit surface occupancy and, in some cases, surface-disturbing activities, on 501,100 acres of the federal mineral estate (see the	Allowable Use: **STIPULATION** *TLs* (all TLs): Prohibit surface occupancy and surface-disturbing activities on 696,450 acres[1] of the federal mineral estate (see the specific resource	Allowable Use: **STIPULATION** *TLs* (all TLs): Prohibit surface occupancy and surface-disturbing activities on 582,390 acres of the federal mineral estate (see the specific resource	Allowable Use: **STIPULATION** *TLs* (all TLs): Prohibit surface occupancy and surface-disturbing activities on 865,970 acres of the federal mineral estate (see the specific resource	Allowable Use: **STIPULATION** TLs (all TLs): Prohibit surface occupancy and surface-disturbing activities on 635,430 acres of the federal mineral estate (see the specific resource

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	specific resource section and Appendix B for dates): • BLM surface/federal fluid mineral estate: 423,900 acres. • Private or State surface/federal fluid mineral estate: 77,200 acres that are open to oil and gas leasing. (Refer to Appendix T for details.)	section and Appendix B for dates): • BLM surface/federal fluid mineral estate: 494,580 acres.[1] • Private or State surface/federal fluid mineral estate: 201,870 acres[1] that are open to fluid mineral leasing. [1]*Under **Alternative B.1**, portions of some of the above areas would be closed to oil and gas leasing. As such, 609,360 acres of the federal mineral estate would be subject to TL stipulations:* • *BLM surface/federal fluid mineral estate: 454,230 acres.* • *Private or State surface/federal fluid mineral estate: 155,130 acres.* (Refer to Appendix T for details.)	section and Appendix B for dates): • BLM surface/federal fluid mineral estate: 475,220 acres. • Private or State surface/federal fluid mineral estate: 107,170 acres that are open to fluid mineral leasing. (Refer to Appendix T for details.)	section and Appendix B for dates): • BLM surface/federal fluid mineral estate: 627,290 acres. • Private or State surface/federal fluid mineral estate: 238,680 acres that are open to fluid mineral leasing. (Refer to Appendix T for details.)	section and Appendix B for dates): • BLM surface/federal fluid mineral estate: 494,340 acres. • Private or State surface/federal fluid mineral estate: 141,090 acres that are open to fluid mineral leasing. (Refer to Appendix T for details.)
	Allowable Use Stipulations:	Allowable Use Stipulations: • NL-14	Allowable Use Stipulations: • CSU-49	Allowable Use Stipulations: • NSO-54	Allowable Use Stipulations: • NSO-54

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	No similar allowable use in current RMPs.	• NSO-55 (Refer to Appendix B for details.)	• NSO-55 (Refer to Appendix B for details.)	• NSO-55 (Refer to Appendix B for details.)	• NSO-55 (Refer to Appendix B for details.)
	No similar action	Where appropriate and feasible, require installation of central liquids gathering and production facilities to reduce the total number of sources and to minimize truck traffic during fluid minerals development.			Same as Alternative A
	Require operators to meet the current BLM Gold Book standards for soil and water protection and plans for surface reclamation, plus other BMPs (Appendix G), as applicable, for all permitted fluid minerals (i.e., oil and gas and geothermal) actions.				
Locatable Minerals, Mineral Materials, and Nonenergy Leasable Materials	Maintain specified areas as withdrawn from locatable mineral entry (28,060 acres).				
	Recommend to the Secretary of the Interior withdrawal from mineral entry specified areas totaling 27,690 acres.	Recommend to the Secretary of the Interior withdrawal from mineral entry specified areas totaling 387,270 acres: • BLM surface/federal mineral estate: 382,900 acres. • Private or State surface/federal mineral estate: 4,370 acres.	Recommend to the Secretary of the Interior withdrawal from mineral entry specified areas totaling 11,250 acres: • BLM surface/federal mineral estate: 9,550 acres. • Private or State surface/federal mineral estate: 1,700 acres.	Recommend to the Secretary of the withdrawal from mineral entry specified areas totaling 55,880 acres: • BLM surface/federal mineral estate: 54,090 acres. • Private or State surface/federal mineral estate: 1,790 acres.	Recommend to the Secretary of the Interior withdrawal from mineral entry specified areas totaling 15,790 acres: • BLM surface/federal mineral estate: 15,790 acres. • Private or State surface/federal mineral estate: 0 acres.
	Allow locatable mineral exploration and development on the remaining 840,440 acres under the General Mining Law of 1872: • BLM surface/federal mineral estate: 620,050 acres.	Allow locatable mineral exploration and development on the remaining 480,860 acres under the General Mining Law of 1872: • BLM surface/federal mineral estate: 264,840 acres.	Allow locatable mineral exploration and development on the remaining 856,880 acres under the General Mining Law of 1872: • BLM surface/federal mineral estate: 638,190 acres.	Allow locatable mineral exploration and development on the remaining 812,250 acres under the General Mining Law of 1872: • BLM surface/federal mineral estate: 593,650 acres.	Allow locatable mineral exploration and development on the remaining 853,460 acres under the General Mining Law of 1872 and with certain conditions:

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	• Private or State surface/ federal mineral estate: 220,390 acres. Continue approved operations of hard rock mining on 12,790 acres. Open 309,720 acres to mineral entry and location due to the lack of resource conflicts.	• Private or State surface/federal mineral estate: 216,020 acres.	• Private or State surface/ federal mineral estate: 218,690 acres.	• Private or State surface/ federal mineral estate: 218,600 acres.	• BLM surface/federal mineral estate: 633,070 acres. • Private or State surface/ federal mineral estate: 220,390 acres.
	Close 104,690 acres of federal mineral estate to mineral materials disposal: • BLM surface/federal mineral estate: 102,190 acres. • Private or State surface/federal mineral estate: 2,500 acres.	Close 567,590 acres of federal mineral estate to mineral materials disposal: • BLM surface/federal mineral estate: 499,340 acres. • Private or State surface/federal mineral estate: 68,250 acres.	Close 58,610 acres of federal mineral estate to mineral materials disposal: • BLM surface/federal mineral estate: 56,350 acres. • Private or State surface/federal mineral estate: 2,260 acres.	Close 135,370 acres of federal mineral estate to mineral materials disposal • BLM surface/federal mineral estate: 132,520 acres. • Private or State surface/federal mineral estate: 2,850 acres.	Close 125,780 acres of federal mineral estate to mineral materials disposal: • BLM surface/federal mineral estate: 121,740 acres. • Private or State surface/federal mineral estate: 4,040 acres.
	Allow disposal of mineral materials on 791,500 acres of federal mineral estate: • BLM surface/federal mineral estate: 573,610 acres.	Allow disposal of mineral materials on 328,600 acres of federal mineral estate: • BLM surface/federal mineral estate: 176,460 acres.	Allow disposal of mineral materials on 837,580 acres of federal mineral estate: • BLM surface/federal mineral estate: 619,450 acres.	Allow disposal of mineral materials on 760,820 acres of federal mineral estate:	Allow disposal of mineral materials on 770,410 acres of federal mineral estate: • BLM surface/federal mineral estate: 554,060 acres.

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	• Private or State surface/federal mineral estate: 217,890 acres. • Continue sand and gravel operations • **STIPULATION** *TL* (all TLs): Apply TLs to 146,050 acres that are open to mineral materials disposal.	• Private or State surface/federal mineral estate: 152,140 acres.	• Private or State surface/federal mineral estate: 218,130 acres.	• BLM surface/federal mineral estate: 543,280 acres. • Private or State surface/federal mineral estate: 217,540 acres.	• Private or State surface/federal mineral estate: 216,350 acres.
	Close 44,220 acres in specified areas to nonenergy solid leasable mineral exploration and/or development.	Close 395,900 acres in specified areas to nonenergy leasable mineral exploration and/or development • BLM surface/federal mineral estate: 386,400 acres. • Private or State surface/federal mineral estate: 9,500 acres.	Close 57,390 acres in specified areas to nonenergy leasable mineral exploration and/or development • BLM surface/federal mineral estate: 55,570 acres. • Private or State surface/federal mineral estate: 1,820 acres.	Close 170,490 acres in specified areas to nonenergy leasable mineral exploration and/or development • BLM surface/federal mineral estate: 168,130 acres. • Private or State surface/federal mineral estate: 2,360 acres.	Close 167,330 acres in specified areas to nonenergy leasable mineral exploration and/or development • BLM surface/federal mineral estate: 163,300 acres. • Private or State surface/federal mineral estate: 4,030 acres.
	Continue nonenergy solid leasable mineral leasing on 631,480 acres.	Manage 500,290 acres as open for consideration of nonenergy solid leasable mineral exploration and/or development, subject to stipulations in Appendix B:	Allowable Use: Manage 838,800 acres as open for consideration of nonenergy solid leasable mineral exploration and/or development, subject	Allowable Use: Manage 725,700 acres as open for consideration of nonenergy solid leasable mineral exploration and/or development, subject	Allowable Use: Manage 728,860 acres as open for consideration of nonenergy solid leasable mineral exploration and/or development, subject

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		• BLM surface/federal mineral estate: 289,400 acres. • Private or State surface/federal mineral estate: 210,890 acres.	to stipulations in Appendix B: • BLM surface/federal mineral estate: 620,230 acres • Private or State surface/federal mineral estate: 218,570 acres	to stipulations in Appendix B: • BLM surface/federal mineral estate: 507,670 acres. • Private or State surface/federal mineral estate: 218,030 acres.	to stipulations in Appendix B: • BLM surface/federal mineral estate: 512,500 acres. • Private or State surface/federal mineral estate: 216,360 acres.
	Manage 120,260 acres as a common use area for moss rock.	Manage 120,260 acres as a common use area for moss rock.	Manage 120,260 acres as a common use area for moss rock. Establish common use areas in appropriate locations and with sufficient capacity, while avoiding proliferation of sites for similar materials in a given area.	Same as Alternative B	
Recreation and Visitor Services	No similar action	• Close specified areas to dispersed camping. List of locations varies by alternative and is available in Appendices J and T. • Close specified areas to overnight use. List of locations varies by alternative and is available in Appendices J and T. • Provide new and maintain existing facilities where needed to meet management objectives.			
	Issue SRPs as a discretionary action to manage commercial, competitive, vending, special area use, organized groups, and	• Issue SRPs and competitive events as a discretionary action unless otherwise restricted. • Issue SRPs for a wide variety of uses that are consistent with resource/program objectives and within budgetary/workload constraints. • Prohibit vending permits outside of special events on BLM-administered lands. • Apply cost-recovery procedures for issuing SRPs, where appropriate. • Unless otherwise restricted through other RMP actions:			

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	event permits under the UFO Special Recreation Permit Policy and BLM Handbook H-2930-1, Recreation Permit Administration.	Same as Alternative A Prohibit competitive events in specified SRMAs. Prohibit motorized competitive events (allow nonmotorized competitive events) in specified SRMAs.	Same as Alternative A	Same as Alternative A Prohibit all competitive events in specified SRMAs Prohibit motorized competitive events (allow nonmotorized competitive events) in specified SRMAs. Prohibit motorized and mechanized competitive events (allow nonmotorized/ nonmechanized competitive events) in Spring Creek SRMA, RMZ 2.	Issue SRPs as a discretionary action to manage commercial, competitive, vending, special area use, organized groups, and event permits under current policies and BLM Handbook H-2931-1, Recreation Permit Administration. Prohibit all competitive events in specified SRMAs. Prohibit motorized competitive events (at the discretion of the BLM Authorized Officer, allow nonmotorized competitive events if compatible with experiences and benefits for SRMA) in specified SRMAs.
	No similar action in current RMPs, although organized group permits are required to be obtained by the	Unless otherwise restricted or allowed through other RMP actions, require the organizer to obtain organized group permits for:			
		Groups with or expecting 50 people, including spectators. Adjust numbers if	Groups with or expecting more than 150 people, including spectators. Adjust	Groups with or expecting more than 16 people in a WSA, wilderness, or	Groups with 16 or more people in a WSA, wilderness, or Tabeguache Area, and

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	organizer. Vehicle and participant, including spectator, limits are determined on a case-by-case basis. In the Dolores River Canyon SRMA, group size is limited to no more than 16 people.	monitoring indicates the need. An additional restriction for SRMAs is: Dolores River: No more than 12 people, including guides.	numbers if monitoring indicates the need.	Tabeguache Area and groups with or expecting more than 75 people in all other areas. An additional restriction for SRMAs is: Dolores River: No more than 16 people, including guides.	groups with 75 or more people in all other areas.* An additional restriction for SRMAs is: Dolores River: Group size limit is 16 people, including guides.*
	Allow recreational mining.	Prohibit recreational mining.	Prohibit recreational mining in developed recreational sites.	Prohibit mining in the following areas: • In occupied streams during spawning periods to protect native fish o April 1 to July 15 for spring spawning native cutthroat trout, rainbow trout, and native warm water fish (flannelmouth sucker, bluehead sucker, and roundtail chub). • Within 100 feet of developed recreation sites, roadways, and boat ramps.	Allow casual use mining.

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	No similar allowable use.	No Similar allowable use.	Recreational mining must adhere to the following practices: • All recreational mining activities must take place within the stream channel, no closer than 2 feet from any stream bank (and /or inter-river island) with established vegetation, and shall be conducted to prevent undercutting of banks; • Material too large to be moved by hand shall remain undisturbed; • All excavations shall have materials replaced upon completion of operations, and no sites shall be left open in excess of 14 days; • Operations shall not disturb in excess of 2 cubic	Recreational mining must adhere to the following practices: • Prohibit motorized recreational mining (e.g., motorized dredge); • All activities shall be conducted below existing water surface; • Material too large to be moved by hand, including using hand tools such as crowbars and pry-bars, shall remain undisturbed; • All excavations shall have materials replaced upon completion of operations, and no sites shall be left open in excess of 14 days; and • Operations shall not disturb in excess of 1 cubic yard of material per day.	Same as Alternative A (See *Locatable Minerals* for restrictions on casual use mining.)

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
			yards of material per day; and • Anchorage systems (if used) shall not span the stream if it will restrict the free passage of water craft.		
	No similar action	Recommend to the Secretary of the Interior to withdraw from locatable mineral entry the San Miguel River, Uncompahgre River, North Fork Gunnison River, Gunnison River, and Dolores River, plus a 0.25-mile buffer each side of center.	No similar allowable use. (Recreation sites would not be recommended for withdrawal from locatable mineral entry.)	Recommend to the Secretary of the Interior to withdraw from locatable mineral entry all developed recreational sites plus a 100-foot buffer.	
	Allow hunting in accordance with CPW regulations.				
	Target Shooting. Prohibit (close) target shooting in developed recreation sites (340 acres) (43 CFR, 8365.2-5).	*Target Shooting*. The purpose of the limits and closures is for visitor and public safety and to protect facilities from damage. Allow hunting in accordance with CPW regulations.	*Target Shooting*. The purpose of the closure is for visitor and public safety and to protect facilities from damage. Allow hunting in accordance with CPW regulations.	*Target Shooting*. The purpose of the limits and closures is for visitor and public safety and to protect facilities from damage. Allow hunting in accordance with CPW regulations.	*Target Shooting*. The purpose of the limits and closures is for visitor and public safety and to protect facilities from damage. Limit target shooting within the following areas: • If within the range of the firearm, do

Resources	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
		Limit target shooting within the following areas: • Do not target shoot towards an intended target that is located across a designated route (roads and designated trails). • If within the range of the firearm, do not target shoot toward or in the direction of any developed recreation site. Prohibit (close) target shooting in specified areas (248,170 acres).	Prohibit (close) target shooting in developed recreation sites (340 acres).	Limit target shooting within the following areas: • If within the range of the firearm, do not target shoot toward or in the direction of any developed site or facility (e.g., recreation site, communication site, and power substation). • Do not target shoot towards an intended target that is located across a designated route (roads and designated trails). Prohibit (close) target shooting in specified areas: (49,370 acres).	not target shoot toward or in the direction of any developed site or facility (e.g., recreation site, communication site, and power substation). • Do not target shoot towards an intended target that is located across a designated route (roads and designated trails). Prohibit (close) target shooting in the following areas: (310 acres) • Do not shoot within 150 yards of any developed recreation site.
	No similar allowable use	The discharge of firearms for recreational target shooting is permitted on BLM-administered lands, considering areas with firearm use restrictions or closures, provided that the firearm is discharged toward a proper backstop sufficient to stop the projectile's forward progress beyond the intended target. Targets shall be constructed of wood, cardboard, and paper or similar unbreakable materials. Discharge of firearms at any appliance, television, object containing glass, or other target material that can shatter and cause a public safety hazard is			Same as Alternatives B-D plus: To reduce the probability of igniting a fire, avoid shooting any hard objects or against backstops

Resources	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
		prohibited. All shooting materials, including targets, shell boxes, shells, shell casings, and clay targets (e.g., trap and skeet), are considered litter and must be removed and properly disposed of. Refer to the *Extensive Recreation Management Area*, *Special Recreation Management Area*, and *Areas of Critical Environmental Concern* sections for firearm use restrictions within these areas.			surrounded by dry grass, especially with steel or copper ammunition. When fire danger is high, the BLM may issue public use closures and prevention measures that must be followed.
	No similar action	No Similar Action. (Designated shooting areas and ranges would not be allowed.)	Allow designated shooting areas and ranges.	Same as Alternative B	Same as Alternative A
Special Recreation Management Areas	Manage SRMAs to provide for targeted recreation opportunities, experiences, benefits, and settings. Targeted objectives for SRMAs and associated Recreation Management Zones (RMZs) vary by alternative. See Appendices J and T for details.				
	Manage 49,320 acres as SRMAs to provide targeted recreation opportunities, visitor experiences, and benefits. Investments in SRMAs include facilities, visitor management, interpretation and environmental education, and increased on-the-ground BLM presence for enhanced visitor	Manage 246,760 acres as SRMAs to provide targeted recreation opportunities, experiences, and benefits listed below: • Burn Canyon (9,160 acres) • Dolores River Canyon (13,380 acres) • Dry Creek (42,180 acres) • Jumbo Mountain (5,020 acres)	No Similar Action. (Manage no areas as SRMAs; see ERMAs.)	Manage 124,400 acres as SRMAs to provide targeted recreation opportunities, experiences, and benefits listed below: • Dolores River Canyon (13,380 acres) • Dry Creek (42,180 acres) • Jumbo Mountain (1,360 acres) • Ridgway Trails (1,130 acres)	Manage 122,130 acres as SRMAs to provide targeted recreation opportunities, experiences, and benefits listed below: • Dolores River Canyon 13,410 acres) • Dry Creek (42,180 acres) • Jumbo Mountain (1,600 acres) • Ridgway Trails (1,130 acres)

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	services and resource protection: • Dolores River Canyon (13,380 acres) • San Miguel River (35,940 acres) (Refer to Appendix J for details.)	• Kinikin Hills (11,320 acres) • North Delta (8,520 acres) • Paradox Valley (86,990 acres) • Ridgway Trails (1,130 acres) • Roubideau (25,350 acres) • San Miguel River (36,020 acres) • Spring Creek (4,980 acres) • Youngs Peak (2,710) (Refer to Appendix J for details.)		• Roubideau (25,350 acres) • San Miguel River (36,020 acres) • Spring Creek (4,980 acres) (Refer to Appendix J for details.)	• Roubideau (25,350 acres) • San Miguel River (29,530 acres) • Spring Creek (4,980 acres) • North Delta (3,950 acres) (Refer to Appendix J for details.)
	No similar action	Within SRMAs, allow activities that benefit biological values (including fire) to support the management objectives of the overlying ACECs, WSAs, lands managed to protect wilderness characteristics, ecological emphasis areas, areas with exemplary, ancient, or rare vegetation, and suitable WSR	No similar action	Within SRMAs, allow activities that benefit biological values (including fire) to support the management objectives of the overlying ACECs, WSAs, lands managed to protect wilderness characteristics, ecological emphasis areas, areas with exemplary, ancient, or rare vegetation, and suitable WSR	Within SRMAs, allow activities that benefit biological values (including fire) if consistent with SRMA objectives in the long term.

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		segments with a fish, wildlife, or vegetation ORV.		segments with a fish, wildlife, or vegetation ORV, if consistent with SRMA objectives in the long term.	
	Allowable Use Stipulations for SRMAs: • NSO-SJ-3 (Refer to Appendix B for details.)	Allowable Use Stipulations for SRMAs: • NGD-25 • NL-15 • NSO-56 North Fork Only Stipulation: • NSO-57 (Refer to Appendix B for details.)	No similar allowable use. (Areas would not be managed as SRMAs under Alternative C)	Allowable Use Stipulations for SRMAs: • NSO-56 • CSU-50 (Refer to Appendix B for details.)	Allowable Use Stipulations for SRMAs: • NSO-56 • CSU-50 (Refer to Appendix B for details.)
Extensive Recreation Management Areas	Manage ERMAs to provide for targeted recreation opportunities. Targeted objectives for ERMAs vary by alternative. See Appendices J and T for details.				
	No similar action in current RMPs. Planning guidance that was in place when the San Juan/San Miguel and Uncompahgre Basin RMPs were written directed that all BLM-administered land not designated as a SRMA should be designated as an ERMA. Under today's recreation guidance, what was formerly the	No similar action (ERMAs would not be designated; see SRMAs)	Manage 215,880 acres as ERMAs to specifically address local recreation issues (refer to Appendix J, Description of Recreation Management Areas, for actions of each ERMA): • Adobe Badlands (6,370 acres) • Burn Canyon (9,160 acres)	Manage 73,310 acres as ERMAs to specifically address local recreation issues (refer to Appendix J, Description of Recreation Management Areas, for actions of each ERMA): • Burn Canyon (9,160 acres) • Kinikin Hills (10,810 acres)	Manage 64,790 acres as ERMAs to specifically address local recreation issues (refer to Appendix J, Description of Recreation Management Areas, for actions of each ERMA): • Burn Canyon (9,160 acres) • Kinikin Hills (10,810 acres)

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	Uncompahgre ERMA would be considered undesignated (i.e., neither an ERMA nor a SRMA). As such, the terminology has been updated to reflect more closely the recreation guidance under which this RMP was written to avoid unequal comparisons.		• Dolores River Canyon (13,380 acres) Dry Creek (41,290 acres) • Jumbo Mountain (5,020 acres) • Kinikin Hills (11,310 acres) • North Delta (8,520 acres) • Paradox Valley (44,820 acres) • Ridgway Trails (1,130 acres) • Roubideau (25,350 acres) • San Miguel River Corridor (36,020 acres) • Spring Creek (13,510 acres)	• North Delta (8,520 acres) • Paradox Valley (44,820 acres)	• Paradox Valley (44,820 acres)
	Allowable Use Stipulation for ERMAs: No similar allowable use in current RMPs.	Allowable Use Stipulation for ERMAs: No similar allowable use. (ERMAs would not be designated under Alternative B; a CSU would not apply to ERMAs under Alternative C.)		Allowable Use Stipulation for ERMAs: CSU-51: *Recreation ERMAs*. Apply CSU restrictions in ERMAs.	
Public Lands Not Designated as Recreation Management Areas	Manage 626,480 acres as public lands not designated as recreation management areas to	Manage 432,880 acres as public lands not designated as recreation	Manage 459,920 acres as public lands not designated as recreation management areas	Manage 479,220 acres as public lands not designated as recreation management areas	Manage 488,880 acres as public lands not designated as recreation management areas

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	provide a wide range of diverse recreational opportunities to meet public demands for dispersed recreation. Emphasize providing access, visitor information, and facilities needed to address public health and safety standards.	management areas (i.e., ERMAs or SRMAs).	(i.e., ERMAs or SRMAs).	(i.e., ERMAs or SRMAs).	(i.e., ERMAs or SRMAs).
Comprehensive Travel and Transportation Management	Identify off-road vehicle designations as follows • Open: 8,560 acres • Closed to motorized travel: 11,950 acres • Closed to motorized and mechanized travel: 44,200 acres • Limited yearlong to existing routes for motorized and mechanized travel: 465,790 acres • Limited yearlong to designated routes for motorized and mechanized travel: 145,300 acres	Designate travel areas as follows: • Open: 0 acres • Closed to motorized travel: 12,180 acres • Closed to motorized and mechanized travel: 102,790 acres • Limited yearlong to designated routes for motorized and mechanized travel: 560,830 acres • Seasonal limitations: 218,230 acres	Designate travel areas as follows: • Open: 16,070 acres • Closed to motorized travel: 0 acres • Closed to motorized and mechanized travel: 45,170 acres • Limited yearlong to designated routes for motorized and mechanized travel: 614,560 acres • Seasonal limitations: 19,580 acres	Designate travel areas as follows: • Open: 0 acres • Closed to motorized travel: 1,160 acres • Closed to motorized and mechanized travel: 57,400 acres • Limited yearlong to designated routes for motorized and mechanized travel: 617,240 acres • Seasonal limitations: 104,940 acres	Designate travel areas as follows: • Open: 3,950 acres • Closed to motorized travel: 880 acres • Closed to motorized and mechanized travel: 55,770 acres • Limited yearlong to designated routes for motorized and mechanized travel: 615,200 acres • Seasonal limitations: 28,550 acres

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	• Seasonal limitations: 59,070 acres				
	Identify the North Delta OHV Area (8,560 acres) as open to OHV use.	Manage 0 acres as open to OHV use.	Manage 16,070 acres as Open to OHV use.	Same as Alternative B	Manage 3,950 acres as Open to OHV use
	Identify 11,950 acres as closed to motorized travel (except for administrative and permitted use).	Manage 12,180 acres as closed to motorized travel, except for administrative and permitted vehicular access (which would be limited to authorized routes), and with mechanized travel limited to designated routes.	No similar action	Manage 1,160 acres as closed to motorized travel, except for with administrative and permitted vehicular access (which would be limited to authorized routes), and with mechanized travel limited to designated routes.	Manage 880 acres as closed to motorized travel, except for administrative and permitted vehicular access (which would be limited to authorized routes), and with mechanized travel limited to designated routes.
	Manage 44,200 acres as closed to motorized and mechanized travel, except for administrative and permitted vehicular access.	Manage 102,080 acres as closed to motorized and mechanized travel, except for administrative and permitted vehicular access, which would be limited to authorized routes.	Manage 45,170 acres as closed to motorized and mechanized travel, except for administrative and permitted vehicular access, which would be limited to authorized routes.	Manage 57,400 acres as closed to motorized and mechanized travel, except for administrative and permitted vehicular access, which would be limited to authorized routes.	Manage 55,770 acres as closed to motorized and mechanized travel, except for administrative and permitted vehicular access, which would be limited to authorized routes.
	Manage the remaining portion of the Planning Area as limited to designated routes for motorized and mechanized travel. Until travel management plans to designate routes are completed, limit areas to existing routes and existing route widths.				
	• 145,300 acres limited to designated routes	560,830 acres; including landing strips.	614,560 acres; including landing strips.	617,240 acres and including landing strips.	615,200 acres and including landing strips.

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	for motorized and mechanized travel. • 465,790 acres without designated routes - limited to existing routes.				
	Prohibit motorized and mechanized travel seasonally, except for administrative and permitted vehicular access, in specified areas (refer to Appendix T):				
	59,070 acres	218,230 acres The Field Manager may modify the size and time frames upon consultation with CPW based on specific criteria.	19,580 acres The Field Manager may modify the size and time frames based on specific criteria.	103,840 acres The Field Manager may modify the size and time frames upon consultation with CPW based on specific criteria.	28,550 acres The BLM Field Manager may modify the size and time frames for seasonal travel limitations upon consultation with CPW. Prohibit all travel (including motorized, mechanized, foot, and equestrian) seasonally in Ridgway Trails SRMA RMZ 2 from December 1 to April 30, except for administrative and permitted access (1,100 acres).*
	No similar action	Prohibit mechanized and motorized off-route travel in areas	Prohibit mechanized and motorized off-route travel in areas with riparian or	Prohibit motorized off-route travel in riparian and wetland areas, including for camping and collecting rock, wood products, and other plant products.	

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		with riparian or wetland vegetation.	wetland vegetation, with the exception of camping, collecting rock, wood products, and other plant products, and retrieving large game during hunting seasons.		
	No similar action	Where off-highway vehicles or aircraft are causing or will cause considerable adverse effects on soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, immediately close the affected areas to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence.			Same as Alternatives B-D except reference is to "motorized and mechanized vehicles or aircraft," includes roads and trails, and adds "prohibit travel in areas where soils are saturated or that demonstrate rutting of 3 inches or more."
	Guidance to use for areas that are limited to existing routes until travel management plans to designate routes are completed can be found in more detail in Appendices M and T.				
	Bring forward the decisions from the Dry Creek Travel Management Plan (BLM 2009a) in the Dry Creek Travel Management Area and the Ridgway Travel Management Plan (BLM 2013a).				Same as Alternative A-D, with the addition of the decisions from the Burn Canyon Travel Management Plan (BLM 2018d).
	Develop facilities to support the travel management plan. Allow up to a maximum of 3 acres	• Establish Travel Management Areas and initiate comprehensive travel management plans within each the following Travel Management Areas and in the following order unless a change is deemed necessary by the BLM Authorized Officer): 1. North Fork (71,020 acres) 2. South Montrose (66,180 acres)			

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	of disturbed surface for these facilities.	3. North Delta (61,270 acres) 4. San Miguel (74,960 acres) 5. West End (289,960 acres) • Develop facilities as needed to support the travel management plan goals and objectives. • Refer to Appendix M, Travel Management, for information and guidance on comprehensive travel management planning.			
	No similar action	Any emergency or administrative motorized vehicle or equipment use off designated routes on BLM-administered lands would require prior notification and approval. Should prior notification not be possible, contact would be made with the authorized BLM official within 72 hours following emergency entry.			Any administrative motorized vehicle or equipment use off designated routes on BLM-administered lands would require prior notification of and approval from the BLM Authorized Officer. Any emergency motorized vehicle or equipment use off designated routes on BLM-administered lands would require notification of the BLM Authorized Officer within 72 hours following emergency entry.
	No similar action	In cooperation with the local communities, counties, and other partners, secure access to and manage a network of roads and trails that ensure management objectives are met and provide connectivity to the surrounding communities.			

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
Lands and Realty	ROW Exclusion Areas (including renewable energy sites): Manage 85,080 acres as ROW exclusion areas that are not available for locating ROWs or other land use authorizations under any conditions.	ROW Exclusion Areas (including renewable energy sites): Manage 431,040 acres as ROW exclusion areas that are closed to land use authorizations. The following exceptions would apply to ROW exclusions (these areas would be managed as ROW avoidance): • Designated West-wide Energy Corridors (section 368 corridors). • Designated utility corridors. • 100-foot buffer from the center line of county roads and highways. • Allow ROWs for private in-holdings or edge-holdings for reasonable access and utilities.	ROW Exclusion Areas (including renewable energy sites): Manage 44,550 acres as ROW exclusion areas that are closed to land use authorizations. The following exceptions would apply to ROW exclusions: • Designated West-wide Energy Corridors (section 368 corridors). • 100-foot buffer from the center line of county roads and highways (these areas would be managed as ROW avoidance). • Allow ROWs for private in-holdings or edge-holdings for reasonable access and utilities (these areas would be managed as ROW avoidance).	ROW Exclusion Areas (including renewable energy sites): Manage 53,700 acres as ROW exclusion areas that are closed to land use authorizations. The following exceptions would apply to ROW exclusions: • Designated West-wide Energy Corridors (section 368 corridors). • Designated utility corridors. • 100-foot buffer from the center-line of county roads and highways (these areas would be managed as ROW avoidance). • Allow ROWs for private in-holdings or edge-holdings for reasonable access and utilities (these areas would	ROW Exclusion Areas (including renewable energy sites): Manage 53,040 acres as ROW exclusion areas that are closed to land use authorizations. The following exceptions would apply to ROW exclusions: • Designated West-wide Energy Corridors (section 368 corridors). • Designated utility corridors. • 100-foot buffer from the center-line of county roads and highways (these areas would be managed as ROW avoidance). Allow ROWs for private in-holdings or edge-holdings for reasonable access and utilities (these areas would be managed as ROW avoidance).

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
				be managed as ROW avoidance).	Recognize the valid existing rights of grant holders to continue to operate, maintain, and improve/upgrade facilities.
	In the San Miguel River ACEC (22,780 acres) outside of relic riparian communities, restrict ROW authorizations to only those with an overriding public need that will not create long-term visual impacts or damage the riparian system (BLM 1993a).	ROW Avoidance Areas (including renewable energy sites): Manage 195,460 acres as ROW avoidance areas.	Allowable Use: ROW Avoidance Areas (including renewable energy sites): Manage 210,390 acres as ROW avoidance areas.	Allowable Use: ROW Avoidance Areas (including renewable energy sites): Manage 276,500 acres as ROW avoidance areas.	Allowable Use: ROW Avoidance Areas (including renewable energy sites): Manage 66,030 acres as ROW avoidance areas. The following exceptions would apply to ROW avoidance areas: • Designated West-wide Energy Corridors (section 368 corridors). • Designated utility corridors (allow all compatible uses in designated corridors). Recognize the valid existing rights of grant holders to continue to operate, maintain, and

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
					improve/upgrade facilities.
	Make every reasonable effort to authorize primary access to private landowners via ROWs, when such access will not cause significant adverse impacts on other resources. Do not grant additional ROWs when reasonable access already exists, unless there is a compelling public need.	Provide reasonable access and utilities to private landowners in an environmentally responsible manner. New ROWs would not be permitted if there is other reasonable access.			
	No similar action				Limit applications for filming permits and still photography involving motorized, mechanized, or other intensive uses to existing highways and pullouts; designated routes, roads, and trails; and previously disturbed or cleared areas. Accept applications for filming permits, and encourage applicants

Resources	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
					to adhere to the specified criteria provided in Appendix T.
	The ROD for the Solar Energy Development Programmatic EIS (2012) excluded all lands within the UFO for solar development for projects 20 megawatts or greater.	Allow renewable energy projects (such as wind, solar under 20 megawatts, and hydropower) development and operation, except in ROW exclusion areas and areas identified as exclusion in **Table 2-3** (Renewable Energy Exclusion and Avoidance Areas[1]).			
	Manage existing communication sites.	Same as Alternative A, plus: • Designate all existing sites for low-power uses (i.e., 1,000 watts effective radiated power or less), except for high-power uses that currently exist. • Evaluate and allow new low- or high-power communication site locations on a case-by-case basis.	Same as Alternative A, plus: • Evaluate and allow new low- or high-power. communication site locations on a case-by-case basis.	Same as Alternative B	
	Manage the designated West-wide Energy Corridor (26,880	Same as Alternative A, plus: Designate and manage an additional 14	Same as Alternative A	Same as Alternative B	

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	acres) according to existing policy.	corridors (37,420 acres) for public utilities and facilities.			
	Identify 297,930 acres as open to development of major utility corridors.	Allow ROW development and operation except in ROW exclusion areas. ROWs must follow existing facilities and routes.	Allow ROW development and operation except in ROW exclusion areas. Preferred locations are next to existing facilities and routes.		Allow ROW development and operation except in ROW exclusion areas. Preferred locations are next to existing facilities and routes. Specified exceptions would apply to ROW exclusions. Recognize the valid existing rights of grant holders to continue to operate, maintain, and improve/upgrade facilities.
	Identify 9,850 acres as available for disposal.	Identify 2,650 acres as available for disposal by any method.	Identify 9,850 acres as available for disposal by any method.	Identify 1,930 acres as available for disposal by any method.	Identify 1,930 acres as available for disposal by any method.
	Criteria to consider for additional lands suitable for disposal by any method vary by alternative. See Appendix T for specific alternative detail.				
	No similar action	• Do not dispose of lands within existing withdrawals, powersite classifications, or powersite reserves (19,710 acres) without concurrence from the managing agency (e.g., BOR and DOE). • Reserve public access easements on lands transferred from public ownership (patents) when it would benefit management goals or the public. • Do not accept new Desert Land Entry or Carey Act applications.			

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	No similar action	Criteria to consider to retain lands vary by alternative. See Appendix T for specific alternative detail.			
	Retain public lands not identified for disposal, except for those lands that meet the criteria for disposal, for long-term management:				
	665,950 acres	673,150 acres	665,950 acres	673,870 acres	
	Acquire and or exchange lands and sub-surface mineral estate to improve and benefit public lands, resources, and manageability.	As opportunities arise, acquire lands or easements in specified priority areas.	No similar action	Same as Alternative B	
	Acquire private lands, if available, if they would meet any of the specified criteria.	Criteria to consider for acquiring lands or easements vary by alternative. See Appendix T for specific alternative detail.			
	• Where applicable, issue ROWs, leases, other authorizations, or agreements in lieu of withdrawals. • Maintain existing power site classifications and power site reserves pending determination of potential for power or reservoir-related projects.				
	Upon withdrawal modification or revocation, revert part or all of the withdrawn land to the BLM.	Upon revocation of existing withdrawals, manage the lands consistent with the objectives of adjacent or comparable public lands.			Review withdrawals, as needed, and recommend their extension, continuation, termination, or revocation, as per applicable legislation, order, regulation, or agencies' needs. Continue all existing withdrawals initiated by other agencies unless the initiating

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
					agency requests that the withdrawal be terminated. Following revocation of a withdrawal and issuance of an opening order, manage the lands in a manner consistent with adjacent or comparable public land within the Planning Area.
Special Designations					
Areas of Critical Environmental Concern	Manage the following areas (30,000 acres) as ACECs and RNAs or outstanding natural areas: • Adobe Badlands ACEC/ Outstanding Natural Area (6,370 acres) • Fairview South ACEC/ Research Natural Area (210 acres) • Needle Rock ACEC/ Outstanding	Manage the following areas (215,940 acres) as ACECs: • Coyote Wash ACEC (2,100 acres) • Dolores Slickrock Canyon ACEC (10,670 acres) • East Paradox ACEC (7,360 acres) • Fairview South (CNHP Expansion) ACEC (4,250 acres) • La Sal Creek ACEC (10,490 acres) • Lower Uncompahgre	Manage the following areas (29,440 acres) as ACECs: • Adobe Badlands ACEC (6,370 acres) • Fairview South ACEC (210 acres) • Needle Rock ACEC (80 acres) • San Miguel River (22,780 acres)	Manage the following areas (51,320 acres) as ACECs: • Adobe Badlands ACEC (6,370 acres) • Biological Soil Crust ACEC (1,900 acres) • Dolores River Slickrock Canyon	Manage the following areas (30,190 acres) as ACECs: • Adobe Badlands ACEC (6,370 acres) • Biological Soil Crust ACEC (390 acres) • Fairview South (BLM Expansion) ACEC (610 acres) • Needle Rock ACEC (80 acres) • Paradox Rock Art ACEC (1,080 acres) • San Miguel River (21,660 acres)

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	Natural Area (80 acres) • San Miguel River ACEC (22,780 acres) • Tabeguache Creek ACEC/ Outstanding Natural Area (560 acres)	Plateau ACEC (31,810 acres) • Needle Rock ACEC (80 acres) • Paradox Rock Art ACEC (1,080 acres) • Roubideau-Potter-Monitor ACEC (20,430 acres) • Salt Desert Shrub Ecosystem ACEC (34,510 acres; includes the existing Adobe Badlands ACEC) • San Miguel Gunnison Sage-Grouse ACEC (470 acres) • San Miguel River Expansion ACEC (35,480 acres) • Sims-Cerro Gunnison Sage-Grouse ACEC (25,620 acres) • Tabeguache Pueblo and Tabeguache Caves ACEC (26,400 acres) • West Paradox ACEC (5,190 acres)		ACEC (9,780 acres) • Fairview South (BLM Expansion) ACEC (610 acres) • Needle Rock ACEC (80 acres) • Paradox Rock Art ACEC (1,080 acres) • Roubideau Corridors ACEC (8,720 acres) • San Miguel River (22,780 acres)	

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	No similar action	Specific management prescriptions within each potential ACEC vary by alternative and can be found in more detail in Appendix T.			
	Allowable Use Stipulations (not all stipulations are applied to all ACECs: • NSO-UB-7 (Refer to Appendix B for details.)	Allowable Use Stipulations (not all stipulations are applied to all ACECs: • NSO-58 • NSO-58/NGD-26 • NL-16/SSR-57 • NL-16/NGD-26 • TL-28 North Fork Only Stipulations: • NL-11 (Refer to Appendix B for details.)	Allowable Use Stipulations (not all stipulations are applied to all ACECs: • CSU-52/SSR-57 • CSU-52 (Refer to Appendix B for details.)	Allowable Use Stipulations (not all stipulations are applied to all ACECs: • NSO-58/SSR-57 • NSO-58 (Refer to Appendix B for details.)	Allowable Use Stipulations (not all stipulations are applied to all ACECs: • NSO-58/SSR-57 • NSO-50 • NSO-58 (Refer to Appendix B for details.)
Wilderness and Wilderness Study Areas	Apply the following management actions to the Tabeguache Area (8,060 acres): • Manage as VRM Class I. • Close to motorized and mechanized travel. • Manage as ROW exclusion. • Closed to wood cutting and wood product sales and harvest	Same as Alternative A, plus: Prohibit target shooting.	Same as Alternative A		

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	• Allowable Use: Withdrawn from locatable mineral entry. • Allowable Use: Close to coal leasing.				
	Manage 36,160 acres in the following WSAs according to BLM Manual 6330, Management of Wilderness Study Areas until Congress either designates them as wilderness or releases them for other uses: • Adobe Badlands (10,320 acres) • Camel Back (10,680 acres) • Dolores River Canyon (13,340 acres) • Needle Rock ISA (80 acres) • Sewemup Mesa (1,740 acres)				
	If Congress releases one or more WSAs from wilderness consideration, manage those lands consistent with underlying land use designations as follows:				
	No similar action	Sewemup Mesa WSA: • Manage as VRM Class II. • Close to motorized travel, including over-the-snow travel. • Limit mechanized travel to designated routes. Dolores River Canyon: manage the lands consistent with the Dolores River SRMA	Sewemup Mesa WSA: manage the lands consistent with the goals and objectives in the RMP for adjacent areas. Dolores River Canyon WSA: manage the lands for multiple uses consistent with the goals and objectives in the RMP.	Sewemup Mesa WSA: • Manage as VRM Class II. • Close to motorized travel, including over-the-snow travel. • Limit mechanized travel to designated routes. Dolores River Canyon: manage the lands consistent with the Dolores River SRMA and Dolores	Sewemup Mesa WSA from wilderness consideration: manage the UFO portion to be consistent with the Grand Junction Field Office portion of the WSA: • Manage as VRM Class II. • Close to motorized travel, including over-the-snow travel.

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		and Dolores Slickrock Canyon ACEC. Camel Back WSA: manage those lands consistent with Roubideau SRMA and Roubideau-Potter-Monitor ACEC. Adobe Badlands WSA: manage those lands consistent with Salt Desert Shrub ACEC.	Camel Back WSA: manage those lands consistent with management prescriptions of adjacent public lands. Adobe Badlands WSA: manage those lands consistent with Adobe Badlands ACEC.	Slickrock Canyon ACEC. Camel Back WSA: manage those lands consistent with Roubideau SRMA and Roubideau Corridors ACEC. Adobe Badlands WSA: manage those lands consistent with Adobe Badlands ACEC.	• Limit mechanized travel to designated routes. Dolores River Canyon WSA: manage the lands consistent with the underlying land use designations (i.e., suitable Dolores River Segment 1a, suitable LaSal Creek Segment 3, and Dolores River Canyon SRMA). Camel Back WSA: manage those lands consistent with the underlying land use designations (i.e., suitable Roubideau Creek Segment 1, suitable Monitor Creek, suitable Potter Creek, and Roubideau SRMA). Adobe Badlands WSA: manage those lands consistent with the underlying land use designation (i.e.,

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
					Adobe Badlands ACEC).
	Apply the following management prescriptions to all WSAs: • Manage as VRM Class I. • Manage as ROW exclusion. • Closed to wood cutting and wood product sales and harvest. • Close to coal leasing. • Close to nonenergy solid mineral leasing.				
	No similar action	In addition to the above, apply the following management prescriptions to WSAs:			
		• Prohibit competitive events. • Prohibit target shooting. • Close to mineral materials disposal.	Close to mineral materials disposal.	• Prohibit competitive events. • Allowable Use: Close to mineral materials disposal.	Close to mineral materials disposal.
	Close Needle Rock ISA and a portion of Adobe Badlands WSA (6,380 acres) to mineral materials disposal.	Close WSAs to motorized and mechanized travel: • Adobe Badlands • Camel Back • Dolores River Canyon • Sewemup Mesa Limit motorized and mechanized travel in Needle Rock ISA to designated routes.			
	No similar action	If Congress releases WSAs from wilderness consideration, management of those lands would vary, as specified in Appendix T.			
	Allowable Use Stipulations (not all stipulations are applied to all areas): • NL-17 • NL-18-NGD-27 (Refer to Appendix B for more details.)	Allowable Use Stipulations (not all stipulations are applied to all areas): • NL-17 • SSR-58 • NL-18-NGD-27 • NL-19/NGD-28	Allowable Use Stipulations (not all stipulations are applied to all areas): • SSR-58 • NL-18-NGD-27 (Refer to Appendix B for more details.)	Allowable Use Stipulations (not all stipulations are applied to all areas): • SSR-58 • NL-18-NGD-27 • NL-19/SSR-59	Allowable Use Stipulations (not all stipulations are applied to all areas): • SSR-58 • NL-18-NGD-27 • NSO-53/SSR-56

Resources	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
		(Refer to Appendix B for more details.)		(Refer to Appendix B for more details.)	(Refer to Appendix B for more details.)
Wild and Scenic Rivers	Determine 29 stream segments are eligible for inclusion in the NWSRS. See Table 2-4 (Summary of Wild and Scenic River Study Segments (Alternatives A and B)) (a description of each segment is provided in Appendix P, Summary of Draft Wild and Scenic River Suitability Report).	Determine 29 stream segments are suitable for inclusion in the NWSRS. See Table 2-4 (Summary of Wild and Scenic River Study Segments (Alternatives A and B)) (a description of each segment is provided in Appendix P, Summary of Draft Wild and Scenic River Suitability Report).	Determine that all 29 eligible stream segments are not suitable for inclusion in the NWSRS and release them from interim management protections afforded eligible segments.	Determine that 16 stream segments are suitable for inclusion in the NWSRS. See Table 2-5 (Summary of Wild and Scenic River Study Segments (Alternatives D and E)) (a description of each segment is provided in Appendix P, Summary of Draft Wild and Scenic River Suitability Report).	
	Establish the specified interim protective management guidelines for all eligible segments pending congressional action (subject to valid existing rights).	Establish the specified interim protective management guidelines for all suitable segments pending congressional action (subject to valid existing rights).	No similar action	Establish the specified interim protective management guidelines for all suitable segments pending congressional action (subject to valid existing rights).	
	Allowable Use Stipulations: Protect NWSRS-eligible segments in accordance with the Wild and Scenic Rivers Act and BLM guidance (BLM Manual 6400).	Allowable Use Stipulations: • NSO-59/NGD-29 • CSU-53/SSR-60 (Refer to Appendix B for more details.)	Allowable Use Stipulations: No similar action (there are not any suitable segments under this alternative).	Allowable Use Stipulations: • NSO-60 • CSU-54 • SSR-61 (Refer to Appendix B for more details.)	

Resources	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
National Trails and Byways	No similar action	• Identify known historic trails and/or trail segments (e.g., Old Spanish National Historic Trail-northern branch, Ute Trail, Rivera Expedition trail, Dominguez/Escalante Trail, Loring Military Expedition Trail, and Gunnison Expedition Trail • Establish the National Trail Management Corridor for the Old Spanish National Historic Trail. • Proposed to the Secretary of Interior to designate the Tabeguache and Paradox Trails as National Recreation Trails			
	No similar action	Manage all National Trails, except for the Old Spanish National Historic Trail, as ROW avoidance areas (0.5-mile management corridor on either side of centerline). Manage the Old Spanish National Historic Trail as ROW avoidance (100-meter [328 feet] management corridor on either side of centerline of US Highway 50).	Manage all National Trails as ROW avoidance areas (100-meter [328 feet] corridor). Class III cultural resource inventory will be required for all ROW applications within these corridors, with avoidance of existing traces being the preferred mitigation.		
	No similar action	Manage all National Historic Trails as VRM Class II within 0.5-mile of either side of centerline.	Manage all National Historic Trails as VRM Class III within 0.5-mile of either side of centerline.	Manage all National Historic Trails (except the Old Spanish National Historic Trail) as VRM Class II within 0.5-mile of either side of centerline. Manage the Old Spanish National Historic Trail as VRM Class III within 0.5-mile of either side of the centerline of US Highway 50.	

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	Close all congressionally designated National Trails to coal leasing.	Same as Alternative A, plus close all congressionally designated National Trails to mineral materials disposal and nonenergy solid mineral leasing (0.5-mile buffer).	Same as Alternative A, plus close all National Trails to mineral materials disposal and nonenergy solid mineral leasing (50-meter [164 feet] buffer).		
	No similar action	Designate all National and BLM Byways as VRM Class II within 0.5-mile of either side of centerline.	Designate all National and BLM Byways as VRM Class III within 0.25-mile of either side of centerline.	Within 0.5-mile of either side of centerline, designate: • Grand Mesa Scenic Byway as VRM Class II • West Elk Scenic Byway, from Northeast UFO boundary to Gunnison County Road 12, as VRM Class II • Remaining portion of West Elk Scenic Byway as VRM Class III • San Juan Skyway as VRM Class III • Unaweep/Tabeguache Byway as VRM Class III	
	Allowable Use Stipulations: No similar allowable use in current RMPs.	Allowable Use Stipulations: Trails • NSO-61 • NSO-63 Byways • NSO-65 (Refer to Appendix B for details.)	Allowable Use Stipulations: Trails • NSO-62 • NSO-64 Byways • CSU-57 (Refer to Appendix B for details.)	Allowable Use Stipulations: Trails • NSO-61 • NSO-64 Byways • CSU-58 (Refer to Appendix B for details.)	Allowable Use Stipulations: Trails • CSU-55 • CSU-61 Byways • CSU-58 (Refer to Appendix B for details.)

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
Watchable Wildlife Viewing Sites	No similar action	Designate the following as Watchable Wildlife Viewing Sites; focus management on enhancing wildlife habitat in these areas and providing opportunities for the public to view and learn safely (i.e., signage, trail systems, rest rooms) about the wildlife of these areas: • Uncompahgre Riverway • Billy Creek • San Miguel River ACEC (IBA) The purpose of the sites and specified management would vary by site (Appendix T).	No similar action	No similar action	Same as Alternative B
	No similar action	In coordination with CPW and local wildlife-related organizations evaluate known wildlife concentration areas or areas with special wildlife interest for possible additional	No similar action	No similar action	Same as Alternative B

Resources	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
		designation as Watchable Wildlife Viewing Sites.			
Social and Economic					
Native American Tribal Interests	• Follow current management practices, as guided by directives contained in BLM 8120, American Indian Religious Freedom Act (42 USC, 1996), Native American Graves Protection and Repatriation Act (25 USC, 3001), Executive Order 13007 (Indian Sacred Sites), and Executive Order 13084 (Tribal Consultation). • During project planning, consult with tribes regarding visual resources in connection with Native American religious values and practices. • Continue and expand consulting and educational program partnerships with the Northern Ute Tribe, Southern Ute Tribe, and Ute Mountain Ute tribes. • Continue government-to-government consultation with Indian tribes to identify traditional cultural properties, sacred/religious sites, or traditional use areas through face-to-face meetings, letters, phone calls, emails, and on-site visits. • Protect and preserve Native American cultural and sacred sites and Native American access to these sites whenever possible. Take no action that would adversely affect these areas or locations without consultation with the appropriate Native American tribes (Executive Orders 13007 and 13084). • In cooperation with tribal entities, allow qualified Native Americans appropriate access to public lands in order to practice spiritual traditions and beliefs and to gather resources needed for these practices.				
Public Health and Safety	• Post caution signs for the public in the North Delta unexploded ordnance area. • Require project proponents in the North Delta unexploded ordnance area to clear the affected project area on a project-specific basis. Clear and dispose of identified unexploded ordnance in accordance with applicable US Army policies and procedures. • To the extent possible, conduct hazardous material response and reclaim sites in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR, 300) and the Comprehensive Environmental Response, Compensation, and Liability Act.				
	No similar action	• Continue to work with the Army National Guard to remedy unexploded ordnance in support of land use and management specified in this RMP. • Close the DOE Uranium Mill Tailings Remedial Action Area to mineral materials disposal. • Provide for public safety in the event of a burning or smoldering coal seam.			
	No similar action	Manage new and abandoned mine lands	Manage abandoned mine lands projects	Manage new and abandoned mine	Same as Alternative D

Resources	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		projects to include road closures and rehabilitation to reduce active erosion.	to include rehabilitation to reduce active erosion.	lands projects to include rehabilitation to reduce active erosion. Consider closing routes as part of comprehensive travel management planning.	
	Allowable Use Notice and Stipulations: • LN-UB-8/LN-UFO-2 (Refer to Appendix B for details.)	Allowable Use Notice and Stipulations: • LN-UB-8/LN-UFO-2 • NSO-66/NGD-30 • NSO-67 North Fork Stipulation Only: • NSO-68 (Refer to Appendix B for details.)	Allowable Use Notice and Stipulations: • LN-UB-8/LN-UFO-2 • NSO-66/NGD-30 (Refer to Appendix B for details.)	Allowable Use Notice and Stipulations: • LN-UB-8/LN-UFO-2 • NSO-66/NGD-30 • NSO-67 (Refer to Appendix B for details.)	Allowable Use Notice and Stipulations: • LN-UB-8/LN-UFO-2 • NSO-66/NGD-30 • NSO-67 (Refer to Appendix B for details.)

***** Implementation-level decisions are identified in Alternative E, the Agency-Proposed RMP, by an asterisk (*) following the decision.

Table 2-3
Renewable Energy Exclusion and Avoidance Areas[1]

Resource/Concern	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
ACECs	Follow the ROW management for the ACEC	Wind: Exclude Solar: Exclude Hydropower: Exclude	Wind: Avoid Solar: Avoid Hydropower: Avoid	Same as Alternative B	Adobe Badlands, Biological Soil Crust, Needle Rock, Paradox Rock Art: Wind: Avoid Solar: Avoid Hydropower: Avoid Fairview South (BLM Expansion): Wind: Exclude Solar: Exclude Hydropower: Exclude
Within 0.25-mile of bank-full stage or within 100 meters (328 feet) of the 100-year floodplain (whichever is greatest) on the Gunnison, North Fork Gunnison, San Miguel, Uncompahgre, and Dolores rivers	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	Wind: Avoid Solar: Avoid Hydropower: Avoid	Same as Alternative B	Same as Alternative A
Within 325 feet of all perennial and intermittent waters and naturally occurring wetlands, springs, and seeps to protect riparian areas; if riparian area extends beyond 325 feet, extend restriction to include the entire riparian area.	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	No specific management decisions	Wind: Avoid Solar: Exclude Hydropower: Avoid	Same as Alternative A
Within 50 feet of all perennial streams and naturally occurring riparian and wetland areas, springs, and seeps, unless it can be determined that the project would maintain Proper Functioning Condition	No specific management decisions	Same as Alternative A	Same as Alternative A	Same as Alternative A	Wind: Avoid Solar: Avoid Hydropower: Avoid

Resource/Concern	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
Suitable Wild and Scenic River Segments (Eligible segments in Alternative A)	Wind: Avoid Solar: Avoid Hydropower: Avoid	Wind: Exclude Solar: Exclude Hydropower: Exclude	No suitable segments in this alternative.	Same as Alternative B	Lower Dolores River: Wind: Avoid Solar: Avoid Hydropower: Avoid Dolores River Segment 1a, La Sal Creek Segment 3, Monitor Creek, Potter Creek, Roubideau Creek Segment 1, Saltado Creek, San Miguel River Segment 2, Tabeguache Creek Segment 1: Wind: Exclude Solar: Exclude Hydropower: Exclude
Wilderness Study Areas and Tabeguache Area	Wind: Exclude Solar: Exclude Hydropower: Exclude	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
Ecological Emphasis Areas	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	Wind: Avoid Solar: Avoid Hydropower: Avoid	Same as Alternative C	No ecological emphasis areas in this alternative
Within 200 meters (656 feet) of occupied habitat of federally listed, candidate, and proposed plant species	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	No specific management decisions	Same as Alternative B	Wind: Avoid Solar: Avoid Hydropower: Avoid
Within areas designated as critical habitat for federally listed, candidate, and proposed plant species	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	No specific management decisions	Wind: Avoid Solar: Exclude Hydropower: Avoid	No specific management decisions
Within 1.0 mile of occupied federally listed fish habitat	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	No specific management decisions	Wind: Avoid Solar: Exclude Hydropower: Exclude	Wind: Avoid Solar: Avoid Hydropower: Avoid

Resource/Concern	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
Within known occupied habitat for federally listed wildlife and bird species	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Avoid	Wind: Avoid Solar: Avoid Hydropower: Avoid
In all Gunnison sage-grouse breeding habitat (lek and non-lek) plus a 0.6-mile radius	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	Wind: Avoid Solar: Avoid Hydropower: Avoid	Same as Alternative B	Same as Alternative C
Within 4.0 miles of an active lek or within mapped Gunnison sage-grouse nesting and early brood rearing habitat	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	Wind: Avoid Solar: Avoid Hydropower: Avoid	Same as Alternative C	No specific management decisions
Within Gunnison sage-grouse designated critical habitat	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	No specific management decisions	Same as Alternative C	Wind: Avoid Solar: Avoid Hydropower: Avoid
Within 0.25-mile of special status raptor nest sites and associated alternate nests	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	No specific management decisions	Wind: Exclude Solar: Avoid Hydropower: Avoid	No specific management decisions
Within 0.25- to 1.0 mile of special status raptor nest sites	No specific management decisions	Wind: Exclude Solar: Avoid Hydropower: Avoid	No specific management decisions	Wind: Avoid Solar: Avoid Hydropower: Avoid	No specific management decisions
Within 0.25-mile of non-special status Raptors (*except kestrel*) active nest sites and associated alternate nests	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	No specific management decisions	Wind: Exclude Solar: Avoid Hydropower: Avoid	No specific management decisions
Within 0.5-mile of bald eagle winter roost sites	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	No specific management decisions	Wind: Exclude Solar: Avoid Hydropower: Avoid	No specific management decisions
Within bald eagle winter concentration areas	No specific management decisions	Wind: Exclude Solar: Avoid Hydropower: Avoid	No specific management decisions	Wind: Avoid Solar: Avoid Hydropower: Avoid	No specific management decisions

Resource/Concern	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
Within 0.25-mile of federally listed, BLM sensitive, and Colorado State Species of Concern bat species' maternity roost sites and winter hibernacula	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	Wind: Avoid Solar: Avoid Hydropower: Avoid	Wind: Exclude Solar: Avoid Hydropower: Avoid	No specific management decisions
Habitat for BLM Sensitive plant and animal species	No specific management decisions	Wind: Avoid Solar: Avoid Hydropower: Avoid	No specific management decisions	Same as Alternative B	No specific management decisions
Areas mapped as having soils with elevated levels of salinity/selenium	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	Wind: Avoid Solar: Avoid Hydropower: Avoid	Same as Alternative C	No specific management decisions
Slopes of 30 percent or greater	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	Same as Alternative A	Wind: Avoid Solar: Avoid Hydropower: Avoid	Same as Alternative A
Lands with Wilderness Characteristics	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	Same as Alternative A	Same as Alternative B	Lands managed to minimize impacts on wilderness characteristics: Wind: Avoid Solar: Avoid Hydropower: Avoid
National Historic Trails, within 0.5-mile buffer (Alternative B) or within 100 meter buffer (Alternatives C, D, and E) on either side of centerline	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	Wind: Avoid Solar: Avoid Hydropower: Avoid	Same as Alternative C	Same as Alternative C
National and State Scenic Byways, within 0.50-mile (Alternatives B and D) or within 0.25-mile (Alternative C) of the byway	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	Wind: Avoid Solar: Avoid Hydropower: Avoid	Wind: Avoid Solar: Avoid Hydropower: Avoid	No specific management decisions
VRM Class I	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	Same as Alternative B	Same as Alternative B	No specific management decisions
VRM Class II	No specific management decisions	Wind: Exclude Solar: Exclude Hydropower: Exclude	Wind: Avoid Solar: Avoid Hydropower: Avoid	Same as Alternative C	No specific management decisions

Resource/Concern	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
Total Acres – Open	Wind: 561,200 Solar: 561,200 Hydropower: 561,200	Alternative B: Wind: 33,420 Solar: 34,220 Hydropower: 34,220 Alternative B.1: Wind: 33,940 Solar: 33,940 Hydropower: 33,940	Wind: 369,970 Solar: 369,970 Hydropower: 369,970	Wind: 229,290 Solar: 229,290 Hydropower: 229,290	Wind: 434,300 Solar: 434,300 Hydropower: 434,300
Total Acres – Avoid (Includes other ROW Avoidance)	Wind: 29,460 Solar: 29,460 Hydropower: 29,460	Alternative B: Wind: 123,780 Solar: 128,580 Hydropower: 128,580 Alternative B.1: Wind: 123,720 Solar: 128,440 Hydropower: 128,440	Wind: 261,280 Solar: 261,280 Hydropower: 261,280	Wind: 320,350 Solar: 279,890 Hydropower: 298,790	Wind: 175,530 Solar: 175,530 Hydropower: 175,530
Total Acres – Exclude (Includes other ROW Exclusion)	Wind: 85,140 Solar: 85,140 Hydropower: 85,140	Alternative B: Wind: 517,800 Solar: 513,000 Hydropower: 513,000 Alternative B.1: Wind: 518,140 Solar: 513,420 Hydropower: 513,420	Wind: 44,550 Solar: 44,550 Hydropower: 44,550	Wind: 126,160 Solar: 166,620 Hydropower: 147,720	Wind: 65,970 Solar: 65,970 Hydropower: 65,970

Sources: BLM 2012a, 2018a, 2019

[1]An area restricted by "Exclusion" is closed to the type of renewable energy project. An area restricted by "Avoidance" allows some use and occupancy of BLM-administered lands while protecting identified resources or values. These areas are potentially open to renewable energy projects, but the restriction allows the BLM to require special constraints, or the activity can be shifted to protect the specified resource or value based on site specific analysis.

Notes: Geothermal development would follow stipulations shown under Fluid Minerals. Solar energy projects are allowed for fewer than 20 megawatts only.

Table 2-4
Summary of Wild and Scenic River Study Segments (Alternatives A and B)

River or Creek	Total Segment Length (miles)	Length on BLM Land (miles)	Total Study Corridor (acres)	Area on BLM Land (acres)	Preliminary Classification	Outstandingly Remarkable Values
Gunnison River Segment 2	0.4	0.4	130	90	Recreational	Fish
Monitor Creek	9.4	9.4	2,730	2,610	Wild	Fish, Vegetation
Potter Creek	9.8	9.8	2,880	2,830	Wild	Fish, Vegetation
Roubideau Creek Segment 1	10.7	10.0	2,850	2,700	Wild	Recreational, Wildlife, Cultural, Vegetation
Roubideau Creek Segment 2	7.6	3.5	2,200	1,330	Scenic	Wildlife, Vegetation
Deep Creek	2.6	0.6	810	130	Scenic	Fish
West Fork Terror Creek	1.2	0.5	390	150	Scenic	Fish
Beaver Creek	14.3	14.2	4,290	3,710	Scenic	Vegetation
Dry Creek	10.5	10.4	2,730	2,640	Wild	Scenic, Geologic
Naturita Creek	25.0	10.0	6,420	3,240	Scenic	Fish
Saltado Creek	5.6	4.1	1,760	1,450	Wild	Vegetation
San Miguel River Segment 1	27.2	17.3	8,440	6,680	Recreational	Scenic, Recreational, Wildlife, Historic, Vegetation, Paleontology
San Miguel River Segment 2	4.0	3.6	1,260	1,110	Wild	Scenic, Recreational, Wildlife, Vegetation
San Miguel River Segment 3	7.3	5.3	2,290	1,880	Scenic	Recreational, Fish, Wildlife, Vegetation
San Miguel River Segment 5	14.0	2.6	4,270	2,660	Recreational	Recreational, Fish, Historic, Vegetation
San Miguel River Segment 6	3.2	2.3	990	810	Recreational	Recreational, Fish, Historic, Vegetation
Tabeguache Creek Segment 1	3.6	3.6	1,080	1,080	Wild	Vegetation
Tabeguache Creek Segment 2	11.6	7.9	2,970	2,480	Recreational	Cultural, Vegetation

River or Creek	Total Segment Length (miles)	Length on BLM Land (miles)	Total Study Corridor (acres)	Area on BLM Land (acres)	Preliminary Classification	Outstandingly Remarkable Values
Lower Dolores River	10.5	6.9	2,910	1,990	Scenic	Scenic, Recreational, Geologic, Fish, Wildlife
North Fork Mesa Creek	8.5	5.8	2,170	1,740	Scenic	Vegetation
Dolores River Segment 1 *(portion within the Dolores River Canyon WSA)*	8.7	8.7	1,880	1,880	Wild	Recreational, Scenic, Fish, Wildlife, Geology, Ecologic, Archaeology
Dolores River Segment 1b *(portion from the Dolores River Canyon WSA to Bedrock)*	3.2	0.9	950	460	Recreational	Recreational, Scenic, Fish, Wildlife, Geology, Ecologic, Archaeology
Dolores River Segment 2	11.5	5.4	3,240	1,820	Recreational	Scenic, Recreational, Geologic, Fish, Wildlife, Vegetation
Ice Lake Creek Segment 2	0.6	0.3	180	100	Scenic	Scenic
La Sal Creek Segment 1	4.8	0.6	1,350	720	Recreational	Fish, Vegetation
La Sal Creek Segment 2	4.5	3.8	1,170	1,030	Scenic	Fish, Vegetation
La Sal Creek Segment 3	3.4	3.4	910	900	Wild	Scenic, Recreational, Fish, Cultural, Vegetation
Lion Creek Segment 2	1.6	1.3	490	400	Scenic	Vegetation
Spring Creek	2.7	1.5	830	630	Recreational	Vegetation

Sources: BLM 2010d; BLM and Forest Service 2007

Table 2-5
Summary of Wild and Scenic River Study Segments (Alternatives D and E)

River or Creek	Total Segment Length (miles)	Length on BLM Land (miles)	Total Study Corridor (acres)	Area on BLM Land (acres)	Preliminary Classification	Outstandingly Remarkable Values
Monitor Creek	9.4	9.4	2,540	2,540	Wild	Fish, Vegetation
Potter Creek	9.8	9.8	2,810	2,810	Wild	Fish, Vegetation
Roubideau Creek Segment 1	10.0	10.0	2,680	2,680	Wild	Recreational, Wildlife, Cultural, Vegetation
Beaver Creek	14.3	14.2	4,170	3,640	Recreational	Vegetation
Saltado Creek	5.6	4.1	1,640	1,340	Wild	Vegetation
San Miguel River Segment 1	27.2	17.3	8,360	6,680	Recreational	Scenic, Recreational, Wildlife, Historic, Vegetation, Paleontology
San Miguel River Segment 2	4.0	3.6	1,260	1,100	Wild	Scenic, Recreational, Wildlife, Vegetation
San Miguel River Segment 3	4.5	4.5	1,350	1,350	Recreational	Recreational, Fish, Wildlife, Vegetation
San Miguel River Segment 5	7.5	1.3	2,340	1,740	Recreational	Recreational, Fish, Historic, Vegetation
San Miguel River Segment 6	2.1	2.1	390	390	Recreational	Recreational, Fish, Historic, Vegetation
Tabeguache Creek Segment 1	3.4	3.4	1,010	1,010	Wild	Vegetation
Lower Dolores River	4.2	4.2	630	630	Scenic	Scenic, Recreational, Geologic, Fish, Wildlife
Dolores River Segment 1a	8.7	8.7	1,950	1,950	Wild	Recreational, Scenic, Fish, Wildlife, Geology, Ecologic, Archaeology
Dolores River Segment 2	5.3	5.3	1,230	1,230	Recreational	Scenic, Recreational, Geologic, Fish, Wildlife, Vegetation
La Sal Creek Segment 2	3.3	3.3	790	790	Recreational	Fish, Vegetation
La Sal Creek Segment 3	3.4	3.4	800	800	Wild	Scenic, Recreational, Fish, Cultural, Vegetation

Sources: BLM 2010d; BLM and Forest Service 2007

2.6 SUMMARY COMPARISON OF ENVIRONMENTAL CONSEQUENCES

Table 2-6
Summary of Environmental Consequences of Alternatives A, B/B.1, C, D, and E

Line #	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
1.	**AIR QUALITY AND CLIMATE**				
2.	Potential impacts on air quality due to increased oil and gas and solid mineral development as well as predicted increases in OHV use may occur. Impacts on air quality include potential increases in concentrations of ozone forming pollutants, visibility degradation, fugitive dust, and greenhouse gases.	Potential impacts on air quality are likely to be the lowest for this alternative due to the combination of implementation of the Colorado BLM Comprehensive Air Resource Protection Protocol (Appendix H), restrictions and stipulations on solid and fluid mineral leasing and development, and emission control strategies.	This alternative assumes the maximum level of reasonably foreseeable development for oil and gas predicted over the life of the plan. Potential impacts on air quality are likely to be greatest for this alternative due to the potential for increased oil and gas and solid mineral development. However, Alternative C also includes implementation of the Colorado BLM Comprehensive Air Resource Protection Protocol (Appendix H) and emission control strategies, which would be effective at minimizing emissions.	Potential impacts on air quality would be managed more effectively compared to Alternative A due to the implementation of the Colorado BLM Comprehensive Air Resource Protection Protocol (Appendix H) and associated strategies. Restrictions and stipulations related to solid mineral leasing and development would result in reduced impacts on air quality from these sources.	Impacts and adaptive management strategy implementation would be similar to that described for Alternative D.
3.	**SOILS AND GEOLOGY**				
4.	Adhering to BLM Colorado Public Land Health Standards would ensure a baseline level of soil health and provide protection against soil erosion, compaction,	Compared with Alternative A, the BLM would implement more actions to protect and monitor soils and geology. More areas would be unavailable to livestock	Compared with Alternative A, 62 percent more acres would be unavailable to livestock grazing, reducing impacts from livestock grazing in those areas.	Alternative D provides greater protection to soils by protecting riparian and perennial streams, imposing management measures to control saline and selenium levels in soils,	The Proposed RMP provides greater protection to soils by protecting riparian and perennial streams, imposing management measures to minimize the

Line #	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	contamination, and vegetation removal. There would continue to be 56,300 acres unavailable and 619,500 acres available to livestock grazing. Improper grazing management could result in accelerated erosion rates, localized compaction, and disturbance to biological soil crusts. NSO stipulations would continue to be applied on 24,890acres of BLM surface/federal mineral estate to protect soils and geology resources either directly or indirectly. There would be no SSR restrictions and, thus, no protections from these measures. Continuing to allow dispersed camping, overnight use, and recreational mining in all areas would subject soils to erosion, compaction, degradation of biological soil crust, and vegetation removal.	grazing (10 times more acres than under Alternative A), reducing the impacts noted in Alternative A. NGD restrictions would be applied on 445,720 acres, the most under any alternative, providing the greatest protection from surface-disturbing activities. SSR restrictions would be applied on 230,020 acres, the least under any alternative, to protect soil resources. Motorize use would be reduced from Alternative A, resulting in fewer impacts on soil resources. Alternative B would not manage any areas as open to cross-country travel within the North Delta OHV Area, protecting soils in that area. Closing several areas surrounding water bodies to dispersed camping, overnight use, and recreational mining would protect soils in these sensitive areas.	NGD restrictions would be applied on 42,660 acres, and SSR restrictions would be applied on 241,400 acres, providing less protection for soil resources than Alternatives B or D. Cross-country travel within the North Delta OHV Area would be allowed on 39 percent fewer acres than under Alternative A, protecting fragile soils in a portion of the area.	and directing the BLM to manage lands to improve water quality and to promote the delisting of state-impaired water bodies in areas where BLM management actions are contributing to impaired water quality. The BLM would make unavailable 2,360 fewer acres to livestock grazing than under Alternative A, reducing impacts from livestock grazing in those areas. NGD restrictions would be applied on 36,180 acres, fewer than Alternatives B and C. SSR restrictions would be applied on 512,570 acres, the most of any alternative, providing the greatest protection for soil resources. Impacts from dispersed camping, overnight use, and recreational mining would be similar to Alternative B. No acres would be open to cross-country travel within the North Delta OHV Area, protecting the fragile soils from motorized use.	movement of saline and selenium soils, directing the BLM to manage lands to improve water quality and to promote the delisting of state-impaired water bodies in areas where BLM management actions are contributing to impaired water quality. The apparent reduction in both available and unavailable acres for livestock grazing from Alternative A actually reflects corrections to the existing grazing inventory and associated GIS; in reality, acres open and unavailable under Alternative E are similar to Alternative A and would have a similar potential for grazing impacts on soils. NGD restrictions would be applied on 36,180 acres and SSR restrictions would be applied on 307,450 acres, both of which would protect soils. Soils would receive greater protection than under Alternative A because dispersed camping and overnight use would be closed in several areas.

Line #	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
					The Proposed RMP would have 26 percent more acreage closed to motorized and mechanized travel than under Alternative A, protecting soils in those areas.
5.	**WATER RESOURCES**				
6.	The BLM would continue to apply NSO stipulations on 24,890acres to protect water resources either directly or indirectly. There would be no SSR restrictions and, thus, no protections from these measures. The BLM would continue general activities to maintain or improve water quality, natural stream morphologic conditions, water resources sustainability (water quantity), groundwater aquifer properties, and natural stream hydrographs. The North Delta OHV Area would continue to be open to cross-country travel, which could continue to degrade and contaminate downslope waterways during and after precipitation.	The BLM would restrict surface-disturbing activities by applying NGD restrictions on 445,720 acres and SSR restrictions on 230,020 acres, providing protection for water resources. Alternative B also includes specific protections for perennial streams. Specific actions would maintain or improve water quality, natural stream morphologic conditions, sustainability of water resources (water quantity), groundwater aquifer properties, and natural stream hydrographs. The North Delta OHV Area would be closed to cross-country motorized travel, protecting downslope waters from saline and selenium runoff. Fewer areas would be open to fluid mineral	Under Alternative C, NGD restrictions would be applied on 42,660 acres, and SSR restrictions would be applied on 241,400 acres, providing the least protection for water resources. Impacts from fluid minerals would be similar to Alternative A. More lands would be open to forest harvest, fewer lands would be open to grazing, and more restrictions on recreation would be applied than under Alternative A, result would be varying levels of protection for water resources.	The BLM would restrict surface-disturbing activities by applying NGD restrictions on 36,180 acres and SSR restrictions on 512,570 acres, providing protection for water resources. Specific protections for surface water supply stream segments and domestic water wells would protect water resources. Alternative D provides greater protections to water quality than Alternative A, including protecting riparian and perennial streams, implementing management measures to control saline and selenium levels in soils, and managing lands to improve water quality and to promote the delisting of state-impaired water bodies in areas where BLM	NGD restrictions would be applied on 36,180 acres and SSR restrictions would be applied on 307,450 acres, both of which would protect water resources. Specific protections for surface water supply stream segments and domestic water wells would protect water resources. The Proposed RMP provides greater protections to water quality than Alternative A, including protecting riparian and perennial streams, implementing management measures to minimize the movement of saline and selenium soils, and managing lands to improve water quality and to promote the delisting of state-impaired water bodies in areas where BLM management actions are

Line #	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	Alternative A outlines the fewest restrictions on fluid mineral leasing, forest harvest, recreation, and livestock grazing, but would still continue to reduce impacts on water quality, channel stability, and watershed health.	leasing, forest harvest, recreation, and livestock grazing, reducing impacts on water quality, channel stability, and watershed health. Lands designated as ACECs and managed to protect wilderness characteristics would provide additional protection for water resources.		management actions are contributing to impaired water quality. Fewer areas would be open to fluid mineral leasing, forest harvest, recreation, and livestock grazing, reducing impacts on water quality, channel stability, and watershed health.	contributing to impaired water quality. Fewer areas would be open to forest harvest than under Alternative A, reducing impacts on water quality, channel stability, and watershed health.
7.	**VEGETATION**				
8.	*VEGETATION – UPLANDS*				
9.	ROW activities, mineral and energy development, forest harvest, recreation (especially motorized use), and livestock grazing are primary land uses that could impact vegetation. Land use restrictions designed to protect vegetation and plant communities would be relatively limited and generally handled with design features and mitigation measures at the project level.	Management under Alternative B would have an ecological focus, with existing uses geared toward ensuring the protection of natural values. This focus would improve and protect vegetation communities. Alternative B would emphasize use of fire over mechanical treatments, which could limit vegetation improvement and restoration. Alternative B provides the most restrictions on land use (i.e., the most acres covered by NSO, NGD, and CSU) and the fewest areas open to mineral and energy development, forest	Impacts from Alternative C would be similar to Alternative B, but emphasis would be on managing vegetation for commodities and resource uses, as well as maintaining vegetation conditions. As a result, there would be fewer opportunities for resource protection, vegetation improvement, and restoration. Fewer restrictions (e.g., NSO, NGD, and CSU) and ROW exclusion areas, which reduce surface-disturbing activities, would result in less protection for vegetation and could limit improvements to native vegetation communities	Management would emphasize balancing resources and resource uses while sustaining and enhancing ecological integrity across the landscape. The BLM would implement protective management measures for vegetation and stipulations and restrictions to reduce impacts from resource uses. The BLM would apply more restrictions on surface-disturbing activities (e.g., NSO, NGD, and CSU) and fewer areas would be open to mineral and energy development, forest harvest, recreation (especially motorized use),	Impacts from the Proposed RMP would be similar to Alternative D, though with refinements to increase management flexibility. While the same acreage would be open to fluid mineral leasing and fewer acres would be recommended for withdrawal from locatable mineral exploration or development compared with Alternative A, the BLM would apply more restrictions on surface-disturbing activities (primarily through NSO and CSU stipulations) to reduce vegetation impacts. Fewer acres would be open to forest harvest and

Line #	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		harvest, recreation (especially motorized use), and livestock grazing, providing the greatest protections of vegetation. These restrictions would limit or modify uses in special vegetation or habitat types. Such use restrictions would reduce damage to the condition of native vegetation communities and individual native plant species in areas that are important for regional vegetation diversity and quality. Likewise, use restrictions would minimize connectivity loss and would be more likely to retain existing age class distribution within these specific areas.	and individual native plant species in areas that are important for regional vegetation diversity and quality. Fewer ACECs and ecological emphasis areas would be designated. No lands would be managed to protect wilderness characteristics.	and livestock grazing compared with Alternative A, reducing impacts related to vegetation disturbance, changes in condition, and fragmentation. Lands designated as ACECs, ecological emphasis areas, and managed to protect wilderness characteristics would increase protection of vegetation resources.	recreation (especially motorized use) compared with Alternative A, reducing impacts, as described for Alternative D. Lands designated as ACECs and managed to minimize impacts on wilderness characteristics would increase protection of vegetation resources.
10.	*VEGETATION – RIPARIAN*				
11.	Riparian and aquatic zones would be protected on 15,350 acres. There would be some riparian vegetation management to restore and enhance riparian vegetation, which would maintain or improve riparian vegetation conditions and hydrologic functionality.	Under Alternative B, the BLM would close the major river corridors in the Planning Area to fluid mineral leasing (26,990 acres of BLM surface/ federal mineral estate and 1,060 acres of split-estate) and would also apply NGD restrictions and manage the areas as ROW	The BLM would require some restrictions within riparian areas, though fewer than Alternative B. The BLM would apply CSU and SSR to the major river corridors in the Planning Area (26,990 acres of BLM surface/ federal mineral estate and 1,060 acres of split-estate) and within 325	Protections from restrictions would be similar to, but slightly less than, those described for Alternative B. The BLM would apply NSO and SSR to major river corridors (26,990 acres of BLM surface/federal mineral estate and 1,060 acres of split-estate) and within 325	Protections from restrictions would be similar to, but slightly less than, those described for Alternative B. The BLM would apply CSU and SSR to major river corridors (26,990 acres of BLM surface/federal mineral estate and 1,060 acres of split-estate) and within 50

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	Increased visitation could result in impacts within the San Miguel SRMA. The San Miguel River ACEC and along 29 river segments managed as eligible for inclusion in the NWSRS provide additional protections for riparian vegetation.	avoidance. NSO and NGD restrictions would be applied within 660 feet (63,540 acres of BLM surface/federal mineral estate and 2,530 acres of split-estate) of perennial and intermittent waters and naturally occurring wetlands, springs, and seeps. The following restrictions would also be applied: ROW exclusion within 325 feet of perennial streams; ROW exclusion within 100 feet of riparian and wetland areas, seeps, and springs; mineral materials disposal closures within 500 feet of riparian areas; wood products collection and harvest and other plant products collection closures within 100 feet of riparian areas;. This would protect riparian vegetation condition and hydrologic functionality, as well as reducing impacts from surface-disturbing activities. Vegetation treatments in riparian areas would be limited, reducing the potential for achieving vegetation objectives and	feet of perennial streams (26,050 acres of BLM surface/ federal mineral estate and 12,730 acres of split-estate). CSU and SSR restrictions would also be applied within 100 feet of perennial and intermittent waters and naturally occurring wetlands, springs, and seeps (10,280 acres of BLM surface/ federal mineral estate and 70 acres of split-estate). The BLM would also limit mineral materials disposal, wood products collection and harvest, and other plant products collection within riparian areas. Riparian areas within the Dolores River Canyon and San Miguel River Corridor ERMA could be impacted by increased visitation in the same was as under Alternative B. However, because ERMAs would be managed commensurate with other resource needs, it may be easier for the BLM to modify recreation activities to protect riparian vegetation under this alternative than under alternatives where these	feet of perennial and intermittent waters and naturally occurring wetlands, springs, and seeps (26,050 acres of BLM surface/ federal mineral estate and 12,730 acres of split-estate). The following restrictions would also be applied: ROW avoidance around major river corridors, within 325 feet of perennial streams, and within 100 feet of riparian and wetland areas, seeps, and springs; closure to mineral materials disposal, wood products collection and harvest, and other plant products collection within 100 feet of riparian areas. Impacts from SRMA management would be the same as those described for Alternative B. ACECs on 31,500 acres of riparian areas and along 16 river segments determined suitable for inclusion in the NWSRS would provide additional protections for riparian vegetation.	feet of perennial streams (1,740 acres of BLM surface/federal mineral estate and 2,330 acres of split-estate). The following restrictions would also be applied: ROW avoidance around major river corridors and within 50 feet of perennial streams, riparian and wetland areas, seeps and springs; closure of lands within 100 feet of riparian areas to mineral materials disposal; and closure to wood products collection and harvest. Impacts from SRMA management would be slightly greater than those described for Alternative B due to the slightly larger acreage (30 additional acres) of the Dolores River Canyon SRMA. Impacts from ACEC management would be similar to those described for Alternative A. Impacts from wild and scenic river management would be similar to those described for Alternative D.

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		desired conditions in certain areas. Increased visitation could result in impacts on riparian areas within the Dolores River Canyon and San Miguel SRMAs. ACECs on 55,910 acres of riparian areas and along 29 river segments determined suitable for inclusion in the NWSRS would provide additional protections for riparian vegetation.	areas are managed as SRMAs. ACEC management would be similar to Alternative A, though there would be fewer protections in certain areas. No river segments would be managed as eligible or suitable for inclusion in the NWSRS.		
12.	*VEGETATION – WEEDS*				
13.	Management for weeds would continue per BLM regulations. Over time, recreation would have increasing impacts on the spread of weeds.	Soil and water protections would decrease the potential for the spread of weeds. All quarry pits would be managed as weed free for A, B, and C state-listed noxious weeds and BLM weed species of concern. Recreation management within SRMAs could concentrate weed populations and make them easier to manage.	The increased disturbance associated with Alternative C would result in the greatest potential for the introduction and spread of weeds. All quarry pits would be managed as weed free for A and B state-listed noxious weed species.	Impacts from weed management would be similar to those described for Alternative B. All quarry pits would be managed as weed free for A, B, and C state-listed noxious weed species.	Impacts from weed management would be the same as those described for Alternative D.
14.	**FISH and WILDLIFE**				
15.	Alternative A management direction for fish and wildlife focuses more on single-species management and provides less direction on protecting species and	Alternative B would create the most ecological emphasis areas (12), covering the most area (242,580 acres), and would provide the greatest	In general, Alternative C provides the least protection of the action alternatives for aquatic and terrestrial wildlife by emphasizing resource uses.	Alternative D would provide substantial protection and enhancement of fish and wildlife populations and their habitats.	The Proposed RMP would provide similar protection and enhancement of fish and wildlife populations and their habitats as

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	habitat diversity, intact ecosystems, and ecosystem processes. Continuing current management would result in potential for direct and indirect impacts on fish and wildlife species and their habitats. Land use restrictions designed to protect fish and wildlife and their habitat would be limited and would generally be handled with design features and mitigation measures at the project level. No ecological emphasis areas would be proposed, making it more difficult to effectively and efficiently manage for wildlife.	protections from use impacts, with 186,070 acres of ROW exclusion and 207,320 acres with NSO stipulations. As a consequence, compared with Alternative A, this alternative would have reduced impacts on most fish and wildlife species. Within these special areas, it would provide the greatest protections for wildlife and reduced habitat fragmentation. Healthier vegetation for fish and wildlife would be more resistant to invasive weeds and drought conditions. Alternative B provides the most restrictions on minerals, ROW, trails and travel management, and other surface-disturbing activities. Alternative B would also create the most SRMAs, which would generally provide more protection for fish and wildlife from impacts of recreational use. As a consequence, impacts on fish and wildlife from these uses would be least for this alternative.	Alternative C would create two ecological emphasis areas, covering 24,150 acres, with no ROW exclusion areas, and with ROW avoidance areas and CSU/SSR stipulations throughout the ecological emphasis areas. Alternative C would have reduced impacts on most fish and wildlife species, compared with Alternative A, but is the least protective of the action alternatives. Among the action alternatives, Alternative C provides the least restrictions on minerals, ROWs, trails and travel management, and other surface-disturbing activities. This alternative provides the most ERMAs for recreation management, which would result in increased impacts on most fish and wildlife species and their habitats from recreation because activities would be less controlled in key or sensitive habitats or seasons. Overall, this alternative provides restrictions similar to Alternative A. As a	Alternative D would create 12 ecological emphasis areas, covering 177,700 acres, with no ROW exclusion areas, and with ROW avoidance areas and CSU/SSR stipulations throughout the ecological emphasis areas. ROW avoidance areas provide less protection for ecological emphasis areas than ROW exclusion areas, because ROWs would be allowed in ecological emphasis areas with siting restrictions to reduce impacts on fish and wildlife. Despite this, Alternative D would reduce detrimental impacts on most fish and wildlife species as compared with Alternative A. Overall, Alternative D provides more restrictions than Alternative A on minerals, ROWs, trails and travel management, and other surface-disturbing activities. As a consequence, Alternative D would generally cause fewer impacts on fish and wildlife than Alternative A.	described for Alternative D. Overall, the Proposed RMP provides more restrictions than Alternative A on minerals, ROWs, trails and travel management, and other surface-disturbing activities. As a consequence, the Proposed RMP would generally cause fewer impacts on fish and wildlife than Alternative A.

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			consequence, impacts on fish and wildlife from these uses would be greatest among the action alternatives and similar to Alternative A.		
16.	**SPECIAL STATUS SPECIES**				
17.	*SPECIAL STATUS SPECIES – GENERAL*				
18.	Alternative A provides overall direction to maintain or improve habitat for special status species, but it relies on outdated conservation priorities and practices. Alternative A lacks recognition of the importance of landscape-scale conservation to protect and enhance habitat quality and patterns that preserve ecosystem functions and allow for climate change. As a result, Alternative A would generally result in greater habitat fragmentation and loss of population connectivity for special status species, compared with other alternatives. Land use restrictions designed to protect special status species and their habitat would be relatively limited, and would	Under Alternative B, the BLM would implement protective management measures for fish, wildlife, and plants, and stipulations and restrictions to reduce impacts from resource uses, which would protect special status species populations and habitats. There would be 12 ecological emphasis areas covering 242,580 acres, including 186,070 acres of ROW exclusion areas and 56,490 acres of ROW avoidance areas. NSO stipulations would be applied on 207,320acres, and CSU stipulations would be applied on 35,250 acres of ecological emphasis areas. Ecological emphasis areas and ACECs with ROW exclusion and NSO restrictions would result in the greatest protection among any	Impacts from Alternative C would be similar to Alternative B. However, Alternative C would emphasize managing vegetation for commodities and resource uses, as well as maintaining vegetation conditions. As a result, there would be less opportunity for resource protection. Under Alternative C, two ecological emphasis areas (24,150 acres) would be ROW avoidance areas, with CSU and SSR restrictions applied. Occupied habitat of known populations of federally listed species would be ROW avoidance areas. These protections would cover a smaller area than under Alternative B. Overall, there would be fewer restrictions (e.g., NSO, NGD, CSU, and TL;	Alternative D's overall management direction is similar to Alternative B, with additional direction to promote ecosystem integrity and protect and restore ecosystem processes. As a result, Alternative D would reduce adverse impacts on special status species, compared with Alternative A, and would provide beneficial impacts through active management to restore and enhance habitats. Under Alternative D, the BLM would manage 12 ecological emphasis areas (177,700 acres), with ROW avoidance and CSU and SSR restrictions applied. Impacts are similar to those described for Alternative B, although across fewer acres and with less-protective	The BLM's overall management direction and associated impacts would be similar to Alternative D, although across fewer acres and with less-protective stipulations (i.e., CSU versus NSO). Overall, there would be more restrictions (e.g., NSO and CSU) and fewer areas would be open to mineral and energy development, forest harvest, and recreation (especially motorized use) than under Alternatives A and C, providing protection to special status species over a greater area.

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	generally be handled with design features and mitigation measures at project level.	alternatives for special status fish and wildlife in these more-sensitive areas. These protections would provide the most intact natural landscapes, the greatest amount of corridor conservation for species movements, and the greatest resiliency against climate change or other long-term changes. Overall, there would be more restrictions (e.g., NSO, NGD, and CSU), and fewer areas would be open to mineral and energy development, forest harvest, recreation (especially motorized use), and livestock grazing than Alternative A, reducing impacts related to disturbance from casual use, disturbance from permitted activities, and changes to habitat condition.	ROW avoidance and exclusion areas) to reduce or limit surface-disturbing activities would reduce protections for special status species.	stipulations (i.e., CSU versus NSO). Overall, there would be more restrictions (e.g., NSO, NGD, and CSU), and fewer areas would be open to mineral and energy development, forest harvest, recreation (especially motorized use), and livestock grazing than Alternatives A and C, providing protection to special status species over a greater area.	
19.	*SPECIAL STATUS PLANTS*				
20.	Two ACECs (6,580 acres), Adobe Badlands and Fairview South, would continue to be managed to protect significant resource values, including special status plants	Alternative B would require an NSO in federally listed and candidate plant species' occupied and historic habitat and closure of all federally threatened, endangered, proposed, and	Alternative C would close all federally threatened, endangered, and proposed plant species' occupied habitat to mineral materials disposal and nonenergy solid mineral leasing. Up to	Impacts from closure on mineral materials disposal and nonenergy solid mineral leasing would be the same as those described for Alternative C.	The Proposed RMP would close 163,300 acres, portions of which are federally threatened, endangered, and proposed plant species' occupied habitat, to nonenergy solid

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	(Colorado hookless cactus, clay-loving wild buckwheat, and Adobe Hills beardtongue).	candidate plant species' occupied habitat to mineral materials disposal and nonenergy solid mineral leasing. Seven ACECs (92,900 acres) would be designated to protect special status and rare plants (Colorado hookless cactus, clay-loving wild buckwheat, Adobe Hills beardtongue, Colorado desert parsley, good-neighbor bladderpod, Kachina daisy, Naturita milkvetch, Paradox Valley lupine, Paradox breadroot, and Grand Junction milkvetch), the most of any alternative. OHVs would be limited to designated trails on portions of the Kinikin Hills SRMA, where there are clay-loving wild buckwheat populations.	10 percent of sensitive plant populations could be damaged, injured, or removed. There would be no stipulations to protect federally listed or candidate species. Impacts from ACEC management would be the same as described for Alternative A. Impacts on clay-loving wild buckwheat in the Kinikin Hills ERMA would be similar to, but greater than, those described for Alternative B due to the proximity of the Kinikin Hills ERMA.	Four ACECs (25,480) would be designated to protect special status and rare plant species (Colorado hookless cactus, clay-loving wild buckwheat, Adobe Hills beardtongue, Kachina daisy, Naturita milkvetch, and Grand Junction milkvetch). Impacts on clay-loving wild buckwheat from recreation in the Kinikin Hills ERMA would be similar to those described for Alternative B. However, because ERMAs would be managed commensurate with other resource needs, it may be easier for the BLM to modify recreation activities to protect riparian vegetation under this alternative than under Alternative B.	leasable minerals, which would provide direct protections to federally protected plants in these areas. Two ACECs (6,980 acres) would be designated to protect special status and rare plant species (Colorado hookless cactus, clay-loving wild buckwheat, and Adobe Hills beardtongue). Impacts on clay-loving wild buckwheat from recreation in the Kinikin Hills ERMA would be similar to those described for the Kinikin Hills SRMA under Alternative B.
21.	*SPECIAL STATUS FISH AND WILDLIFE*				
22.	Alternative A does not provide direction to remove nonnative trout to protect native cutthroat trout populations. For Gunnison sage-grouse, some restrictions would apply in sage-grouse winter habitats and within 0.25-	Alternative B provides direction to remove nonnative trout to protect native cutthroat trout populations. For Gunnison sage-grouse, a range of stipulations would increase protection for all seasonal habitats	Alternative C, like Alternative A, does not provide direction to remove nonnative trout to protect native cutthroat trout populations. For Gunnison sage-grouse, stipulations would provide some protection for key	For all special status species, management and impacts would be similar to, though less protective than, Alternative B. Removal of nonnative trout would be the same as Alternative B.	For all special status species, management and impacts would be similar to, though less protective than, Alternative B. Removal of nonnative trout would be the same as Alternative B.

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	mile of leks. Some special status nesting raptors would be protected by NSO and TL stipulations. For other special status species, Alternative A does not provide adequate management guidance or protective stipulations.	compared with Alternative A. Alternative B would have the lowest likelihood of disease transmission between domestic sheep and desert bighorn sheep. Stipulations would also be applied to protect Canada lynx, special status raptors, prairie dogs, kit foxes, sensitive bats, and waterfowl and shorebirds to the greatest extent of any of the alternatives.	habitats but none in winter habitat. Alternative C would manage to reduce the likelihood of disease transmission between domestic sheep and desert bighorn sheep, although to a lesser extent than Alternative B. Stipulations would also be applied to protect special status raptors, prairie dogs, kit foxes, sensitive bats, and waterfowl and shorebirds, though to a lesser extent than Alternative B.	For Gunnison sage-grouse, stipulations would provide protection from surface occupancy and site disturbance in all seasonal habitats. Alternative D would reduce the likelihood of disease transmission between domestic sheep and desert bighorn sheep to a greater extent than Alternative C but to a lesser extent than Alternative B. Stipulations would also be applied to protect Canada lynx, special status raptors, prairie dogs, kit foxes, sensitive bats, and waterfowl and shorebirds.	For Gunnison sage-grouse, stipulations would provide protection from surface occupancy and site disturbance in all seasonal and critical habitats. The Proposed RMP would reduce the likelihood of disease transmission between domestic sheep and desert bighorn sheep to a similar extent as Alternative D. Stipulations would also be applied to protect Canada lynx, special status raptors, prairie dogs, kit foxes, sensitive bats, and waterfowl and shorebirds.
23.	**WILD HORSES**				
24.	Under all alternatives, the BLM would continue to maintain Naturita Ridge as a herd area and would not reintroduce wild horses to the area. The area would be available for other uses.				
25.	**WILDLAND FIRE ECOLOGY AND MANAGEMENT**				
26.	Vegetation management and weed treatments would result in a long-term decrease in standing vegetation and modify the composition and structure of vegetation communities across the Planning Area, which would decrease the intensity of wildland fires.	Increased fuel loading and potential for more costly fires could occur as a result of a reduction in mechanical treatments under this alternative. Specific restrictions include less use of mechanical hazardous fuels treatments in special status species	Alternative C would emphasize forage-producing vegetation treatments, which could reduce the potential for high intensity wildfires. In addition, this alternative would be the most permissive in regard to fuels treatments in riparian	Compared with Alternative A, the increased use of planned and unplanned fires, as well as mechanical treatments, to meet resource objectives under Alternative D would, in the long term, further decrease fire intensity and	Compared with Alternative A, use of managed fire to achieve resource objectives could decrease fire intensity and fuel loading in the long term. Allowing a range of actions to modifying fuels complexes (i.e. mechanical treatment, prescribed fire,

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	However, over the short term, vegetation treatments could increase the amount of downed vegetation in treated areas, thereby raising the risk of high-intensity wildfires until the downed vegetation decays. The extent of planned ignitions and mechanical treatments would be altered in design and potentially limited in the 66,250 acres of VRM Class I and II lands, and 30,000 acres as ACECs, although lack of development in these areas may reduce the risk of human-caused ignition. Areas are not closed to dispersed camping or overnight use, which results in potential for human-caused ignition. Alternative A would have the greatest potential for human-caused fire from recreational vehicles because it includes the fewest travel restrictions.	habitat and when restoring terrestrial wildlife habitat. Emphasizing prescribed fire over mechanical treatments would likely increase the number of acres mitigated against fire, but it could also increase the chance of invasive species. Actions to fully meet or exceed BLM Colorado Public Land Health Standards would lower the risk of impacts from large wildfires and move more areas to fire regime condition class 1. The extent of planned ignitions and mechanical treatments would be altered in design and potentially limited in the 229,800 acres of VRM Class I and II lands (3 times more acres than under Alternative A), 42,150 acres managed for wilderness characteristics, and 215,840 acres of ACECs (7 times more than under Alternative A and the largest area of any alternative). Under Alternative B.1, VRM Class I and II lands would be managed on 235,520 acres (3 times more acres than	areas and upland vegetation communities and wildlife habitat restoration. Emphasizing mechanical treatments (as opposed to prescribed fire) would likely result in slightly fewer acres mitigated against fire, but this could also decrease the chance of invasive species outcompeting native vegetation post-treatment Impacts from ACEC management would be similar to those described under Alternative A. The types of impacts from visual resources management actions would be the same as those described under Alternative A, but VRM Class I and II lands would be managed on 75,480 acres (14 percent more acres than under Alternative A). The restrictions on camping (dispersed and overnight use) would reduce the risk for human-caused ignitions from Alternative A, although not as much as the other action alternatives. The	fuel loading. Alternative D would emphasize a balanced approach to modifying fuels complexes with slightly fewer acres mitigated against fire and a decreased chance of invasive species outcompeting native vegetation, post-treatment, compared with Alternative B. The types of impacts from VRM actions would be the same as those described under Alternative A, but VRM Class I and II lands would be managed on 158,980 acres (2 times more acres than under Alternative A). The types of impacts from ACEC management would be the same as those described under Alternative A, but they would occur over 51,320 acres (71 percent more than under Alternative A). The restrictions on camping (dispersed and overnight use) would reduce the risk for human-caused ignitions from Alternative A, although not as much as Alternative B. Travel management	seeding, and herbicide) would improve ability to perform fuels treatments to modify future wildfire behavior. In addition, long-term fire suppression costs could be reduced. Management for special designations and other protected areas could impact level and type of fuels treatments and the ability to modify future wildfire occurrence and behavior, as well as the ability to respond to wildfire. Limitations would be based on values at risk and may not occur throughout the extent of the mapped special designation area or protected habitat. At the same time, restrictions on resource uses in these areas would also reduce the potential for human-caused ignitions. Specifically, impacts could occur in 30,190 acres of ACECs (less than 1 percent more than under Alternative A). Specific management restrictions for individual areas would be indicated in

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		under Alternative A, and slightly more than Alternative B). Alternative B would have the most restrictions on dispersed camping and close the most areas to overnight camping, reducing the risk for human-caused ignitions. Impacts from comprehensive motorized and mechanized travel management would be similar to those described under Alternative A; however lack of areas open to cross-country motorized and mechanized travel would result in fewer opportunities for unplanned ignition. Designated routes and prohibiting surface-disturbing activities as needed during times of high winds would reduce the risk of human-caused ignitions in those areas.	types of impacts from comprehensive motorized and mechanized travel management would be as described under Alternative A, but increased in intensity (16,070 acres open to cross-country motorized and mechanized travel). Lack of prohibition on surface-disturbing activities during times of high winds would result in an increased risk of human-caused ignitions in those areas.	restrictions on OHVs and open areas would reduce the risk of human-caused ignitions as described in Alternative B.	implementation-level fire management plans. As discussed under Alternative A, lands managed as VRM Class I and II could also have restrictions on the extent of planned ignitions and mechanical fuels treatments. VRM I and II cover over 2 times more acres than Alternative A. Intensive recreation management in SRMAs (2.5 times more acres than under Alternative A) could reduce the risk of human-caused ignitions by providing targeted activities and outcomes. However, more overall recreation use equates to increased potential for human-caused ignition. Travel management regulations can impact potential for human-caused ignition. Areas open to cross-country motorized and mechanized travel would be 54 percent less than under Alternative A, resulting in fewer opportunities for unplanned ignition. Cross-country pedestrian and equestrian travel could still

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					present the potential for the spread of invasive species and human-caused ignition.
27.	**CULTURAL RESOURCES**				
28.	Impacts on resources could occur from authorized surface-disturbing events, unregulated events, and natural events, all of which could impact the integrity of cultural resources. Natural and unregulated events (such as wildfires, illegal artifact collection, and unregulated OHV usage) would create unmitigated impacts. Authorized events (such as oil and gas development and vegetation management) could result in the discovery of additional resources.	Impacts would be similar to Alternative A. Alternative B emphasizes the retention of relatively unmodified landscapes by decreasing areas of authorized surface-disturbing activities, such as increased areas of NSOs and greater use of travel management plans. This alternative provides the most protection from special designations. The BLM would manage four ACECs specifically for the protection of cultural resources and eight stream segments with cultural or historical ORVs would be determined suitable for inclusion in the NWSRS.	Impacts would be similar to Alternative A. Alternative C emphasizes the management of cultural resources on a site-by-site basis as needed for authorized surface-disturbing events.	Impacts would be similar to Alternative A. Alternative D would emphasize a balance of economic and environmental outcomes. Some areas would emphasize the retention of relatively unmodified landscapes by decreasing areas of surface-disturbing activities. Other areas would focus on the management of cultural resources on a site-by-site basis. This alternative provides less protection from special designations that Alternative B, but more than Alternatives A and C. The BLM would manage two ACECs specifically for the protection of cultural resources and six stream segments with cultural or historical ORVs would be determined suitable for inclusion in the NWSRS.	The Proposed RMP expands Alternative A's current management direction and prevailing conditions. However, protective measures would continue to be applied for resources on a case-by-case or project-by-project basis, like Alternative A. Proactive inventory and evaluation actions in certain areas would provide direct and indirect protective measures similar to Alternative D. The restrictions on fluid mineral development would result in a reduction of associated surface-disturbance from those projected in the Reasonable Foreseeable Development Scenario. The Proposed RMP specifies exceptions to ROW exclusions, but the BLM would continue to meet its compliance obligations under the

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					National Historic Preservation Act in these areas.
29.	**PALEONTOLOGICAL RESOURCES**				
30.	Continued management of VRM Class I and II areas, ROW exclusion areas, areas closed to fluid mineral leasing and saleable minerals, areas withdrawn from locatable mineral entry, the Tabeguache Area, WSAs, and ACECs would directly protect paleontological resources by prohibiting or severely restricting surface-disturbing activities. Paleontological resources would continue to be directly protected via the paleontological resources lease notification, which requires an inventory be performed by an accredited paleontologist approved by the BLM Authorized Officer before surface-disturbing activities are authorized in PFYC 4 and 5 areas. Stipulations would continue to provide indirect protection to paleontological resources by restricting or	The same programs noted under Alternative A would likely directly protect paleontological resources by prohibiting or severely restricting surface-disturbing activities that could damage or destroy paleontological resources. Additionally, NGD and SSR restrictions would protect paleontological resources in a similar manner to NSO and CSU stipulations. Stipulations would provide greater protection for paleontological resources by covering a larger area than under Alternative A. There are approximately 386,230 more acres of PFYC 4 and 5 areas covered by NSO stipulations (402,010 acres under Alternative B.1) and 471,580 more acres covered by CSU stipulations (the same under Alternative B.1) than under Alternative A. The 197,890 acres of SRMAs that overlap PFYC	The same programs noted under Alternative A would likely directly protect paleontological resources by prohibiting or severely restricting surface-disturbing activities that could damage or destroy paleontological resources. Additionally, NGD and SSR restrictions would protect paleontological resources in a similar manner to NSO and CSU stipulations. Unlike Alternative A, there are no stipulations that directly protect fossil resources, resulting in a loss of direct protection for these resources. NSO stipulations would provide less protection for paleontological resources than under Alternative A. There are approximately 12,060 acres of PFYC 4 and 5 areas covered by NSO stipulations. However, protections from CSU stipulations would increase as compared to Alternative A:	The same programs noted under Alternative A would likely directly protect paleontological resources by prohibiting or severely restricting surface-disturbing activities that could damage or destroy paleontological resources. Additionally, NGD and SSR restrictions would protect paleontological resources in a similar manner to NSO and CSU stipulations. Unlike Alternative A, there are no stipulations that directly protect fossil resources, resulting in a loss of direct protection for these resources. Stipulations would provide greater protection for paleontological resources by covering a larger area than under Alternative A. There are approximately 141,870 more acres of PFYC 4 and 5 areas covered by NSO stipulations and 263,460 more acres covered by	The same programs noted under Alternative A would likely directly protect paleontological resources by prohibiting or severely restricting surface-disturbing activities that could damage or destroy paleontological resources. Additionally, NGD and SSR restrictions would protect paleontological resources in a similar manner to NSO and CSU stipulations. Unlike Alternative A, there are no stipulations that directly protect fossil resources, resulting in a loss of direct protection for these resources. There are approximately 52,820 acres of PFYC 4 and 5 areas covered by NSO stipulations, and 234,700 acres of PFYC 4 and 5 areas covered by CSU stipulations. There are approximately 29,460 more acres covered by NSO stipulations and 122,740 more acres covered by CSU

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	prohibiting surface-disturbing activities. For example, NSO stipulations would protect approximately 23,360 acres of PFYC 4 and 5 areas, and CSU stipulations would protect 111,960 acres of PFYC 4 and 5 areas. The 41,670 acres of SRMAs that overlap PFYC 4 and 5 areas would continue to generally have a protective effect on paleontological resources due to restrictions on surface-disturbing activities.	4 and 5 areas would continue to generally have a protective effect on paleontological resources due to restrictions on surface-disturbing activities.	there would be134,050 more acres covered by CSU stipulations than under Alternative A. Alternative C has 166,410 acres of PFYC 4 and 5 within ERMAs; the type of impacts would be the same as under Alternative B.	CSU stipulations than under Alternative A. The 173,940 acres of SRMAs that overlap PFYC 4 and 5 areas would continue to generally have a protective effect on paleontological resources due to restrictions on surface-disturbing activities.	stipulations than under Alternative A.
31.	**VISUAL RESOURCES**				
32.	Approximately 7,860 acres lack a visual resource inventory (VRI) class (these lands are part of the Curecanti National Recreation Area and are managed by National Park Service). They are almost entirely managed as VRM Class III. Without a visual resource inventory, it is difficult to identify if VRM Class III management objectives would be appropriate for these lands.	Approximately 7,860 acres would be managed as VRM Class IV. There would be no lands in the Planning Area that lack a VRM class. Most (132,610 acres) of the VRI Class II lands are managed as VRM Class II or III. Virtually the same number of acres of VRI Class II lands are managed as VRM Class II or III under Alternative B.1. Most (253,460 acres) of the VRI Class III lands are VRM Class III. Under	Approximately 7,860 acres would be managed as VRM Class IV. As described under Alternative B, there would be no lands in the Planning Area that lack a VRM class. Alternative C assigns VRM Class II management to more VRI Class II lands than Alternative A. Alternative C assigns VRM Class I or III management to all of the VRI Class III lands. Alternative C is	Approximately 7,860 acres would be managed as VRM Class IV. As described under Alternative B, there would be no lands in the Planning Area that lack a VRM class. Alternative D assigns VRM Class I and II management to more VRI Class II lands than Alternative A. Alternative D assigns VRM Class I, II, or III management to almost all of the VRI Class III lands. Alternative D is more	Similar to Alternative A, approximately 7,860 acres lack a VRI class and would be managed as VRM Class III. As described under Alternative B, there would be no lands in the Planning Area that lack a VRM class. The Proposed RMP assigns VRM Class I and II objectives to more VRI Class II lands than Alternative A. The Proposed RMP assigns VRM Class I, II, and III

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	Approximately 47 percent of the Planning Area lacks a VRM class, making it possible for activities to degrade visual resources. Most (117,810 acres) of the VRI Class II lands are VRM Class III or undesignated. Most (303,670 acres) of the VRI Class III lands are VRM Class III or undesignated. Most (171,010 acres) of the VRI Class IV lands are VRM Class III or undesignated. In those areas managed for a VRM of a lower class than the VRI, it is expected that scenic resources would be degraded. Activities that involve surface disturbance, such as motorized travel, vegetation treatments, utility corridors, and mineral development, would affect visual resources. For utility corridors, Alternative A is the only alternative with lands lacking a VRM class. For lands open to fluid mineral leasing, subject to standard terms and conditions, Alternative A allows for the most VRI	Alternative B.1, 247,380 acres of VRI Class III lands would be managed as VRM Class III. Most (161,470 acres) of the VRI Class IV lands are VRM Class II or III (the same under Alternative B.1). Alternative B is more protective than Alternative A, though slightly less protective than Alternative B.1. Activities that involve surface disturbance, such as motorized travel, vegetation treatments, utility corridors, and mineral development, would affect visual resources. For utility corridors, Alternative B allows for the most VRI Class II, III, and IV lands to be protected due to management with more protective VRM class management objectives. For lands open to fluid mineral leasing, subject to standard terms and conditions, Alternative B is the only alternative that allows for no VRI classes to be managed with less protective VRM class management objectives.	more protective than Alternative A. Activities that involve surface disturbance, such as motorized travel, vegetation treatments, utility corridors, and mineral development, would affect visual resources. For utility corridors, Alternative C allows for the most VRI Class II lands to be degraded due to management with less protective VRM class management objectives. For lands open to fluid mineral leasing, subject to standard terms and conditions, Alternative C is the only alternative that allows for no VRI classes to be managed with more protective VRM class management objectives. For lands open to fluid mineral leasing, subject to CSU, Alternative C allows for the most VRI Class II lands to be degraded due to management with less protective VRM class management objectives.	protective than Alternative A. Activities that involve surface disturbance, such as motorized travel, vegetation treatments, utility corridors, and mineral development, would affect visual resources. For utility corridors, Alternative D allows for the fewest VRI Class II lands to be degraded due to management with less protective VRM class management objectives. For lands open to fluid mineral leasing, subject to standard terms and conditions, Alternative D is slightly more protective of visual resource conditions than Alternative B and C. For lands open to fluid mineral leasing, subject to CSU, Alternative D allows for the most VRI Class II lands to be protected due to management with more protective VRM class management objectives.	objectives to almost all of the VRI Class III lands. The Proposed RMP is more protective than Alternative A. Activities that involve surface disturbance, such as motorized travel, vegetation treatments, utility corridors, and mineral development, would affect visual resources. For utility corridors, of the inventoried lands, only the VRI Class II lands are assigned to a less-protective VRM Class III (5,560 acres). For lands open to fluid mineral leasing, subject to standard terms and conditions, of the inventoried lands, only VRI Class II lands are assigned to a less-protective VRM Class III. This would allow visual resources on these lands to degrade. For lands open to fluid mineral leasing subject to CSU, of the inventoried lands, essentially only the VRI Class II lands are assigned to a less-protective VRM Class III.

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	Class II and IV lands to be protected due to management with more protective VRM class management objectives. It also allows for the most VRI Class II and III lands to be degraded due to management with less protective VRM class management objectives. It is also the only alternative with lands lacking a VRM class. For lands open to fluid mineral leasing, subject to CSU, Alternative A allows for the fewest VRI Class II lands to be degraded due to management with less protective VRM class management objectives. It is also the only alternative with lands lacking a VRM class.	This would keep visual resources on inventoried lands from degrading. For lands open to fluid mineral leasing, subject to CSU, Alternative B protects the most VRI Class III and IV lands due to management with more protective VRM class objectives.			
33.	**LANDS WITH WILDERNESS CHARACTERISTICS**				
34.	Under Alternative A, the BLM would not manage any lands to protect wilderness characteristics and current management provides the least amount of incidental protection to lands with wilderness characteristics. Current management led to current	Under Alternative B, the BLM would manage all lands found to have wilderness characteristics to protect wilderness characteristics. This alternative would offer the most protection to those areas via restrictions on land uses.	Under Alternative C, the BLM would not manage any lands to protect wilderness characteristics. Impacts would be similar to Alternative A, but this alternative would offer slightly more incidental protection from the	Under Alternative D, the BLM would manage 44 percent of lands found to have wilderness characteristics to protect wilderness characteristics. These lands would be protected in a similar manner as under Alternative B except that	Under Alternative E, the BLM would not manage any lands to protect wilderness characteristics, and would instead manage to prioritize other multiple uses. Of the lands not managed to protect their wilderness

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	conditions that include wilderness characteristics existing in seven areas within the Decision Area, and conditions would likely persist in many of these areas under Alternative A. Wilderness characteristics in at least some areas that currently possess wilderness characteristics could degrade under this alternative. Some lands with wilderness characteristics are protected from fluid mineral leasing by CSU (4 percent) or TL (68 percent) stipulations, although these stipulations provide less protection than NSO stipulations, which overlap 35 percent of lands with wilderness characteristics. 47 percent of lands with wilderness characteristics are managed according to VRM Class III objectives, which would allow landscape modifications that could impair the naturalness of the area. The remaining lands would not have a VRM classification, which would allow landscape		management of other resources. More lands with wilderness characteristics would be protected from fluid mineral leasing than Alternative A by CSU (56 percent) or TL (81 percent) stipulations, although these stipulations provide less protection than NSO stipulations, which overlap only 3 percent of lands with wilderness characteristics More lands with wilderness characteristics would be protected from land use authorizations as ROW avoidance areas (33 percent), and from other surface-disturbing activities by SSR restrictions (21 percent). In addition, 97 percent of lands with wilderness characteristics would be managed according to VRM Class III or IV objectives, which would allow landscape modifications that could impair the naturalness of the area. The remaining lands would be managed according to VRM Class II objectives, providing some insurance that the	NSO stipulations would apply instead of closure to fluid mineral leasing, SSR restrictions would apply instead of NGD restrictions, and some lands would be managed as ROW avoidance areas instead of ROW exclusion areas. Of the lands not managed to protect their wilderness characteristics, most lands would be protected from fluid mineral leasing by CSU stipulations (72 percent) and from such land use restrictions as ROW avoidance areas (74 percent). In addition, 71 percent of lands with wilderness characteristics not managed for their protection would be managed according to VRM Class III or IV objectives, which would allow landscape modifications that could impair the naturalness of the area.	characteristics, most lands (77 percent) would be protected from fluid mineral leasing by CSU stipulations and from such land use restrictions as ROW avoidance areas (78 percent). In addition, 50 percent of lands with wilderness characteristics not managed for their protection would be managed according to VRM Class III or IV objectives, which would allow landscape modifications that could impair the naturalness of the area.

Line #	Alternative A *Current Management (No Action)*	Alternative B	Alternative C	Alternative D *Agency-Preferred in Draft RMP*	Alternative E *Agency-Proposed*
	modifications that could impair the naturalness of the area.		naturalness will be protected in those areas.		
35.	**RESOURCE USES**				
36.	**FORESTRY AND WOODLAND PRODUCTS**				
37.	No significant commercial harvest is anticipated over the life of the RMP. Under Alternative A, 168,910 acres are open to forest product harvest and 110,160 acres are closed to harvest to protect special designation areas (including the Tabeguache Area, WSAs, and some ACECs) to protect water quality as well as provide the desired visitor experience in the San Miguel SRMA. Forest product harvest could be impacted on the 372,240 acres open to forest use that overlap TLs, particularly if overlapping TLs provide a narrow window during which harvest would be allowed.	No significant commercial harvest is anticipated over the life of the RMP. Under Alternative B, 397,160 acres would be closed to wood product sales and harvest to protect special designation areas, specific SRMAs and water quality (more than 3 times the acres closed under Alternative A). In addition to the closures discussed under Alternative A, there would be closures in areas to protect sensitive resources such as ecological emphasis areas, fragile soils or steep slopes, ancient woodlands, riparian areas, federally threatened or endangered species habitat, and rare vegetation. As a result, additional acres would be unavailable for harvest. Woodland health is likely to improve in the long term due to protection of soils and sensitive habitat.	No significant commercial harvest is anticipated over the life of the RMP. Under Alternative C, 44,530 acres would be closed to wood product sales and harvest (40 percent fewer acres than Alternative A). Closures include the Tabeguache Area, WSAs, and Fairview South ACEC. In total, 631,270 acres would be managed to provide minor wood products (noncommercial saw timber), some of which would be closed due to overlap with special resource areas. Though more acres are managed for wood product harvest under this alternative than under Alternative A, Alternative C allows the harvest of minor wood products only. Under this alternative, due to few closures, woodland product harvest would be least restricted for	No significant commercial harvest is anticipated over the life of the RMP. Under Alternative D, 281,390 acres would be closed to wood product sales and harvest (2.5 times more than under Alternative A). Closures include special designation areas (i.e., specific ACECs, lands with wilderness characteristics, Tabeguache Area, WSAs) and sensitive resource areas (e.g., steep slopes, ecological emphasis areas, riparian areas, ancient woodlands, rare vegetation). Closures under Alternative D would limit forest product harvest but would likely improve forest and woodland health in the long term, as described under Alternative B. Approximately 394,530 acres would be managed to provide minor wood products (noncommercial	No significant commercial harvest is anticipated over the life of the RMP. Specific acres would be provided for each management unit for areas open and closed to commercial wood collection (e.g., commercial contracts for timber or biomass) and general wood collection (e.g., firewood permits). This would provide more specific management direction for implementation work to efficiently management the resource and promote long-term forest health. In total, 503,830 acres would be open to commercial wood collection, and 444,220 acres would be open for general wood collection. A total of 171,970 acres would be closed to commercial wood collection, and 231,580 acres would be closed to general wood collection. The acres of

Line #	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
		Approximately 278,640 acres would be managed to provide minor wood products (noncommercial saw timber). Though more acres are managed for wood product harvest under this alternative than under Alternative A, Alternative B allows the harvest of minor wood products only. Impacts from closure of commercial saw timber harvest are likely minimal due to the lack of current and projected commercial harvest demand, as well as limited acres occupied by such resources. Forest product harvest could be impacted on the 278,640 acres open to forest use that overlap TLs, particularly if overlapping TLs provide a narrow window during which harvest would be allowed.	personal use, but forest health is less likely to improve or remain stable in the long term. Forest product harvest could be impacted on the 474,930 acres open to forest use that overlap TLs, particularly if overlapping TLs provide a narrow window during which harvest would be allowed.	saw timber) under Alternative D. Forest product harvest could be impacted on the 394,340 acres open to forest use that overlap TLs, particularly if overlapping TLs provide a narrow window during which harvest would be allowed.	commercial and general wood cutting categories are overlapping and are not directly comparable to acres open for woodland harvest discussed under Alternatives A. Commercial timber harvest of pinyon-juniper would be permitted in all forest management units where consistent with land health and vegetation mosaic objectives. This would further promote support land health, while providing wood products. 171,970 acres would be closed to wood product sales and harvest (a 56 percent increase from Alternative A). Closures under the Proposed RMP would impose some site-specific limitations on limited forest product harvest, but exceptions would apply in many locations. This could contribute to improved forest and woodland health in the long term, while allowing for resource use. Woodland harvest is unlikely to be significantly impacted by the

Line #	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
					management of visual resources. Personal use firewood and other special forest product harvest would be prohibited from December 31 to April 30, which could restrict the level and timing of personal wood collection, compared with Alternative A where no seasonal limitations are in place. In addition, TLs would result in commercial harvest restrictions in approximately 392,900 acres, which could result in decreased harvest compared with Alternative A where no such restrictions are in place.
38.	**LIVESTOCK GRAZING**				
39.	This alternative includes the 619,500 acres available to livestock grazing and 35,520 permitted AUMs. In general, Alternative A also has the fewest surface use restrictions that would limit range improvements and livestock management. As a result permittees would have the greatest flexibility for management Under Alternative A, special vegetation	Alternative B includes the smallest area available to grazing, 517,580 acres (approximately 16 percent fewer than under Alternative A). In addition, permitted AUMs would be reduced to 28,958 (an approximately 18 percent reduction from Alternative A). In general, restrictions on grazing and adjustments to management practices would be the most	Alternate C represents the fewest restriction on grazing and the greatest level of permitted AUMs. Alternative C would slightly increase areas available to grazing, compared with Alternative A; approximately 653,270 acres of allotments would be available to grazing (approximately 4 percent more acres than under Alternative A). Similarly,	Alternative D includes a similar level of areas available to grazing to Alternative A; approximately 617,140 acres would be available to grazing (less than 1 percent less than Alternative A). Similarly, permitted AUMs would be slightly reduced from Alternative A to 35,558 AUMs (approximately 1 percent more than under	Due to clerical corrections and eliminating overlap with NCAs, the acres available for livestock grazing under the Proposed RMP were revised to be slightly fewer than Alternative A; approximately 616,640 acres would be available to grazing (less than 1 percent fewer acres than under Alternative A). Similarly, permitted AUMs would be

Line #	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	treatments are authorized on a case-by-case basis. No ecological emphasis areas would be established under this alternative. Current management actions to maintain or improve land health for allotments would remain in place. Trends described for forage and water conditions in Chapter 3 would continue. Limitations on grazing for soil and water protection would affect few acres and have minimal impacts. Management for special status species habitat would continue to result in potential restrictions on known, mapped habitat. Timing limitations for wildlife protection would restrict surface disturbing and could impact ability to construct range improvements management. No specific RMP management actions are in place to prohibit domestic sheep grazing in adjacent or occupied bighorn sheep habitat.	extensive under this alternative, leading to the greatest limitations on livestock management options of all the alternatives. Any additional forage would not be allocated for livestock, eliminating the potential for adjustments to increase AUMs. Furthermore, managing vegetation structure for maximum naturalness would preclude vegetation treatments solely for forage improvement, which could reduce AUMs or limit livestock dispersal options. Approximately 394,540 acres would be closed to sheep and goat grazing. The cost to permittees associated with conversion of permits to cattle could be prohibitive and could result in a major change to the operation or the hardship of finding grazing lands (private or public) to replace the area lost. Impacts from recreation are possible on 171,580 acres open to grazing within SRMAs (8 times	permitted AUMs would be slightly increased to 36,950 (a 4 percent increase in AUMs). Management strategies would emphasize increasing available forage and stocking rates where appropriate, while maintaining land health standards. Additional forage under this alternative would be allocated to domestic livestock, and AUMs could be increased. This alternative is more likely to increase flexibility for livestock management in the long term. In addition, construction, modification, or removal of range improvements would be allowed if compatible with other resource uses. Management for vegetation would emphasize resource production needs and fuels reduction; there would be less focus on resource protection and improvement or restoration of vegetation under Alternative C. As a result, this alternative would have the fewest limitations on manipulation	Alternative A). Under Alternative D, management strategies would emphasize improving rangeland health and forage quality. As a result, short-term impacts on permittees could increase if additional management actions are needed to implement an improved grazing strategy. In the long term, however, land heath and forage base is likely to improve, benefitting permittees. Additional forage under this alternative would be allocated to domestic livestock, wildlife, land health, or a combination of these, allowing for flexibility in livestock management while improving land health conditions. In addition, construction, modification, or removal of range improvements would be allowed if compatible with other resource uses. This would allow permittees additional flexibility while increasing management options.	revised to 35,520 AUMs (nearly the same as under Alternative A). Like Alternatives B, C, and D, management strategies would emphasize improving rangeland health and forage quality. Short-term impacts on permittees could occur if additional management actions (e.g., changes to AUMs, periods of use, allotments, class of livestock, and distribution) are needed based on land health assessment, resource monitoring, and trends data, including data provided via partners of cooperators. Additional forage would be allocated to domestic livestock, wildlife, land health, or a combination of these. Restrictions on livestock grazing would apply to activities next to public water supplies. Grazing would not be expressly prohibited, but would be examined to ensure that impacts were minimized. Construction, modification, or removal of range improvements would be

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	Livestock would continue to be impacted by recreation, particularly in SRMAs on 22,570 acres, where changes in grazing management could be required to reduce user conflicts.	more than under Alternative A).	of forage for livestock purposes. Management for special status species habitat would continue to result in potential restrictions on known, mapped habitat. Timing limitations to protect wildlife would restrict surface-disturbing activities and could impact the ability to construct range improvements. Minimal restrictions on range improvements could result from restriction on surface use for soil protection, but to a lesser degree than under any other alternative. Prohibiting grazing adjacent to public water supplies would affect approximately 3,990 acres. As in Alternative B, domestic goat and sheep grazing would be restricted to minimize disease transmission, but Alternative C would not specifically close existing domestic sheep allotments and would allow for greater flexibility in management. Under Alternative C, no SRMAs would be	Activities next to public water supplies would be restricted, however, grazing would not be expressly prohibited and impacts on grazing would be reduced compared to other action alternatives. Special status species protection would result in 1,050 acres closed to grazing as well as 10,580 acres of mapped special status species habitat open to grazing with potential for limitations. Timing limitations for wildlife protection would restrict surface-disturbing activities and could impact the ability to construct range improvements. Stipulations to protect soil resources could limit range improvements on steep slopes and management options on soils high in salinity and selenium, with potential costs to permittees. Restrictions on domestic sheep grazing would be based on the probability of interaction assessment; decisions would be made based on site-specific needs. Additional costs or	allowed if compatible with other resource uses (as described under Alternatives C and D). This would allow permittees continued flexibility and promote efficient management. Management for vegetation, drought, and special status species would impact livestock grazing, with similar impacts on Alternative D. Similar to Alternative D, restrictions on domestic sheep grazing would be based on currently accepted peer reviewed modeling techniques. No specific closures would directly be in place, and additional costs or management requirements would be limited to those allotments where an adverse impact on bighorn sheep is likely.

Line #	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
			established. ERMAs would be established on 199,250 acres open to livestock grazing. In contrast to SRMAs, ERMA management emphasizes multiple use and impacts on livestock from recreation are likely to be reduced compared with a SRMA, due to the management focus on interdisciplinary objectives rather than specifically on recreation.	management requirements would be limited to those allotments where an adverse impact on bighorn sheep is likely. Under Alternative D, SRMAs would be established, with impacts similar to those described under Alternative A but occurring over a larger area (4 times more than under Alternative A).	
40.	**COAL**				
41.	Under Alternative A, there would be fewer restrictions on coal development than the action alternatives. However, a smaller coal development potential area would continue to constrain the amount of acreage suitable for coal development. There would continue to be 980 acres within the Nucla-Naturita coal field with a TL stipulation that precludes surface-disturbing activities (e.g., surface mining) during certain times of the year, reducing the area available	The coal development potential area would to 421,500 acres, resulting in a larger area available to coal development. Closures would also increase, prohibiting development in portions of areas such as WSAs, and the Grand Mesa, Somerset, and Tongue Mesa coal fields. A TL stipulation would preclude surface mining operations in the Nucla-Naturita coal field during certain times of the year. Coal production is expected to remain the same across all alternatives.	Increased coal development potential area would be the same size as Alternative B. Compared with Alternative B, a smaller portion of the Grand Mesa, Somerset, and Tongue Mesa coal fields would be closed to development. A TL stipulation would preclude surface mining operations on 17,480 of 19,500 acres in the Nucla-Naturita coal field during certain times of the year. Coal production is expected to remain the same across all alternatives.	Increased coal development potential area would be the same size as Alternative B. Compared with Alternatives B and C, a smaller portion of the Grand Mesa, Somerset, and Tongue Mesa coal fields would be closed to development. A TL stipulation would preclude surface mining operations in the Nucla-Naturita coal field during certain times of the year. Coal production is expected to remain the same across all alternatives.	Increased coal development potential area would be the same size as Alternative B. Compared with Alternatives B and C, a smaller portion of the Grand Mesa, Somerset, and Tongue Mesa coal fields would be closed to development. A TL stipulation would preclude surface mining operations in the Nucla-Naturita coal field during certain times of the year. Coal production is expected to remain the same across all alternatives.

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	for surface mining operations. Coal production is expected to remain the same across all alternatives.				
42.	**FLUID MINERALS** ***(Oil and Gas and Geothermal Resources)***				
43.	871,810 acres (95 percent) of federal fluid mineral estate would remain open to oil and gas and geothermal leasing, and 44,220 acres (5 percent) would remain closed. NSO, CSU, and TL stipulations restrict future exploration and development activities by identifying where surface-disturbing activities may not occur, the manner in which they may be implemented, and when they may occur. 459,650 acres have higher development potential for conventional oil and gas and would remain open to leasing, 25,390 acres (6 percent) of which have NSO stipulations, 126,650 acres (28 percent) are open with a CSU stipulation, and 319,050 acres (69 percent) have higher development	Alternative B includes increased restrictions on development compared with Alternative A. 696,450 acres (76 percent) of the federal fluid mineral estate would be open to future oil and gas and geothermal leasing, a 20 percent decrease from Alternative A. Approximately 181,220 acres (20 percent) would be closed (nearly 5 times more acres than under Alternative A). NSO, CSU, and TL stipulations restrict future exploration and development activities by identifying where surface-disturbing activities may not occur, the manner in which they may be implemented, and when they may occur. Approximately 24 percent of the area with geothermal resource potential would	Alternative C includes increased restrictions on development compared with Alternative A. 871,810 acres (95 percent) of federal fluid mineral estate would be open to future oil and gas and geothermal leasing (the same as Alternative A), and 44,220 acres (5 percent) would be closed (the same as Alternative A). NSO, CSU, and TL stipulations restrict future exploration and development activities by identifying where surface-disturbing activities may not occur, the manner in which they may be implemented, and when they may occur. Approximately 4 percent of the area with geothermal resource potential would be closed to geothermal leasing. Approximately 3 percent	Alternative D includes increased restrictions on development compared with Alternative A. 865,970 acres (95 percent) of federal fluid mineral estate would be open to future oil and gas and geothermal leasing (less than 1 percent fewer acres than under Alternative A), and 50,060 acres (5 percent) would be closed (13 percent more acres than under Alternative A). NSO, CSU, and TL stipulations restrict future exploration and development activities by identifying where surface-disturbing activities may not occur, the manner in which they may be implemented, and when they may occur. Approximately 4 percent of the area with geothermal resource potential would be closed	The Proposed RMP includes increased restrictions on development compared with Alternative A. Acres of federal fluid mineral estate open and closed to future oil and gas and geothermal leasing would be the same as Alternative A. NSO, CSU, and TL stipulations restrict future exploration and development activities by identifying where surface-disturbing activities may not occur, the manner in which they may be implemented, and when they may occur. Approximately 4 percent of the area with geothermal resource potential would be closed to geothermal leasing. Approximately 13 percent of the geothermal potential area open to leasing would

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	potential and no NSO or CSU stipulations. 282,650 acres (61 percent) are open with a TL. 456,190 acres have development potential for coalbed natural gas and would remain open to leasing, 5,460 acres (1 percent) of which has NSO stipulations, 15,010 acres (3 percent) are open with a CSU stipulation, and 437,750 acres (96 percent) have development potential and no NSO or CSU stipulations. 232,570 acres (51 percent) are open with a TL.	be closed to geothermal leasing. Approximately 65 percent of the geothermal potential area open to leasing would be subject to NSO stipulations. 369,600 acres have higher development potential for conventional oil and gas and would remain open to leasing, 219,610 acres (59 percent) of which would have an NSO stipulation, 372,860 acres (99 percent) would be open with a CSU stipulation, and 480 acres (less than 1 percent) of which would have neither NSO nor CSU stipulations. 369,420 acres (nearly 100 percent) would be open with a TL. 392,080 acres have development potential for coalbed natural gas and would remain open to leasing, 250,060 acres (64 percent) of which would have an NSO stipulation and 412,490 acres (98 percent) would be open with a CSU stipulation. There would be 4,420 acres (1 percent) with development potential open to leasing without NSO or CSU stipulations. 391,880	of the geothermal potential area open to leasing would be subject to NSO stipulations. 459,650 acres have higher development potential for conventional oil and gas and would remain open to leasing, 11,210 acres (2 percent) of which would have an NSO stipulation, 182,140 acres (40 percent) would be open with a CSU stipulation, and 257,420 acres (56 percent) have higher development potential and no NSO or CSU stipulations. 340,010 acres (74 percent) would be open with a TL. 456,220 acres have development potential for coalbed natural gas and would remain open to leasing, 12,810 acres (3 percent) of which would have an NSO stipulation, 253,470 acres (56 percent) would be open with a CSU stipulation, and 81,880 acres (18 percent) has development potential and no NSO or CSU stipulations. 246,010 acres (54 percent) would be open with a TL.	to geothermal leasing. Approximately 28 percent of the geothermal potential area open to leasing would be subject to NSO stipulations. 455,370 acres have higher development potential for conventional oil and gas and would remain open to leasing, 110,830 acres (24 percent) of which would have an NSO stipulation, 202,180 acres (44 percent) would be open with a CSU stipulation, and 198,360 acres (44 percent) have higher development potential and no NSO or CSU stipulations. 455,370 acres (100 percent) would be open with a TL. 452,330 acres have development potential for coalbed natural gas and would remain open to leasing, 87,420 acres (19 percent) of which would have an NSO stipulation, 271,820 acres (60 percent) would be open with a CSU stipulation. There would be no acres with development potential open to leasing without NSO or CSU stipulations. 452,330 acres (100	be subject to NSO stipulations. 459,650 acres have higher development potential for conventional oil and gas and would remain open to leasing, 52,350 (11 percent) of which would have an NSO stipulation, 160,160 acres (35 percent) of which would be open with a CSU stipulation, and 246,970 acres (54 percent) of which have higher development potential and no NSO or CSU stipulations. 364,280 acres (100 percent) would be open with a TL. 456,210 acres have development potential for coalbed natural gas and would remain open to leasing, 101,390 acres (22 percent) of which would have an NSO stipulation, 210,270 acres (46 percent) of which would be open with a CSU stipulation, and 144,550 acres (32 percent) of which have development potential and no NSO or CSU stipulations. 456,340 acres (79 percent) would be open with a TL.

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		acres (nearly 100 percent) would be open with a TL. **Alternative B.1** (North Fork area): Increased restrictions on development when compared with Alternative A. 609,360 acres of federal fluid mineral estate would be open to future oil and gas leasing, a 27 percent decrease from Alternative A. Approximately 306,670 acres would be closed (6 times more acres than under Alternative A). NSO, CSU, and TL stipulations restrict future oil and gas exploration and development activities by identifying where surface-disturbing activities may not occur, the manner in which they may be implemented, and when they may occur. Analysis of leasing decisions for geothermal resources is the same as Alternative B. 344,020 acres have higher development potential for conventional oil and gas and would remain open to leasing, 214,850 acres (62 percent) of which would		percent) would be open with a TL.	

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		have an NSO stipulation, 343,480 acres (nearly 100 percent) would be open with a CSU stipulation, and 480 acres (less than 1 percent) have higher development potential and no NSO or CSU stipulations. 346,340 acres (100 percent) would be open with a TL. 329,280 acres have development potential for coalbed natural gas and would remain open to leasing, 222,880 acres (68 percent) of which would have an NSO stipulation, 322,320 acres (98 percent) would be open with a CSU stipulation, and 4,430 acres (1 percent) have higher development potential and no NSO or CSU stipulations. 329,200 acres (nearly 100 percent) would be open with a TL.			
44.	**LOCATABLE MINERALS, MINERAL MATERIALS, and NONENERGY LEASABLE MINERALS**				
45.	*LOCATABLE MINERALS*				
46.	Impacts of withdrawals and areas petitioned for withdrawal with gypsum and gold potential would continue to be negligible. If 12,350 acres petitioned for withdrawal in the	Limiting the availability of locatable minerals on 387,270 acres (7 times more acres than under Alternative A), including recommending withdrawing 37,090 acres	Under Alternative C, there are fewer limitations on availability of locatable minerals (39,310 acres; 29 percent fewer acres than under Alternative A) than any of the alternatives.	Under Alternative D, there are fewer limitations on availability of locatable minerals (83,940 acres; 1.5 times more acres than under Alternative A) than Alternative B.	Under the Proposed RMP, there are fewer limitations on availability of locatable minerals (43,850 acres; 21 percent fewer acres than under Alternative A) than

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	uranium/vanadium potential area are withdrawn, the uranium/ vanadium potential area would be reduced by 6 percent, pending resolution of the required mining claim validity exams.	of open and active mining claims, would result in the most restrictive alternative for gypsum, uranium/vanadium, and placer gold mining.	About 460 acres of open and active mining claims are within the area to be recommended for withdrawal. Restrictions for gypsum, uranium/vanadium, and placer gold mining would apply to a smaller area than under Alternatives B and D.	Restrictions for gypsum, uranium/vanadium, and placer gold mining would apply to a smaller area than under Alternative B. Of these minerals, gypsum would be the most-impacted: 73 percent of the potential area would be recommended for withdrawal.	under Alternatives B and D. None of the uranium/ vanadium potential area would be restricted under the Proposed RMP. Restrictions for gypsum would apply to a smaller area than under Alternative D, and restrictions for placer gold mining would apply to a smaller area than Alternatives B, C, and D.
47.	*MINERAL MATERIALS*				
48.	Constraints and closures would cover the smallest area of any alternative, resulting in the fewest restrictions on the disposition of mineral materials.	The largest area would be closed to the disposition of mineral materials (568,270 acres) with SSR and TL stipulations on the 327,920 acres open to the disposition of mineral materials where development would be constrained.	TL stipulation constraints (558,320 acres) and closures (58,610 acres) would, combined, cover a smaller area than under Alternatives B and D.	Under Alternative D, there would be fewer closures than Alternatives B and C, but up to 756,760 acres where development would be seasonally constrained by a TL stipulation.	Under Alternative E, there would be slightly more closures than Alternative D, and up to 553,020 acres where development would be seasonally constrained by a TL stipulation.
49.	*NONENERGY SOLID LEASABLE MINERALS (e.g., sodium)*				
50.	The Tabeguache Area and WSAs could continue to be closed to the leasing of nonenergy solid minerals, precluding future mining in these areas.	Alternative B would have the largest area closed to the leasing of nonenergy solid minerals (396,400 acres). There would be 499,790 acres open to the leasing of nonenergy solid minerals, with SSR restrictions on 487,610 acres. TL stipulations on an additional 289,400 acres	Closures (57,390 acres) and TL stipulation constraints (560,540 acres) would, combined, cover a smaller area than under Alternatives B and D.	Under Alternative D, there would be more closures (170,490 acres) than Alternative C, but up to 725,700 acres where development would be seasonally constrained by a TL stipulation.	Under the Proposed RMP, there would be slightly less closures (167,330 acres) than Alternative D, and up to 529,290 acres where development would be seasonally constrained by a TL stipulation.

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		open to leasing where development would be seasonally constrained.			
51.	**RECREATION AND VISITOR SERVICES**				
52.	Certain parts of the Planning Area, such as Spring Creek and the Jumbo Mountain receive heavy recreation use that currently falls under undesignated recreation management area management. Not providing special recreation management for these areas would likely inhibit desired opportunities, outcomes, and experiences and would result in user conflict and displacement. Similar impacts would be expected where outdated management plans for popular areas, such as Dry Creek, North Delta, Burn Canyon, and the Paradox Valley, fail to provide adequate management direction for emerging recreation trends and increased visitation. These impacts would likely become significant in certain areas over the life of the plan.	Alternative B attempts to identify the areas that will continue to require or will be most likely to require management actions to support recreation and the attainment of outcome-focused objectives. Eleven SRMAs would be managed to protect and enhance a targeted set of activities, experiences, benefits, and desired recreation setting characteristics. Management actions from other resource programs generally facilitate SRMA objectives. Managing zero acres as open for cross-country motorized travel would have a long-term direct effect by eliminating this type of recreation in the North Delta OHV area. Prohibiting target shooting in certain areas (see **Appendix T, Table T-1**) would reduce opportunities for this activity but would increase public safety in many parts	Twelve ERMAs would be managed to support principal recreation activities. There would be no SRMA management, so recreation outcomes would not be protected under this alternative. Over time, outcomes desired by current visitors, service providers, and affected communities may become unavailable. However, ERMA management would protect a variety of recreation opportunities. Recreation management actions to protect and provide recreation (e.g., trail design, construction, maintenance, and access points) would help mitigate conflict among user groups and with important biological resources. Compared to Alternative A, more recreation opportunities would be lost in the long term by prohibiting target shooting within or toward	Seven SRMAs would provide long-term protection of targeted recreation outcomes in those areas. In general, desired future recreation setting characteristics would largely be realized through less-restrictive management actions. Four ERMAs would support principal recreation activities. Managing zero acres as open for cross-country motorized travel would result in impacts similar to those under Alternative B. There would be more long-term loss of recreation opportunities than under Alternative A by prohibiting recreational mining and target shooting within and near developed recreation sites and roads, near residences, in the North Delta OHV area, and in specific ACECs and SRMAs. However, this could also result in the potential for maintaining	Eight SRMAs would provide long-term protection of targeted recreation outcomes in those areas. Opportunities for cross-country motorized travel would be available in the North Delta SRMA. Management actions from other resource programs generally facilitate SRMA objectives. Additionally, three ERMAs would support principal recreation activities. Similar to Alternative A, casual mineral specimen collection and recreational target shooting would generally be permitted; 9 percent more acres would be open to target shooting than under Alternative A.

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	Allowing recreational shooting (except in developed recreation sites) and recreational mining without restrictions would provide recreation opportunities but could increase surface disturbance and visitor conflicts in specific areas with frequent use.	of the Decision Area by focusing target shooting in appropriate locations.	developed recreation sites, and by prohibiting recreational mining in developed recreation sites. However, this could maintain naturalness in specific areas where these activities would no longer occur and would increase the quality of other recreation opportunities.	naturalness in localized areas where these activities would no longer occur and could increase the quality of other recreation opportunities.	
53.	**COMPREHENSIVE TRAVEL AND TRANSPORTATION MANAGEMENT**				
54.	The degree of impact on travel would be lowest under Alternative A because of fewer land use restrictions for the protection of sensitive resources. Except for Alternative D, Alternative A would limit the most acreage to existing or designated routes (611,090 acres, 90 percent of the Decision Area).	Alternative B includes the most limitations on and closures to motorized and mechanized vehicle use for resource protection. Therefore, this alternative would cause the greatest adverse impacts on access opportunities for motorized vehicle use. Alternative B closes the most areas to motorized travel (114,970 acres). Alternative B would have no areas open to cross-country motorized travel.	Alternatives C would have the least amount of restrictions on travel, and, therefore, slightly less impact than Alternative B. Alternative C would have the most acres open to cross-country motorized travel (16,070 acres) and the fewest acres closed to motorized travel (45,170 acres).	Alternative D would have slightly less restriction, and therefore slightly greater impact, than Alternative B. Alternative D limits the most acreage to designated routes (617,240 acres, 91 percent of the Decision Area). Alternative D would have no areas open to cross-country motorized travel.	The Proposed RMP would be similar to Alternative D, with 615,200 acres (91 percent) of the Decision Area limited to designated routes. Seasonal restrictions would apply to 28,550 acres. The North Delta SRMA would be open for cross-country motorized travel (3,950 acres; 1 percent of the Decision Area).
55.	**LANDS AND REALTY**				
56.	Continuing to manage 85,080 acres as ROW exclusion areas would prohibit ROW development in these areas. There would	ROW exclusion and avoidance areas would have impacts similar to those under Alternative A, except that there would be 431,040 acres of ROW	ROW exclusion and avoidance areas would have impacts similar to Alternative A, except that the BLM would manage 44,550 acres as ROW	ROW exclusion and avoidance areas would have impacts similar to Alternative A, except that there would be 53,700 acres of ROW exclusion	ROW exclusion and avoidance areas would have impacts similar to Alternative A, except that there would be 53,040 acres of ROW exclusion

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	continue to be no ROW avoidance areas. Alternative A would continue to manage 56,150 acres as closed to motorized travel. This creates areas that cannot be accessed readily, thereby creating areas that are off limits to some types of land uses, such as ROWs.	exclusion areas (5 times more than under Alternative A) and 195,460 acres of ROW avoidance areas. Alternative B would manage 114,970 acres as closed to motorized travel. Impacts are similar to those identified under Alternative A, but there would be twice as many acres closed to motorized travel.	exclusion areas (48 percent fewer acres than under Alternative A) and 210,390 acres as ROW avoidance areas. Alternative C would manage 45,170 acres as closed to motorized travel. Impacts are similar to those identified under Alternative A, but there would be a 20 percent decrease in the areas closed to motorized or mechanized travel.	areas (37 percent fewer than Alternative A) and 276,500 acres of ROW avoidance areas (the greatest acreage under all of the alternatives). Alternative D would manage 58,560 acres as closed to motorized travel. Impacts are similar to those identified under Alternative A, but there would be a 4 percent increase in the areas closed to motorized travel.	areas (38 percent fewer than Alternative A) and 66,030 acres of ROW avoidance areas. The Proposed RMP would manage 55,770 acres as closed to motorized travel. Impacts would be the same as under Alternative D.
57.	*UTILITY CORRIDORS*				
58.	Utility corridors would continue to occupy 297,930 acres in area. Collocating utilities within designated corridors would reduce land use conflicts in other locations by grouping similar facilities and activities in specific areas and away from conflicting developments and activities. It would also clarify the preferred locations for utilities and simplify processing on BLM-administered lands. However, designation of corridors could limit options for ROW design	Corridors totaling 64,300 acres for utilities would be managed for under Alternative B. Impacts would be the same as identified under Alternative A, but within a smaller area.	Impacts from utility corridors would be the same as those identified under Alternative B, except that only the West-wide Energy Corridor would be designated, a smaller area than Alternative B.	Impacts from utility corridors would be the same as those identified under Alternative B.	Impacts from utility corridors would be the same as those identified under Alternative B.

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	plans and selection of more-preferable locations.				
59.	*LAND TENURE ADJUSTMENTS*				
60.	Under Alternative A, 9,850 acres would remain available for land disposal. This would result in more contiguous public lands within the Planning Area and accommodate resource management. Land disposals near cities or towns could accommodate community expansion needs by enabling lands to be used for public purposes. Disposal would also reduce isolated tracts, thus increasing land management efficiency. Most lands identified for disposal are south and west of Paonia, south of Montrose, and northwest and southeast of Norwood. Land acquisitions would improve access and manageability.	Alternative B identifies 2,650 acres for land disposal (7,200 acres fewer than under Alternative A). Impacts would be similar to those identified under Alternative A, but less consolidation of BLM-administered land would occur. Most lands identified for disposal are south of Montrose and northwest of Norwood. Land acquisitions would improve access and manageability.	Impacts would be the same as Alternative A, except no lands are identified for acquisition and there would be no benefit to access for manageability through acquisition.	Alternative D identifies 1,930 acres for land disposals (7,920 fewer acres than under Alternative A). Impacts would the same as those described under Alternative A, but less consolidation of BLM-administered land would occur. Most lands identified for disposal are south of Montrose and northwest of Norwood. Land acquisitions would improve access and manageability.	Impacts from land tenure adjustments would be the same as those identified under Alternative D.
61.	**RENEWABLE ENERGY**				
62.	Managing 85,140 acres as exclusion areas for wind, solar, and hydropower would continue to prohibit renewable energy development in this area.	Alternative B would implement the most restrictions of any alternative. Managing 518,150 acres (518,490 acres under Alternative	Alternative C would implement the fewest restrictions of any alternative. Managing 44,550 acres as exclusion areas for wind, solar, and	Alternative D would be slightly less restrictive than Alternative A. There would be 126,160 acres of exclusion areas for wind, 166,620 acres of exclusion	The Proposed RMP would be less restrictive than Alternative A. There would be 65,970 acres of ROW exclusion areas for wind, solar, and

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	A significant area containing no VRM class objectives, as well as VRM Class III and IV management (totaling 609,550 acres), would continue to allow for renewable energy ROW authorizations.	B.1) as exclusion areas for wind and 513,360 acres (513,700 acres under Alternative B.1) as exclusion areas for solar and hydropower would result in the largest area off-limits to renewable energy development. Likewise, aside from Alternative B.1, the fewest acres would be managed as VRM Class III or IV (445,920 acres) where restrictions would be less likely. Under Alternative B.1, 439,630 acres would be managed as VRM Class III or IV. Alternative B would be more supportive of biomass production than Alternative A.	hydropower would result in the smallest area off-limits to renewable energy development. There would be few restrictions on the 600,320 acres managed as VRM Class III or IV. Alternative C would be more supportive of biomass production than Alternative A.	areas for solar, and 147,720 acres of exclusion areas for hydropower off-limits to ROW applications. There would be 516,820 acres managed as VRM Class III and IV, where restrictions would be less likely. Alternative D would be more supportive of biomass production than Alternatives B and C.	hydropower. There would be 523,860 acres managed as VRM Class III and IV, where restrictions would be less likely. The Proposed RMP would be the most supportive of biomass production.
63.	**Special Designations**				
64.	**AREAS OF CRITICAL ENVIRONMENTAL CONCERN**				
65.	Impacts on values of existing ACECs would continue from authorized land uses, including grazing, recreation, and motorized use. Restrictions on authorized land uses within these ACECs would protect their relevant and important values.	Fewer impacts on relevant and important values would occur compared with Alternative A because more areas would be designated as ACECs (7 times the acres under Alternative A). Increased restrictions on authorized land uses within these ACECs would protect	The BLM would designate the same ACECs as under Alternative A, except for Tabeguache Creek. More impacts on relevant and important values would occur because the BLM would reduce restrictions on authorized land uses. Impacts on values in areas identified as potential	Fewer impacts on relevant and important values would occur compared with Alternative A because more areas would be designated as ACECs (71 percent more acres than under Alternative A). Restrictions on authorized land uses within these ACECs would protect their	Impacts on relevant and important values would be similar to Alternative A, but 190 more acres (less than 1 percent more) of ACECs would be designated. Restrictions on authorized land uses within these ACECs would protect their relevant and important

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	Values in areas identified as potential ACECs that are not existing ACECs would continue to be impacted by authorized land uses including grazing, recreation, motorized use, utility development, and energy, and mineral development.	their relevant and important values. Impacts on values on the 770 acres identified as potential ACECs not proposed for designation would be similar to those under Alternative A, but would occur over a smaller area. Restrictions on authorized land uses in these areas would increase compared with Alternative A.	ACECs not proposed for designation would be similar to those under Alternative A, but restrictions on authorized land uses would increase.	relevant and important values in a manner similar to Alternative A. Impacts on values in areas identified as potential ACECs not proposed for designation would be similar to those under Alternative A, but would occur over a smaller area. Restrictions on authorized land uses in these areas would increase, compared with Alternative A.	values in a manner similar to Alternative A. Impacts on values in areas identified as potential ACECs not proposed for designation would be similar to those under Alternative A, but would occur over a slightly smaller area. Restrictions on authorized land uses in these areas would increase, compared with Alternative A.
66.	**WILDERNESS AND WILDERNESS STUDY AREAS**				
67.	*TABEGUACHE AREA*				
68.	The BLM would not permit any actions that would impair the wilderness character of the Tabeguache Area. Such impacts would only occur from activities associated with valid existing rights or special provisions (e.g., livestock grazing).	Alternative B would provide the maximum level of protection for wilderness character for the Tabeguache Area. In addition to impacts experienced under Alternative A, management of lands with wilderness characteristics, ACECs, SRMAs, and ecological emphasis areas and WSR protection would provide management complementary to the protection of wilderness character both adjacent to and overlapping the Tabeguache Area. Such management could	Impacts would be similar to Alternative A.	Impacts would be similar to Alternative A.	Impacts would be similar to Alternative A.

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		heighten protection within the Tabeguache Area and further ensure the integrity of wilderness character. Recreational impacts on wilderness character under Alternative B would be reduced by the prohibition of competitive events and target shooting in the Tabeguache Area, preserving opportunities for solitude and naturalness and undeveloped character.			
69.	*WILDERNESS STUDY AREAS*				
70.	Alternative A would allow resource uses in the WSAs that maintain each area's suitability for preservation as wilderness and protects the viability of current wilderness characteristics. Additional protection for naturalness would be provided by closing Needle Rock ISA and a portion of the Adobe Badlands WSA to mineral materials disposal. If Congress were to release WSAs from wilderness consideration, some protection would be afforded for wilderness characteristics due to overlapping special	Alternative B would provide the maximum level of protection for wilderness characteristics of all WSAs. Management of ACECs, SRMAs, ecological emphasis areas, WSRs, and lands with wilderness characteristics would provide management complementary to the protection of wilderness characteristics both adjacent to and overlapping WSAs. All WSAs under Alternative B would be closed to mineral material disposal, providing protection for all	Alternative C would provide the fewest adjacent or overlapping special designation areas, so incidental impacts from special designation areas on WSAs would be minimized and surface disturbance could be more likely to occur in areas released from wilderness consideration. All WSAs would be closed to mineral materials disposal, as described under Alternative B.	Under Alternative D solitude and primitive and unconfined recreation would be enhanced by the prohibition of competitive events. As described under Alternative B, management for areas with wilderness characteristics would provide protection of wilderness characteristics in areas next to current WSAs. This is only applicable for the Camel Back WSA Adjacent (6,950 acres) under Alternative D. Impacts from rivers suitable for inclusion in the NWSRS would be as	Stream segments determined to be suitable for inclusion in the NWSRS could provide indirect protection of WSAs. Segments would overlap Dolores River Canyon and Camel Back WSAs. All WSAs would be closed to mineral material disposal, with impacts as described under Alternative B.

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	designations. Specifically, a portion of the Abode Badlands WSA (6,380 acres) would be encompassed in the Adobe Badlands ACEC, and segments eligible for inclusion in the National Wild and Scenic River System overlap with portions of the Dolores River Canyon WSA (La Sal Creek Segment 3 and Dolores River Canyon Segment 1a) and Camelback WSA (Roubideau Creek Segment 1).	wilderness characteristics. If any WSAs were released from wilderness consideration and managed as open to leasing, mineral entry and development, or mineral material sales, there could be impacts on wilderness characteristics from surface disturbance caused by mineral exploration and development. Recreational impacts on wilderness characteristics under Alternative B would be reduced by prohibiting competitive events and target shooting in all WSAs, preserving opportunities for solitude and preserving naturalness.		described under Alternative B. All WSAs would be closed to mineral material disposal, with impacts as described under Alternative B.	
71.	**WILD AND SCENIC RIVERS**				
72.	There are 29 stream segments identified as eligible for inclusion in NWSRS. The BLM would not authorize any action that would adversely affect the free-flowing condition, water quality, ORVs, or tentative classifications of the segments. Potential impacts on WSR values would be minimized where other special management	All stream segments would be determined suitable for inclusion in NWSRS. In addition to protections afforded the eligible segments under Alternative A, the BLM would apply land use restrictions to protect the suitable segments under Alternative B. This alternative provides the most protection of any alternative to the free-	Alternative C offers the least amount of protection for the 29 eligible segments. All eligible segments would be determined not suitable for inclusion in the NWSRS and would not be managed to protect their free-flowing condition, water quality, tentative classification, and ORVs. This could result in a	Alternative D offers more protection to eligible segments than Alternative C but less than Alternatives A and B. Under Alternative D, 16 segments would be determined suitable for inclusion in the NWSRS. In addition to protections afforded the eligible segments under Alternative A, the BLM would apply land use restrictions to	Impacts from wild and scenic river management would be similar to Alternative D.

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	designations overlap a stream segment.	flowing condition, water quality, tentative classification, and ORVs of the segments.	potential long-term impact on the free-flowing condition, water quality, tentative classification, and ORVs. While the BLM would not be obligated to protect the ORVs, free-flowing condition, or tentative classification of the segments, the river segments could still receive indirect protection from other resource management actions.	protect the suitable segments under Alternative D. The remaining 13 eligible segments would be determined not suitable for inclusion in the NWSRS. Impacts would be similar to Alternative C, although more incidental protection would be afforded under this alternative.	
73.	**NATIONAL TRAILS AND BLM BYWAYS**				
74.	*NATIONAL TRAILS*				
75.	No impacts on the Old Spanish Trail from mining coal. Portions of the Paradox Trail near Nucla could be directly impacted by activities related to mining (such as surface disturbance) over the long term. Indirect impacts are visual resource impacts from mining that could alter the scenic values of the trail. No special restrictions for surface occupancy or fluid mineral leasing surrounding the Old Spanish, Tabeguache, and Paradox trails, which could result in impacts on visual	No impacts on the Old Spanish Trail from mining coal. The Tabeguache Trail is also in an area unacceptable to coal leasing. Portions of the Paradox Trail near Nucla are within areas acceptable to coal leasing; some trail sections could be directly impacted in the short and long term by activities related to mining (such as surface disturbance). Indirect impacts would include visual resource impacts that could alter the scenic values of the trail in the long term.	No impacts on the Old Spanish Trail from mining coal. The Tabeguache and Paradox Trails are in areas acceptable to coal leasing; some trail sections could be directly impacted in the short and long term by activities related to mining (such as surface disturbance). Indirect impacts include visual resource impacts that could alter the scenic values of the trail in the long term. Applying NSO and CSU stipulations (50-meter buffer) on either side of the Old Spanish Trail	No impacts on the Old Spanish Trail from mining coal. The Tabeguache Trail is also in an area unacceptable to coal leasing. Portions of the Paradox Trail are within areas acceptable to coal leasing; some trail sections could be directly impacted in the short and long term by activities related to mining (such as surface disturbance). Indirect impacts would include visual resource impacts that could alter the scenic values of the trail in the long term.	All congressionally designated National Trails would continue to be closed to coal leasing. The BLM would close all National Trails to mineral materials disposal and nonenergy solid mineral leasing, thereby preserving trail integrity. A CSU stipulation would restrict surface use within 5 miles on either side of the Old Spanish Trail. Impacts would be similar to those under Alternative B. Like Alternative C, if the Tabeguache and Paradox Trails are designated, a

Line #	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	resources or setting for the trail. Visual resource management could impact natural scenic qualities of trails. Development may be permitted that could impact scenic qualities of the trail. The Old Spanish, Tabeguache, and Paradox trails are all within areas not managed as recreation management areas. Recreation settings and opportunities would be impacted by other uses, and current opportunities and recreation settings could change over the long term.	Applying NSO stipulation (0.5-mile buffer) and CSU stipulation (0.5- to 5-mile buffer) on either side of the Old Spanish Trail would provide more protection from surface-disturbing activities than under Alternative A. If the Tabeguache and Paradox trails were designated as National Recreation Trails, applying NSO stipulation (0.5-mile buffer) on either side of these trails would provide more protection from surface-disturbing activities than under Alternative A. In areas of NGD and SSR, national trails would also be less impacted in the short and long term by controlling surface-disturbing activities. Visual impacts would be the same as Alternative A. Increased recreation management in SRMAs could provide additional opportunities for activities and experiences for national trail users. Potential listing of the Tabeguache and Paradox trails as a National Recreation Trail could	would provide more protection from surface-disturbing activities than under Alternative A, but less than Alternative B. If the Tabeguache and Paradox trails were designated, applying NSO stipulation (200-meters [656-foot] buffer) on either side of these trails would provide more protection from surface-disturbing activities than under Alternative A, but less than Alternative B. Alternative C would have would have fewer areas of NGD and SSR, resulting in less protection from surface disturbance and development impacts then Alternative B. Less restrictive visual resource management would result in increased impacts from development. Recreation management in ERMAs would result in similar impacts as Alternative A. Like Alternative B, potential listing of the Tabeguache and Paradox trails as a National Recreation Trail would result in the same impacts.	The same NSO and CSU stipulations as Alternative B would be applied to the Old Spanish Trail and would result in the same impacts. If the Tabeguache and Paradox trails were designated as National Recreation Trails, the same NSO stipulation as Alternative C would be applied and would result in the same impacts. Most of the Old Spanish, Tabeguache, and Paradox Trails would be in areas of SSR, resulting in more opportunities for protection from surface disturbance and development impacts. Similar to Alternative C, less restrictive visual resource management would result in increased impacts from development. Recreation management in SRMAs and ERMAs would result in impacts similar to Alternatives B and C. Like Alternative B, potential listing of the Tabeguache and Paradox trails as a National Recreation Trail would result in the same impacts.	CSU stipulation would apply. Impacts from visual resources management would be a combination of the impacts under Alternatives A, B, and C. Recreation management in SRMAs and ERMAs would result in impacts similar to Alternatives B and C. Like Alternative B, potential listing of the Tabeguache and Paradox trails as a National Recreation Trail would result in the same impacts.

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		increase recreational use of these trails, thus providing the potential for greater opportunities for interpretation and education, while also increasing pressure on trail resources.			
76.	*NATIONAL AND BLM BYWAYS*				
77.	By not establishing additional BLM byways, resources along those roads would not receive public recognition and traffic would not increase at levels commensurate with an official byway. Areas of less restrictive visual resource management would result in development that could attract attention. Portions of the Unaweep-Tabeguache Byway and San Juan Skyway would run through the San Miguel SRMA, and driving for pleasure combined with SRMA visitation could lead to an increase in use. Portions of the Unaweep-Tabeguache Byway and West Elk Loop are in areas managed as ROW exclusion areas, eliminating	No new BLM byways would be established. Impacts would be the same as those under Alternative A. All national and BLM byways would be managed as VRM Class II within 0.5-mile of either side of the centerline. By designating the area around byways as VRM Class II, opportunities to protect viewsheds would be greater than under Alternative A. An NSO stipulation would apply to fluid mineral leasing within a half-mile of scenic byways. Potential impacts from these uses would be less than under Alternative A. Potential impacts from SRMAs would be the same as Alternative A. Scenic touring would be a	No new BLM byways would be established. Impacts would be the same as those under Alternative A. All national and BLM byways would be managed as VRM Class III within a 0.25-mile of either side of centerline. This would result in less protection of scenic values than Alternative B. A CSU stipulation would apply to fluid minerals within a 0.25-mile of scenic byways. The less restrictive stipulation and smaller buffer area would not provide as much protection to viewsheds as Alternative B. Potential impacts from ERMAs would be the same as impacts on SRMAs under Alternative A.	No new BLM byways would be established. Impacts would be the same as those under Alternative A. Byways would be managed as VRM Class II or III. Impacts would vary depending on classification and would be similar to Alternatives B and C. A CSU stipulation would apply to fluid minerals within a 0.5-mile of scenic byways. The less restrictive stipulation and smaller buffer area would not provide as much protection to viewsheds as Alternative B. Potential impacts from ERMAs would be the same as impacts on SRMAs under Alternative A. Potential impacts on byways related to ROW activities are similar to	No new BLM byways would be established. Impacts would be the same as under Alternative A. Byways would be managed as VRM Class II or III. Impacts would vary depending on classification and would be similar to Alternatives B and C. A CSU stipulation would apply to fluid minerals within a 0.5-mile of scenic byways. The less-restrictive stipulation would not provide as much protection to viewsheds as Alternative B. Impacts from SRMAs would be the same as those under Alternative A. Potential impacts on byways related to ROW activities are similar to Alternative C; however, expanded areas of avoidance could provide

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	impacts from development in these areas. Efforts to protect scenic ORVs along eligible WSR segments would benefit scenic values of the byways by prohibiting or limiting most surface-disturbing activities.	targeted activity in these SRMAs. More ROW avoidance and exclusion areas would provide more protections from development then Alternative A. Overall, additional stipulations (NSO and CSU for fluid minerals, and NGD and SSR for other surface-disturbing activities) under Alternative B would provide greater protection of ORVs along byways than under Alternative A.	Most areas would be managed as ROW avoidance areas and would provide more protections from development then Alternative A. All eligible stream segments would be found not suitable. Therefore, opportunities to protect scenic values associated with the eligible segments along this byway would be less than under Alternative A.	Alternative C. However, expanded areas of avoidance could provide more opportunities to preserve values. Protection ORVs along the Unaweep-Tabeguache Byway are similar to those under Alternative B. However, the Naturita Creek segment would be determined to be not suitable, so ORV protective measures would not apply. Like Alternative B, additional stipulations would provide greater protection of ORVs than under Alternative A.	more opportunities to preserve the historic, natural, and scenic qualities of lands next to these byways. Efforts to protect ORVs for WSR segments (Lower Dolores and San Miguel Segments 1, 2, and 5) along the Unaweep-Tabeguache Byway could indirectly preserve the scenic values along the byway.
78.	**WATCHABLE WILDLIFE VIEWING SITES**				
79.	There are no watchable wildlife viewing sites under Alternative A. Visitors have to create their own opportunities to view wildlife, but the associated interpretation and education is lacking. Visitors are not directed to these areas for the purpose of viewing wildlife, so visitors may not know that they are good locations. Wildlife viewing takes place across the Decision Area as	Under Alternative B, three watchable wildlife viewing sites would provide targeted opportunities for wildlife interpretation and education, enhancing public wildlife viewing experiences as a result. The watchable wildlife areas would also direct resources for watching wildlife to areas most suitable for this activity, thereby improving the chances of viewing wildlife. In addition, wildlife habitat	Impacts would be similar to Alternative A, except that there would be fewer restrictions on recreation within potential watchable wildlife viewing sites than the other alternatives which may decrease opportunities for wildlife viewing by disturbing wildlife or their habitat.	Impacts would be similar to Alternative A.	Impacts would be the same as Alternative B.

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	opportunities arise, but is lower quality that provided for under Alternative B.	improvements in the watchable wildlife areas would encourage more wildlife to frequent the area.			
80.	**Support**				
81.	**NATIVE AMERICAN TRIBAL USES**				
82.	There would be no immediate impacts from the goals, objectives, and allocations noted in the alternatives, though there may be direct impacts associated with some future management actions. Impacts are difficult to quantify because the locations of sacred sites in the Planning Area are unknown and planning-level alternatives typically do not identify specific areas for surface-disturbing activities.				
83.	**PUBLIC HEALTH AND SAFETY**				
84.	Hazardous materials threaten public health and safety directly through potential exposure to a hazardous substance and indirectly through potential contamination of water, soil, and air. Risks described in existing conditions from the unexploded mines, abandoned mines, recreation on public lands, and hazardous fuels treatments, would continue to be present. Target shooting would continue to be prohibited on developed recreational sites (340 acres), providing a minimal level of protection for the public from injury gunfire.	Impacts would be similar to A with the following exceptions: Target shooting would be prohibited on 248,170 acres, providing the maximum level of protection from injury and damage to facilities from gunfire across all alternatives. All municipal water supplies classified by the State of Colorado, as well as groundwater wells and springs used for public water supply, would be protected from contamination with a no leasing (fluid minerals) restriction, as well as an NGD restrictions for other activities providing enhanced protection in	Impacts would be similar to A with the following exceptions: Target shooting would be prohibited within and towards developed recreational sites, providing a similar level of protection from injury by gunfire to Alternative A, but less than under Alternative B. All municipal water supplies classified by the State of Colorado, as well as groundwater wells and springs used for public water supply would be similar to Alternative B, but would have an additional CSU stipulation and additional protective measures between 1,000 and 2,640 feet from the water would be	Impacts would be similar to A with the following exceptions: Target shooting would be prohibited on 49,370 acres, providing more protection from injury and damage to facilities by gunfire than Alternative A or C, but less than Alternative B. Municipal water supplies classified by the State of Colorado, as well as groundwater wells and springs used for public water supply, would be protected from contamination with a no leasing restriction for the first 1,000 feet from the water supply, with a CSU stipulation and additional protective measures	Impacts would be similar to Alternative A with the following exceptions: To be consistent with 43 CFR 8365.2-5, 310 acres would be closed in Delta, Montrose, Ouray, and San Miguel counties, a 30 acre reduction from Alternative A. The purpose of the closure is for visitor and public safety and to protect facilities from damage. NSO stipulations for occupied dwellings and other high-occupancy buildings would be extended to 1,000 feet, reducing risk of exposures and related health impacts for area residents. Impacts from development on air quality and human health issues would be

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	Specific protection measures for municipal water supplies are limited to the water supply for the town of Norwood, so there is some potential for contamination of water supplies by development related to mining and oil, gas, and geothermal exploration.	comparison with Alternative A. Under Alternative B.1, all municipal water supplies classified by the State of Colorado, as well as domestic water wells and private water systems, would be protected from contamination with a no leasing (oil and gas) restriction. The area closed to leasing surrounding these sites is smaller than under Alternative B but would still provide enhanced protection compared with Alternative A. The surface occupancy and surface-disturbing activities on a 20-acre site near Uravan would be prohibited resulting in the reduction of risk from exposure to uranium and vanadium caused by earth-disturbing activities. Management of new and abandoned mine lands to include road closure and soil stabilization reduce risk by reducing exposure to these areas through inhibiting access.	maintained, providing enhanced protection.	between 1,000 and 2,640 feet. Management of active and abandoned mine lands to reduce active soil erosion through rehabilitation would be similar to Alternative B, but additionally provides for the possible closure of routes as a part of a comprehensive travel management plan	reduced from Alternative A due to the potential addition of mitigation requirements Measures would be implemented to protect municipal water supplies classified by the State of Colorado, as well as groundwater wells and springs used for public water supply, from contamination during mineral development. Restrictions would include a NSO stipulations in a 1,000-foot buffer around surface water supply stream segments, NSO stipulations in a 0.5-mile buffer around ground water supplies, and further prohibitions on directional drilling limitations within 1,500 vertical feet below ground for ground and surface water supplies. In addition, CSU stipulations would be imposed in a 1,000-foot buffer for 5 miles upstream public water supply intakes. These measures would reduce potential for contamination of public water supplies from conventional and

Line #	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
					nonconventional drilling practices, compared with Alternative A. Similarly, CSU stipulations that impose limitations within 1,000 feet of domestic water wells and prohibitions of directional drilling with 1,500 vertical feet below ground of wells would result in a reduced potential for contamination from drilling, compared with Alternative A. The Proposed RMP prohibits surface occupancy and surface-disturbing activities on a 20-acre site near Uravan, the impacts of which are similar to those described under Alternative B. Management and closure of abandoned mine lands would resulting in a greater capacity to reduce the risk of active and abandoned mine sites on public health and safety than Alternative A.
85.	**SOCIOECONOMICS**				
86.	*Note: Dollar amounts and employment numbers provided below represent the quantifiable economic impacts based on the level of activity predicted by alternative in the year 2032. These numbers are estimates based on best available data and should be utilized only for comparison of impacts by alternative. Refer to Chapter 4, Section 4.6.3 for detailed assumptions and methodology utilized in economic modeling.*				
87.	Livestock grazing would support an annual average	Livestock grazing would support an annual average	Livestock grazing would support an annual average	Livestock grazing would support an annual average	Livestock grazing would support an annual average

Line #	**Alternative A** *Current Management (No Action)*	**Alternative B**	**Alternative C**	**Alternative D** *Agency-Preferred in Draft RMP*	**Alternative E** *Agency-Proposed*
	of 24 to 29 total jobs and $7.6 to $12.8 million in labor. Planning period total economic output from grazing is estimated at $39.89 to $51.34 million. Expenditures of local and nonlocal recreation visitors are estimated to support approximately 410 total jobs, $4.3 million annually in direct economic output, and $31.7 million total economic output in the regional economy for 2018. This is predicted to increase to 478 total jobs, $5.3 million annually in direct output, and $42.3 million total economic output in 2038. Approximately 10 wells would be developed annually. Over the planning period, Alternative A would support an annual average of 138 total jobs, as well as $676 million total economic output. Estimated production levels would support an average of 73 total average annual jobs. Over the 20-year planning period, production would support $190 million in total economic output. Coal	of approximately 14 to 23 total jobs. Planning period total economic output from grazing is estimated at $25.12 to $41.65 million. Economic effects from recreation spending would be similar to Alternative A. Over the planning period, fluid minerals development would support $548 million direct economic output and $725 million total economic output. Production levels would support an annual average of 76 total jobs. Over the planning period, production would support $117 million in direct economic output and $196 million in total economic output. The economic effects from coal production would be the same as Alternative A. Under Alternative B.1, impacts would be similar to those discussed under Alternative B; however, additional oil and gas closures and stipulations would increase restrictions on development and costs to developers, reducing economic contributions from the oil and gas	of approximately 18 to 30 jobs. Planning period total economic output from grazing is estimated at $32.16 to $53.14 million. Economic effects from recreation spending would be similar to Alternative A. Over the planning period, fluid minerals development would support an annual average of 259 total jobs. Over the planning period, this would result in $1,184 million total economic output. Production levels would support an annual average of 141 total jobs and $221 million in direct economic output, and $367 million in total economic output over the 20-year planning period. The economic effects from coal production would be the same as Alternative A.	of approximately 18 to 29 jobs. Planning period total economic output from grazing is estimated at $30.96 to $51.34 million. Economic effects from recreation spending would be similar to Alternative A. Over the planning period, fluid minerals development would support annual average of 217 total jobs. Development would result in $998 million total economic output over the planning period. Production levels would support an annual average of 113 total jobs. Over the planning period, production would support $294 million in total economic output. The economic effects from coal production would be the same as Alternative A.	of approximately 24 to 29 jobs, the same as under Alterative A. Planning period total economic output from grazing is estimated at $39.89 to $51.34 million. Over the planning period, fluid minerals development would support an annual average of 234 total jobs. Development would support $1,073 million total economic output over the planning period. Estimated production levels would support an annual average of 123 total jobs. Over the planning period, production would support $319 million in total economic output. Economic effects from recreation spending would be similar to Alternative A. The economic effects from coal production would be the same as Alternative A.

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	contributions to employment and income from extraction would annually support approximately 35 direct and 112 total jobs, $6.35 million total labor income, and $38.7 million total economic output. Over the 10-year production period, these figures increase to $63.5 million in labor income and $387.5 million in total economic output.	industry. These additional stipulations on oil and gas development are intended to increase protection of local water sources for North Fork Valley residents and to maintain water quality for local agricultural operations. Protecting these resources would likely maintain and enhance quality of life for area residents (North Fork Heart and Soul 2014). Additionally, agriculture is of local economic importance for farms and agritourism; therefore, maintaining water quality would protect these economic sectors from potential development impacts.			

Chapter 3
Affected Environment

CHAPTER 3
AFFECTED ENVIRONMENT

This chapter describes the existing biological, physical, and socioeconomic characteristics of the Uncompahgre Resource Management Plan (RMP) Planning Area (Planning Area), including human uses that could be affected by implementing the alternatives described in **Chapter 2** (Alternatives) and **Appendix T** (Description of Alternatives). This chapter includes a discussion of resources, resource uses, special designations, support functions, and social and economic conditions. Each resource area includes an introduction, followed by a description of current conditions and characterization. Characterization includes the indicators, which assess the resource condition, and trends, which express the direction of change between the present and some point in the past.

Information from broad-scale assessments was used to help set the context for the Planning Area. The information and direction for Bureau of Land Management (BLM) resources and resource uses has been further broken down into fine-scale assessments and information. The level of information presented in this chapter is commensurate with and sufficient to assess potential effects discussed in **Chapter 4** (Environmental Consequences), based on the alternatives presented in **Chapter 2** and **Appendix T** (Description of Alternatives).

3.1 RESOURCES

This section contains a description of the biological and physical resources of the Planning Area and follows the order of topics addressed in **Chapter 2** and **Appendix T**, as follows:

- Air Quality
- Climate
- Geology and Soils
- Water Resources
- Vegetation
- Fish and Wildlife
- Special Status Species
- Wild Horses
- Wildland Fire Ecology and Management
- Cultural Resources
- Paleontological Resources
- Visual Resources
- Lands with Wilderness Characteristics

3.1.1 Air Quality

Meteorological and topographical characteristics within the Planning Area and the surrounding lands affect the transport, deposition, and dispersion of air pollutant emissions within the Planning Area and local region. The effects of both emissions and management decisions within the area influence air quality throughout the local region, not just within the Planning Area boundaries. The BLM Colorado Air Resource Protection Protocol (**Appendix H**) details the processes and approach for protecting air quality while permitting / authorizing activities that have the potential to influence air quality conditions. In accordance with Section V of the BLM Colorado Air Resource Protection Protocol, BLM Colorado

State Office air resource specialists annually prepare a report as a comprehensive assessment tool to assist in the preparation of planning-level and project-level National Environmental Policy Act of 1969 (NEPA) assessments for oil and gas development projects; the online 2015 Annual Report (Annual Report) (BLM 2015e) is the current version. The BLM is currently developing the 2016–2017 Annual Report. A link for newer versions of the Annual Report will be included on BLM Colorado's Air Resources website (https://www.blm.gov/programs/natural-resources/soil-air-water/air/colorado) and will be used to support UFO mineral leasing and project-level NEPA assessments over the life of this RMP:.

The Annual Report (BLM 2015e) provides up-to-date information on oil and gas development (e.g., current regulations, drilling and production rates, and emissions inventories) and the state of the atmosphere (e.g., air pollutant concentration trends and air quality-related values) for each applicable BLM Colorado Field Office or respective planning area. The Annual Report is an Internet-based, dynamic, data-driven document that allows BLM Colorado to convey a vast amount of information in a relatively compact and reusable framework. Consistent with Council on Environmental Quality regulation 40 CFR 1502.21, Incorporation by Reference, and paperwork-reduction mandates, data and information from the 2015 Annual Report (BLM 2015e) describing baseline air quality conditions for the Planning Area and Region are incorporated by reference into this section.

The sections of the Annual Report describing the affected environment are as follows. Years 2016 and 2017 monitored air quality concentrations and conditions information is also presented to supplement the information for the online Annual Report to describe baseline air quality conditions for the local region:

- Regulatory Analysis – This section of the Annual Report describes and defines the applicable general and oil and gas-specific air quality regulations, as well as the authority for such laws; provides a basic overview of the science and issues associated with the various types of air pollutants (criteria, hazardous, and greenhouse gases) and air quality-related values, any applicable metrics for their analysis, and the contexts of such analysis relative to various geographic designations (e.g., attainment, nonattainment, and Class I areas); and provides for all available criteria pollutant monitoring data and geographic-based national emissions inventory data. This section is referenced to set the context for current air quality and existing environment (e.g., emissions) conditions. The following provides a summary of baseline monitored conditions for the region as shown in (or referenced for) the Annual Report:
    - 3-year average 4th high maximum daily 8-hour average ozone (form of Standard) monitored concentrations for local monitors in the region are below the state and federal 8-hour ozone standard for years 2013–2017.
    - 3-year average 98th percentile particulate matter smaller than 2.5 microns in effective diameter ($PM_{2.5}$) 24-hour average (form of Standard) concentrations for local monitors in the region are below the state and federal $PM_{2.5}$ 24-hour average standard for years 2013–2017.
    - Steady visibility improvements (trends) for clearest and haziest days at local regional monitors (White River National Forest) for the past 15 years.
    - Annual nitrogen deposition at a local regional monitor (Gothic) has been over the Federal Land Manager critical load for approximately the last 15 years, with some of the highest annual nitrogen deposition rates occurring in recent years (years 2013 and 2014 were "wet" years in regards to precipitation and resulted in higher total annual wet nitrogen deposition).
- Analysis Methodology Summary – This section describes the basic science of air resources analysis; refers to the BLM Colorado Air Resource Protection Protocol (**Appendix H**) for project-specific analysis guidelines; describes the analysis methods used with the Annual Report

to scale current cumulative development within the context of the applicable Colorado Air Resource Management Modeling Study (CARMMS) scenario; describes why scaling current report year emissions is a scientifically valid method for describing cumulative impacts; and provides plots of the CARMMS high scenario emissions (for various development and pollutant groups), as well as plots of the modeled impacts (e.g., concentrations and air quality-related values) for each CARMMS scenario. This section is referenced to provide support for the methodology of analysis used in this EIS. The current online Annual Report is based on CARMMS 1.0 / 1.5 that models future year 2021 air quality conditions. BLM Colorado has completed CARMMS 2.0 (Vijayaraghavan 2017) that models future year 2025 air quality conditions, and subsequent versions of the Annual Report will be based on CARMMS 2.0 (or later versions).

- Field Office Data / Analysis UFO – This section provides details about the current and trending pace of oil and gas development within the UFO and describes a summary of the available air quality monitoring and related data for the UFO presented in the *Regulatory Analysis* described in the report and summarized above. The following provides summary level information for UFO oil and gas activity and air quality analysis for Annual Report year 2015:
    - New UFO oil and gas development and related emissions for recent years are tracking at the CARMMS "low" oil and gas development projection rates according to Annual Report information. New UFO federal oil and gas emissions are projected to not contribute significantly to cumulative air quality concentrations (and related values) if oil and gas activity for the Planning Area continues at this pace through CARMMS 1.0 / 1.5 analysis year 2021, and CARMMS 2.0 future modeled year 2025.

Baseline and future air quality conditions for an area are dependent on the level of air pollutant emissions occurring for the local region. Air quality modeling impact assessments were completed in recent years for several oil and gas projects in the Planning Area, including the Gunnison Energy/SGI dual proposal (approximately 25 new wells) and the Bull Mountain Unit Master Development Plan (approximately 146 new wells). New oil and gas development that would occur for these projects, totaling approximately 170 new federal wells, would make up a large percentage of the total new foreseeable federal wells projected for UFO over the life of the RMP. Air quality modeling analyses were completed for both of these projects, and appropriate mitigation and requirements were established as a result of the air quality modeling for the Bull Mountain Unit Master Development Plan EIS (BLM 2016f, 2017e). Therefore, the potential air quality impacts for approximately 50 percent of the new federal oil and gas that could be developed in UFO over the life of the RMP have already been addressed.

In addition to the Annual Report information being incorporated by reference, information from the latest CARMMS Report, available online, is also being incorporated to provide additional baseline information to describe the affected environment. A copy of the latest CARMMS 2.0 Report can be found at https://www.blm.gov/programs/natural-resources/soil-air-water/air/colorado. Locations in the CARMMS Report for information being incorporated by reference are:

- Section 5.3 of the CARMMS 2.0 Report (Vijayaraghavan 2017) provides baseline year 2011 cumulative visibility impacts at Class I areas in the Region.
- Section 5.4.1.2 of the CARMMS 2.0 Report (Vijayaraghavan 2017) provides baseline year 2011 cumulative nitrogen and sulfur annual deposition at Class I areas in the region.
    - As described above, baseline nitrogen deposition values for many of the Class I areas in the region are above the annual nitrogen deposition critical load value.
- Section 5.6.1.1 of the CARMMS 2.0 Report (Vijayaraghavan 2017) provides ozone baseline design values for air quality monitors around the region.
    - 19 of the 28 monitors in Colorado included for the CARMMS baseline analysis have ozone baseline design values above the state / federal ozone standard.

- Section 5.6.1.2 of the CARMMS 2.0 Report (Vijayaraghavan 2017) provides plots of baseline ozone design values for unmonitored areas in the region.
    - Plots show CARMMS base year ozone concentrations ranging from 60 to 70 parts per billion (Standard ~ 70 parts per billion) for unmonitored areas in the UFO.

The **Chapter 4** air resource section provides projected / modeled changes in air quality concentrations and related values, and greenhouse gas emissions and climate change from baseline conditions due to projected changes in cumulative inventories, and also describes the potential contributions to the future cumulative impacts that could be associated with UFO only resource use and development.

3.1.2 Climate

The *Climate Change Baselines* section of the 2015 Annual Report (BLM 2015e) provides an updated and comprehensive overview of the topography and climate for the region and a current understanding for the changes to global greenhouse gas emissions and climate that have occurred for the last few centuries. Information from that Annual Report section is being incorporated by reference to set the context for the existing environment of this Proposed RMP/Final EIS. The information for this Annual Report section was obtained primarily from the latest Intergovernmental Panel on Climate Change Study (AR5). For the 2015 Annual Report, baseline BLM Colorado estimated downstream greenhouse gas emissions are approximately 17 percent of the total US federal oil and gas greenhouse gas emissions, and all federal oil and gas downstream emissions are approximately 8.4 percent of the US total oil and gas combustion (downstream) greenhouse gas emissions on an annual basis.

3.1.3 Soils and Geology

Sedimentary sandstone and shale formations occupy much of the Planning Area's bedrock geology, which therefore dominates the parent (source) material from which soils are formed. Igneous and metamorphic rocks along the mountainous eastern margin of the Planning Area provide additional variety in the parent material. Most of the mountainous areas have been glaciated, thus stripping the soils and depositing them in the valley floors or washing them away, so those soils at higher elevations are relatively young compared with the canyon country (Colorado Plateau) sandstone and shale that occupies roughly 80 percent of the Planning Area.

The geology of the Planning Area is complex, consisting of thick layers of sedimentary rocks from the Colorado Plateau, which meet the crystalline basement and volcanic rocks of the Rocky Mountains. The region contains major landforms such as the Uncompahgre Plateau, Paradox Basin, San Juan Mountains, Grand Mesa, West Elk Mountains, and the Black Canyon of the Gunnison River. Major river valleys were also carved by the Uncompahgre, Gunnison, North Fork of the Gunnison, San Miguel, and Dolores rivers. These mountains and valleys create a dramatic landscape offering a spectacular view into the Earth's history.

The following section describes the current conditions and characterization of soils and geology in the Planning Area.

Current Conditions

Soils

Colorado Standards for Public Land Health. BLM Colorado finalized *Standards for Public Land Health and Guidelines for Livestock Grazing in Colorado* in March 1997 (BLM 1997). The BLM applies these standards to public lands on a landscape scale to help describe a landscape's potential various uses and conditions needed to sustain land health. The five Colorado Standards (presented in **Appendix C** [BLM Standards

for Public Land Health and Guidelines for Livestock Grazing Management in Colorado]). Beginning in 1998, the BLM directed its field offices to assess all BLM-administered lands against these standards over a ten-year period. The findings are documented in annual reports known as land health assessments. BLM staff completed the ten-year cycle of land health assessments for the UFO during the winter of 2008-2009. Soil results for the Planning Area are summarized in **Table 3-1** (Land Health Assessment Soil Summary Ratings). Site-specific soil evaluations for each land health assessment are on file at the UFO.

Table 3-1
Land Health Assessment Soil Summary Ratings

		Area Soils (Acres)		
Land Health Assessment	**Year**	**Meeting**	**Meeting with Problems[1]**	**Not Meeting**
East Paradox	1999	70,354	6,115	1,559
North Delta	2002	39,896	30,132	1,554
Mesa Creek	2004	59,931	50,507	1,005
Roubideau	2005	45,905	45,186	9,616
Norwood	2006	82,971	15,768	730
North Fork	2007	31,833	28,399	1,472
Colona	2008	39,754	8,864	2,394
West Paradox	2009	53,281	15,240	0
Total		*423,925*	*200,211*	*18,330*

[1]Land health assessments from 1998 to 2014 were conducted with a determination category of "meeting with problems." Beginning in 2018, all land health determinations are conducted according to current BLM manuals and handbooks.

Land Health Assessments. Soil resources on lands within the Planning Area were rated in one of three categories based upon BLM Colorado Public Land Health Standard 1: 1) Meeting the standard, 2) meeting the standard with problems, or 3) not meeting the standard. The soil rating for each land health assessment unit is shown in **Table 3-1**.

The "meeting with problems" category implies that less than half of the assessment sites within a soil polygon had a soil indicator rating of less than satisfactory, but overall, the soil condition in the polygon was meeting the standard.

The most common soil indicators resulting in rankings of "meeting with problems" or not meeting the standard were:

- high levels of bare-exposed soil surface
- low densities of live-perennial plant basal cover
- low amounts of plant litter cover
- high levels of annual-invasive weed species
- presence of gullied (incised) stream channels

The causal factors for not meeting the soil standard were also numerous, but often determined to be caused by:

- poor follow-up management of vegetation treatments
- historic livestock grazing
- historic wildfire suppression
- proximity to private lands

Soil Composition. Based on the Web Soil Survey (Natural Resources Conservation Service 2010), there are approximately 30 major soil units and eight soils surface textures in the Planning Area (**Figure 3-1** [Major Soil Units]). The primary parent material from which these soils are derived are shale and sandstone bedrock, but there other contributing parent materials, including mixed alluvium on mesas and in valley bottoms, mountain residuum and colluvium derived from igneous and sedimentary rocks, and eolian (windblown silt and sand) deposits. The interbedded sandstone and shale units of the Cretaceous Dakota Sandstone and Mancos Shale formations dominate the surface over much of the Planning Area. Weathering of parent material produces sandy and fine sandy loam to silty clay and clay loam textured soils. The Dakota Sandstone, which was formed in a coastal environment, contains massive, well-cemented sandstone interbedded with weaker shale, carbonaceous shale, and coal. The sandstone beds in this formation resist weathering and form cliffs, ledges, and mesa tops. The soils derived from Dakota Sandstone are typically sandy to fine sandy loam with some clay loam where more shale is present in the unit. The overlying Mancos Shale is the primary shale formation, which characteristically weathers to produce fine-textured silty clay to clay loam soils. The Mancos Shale is a marine-deposited formation and, as a result, often contains high levels of selenium (a non-metallic chemical element) and a variety of soluble salts, both of which can degrade water quality in receiving streams when mobilized by natural processes (i.e., wind or water) and human-caused soil disturbances.

Additional shale- and sandstone-bearing formations in the Planning Area are the Jurassic Morrison Formation, which underlies the Dakota Sandstone found in the deeper canyons of the western half of the Planning Area, and the Cretaceous Mesaverde Formation, which overlies the Mancos Shale. The Mesaverde formation has been stripped off of most of the Mancos Shale and is not present in the western half of the Planning Area. The Mesaverde remains where it is protected by overlying Tertiary sedimentary and volcanic rocks along the southern flank of Grand Mesa and south along the West Elk Mountains and Cimarron Ridge (south of the Black Canyon of the Gunnison National Park).

Soil Surveys. Order 3 soil surveys have been completed for the Planning Area, which describe and assess soil resources down to the phases of a soil series and delineations on the ground ranging from 6 to 640 acres.

Five surveys conducted by the United States Department of Agriculture (USDA), Natural Resources Conservation Service describe soil resources in the Planning Area:

1. Soil Survey of Paonia Area, Colorado (Natural Resources Conservation Service 1981), including parts of Delta, Gunnison, and Montrose counties
2. Soil Survey of Ridgway Area, Colorado (Natural Resources Conservation Service undated), including parts of Delta, Montrose, Gunnison and Ouray counties
3. Soil Survey of Uncompahgre National Forest Area, Colorado (Natural Resources Conservation Service 1995), including parts of Mesa, Montrose, Ouray, and San Miguel counties
4. Soil Survey of Grand Mesa-West Elk Area, Colorado (Natural Resources Conservation Service 1997), including parts of Delta, Montrose, Mesa, and Gunnison counties
5. Soil Survey of San Miguel Area, Colorado (Natural Resources Conservation Service 2003), including parts of Dolores, Montrose, and San Miguel counties

In addition, the online Web Soil Survey (Natural Resources Conservation Service 2010) provides soil survey data in map and tabular formats and is the source for "Ridgway Area Soil Survey" data that is compiled but unpublished in a report.

Two BLM-administered lands parcels within the Planning Area have not been surveyed. Soils in a 12,000-acre parcel adjoining National Forest System lands along the northern Planning Area boundary on the west side of the Uncompahgre Plateau in Mesa County have been field surveyed but not yet compiled

and finalized into a soil survey report. The second parcel is 1,000 to 1,500 acres and is near High Park Lake in the Big Cimarron drainage. Limited access to this area has prevented the field work necessary to complete the survey.

Fragile Soils. For the purposes of this RMP, fragile soils include soils with a high potential for supporting biological soil crust, soils with elevated levels of salinity (dissolvable salts) and/or selenium, soils prone to erosion by wind or water, and soils prone to impacts from drought conditions.

At higher elevations in the Planning Area, mountain shrub and spruce (*Picea* spp.), fir, aspen *(Populus tremuloides)*, and ponderosa pine *(Pinus ponderosa)* tree communities provide soil surface cover and help bind the soil with their roots. At lower elevations, pinyon *(Pinus edulis) and* juniper *(Juniperus* spp.*)* and sagebrush *(Artemisia* spp.*)* communities dominate coarser-textured, non-saline soils, while salt desert shrub communities occur on saline, shale-derived soils.

Biological Soil Crust. In lower-elevation areas with sparse plant cover, biological soil crust provides another important soil cover component. Biological soil crust is comprised of a complex mosaic of green algae, lichens, mosses, cyanobacteria, and other bacteria (BLM and U.S. Geological Survey 2001). It serves many beneficial functions to protect and enhance soil productivity, including acting as a stabilizer to inhibit erosion of surface soils. Biological soil crust is most prevalent in portions of the Planning Area that receive less than 14 inches of annual precipitation, and on terrain with less than a 25 percent slope. In areas receiving more than 14 inches of annual precipitation, competition from vascular plants reduces the occurrence of biological soil crust. On terrain with greater than 25 percent slope, erosional forces act to minimize the establishment of biological soil crust. While soil texture and chemistry can also be factors in determining the density and composition of biological soil crust communities, field inventories to define these differences have not been completed and were not used to identify soils having a high potential for biological soil crust. Based on these precipitation and slope parameters, approximately 254,850 acres of Planning Area soils have been identified as having a high potential for supporting biological soil crust as presented in **Table 3-2** (Acreage of Fragile Soils) and **Figure 3-2** (Potential Biotic Soil Crust Locations).

Table 3-2
Acreage of Fragile Soils

Soil Attribute[1]	Low Potential	Moderate Potential	High Potential
Wind Erosion	249,750	375,940	1,130
Water Erosion	285,900	140,390	120,410
Drought Affected	207,120	319,280	100,430
Saline	0	0	107,180
Biological Soil Crust	0	0	254,850

[1]Total acreage within and between each soil attribute and under BLM management varies because of the specific set of soil units rated by the Natural Resources Conservation Service.

Saline Soils. The Colorado River Basin Salinity Control Act (Colorado River Water Quality Office, Bureau of Reclamation) directs the BLM to minimize salt contributions to the Colorado River system from BLM-administered lands. The Mancos Shale is the primary source of both salinity and selenium in the region. Since the early 1980s, the UFO has been managing some areas dominated by Mancos Shale to minimize salinity yields.

The most recent salinity management efforts in the UFO have concentrated on non-structural controls, such as managing soil surface-disturbing activities such as livestock grazing and off-highway vehicle (OHV) use to minimize salinity yields. Additionally, potential salinity yields from realty actions such as land exchanges are assessed and minimized. Recently completed land health assessments identify areas where soils are meeting, meeting but with problems, or not meeting BLM Colorado Public Land Health Standard 1 (**Appendix C**). The land health assessments also identify causal factors for less than satisfactory soil ratings, and specify actions needed to correct problem areas. Adding terms and conditions to grazing permit renewals has been the most commonly used tool aimed at improving surface conditions on saline soils.

The Gunnison Basin Selenium Task Force is a group of private, local, state, and federal interests committed to finding ways to reduce selenium in affected waterways in the Gunnison Basin, while maintaining the economic viability and lifestyle of the Lower Gunnison River basin of western Colorado. **Section 3.1.4** (Water Resources) explains the water quality implications of excessive selenium levels in the Gunnison Basin. Because high concentrations of selenium occur in Mancos Shale and soils derived from this formation, land management practices and actions that reduce soil surface disturbance and deep water percolation minimize the yield of selenium offsite, much like salinity management. The UFO has been coordinating with the Gunnison Basin Selenium Task Force to develop best management practices (BMPs) to minimize selenium yields from management activities on BLM-administered lands.

Figure 3-3 (Saline and Selenium Enriched Soils) shows the occurrence of 107,180 acres of saline geologic units (primarily of Mancos Shale and the Paradox Formation) in the Planning Area. Saline soils are commonly coincident with these strata. However, salinity concentrations in the surface soils vary according to site-specific topography, local climate, and the geologic member that weathered to produce the soil. Shale in steep badland areas generally exhibits higher surface salinity concentrations than valley fill or outwash, shale-derived soils. Within badland areas, southerly and westerly hill slope aspects have higher surface salinity levels than more northerly aspects. Salinity concentrations also tend to be higher in more arid portions of the Planning Area.

Wind and Water-eroded Soils. As shown in **Table 3-2**, the potential for soil erosion from wind or water action varies across the Planning Area. While less than 1 percent of soils in the Planning Area have a high potential to be eroded through wind action, about 18 percent have high potential for erosion by water, due to steep topography and the physical characteristics of the soil. The erodibility of a soil, known as the "K" factor presented in soil surveys, represents both the susceptibility of soil to erosion and the rate of runoff. **Figure 3-4** (Wind Erosion Areas) shows areas susceptible to wind erosion, while **Figure 3-5** (Soil Erosion Capacity) shows areas susceptible to water erosion. As shown in **Table 3-2**, 1,130 acres of the Planning Area are soil with a high potential for wind erosion, and 120,410 acres have a high potential for water erosion.

Drought-affected Soils. Drought-affected soils have a low capacity to retain water in the root zone of the soil profile (calculated as a soil depth of 40 inches or a limiting layer). Within the Planning Area, approximately 15 percent of soils have a high potential to be affected by drought conditions as shown in **Table 3-2** and **Figure 3-6** (Droughty Soil Areas). Through a National Cooperative Soil Survey interpretation, criterion was developed to determine fragile soils (Bryce et al. 2012).

Prime or Unique Farmlands and Residential Development. Four categories of farmlands are federally regulated by the USDA under the Farmland Protection Policy Act: (1) Prime farmlands, (2) Unique farmlands, (3) Farmlands of statewide importance, and (4) Farmlands of local importance. Impacts from federal actions on BLM-administered lands to farmlands identified as prime or unique are required to be analyzed and disclosed to the public during development of an RMP/EIS. In addition, the USDA delineates important farmlands as those having soils that support the crops necessary for the

preservation of the nation's domestic food and other supplies, specifically the capacity to preserve high yields of food, seed, forage, fiber, and oilseed with minimal agricultural amendment of the soil, adequate water, and a sufficient growing season. The acres of prime or unique farmland in the Planning Area are listed in **Table 3-3** (US Department of Agriculture Classified Prime and Unique Farmland in the Planning Area).

Table 3-3
US Department of Agriculture Classified Prime and Unique Farmland in the Planning Area

Prime and Unique Farmlands Classification	BLM-Administered Surface (acres)	Split-Estate (acres)	Non-BLM Jurisdiction (acres)
Farmland of statewide importance	2,360	5,740	31,550
Farmland of unique importance	9,040	6,090	42,670
Not prime farmland	590,660	199,000	1,689,930
Prime farmland if irrigated	25,400	5,810	151,260
Prime farmland if irrigated and drained	120	140	3,950
Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season	890	330	6,500
Not Recorded / Unknown	47,330	78,300	200,430
Total	675,800	295,410	2,126,290

Source: BLM 2018a

There are no intentionally irrigated soils on BLM-administered lands within the Planning Area. The National Soil Survey Handbook 622.3(a)(3) states: "Irrigation – Some map units include areas that have a developed irrigation water supply that is dependable and of adequate quality and areas that do not have such a supply. In these units, only the irrigated areas meet the prime farmland criteria." Therefore, there are no irrigated farmlands of national or statewide importance on BLM-administered lands within the Planning Area. Several private and federal (e.g., U.S. DOI Bureau of Reclamation [BOR]) ditch and canal systems provide irrigation water to these farmlands and some of the associated facilities cross or are located on BLM-administered lands. In several locations, tributaries that drain onto these farmlands have their headwaters on public lands within the Planning Area. Historically, flood events originating on public lands within the Planning Area have resulted in damage to farmland and associated canals and laterals operated by the Uncompahgre Valley Water Users Association.

Flood Hazard Areas and Control Measures. Within the Planning Area, two flood-control retention structures in the Shavano Valley and the Roatcap drainage west of Olathe help mitigate flood damage to valley bottom farmland. Although these facilities provide flood protection for their respective drainages, other drainages in the Planning Area remain free flowing. The soil surface and hydrologic condition of these watersheds influences the amount of runoff and sediment produced during flood events. An effort by Montrose County and the Colorado Geological Survey to identify flood/debris flow hazard areas on private lands in eastern Montrose County was conducted in part to help assess future land use proposals (White et al. 2008). **Figure 3-7** (Flood Hazard Areas) shows flood hazard areas within the Planning Area that were determined by the hazard study.

Geology

Geologic resources are defined through descriptions of the surficial and bedrock geology and stratigraphy of the Planning Area. Geologic information is used to evaluate the potential development of mineral resources as identified in the *Reasonable Foreseeable Development Scenario for Oil and Gas for the*

Uncompahgre Field Office, Colorado report (BLM 2012d), as well as to regulate land uses based upon slope stability, geologic hazards, and accessibility issues. Several geologic type localities and areas of paleontological significance occur within the Planning Area.

Surficial and Bedrock Geology. Much of the Planning Area lies within the Colorado Plateau physiographic province, which is characterized by deeply dissected plateaus composed mostly of sedimentary rocks with some younger intrusions and volcanic lava flows. The southeastern to northeastern edge of the Planning Area contains the Rocky Mountain physiographic province, composed of uplifted Precambrian crystalline basement rocks and Tertiary volcanic rocks. Surface and bedrock geology for much of the area consists of sedimentary rocks ranging in age from Paleozoic (230 to 600 million years) to Cenozoic (63 million years to present). **Figure 3-8** (Geology of the Uncompahgre RMP Planning Area) depicts the generalized geology, which shows that Paleozoic and Mesozoic Era (i.e., Triassic, Jurassic, and Cretaceous Periods) sedimentary rocks are most common in the western half of the Planning Area, while Mesozoic and Cenozoic sedimentary rocks dominate the northern and central portions. Volcanic rocks and related intrusions are located along the southeastern and northeastern edges in the San Juan and West Mountains, respectively. Dominant sedimentary formations include the Cretaceous Mancos Shale that occupies the Uncompahgre and North Fork Valleys, forming the Adobe Badlands, and the Cretaceous Dakota Sandstone that caps the Uncompahgre Plateau and canyon rims to the east and west.

The structural geology of the Planning Area (**Figure 3-8**) consists of the following main features presented from southwest to northeast: Paradox Basin (salt dome anticlines and synclines), Uncompahgre Plateau, Montrose Syncline, Piceance Basin, San Juan Volcanic Field, and the Gunnison Gorge Uplift, including the Gunnison Gorge and West Elk Volcanic Field.

The northern portion of the Planning Area lies within the southern Piceance Basin in western Colorado. The Piceance Basin is a broad, southeast-northwest trending structural and topographic basin bordered by the White River Uplift to the east, the West Elk Mountains to the southeast and south, the Uncompahgre Uplift to the southwest, the Douglas Creek Arch to the west-northwest, the Yampa Plateau to the north, and the Axial Basin Uplift to the northeast. The Piceance Basin encompasses 3,900 square miles of exposed Tertiary rocks. The Tertiary-Cretaceous contact forms a nearly continuous outcrop along the basin margins. The basin is asymmetric, with gently dipping beds along the southwest flank and steeply dipping beds along the northeast flank, which form the Grand Hogback (Dunn 1972). Deposition of sediments into this region began with downwarping of the Piceance Basin floor during the Cretaceous and continued through the Eocene. This resulted in the deposition of the Wasatch, Green River, and Uinta formations in and around a series of landlocked lakes (Bradley 1964). The Tertiary Wasatch Formation is one of the main surface formations along the northern Planning Area boundary.

The Planning Area contains stratified rock units ranging in age from Precambrian through late Tertiary, with Quaternary deposits such as alluvium, colluvium, glacial moraines, and landslide deposits placed on top of some of the bedrock units. As a result of the large geographic size of the Planning Area, lateral changes in the presence, thickness, and composition of these units occurs.

Geologic Hazards. Geologic hazards are geologic conditions or materials that pose risks to life and property. Geologic hazards include landslides, unstable slopes, rockfall, debris flows, flooding, avalanches, subsidence, and earthquakes (Shelton and Prouty 1979). Other hazards such as swelling soils, collapsible soils, shallow groundwater, erosion, and radon are more related to construction problems, damage to property, and expensive mitigation, but do not generally pose a risk for loss of life due to a catastrophic event. However, all these geologic hazards are potentially present in the Planning Area. Those of primary concern for use and management of public land are those that cause damage to infrastructure and facilities, injury or death, degradation of resources, and disrupted access. Some small areas in the

Planning Area have geologic hazard maps available, primarily in the most populated areas where development is occurring, but most of the area is largely unmapped for geologic hazards. The significant geologic hazards relevant to the Planning Area are discussed below.

Unstable Slopes. Unstable slopes occur naturally and are widespread in the Planning Area due to over-steepened slopes, dipping bedrock, an abundance of unconsolidated surficial material, and inherently weak bedrock units such as shale. Most unstable slopes consist of weathered sedimentary strata and/or recent colluvium deposits that move downhill due to gravity. Unstable slopes can be active or inactive. Slope failure can be initiated by natural events or human actions. Natural factors contributing to slope instability include weathering and erosion, changes in the hydrologic characteristics of a hillside, loss of vegetation cover, earthquakes, and the slow natural deterioration of slope strength. Artificial factors that can undermine slope strength include cut and fill operations, blasting, vehicular traffic, excessive irrigation, the alteration of surface drainages, and the removal of vegetation cover.

Mass Movement. Mass movement or wasting includes any activity that involves the downhill movement of rock and soil under the influence of gravity. The Paonia-McClure Pass area, in the northeast corner of the Planning Area, has a well-known zone of mass movement. A technical study using aerial photographs and field surveys mapped 683 movement features covering approximately 600 square kilometers. The area of movement is classified as 29 percent debris flows, 26 percent rockslides, 23 percent debris slides, 15 percent soil slides, and 7 percent highway and forest road-influenced landslides (Regmi et al. 2008). Future hazard analysis will produce landslide hazard zone maps that the BLM can use in planning efforts.

Rockfall. Rockfall can originate from bedrock outcrops or loose rocky debris on a hillside left behind by glaciers, landslides, or other forms of mass movement. Roadways are particularly susceptible to rockfall due to the over-steepened hillsides caused by roadcuts. Rockfall in undeveloped areas is not a significant hazard due to the low population density, but high risk areas can be avoided with careful placement of trails, roads, and structures.

Debris Flows. Debris flows are a slurry of rocks, trees, and other debris entrained in a flood event carried down a channel and then deposited in a fan-shaped deposit in the valley floor where the gradient becomes less steep. The towns of Telluride and Ouray within the Planning Area are located on active debris flow fans. Avoiding the mouth of steep canyon streams can avoid this type of hazard.

Mineral Resources. The Planning Area has a number of active and inactive mining districts and a variety of mineral resources resulting from the unique and widely varying geologic setting of the region. Mineral resources include industrial minerals, metals, coal, natural gas, and radioactive elements. Separate studies have been performed for these topics and are summarized in other sections of **Chapter 3**.

Trends

Soils

Effectiveness monitoring of soil problems will be an important part of the adaptive management approach, ensuring that land management actions are appropriate for a particular site. At present, guidelines for both recreation and livestock grazing are used to develop appropriate site management activities. The land health assessments identify causal factors (including activities in addition to grazing and recreation) responsible for soils not meeting BLM Colorado Public Land Health Standard 1.

While BMPs for mineral and energy development activities help to minimize soil surface disturbance, projected increases in both uranium (concentrated in the western portions of the Planning Area) and natural gas extraction (concentrated in the northeastern and western portions of the Planning Area) indicate that there is potential for additional soil disturbance and accelerated rates of erosion. Coal

mining activities in the Planning Area will also contribute to soil disturbance in the Planning Area. Surface strip mining in the Nucla area will expose new areas to be stripped and reclaimed, while underground mining in the North Fork Valley will have associated roads, stock piles, processing plants, and other infrastructure on the surface associated with the mining activities.

Population growth and the subdividing and development of historic farmland and rangeland along the lower elevations of the Planning Area have created an additional and progressively increasing problem regarding flood potential, especially in the Uncompahgre Valley. Occasionally, residential developments occur in alluvial plains or on alluvial fans and may experience rare flood and debris events of high magnitude from intermittent drainages with headwaters on public land. Because most of these flood hazard areas have not been identified as floodplains, the county land use department has allowed such development to occur. The recent identification of these areas should aid Montrose County in making land use decisions with this flood potential in mind and provide the BLM with locations of high priority watersheds that should be managed in the future to meet BLM Colorado Public Land Health Standards.

Black Shale Terrains. A five-year scientific research effort conducted in the Gunnison Gorge National Conservation Area (NCA) by the U.S. Geological Survey in partnership with the BLM and BOR (Grauch et al. 2005) resulted in a broad array of scientific findings about Mancos Shale. The primary focus was to assess how soil surface-disturbing activities affect physical, chemical, and biological processes on the diverse terrain. The research examined and described the stratigraphy and chemistry of individual members of the Mancos Shale, soil chemistry (including salinity and selenium), hillslope erosion processes, and area botany, as well as completing a rainfall/runoff analysis in a variety of landscape positions. Although the research was conducted in the Gunnison Gorge NCA, the intent of the effort was to identify attributes of Mancos Shale that were applicable to similar black shale landscapes outside of the Gunnison Gorge NCA. These areas could include all or portions of public land in the Planning Area dominated by Mancos Shale (as shown in **Figure 3-8**). Soil resources are not depicted herein for the Gunnison Gorge NCA, which operates under its own RMP.

Suggested BMPs derived from this study aimed at reducing salinity, selenium, and erosion emanating from areas dominated by Mancos Shale include:

- Developing and implementing BMPs from the BLM/U.S. Geological Survey Mancos Shale research findings applicable to livestock management, recreation management (e.g., location and limitations of OHV use areas), rights-of-way (ROWs), and other surface-disturbing activities
- Continuing efforts to locate, assess, and remove hundreds of non-functional, eroding earthen check dams in Mancos Shale areas north of Delta
- Continuing to identify and minimize potential salinity and selenium yield increases from future land uses that could occur on exchanged or disposed of parcels of BLM-administered land
- Continuing to collaborate and coordinate salinity and selenium management activities with both the Colorado River Basin Salinity Control Forum and the Gunnison Basin Selenium Task Force

Predicted Changes in Climate. Many prominent climatologists are predicting some change to the near term future climate of Colorado. A recent report, Climate Change in Colorado 2008, analyzes past and present climate data, and makes a forecast that southwestern Colorado will experience warmer temperatures in the coming decades (Ray et al. 2008). The report summarizes potential issues for land and water managers in response to the forecast, concluding that increasing temperatures would raise evapotranspiration by plants, lower soil moisture, alter growing seasons, alter disturbances such as wildfire and insect outbreaks, and shift existing plant communities to higher elevations.

Although difficult to predict, impacts on the health of the soil surfaces could occur from a changing climate, and could include reduced vigor of native plant communities that provide needed soil surface

protection; higher levels of bare, exposed surface soil; and higher densities of annual invasive weed species (which are unreliable for providing a protective soil cover). These changes could affect most, if not all, of the soil resources in the Planning Area, but would likely be most pronounced for the drought-affected soils shown in **Figure 3-6**.

Geology

An increased understanding of area geology can be expected as more knowledge is gained through mineral exploration and development, as well as from geologic mapping.

3.1.4 Water Resources

Surface water on BLM-administered lands is regulated by the Clean Water Act, Colorado River Salinity Control Act, BLM Colorado Public Land Health Standards (BLM 1997), Colorado Water Quality Standards, and other laws, regulations, and policy guidance at the federal, state, and local levels. The BLM strives to manage for and sustain good water quality and adequate flows in area streams for the benefit of people, and riparian, aquatic, and terrestrial organisms, on a watershed scale.

This section describes the existing conditions of water resources and quality within the Planning Area, including surface water, groundwater, and major hydrologic units. It also lists Colorado 303(d) impaired waters in the Planning Area and factors that may affect water quality.

Current Conditions

Surface Water

The Planning Area includes portions of seven major hydrologic units, as shown in **Table 3-4** (Major Hydrologic Units) and **Figure 3-10** (Major Hydrologic Units). Over 66 percent of the Planning Area is within the Lower Gunnison, San Miguel, and Uncompahgre River basins.

Table 3-4
Major Hydrologic Units

Hydrologic Unit	4th Level HUC[1]	BLM Acres	Percentage of Planning Area
Lower Dolores River	14030004	55,680	8
Upper Dolores River	14030002	96,000	14
San Miguel River	14030003	211,790	31
North Fork Gunnison River	14020004	59,080	9
Uncompahgre River	14020006	127,920	19
Lower Gunnison River	14020005	108,210	16
Upper Gunnison River	14020002	15,840	2

Source: Natural Resources Conservation Service 2009[1]
HUC – Hydrologic Unit Code developed by the U.S. Water Resources Council to delineate and catalog the drainage basins of the United States.

Large drainages with headwaters at higher elevations experience high flows from spring snowmelt, which can last for several weeks. Baseflow in these drainages occurs from late summer through February or March. In all area drainages, high-magnitude, short-duration floods can occur in summer months due to high-intensity, short-duration precipitation events associated with southwest monsoonal airflow. The frequency and magnitude of these events is highly variable from year to year. Localized flooding from these events can be significant in ephemeral channels, as floodwaters commonly contain large amounts of accumulated vegetation debris and sediment. Additionally, watershed characteristics such as size,

shape, slope, orientation, watershed cover condition, and soils can affect the magnitude of flood peaks produced by localized summer storms.

Planning Area soils have been evaluated by the Natural Resources Conservation Service for their capacity to infiltrate water and categorized into one of four Hydrologic Soil Groups, as shown in **Figure 3-11** (Distribution of Hydrologic Soil Groups) and **Table 3-5** (Hydrologic Soil Group Ratings). Category A and B soil groups have higher infiltration capacities and produce low amounts of runoff during storm events, while the inverse occurs with categories C and D. Over 73 percent of Planning Area soils falls into Categories C and D, meaning the majority of area soils have high runoff potential.

Table 3-5
Hydrologic Soil Group Ratings

Hydrologic Soil Group	Description	BLM Acres
A	Soils having a high infiltration rate even when thoroughly wetted (estimated range of water infiltration 1.00 – 8.30 inches/hour)	1,560
B	Soils have a moderate infiltration rate when thoroughly wetted (estimated range of water infiltration 0.50 – 1.00 inches/hour)	169,770
C	Soils have a slow infiltration rate when thoroughly wetted (estimated range of water infiltration 0.17 – 0.50 inches/hour)	115,840
D	Soils have a very slow infiltration rate when thoroughly wetted (estimated range of water infiltration 0.02 – 0.17 inches/hour)	339,650

Source: Soil Survey Division Staff 1993

High-magnitude flood events commonly originate from public lands on the eastern side of the Uncompahgre Plateau due to the northeast drainage orientation, direction of storm travel, and soils with high runoff potential, as well as small watershed size and linear shape, which allow for rapid runoff concentration. **Figure 3-7** shows areas of private land along the boundary with public land in eastern Montrose County that experience flooding, some of which originates on public lands. This flooding situation and related issues are further addressed in **Section 3.1.3** (Soils and Geology).

Floodplains along some reaches of higher-order rivers, such as the San Miguel, Dolores, Uncompahgre, North Fork of the Gunnison, and Lower Gunnison, are mapped by the Federal Emergency Management Agency. In reaches that are not incised, lower-order streams without a delineated floodplain are commonly considered to include the extent of the riparian zone bordering the channel. The floodplain width on these streams is partially determined by the degree of valley confinement, but even at downstream locations within the Planning Area, floodplains typically extend less than 50 feet from active channel banks.

Over 2,700 total stream miles (perennial, intermittent, and ephemeral stream channels) are managed in the Planning Area (**Figure 3-12**, Key Water Features). Perennial streams make up approximately 350 stream miles and drain from 30 major watersheds across the UFO. Most perennial streams are highly dissected by private property, which makes it challenging to implement management actions to fully protect water resource values.

Groundwater

Groundwater in the Planning Area ranges from local, unconsolidated aquifers to extensive, bedrock (consolidated) aquifers, and is most common in coarse sedimentary rock formations. The unconsolidated aquifers are most common in alluvial deposits along perennial watercourses and on higher-elevation mesa tops. Water yields in these aquifers can vary seasonally and in response to long-term climatic variations. The extensive bedrock aquifers are often interrupted by deeply incised

topography over much of the Planning Area. The bedrock aquifers typically have lower water yields and are higher in dissolved salts compared with water contained in unconsolidated aquifers. Groundwater recharge typically originates from higher elevations and is limited by a semi-arid climate over much of the Planning Area.

Groundwater resources have been developed extensively throughout the Planning Area. An inventory of springs and seeps across the UFO is incomplete, but the majority of sources that are known to flow on a regular basis have been developed for livestock watering, recreational developments, and other beneficial uses. Since the early 1970s, approximately 99 groundwater wells have been permitted on BLM-administered lands within the UFO. The majority of these wells were drilled into shallow (less than 100 feet deep) unnamed aquifers, while other aquifers were identified as being part of the Dakota, Burro Canyon, and Mesa Verde formations, which vary in depth but can be upwards of 800 feet deep. Many wells on BLM-administered lands have been abandoned over time, while other sources are being relied on more heavily as overall demand has increased (see *Source Water Protection of Public Water Supplies*, below). The majority of the permitted wells are for domestic and household use only. Other beneficial uses are for commercial, stock, industrial, irrigation, municipal, and monitoring purposes. The total volume of groundwater withdrawal from the UFO is unknown at this time.

Oak Mesa Groundwater Study

A groundwater study of the Oak Mesa area of Delta County, Colorado was performed (Kolm and van der Heijde 2012). The study included a Hydrologic and Environmental System Analysis of the groundwater system in the study area and the development of Geographic Information System (GIS) databases and maps of hydrogeologic and hydrologic characteristics of this groundwater system. The report and GIS databases provide support for planning, zoning, and other decision-making tasks of County staff, including those related to protection of groundwater resources for use as public or communal water supplies (Kolm and van der Heijde 2012).

The Hydrologic and Environmental System Analysis showed that there are two significant groups of hydrogeologic units in the Oak Mesa study area:

- Quaternary unconsolidated clastic materials, which are predominantly glacial-fluvial outwash plains and terrace gravels (older mesa top gravels and glacial drift), slope deposits, alluvial fans, bajadas (coalescing fans), lower-mesa gravels, younger valley gravels and river terraces, and alluvial valley bottom deposits; and
- Tertiary and Cretaceous bedrock units, including the following potentially water-bearing units: Tertiary Wasatch Formation (Tw); Cretaceous Mesaverde Formation (Kmv), including Ohio Creek, Barren, and Upper and Lower Coal Bearing members (Kmvc), as well as the Rollins Sandstone member (Kmvr); and the Mancos Shale unit (Km), which may act as a thick, poorly transmissive confining layer (Kolm and van der Heijde 2012).

The Quaternary unconsolidated clastic units (Qal, Qgy, Qat, Qs, Qgf, and Qgo), which are moderately to highly permeable; are recharged by infiltration from precipitation that is nonuniformly distributed due to the slope steepness, slope aspect, and to position in the landscape; and by the incidental leaky irrigation ditch and irrigation return flow. There may be lateral and vertical connection (upward or downward groundwater flow depending on position in the hydrologic system) between the unconsolidated materials and the Tertiary and Cretaceous sedimentary units in the underlying bedrock formations (Kolm and van der Heijde 2012).

Three broad hydrostructures occur in the Oak Mesa area: 1) the northwest-trending Roatcap Creek fault zone and associated en-echelon faults to the east; 2) the northeast-trending Upper Leroux Creek fault zone and en-echelon lineaments, such as the Dever Creek lineament; and 3) the north-south-

trending Jay Creek lineament-fracture zone and associated en-echelon lineaments, such as Lower Leroux Creek, and faults, such as the west Oak Mesa fault. These hydrostructures function as French drains and are responsible for various springs and groundwater discharge and recharge areas observed in Roatcap, Jay, and Leroux Creeks. These hydrostructures move significant quantities of groundwater horizontally and vertically, interconnecting the shallow aquifers with deep bedrock aquifers (Kolm and van der Heijde 2012).

The Regional Bedrock Subsystems in the Oak Mesa study area include the following potentially water-bearing units: Tertiary Wasatch Fm (Tw); Cretaceous Mesaverde Formation (Kmv), including Ohio Creek, Barren, and Upper and Lower Coal Bearing members (Kmvc), as well as the Rollins Sandstone member (Kmvr); and the Mancos Shale unit (Km). The bedrock units are variably saturated based on location and proximity to recharge area. The Mesaverde aquifer is partially saturated in the south and central areas of Oak Mesa, as evidenced by the water levels recorded in well logs. The water table appears to be above the Upper and Lower Coal Bearing units, which suggests that dewatering will be necessary. Groundwater flows vertically, then horizontally to the north along hydrostructures that become part of the regional groundwater flow system. The groundwater flow direction in the regional bedrock systems is from south to north beneath Oak Mesa and Grand Mesa, and is away from the coal mining activities, drinking water supplies, and Delta County in general (Kolm and van der Heijde 2012).

Upper North Fork River Valley and Terraces Groundwater Study

Kolm and van der Heijde (2013) studied the groundwater resources of the valley and terraces of the Upper North Fork River area from the town of Hotchkiss to northeast of the town of Paonia in Delta County. This study included a Hydrologic and Environmental System Analysis of the groundwater system in the study area and the development of GIS databases and maps of hydrogeologic and hydrologic characteristics of this groundwater system. The Hydrologic and Environmental System Analysis is documented in the report, which also contains a description of the development and use of the GIS databases and maps. The report and GIS databases provide support for planning, zoning and other decision-making tasks of county staff, including those related to protection of groundwater resources for use as public or communal water supplies. The study area is to the southeast and adjacent to the previously conducted Oak Mesa groundwater study (Kolm and van der Heijde 2013).

The Hydrologic and Environmental System Analysis showed that there are two significant groups of hydrogeologic units in the North Fork Valley and Terraces study area:

- Quaternary unconsolidated clastic materials, which are predominantly glacial-fluvial outwash plains and terrace gravels (older mesa top gravels and glacial drift), hillside (slope) deposits, alluvial fans, bajadas (coalescing fans), lower-mesa gravels, younger valley gravels and river terraces, and alluvial valley bottom deposits; and
- Cretaceous and Tertiary bedrock units, including the following potentially water-bearing units: Cretaceous Dakota Sandstone and Burro Canyon Formation (Kdb) and the Tertiary Intrusive fractured crystalline aquifer near the town of Crawford (Tmi). The Mancos Shale unit (Km) may act as a thick, poorly transmissive confining layer (Kolm and van der Heijde 2013).

The Quaternary unconsolidated clastic units (Qal, Qgy, Qat, Qs, Qgf, and Qgo), which are moderately to highly permeable, are recharged by infiltration from precipitation that is nonuniformly distributed due to the slope steepness, slope aspect, and to position in the landscape, and by the incidental leaky irrigation canal or ditch, and irrigation return flow. These units may be fully or partially saturated based on spatial location and seasonal precipitation events, and there may be lateral and vertical connection (upward or downward groundwater flow depending on position in the hydrologic system) between the unconsolidated materials and the Tertiary intrusive units and Cretaceous sedimentary units in the underlying bedrock formations (Kolm and van der Heijde 2013).

Three broad hydrostructure sets occur in the North Fork Valley and Terraces area: 1) the northwest-trending fractures that parallel or connect with the Roatcap Creek fault zone and associated en-echelon faults to the east; 2) the northeast-trending North Fork Valley lineament, which parallels the Upper Leroux Creek fault zone; and 3) the radial fracture zone/lineaments that emanate from the West Elk Intrusions of Mt. Lamborn and Landsend Peak, which include the major lineaments of Cottonwood, Bell, and German Creeks. These hydrostructures function as French drains in the bedrock hydrogeologic units, and are responsible for various springs and groundwater discharge areas (gaining reaches) observed in lower Roatcap, lower Cottonwood, lower Bell, and lower German Creeks. These hydrostructures move significant quantities of groundwater horizontally and vertically, interconnecting shallow aquifers; and in the North Fork Valley, potentially interconnecting the shallow aquifers with deep bedrock aquifers (Kolm and van der Heijde 2013).

The Regional Bedrock Subsystems in the North Fork Valley and Terraces study area include the following potentially water-bearing units: Cretaceous Dakota Sandstone and Burro Canyon Formation (Kdb), and the Tertiary intrusive rocks (Tmi). The bedrock units are variably saturated based on location and proximity to recharge area. The Dakota Sandstone and Burro Canyon aquifer is partially saturated in the recharge area north of the Smith Fork, as evidenced by the springs in the Alum drainage. Groundwater flows laterally downdip to the north as an unconfined or water table system, and becomes part of the regional confined groundwater flow system after passing under the Mancos Shale at Alum Creek. The groundwater flow direction in the regional bedrock systems is from south to north beneath the North Fork Valley and Terraces study area and the Grand Mesa, and Delta County in general (Kolm and van der Heijde 2013).

Water Quality

Water quality of UFO surface waters is assessed and monitored by several means. The land health assessments[1] conducted over the most recent ten-year period assessed water quality against Standard 5 of the BLM Colorado Public Land Health Standards (BLM 1997). Data assessed for land health assessments include water chemistry, bacteriological analyses, density, and composition of aquatic macroinvertebrates, and the potential for accelerated levels of sediment, salinity, and selenium. UFO land management actions also consider potential affects to water quality-impaired rivers and streams on the Colorado's 303(d) and Monitoring and Evaluations lists. While water temperature and dissolved oxygen levels are important factors in the ability of water to support aquatic life at the local habitat level, these factors are not human health concerns nor have they been identified as major water quality concerns in the Planning Area. As such, temperature and dissolved oxygen levels are not discussed further.

Table 3-6 (Land Health Standard 5 Summary Ratings) shows the ratings for stream miles within each land health assessment unit. The potential for streams to experience accelerated levels of sediment was the most common cause for not meeting the standard. The sediment yield entering streams from any given watershed in the Planning Area is difficult to quantify, as much of the sediment is derived from uplands and is detached and transported during intense, short-duration rainfall events during summer months. In order to assess the potential for an area to introduce accelerated levels of sediment into receiving streams, surrogate indicators (such as upland soil surface conditions) were used in place of water quality analyses. The specific surrogate indicators used for assessing water quality include the amount of bare soil surface, live plant basal coverage, and the degree of soil pedestal formation

[1] Land health assessments from 1998 to 2014 were conducted with a determination category of "meeting with problems." Beginning in 2018, all land health determinations are conducted according to current BLM manuals and handbooks.

Table 3-6
Land Health Standard 5 Summary Ratings

Land Health Assessment Unit	Meeting Standard[1]	Meeting with Problems[1, 2]	Not Meeting[1]
Colona	22.2	16.4	5.6
East Paradox	11.8	36.9	0
Roubideau	91.7	24.2	8.2
Norwood	92.0	22.3	15.5
North Fork	43.2	13.8	1.9
North Delta	50.2	19.7	0
Mesa Creek	95.1	50.8	0
West Paradox	16.1	9.7	7.0
Total	*422.3*	*193.8*	*38.2*

[1]Miles of streams

[2]Land health assessments from 1998 to 2014 were conducted with a determination category of "meeting with problems." Beginning in 2018, all land health determinations are conducted according to current BLM manuals and handbooks.

Because soil surface indicators were used for the water quality assessment, the causal factors for not meeting the water quality standard would be the same as those described in the soils: poor follow-up management on vegetation treatments, historic livestock grazing, historic wildfire suppression, and proximity to private lands.

The primary water quality issues for the waters in the Planning Area include elevated levels of sediment, salinity, and selenium.

Sediment. There are many sources for excessive sediment loading of surface waters on public lands. Soil surface-disturbing activities have the potential to accelerate the rate of soil erosion, which is strongly correlated with sediment production. Excess sediment has both on- and off-site impacts, lowering soil productivity at its source and affecting downstream uses of water, including instream riverine values.

Salinity and Selenium. Salinity and selenium are yielded from areas dominated by Mancos Shale and can be accelerated by the same processes that increase sediment, but additionally can be mobilized and transported by deep water percolation from activities such as irrigation and land development, especially in more arid portions of the Planning Area. Selenium is a particularly important issue in the Gunnison River Basin, as elevated levels are the suspected cause of reproductive failure of select species of warm water fishes in the Lower Gunnison River. Salinity is a Colorado River Basin issue and affects many water uses, especially in the Lower Basin and Mexico. In 2009, the U.S. Fish and Wildlife Service (USFWS) issued a Programmatic Biological Opinion under the Endangered Species Act (ESA), requiring a selenium management program for which the UFO is a participatory agent. The UFO signed a memorandum of understanding with the BOR to assist with developing a long-range plan for the program.

Selenium. The most widespread impairment to area water quality is excessive selenium. Elevated levels of selenium have been shown to cause reproductive failure and deformities in fish and aquatic birds and are suspected to be the cause of reproductive failures in select species in the Lower Gunnison River. The stream segments in **Table 3-7** (Colorado 303(d) List of Impaired Waters in the Planning Area) are on the 2008 Colorado 303(d) list of impaired waters and include reaches of, or receive drainage from, public lands within the Planning Area. In June 2011, the Colorado Department of Public Health and Environment, Water Quality Control Commission amended the Classifications and Numeric Standards for the Gunnison and Lower Dolores River Basins (Colorado Department of Public Health and

Environment 2011c). These amendments included the adoption of new standards for selenium and the adoption of temporary modifications for selenium standards in four segments of the basin. These segments are now included in the Colorado 303(d) list.

Table 3-7
Colorado 303(d) List of Impaired Waters in the Planning Area

Segment ID	Segment	Impairment
COGUUG01	All tributaries to the Gunnison River, including wetlands, within the La Garita, Powderhorn, West Elk, Collegiate Peaks, Maroon Bells, Raggeds, Fossil Ridge, or Uncompahgre Wilderness Areas, excluding Stewart Creek	Arsenic
COGUUG26	All tributaries, including wetlands which are tributary to the Gunnison River from County Road 32 to the inlet of Blue Mesa Reservoir, Blue Mesa Reservoir, Morrow Point Reservoir, Crystal Reservoir or the segments of the Gunnison River that interconnect	Arsenic
COGUNF06b	Alum Gulch	Iron-TREC, Sulfate, Iron-Dis, Arsenic, Manganese
COGUUG26	Blue Creek and its tributaries	Arsenic
COGUSM07	Chapman Creek and its tributaries	Macroinvertebrates
COGUSM12b	Coal Canyon and its tributaries, except for the North and South tributaries in Second Park	Iron-TREC
COGUUN05	Commodore Gulch and its tributaries	Zinc
COGUSM02	Cornet Creek	Arsenic
COGUNF06b	Cottonwood Creek	Iron-TREC, Sulfate, Manganese
COGULG04a	Cummings Gulch	Iron-TREC, Sulfate
COGUUN11	Deer Creek from source to Cow Creek	Macroinvertebrates, Arsenic
COGUNF04b	East Muddy Creek from Forest Boundary to Confluence with Muddy Creek	Iron-TREC, Arsenic
COGUUN05	Governor Basin	Cadmium, Copper, Zinc, Manganese
COGUSM02	Howard Fork above Swamp Canyon	Dissolved Oxygen, pH
COGUSM07	Iron Bog Creek and its tributaries	Macroinvertebrates
COGUUN12	Loutzenhizer Arroyo and its tributaries	Iron-TREC
COGUUN09	Mainstem and all tributaries of Sneffels Creek from a point 1.5 miles above its confluence with Imogene Creek at 37.974979, -107.753960 (WGS84) to its confluence with Imogene Creek	Cadmium, Zinc, Lead
COGUNF06b	Mainstem and all tributaries to Bear, Reynolds, Bell, McDonald, Cow, Dever, German and Miller Creeks; and Love, Stevens, Big and Stingley Gulches that are not within national forest boundaries, from the source to the North Fork of the Gunnison River, exc	Selenium
COGUUN09	Mainstem of Imogene Creek from its source to its confluence with Sneffels Creek	Cadmium, Zinc
COGUUN11	Mainstem of Billy Creek	Arsenic
COGUUN09	Mainstem of Canyon Creek from its inception at the confluence of Imogene Creek and Sneffels Creek to the confluence with the Uncompahgre River	Zinc

Segment ID	Segment	Impairment
COGUUN10a	Mainstem of Cow Creek from the confluence of Nate Creek to the Uncompahgre River	Arsenic
COGUUN11	Mainstem of Cow Creek From the wilderness to the confluence with Nate Creek and all tributaries of Cow Creek	Arsenic
COGUUG26	Mainstem of Crystal Creek from source to confluence with the Gunnison River	Macroinvertebrates
COGUUN11	Mainstem of Dallas Creek	Arsenic
COGULD02	Mainstem of Dolores River below the confluence with the San Miguel River	Iron-TREC
COGULD02	Mainstem of Dolores River from Big Gypsum Creek to East Paradox Creek	Iron-TREC
COGULD02	Mainstem of Dolores River from East Paradox Creek to the San Miguel River	Chloride, Iron-TREC
COGUUN12	Mainstem of Dry Creek From Coalbank Canyon Creek to Uncompahgre River	Iron-TREC
COGUUN07	Mainstem of Gray Copper Gulch from the source to the confluence with Red Mountain Creek	pH, Lead, Zinc, Copper
COGUSM06a	Mainstem of Ingram Creek including, all tributaries and wetlands, from the source to the confluence with the San Miguel River	Copper, Manganese
COGUSM12b	Mainstem of Maverick Draw	Macroinvertebrates
COGUUN08	Mainstem of Mineral Creek from the source to the confluence with the Uncompahgre River	Copper, Zinc, Cadmium
COGUNF04b	Mainstem of Muddy Creek to Anthracite Creek	Iron-TREC, Arsenic
COGUNF03	Mainstem of North Fork of the Gunnison River from the Black Bridge (41.75 Drive) above Paonia to the confluence with the unnamed tributary east of Lazear Colorado	Manganese, Temp
COGUNF03	Mainstem of North Fork of the Gunnison River from the unnamed tributary east of Lazear Colorado to the confluence with the Gunnison River	Manganese, Temp
COGUUN06a	Mainstem of Red Mountain Creek from the source to immediately above the confluence with the East Fork of Red Mountain Creek.	Silver, Copper
COGULG04c	Mainstem of Red Rock Creek from the boundary of Black Canyon of the Gunnison National Park to the confluence of the Gunnison River	Selenium, E. coli
COGULD02	Mainstem of the Dolores River Above Big Gypsum Creek	Iron-TREC
COGULG02	Mainstem of the Gunnison River from a point immediately above the confluence with the Uncompahgre River to the confluence with the Colorado River	E. coli, Iron-TREC, Manganese, Sulfate
COGULG02	Mainstem of the Gunnison River from Highway 65 to a point immediately above the confluence with the Uncompahgre River.	E. coli, Iron-TREC, Manganese, Sulfate
COGUSM07	Mainstem of the Howard Fork, all tributaries and wetlands, from the Swamp Gulch to the South Fork of the San Miguel River, excluding the Chapman Creek and the Iron Bog Creek	Macroinvertebrates
COGUSM08	Mainstem of the South Fork of the San Miguel River from its inception at the confluence of the Howard and Lake Forks to its confluence with the San Miguel River	Arsenic
COGUUN03b	Mainstem of the Uncompahgre River from a point immediately above the confluence with Cascade Creek to a point immediately above the confluence with Dexter Creek	Manganese

Segment ID	Segment	Impairment
COGUUN03c	Mainstem of the Uncompahgre River from a point immediately above the confluence with Dexter Creek to a point immediately below the confluence with Dallas Creek	Manganese
COGUUN03a	Mainstem of the Uncompahgre River from a point immediately above the confluence with Red Mountain Creek to a point immediately above the confluence with Cascade Creek.	Zinc, Manganese, pH
COGUUN04a	Mainstem of the Uncompahgre River from Cedar Creek to Gunnison Road	Arsenic, Iron-TREC
COGUUN04b	Mainstem of the Uncompahgre River from Gunnison Road to the upstream boundary of Confluence Park	Arsenic, Manganese
COGUUN03e	Mainstem of the Uncompahgre River from the confluence with Broman Canyon to a point immediately above the outlet of the South Canal near Uncompahgre	Temp
COGUUN03e	Mainstem of the Uncompahgre River from the outlet of Ridgway Reservoir to a point immediately above the confluence with Broman Canyon	Temp
COGUUN02	Mainstem of the Uncompahgre River from the source (Poughkeepsie Gulch) to a point immediately above the confluence with Red Mountain Creek	Manganese, pH
COGULG07b	Mainstem of Tongue Creek from its inception at the confluence of Ward Creek and Dirty George Creek to the confluence with the Gunnison River	Selenium, Iron-TREC, Sulfate
COGUUN11	Mainstems of Coal, Pleasant Valley, and Beaton Creeks	Arsenic
COGUSM12a	McKenzie Creek	Macroinvertebrates
COGULD05	Mesa Creek and tributaries	Arsenic
COGULG12	Muddy Creek.	Iron-TREC, Manganese
COGUUN11	Onion Creek and its tributaries	Arsenic
COGULD05	Roc Creek and its tributaries	Copper, Iron-TREC
COGUNF04a	Ruby Anthracite Creek and its tributaries in the National forest except for the tributaries to Lake Irwin	Arsenic
COGUSM12b	Second Park Tributary South	Iron-TREC
COGUUN05	Sneffels Creek below Governor Basin	Zinc, Cadmium, Manganese, Macroinvertebrates, Lead
COGUSM12a	Specie Creek and its tributaries	Arsenic
COGUSM12b	Tuttle Draw and its tributaries	Arsenic, Iron-TREC

Source: Colorado Department of Public Health and Environment 2018a

The Colorado Water Quality Control Division has prepared a draft Total Maximum Daily Load, which identifies both point and non-point sources of selenium loading and establishes safe levels of selenium for the Gunnison River Basin.

Selenium loading of waters on Planning Area lands primarily originate from diffuse, non-point sources associated with natural runoff and erosion process. Assessments made by the local National Resources Conservation Service office determined that areas dominated by Mancos Shale in its natural state contains up to 34 times the concentration of selenium in comparison to similar irrigated lands. On public lands, accelerated yields of selenium can occur from activities that result in soil surface disturbance and increased runoff and erosion. Management of surface-disturbing land uses such as

livestock and OHV use on Mancos Shale-dominated areas has been to apply stipulations or terms and conditions that reduce accelerated selenium yields.

Another process resulting in excessive yields of selenium is the application of added amounts of water from activities such as agricultural irrigation and land developments (including golf courses and septic systems). Adding water to unaltered Mancos Shale commonly results in deep water percolation through the shale, and the dissolving and transporting of selenium to receiving streams. Management actions in the Planning Area that could result in accelerated selenium yields from deep water percolation include ROWs involving open water sources (such as irrigation ditches and canals), and land sales or exchanges that involve lands dominated by Mancos Shale. Once land is transferred from public to private ownership, future land uses allowed by local governments could result in accelerated selenium yields. These land actions are assessed through the NEPA process, during which potential impacts are identified and mitigated where possible.

Salinity. Accelerated levels of salinity in surface waters are also an issue in the Planning Area. The processes that cause salinity loading of waters are similar to those discussed above for selenium. As with selenium, areas dominated by Mancos Shale have the highest potential to yield dissolvable salts to surface waters. The State of Colorado develops and adopts water quality standards for salinity as part of a seven-state Colorado River Basin Salinity Control Forum. The Forum gathers and reviews information relevant to the complex problem of salinity standards and implementation of controls by the basin states. Through this basin-wide effort, Colorado works with the other basin states and the federal government to manage salinity and its effects.

The BLM is mandated by the Colorado River Basin Salinity Control Act (Colorado River Water Quality Office) to manage lands to minimize salinity yields to surface waters. Because of the semi-arid climate throughout much of the Planning Area, most of the salinity yielded from public lands is episodic and only occurs during rainfall events that produce runoff. Maintaining adequate watershed cover and healthy soil surface conditions are important for minimizing runoff, sediment, and salinity from areas dominated by Mancos Shale. Through the land health assessment process, the BLM has identified areas where watershed conditions are less than adequate and has developed corrective actions.

The stream segments in **Table 3-8** (Colorado Monitoring and Evaluation List) are on the 2018 Colorado Monitoring and Evaluation List of waters suspected of being water quality impaired and either include reaches of, or receive drainage from, public lands within the Planning Area. As sufficient water quality data are collected and analyzed for these stream reaches, they will ultimately be either removed from the Monitoring and Evaluation List or transferred to the 303(d) list of impaired waters. While on the Monitoring and Evaluation List, the BLM recognizes the potential water quality impairment and manages lands draining into these streams to minimize further water quality degradation.

Table 3-8
Colorado Monitoring and Evaluation List

Segment ID	Segment	Impairment
COGUUN10a	Alkali Creek and all tributaries.	Selenium
COGUUG01	All tributaries to the Gunnison River, including wetlands, within the La Garita, Powderhorn, West Elk, Collegiate Peaks, Maroon Bells, Raggeds, Fossil Ridge, or Uncompahgre Wilderness Areas, excluding Stewart Creek.	Iron
COGUUG26	Blue Creek and its tributaries.	E. coli
COGUSM07	Chapman Creek and its tributaries	Iron-TREC

Segment ID	Segment	Impairment
COGUSM12b	Coal Canyon and its tributaries, except for the North and South tributaries in Second Park.	Arsenic
COGUNF06a	Coal Gulch, Hawksnest Creek, and Gribble Gulch	Iron-TREC
COGUUN05	Commodore Gulch and its tributaries	Cadmium, Copper, Lead
COGUSM12b	Dry Creek and its tributaries	Arsenic, Iron-TREC
COGUNF04b	East Muddy Creek from Forest Boundary to Confluence with Muddy Creek.	Lead, Selenium
COGUSM07	Iron Bog Creek and its tributaries	Dissolved Oxygen, pH
COGULG11b	Lunch Creek.	Sediment
COGUUN09	Mainstem and all tributaries of Sneffels Creek from a point 1.5 miles above its confluence with Imogene Creek at 37.974979, -107.753960 (WGS84) to its confluence with Imogene Creek.	Macroinvertebrates
COGUUN09	Mainstem of Imogene Creek from its source to its confluence with Sneffels Creek.	Copper
COGUUN11	Mainstem of Billy Creek	Iron-TREC
COGUUN11	Mainstem of Dallas Creek.	Temp
COGULD02	Mainstem of Dolores River below the confluence with the San Miguel River.	Macroinvertebrates
COGULD02	Mainstem of Dolores River from Big Gypsum Creek to East Paradox Creek.	Temp, Macroinvertebrates
COGULD02	Mainstem of Dolores River from East Paradox Creek to the San Miguel River.	Temp, Macroinvertebrates
COGUUN15b	Mainstem of Dry Creek from the confluence of the East and West Forks to immediately above the confluence with Coalbank Canyon Creek.	Sediment
COGUSM06b	Mainstem of Marshall Creek, including all tributaries and wetlands, from the source to the confluence with the San Miguel River.	Cadmium, Zinc, Lead
COGUNF04b	Mainstem of Muddy Creek to Anthracite Creek	E. coli, Temperature
COGUSM10b	Mainstem of Naturita Creek from the national forest to the confluence with the San Miguel River.	Dissolved Oxygen, E. coli
COGULD02	Mainstem of the Dolores River Above Big Gypsum Creek	Macroinvertebrates
COGULG02	Mainstem of the Gunnison River from a point immediately above the confluence with the Uncompahgre River to the confluence with the Colorado River.	Selenium, Sediment
COGULG02	Mainstem of the Gunnison River from Highway 65 to a point immediately above the confluence with the Uncompahgre River.	Selenium, Sediment
COGUSM03b	Mainstem of the San Miguel River from a point immediately above the confluence of Marshall Creek to a point immediately above the confluence of the South Fork San Miguel River.	Cadmium, Sediment, Zinc, Temperature
COGUSM08	Mainstem of the South Fork of the San Miguel River from its inception at the confluence of the Howard and Lake Forks to its confluence with the San Miguel River.	Manganese
COGUUN04a	Mainstem of the Uncompahgre River from Cedar Creek to Gunnison Road.	Selenium, Sulfate, Sediment
COGUUN04b	Mainstem of the Uncompahgre River from Gunnison Road to the upstream boundary of Confluence Park.	Selenium, Sediment
COGUUN04a	Mainstem of the Uncompahgre River from the Highway 90 bridge at Montrose to Cedar Creek.	Sediment

Segment ID	Segment	Impairment
COGUUN02	Mainstem of the Uncompahgre River from the source (Poughkeepsie Gulch) to a point immediately above the confluence with Red Mountain Creek.	Cadmium, Copper, Zinc, Lead
COGUUN04c	Mainstem of the Uncompahgre River from the upstream boundary of Confluence Park to the confluence with the Gunnison River.	Selenium, Sediment
COGULD04	Mainstem of West Paradox Creek	Iron-Trec, E. coli
COGUSM02	Muddy Creek and its tributaries	Dissolve Oxygen
COGULG12	Muddy Creek.	E. coli, Sulfate
COGULD05	Roc Creek and its tributaries	E. coli
COGUUN05	Silver Creek	Lead
COGUNF06a	Unnamed tributary to North Fork Gunnison River near Hotchkiss	Selenium
COGULG04a	Wells Gulch	Selenium, pH Manganese

Source: Colorado Department of Public Health and Environment 2018a

Other less widespread water quality issues include excessive heavy metal loading, radium isotopes Ra-226 and Ra-228, and biological pathogens. Little of the Planning Area is directly affected by metal pollutants. Heavy or toxic metal issues affecting water quality are primarily associated with high-elevation hard rock mining areas in the San Juan Mountains. Ra-226 and Ra-228 are occasionally elevated in waters associated with the Uravan Mineral Belt, especially water discharges from uranium mine and waste rock areas.

Biologic pathogens, including several types of bacteria and protozoan, potentially occur in water bodies in the Planning Area and can increase in relation to the density and activities of warm-blooded animals, including humans. As part of the land health assessment process, several UFO streams with primary-contact recreation activities were monitored for fecal and *Escherichia coliform* bacteria concentrations. There is a strong correlation between these bacteria and the occurrence of other pathogens. Based on a limited number of samples per site (usually one or two samples collected in spring or summer months), none of the sampled streams exceeded state criteria for bacteria as defined in the Basic Standards and Methodologies for Surface Water (Colorado Department of Public Health and Environment 2007). However, because of the temporal and spatial variability of bacteria in surface waters, a more-intensive sampling regime would be required to determine conclusively whether Planning Area streams comply with state criteria for bacteria. Overall, the data show that bacterial concentrations are highest in Planning Area waters during warm months and following rainfall events that produce runoff.

Macroinvertebrates and Stream Health. The population density and composition of macroinvertebrates are used as another tool to assess stream health in the Planning Area. Twenty-six sites along perennial watercourses throughout the UFO were inventoried for aquatic macroinvertebrate composition and density during a ten-year period between 1998 and 2007. **Table 3-9** (Aquatic Macroinvertebrate in Planning Area Streams[1]) provides a summary of invertebrate metrics for Planning Area streams in relation to average values within the Colorado Plateau Ecoregion. Some of the monitoring sites were sampled during water years 2000 and 2002, which experienced extremely warm and dry climatic conditions. These extreme conditions could have significantly altered both the abundance and species composition of aquatic macroinvertebrates as a result of reduced water flow, increased water temperature, and higher levels of total dissolved solids. Many higher-order streams in the Planning Area are significantly dewatered during the irrigation season, which can restrict the invertebrate population of a watercourse. All aquatic macroinvertebrate data for waters in the Planning Area are on file at the UFO.

Table 3-9
Aquatic Macroinvertebrate in Planning Area Streams[1]

Stream	Latitude	Longitude	Sample Number	Total[2] Abundance	EPT[3] Taxa	EPT[4] Abundance	Intolerant[5] Abundance	Tolerant[6] Abundance
Cow Creek	38.1491	107.6444	1	789	13	645	39	0
Dry Creek	38.5353	108.0644	2	3,135	6	1,830	0	0
Hubbard Creek	38.9333	107.5186	1	63	6	23	7	0
La Sal Creek Lower	38.2785	108.9328	1	293	8	258	11	0
La Sal Creek Upper	38.3234	108.9856	1	858	12	380	39	3
Leroux Creek	38.8789	107.7850	1	2,004	17	772	23	0
Lion Canyon	38.3334	109.0553	1	430	10	261	32	1
Maverick Draw	38.2256	108.5061	1	3,522	2	397	0	0
Mesa Creek	38.4508	108.8225	1	1,297	2	20	1	0
Minnesota Creek	38.8625	107.5411	1	394	11	81	16	0
Monitor Creek	38.6217	108.2089	2	5,112	4	1,916	0	8
Naturita Creek	38.1475	108.3353	1	61,279	3	21,798	0	88
Naturita Creek	38.1594	108.4033	2	2,436	4	542	0	1
Naturita Creek	38.2244	108.5047	2	7,197	4	665	3	0
North Fork Mesa Creek	38.5036	108.7903	1	3,358	7	178	0	0
Potter Creek	38.6339	108.1944	3	2,270	5	1,001	1	5
Roatcap Creek	38.8833	107.6436	1	3	0	0	0	0
Roubideau Creek above Potter Creek	38.6378	108.1936	3	1,475	5	827	0	1
San Miguel River at Tabeguache Creek	38.3578	108.7083	1	23	3	4	3	0
San Miguel River below Beaver Creek	38.1060	108.1866	2	8,201	22	6,480	2,758	0
San Miguel River near mouth	38.3881	108.7872	2	884	8	397	46	0
San Miguel River above Pinon	38.2496	108.3867	2	1,308	13	392	46	0
San Miguel River above Placerville	38.0060	108.0459	2	11,753	19	7,574	3,683	0
San Miguel River above Tabeguache	38.3392	108.7015	4	2,520	5	848	48	0
South Fork Mesa Creek	38.4500	108.8028	1	355	5	27	1	0
Spring Creek	38.3808	107.9539	3	2,306	10	431	35	0
Williams Creek	38.9733	107.3350	1	4,169	9	2,208	257	5

Source: BLM 2007c

[1]Values *italicized* rate higher than the average of 524 samples at 245 sites across the Colorado Plateaus Ecoregion. Tolerant Abundance rates with lower values are higher.

[2]Number of invertebrates per 0.74 square meters of stream bottom.

[3]Number of invertebrate families within orders Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies)

[4]Total number of invertebrates within orders Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies)

[5]Total number of invertebrates rated as intolerant to pollution.

[6]Total number of invertebrates rated as tolerant to pollution.

Water Rights

The process of allocating water through the water rights system has a significant impact on the availability of water for meeting public land management purposes. Exercise of surface water rights located within and upstream from public lands can significantly change the rate, timing, location and quality of streamflows through public lands. In addition, exercise of groundwater rights can significantly affect aquifer levels, discharge of groundwater systems to surface streams, and groundwater quality. Reduced water flows or aquifer levels can have adverse impacts on the ecology of streams, springs, and wetlands, on recreational potential, on the availability of water for consumptive on public lands, such as livestock watering and mineral development. Collectively, the exercise of water rights places limits on the management alternatives and actions that can be considered during the planning process. While describing water availability limitations for each stream and aquifer on BLM-administered lands is beyond the scope of this document, it is important to note that the hydrology of a majority of the stream miles managed by the BLM have been significantly altered by the exercise of water rights. The BLM holds two types of water rights – those established pursuant to the provisions of Colorado water law (state-based water rights), and those established pursuant to federal law (federal reserved water rights).

The BLM's authority to apply for water rights to support multiple use management is provided by the Federal Land Policy and Management Act (FLPMA) of 1976. The BLM is able to claim state-based water rights for federal land management purposes pursuant to the provisions of the McCarran Amendment, signed into federal law in 1952. The McCarran Amendment allows the United States to be joined as a participant in state-run water rights adjudication and allocation processes, even though the United States generally has sovereign immunity from state laws. In Colorado, the BLM applies to the Colorado water court system for water rights and to the Colorado Division of Water Resources for administrative water use authorizations, such as well permits. Through this process, the State of Colorado has granted thousands of water rights to the BLM for water uses that occur on public lands, including domestic, livestock, wildlife, recreation, and fire suppression use. The Colorado Supreme Court has confirmed United States water uses on public lands that date back to the 1800's.

Table 3-10 (BLM Consumptive Water Rights by Source) summarizes water rights granted to the BLM by the State Colorado within the Planning Area.

Table 3-10
BLM Consumptive Water Rights by Source

Water Source Type	Number[1]
Ditches	2
Wells	1
Adjudicated Federal Reserved Water Rights	64
Springs	67
Reservoirs	15

[1]Water source data comes from a UFO water source inventory database.

Federal reserved water rights are created when lands owned by the United States are reserved for a specific purpose by Congressional action or executive order. In general, most BLM lands are not reserved lands. This is in contrast to Forest Service lands, which were reserved through Congressional action to place them into National Forests. However, some BLM lands were reserved as Public Water Reserves, which were created by a 1926 Executive Order that reserved natural springs and water holes to prevent monopolization of scarce water resources on public lands. The order states that the 40-acre tract surrounding any spring or water hole not already claimed by a private party under the Homestead Act was reserved for public use. Of the 161 springs in the Planning Area, 64 possess adjudicated federal reserved water rights claimed under Public Water Reserve 107.

Livestock Tanks. In addition to water rights, the BLM applies to the State of Colorado for permits to construct livestock water tanks (ponds). Livestock tanks are permitted through the Colorado Division of Water Resources and typically have storage capacities of less than one acre-foot. They are required to be located on intermittent or ephemerally flowing channels, and typically contain water only after snowmelt or large precipitation events. The BLM records show between 375 and 600 existing livestock tanks in the UFO. However, because many livestock tanks were constructed prior to state permit filings or being cataloged in BLM databases, the actual number is considered to be much higher. Many of the tanks are poorly maintained or non-functional and cause accelerated levels of erosion and sedimentation. Invasive weed species commonly become established on areas disturbed by livestock tanks, which can degrade watershed conditions.

Instream Flow. Instream flow water rights to protect aquatic resources are secured for a number of streams in the Planning Area, as shown in Table 3-11 (Stream Reaches Protected by Instream Flow Water Rights Held by The Colorado Water Conservation Board). While only the Colorado Water Conservation Board can hold an instream flow water right in Colorado, the BLM makes recommendations to the state for candidate streams and provides the channel surveys and assessments necessary for quantifying the flow. Instream flow water rights are secured to protect habitat for both warm and cold water fish species, and can vary in amount throughout the year.

Table 3-11
Stream Reaches Protected by Instream Flow Water Rights Held by The Colorado Water Conservation Board

Stream[1]	Case Number	Reach Length (miles)
Alkali Creek	15CW3079	5.1
Anthracite Creek	06CW230	8.2
Beaver Creek	93CW268	11.6
Big Bear Creek	84CW435	8.6
Cottonwood Creek	05CW149	3.2
Dolores River	75W1346	120.7
Dolores River	15CW3111	33.1
Dry Creek	05CW150	13.2
East Fork Dry Creek	05CW151	10.2
East Fork Spring Creek	06CW167	8.8
Fall Creek	84CW436	12.4
Horsefly Creek	05CW215	5.2
Hubbard Creek	15CW3089	1.9
La Sal Creek	02CW271	7.9
Leopard Creek	84CW438	13.5
Little Spring Creek	09CW072	0.4
Little Spring Creek	09CW073	0.2
Mesa Creek	06CW168	2.1
Middle Fork Spring Creek	06CW169	6.5
Naturita Creek	84CW442	11.0
North Fork Gunnison River	84CW400	6.4
North Fork Mesa Creek	02CW274	6.2
North Fork Mesa Creek 2	06CW170	4.4
Potter Creek	04CW161	9.8
Roc Creek	02CW275	10.8
Roubideau Creek	04CW162	16.5

Stream[1]	Case Number	Reach Length (miles)
Saltado Creek	93CW267	8.4
San Miguel R	11CW129	17.2
San Miguel River	02CW277	24.7
San Miguel River	84CW429	8.6
South Fork Mesa Creek	02CW278	11.0
South Fork Mesa Creek	06CW171	1.7
Specie Creek	02CW279	3.2
Spring Creek	04CW163	6.1
Tabeguache Creek	11CW144	3.7
Tabeguache Creek Lower Section	10CW186	9.7
Tabeguache Creek Upper Section	10CW187	5.4
Terror Creek (Lower)	15CW3101	1.5
Terror Creek (Upper)	15CW3101	1.6
Uncompahgre River	98CW222	4.2
West Fork Dry Creek	05CW155	6.2
West Fork Spring Creek	06CW173	5.8

Source: BLM 2010e, 2018c

[1]Some stream reaches include segments of land not managed by the BLM. Protected streams not included: Dolores River, Lower San Miguel River, Alkali Creek, Dry Creek, West Fork Dry Creek, Escalante Creek, Hubbard Creek, Terror Creek, West Fork Terror Creek, and Tabeguache Creek

Source Water Protection of Public Water Supplies

While the BLM has no statewide policy for managing public water supplies or source water areas, the BLM is required to comply with the Safe Drinking Water Act as amended.

Source Water Area – Assessment Phase. The Water Quality Control Division has completed initial source water assessments for over 1,700 public water systems in Colorado. **Table 3-12** (Public Water Sources with Zones of Potential Influence) lists public water supplies, including assessment reports for counties with lands in the Planning Area.

Table 3-12
Public Water Sources with Zones of Potential Influence

Public Water System ID Number	Water Source Name	County	Water Source
115152	BONE MESA DOMESTIC WD	Delta	Ground
215202	BOWIE MINE NO2	Delta	Surface
215166	CAMP CEDAREDGE	Delta	Ground
115168	CATHEDRAL WC	Delta	Ground
115171	CEDAREDGE TOWN OF	Delta	Surface
115185	COALBY DOMESTIC WC	Delta	Ground
315166	COBBETT CG	Delta	Ground
315190	CRAG CREST CAMPGROUND	Delta	Ground
115189	CRAWFORD MESA WA	Delta	Groundwater under influence of surface water
115188	CRAWFORD TOWN OF	Delta	Ground
215225	DEUTSCH DOMESTIC WATER	Delta	Groundwater under influence of surface water
315240	EGGLESTON LAKE CG	Delta	Ground
215288	FROST RVP	Delta	Ground

Public Water System ID Number	Water Source Name	County	Water Source
215321	GRAND MESA CHRISTIAN ASSN CAMP	Delta	Ground
315310	GRAND MESA VISITOR CENTER	Delta	Ground
115352	HOTCHKISS TOWN OF	Delta	Surface
315390	ISLAND LAKE CG	Delta	Ground
115467	LAZEAR DOMESTIC WC	Delta	Ground
215538	MAD DOG WC	Delta	Groundwater under influence of surface water
115588	ORCHARD CITY TOWN OF	Delta	Groundwater under influence of surface water
115601	PAONIA TOWN OF	Delta	Groundwater under influence of surface water
115610	PITKIN MESA PIPELINE CO	Delta	Ground
115671	REDWOOD ARMS MOTEL	Delta	Ground
115726	STUCKER MESA DOMESTIC WC	Delta	Groundwater under influence of surface water
115725	SUNSHINE MESA DOMESTIC WC	Delta	Ground
115784	UPPER SURFACE CREEK DOMESTIC WUA	Delta	Surface
326153	BOGAN CAMPGROUND	Gunnison	Ground
126175	CHAIR MTN RANCH HOA FILING 1	Gunnison	Ground
226189	CRYSTAL MEADOWS RANCH	Gunnison	Ground
326011	CURECANTI NRA EAST PORTAL RA	Gunnison	Ground
326502	ERICKSON SPRINGS CG	Gunnison	Ground
226845	HIGH PARK SPRING LLC SONRISE	Gunnison	Ground
226500	MARBLE WC	Gunnison	Ground
326503	MCCLURE CG	Gunnison	Ground
226838	MOUNTAIN COAL CO LLC WEST ELK MINE	Gunnison	Surface
126718	OXBOW MINING WW	Gunnison	Groundwater under influence of surface water
226630	RAGGED MOUNTAIN CAMP	Gunnison	Groundwater under influence of surface water
226756	TREASURE MOUNTAIN BIBLE CAMP	Gunnison	Ground
226844	YWAM HIGH PARK	Gunnison	Ground
143233	EARLES SUBDIVISION WC	Montrose	Ground
115288	FRUITLAND DOMESTIC WC	Montrose	Surface
143510	MILLARDS MANAGEMENT LLC	Montrose	Ground
143525	MUSTANG WATER AUTHORITY	Montrose	Surface
143533	NATURITA TOWN OF	Montrose	Surface
143559	NUCLA TOWN OF	Montrose	Surface
143600	PARADOX PIPELINE CO	Montrose	Ground
143621	PROJECT 7 WA	Montrose	Surface
143505	RIVER MEADOWS THE	Montrose	Ground
143676	RIVERWOOD SUBD WC	Montrose	Ground
143719	SPRING VIEW TP	Montrose	Ground
143725	SUNRISE TRAILER PARK	Montrose	Ground
243185	TRI STATE G AND T NUCLA STA	Montrose	Surface
346116	AMPHITHEATER CG	Ouray	Ground

Public Water System ID Number	Water Source Name	County	Water Source
146485	DALLAS CREEK WC	Ouray	Groundwater under influence of surface water
146592	ELK MEADOWS ESTATES	Ouray	Groundwater under influence of surface water
246452	KOA OURAY CG	Ouray	Ground
146588	OURAY CITY OF	Ouray	Ground
146676	RIDGWAY TOWN OF	Ouray	Surface
157011	ALDASORO RANCH HOC	San Miguel	Ground
257300	CAMP ILIUM	San Miguel	Ground
257220	DOWN VALLEY PARK	San Miguel	Ground
157250	ILIUM VALLEY WS	San Miguel	Ground
157300	LAST DOLLAR PUD	San Miguel	Ground
357500	MATTERHORN CG	San Miguel	Groundwater under influence of surface water
157400	MOUNTAIN VILLAGE TOWN OF	San Miguel	Ground
157500	NORWOOD WATER COMMISSION	San Miguel	Surface
157600	OPHIR TOWN OF	San Miguel	Ground
157700	SAWPIT TOWN OF	San Miguel	Ground
257800	SKYLINE RANCH	San Miguel	Ground
357725	SUNSHINE CG	San Miguel	Ground
157900	TELLURIDE PINES HOA	San Miguel	Groundwater under influence of surface water
257050	TELLURIDE REGIONAL AIRPORT	San Miguel	Ground
157800	TELLURIDE TOWN OF	San Miguel	Ground
157950	WILSON MESA	San Miguel	Surface

Source: Colorado Department of Public Health and Environment 2018b

Within the Planning Area, the Source Water Assessment area for surface water totals 480,104 acres of public land, while the Source Water Assessment area for groundwater totals 22,101 acres. These figures may change when public water suppliers complete a source water protection plan.

Source Water Areas – Protection Plan Phase. The second phase of source water assessment and protection is the collaboratively developed protection plan phase.

There are numerous completed protection plans that affect Uncompahgre RMP Decision Area (Decision Area) lands. As protection plans are completed, land use activities on affected BLM-administered lands would be managed to provide adequate protection to public water supplies, in coordination with public water supply managers.

UFO Coordination and Collaboration with Partners

The UFO continues to coordinate and collaborate with several external groups in managing soil and water resources within the Planning Area. The UFO has been active in the San Miguel Watershed Coalition since its inception in the early 1990s, and assisted in preparing and implementing the coalition's watershed plan. The coalition's accomplishments include:

- Securing an instream flow water right on a 24-mile reach of the San Miguel River
- Collecting survey data to allow instream flow recommendations on other river reaches
- Preparing a draft San Miguel Instream Flow Water Needs Assessment

- Implementing two in-channel river stabilization projects in the San Miguel near Placerville, Colorado, requiring close coordination with the Colorado Department of Transportation
- Improved fish migration and boater safety for the Highline Canal Diversion and represented the coalition on the Ames Hydroelectric Power Plant, Federal Energy Regulatory Commissions relicensing process

Other outreach efforts include:

- Participating in the local Water Roundtable for the Gunnison Basin, a state-based effort to identify, coordinate, and collaborate on water issues throughout the state
- Providing water resources education to local public schools, including 15 years of presentations to over 6,000 students at the Children's Water Festival
- Collaborating with the U.S. Geological Survey during the Mancos Shale research effort, which will benefit future management of Mancos Shale areas in the Planning Area
- Participating in a watershed coalition group formed in the Uncompahgre Valley
- Participating in the development of a watershed action plan for the Uncompahgre River through the Uncompahgre Watershed Planning Partnership

Trends

Competing uses for water in an ever drier climate may result in decreases in water quantity and quality in the Planning Area over the long term. Lead climatologists forecast warmer temperatures in southwestern Colorado over the upcoming decades. Changes in precipitation and soil moisture will likely affect groundwater recharge rates, causing diminished spring and well discharge rates on public lands. Earlier spring runoff and decreased snowpack could complicate prior appropriation systems and interstate water compacts, affecting which rights holders and irrigation operations receive water. Focused efforts by the BLM have secured many instream flow water rights, although most rights have recent adjudication dates, making them junior to many other water users.

There has been a trend towards more domestic and industrial uses for water, as the population grows and energy demands increase throughout Colorado. Oil and gas production, coal mining and other energy related activities such as uranium processing are becoming more active once again and energy and mineral resources are expected to increase in price over time, likely resulting in increasing demand for extraction. Consumptive uses of freshwater resources have also been increasing. As a result, many public stakeholders groups have formed to address water quantity and quality issues and the potential to balance competing uses for water in the future.

3.1.5 Vegetation

Over 1,100 plant species occur in and near the Planning Area. Of these, more than 1,000 species are native. Some of these species are generalists, tolerant of a wide variety of soil chemistry, soil depth and texture, aspect, elevation, and precipitation timing and amount. Other species may be more limited in the physical conditions they tolerate, such as those associated with riparian and wetland areas or those associated with saline soils. The presence of plant species within the Planning Area can range from extremely common to scarce. Based on land health assessment[2] data, over 40 percent of Planning Area plant species could be considered uncommon, while less than 10 percent could be considered extremely common. Those that are particularly scarce or rare may be classified as BLM sensitive species, threatened, or endangered species. In contrast, some of the most common species are highly adaptable, non-native weeds and are very competitive with native species. Whether they are species considered

[2] Land health assessments from 1998 to 2014 were conducted with a determination category of "meeting with problems." Beginning in 2018, all land health determinations are conducted according to current BLM manuals and handbooks.

noxious by the State of Colorado or are considered exotic species, they can have a marked negative effect on native plant vegetation.

On a national scale, similar geographic areas are divided into ecoregions by a variety of factors, including elevation, climate, and geology. As shown in **Table 3-13** (Vegetation Communities) the Planning Area falls primarily in the Colorado Plateau ecoregion, and secondarily in the Southern Rockies ecoregion (Chapman et al. 2006).

Table 3-13
Vegetation Communities

Ecoregion	Ecoregion Subdivision	Total Acres	Vegetation Community	Percent of Subdivision
Colorado Plateau	Sedimentary Mid-Elevation Forests and Shrublands	507,456	Grass-Forb	5
			Montane Forest	2
			Mountain Shrub	2
			Pinyon-Juniper	71
			Riparian	2
			Sagebrush	18
	Shale and Sedimentary Basins	102,200	Grass-Forb	49
			Pinyon-Juniper	16
			Riparian	1
			Sagebrush	20
			Salt-Desert Shrub	12
			Unvegetated/other	2
Southern Rockies	Sedimentary Mid-Elevation Forests and Shrublands	56,433	Montane Forest	23
			Mountain Shrub	43
			Pinyon-Juniper	27
			Subalpine Forest	2
			Unvegetated/other	5
	Sedimentary Subalpine Forests	7,998	Montane Forest	43
			Mountain Shrub	20
			Pinyon-Juniper	3
			Subalpine Forest	27
			Unvegetated/other	7
	Volcanic Subalpine Forests	1,510	Alpine	5
			Grass-Forb	3
			Montane Forest	4
			Mountain Shrub	2
			Subalpine Forest	78
			Unvegetated/other	8

Ecoregion	Ecoregion Subdivision	Total Acres	Vegetation Community	Percent of Subdivision
Southern Rockies *(continued)*	Volcanic Mid-Elevation Forests and Shrublands	90	Montane Forest	44
			Mountain Shrub	36
			Subalpine Forest	19
			Unvegetated/other	1
	Alpine Zone	13	Alpine	59
			Unvegetated/other	41

Source: BLM 2012a

The following section describes the current conditions and characterization of the major vegetation communities in the Planning Area.

Vegetation Types within the Planning Area

Alpine

Alpine vegetation is typically found above 11,000 feet in elevation and occurs in only a tiny fraction of the Decision Area. It is characterized by low-growing shrubs such as arctic willow (*Salix arctica*), numerous sedge (*Carex* spp.) species, grasses such as alpine bluegrass (*Poa alpina*), and a variety of highly specialized forb species.

Grass-Forb

The grass-forb vegetation type is a significant component of the Planning Area and occurs across a wide range of elevations. In some cases, its presence is related to perennial soil characteristics, while it is a result of disturbances such as fire, avalanche, rangeland projects, or drought in others. In disturbed areas, it is considered an early successional stage to other vegetation types. The dominant grasses and forbs are dependent primarily upon elevation and secondarily upon soil type. Typical grass species include bottlebrush squirreltail (*Elymus elymoides*), western wheatgrass (*Pascopyrum smithii*), saline wildrye (*Leymus salinus*), galleta grass (*Pleuraphis jamesii*), needle-and-thread grass (*Hesperostipa comata*), Indian ricegrass (*Achnatherum hymenoides*), blue grama *(Bouteloua gracilis)* and bluegrasses *(Poa* spp*.).* Common forbs include scarlet globemallow *(Sphaeralcea coccinea)*, longleaf phlox *(Phlox longifolia),* wild onion (*Allium* spp.), and biscuitroots (*Lomatium* and *Cymopterus* spp.) These species can also be found in each of the different vegetation types described below.

Montane Forest

The montane forest vegetation type generally occurs between 7,500 and 9,500 feet in elevation and comprises a small component of the Planning Area. This vegetation type typically includes ponderosa pine (*Pinus ponderosa*), Douglas-fir, (*Pseudotsuga menziesii*), and aspen (*Populus tremuloides*), singularly and in combination with one another. Soils and fire history influence where and in what combinations these species occur. They also influence the understory vegetation. Many of the mountain shrub species are found in montane forest. The more common species include birchleaf mountain mahogany (*Cercocarpus montanus*), Utah serviceberry (*Amelanchier utahensis*), Gambel oak (*Quercus gambelii*), Rocky Mountain juniper (*Juniperus scopulorum*), black chokecherry (*Prunus virginiana*), and roundleaf snowberry (*Symphoricarpos rotundifolius*). The herbaceous component is generally sparse but contains many of the same grasses and forbs found in the mountain shrub vegetation type described above.

Mountain Shrub

The mountain shrub vegetation type occurs at elevations ranging from 7,000 to 9,000 feet and makes up a significant proportion of the Planning Area. Birchleaf mountain mahogany, Utah serviceberry, and

Gambel oak are prominent overstory components. Soils, slope, aspect, and fire history influence the character and distribution of this vegetation type, resulting in several diverse communities. These communities are distinguished by one or a combination of the prominent shrub species, along with one or more of the following species: black chokecherry, mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), wild crabapple (*Peraphyllum ramosissimum*), fendlerbush (*Fendlera rupicola*), roundleaf snowberry, Utah juniper (*Juniperus osteosperma*), Rocky Mountain juniper, and Colorado pinyon pine (*Pinus edulis*). Common herbaceous species include elk sedge (*Carex geyeri*), Letterman's needlegrass (*Achnatherum lettermanii*), Kentucky bluegrass (*Poa pratensis*), muttongrass (*Poa fendleriana*), Sandberg bluegrass (*Poa secunda*), bottlebrush squirreltail, western wheatgrass, slender wheatgrass (*Elymus trachycaulus*), and nodding brome (*Bromus anomalus*). Forbs are abundant, with many species. Among the most widespread and dominant are western yarrow (*Achillea millefolium*), lupine (*Lupinus* spp.), biscuitroot (*Lomatium* spp.), and aspen peavine *(Lathyrus lanzwertii)*.

Pinyon-Juniper

The pinyon-juniper vegetation type occurs between 5,800 and 7,500 feet and occupies more of the Planning Area than any other vegetation type. Pinyon-juniper woodland is dominated by Utah juniper and Colorado pinyon in varying proportions depending on soil, slope, aspect, and elevation. The understory is typically sparse and variable and may contain remnant shrubs such as Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), birchleaf mountain mahogany, Utah serviceberry, snakeweed (*Gutierrezia sarothrae*), yucca (*Yucca harrimaniae*), potato cactus (*Opuntia fragilis*), muttongrass, Indian ricegrass, and bottlebrush squirreltail. Primary forbs in this type are western tansy mustard (*Descurainia pinnata*), scarlet globemallow, rock goldenrod (*Petradoria pumila*), lobeleaf groundsel (*Packera multilobata*), and numerous species of *Penstemon*, *Arabis*, *Astragalus*, *Lomatium*, *Erigeron*, and *Machaeranthera*.

Riparian and Wetlands

Riparian. The riparian vegetation type is always associated with water and extends from the lowest to highest elevations within the Planning Area. Approximately 1 to 2 percent of Colorado is covered with riparian or wetland vegetation (Lyon and Sovell 2000). Although small in area, it is a significant vegetation type because of its productive and diverse plant communities. Within the broad category of riparian vegetation are many distinct, interwoven plant communities. Among the most widespread are communities dominated by narrowleaf cottonwood (*Populus angustifolia*) above 5,800 feet in elevation, and Fremont cottonwood (*Populous fremontii*) generally below this elevation. These areas are distinguished by various associated shrubs and trees, including thinleaf alder (*Alnus tenuifolia*), blue spruce (*Picea pungens*), Douglas-fir, sandbar willow (*Salix exigua*), skunkbush sumac (*Rhus trilobata*), Wood's rose (*Rosa woodsii*), and red osier dogwood (*Cornus sericea*). Some willow-dominated communities are also present, with sandbar willow occurring alone or in combination with strapleaf willow (*Salix ligulifolia*) or other willow species. Thinleaf alder forms a common community along the edge of many streams. Shrub-dominated communities are found along some higher stream terraces, including skunkbush sumac, seep willow (*Baccharis salicina*), New Mexico privet (*Forestiera pubescens*), and silver buffaloberry (*Shepherdia argentea*). Small pockets of scouringrush horsetail (*Equisetum hyemale*) can be found at lower elevations. Ephemeral and lower-elevation drainages are often dominated by black greasewood (*Sarcobatus vermiculatus*) and alien tamarisk (*Tamarix chinensis*).

Wetlands. Wetland communities and other water features in the Planning Area are presented in **Figure 3-12** (Key Water Features). These communities in the Planning Area are very infrequent and typically much smaller than riparian areas. Though they often share some species with riparian communities, wetland communities are characterized by vegetation inundated with water during some time of the year or soils that are saturated with water during all or part of the year (Carsey et al. 2003). Wetlands are most often associated with standing water such as lakes, reservoirs, and ponds, but many of the

remaining wetlands in the Planning Area are associated with stock ponds and are not natural in origin. They may be located within any of the other vegetation types in the Planning Area, and mainly exist naturally as hanging gardens, springs, and seeps. Plant species that may commonly be found in wetland communities include Geyer willow (*Salix geyeriana*), water sedge (*Carex aquatilis*), cattail (*Typha angustifolia-Typha latifolia*), Mancos columbine (*Aquilegia micrantha*), Eastwood monkeyflower (*Mimulus eastwoodiae*), scouringrush horsetail, thinleaf alder, hardstem bulrush (*Schoenoplectus acutus*), and, in some degraded areas, salt cedar (*Tamarix ramosissima*) (Carsey et al. 2003). At the time of this writing, the UFO has limited data on wetland communities within the Planning Area.

Sagebrush

The sagebrush rangeland vegetation type is widespread and occupies a significant portion of the Planning Area. This vegetation type typically occurs on deeper soils at elevations ranging from 5,000 to 7,500 feet. The sagebrush community is dominated by Basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) at the lowest elevations, Wyoming big sagebrush at mid-elevations, and mountain big sagebrush at the highest elevations. Black sagebrush (Arte*misia nova*) also occurs as a dominant shrub on some soils across this elevation range. The sagebrush type can also occur on steeper rockier sites, where it is usually successional to woodland types and has resulted from removal of the tree canopy by fire or other natural disturbances. Snakeweed, Utah serviceberry, rabbitbrush (genus *Ericameria* or *Chrysothamnus*), and four-wing saltbush (*Atriplex canescens*) can be secondary shrubs in the sagebrush vegetation type. The sagebrush vegetation type contains a variable understory that can include western wheatgrass, galleta grass, bottlebrush squirreltail, Indian ricegrass, blue grama, Sandberg bluegrass, muttongrass, needle-and-thread grass, prairie junegrass (*Koeleria macrantha*), and many forbs. Among the most prominent are scarlet globemallow and longleaf phlox.

Salt-Desert Shrub

The salt-desert shrub vegetation type is commonly found on saline and other droughty soils in the driest portions of the Planning Area below 6,000 feet. Plant densities in some salt desert communities, such as those found on Mancos Shale-derived soils, can be extremely low, and those sites are sometimes classified as barren. The following shrubs characterize this drought-tolerant vegetation type: shadscale (*Atriplex confertifolia*), Gardner saltbush (*Atriplex gardneri*), mat saltbush (*Atriplex corrugata*), black greasewood, four-wing saltbush, black sagebrush, winterfat (*Krascheninnikovia lanata*), snakeweed, and prickly pear cactus (*Opuntia polyacantha*). The numbers of individuals for each species vary, and species can be found in various combinations depending on the soil type and disturbance history of the area. Native grasses in this vegetation type include western wheatgrass, galleta grass, bottlebrush squirreltail, Salina wildrye (*Leymus salinus*), and Indian ricegrass on better-condition sites. Many different forbs are present, with some of the most common including wild buckwheats (*Eriogonum* spp.), wild onion, and biscuitroots.

Several BLM sensitive species and threatened or endangered plant species (see **Section 3.1.7** [Special Status Species]) are primarily or exclusively found within this plant community. The endangered clay-loving wild buckwheat (*Eriogonum pelinophilum*) and threatened Colorado hookless cactus (*Sclerocactus glaucus*) are both found in the salt desert shrub community (Spackman et al. 1997).

Subalpine Forest

The subalpine forest vegetation type occupies only a minor portion of the Planning Area above 9,500 feet elevation. Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies lasiocarpa*) characterize the overstory of this vegetation type. Aspen may be present in some areas as well, but is typically successional to the spruce and fir. The understory in this vegetation type is generally sparse and dominated by sedges, whortleberry (*Vaccinium myrtillus*), and arnica (*Arnica cordifolia*). Mountain brome

(*Bromus marginatus*), Thurber fescue (*Festuca thurberi*), slender wheatgrass, wild strawberry (*Fragaria* spp.), and an abundance of other forbs may occur where the tree canopy lets sunlight through.

Current Conditions

BLM Colorado Standards for Public Land Health Standard 2 and Standard 3 (**Appendix C**) are applicable to the vegetation communities discussed in this section. In order to implement the Standards and establish a baseline of current conditions, the UFO conducted land health assessments that identify the current condition of vegetation and overall land health in ten landscape units across the Decision Area between 1999 and 2008.

Vegetation problems identified during the assessments relate to indicators outlined in the Standards. Problems were noted throughout the Decision Area but were not clearly associated with a particular region. **Table 3-14** (Major Vegetation Issues in the Decision Area) lists the major vegetation problems in order of prevalence. The column indicating the percentage of the Planning Area affected represents a high estimate. Problem areas could be widespread and serious, or they could be isolated, localized, or minor.

Table 3-14
Major Vegetation Issues in the Decision Area

Identified Problem or Issue	Percentage Affected
Upland Vegetation	
Not enough cool season perennial grass	39
Exotic plants in community	37
Not enough perennial forbs	37
Low plant diversity in community	26
Shrubs in low vigor	19
Not enough warm season perennial grass	15
Browse shrubs heavily hedged	13
Noxious weeds within or nearby community	10
Plant spacing too great	5
Riparian and Wetland Vegetation	
Not enough riparian vegetation to protect banks	14
Riparian plant root structure will not withstand flooding	14
Streamside plants are not wetland species	13
Riparian vegetation in poor vigor	11
Riparian vegetation does not have diverse age classes	10
Riparian vegetation does not have diverse composition	9
Riparian vegetation not establishing on point bars	6

Source: BLM 2012a

Upland Vegetation

Table 3-15 (Land Health Assessment Results Since 1999) presents the current condition of vegetation in the Decision Area assessed as part of implementing the Standards. Of the approximately 675,800 acres assessed for upland vegetation health, 565,527 acres (84 percent) were considered to meet BLM Colorado Public Land Health Standard 3 for healthy upland plant communities, and 79,042 acres in the Planning Area (12 percent) failed to meet BLM Colorado Public Land Health Standard 3, with the highest percentage of land not meeting standards in the North Fork (25 percent), Roubideau (17 percent), and North Delta (13 percent) units. The remaining acreage (4 percent) was not assessed or did not contain upland vegetation.

Cool season grasses were underrepresented in plant communities across all eight land health assessment units in the Decision Area, probably as a result of livestock grazing in the spring and fall periods when these grasses are most vulnerable. Perennial forbs are also underrepresented in the same areas. The reduced cool season grass and forb cover may make it easier for exotic species such as cheatgrass to move in. On many crucial big game winter ranges throughout the Planning Area, moderate to severe hedging of palatable shrubs is common. Usually reduced vigor of these shrubs is also evident.

On 5 percent of public lands in the Planning Area, past vegetation treatments resulted in the loss of native plant communities, primarily due to the use of exotic grass and forb species that prevented native species from occupying the sites. Exotic weed infestations, resulting from poorly reclaimed fires and disturbances such as heavy OHV use and grazing, have been found on an estimated additional 2 percent of this area. Such infestations are shrinking over time, as natural processes return native vegetation to the sites. In addition, historic treatment locations are being retreated and seeded with native species in small patches. Large disturbances, such as wildfires, are also being treated with native species. It is UFO policy to utilize native plant species to reclaim disturbed sites.

Table 3-15
Land Health Assessment Results Since 1999

		Area Vegetation (acres)		
Land Health Assessment	**Year**	**Meeting**	**Meeting with Problems[1]**	**Not Meeting**
East Paradox	1999	61,743	8,087	8,199
North Delta	2002	9,677	52,420	9,484
Mesa Creek	2004	60,004	40,849	10,591
Roubideau	2005	17,403	66,437	16,867
Norwood	2006	66,695	24,881	7,894
North Fork	2007	18,905	27,200	15,598
Colona	2008	17,334	29,220	4,459
West Paradox	2009	49,552	16,907	2,069

[1]Land health assessments from 1998 to 2014 were conducted with a determination category of "meeting with problems." Beginning in 2018, all land health determinations are conducted according to current BLM manuals and handbooks.

Within plant communities across the Planning Area, there are indications that the diversity, composition, and frequency of occurrence of native species are degraded. Land health assessment data show that 25 percent of 2,170 upland sites evaluated had low native plant diversity, while 31 percent had plants spaced too far apart. These affected communities may not be resistant to changing conditions, disturbances, or weed invasions. Over time, this lack of resilience equates with decreased sustainability and may pose a threat to native species in some areas.

Riparian and Wetland Vegetation

Riparian Vegetation. Riparian vegetation along nearly all of the 418 miles of perennial and intermittent streams in the Decision Area has been evaluated for BLM Colorado Public Land Health Standard 2. This standard is based on BLM's Proper Functioning Condition concept (BLM 1998). Riparian areas along 389 miles of streams and rivers (94 percent) met Standard 2 for riparian health, while approximately 29 miles (7 percent) were rated as not meeting Standard 2.

Of the riparian systems not meeting the standard, the reasons are summarized in **Table 3-14**. Past management practices, such as livestock grazing, vehicle use, road construction, and water diversions, have contributed to the failure of riparian systems to fully meet BLM Colorado Public Land Health

Standards. Because state water law often precludes BLM management actions that could address water use issues, some riparian vegetation communities have a very low potential to recover to the point where they would fully meet Standard 2.

Wetland Vegetation. At the time of this writing, very little information is available on the condition of Planning Area wetlands, and their health has not been evaluated.

Weeds

Weeds are plants considered nonnative in origin with invasive and highly competitive characteristics. Weeds can disrupt the function of an ecosystem, conflict with the management objectives of an area, and compete with native vegetation for space, light, and limited nutrients. Invasive species can also reduce the cover and species richness of biological soil crusts (DOI 2001). Serious infestations can create a monoculture, effectively locking the area into a long-term dysfunctional situation. When an individual species is identified as a substantial economic threat, it is designated by the State of Colorado as a noxious species or by the BLM as a species of concern. Noxious weeds or invasive species of concern can be found in every plant community present in the Planning Area.

Weed Control Guidance and Programs. The June 2007 programmatic EIS, *Vegetation Treatments using Herbicides on Bureau of Land Management Lands in 17 Western States* (BLM 2007a), discusses how herbicides will be applied to BLM-administered lands, including mitigation measures, standard operating procedures, and analysis of active and inactive ingredients by herbicide. The UFO subsequently created an Integrated Weed Management program for control of weeds on the Colorado Noxious Weed List and on the BLM Colorado List of Invasive Weed Species of Concern (BLM 2010f).

The UFO coordinates with counties and other entities in and around the Planning Area to implement the Integrated Weed Management program. This cooperation promotes the success of methods such as early detection/rapid response and the treatment and re-treatment of small and large patches of noxious weeds. The coordinated strategy means that more people are looking for and treating noxious weeds in a strategic manner on public lands. Support for Integrated Weed Management comes from executive orders, legislation, and strategic documents, including:

- Colorado Noxious Weed Act 8 CCR 1203-15 (2003)
- President's Executive Order 13112 (1999)
- Federal Noxious Weed Act of 1974, Public Law 93-692
- BLM Partners Against Weed Plan (BLM's strategic plan)
- Colorado Governor's Executive Order D 00699
- UFO Weed Management Strategy (BLM 2010c)
- Record of Decision (ROD) on *Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States* (September 2007) (BLM 2007a)

Systematic Weed Surveys. Between 2001 and 2010, the UFO completed a systematic weed survey on about 473,000 acres (70 percent) of the Decision Area. Thus far, 6,600 associated noxious weed infestations affecting 8,600 acres have been identified. The estimate is conservative and not comprehensive, as the entire Decision Area has not been surveyed, much of the survey is linear, and part of the survey was completed over ten years ago.

The average size of an infestation patch is 1.3 acres, making it relatively small and easy to treat using a hand-held spray gun. This patch size supports the land health assessment finding that noxious weeds have not become a prominent feature in most of the Decision Area, and presents an opportunity to continue this trend. Large patches of weeds will need to be treated for years to come, and linear infestations always pose a threat due to ease of seed transportation by trail, road, irrigation ditch, stream, or river. The UFO will continue to survey for about 40 weed species, including all weeds on the

Colorado Noxious Weed list and the BLM species of concern (BLM 2010f). The UFO has noxious weed species from all categories of the Colorado list and several from the BLM list. **Table 3-16** (Noxious Weeds) lists some of the most troublesome weeds in the Decision Area, along with associated data.

The land health assessment data reveal the current scope of the weed establishment on uplands as follows: 92 percent of the 2,170 upland sites evaluated had no noxious weeds, 6 percent had small infestations, and 1.5 percent had noxious weeds as a dominant part of the vegetation. The land health assessment data also show that 37 percent of upland sites had no exotics, 21 percent had isolated occurrences, 29 percent had exotics growing within native vegetation, and 12 percent had exotics dominating a plant community.

Table 3-16
Noxious Weeds

Weed Species	Listing	Number of Infestations	Acres Infested	Average Infestation (by acre)	Potential Average Rate of Spread (percent)
Russian knapweed *Acroptilon repens*	State Noxious BLM Concern	1,920	2,280.0	1.2	8-14
Spotted knapweed *Centaurea maculosa*	State Noxious BLM Concern	85	725.0	8.5	10-24
Diffuse knapweed *Centaurea diffusa*	State Noxious BLM Concern	26	31.0	1.2	16
Oxeye daisy[1] *Chrysanthemum leucanthemum*	State Noxious BLM Concern	35	115.0	3.3	
Yellow toadflax *Linaria vulgaris*	State Noxious BLM Concern	2	5.0	5.0	8-29
Dalmatian toadflax *Linaria dalmatica*	State Noxious BLM Concern	1	1.0	1.0	8-29
Purple loosestrife *Lythrum salicaria*	State Noxious BLM Concern	8	4.0	0.5	15
Hoary cress (Whitetop) *Cardaria draba*	State Noxious BLM Concern	340	288.0	1.0	11-18
Absinth wormwood *Artemisia absinthium*	State Noxious	4	2.0	0.5	
Yellow starthistle *Centaurea solstitialis*	State Noxious BLM Concern	4	20.0	10.0	13-17
Sulfur cinquefoil *Potentilla recta*	State Noxious BLM Concern	2	2.0	1.0	
Canada thistle *Cirsium arvense*	State Noxious BLM Concern	1,253	1,264.0	1.0	10-12
Bull thistle *Cirsium vulgare*	State Noxious BLM Concern	399	296.0	1.0	
Musk thistle *Carduus nutans*	State Noxious BLM Concern	659	1,104.0	1.5	12-22
Russian olive *Elaeagnum angustifolia*	State Noxious BLM Concern	24	7.5	0.5	
Tamarisk *Tamarix* spp.	State Noxious BLM Concern	907	1,508.0	1.7	12
Chinese clematis *Clematis orientalis*	State Noxious BLM Concern	2	2.0	0.3	

Weed Species	Listing	Number of Infestations	Acres Infested	Average Infestation (by acre)	Potential Average Rate of Spread (percent)
Jointed goatgrass *Aegilops cylindrica*	State Noxious BLM Concern	6	11.0	1.8	14 (traits similar to cheatgrass)
Burdock *Arctium minus*	State Noxious BLM Concern	113	222.0	2.0	
Plumeless thistle *Carduus acanthoides*	State Noxious BLM Concern	5	5.3	1.0	
Chicory *Cichorium intybus*	State Noxious BLM Concern	18	7.3	0.4	
Field bindweed *Convolvulus arvensis*	State Noxious BLM Concern	73	133.0	1.8	
Hounds tongue *Hieracium cynoglossoides*	State Noxious BLM Concern	63	83.5	1.3	
Leafy spurge *Euphorbia esula*	State Noxious BLM Concern	1	89.0	89.0	12-16
Halogeton *Halogeton glomeratus*	State Noxious BLM Concern	47	90.0	1.9	
Scotch thistle *Onopordum acanthium*	State Noxious BLM Concern	2	0.4	0.2	
Siberian elm *Ulmus pumila*	State Noxious BLM Concern	4	5.6	1.4	
Common mullein *Verbascum thapsus*	State Noxious BLM Concern	263	58.0	0.3	

Source: BLM 2012a

[1] Does not include San Miguel River watershed

Note: Data are not comprehensive.

Treating Problem Weeds. In addition to county weed treatments, approximately 970 weed treatments have been conducted by the BLM in the Decision Area. Of these, about 75 percent were carried out with herbicide or a combination of herbicide, mechanical, and manual treatments. The majority of the most troublesome weeds in the Planning Area are perennial, and the most effective option for long-term success and eradication is continued implementation of early detection/rapid response, as well as the application of herbicides on small infestations.

Herbicides: The appropriate use of approved herbicides in moderation in the Planning Area reduces the cost of treatment, ensures a reduction in infestation size, potentially eradicates weeds in a location, reduces herbicide use in native systems by reducing the need to treat large patches over several years, and promotes land health.

Biological Controls: Several biological controls using living organisms are in development that could be effective against some of the more troublesome weed species in the Planning Area. For instance, biological agents to control Russian knapweed were tested and released in 2011. As biological controls become more available, they could be used in conjunction with chemical and mechanical treatments. Some biological agents currently approved for release are effective against certain weed species in the Planning Area, including Canada, musk, bull, and scotch thistles; field bindweed; Dalmatian toadflax; spotted knapweed; puncture vine; and tamarisk. The Tamarisk leaf beetle (*Diorhabda elongata*) is a prime example of a biological control agent being used in riparian areas; the beetle enables a small amount of tamarisk to remain but not enough to compromise the function of the riparian ecosystem.

Other Common Exotic Species. Other common weedy exotic species in the Planning Area include cheatgrass (*Bromus tectorum*), annual wheatgrass (*Eremopyrum triticeum*), clasping pepperweed (*Lepidium perfoliatum*), Russian thistle (*Salsola tragus*), filaree (*Erodium cicutarium*), burr buttercup (*Ceratocephala testiculata*), spreading wallflower (*Erysimum repandum*), blue mustard (*Chorispora tenella*), and European madwort (*Alyssum simplex*).

Trends

Upland Vegetation

Undesirable Species in Native Communities. Undesirable, exotic species are generally increasing within native vegetation in the Planning Area. An analysis of 190 trend studies over the past 20 years showed a slim majority (46 percent) had no exotic plants, 40 percent had increasing levels of exotic species, and 14 percent showed declines in exotics. These findings are consistent with patterns observed across the western United States. There is concern that some winter annuals like cheatgrass have the potential to overtake native vegetation, alter the fuels and fire regime, and ultimately displace entire native communities, as has happened in other ecoregions. There is little evidence that this is happening at a large scale, as the Planning Area has not experienced dramatic increases in fire frequency or fires fueled by invasive annuals. Several cheatgrass-fueled burns indicate this is happening in localized areas. Many of the undesirable species are tied to disturbances on the landscape. Fifty-eight percent of sampled travel routes in the Planning Area have weed infestations nearby, as do 70 percent of sampled ponds. In addition, many past vegetation treatments were seeded with nonnative species, such as crested wheatgrass, which produce abundant forage but compete with native species.

Native Community Distribution. Plant community distribution is on a slight downward trend across the region. This trend is less pronounced on Decision Area lands. Whether or not a given plant community can grow on a site is largely determined by the soils and climate (or site potential), and data from land health assessments indicate that appropriate plant communities were found on appropriate sites. The amount of land supporting native plant communities in the region has declined, reducing their spatial distribution and frequency in the Planning Area. The great majority of this is due to land use changes and development on private lands. On public lands, loss of native plant communities has been caused by past vegetation treatments that replaced native species with introduced (exotic) grasses and forbs on 5 percent of the Planning Area. Exotic weed infestations, resulting from poorly reclaimed fires and disturbances such as heavy OHV use and grazing, have been found on an estimated additional 2 percent of this area. Other losses of native communities from appropriate sites, including die-off of aspen from lower-elevation stands and invasion of trees into adjacent shrub and grass communities in some areas, appear to be associated with a changing climate.

Native Species Diversity and Density. A modest upward trend is apparent for native species diversity on Decision Area lands. While there are some issues with diversity, composition, and density in some areas, trends generally appear to be improving. Evidence from 190 trend studies read over the past 20 years shows 47 percent of communities increased in native species richness, compared with 30 percent that showed declines (16 percent showed no changes). Total native species canopy cover also showed generally upward trends with 62 percent of communities improving, while only 33 percent declined. There is some evidence that tree density is increasing. Many land use activities can degrade native communities. Excessive grazing by livestock, big game, and even rabbits can reduce palatable plants and trample others. Physical disturbance can damage plants and is associated with off-road travel or concentrated activities like woodcuts or rock collecting. Alteration of normal drainage patterns such as those associated with road development or range or watershed improvement projects can also degrade native plant communities.

Age Classes and Recruitment. For the most part, upland age class distribution seems adequate to maintain the major species on the landscape, and no strong trends are evident. The land health assessment data confirm field observations that the majority (74 percent) of dominant species are present in a range of age classes at evaluated sites. Only 5 percent of species were found limited to old-age individuals at some sites, indicating problems with recruitment for those species at those sites, but there are no data regarding trend. The dominance of old age classes on some sites is probably due to plant community successional processes, and is normal at some level on the landscape. Large-scale trends, which are occurring regionally and beyond, include drought-triggered tree and shrub die-offs and large beetle, borer, and bud worm infestations. Qualitative observations indicate that populations of trees and shrubs have sustained themselves despite the increased mortality, suggesting that age class distribution is adequate to sustain populations.

Habitat Connectivity. The general trend is one of increasing fragmentation, both at the regional and local levels. Regionally, the topography and varied geology of the Planning Area cause a substantial background level of habitat fragmentation and habitat isolation, particularly in the lowest- and highest-elevation areas. The pattern of land ownership and private land development has further fragmented this landscape, with native habitat converted into agricultural and residential development in the Uncompahgre and North Fork valleys, and, to a lesser extent, the Norwood area and Paradox Valley. This has isolated the large areas of intact public land habitat into three distinct, separate blocks: 1) the area from Grand Mesa down to Dry Creek on the east side of the Uncompahgre Plateau; 2) the area northeast of Paradox Valley down to Third Park on the west side of the Uncompahgre Plateau; and 3) the area on the southwest of Paradox Valley to the UFO boundary. A more subtle fragmentation of habitat on Decision Area lands has occurred due to the development of roads, pipelines, canals, and other disturbed areas. This kind of fragmentation has brought in weeds and degraded habitat along these corridors so that areas of intact or suitable habitat for some plant species become separated from one another. Lower-level fragmentation is expected to continue as growth and development continue.

Photosynthetic Activity. Overall, large areas of BLM-administered land do not have plant communities that take full advantage of sunlight, but there have been improvements over time in some areas. While inadequate cool season grass was identified as the biggest problem in land health assessment data, trend data show substantial improvements over the past decades. Data from the set of 190 trend studies show that perennial cool season grasses increased over the past 20 to 30 years in 54 percent of areas and declined in 34 percent, while 12 percent had no perennial cool season grasses. Warm season grass was a lesser problem in the land health assessment data, but trend data indicate it is continuing to diminish on the landscape, with 15 percent of studies showing an increase in warm season cover, 25 percent declining, and 61 percent with none. Physical disturbances, the spread of invasive cool season annuals and seeded species, and heavy grazing (especially through the duration of the growing season for a particular type of plant) have been primary causes for reduced photosynthetic activity. Climate change may disrupt the moderate improving trends that BLM-administered lands have shown over the past 30 years. If monsoonal patterns are changed to reduce moisture during the summer months, it is likely that warm season grasses will continue to decline. If spring and fall moisture dries out, reductions in cool season plants are expected.

Litter Accumulation. Trends in plant litter accumulation and contributions to the soil indicate a general lack of problems and that plant litter has increased over the past 30 years. The land health assessment data showed that only 5 percent of sites appeared to have too little litter. An increase in plant litter was shown in 67 percent of long-term trend studies. Litter accumulation is affected by grazing, wind and water erosion, and ground-disturbing activities. To date, these activities generally appear to be consistent with increasing litter accumulation. Invasions of annual invasive species have increased litter in some areas and may disrupt natural litter and carbon cycles, as well as soil organic matter. The forecast

for plant litter is a likely continued increase as the existing trends continue and invasive annual plants continue to increase.

Landscape Patterns. There is some evidence that vegetation is gradually becoming more uniform, although the Planning Area does not appear to be substantially affected yet. Within that overall trend, lower-level trends are occurring that have moved parts of the landscape in the opposite direction. Wildfire is burning an average of 0.16 percent of the Decision Area each year, and vegetation management practices, such as rollerchops and prescribed burns that result in younger age classes, affect another 0.18 percent of the Decision Area per year on average. Because some studies (Eisenhart 2004; Baker and Shinneman 2004) suggest a 250-year fire return interval for woodland, approximately 0.4 percent of the vegetation would need treatment or fire annually. This suggests that the vegetation is gradually aging, and the pattern is generally becoming more uniform across the landscape. Counteracting trends include the large woodland conversion projects of the 1960s and the recent fuels control work around wildland-urban interface areas. The land health assessments have determined that, in general, early seral (or grass- and forb-dominated) vegetation is most lacking, with most of the landscape units needing more of this stage on the landscape. Early mid-seral stage (shrub- and grass-dominated) vegetation is also lacking in the majority of units. While late-stage vegetation (mature tree or shrub) is too abundant in just over half of the units, it is lacking in other units.

Riparian and Wetland Vegetation

Vegetation Indicators. No measured trends are available for riparian plants, but, overall, these indicators have been stable to improving. Riparian vegetation appears generally healthy, with stable conditions to date for streams in the Planning Area, but with problems along rivers. Riparian Proper Functioning Condition data from 162 reaches indicates that between 70 and 85 percent of studied reaches have wetland species, high vigor vegetation, appropriate age class structure and species composition, and adequate riparian vegetation cover. Inappropriate grazing can lead to the loss of desirable plants, but there are very few streams with this problem in the Planning Area. Channel dewatering from upstream diversions associated with private water rights appears to be the biggest factor behind low-vigor riparian vegetation. The BLM has acquired some minimal instream flows for many of the larger streams to protect them from further dewatering. The rivers, with the exception of the San Miguel, are mostly impacted by altered flow regimes tied to upstream reservoir management. This has resulted in changes in species composition and loss of young age classes of cottonwood and willow. These trends are expected to continue unless reservoir management changes to simulate spring flooding. The forecast for climate change may cause widespread reductions in riparian plant vigor that will ultimately affect riparian composition, reproduction, age class distribution, and streambank cover.

Weeds, particularly tamarisk, are a significant problem in these riparian areas and, in a few cases, dominate the vegetation. Forty-six percent of sampled riparian areas in the Planning Area had exotic or noxious species at some level within the native vegetation. While tamarisk control work has been done with herbicide on a number of Planning Area streams, the tamarisk beetle, which has already become established in the Planning Area, shows great promise for ultimately providing long-term tamarisk control. This will result in improvements to riparian vegetation vigor and composition in the future, although other weeds are present, which may diminish this gain. The forecast for climate change and the projected earlier snowmelt, reduced precipitation, and warmer temperatures may cause widespread reductions in riparian plant vigor that negates the improvements from tamarisk control.

Hydrologic Indicators. These indicators also show little change. There are very few instances of channel downcutting, widening, sinuosity, or increasing width-to-depth ratios. Hydrologic impacts on stream channels are most evident along the Dolores River and sections of the San Miguel River, which have been dewatered for many years; these changes are minor. While there are no measured trends for

hydrologic changes, Riparian Proper Functioning Condition data indicate that 75 to 88 percent of reaches studied have point bar colonization and adequate streambank vegetation to protect streambanks during floods (BLM 2009b). Activities such as heavy grazing, mining, and uncontrolled recreation use, which remove streambank vegetation, can be drivers of channel widening or downcutting and dewatering of the riparian area. These have been very limited in the Planning Area and have been reduced in scope over the past 20 years. Stream dewatering from upstream diversions is one of the largest influences on channel morphology and hydrologic indicators in the Planning Area.

Weeds

Spread of New and Existing Weed Species. Noxious weeds continue to spread rapidly across the western United States. The Planning Area is no exception, with creeping perennials like hoary cress, oxeye daisy, Russian knapweed, and spotted knapweed spreading at rates of 8 to 24 percent per year (Duncan and Clark 2005). Evidence of this spread includes the recent appearance of the following noxious weed species previously absent from this area:

- yellow star thistle near Colona and Paonia and along P12 Road in Montrose County
- spotted knapweed along Highway 90
- diffuse knapweed in an old woodcut
- jointed goatgrass along county roads
- absinth wormwood in and around Ouray
- meadow knapweed in the Owl Creek Pass area
- oxeye daisy throughout riparian areas in the San Miguel River and upper North Fork watersheds

Competition with Native Vegetation. Other exotic species are increasing within areas of native vegetation. Estimates from a sampling of 190 twenty to thirty-year-old trend studies on Decision Area lands indicate that 46 percent had no exotic species either at the time the study was initiated or at the last reading of the study, while 40 percent had increasing levels of exotics, and 14 percent had declines in exotics. This has generally been substantiated and further clarified by land health assessment data. There is concern that some winter annuals like cheatgrass have the potential to overtake native vegetation, alter fuel and fire regimes, and ultimately displace entire native communities as has happened in other ecoregions. There is little evidence that this is happening on a large scale yet, as there has not been a dramatic increase in fire frequency or fires fueled by invasive annuals. Some cheatgrass-fueled burns have occurred, indicating that it is happening in localized areas.

Landscape Disturbances. Many weed invasions are tied to disturbances on the landscape. Based on partially completed road and weed inventories, about 58 percent of travel routes in the Decision Area have noxious weed infestations within 15 feet, while an estimated 70 percent of ponds have noxious weeds associated with them. Weeds are also commonly found in riparian areas and drainages, with 46 percent of riparian areas sampled having exotic or noxious species at some level within native vegetation. Past vegetation treatments have included seeding of nonnative species, contributing to high levels of undesirable plants such as crested wheatgrass. Based on staff observation, the scale of disturbances infested with exotic annuals is probably even greater.

It is likely that noxious weeds and exotic plants will continue to stay at high levels and increase in some locations in the Planning Area. Increasing population densities and development trends on private lands, increasing recreation use, increasing mineral and oil and gas development, irrigation ditches, wildlife corridors, and sustained livestock grazing are all factors that will promote weeds and exotic species to the detriment of native plant communities.

The phenomenon of climate change is also likely to favor weeds over natives, as mountain climates move upward in elevation and desert southwest climates move into western valleys, causing disruptions

in native plant communities (Ray et al. 2008). However, the risk that exotics and noxious weeds will overtake native vegetation across substantial amounts of the Decision Area seems unlikely over the next 20 years due to active an integrated weed management program.

3.1.6 Fish and Wildlife

This section describes the existing conditions of fish and wildlife resources within the Planning Area, including aquatic and terrestrial animal species and their habitats. Fish and wildlife resources include big game, upland game, waterfowl, raptors, migratory birds, small mammals, reptiles, amphibians, and fish. Colorado Parks and Wildlife (CPW) and USFWS have primary responsibilities for management of fish and wildlife species in the Planning Area. The BLM is responsible for land management. Therefore, on BLM-administered lands in the Decision Area, the BLM is directly responsible for the management of habitat for fish and wildlife species and indirectly responsible for the health of fish and wildlife populations that are supported by these habitats.

Current Conditions

Habitat Types

An overview of fish and wildlife habitats in the Planning Area is provided in the existing conditions discussion in **Sections 3.1.4** (Water Resources) and **3.1.5** (Vegetation). Additional details particularly important to fish and wildlife management are presented here.

Dominant habitat types in the Planning Area correspond with the principal vegetation communities and include tall and low shrublands, desert shrub, grassland, woodland, forest, and riparian. Other localized habitats include rocks and cliffs, caves and mines, barren slopes, and water bodies. Vegetation communities vary based on precipitation, elevation, topography, slope, aspect, geology, soils, and other environmental variables. Habitat type and quality are further characterized by site-specific attributes such as vegetation cover, composition, and structure.

Dominant Habitats in the Planning Area

Sagebrush provides important habitat for sagebrush-dependent bird species, including sage sparrow (*Artemisiospiza belli*), Brewer's sparrow (*Spizella breweri*), and Gunnison sage-grouse (*Centrocercus minimus*). Sagebrush also provides important winter range for mule deer (*Odocoileus hemionus*) and foraging habitat for open-country raptors. Salt desert shrub provides habitat for pronghorn (*Antilocapra americana*), winter range for mule deer and elk (*Cervus canadensis*), and birds such as horned lark (*Eremophila alpestris*) and Swainson's hawk (*Buteo swainsoni*). Grasslands provide habitat for northern harrier (*Circus cyaneus*), lark sparrow (*Chondestes grammacus*), prairie dog (*genus Cynomys*), and numerous other species. Pinyon-juniper woodlands and mixed mountain shrub communities provide habitat for bats, big game, ravens, and a variety of songbirds. Forests of cottonwood, aspen, ponderosa pine, and Douglas-fir provide habitat for big game such as elk, mule deer, and black bear (*Ursus americanus*), and habitat for a host of forest and woodland species, notably raptors, squirrels, bats, and songbirds, including cavity-nesting species. Riparian and aquatic habitats such as streams, rivers, and springs support warblers, raccoons, frogs, toads, and other species (aquatic species are discussed below).

Rock complexes provide unique habitats that are used by many species of wildlife. Cliff-nesting birds include golden eagle (*Aquila chrysaetos*), prairie falcon (*Falco mexicanus*), peregrine falcon (*Falco peregrinus anatum*), swallows, and swifts. Rocky canyons and slopes provide essential habitat for bighorn sheep (*Ovis canadensis nelsoni*) and preferred hunting areas for mountain lion, bobcat, and ringtail. Boulder piles may be occupied by American pika, marmot, and various species of woodrats and other rodents. Several bat species roost, hibernate, and breed in rock crevices, caves, and mines.

Water bodies, including rivers, perennial and intermittent streams, ponds, springs, and water diversions, provide habitat for fish, amphibians, and aquatic mammals such as beaver, river otter, and mink. Rivers and streams in the Planning Area include middle-elevation reaches characterized by higher gradients, fast water velocity, and normally clear, cool water. These reaches tend to support native and introduced trout species, mink, and relatively low diversity of amphibian species. At lower elevations in the Planning Area, rivers and streams are typically lower gradient with slower velocity; water may be sediment laden and warm during summer. These reaches typically support a mix of native and introduced warm water fish species, beaver and muskrat, and a higher diversity of amphibian species.

Key Fish and Wildlife Species

Table 3-17 (Key Fish and Wildlife Species) lists species of high priority for BLM management efforts due to their economic value, regulatory status, high public interest, or other qualities. Special status species are discussed in **Section 3.1.7** (Special Status Species).

Table 3-17
Key Fish and Wildlife Species

Species or Group	Rationale for Key Designation
Birds	
Waterfowl and shorebirds	Economic and recreational value
Upland game birds	Economic and recreational value
Migratory birds	High interest and protected by law
Golden eagle	High interest and protected by law
Other Raptors	High interest, protected by law, top of food chain
Mammals	
Bighorn sheep; Rocky Mountain and desert	High economic and recreational value
Black bear	High interest, economic and recreational value
Elk	High interest, economic and recreational value
Moose	High interest, economic and recreational value
Mountain lion	High interest, economic and recreational value
Mule deer	High economic and recreational value
Pronghorn	High economic and recreational value
Gunnison and white-tailed prairie dogs	High interest, species declines, and listing petitions
River otter	High interest, economic value
Bats	High interest
Fish	
Rainbow, brown, and cutthroat trout	High interest, economic and recreational value

The following discussion of fish and wildlife in the Planning Area, including assessments of species distribution and population trends, is based on UFO data files, personal experience of UFO biologists, CPW Species Activity Maps (CPW 2009), and several general references on the zoology of the region. These include Colorado Birds (Andrews and Righter 1992), Colorado Breeding Bird Atlas (Kingery 1998), Birds of Western Colorado Plateau and Mesa Country (Righter et al. 2004), Amphibians and Reptiles of Colorado (Hammerson 1999), and Mammals of Colorado (Fitzgerald et al. 1994).

Birds

Waterfowl. Streams, rivers, reservoirs, ponds, canals, and associated riparian vegetation provide habitat for waterfowl and shorebirds. Canada goose, mallard, green-winged teal, common merganser, and American widgeon are a few of the more common game waterfowl species found in the area. Great blue heron, great egret, sandhill crane, and other wading birds and shorebirds can be found along major rivers, valleys, and irrigated fields, many as spring and fall migrants.

Upland Game Birds. The quality of upland game bird habitat depends on the availability of mixed shrubby and herbaceous vegetation for nesting, brood rearing, foraging, and thermal cover. Riparian habitat plays an important role as a source of food, water, and cover for many upland birds. Dusky grouse are widely distributed throughout the higher-elevation woodlands and into adjacent shrublands. Wild turkeys occupy ponderosa pine and Gambel oak woodlands, mixed mountain shrub, pinyon-juniper woodlands, and riparian areas. Chukar and Gambel's quail, both introduced in the Planning Area by CPW for sport hunting, occur in rocky foothills, canyons, and valleys, primarily in the north and central portions of the Planning Area along the Uncompahgre-Gunnison River watershed. Mourning doves occupy a variety of habitats across the Planning Area. Ring-necked pheasants are common in agricultural lands and adjacent riparian areas.

Raptors. Raptors in the Planning Area include eagles, falcons, hawks, and owls. Golden eagles, red-tailed, sharp-shinned, ferruginous, Swainson's, and Cooper's hawks, peregrine and prairie falcons, northern harrier, and American kestrel are the most common diurnal species. Great-horned owl and several other owl species occupy mostly wooded habitats in the Planning Area, while the burrowing owl occurs in open landscapes usually associated with prairie dogs. Cliffs, rocky outcrops, and large trees provide nesting habitat for most of these species, while a few nest in tree cavities or on the ground.

Migratory Birds. The Planning Area supports a variety of migratory bird species, including neotropical migrants. A migratory bird literature review by the UFO (Lambeth and Reeder 2009) compiled a database of all migratory birds that occupy the Planning Area, mapped migratory bird species diversity in all four seasons, reviewed conservation plans from various agencies and conservation groups, and developed management recommendations and conservation opportunities for migratory birds in the Planning Area. At least 240 bird species are considered residents or annual visitors in the Planning Area. Species richness is highest in spring and fall due to the presence of migrants, with water and riparian land cover types showing the highest diversity of species. For upland habitats during spring through fall, species richness is generally higher in mid- to high-elevation shrublands and forests, but, in winter, pinyon-juniper woodlands and lower-elevation shrublands support the most species.

Recent studies and monitoring suggest that some of these populations are declining, due in part to land use and management practices and habitat loss and degradation (USFWS 2008). Some of the bird species in the Planning Area have been identified by USFWS as Birds of Conservation Concern (USFWS 2008). These bird species, and their habitats and conservation status, are listed in **Table 3-18** (Birds of Conservation Concern). Several species of concern listed here are also addressed in **Section 3.1.7** (Special Status Species).

Table 3-18
Birds of Conservation Concern

Species	Habitat Description	UFO Range and Status[1]
Gunnison sage-grouse *Centrocercus minimus*	Sagebrush communities for hiding and thermal cover, food, and nesting; open areas within sagebrush stands for leks; sagebrush-grass-forbs mix for nesting; wet meadows for brood rearing	Year-round resident Breeding
American bittern *Botaurus lentiginosus*	Marshes and wetlands; ground nester	Spring/ summer resident Breeding confirmed in region but not within Planning Area
Bald eagle[2] *Haliaeetus leucocephalus*	Nests along forested rivers and lakes; winters in upland areas, often with rivers or lakes nearby	Fall/winter resident Rarely nesting in river valleys
Ferruginous hawk *Buteo regalis*	Open, rolling and/or rugged terrain in grasslands and shrub-steppe communities; also grasslands and cultivated fields; nests on cliffs and rocky outcrops	Fall/ winter resident Non-breeding
Golden eagle *Aquila chrysaetos*	Open country, grasslands, woodlands, and barren areas in hilly or mountainous terrain; nests on rocky outcrops or large trees	Year-round resident Breeding
Peregrine falcon[2] *Falco peregrinus*	Open country near cliff habitat, often near water such as rivers, lakes, and marshes; nests on ledges or holes on cliff faces and crags	Spring/summer resident Breeding
Prairie falcon *Falco mexicanus*	Open country in mountains, steppe, or prairie; winters in cultivated fields; nests in holes or on ledges on rocky cliffs or embankments	Year-round resident Breeding
Snowy plover[3] *Charadrius alexandrines*	Sparsely vegetated sand flats associated with pickleweed, greasewood, and saltgrass	Rare spring migrant Non-breeding
Mountain plover *Charadrius montanus*	High plain, cultivated fields, desert scrublands, and sagebrush habitats, often in association with heavy grazing, sometimes in association with prairie dog colonies; short vegetation	Rare spring/fall migrant Non-breeding
Long-billed curlew *Numenius americanus*	Lakes and wetlands, and adjacent grassland and shrub communities	Spring/fall migrant Non-breeding
Yellow-billed cuckoo[4] *Coccyzus americanus*	Riparian, deciduous woodlands with dense undergrowth; nests in tall cottonwood and mature willow riparian, moist thickets, orchards, abandoned pastures	Summer resident Breeding
Flammulated owl *Otus flammeolus*	Montane forest, usually open and mature conifer forests including ponderosa pine, Douglas-fir, aspen, and aspen-conifer mix	Summer resident Breeding
Burrowing owl *Athene cunicularia*	Open grasslands and low shrublands often in association with prairie dog colonies; nests in abandoned burrows created by mammals; short vegetation	Spring/summer/fall resident Breeding, very few records in recent years
Lewis's woodpecker *Melanerpes lewis*	Open forest and woodland, often logged or burned, including oak, coniferous forest (often ponderosa pine), aspen, riparian woodland, and orchards, less often in pinyon-juniper	Year-round resident Breeding
Willow flycatcher[3] *Empidonax traillii*	Riparian and moist shrubby areas; winters in shrubby openings with short vegetation	Summer resident Breeding
Gray vireo *Vireo vicinior*	Pinyon-juniper and open juniper-grassland	Summer resident Breeding

Species	Habitat Description	UFO Range and Status[1]
Pinyon jay *Gymnorhinus cyanocephalus*	Pinyon-juniper woodlands	Year-round resident Breeding
Juniper titmouse *Baeolophus griseus*	Pinyon-juniper woodlands, especially juniper; nests in tree cavities	Year-round resident Breeding
Veery *Catharus fuscescens*	Deciduous forests, riparian, shrubs	Possible summer resident observed in Gunnison County Possible breeding
Grace's warbler *Dendroica graciae*	Mature ponderosa pine forests	Summer resident Breeding
Brewer's sparrow *Spizella breweri*	Sagebrush-grass stands; less often in pinyon-juniper woodlands	Summer resident Breeding
Chestnut-collared longspur *Calcarius ornatus*	Open grasslands and cultivated fields	Spring migrant Non-breeding
Black rosy-finch *Leucosticte atrata*	Open country including mountain meadows, high deserts, valleys, and plains; breeds/nests in alpine areas near rock piles and cliffs	Winter resident Non-breeding
Brown-capped rosy-finch *Leucosticte australis*	Alpine meadows, cliffs, and talus and high-elevation parks and valleys	Summer resident Breeding
Cassin's finch *Carpodacus cassinii*	Open montane coniferous forests; breeds/ nests in coniferous forests	Year-round resident Breeding

Source: USFWS 2008
[1]Assessment based on UFO files and GIS data, partner data, and local knowledge
[2]ESA delisted species
[3]Non-listed subspecies/population
[4]ESA candidate species

Reptiles. Reptile species in the Planning Area are most diverse in lower elevations and drier habitats, such as shrublands, pinyon-juniper woodlands, and associated riparian areas. Reptile species diversity is consequently higher in the drier western portion of the Planning Area where these habitats are more common. Common species in the Planning Area include gopher snake, western rattlesnake, western terrestrial garter snake, sagebrush lizard, fence lizard, plateau striped whiptail, and collared lizard.

Mammals

Big Game. CPW mapped some of the important seasonal habitats for big game, particularly hooved mammals. Elk and mule deer are the most abundant and widespread big game species in the Planning Area. During summer, elk occupy higher, often forested elevations and the Planning Area includes a few of the mapped calving areas and summer concentration areas. Mule deer also typically move to higher, forested elevations in summer, although some remain resident year-round in lower valleys along riparian areas or agricultural and urban areas. Elk and mule deer mostly migrate to lower elevations in winter and utilize pinyon-juniper woodland, mountain shrub, sagebrush, and agricultural areas. BLM-administered lands provide the majority of deer and elk winter range in the Planning Area. Crucial winter ranges, consisting of CPW-defined severe winter range and winter concentration areas, are considered critical to maintaining mule deer and elk herds at desired levels in the Planning Area. The UFO has participated with agency and private landowner partners on many recent programs and projects to protect and improve big game winter range, including the Uncompahgre Project collaborative landscape-scale planning and brush treatment projects, brush and woodland treatments on Fruitland Mesa, and projects with CPW in the region of the Billy Creek State Wildlife Area.

Pronghorn occur in limited numbers in the northeast portion of the Planning Area near Delta, Colorado. BLM-administered lands provide the majority of the salt desert shrub habitat used by these open-country animals in the Planning Area.

CPW introduced moose into the San Juan Mountains southeast of the Planning Area, and more recently onto Grand Mesa north of the Planning Area. While no moose are permanently established within the Planning Area, emigrants from the established populations occasionally move into adjacent forested areas and move through the river valleys and foothills. Primary habitat for moose in Colorado is montane willow stands and similar wetland areas, along with adjacent forest stands and meadows.

Black bear are common in more mesic habitats and riparian areas throughout much of the Planning Area. BLM-administered lands supporting aspen forest, Gambel oak shrublands, and pinyon-juniper woodlands provide key habitat for black bears, particularly in fall when bears seek rich foods, including oak acorns and pinyon nuts, as they prepare for hibernation.

Mountain lion are uncommon but widely distributed in the Planning Area, mainly in drier forest types and shrublands above the valleys. Mountain lions tend to favor rough terrain such as canyon edges and, in the Planning Area, are highly dependent on migratory herds of mule deer and elk, their primary prey.

A description of desert and Rocky Mountain bighorn sheep in the Planning Area is presented in **Section 3.1.7** (Special Status Species).

Small Mammals. Small mammal species include mountain and desert cottontail rabbits, white-tailed jackrabbit, striped and spotted skunks, raccoon, several species of ground squirrels, chipmunks, mice, and woodrats, white-tailed prairie dog in the Uncompahgre and Gunnison River watersheds, and Gunnison's prairie dog in the western part of the Planning Area.

Seventeen bat species are known to occur in the Planning Area. Species such as the big brown bat are common in urban areas and around human settlement. Species such as the little brown bat, hoary bat, long-legged myotis, fringed myotis, and silver-haired bat are most common in forested areas. Other species are more common in desert shrublands and pinyon-juniper woodlands at lower elevations, including the California myotis, western pipistrelle, and pallid bat. Some species, such as the big free-tailed bat, Allen's lappet-browed bat, and Yuma myotis, are rare since the Planning Area is located at the northern or eastern edges of their breeding ranges which primarily occur in the desert southwest. The spotted bat, uncommon throughout its range, occupies rocky canyons in the Planning Area. Townsend's big-eared bat, also uncommon throughout its range, utilizes abandoned mines as hibernacula and maternity roosts, with most of Colorado's five known roosts in abandoned mines in western Colorado. Many bat species are closely associated with streams and riparian areas. In winter, bats in the region either hibernate or migrate south. Bats roost in trees, caves, mines, rock crevices, rock piles, buildings, bridges, and other protected situations, and roost preference differs by species. Bats are especially vulnerable to human disturbance at maternity roosts where young are raised and winter hibernation sites; protection of these roosts is an important conservation concern.

Furbearers. Coyotes, bobcats, raccoons, red foxes, and muskrats occur in all habitat types throughout the Planning Area, with coyotes being the most abundant. In the Planning Area, river otters are found in the San Miguel, Dolores, and Gunnison rivers, and in major tributaries with abundant fish.

Aquatic Species. Game fish include rainbow, brown, brook, and cutthroat trout. Non-game fish include carp, sculpin, dace, minnows, suckers, cottids, shiners, and sunfish. Amphibians occur exclusively or seasonally in most aquatic systems throughout the Planning Area. The most common amphibians include the western chorus frog, tiger salamander, and Woodhouse's toad.

Trends

Wildlife Populations

A Data Analysis Unit is a geographic area that represents the year-round range of a big game herd, and includes all of the seasonal ranges of a specific herd. In the Planning Area, elk numbers typically exceed and mule deer numbers typically fall short of CPW population targets for Data Analysis Units. The BLM seeks to cooperate with CPW management aimed at reducing populations that exceed objectives and increasing populations that fall below objectives.

Current trends for fish, amphibians, and other aquatic species are largely unknown. With the limited data available, it appears that most raptor populations are stable. However, a number of migratory bird and neotropical passerine populations are declining across the Planning Area. Although data are lacking, other non-game populations, including furbearers, small mammals, and reptiles, are expected to be stable. Those wildlife species or populations thought to be at risk or declining are monitored and tracked as special status species (as described in **Section 3.1.7** [Special Status Species]).

Declining Habitat

Wildlife diversity and abundance typically reflect the diversity, quality, and quantity of habitat. In general, habitats have declined over time. Possible causes include conversion of native vegetation to agricultural uses, noxious weed infestations, and increased recreational use of public lands. The effects of habitat decline vary for each species. While problems such as poor browse conditions for wintering big game are present in some areas, most of the Planning Area appears to be meeting land health objectives. Still, sagebrush and salt desert habitats, in particular, have been reduced in area and quality in the Planning Area and other regions across the United States. These sites are at risk due to overgrazing, cheatgrass and other weed invasions, pinyon-juniper succession, and other factors. Wildlife that depend on these habitat types have declined in abundance and range (see **Section 3.1.7** [Special Status Species]).

Monitoring Results

Long-term systematic monitoring of wildlife habitat conditions, such as with permanent transects, has not been conducted in most of the Planning Area. Currently, the best available information is derived from annual land health assessments, including a limited number of vegetation transects in select areas. The entire Decision Area has been assessed using the land health methodology. Portions of each landscape were found to be meeting, meeting with problems, or not meeting BLM Colorado Public Land Health Standards. The following is a summary of the most common conditions observed in problem areas, along with the significance to wildlife and fish.

Low cover by perennial cool season and warm season grasses and forbs. Cover by desirable native species is lower than expected for a particular site's ecological potential. This problem is most evident at drier low-elevation sites in the Decision Area. Low-elevation sites also sustain heavier concentrations of grazing wildlife and livestock, which may further reduce palatable native grasses. Among other benefits, healthy stands of native perennial grasses and forbs provide essential hiding and breeding cover and forage for many wildlife species.

Low plant community diversity. Plant community diversity is lower than expected for a particular site's ecological potential. This problem is often observed in connection with other symptoms, such as weeds and overbrowsing. Typically, diverse plant communities or heterogeneous habitats are more resilient to disturbances, more productive, and provide habitat for a greater number of wildlife species and individuals than uniform or homogenous plant communities. Vegetation patches that vary in type, size, shapes, and juxtaposition across a landscape are typically desired so that multiple species benefit.

Low seral stage diversity. Seral stage refers to a specific period in the development or succession of the plant community. Seral stage influences structural and spatial diversity of plant assemblages. Typically, low seral stage diversity across a landscape, such as closed-canopy pinyon-juniper, provides relatively poor habitat from a multi-species standpoint. Where late seral stages of forest communities are reduced, habitat quality for some wildlife species such as cavity-nesting birds may be reduced.

Low vegetation age-class diversity. Areas are dominated by an even-aged stand of vegetation, such as sagebrush, and some sites may be closed canopy or stagnant (e.g., lacking cover with understory grasses). Like plant community and seral stage diversity, a diverse age-class community or population is typically more resilient to environmental disturbances and provides habitat for a greater number of species than even-aged stands of vegetation. Age-class diversity also indicates that vegetation reproduction and recruitment are occurring, another indicator of land health.

Excessive weeds and/or threat of invasion. Weeds, including cheat grass, other annuals, and noxious species, are at moderate to high levels in some areas and have invaded some undisturbed sites. In some cases, weed cover occurs at a level that poses an invasion risk, should a major disturbance such as fire or drought occur. Exotic and noxious weeds often displace native vegetation, typically resulting in degraded or unsuitable habitat for wildlife.

Pinyon-juniper encroachment. Pinyon juniper communities are expanding beyond their perceived or known historical range or are increasing in canopy cover. Pinyon-juniper encroachment can render habitat unsuitable or poor for some species, such as Gunnison sage-grouse, and may alter plant community productivity, particularly in the understory community.

Habitat fragmentation, degradation, and loss. Road expansion, recreation, agriculture, and residential developments are increasing habitat fragmentation and degrading some habitats through the introduction of weeds. Disturbances may negatively impact some species and benefit others.

Degraded or unsuitable habitat due to past vegetation treatments. Some vegetation treatments have resulted in poor or unsuitable habitat for wildlife. In the Planning Area, the most common example is the conversion of sagebrush communities to crested wheatgrass stands. Crested wheatgrass plantings create a monoculture that typically results in poor habitat structure and diversity for wildlife, with exceptions such as big game, and contributes to declines in sagebrush obligate populations. In addition, cheatgrass, annuals, and noxious weeds have invaded a number of treatment areas. However, when done properly, sagebrush thinning can promote herbaceous production and forbs cover. Thus, some treatment areas in the UFO are recovering well and have resulted in improved conditions for wildlife.

Over-browsed shrubs and trees. Abnormal growth form, hedging, poor leader growth, high or conspicuous browse-line heights, and similar problems indicate overuse by wildlife and livestock. This problem is most evident where big game and livestock use overlap. Intensive browsing of shrubs can cause shifts in vegetation, which can impact birds, small mammals, and other wildlife. This may indicate an imbalance between big game numbers, livestock stocking rates, and animal distribution, and the capacity of a habitat to support these population levels.

Poor vigor of shrubs. Decadent plants, dead plants, poor leader growth, and marginal seed production are observed in some areas. These problems are often observed in association with heavy browsing and foraging damage by grazing animals. The health and persistence of native shrubs is critical to provide essential cover, food, and structural diversity for many wildlife species.

Loss and/or degradation of crucial habitats. Impacts from developments, weeds, recreation, and similar activities may result in short or long-term loss or degradation of crucial habitats, such as big game severe winter range and production areas.

Landscape and habitat connectivity problems. Roads, fences, trails, rangeland conversions, power lines, energy corridors, and other human developments may impede or prevent animal movement and migration.

Declining wildlife populations. Wildlife populations, such as neotropical migratory birds, may be declining.

Overabundance or unwanted growth of wildlife populations. Some wildlife species are exceeding habitat carrying capacity and may be contributing to site degradation. Overpopulation may be inferred from both habitat condition and utilization indices, such as overbrowsing or hedging of shrubs, scat, and weed proliferation, and harvest/population data collected by CPW.

Poor water quality, channelized streams, and poor or weedy riparian vegetation. Riparian habitat is crucial to the survival of species in arid environments. In addition, the condition of fish habitat is intrinsically linked to the condition of adjacent riparian habitat and stream channel characteristics. Among other benefits, riparian vegetation moderates water temperatures, reduces stream bank erosion, and provides cover for fish. Amphibian and aquatic invertebrate species richness and diversity are strongly correlated with water quality and hydrologic conditions.

Further discussion of land health trends and causal factors can be found in **Section 3.1.5** (Vegetation).

3.1.7 Special Status Species

Special status species are those that:

- have been proposed for listing or officially listed as threatened or endangered
- are candidates for listing as threatened or endangered under the provisions of the ESA
- have been listed by a state in a category such as threatened or endangered, implying potential endangerment or extinction
- have been designated by each BLM State Director as sensitive

The BLM cooperates with the USFWS to identify and manage critical habitat for listed species, in addition to habitat previously designated, with the ultimate goal of species recovery and viability. Candidate species are managed to maintain viable populations to avoid listing. State of Colorado and BLM sensitive species are treated similarly. The BLM, USFWS, and State of Colorado have developed formal and informal agreements to provide guidance on species management. Consultation is required on any action proposed by the BLM or another federal agency that "may affect" a listed species or critical habitat.

Federal Endangered, Threatened, Proposed, and Candidate Species

The ESA, as amended (in 16 United States Code [USC] 1531-1534), mandates the protection of species listed as threatened or endangered of extinction and the habitats on which they depend. Section 7 of the ESA clarifies the responsibility of federal agencies to utilize their authority to carry out programs for the conservation of listed species. In addition, federal agencies must consult with the USFWS to insure that any action authorized, funded, or carried out by the agency is "…not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species…"

The UFO refers to the most current list of threatened, endangered, and candidate species Colorado by county provided on the USFWS website[3] to analyze the effects of proposed actions on threatened, endangered, and candidate species and designated critical habitat for these species.

The following section describes the current conditions and characterization of special status species in the Planning Area.

Current Conditions

Special Status Plants

Federally Listed Species. Two federally protected plant species are known to exist in the Planning Area, as shown in **Table 3-19** (Federally Listed Plant Species). Federally designated critical habitat for one of these plant species, the clay-loving wild buckwheat, also exists in the Planning Area. Some species are not known to inhabit in the Planning Area yet are included in this analysis due to historic populations in the area, adjacent known populations, the presence of suitable habitat, insufficient survey coverage, potential expansions or shifts in species ranges, and other factors. In accordance with BLM Manual 6840, Special Status Species Management, federal candidate species are managed as BLM sensitive species to prevent the need for future listing of species. Candidate species are discussed in *BLM Sensitive Species* subsection of this Special Status Species section.

Table 3-19
Federally Listed Plant Species

Common Name ***Scientific name***	**Federal Status**	**Designated Critical Habitat in Planning Area**
Clay-loving wild buckwheat *Eriogonum pelinophilum*	Endangered	No
Colorado hookless cactus *Sclerocactus glaucus*	Threatened	No

Source: USFWS 2018a

*Clay-loving wild buckwheat (*Eriogonum pelinophilum*).* Clay-loving wild buckwheat is confined to whitish alkaline, clay soils and soils of the Mancos Shale adobe badlands. This species is endemic to Montrose and Delta counties. The following is known about the species:

- Over 22 known occurrences of clay-loving wild buckwheat have been recorded by the Colorado Natural Heritage Program (CNHP) and the BLM:
  - Nine of these occurrences are found entirely or partially on BLM-administered land. Seven of these occurrences have not been relocated in over 20 years, and one occurrence could not be relocated upon revisit; however, all of these occurrences are on private land.
  - The 22 known occurrences are found on less than 600 acres of occupied habitat. Sites range in size from 1 acre to over 200 acres and contain anywhere from 100 to more than 10,000 individuals. Based on recent surveys, the total estimated population is likely more than 278,000 individuals on approximately 582 acres (USFWS 2009a).
- Clay-loving wild buckwheat is found on BLM-administered land on the Fairview North and Fairview South Areas of Critical Environmental Concern (ACECs), and on BLM-administered land immediately adjacent to Fairview South ACEC (Colorado Natural Areas Program 2010; USFWS 2009a).
  - The Fairview North ACEC is within the Gunnison Gorge NCA, which is outside the Planning Area.

[3] Found at https://ecos.fws.gov/ecp0/reports/species-listed-by-state-totals-report

  - The Fairview South occurrence is adjacent to another protected site, the Wacker Ranch Natural Area. The Wacker Ranch was purchased through a cooperative USFWS Recovery Land Acquisition grant to Colorado State Parks/Colorado Natural Areas Program and The Nature Conservancy specifically for protection of the clay-loving wild buckwheat.
- The remaining 50 percent of known occurrences are on scattered BLM-administered land and private land. Other BLM locations include Sunshine Road, Dry Cedar Creek, Garret Ditch, and several other locations within the Gunnison Gorge NCA Planning Area (USFWS 2009a).
- The BLM occurrences and the Wacker Ranch occurrence together comprise about 50 percent of the total known occurrences (USFWS 2009a) and 50 percent of the known geographic area (312 of 582 acres).
- Two of the occurrences on private land are protected by conservation easements through the Black Canyon Land Trust, but the remaining occurrences on private land are vulnerable to extirpation from land development. Therefore, the occurrences on BLM-administered land, especially the Fairview South occurrence, are critical to this species' persistence and recovery.

Clay-loving wild buckwheat was listed as endangered by USFWS in 1984, a Recovery Plan was finalized in 1988 (USFWS 1988a), and a ruling on a petition to list the species was issued in 2009 (USFWS 2009a). At the time of listing, there was only one known population on private land with less than 10,000 individuals. The entire geographic area of the then-only population (120 acres) was designated as critical habitat. The original critical habitat remains the only critical habitat, protecting approximately 200 plants.

The clay-loving wild buckwheat is threatened primarily by habitat loss from agricultural and residential development (USFWS 1988a). Trespass OHV use and overgrazing are also threats. The small population size and small geographic extent makes the clay-loving wild buckwheat vulnerable to catastrophic events such as wildfire.

The BLM has conducted monitoring of the clay-loving wild buckwheat at four plots on Fairview South. The BLM has also collaborated with USFWS to conduct inventories for clay-loving wild buckwheat. The following additional monitoring and protective/recovery actions for clay-loving wild buckwheat have been conducted since 2011:

- 2011–2012: UFO worked with USFWS, Montrose Model Airplane Club, and Colorado Natural Heritage Program to establish three exclosures to protect clay-loving wild buckwheat occurrences from recreation and to study the effects of livestock grazing on clay-loving wild buckwheat with a no-grazing control
- 2013: UFO established a 14-acre exclosure to protect clay-loving wild buckwheat from recreation impacts in the Elephant Skin area in the Gunnison Gorge NCA adjacent to but outside the Planning Area.
- 2008–2013: UFO established a long-term monitoring program for clay-loving wild buckwheat with five study plots: two in the Planning Area in the South Fairview ACEC, and three adjacent to but outside the Planning Area (in the Gunnison Gorge NCA)

Protections for the clay-loving wild buckwheat in the Fairview South ACEC include the following (BLM 1989a):

- Open to fluid minerals leasing with no surface occupancy stipulation
- Closed to disposal of mineral materials
- Available to livestock grazing unless studies determine threatened and endangered plants or habitats are being degraded
- Closed to OHV use

- Open to major utility development, except pipelines, provided there are no effects on threatened and endangered plants or habitats

The USFWS has ruled that revisions to critical habitat were warranted but precluded by other priorities. If additions to critical habitat for clay-loving wild buckwheat become a priority, the USFWS may identify BLM-administered land as critical habitat.

*Colorado Hookless Cactus (*Sclerocactus glaucus*).* Habitat for the Colorado hookless cactus, formerly the Uinta Basin hookless cactus, includes rocky hills, mesa slopes, and alluvial benches in desert shrub communities at elevations from 4,500 to 6,000 feet. The Uinta Basin Hookless Cactus Recovery Plan estimated that 15,000 individual plants exist in the Gunnison River population. Recent surveys near Delta, Colorado, suggest total population size and distribution may be much larger than originally thought. Within the Planning Area, this species is found primarily north of Montrose, Colorado, in the lower Uncompahgre River and Gunnison River valleys, with most subpopulations found near the city of Delta, Colorado. The Colorado hookless cactus was listed as threatened by the USFWS in 1979.

The taxonomy of the Colorado hookless cactus (*Sclerocactus glaucus* complex) has changed since its listing in 1979 (USFWS 2009b). The USFWS now recognizes the *Sclerocactus glaucus* complex as three separate species: the Colorado hookless cactus (*S. glaucus*), the Uinta Basin cactus (*S. wetlandicus*), and the Pariette cactus (*S. brevispinus*). The Uinta Basin and Pariette cacti are only found in Utah, outside the Planning Area.

There are 314 distinct Colorado hookless cactus occurrences occupying greater than 0.25-acre that are documented, and 950 occurrences occupying less than 0.25-acre within the Planning Area. This does not include the Dominguez-Escalante or Gunnison Gorge NCAs, both of which also contain significant occurrences adjacent to the Planning Area. Currently identified Colorado hookless cactus occurrences occupy more than 3,000 acres within the Planning Area. Numerous point-in-time counts conducted between 2012 and 2013 suggest that historic Element Occurrence Records drastically underestimate the size of the occurrences. Since the publication of the 2010 USFWS Recovery Outline, 94 new distinct occurrences have been documented within the Planning Area, totaling well over 2,000 individuals. Within the last 10 years, two newly designated wilderness areas have effectively protected a substantial portion of the species' range from development-related impacts, and the Dominguez-Escalante and Gunnison Gorge NCAs have added or are likely to add new protections specific to the conservation of the Colorado hookless cactus. Continued survey is likely to add significantly more new occurrences within the Planning Area.

BLM Sensitive Species. Species designated as BLM sensitive are native species found on BLM-administered lands for which the BLM has the capability to significantly affect the conservation status of the species through management and either:

1. There is information that a species has recently undergone, is undergoing, or is predicted to undergo a downward trend such that the viability of the species or a distinct population segment of the species is at risk across all or a significant portion of the species range, or
2. The species depends on ecological refugia or specialized or unique habitats on BLM-administered lands, and there is evidence that such areas are threatened with alteration such that the continued viability of the species in that area would be at risk.

All federal candidate species, proposed species, and delisted species in the five years following delisting are considered BLM sensitive species. BLM sensitive species may also include Colorado State endangered, threatened, and species of conservation concern; or plant species ranked as critically imperiled (G1 or S1) or imperiled (G2 or S2) by the CNHP. Sensitive species known to inhabit and

potentially inhabiting in the Planning Area are listed in **Table 3-20** (Sensitive Plant Species Known to Inhabit and Potentially Inhabit the Planning Area).

Table 3-20
Sensitive Plant Species Known to Inhabit and Potentially Inhabit the Planning Area

Common Name	Scientific Name
Crandall's rockcress	*Arabis crandallii*
Naturita milkvetch	*Astragalus naturitensis*
San Rafael milkvetch	*Astragalus rafaelensis*
Sandstone milkvetch	*Astragalus sesquiflorus*
Gypsum Valley cateye	*Cryptantha gypsophila*
Fragile (slender) rockbrake	*Cryptogramma stelleri*
Kachina daisy (fleabane)	*Erigeron kachinensis*
Montrose (Uncompahgre) bladderpod	*Lesquerella vicina*
Colorado (adobe) desert parsley	*Lomatium concinnum*
Paradox Valley lupine	*Lupinus crassus*
Dolores skeleton plant	*Lygodesmia doloresensis*
Paradox (aromatic Indian) breadroot	*Pediomelum aromaticum*

Source: BLM 2015d

All BLM sensitive species are managed in accordance with BLM Manual 6840, Special Status Species Management (BLM 2008i).

*Crandall's Rockcress (*Arabis crandallii*).* Habitat for this species includes limestone chip-rock and stony areas, often among sagebrush, ridges, and steep hill slopes. The species tends to grow in open, sometimes windswept locations, and is found at 8,100 to 10,600 feet in elevation. Based on current knowledge, the only known occurrence in the Planning Area is north of Highway 50 near Sheep's Knob on private land.

*Naturita Milkvetch (*Astragalus naturitensis*).* Habitat for the Naturita milkvetch includes the cracks and ledges of sandstone cliffs and flat bedrock areas with shallow soil development within pinyon-juniper woodlands at elevations of 5,000 to 7,000 feet. This species is found on mesas adjacent to the Dolores River and its tributaries in Montrose and San Miguel counties, including portions of the BLM Dolores Field Office. Recent surveys have found additional populations in the region, including a population in the Dominguez-Escalante NCA area in the BLM Grand Junction Field Office, and the species appears to be more abundant than originally thought.

*San Rafael Milkvetch (*Astragalus rafaelensis*).* San Rafael milkvetch habitat includes sparsely vegetated, sandy clay gulches at the foot of sandstone outcrops, boulders along dry watercourses, and gullied hills and washes in seleniferous soils. The species occurs in pinyon-juniper and sagebrush communities at 4,500 to 6,200 feet in elevation. The species is found in the east side of the Uncompahgre Plateau, as well as in Dolores River canyon, on side slopes, and tributary drainages near Uravan, Nucla, and Roc Creek. Recent analysis determined that San Rafael milkvetch is not genetically distinct from Grand Junction milkvetch (*Astragalus linifolius*), and it has been proposed that Grand Junction milkvetch be subsumed into San Rafael milkvetch. The species is known from fewer than 30 reliably documented locations overall (Statwick et al. 2016).

*Sandstone Milkvetch (*Astragalus sesquiflorus*).* Habitat for this milkvetch includes sandstone rock ledges, slickrock fissures, cliff talus, and sometimes, sandy washes at 5,000 to 5,500 feet in elevation. This species is found in the Dolores River canyon near Uravan and in the Paradox Valley area.

*Gypsum Valley Cateye (*Cryptantha gypsophila*).* This cateye species is confined to scattered gypsum outcrops and grayish-white, often lichen-covered, soils of the Paradox Member of the Hermosa Formation at elevations from 5,200 to 6,500 feet. It is often the dominant plant at these sites. Although suitable habitats are present, particularly in the Paradox Valley region, no populations have been found in the Planning Area. Several known populations exist in neighboring BLM field offices.

*Fragile (slender) Rockbrake (*Cryptogramma stelleri*).* Habitat for the fragile rockbrake includes cool, moist, sheltered calcareous cliff crevices and rock ledges, typically in coniferous forest or other boreal habitats. Known populations exist within the Planning Area but are restricted to higher elevation lands administered by the Forest Service.

*Kachina Daisy (*Erigeron kachinensis*).* This species of daisy is found in wet, seasonally flooded sites and in the shallow caves or hanging gardens of red sandstone cliffs at 4,800 to 8,400 feet in elevation. One population exists within the Planning Area in Coyote Wash near the Dolores River. Populations are also found along the Dolores River south and north of the UFO in the BLM Grand Junction and Dolores field offices. Suitable habitat is present in the Dolores River vicinity and other similar areas in the UFO, and future surveys will likely discover additional populations.

*Montrose Bladderpod (*Lesquerella vicina*).* This bladderpod species inhabits sandy-gravel soil comprised mostly of sandstone fragments over Mancos Shale adobe soils, primarily in pinyon-juniper woodlands or pinyon-juniper and salt desert scrub mixed communities at 5,800 to 7,500 feet in elevation. The species is found less often in sandy soils in sagebrush steppe communities. Distribution centers on the Uncompahgre River Valley in south Montrose County and north Ouray County, with most populations near the town of Montrose. However, outlying subpopulations persist near Escalante Canyon just south of the Delta County line, and north to the Peach Valley area in the Gunnison Gorge NCA in Montrose County.

*Colorado Desert Parsley (*Lomatium concinnum*).* This species of parsley prefers barren adobe soils derived from Mancos Shale in shrub-dominated communities, including sagebrush, shadscale, or scrub oak at 4,300 to 7,300 feet in elevation. The species is found along the lower Uncompahgre and Gunnison River valleys in Montrose, Delta, and Ouray counties.

*Paradox Valley Lupine (*Lupinus crassus*).* Paradox Valley lupine is typically found in or near pinyon-juniper or juniper woodland at 5,000 to 5,800 feet in elevation, on shales, quaternary alluvium, and other sparsely vegetated soils. The species is often found in drainages in the Paradox Valley near Nucla and Naturita.

*Dolores Skeleton Plant (*Lygodesmia doloresensis*).* Habitat for the Dolores skeleton plant includes juniper-shrub or juniper-grassland communities in reddish-purple alluvial soils derived from sandstone outcrops at 4,000 to 5,500 feet in elevation. Most of these plants are found along benches between canyon walls and the river in juniper, shadscale, or sagebrush communities. Distribution includes the Dolores River Valley near Uravan, Colorado, and Escalante Canyon, near Delta, Colorado. This species has only been confirmed within the UFO since 2015.

*Paradox Breadroot (*Pediomelum aromaticum*).* This breadroot species prefers open pinyon-juniper, sagebrush, and shadscale communities in sandy or clay soils on adobe hills or in dry washes at 4,800 to 5,700 feet in elevation. This plant is often found alongside the Paradox Valley lupine (see description

above.) The distribution of this breadroot is concentrated in the Paradox Valley of western Montrose County, although additional occurrences have been found along the Dolores River and its tributaries.

In general, threats to all BLM sensitive plants include water development, livestock grazing, weeds, OHVs, mining, oil and gas, and climate change. To date, permitted actions that affect special status plants are routinely moved, modified, or mitigated to reduce impacts to individuals or populations.

Special Status Fish and Wildlife

Federally Listed Species. Twelve federally protected animal species potentially exist in the Planning Area, as shown in **Table 3-21** (Federally Listed Fish and Wildlife Species). Federally designated critical habitat for three of these species also exists in the Planning Area. Some species are not known to exist in the Planning Area yet are included in this analysis and all other project planning efforts due to historic populations in the area, adjacent known populations, a presence of suitable habitat, insufficient survey coverage, potential expansions or shifts in species ranges, and other factors.

Table 3-21
Federally Listed Fish and Wildlife Species

Species	Federal Status	Designated Critical Habitat in Planning Area
Bonytail chub *Gila elegans*	Endangered	No
Humpback chub *Gila cypha*	Endangered	No
Razorback sucker *Xyrauchen texanus*	Endangered	Yes
Colorado pikeminnow *Ptychocheilus lucius*	Endangered	Yes
Greenback cutthroat trout *Oncorhynchus clarki stomias*	Threatened	No
Gunnison sage-grouse *Centrocercus minimus*	Threatened	Yes
Black-footed ferret *Mustela nigripes*	Endangered	No
Canada lynx *Lynx canadensis*	Threatened	No
Mexican spotted owl *Strix occidentalis*	Threatened	No
Southwestern willow flycatcher *Empidonax traillii extimus*	Endangered	No
Western yellow-billed cuckoo *Coccyzus americanus*	Threatened	No
Uncompahgre fritillary butterfly *Boloria acrocnema*	Endangered	No

Source: USFWS 2018b

Colorado River endangered fishes include the following four species (Bonytail chub, Humpback chub, Razorback sucker, and Colorado Pikeminnow), all of which inhabit the larger rivers of the Colorado River Watershed in lower-elevation warm water reaches. The Gunnison, Uncompahgre, Dolores, and San Miguel rivers all flow through the Planning Area into the Upper Colorado River system, which supports populations of these species. Habitat for the Colorado River endangered fishes has been affected by changes in flow regimes associated with construction of dams, trans-basin water diversions,

municipal water use, and agricultural irrigation diversions. Altered water quality has also affected the species. This includes both reduced sediment loads and lower temperatures associated with impoundments in some cases, while in other cases, there has been excessive sediment loading due to reduced conveyance/flushing flows. Chemical pollutants (notably mercury and selenium) have also affected the water quality. In addition, the Upper Colorado River system lost habitat complexity due to impoundments, reduced flows, in some cases reduced sediments, and in other cases excessive sediment loading and channel constriction. Nonnative fish introductions have resulted in competition for limited resources, including preferred microhabitats (backwaters, side channels, spawning areas, flooded bottomlands, and tributaries), and food; direct mortality resulting from predation on eggs, larvae, juvenile, and adult fish by predatory game and nongame fish species, such as northern pike, smallmouth bass, and walleye; and hybridization with similar species (e.g., white sucker and razorback sucker hybrids) (BLM 2017a). Critical habitat was designated in 1994 for all four species (USFWS 1994), and recovery plans for each species were amended in 2002 with the addition of recovery goals for each species (USFWS 2002).

*Colorado Pikeminnow (*Ptychocheilus lucius*).* In the Planning Area, critical habitat includes the Gunnison River and its 100-year floodplain from the mouth of the Uncompahgre River near the town of Delta north to the Planning Area boundary. In the Planning Area, the Colorado pikeminnow are found in the Gunnison River below the Uncompahgre River, and the lower reaches of the Uncompahgre River (USFWS 2002). Recent data also suggests this species may exist in portions of the Dolores River (BLM 2010o). Trends for the species in the tributaries to the Colorado River are not known. The most recent population estimates (collected in 2013 to 2015) indicate the adult population in the mainstem Colorado River has declined to approximately 400 individuals, though strong numbers of subadults and age-0 Colorado pikeminnow were recorded in 2015 (Upper Colorado River Endangered Fish Recovery Program 2017). The USFWS initiated a population viability analysis and species status assessment for Colorado pikeminnow in 2016, which was not completed as of early 2018.

*Razorback Sucker (*Xyrauchen texanus*).* In the Planning Area, critical habitat includes the Gunnison River and its 100-year floodplain from the mouth of the Uncompahgre River near the town of Delta north to the Planning Area boundary. Historically, razorback suckers inhabited as far upstream as the Gunnison and Uncompahgre River confluence. Today only small populations are found in the Colorado River and in the Gunnison River below the Planning Area. Wild razorback sucker populations in the mainstem Colorado River declined precipitously in the mid-1990s. Hatchery-produced, stocked fish form the foundation for the reestablishment of naturally self-sustaining populations of razorback sucker in the upper Colorado River system, conducted by the Upper Colorado River Endangered Fish Recovery Program. The Recovery Program has been largely successful in meeting their annual stocking targets. Stocked razorback sucker are reproducing and wild juvenile razorback suckers were collected in 2013 (Upper Colorado River Endangered Fish Recovery Program 2017).

*Bonytail Chub (*Gila elegans*).* Critical habitat includes parts of the Colorado River downstream of the Planning Area. Bonytails historically were found in the Gunnison River up to about the town of Delta, Colorado. Similar to razorback sucker, the Upper Colorado River Endangered Fish Recovery Program has been implementing an integrated stocking plan for bonytail chub in the upper Colorado River system. While recaptures of bonytail have been rarer than those of razorback sucker, increasing numbers of bonytail chub have been detected throughout the upper Colorado River basin (BLM 2017a).

*Humpback Chub (*Gila cypha*).* Critical habitat includes parts of the Colorado River downstream of the Planning Area. The historic range of the humpback chub is similar to that of the Colorado pikeminnow. While this species may still exist in the lower Gunnison River near the mouth (Black Rocks population), most are found in the Colorado River downstream of the city of Grand Junction. This species likely does

not exist in the Planning Area. The closest extant population is the Black Rocks population, which declined in the early 2000s, but has apparently stabilized over the past decade (USFWS 2018c).

*Greenback Cutthroat Trout (*Oncorhynchus clarki stomias*).* A recovery plan for this subspecies was completed in 1998 (USFWS 1998). No critical habitat has been designated. Habitat for the greenback includes cold-water streams and lakes with adequate spawning habitat in gravelly riffles, often with shading cover. Young typically shelter in shallow backwaters. Greenbacks are closely related to the Colorado River cutthroat trout, a BLM sensitive species found in similar habitats in the region, and the two subspecies are difficult or impossible to distinguish from appearance alone (Behnke 1992). As a result, geographic range had become the default approach for establishing subspecies designation and occupation.

Early molecular work did not distinguish between the subspecies, but Metcalf et al. (2007) used mitochondrial and nuclear molecular markers to suggest that indeed there was a genetic basis for separating greenback cutthroat trout from Colorado River cutthroat trout. The primary concern raised by that paper was five of the nine east slope greenback cutthroat trout populations examined actually displayed genetic fingerprints more similar to Colorado River cutthroat trout of Trappers Lake (White River Basin) origin than they did with many of the other greenback populations.

From 1903 through 1938, at least 80 million pure Colorado River cutthroat trout were produced at Trappers Lake (Rogers 2012). Millions more were produced on the south slope of Pikes Peak (Rogers and Kennedy 2008). Although the fate of many of those fish remains a mystery, it is clear that they were stocked in virtually every county east of the Continental Divide that would support trout (Metcalf et al. 2012).

A finding of Metcalf et al. (2007) that attracted less attention was the discovery of a "greenback" cutthroat trout population west of the Continental Divide near the town of Gunnison in West Antelope Creek. Intensive survey and genetics testing work since indicated that the West Antelope Creek population is not unique, and that populations with similar genetic fingerprints are pervasive across Colorado's western slope (Rogers 2010). That finding led the Greenback Cutthroat Trout Recovery Team to question whether the West Antelope Creek fish were really greenback cutthroat trout, as suggested by Metcalf et al. (2007), or whether they simply represented diversity within Colorado River cutthroat trout (Rogers 2010). In an effort to avoid confusion, trout with this genetic fingerprint are hereafter referred to as green lineage cutthroat trout, while cutthroat trout displaying the genetic signature commonly associated with those from Trappers Lake (White and Yampa River Basins) are referred to as blue lineage cutthroat trout. Two known greenback populations in the Planning Area are restricted to a few relatively short stream segments in the North Fork area of Delta County, south of Grand Mesa.

*Black-footed Ferret (*Mustela nigripes*).* Historically black-footed ferrets occupied the Gunnison and Uncompahgre River valleys, but the species has been extirpated from this area of Colorado for more than 30 years. A recovery plan has been completed (USFWS 1988b) and no critical habitat has been designated. Gunnison and white-tailed prairie dogs exist in the Planning Area, but no colonies are large and dense enough to support black-footed ferrets.

*Canada Lynx (*Lynx canadensis*).* A recovery plan was completed (USFWS 2005) and critical habitat has been designated and revised (USFWS 2009c), with no critical habitat in Colorado. Lynx historically existed in Colorado but were extirpated by the 1970s. CPW began a reintroduction program in 1999, and lynx are now established in the San Juan Mountains of southwestern Colorado and are found at least occasionally in other mountainous areas of the state. Lynx in Colorado use primary habitat of spruce-fir forest and secondary habitat of aspen and drier conifer forest types (Ruediger et al. 2000). Lynx

sometimes move large distances, and maintenance of movement corridors between habitat areas is an important conservation concern. Primary habitat for lynx is very limited in the Planning Area. Lynx may occasionally be present in the higher elevations of the Planning Area.

*Gunnison Sage-grouse (*Centrocercus minimus*)*: The Gunnison sage-grouse is found in sagebrush communities, adjacent riparian meadows, and mixed mountain shrub communities with a diversity of understory grasses and forbs. Sagebrush provides essential cover throughout the year and winter food. Three Gunnison sage-grouse populations inhabit the Planning Area: Crawford (west of Crawford, Colorado), Cerro Summit-Cimarron-Sims Mesa (east and south of Montrose, Colorado), and San Miguel (mainly near Miramonte Reservoir, Colorado, mostly in the BLM Dolores Field Office Planning Area). The species was listed as threatened under the ESA in late 2014. The UFO has conducted several habitat improvement projects to benefit Gunnison sage-grouse, primarily in the Crawford Area, in the Gunnison Gorge NCA (outside but adjacent to the Planning Area), and is active in collaborative working groups and other cooperative efforts to conserve this species and its habitats.

*Mexican Spotted Owl (*Strix occidentalis*)*: Although widely variable by region and population, typical habitat for this species includes deep canyons with dense old growth conifers with high canopy cover and stand density. Mexican spotted owls are not known to exist within the Planning Area, although small isolated areas of suitable habitat may be present in the west and north portions of the Planning Area. Numerous spotted owl surveys over the past 20 years have been conducted in the major drainages of the Dolores and San Miguel watersheds and the Uncompahgre Plateau, all with negative results. The nearest known populations are to the west around Moab, Utah, to the south near Mesa Verde National Park, and to the east around Canon City, Colorado. USFWS considers all suitable terrain in western Colorado to be potential habitat for Mexican spotted owls.

*Southwestern Willow Flycatcher (*Empidonax traillii extimus*)*: Breeding habitats include riparian tree and shrub communities along rivers, wetlands, and lakes. In Colorado, historic and current breeding range includes the extreme southwest portion of the state. Although suitable habitat is found in the region, the Planning Area is outside the current known range for the southwestern willow flycatcher.

*Western Yellow-billed Cuckoo (*Coccyzus americanus*)*: Habitats for the cuckoo include extensive cottonwood galleries and riparian willow thickets with dense undergrowth. Potentially suitable habitat is found across the Planning Area, primarily at lower elevations. This species had not been reported in the region since the late 1980s until surveys in 2008 and 2009 documented nesting pairs on private land near the North Fork of the Gunnison River in Delta County. Summer observations of the species have been recently reported near the San Miguel River near Nucla, Colorado, and south of Montrose, Colorado, but no breeding has been documented in those areas.

*Uncompahgre Fritillary Butterfly (*Boloria acrocnema*).* The Uncompahgre fritillary butterfly is found in the San Juan Mountains above 12,000 feet elevation on moist alpine slopes with extensive stands of snow willow, a very short mat-forming willow species. In the Planning Area, habitat is very limited and no known populations of the butterfly exist. The known colonies in the San Juan Mountains are on lands managed by the Forest Service and the BLM Gunnison Field Office. The greatest known controllable threat is collecting by butterfly enthusiasts. Climatological patterns, disease, parasitism, predation, and trampling of larvae by humans and livestock are other possible threats.

BLM Sensitive Species. Sensitive species known to inhabit and potentially inhabiting the Planning Area are listed in **Table 3-22** (Sensitive Animal Species Known to Inhabit and Potentially Inhabiting the Planning Area).

Table 3-22
Sensitive Animal Species Known to Inhabit and Potentially Inhabiting the Planning Area

Common Name	Scientific Name
FISH	
Roundtail chub	*Gila robusta*
Bluehead sucker	*Catostomus discobolus*
Flannelmouth sucker	*Catostomas latipinnis*
Colorado River cutthroat trout	*Oncorhynchus clarki pleuriticus*
MAMMALS	
Desert bighorn sheep	*Ovis canadensis nelsoni*
Rocky Mountain bighorn sheep	*Ovis canadensis canadensis*
Gunnison's prairie dog	*Cynomys gunnisoni*
White-tailed prairie dog	*Cynomys leucurus*
Kit fox	*Vulpes macrotis*
Allen's (Mexican) big-eared bat	*Idionycteris phyllotis*
Big free-tailed bat	*Nyctinomops macrotis*
Spotted bat	*Euderma maculatum*
Townsend's big-eared bat	*Corynorhinus townsendii*
Fringed myotis	*Myotis thysanodes*
BIRDS	
Bald eagle	*Haliaeetus leucocephalus*
Golden eagle	*Aquila chrysaetos*
American peregrine falcon	*Falco peregrinus anatum*
Northern goshawk	*Accipter gentilis*
Ferruginous hawk	*Buteo regalis*
Burrowing owl	*Athene cunicularia*
Brewer's sparrow	*Spizella breweri*
REPTILES and AMPHIBIANS	
Longnose leopard lizard	*Gambelia wislizenii*
Midget faded rattlesnake	*Crotalus viridis concolor*
Northern leopard frog	*Rana pipiens*
Canyon treefrog	*Hyla arenicolor*
INVERTEBRATES	
Great Basin silverspot butterfly	*Speyeria nokomis Nokomis*

Source: BLM 2015d

*Roundtail Chub (*Gila robusta*)*: Roundtail chub habitats include warm to cool waters with rocky runs and rapids, and pools in creeks, streams, and rivers. Roundtail chubs also inhabit some reservoirs. Important habitat features include cobble-rubble, sand-cobble, or sand-gravel substrate. The chub exists in warm-water watersheds at lower elevations across the UFO, including the Lower Gunnison River downstream of the North Fork, Dolores River, and San Miguel River.

*Bluehead Sucker (*Catostomus discobolus*)*: While blueheads typically inhabit cool rivers and mountain streams, they are occasionally found in lakes and warm, turbid streams. Most occupied sites have

moderate to fast flowing water above rubble-rock substrate. In the UFO, the species are found in the lower Dolores River, lower San Miguel River, and lower Gunnison River watersheds.

*Flannelmouth Sucker (*Catostomas latipinnis*)*: Habitats for the flannelmouth sucker include rivers and creeks free of major impoundments and barriers. In the Planning Area, the species is known to exist in the lower Dolores, lower Gunnison, and lower San Miguel river watersheds.

*Colorado River Cutthroat Trout (*Oncorhynchus clarki pleuriticus*)*: This is the native trout of western Colorado. It requires cool, clear water and well-vegetated streambanks for cover and bank stability, as well as instream features including deep pools, boulders, and logs. Populations are found in higher-elevation streams and lakes. The genetic differentiation between pure Colorado River cutthroat trout and green lineage cutthroat trout is described above under greenback cutthroat trout. The Planning Area has a number of more or less isolated populations in mid- to high-elevation stretches and major tributaries of the Gunnison, North Fork of the Gunnison, Uncompahgre, San Miguel, and Dolores rivers. Conservation populations of the species are in the northern portion of the North Fork area in Delta County.

*Desert Bighorn Sheep (*Ovis canadensis nelsoni*)*: Important habitat requirements for the desert bighorn include escape terrain and areas with high visibility, with good forage sources and reliable water sources nearby. Terrain is typically rough, rocky, and broken by canyons and washes, with steep slopes used for lambing and predator avoidance and cliff overhangs for shade in hot weather. Desert bighorn utilize grass and shrub communities, generally avoiding areas of dense vegetation and poor visibility. Water availability can influence distribution patterns for some herds. In the UFO, desert bighorn sheep are found along the Lower Dolores River corridor and in the area around Roubideau Creek-Camel Back Wilderness Study Area (WSA), including portions of the Dominguez-Escalante NCA. The Dominguez-Escalante-Roubideau herd is currently the largest in the state of Colorado. Both populations in the UFO are the result of reintroductions by CPW in the 1980s, and the populations are closely managed.

*Rocky Mountain Bighorn Sheep (*Ovis canadensis canadensis*):* Rocky Mountain bighorn sheep are typically found on mountain slopes above 8,000 feet elevation but move to lower elevations in late spring and early summer. As for desert bighorn sheep, water availability can influence distribution patterns for some herds. Further, escape terrain is an important feature of the habitat. In winter, Rocky Mountain bighorn sheep spend as much as 86 percent of their time within 325 feet of escape terrain and usually stay within a 0.5-mile of escape terrain throughout the year. Rocky Mountain bighorn sheep feed on grasses in the summer and browse shrubs in the fall and winter. Access to nutrients provided by mineral licks may be important, particularly in spring. The population in Colorado was estimated at over 6,900 in 2017, an increase from the previous two years. The CPW closely monitors Rocky Mountain bighorn sheep herds and maintains healthy populations through ongoing trapping and relocation to reestablish populations in the state. Portions of the Ouray–Mount Sneffels herd of Rocky Mountain bighorn sheep range into the Planning Area from the upper Uncompahgre River watershed west to near Placerville, Colorado. The sheep mostly occupy alpine tundra and subalpine meadows and cliff areas, especially in summer, but range lower into open woodlands, shrublands, and meadows in winter, particularly in the City of Ouray and adjacent oak woodlands to the northeast, and in the Placerville area where they sometimes range onto BLM-administered lands.

*Gunnison's Prairie Dog (*Cynomys gunnisoni*)*: Gunnison's prairie dog habitats include level to gently sloping grasslands and semi-desert and montane shrublands at elevations from 6,000 to 12,000 feet. Although historically present in the Uncompahgre River Valley and surrounding areas, this species now exists primarily in the south and west portions of the Planning Area (Seglund et al. 2005). A 12-month finding by USFWS on a petition to list the Gunnison's prairie dog under the ESA determined that the "montane population segment, in south-central Colorado and north-central New Mexico, has experienced

significant declines and is warranted for listing, but precluded by higher priority actions." The primary threat is sylvatic plague, which appears to be more prevalent at montane elevations. Other threats are habitat loss and direct take, which can include recreational shooting. While Gunnison's prairie dogs are found in the Planning Area, there are no known populations on BLM-administered lands that meet the USFWS definition of the "montane" population segment. However, one small colony inhabits private lands within the montane range near Ridgway, Colorado. CPW is conducting genetic studies to examine the differences, if any, between prairie and montane subpopulations.

*White-tailed Prairie Dog (*Cynomys leucurus*)*: Habitats include level to gently sloping grasslands and semi-desert grasslands typically from 5,000 to 10,000 feet in elevation. Within the Planning Area, colonies are concentrated along the lower valleys of the Uncompahgre, Gunnison, and North Fork of the Gunnison Rivers and adjacent lowlands. White-tailed prairie dog range partially overlaps with Gunnison's prairie dog in the upper Uncompahgre River valley in Ouray County. Generally, most colonies east of the Uncompahgre Plateau are white-tailed, while colonies west of the plateau are Gunnison's prairie dogs (Seglund et al. 2005). Genetic testing is underway to determine whether there is evidence of hybridization between these two species. Threats include plague, habitat loss, and direct take, which can include recreational shooting.

*Kit Fox (*Vulpes macrotis*)*: Kit foxes occupy sparsely vegetated semi-desert shrublands, primarily dominated by saltbush, shadscale, and greasewood. Kit foxes spend most daylight hours in dens, important for raising young and avoiding predators such as coyotes, and hunt small mammals and other small prey at night. Probably never abundant in western Colorado in recent times, by the 1990s the species was known from only a few scattered locations in adobe hills around Montrose, Delta, and Grand Junction (Fitzgerald 1996) and recent intensive surveys suggest that kit fox are now extirpated, or nearly so, from Colorado (Reed-Eckert 2009). Kit fox are listed as endangered in Colorado by CPW but remain relatively common in suitable habitat of adjacent eastern Utah.

*Allen's (Mexican) Big-eared Bat (*Idionycteris phyllotis*)*: Habitats for Allen's big-eared bat include mountainous, wooded areas dominated by ponderosa pine, pinyon-juniper, and oak brush, riparian woodlands, and low-elevation deserts. This bat is typically found near rock and cliff features, and is frequently observed along streams or over ponds. The species was first recorded (acoustically) in Colorado in western Montrose County in the Planning Area (Hayes et al. 2009). The species has not yet been confirmed through capture techniques. Suitable habitat for this species exists across the Planning Area, and the species may be more widespread than currently documented.

*Big Free-tailed Bat (*Nyctinomops macrotis*)*: Habitats for the big free-tailed bat include rocky areas in rugged country, shrubland deserts, and woodlands. The species roosts in cliff and cave crevices, and occasionally in tree cavities. Big free-tailed bats have been documented along the Dolores River in Montrose County, and 2008 surveys in Paradox Valley suggested the presence of big free-tailed bats based on recorded echolocation calls (Hayes 2008). The species may exist across the Planning Area wherever suitable habitat is present.

*Townsend's Big-eared Bat (*Corynorhinus townsendii*)*: Townsend's big-eared bats commonly utilize mesic habitats characterized by coniferous and deciduous forests but occupy a broad range of other habitats, including sagebrush steppes, juniper woodlands, and mountain shrub communities. Maternity and hibernation typically occur in caves and mine shafts. Maternity roosts for Townsend's big-eared bats were documented at Hieroglyphic Canyon west of Uravan and at Joe Davis Hill Project along the Dolores River. Roosting sites are found in several mines in the Dolores and San Miguel Canyons. Surveys in the Paradox Valley recorded echolocation call sequences consistent with that of Townsend's big-eared bats. The species is likely to be found across the Planning Area wherever suitable habitat is present.

*Spotted Bat (*Euderma maculatum*)*: Spotted bats inhabit desert to montane coniferous stands, including open ponderosa pine, pinyon-juniper woodland, and canyon bottoms, open pastures, and hayfields. Although roosting behavior is poorly known, spotted bats appear to roost singly in crevices of rocky cliffs near surface water. The species, including lactating females, are known to forage long distances (20 to 30 miles) from roost sites (Rabe et al. 1998; Siders et. al 1999). Spotted bats were recently documented through call identification in the Gunnison Gorge and Black Canyon of the Gunnison National Park (Hayes 2009). This bat is expected to exist in other major canyon systems in western Montrose County.

*Fringed Myotis (*Myotis thysanodes*)*: Habitats for the fringed myotis include desert, grasslands, and woodlands. Common vegetation associations may include ponderosa pine, pinyon-juniper, greasewood, saltbush, and scrub oak. Roost sites include caves, mines, rock crevices, buildings, and other protected sites. The species has been documented in inactive mines in Montrose and San Miguel counties (Navo et al. 2003; Navo et al. 2005) and identified by echolocation call surveys in Paradox Valley (Hayes 2008). Suitable habitat is found throughout the Planning Area.

*Bald Eagle (*Haliaeetus leucocephalus*)*: Bald eagles concentrate near rivers, lakes, and adjacent uplands. In the Planning Area, most birds are observed along the Uncompahgre, San Miguel, and Gunnison rivers. Nesting is rare in the Planning Area, with just one active nest known in 2010 near the town of Delta. Bald eagles are common in the lower valleys and western mesas in winter. CPW has identified winter forage, winter concentration, and roosts in the Planning Area. The bald eagle was removed from ESA federal listing in July 2007. Management of eagles and their habitat is guided by the delisting monitoring plan for five years, and the species is protected by the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act.

*Golden Eagle (*Aquila chrysaetos*)*: As described in **Section 3.1.6** (Fish and Wildlife), golden eagles use open country, grasslands, woodlands, and barren areas in hilly or mountainous terrain. The species nests on rocky outcrops or large trees. Golden eagles occur throughout the Planning Area as a year-round resident and breeds where suitable habitat exists. The species is protected by the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act.

*Peregrine Falcon (*Falco peregrinus anatum*)*: Peregrine falcons occupy open, rugged terrain, typically on cliffs or similar features near water. Nests are often on cliff faces and rarely in trees. Peregrines and their habitat are found throughout the Planning Area, with the greatest concentration along the Dolores River. Peregrine falcons were removed from ESA federal listing in 1999, and are currently managed under the delisting monitoring plan.

*Northern Goshawk (*Accipiter gentilis*)*: In the western United States, goshawk habitats include coniferous forest and mature aspen woodlands, often on north-facing slopes. Northern goshawks typically nest in large blocks of forested habitats above 7,000 feet elevation. Nesting has been confirmed on adjoining National Forest System lands and is possible on higher elevation BLM-administered lands in the Planning Area.

*Ferruginous Hawk (*Buteo regalis*)*: Habitats for the ferruginous hawk include open landscapes in grassland, shrubland, and juniper-pinyon woodland types. This species is often observed near prairie dog colonies and other rodent populations, in proximity to their primary prey. The species apparently is only found as an uncommon winter resident and migrant in the Planning Area. However, suitable nesting habitat is common, particularly along the lower Uncompahgre and Gunnison River Valleys.

*Burrowing Owl (*Athene cunicularia*)*: Burrowing owls are primarily found in grasslands and mountain parks, usually in or near prairie dog towns. The burrowing owl also uses well-drained steppes, deserts, prairies, and agricultural lands. Burrowing owls require rodent burrows, typically prairie dog, for shelter

and nesting. Abandoned prairie dog colonies eventually become unsuitable for burrowing owls due to burrow collapse. Although very uncommon in the Planning Area, the species has been observed during breeding season in Delta County between 2007 and 2009 and in western Montrose County in 2005.

*Brewer's Sparrow (*Spizella breweri*)*: Brewer's sparrow primarily breeds in sagebrush communities, and occasionally in other shrublands such as mountain mahogany and rabbitbrush. Migrants are found in wooded, brushy, and weedy riparian, agricultural, and urban areas. The species occasionally utilizes pinyon-juniper woodlands for habitat. Brewer's sparrows are summer breeding residents in suitable habitats throughout the Planning Area.

*Longnose Leopard Lizard (*Gambelia wislizenii*)*: Habitats for this lizard include lowland desert and semidesert areas with scattered shrubs or other low plants, such as sagebrush, especially in areas with abundant rodent burrows. No populations have been documented in the Planning Area, and the nearest known populations are in western Montezuma and Mesa counties. However, the distribution in Colorado is not well known, and the species could exist in lower elevations in the western part of the Planning Area.

*Midget Faded Rattlesnake (*Crotalus viridis concolor*)*: The distribution of this snake appears to be limited by the availability of rocky outcrops, which support many of their survival needs, including cover and winter hibernation sites. In the Planning Area, the midget faded rattlesnake has been documented along the lower Gunnison, Dolores, and San Miguel rivers and tributaries.

*Northern Leopard Frog (*Rana pipiens*)*: The northern leopard frog inhabits springs, slow streams, marshes, bogs, ponds, canals, flood plains, reservoirs, and lakes. Sites usually contain perennial water and aquatic vegetation. In the summer, the species sometimes inhabits wet meadows and fields. Within the Planning Area, the species has been reported along the San Miguel, Uncompahgre, and Dolores rivers, as well as the major tributaries.

*Canyon Treefrog (*Hyla arenicolor*)*: The canyon treefrog requires temporary or permanent pools along streams for breeding, typically in rocky canyons. Because the species is primarily terrestrial, it is also found in arroyos and streambeds in pinyon-juniper communities. Several populations are known in the Planning Area, primarily in the lower San Miguel and Dolores river watersheds.

*Great Basin Silverspot Butterfly (*Speyeria nokomis nokomis*)*: The Great Basin silverspot butterfly is found in arid, streamside meadows and open seepage areas, typically with an abundance of the northern bog violet (*Viola nephrophylla*), upon which this species depends. The colonies of the silverspot are often isolated. There are historic records of this species in Paradox Valley, although the exact location is uncertain and habitats do not appear suitable in that area. There are no current populations known in the Planning Area, with the closest known population in Unaweep Canyon in the BLM Grand Junction Field Office.

Trends

Special Status Plants

The CNHP and Colorado Natural Areas Program, in conjunction with the BLM, track populations of rare plants through Element Occurrence Records. The UFO coordinates with CNHP or Colorado Natural Areas Program to periodically check element occurrences for BLM sensitive species, and requires surveys in suspected or suitable habitat for proposed projects to aid in expanding the distribution, abundance, and population condition. Based on the spot checks of historic Element Occurrence Records and results of surveys conducted for projects, the trend for BLM sensitive species within the UFO appears to be stable based on no documented loss of a specific occurrence and the addition of new occurrences through survey.

A monitoring program is in place for the clay-loving wild buckwheat, with three long-term trend plots established in the Gunnison Gorge NCA on BLM lands outside the Planning Area and two long-term trend plots established at South Fairview on BLM lands within the Planning Area. The plots at South Fairview were established in 2008 and are designed to monitor grazing on the species. The plots in the Gunnison Gorge NCA were established in 2012 to monitor similar impacts. Based on the data to date, trends in clay-loving wild buckwheat appear to be stable, with climactic variability largely driving population density.

A collaborative Colorado hookless cactus monitoring program between the Denver Botanic Gardens and the BLM is also in place. Within and adjacent to the Planning Area, there are a total of seven long-term monitoring plots designed to determine population trends and monitor impacts from BLM-permitted actions. Six of the seven sites show stable to slightly upward trends in population density with very minimal to no impacts documented from BLM-permitted actions. The one site with documented declines is just north of the town of Delta, Colorado, which was considerably drier than the surrounding areas of the Planning Area during the significant drought in 2012. Declines at this site have been attributed to the drought with documented mortality caused by rodent herbivory, cactus borers, and drought-induced mortality.

Since the inception of the Public Land Health Standards (BLM 1997), UFO policy has been to manage for healthy rangelands. If rangeland, including special status species habitat, is deemed to meet Public Land Health Standards, then it is assumed that all indicators for Standard 4, special status species, are also being met unless otherwise specifically addressed (which would include all three indicators).

Special Status Fish and Wildlife

By definition, the populations, and often habitats, of all special status wildlife species have historically suffered downward trends. However, due to protection and recovery efforts, some populations, such as peregrine falcon and bald eagle, are stabilizing. Management efforts by the USFWS, CPW, BLM, and others have reversed the downward trend for a number of these populations. Nevertheless, none of the populations are thought to be near their historic levels, and most remain biologically insecure, regardless of their legal status.

Current and future threats include habitat loss and fragmentation, poaching, predation, disease, invasive species, and others. Habitat degradation and loss are caused by, or exacerbated by, historic overgrazing, oil and gas development, mining, coal development, water diversions, recreation, agriculture, residential development, and other human activities. Natural processes such as fire, drought, vegetation type conversions, and climate change may also contribute to landscape changes over time. It is not known which species will be able to adapt to these changes and persist. Pinyon-juniper, riparian, sagebrush, and salt-desert shrub, which provide habitat for many special status and rare species, have been determined to be at-risk.

3.1.8 Wild Horses

The BLM protects, manages, and controls wild horses and burros under the authority of the Wild Free-Roaming Horses and Burros Act of 1971 (as amended) to ensure that healthy herds thrive on healthy rangelands.

The following section describes the current conditions and characterization of the wild horse herd management area in the Planning Area.

Current Conditions

There is one herd management area located in the Naturita Ridge area, south of the town of Naturita (**Figure 3-13**, Naturita Ridge Herd Area). Through analysis and decision of the 1985 San Juan/San Miguel RMP, all wild horses in this area were removed. The herd management area has not had wild horses since 1985.

Trends

Following the passage of the Wild Horse and Burro Act of 1971, it was estimated that the Naturita Ridge wild horse herd roamed an area of 63,000 acres. Nearly 10,000 acres of their estimated range at that time was private and state land. Analysis for the 1985 San Juan/San Miguel RMP/EIS estimated the roaming area for the herd had diminished to 9,300 acres of public land and 330 acres of private land. In 1971, the population was estimated at eight wild horses.

Factors supporting the decision to close out the population on Naturita Ridge included the segmentation of the area by private land and pasture fences, lack of dependable water, conflicts with private land uses, elk herds, and livestock. In addition, the population was not large enough to sustain a viable genetic base.

3.1.9 Wildland Fire Ecology and Management

Unit Fire Management Plans

The DOI and others' 2001 review and update of the 1995 Federal Wildland Fire Management Policy (FWFMP) consists of findings, guiding principles, policy statements, and implementation actions (DOI et al. 2001) and replaces the 1995 FWFMP. Known as the 2001 FWFMP, this update directs federal agencies to achieve a balance between fire suppression to protect life, property, and resources, and fire use to regulate fuels and maintain healthy ecosystems (DOI et al. 2001). Every unit within a federal land management agency, such as a BLM field office, that has vegetation capable of sustaining wildland fire is required to prepare a Fire Management Plan (FMP). The purpose of the FMP is to provide for firefighter and public safety and outline fire management strategies and tactics that, when implemented, protect values and meet RMP resource goals and objectives. The FMP is a dynamic document that is reviewed annually and updated whenever better information is available. The FMP contains direction for wildland fire (wildfires and prescribed fires), fuels treatment, and emergency stabilization/burned area rehabilitation.

Fire Regime Condition Class

National and State BLM fire policy requires that current and desired resource conditions related to fire management be described in terms of three condition classes and five fire regimes. The Fire Regime Condition Classification System measures the extent to which vegetation departs from reference conditions, or how the current vegetation differs from a particular reference condition. The classification system is used to categorize existing ecosystem conditions and to determine priority areas for treatment as mandated by national direction.

Fire Regime Condition Class 1. Fire regimes in this condition class are within historical ranges. Thus, the risk of losing key ecosystem components from the occurrence of fire remains relatively low. Maintenance management, such as prescribed fire, mechanical treatments, or preventing the invasion of non-native weeds, is required to prevent these lands from becoming degraded.

Fire Regime Condition Class 2. Fire regimes on these lands have been moderately altered from their historical range by either increased or decreased fire frequency. A moderate risk of losing key ecosystem components has been identified for these lands. To restore their historical fire regimes, these

lands may require some level of restoration as through prescribed fire, mechanical or chemical treatments, and the subsequent reintroduction of native plants.

Fire Regime Condition Class 3. These lands have been significantly altered from their historical range. Because fire regimes have been extensively altered, risk of losing key ecosystem components from fire is high. Consequently, these lands are on the verge of the greatest risk of ecological collapse. To restore their historical fire regimes before prescribed fire can be utilized to manage fuel or obtain other desired benefits, these lands may require multiple mechanical or chemical restoration treatments, or reseeding.

Based on the analysis conducted by the BLM fire ecologist and fuels specialists, most of the vegetation types within the Planning Area were identified as belonging to Fire Regime Condition Class 2. The analysis completed in the San Miguel County Community Wildfire Protection Plan indicates that many of the pinyon-juniper forests in the study area fall into Fire Regime Condition Classes 2 and 3. This classification is supported by the volatile fire behavior that is seen in these stands. There is a high percentage of decadent wood in the trees that contribute to high intensity fires (San Miguel County 2009).

Fire History

Another indicator of possible changes to fire regimes, including changes in vegetation, is the number of large fires that have occurred in the past 15 years. Beginning in 1993, numerous large fires ignited on southern and southwestern aspects, primarily in pinyon-juniper vegetation, and moved upward into ponderosa pine. These fires ranged from hundreds of acres to 5,000 acres in size, with the largest burning over 31,000 acres. Although historically rare, this type of fire may have been part of the prehistoric fire regime. While there were no large fires within the Planning Area during 2006, 2007, or 2008, the Grammar Fire burned 800 acres in 2009, the Beaver Fire burned 3,000 acres in May 2010, the Bull Draw Fire burned 35,000 acres in 2018, of which 9,965 acres were on BLM-administered lands.

Lightning is a significant cause of historic fire starts. Additionally, campfires and human caused fires will continue to pose a threat as more development occurs in the surrounding private lands (San Miguel County 2009).

The following section describes the current conditions and characterization of fire management in the Planning Area.

Current Conditions

UFO Fire Management Plan

The UFO FMP was originally written and approved in 1998, and has undergone three revisions in order to incorporate national policy changes, as well as minor changes gained through experience. The plan addresses wildland fire (natural and managed fires) to protect, maintain, and enhance resources consistent with management objectives because these events sometimes burn a large part of the Planning Area. In addition, the plan outlines constraints on fire management activities as needed to protect natural and cultural resources. Numerous management polygons were developed for the FMP, with emphases on wildland urban interface, winter range for deer and elk, and sage-grouse habitat. In addition, polygons were designated for fire exclusion, as well as the use of fire as a natural process.

Vegetation mosaics were identified that best characterize a desired future condition in terms of a range of variability in seral stage (early, early mid, mid, and late) and patch size (in acres). Mosaics have been helpful in designing and planning mechanical fuels reduction treatments and, to some extent, prescribed burns, but have been of limited value for analyzing and managing wildland fire used to protect, maintain, and enhance resources consistent with management objectives events which sometimes burn larger and hotter than is ideal (such as deer winter range).

The FMP is a primary document supporting the development of vegetation treatment projects for fuels management, to enhance ecosystem processes, and for wildlife, range, or watershed enhancement. FMPs for Black Canyon of the Gunnison National Park, the Forest Service, and the BLM Gunnison Field Office are similar in direction to the UFO FMP, allowing for seamless management of fire and fuels across jurisdictional boundaries.

Fire Management Units

As of 2011, the UFO is managed by the Southwest Colorado Fire and Aviation Management Unit. The UFO includes 13 smaller fire management units delineated by similar vegetation type and natural processes. The fire management units are designed to help describe fire history, fire ecology, and suppression needs and constraints on a landscape scale. The fire management units describe the vegetation and fuels situation, as well as some of the more significant land management issues within each area, making them extremely useful in managing wildland fire across the landscape, and as part of the Fire Planning Analysis budget process. These fire management units, as utilized in the UFO FMP, are not decision polygons but rather provide information to help make decisions regarding ignition specific fires and prescribed fire and fuels treatments. The current UFO FMP (2008 revision) includes a description of these fire management units (BLM 2008d) which are summarized in **Table 3-23** (Fire Management Units and Dominant Vegetation Types) and depicted in **Figure 3-14** (Fire Management Units).

Table 3-23
Fire Management Units and Dominant Vegetation Types

Fire Management Unit	UFO Acres (Percent BLM)	Dominant Vegetation Types (Percent BLM)
Black Canyon	95,102 (27%)	Oak/Brush (40%)
		Grass/Sage (30%)
		Pinyon/Juniper (20%)
		Aspen (10%)
Carpenter Ridge	58,549 (92%)	Grass/Sage (68%)
		Pinyon-Juniper (32%)
East Uncompahgre	4,351 (3%)	Oak/Brush (50%)
		Pinyon/Juniper (50%)
LaGarita	3,466 (0.4%)	Spruce/Fir (100%)
Naturita Division	10,043 (15%)	Grass (66%)
		Pinyon/Juniper/Oak (34%)
Roubideau	193,437 (67%)	Aspen (40%)
		Grass (30%)
		Shrub (30%)
Sneffles	15,483 (4%)	Spruce/Fir (63%)
		Aspen (19%)
		Shrub (18%)
South Grand Mesa	67,148 (26%)	Oak/Brush (61%)
		Pinyon/Juniper (27%)
		Aspen (12%)

Fire Management Unit	UFO Acres (Percent BLM)	Dominant Vegetation Types (Percent BLM)
Tabeguache	137,501 (66%)	Pinyon/Juniper (77%)
		Grass (23%)
Uncompahgre Valley	117,925 (24%)	Grass (66%)
		Shrub (34%)
West Uncompahgre	27,557 (11%)	Pinyon/Juniper/Oak/Sage (58%)
		Ponderosa pine (32%)
		Spruce/Fir/Aspen (10%)
West Muddy	2,739 (1%)	Pinyon/Juniper/Oak (100%)
Wray Mesa	116,849 (75%)	Pinyon/Juniper/Sage/Grass (79%)
		Grass (21%)

Source: BLM 2012a

Wildland Urban Interface

The wildland urban interface is defined as those areas in which undeveloped wildlands meet or intermix with human development, ranging from communities and subdivisions to isolated structures and infrastructure, such as communication sites and powerlines. Wildland urban interface is an issue throughout much of the Planning Area. The location of the wildland urban interface in the Planning Area is represented in **Figure 3-15** (Wildland Urban Interface). These areas present a management challenge, not just from a fire perspective, but also with regard to wildlife habitat, travel management, recreation, watersheds, and exotic species. Continuing collaboration with the Colorado State Forest Service, county and community leaders, industry representatives, and homeowners associations is essential in order to mitigate some of these issues, particularly regarding fuels management and fire suppression. Over the past eight years, numerous fuel management projects involving extensive acreage within the Planning Area have been designed and implemented in wildland urban interface areas. The UFO supports local volunteer and rural fire departments with funding for training and equipment as programs and budgets are available. These programs complement and enhance local fire protection capabilities within the wildland urban interface.

Fire Suppression

The UFO has a moderate fire suppression load, which can range from as few as 30 to 40 fires per year with a few hundred acres burned, to 70 to 90 fires per year, with several thousand acres burned. As part of the larger Montrose Interagency Fire Management Unit, fires are managed across jurisdictional boundaries as needed, sometimes including prioritization of suppression needs. The majority of fires and acres burned occur in the pinyon-juniper vegetation community, where fuels are typically more available than in lower grassland communities that may be grazed or impacted by drought. Fires also occur in grassland, desert shrub, oakbrush, ponderosa pine, and occasionally in spruce/fir/aspen vegetation, although the acres burned tends to be lower in these vegetation communities. Wildland fire used to protect, maintain, and enhance resources consistent with management objectives are designated five to ten times each season within the UFO, depending on the forecasted ability of the fire to meet desired resource objectives through a naturally occurring fire. Wildland fire use acres burned range from as few as 10 acres per year to 3,000 acres per year.

Fuel Management Objectives

Prescribed Fire. Prescribed fires are implemented regularly with four to five burns each year, totaling approximately 600 to 1,000 acres burned. The majority of burns are located in previous mechanical treatments with the objective of reducing dead and down fuels and maintaining a mosaic of earlier seral

stages across the landscape. The majority of burns in recent years have been implemented in wildland urban interface areas in order to keep fuel loadings and continuity low so that subsequent wildfires would burn with less intensity and reduced resistance to control.

Mechanical Fuel Reduction. Mechanical fuel reduction treatments are aimed primarily at reducing fuel loadings and subsequent fire behavior with secondary objectives of improving wildlife habitat, range, and watershed conditions. Tools used for mechanical treatment include roller choppers, hydro-axes, brush beaters, hand crews, and small timber sales. Between 1,500 and 4,900 acres of mechanical treatment are implemented each year within the UFO.

Trends

The trend is somewhat uncertain, given the continuity of vegetation types in the absence of significant disturbance over the past 120 years, coupled with changes in climate, as well as other unknown factors. The increasing incidence of larger fires should be considered when planning fire and fuels management activities, as well as resource management actions.

Challenges for the Fire Program

Wildland Urban Interface. Wildland urban interface areas have been increasing dramatically throughout the Planning Area over the past two decades. Many large pieces of private land adjacent to BLM-administered lands have been subdivided, while smaller acreages within larger pieces of contiguous BLM-administered land are also being developed. Many of these subdivisions contain 35- to 40-acre parcels, while others contain 3- to 10-acre parcels. Subdividing of large blocks of private land is expected to continue into the near future. Additional wildland urban interface infrastructure includes powerlines, pipelines, and communications sites, as well as some recreation and energy sites. Much of the UFO fuel management budget is being used to plan and implement fuel treatments within the wildland urban interface, with the objective of reducing risk to these values. Many of the more-intensive and costly fire suppression actions occur within and adjacent to the expanding wildland urban interface.

Invasive Plants. Exotic species are a growing concern in fire management (see the subsection on Weeds in **Section 3.1.5** [Vegetation]). Most fire management activities are either surface or vegetation disturbing and subsequently the impacts from these activities include increased susceptibility to exotic species. The most significant, widespread, and persistent threat is the invasion of cheatgrass into disturbed areas. The potential impact of exotic species invasions, as well as mitigation measures that must be followed in order to reduce or, if possible, eliminate the risk, are carefully considered in planning for mechanical and prescribed burn treatments, as well as wildland fire used to protect, maintain, and enhance resources consistent with management objectives. Rehabilitation of lands after large wildfires is primarily aimed at quickly reestablishing native vegetation that can compete with invasive species. Regular monitoring of treatments, as well as treating exotic species in and near treatments, is the key to maintaining healthy landscapes.

Smoke Impacts. Smoke management, primarily from prescribed burning, is always an issue. With increasing population and the changing demographics of the communities, the aesthetic impacts of smoke cannot be ignored. Although no known violations of National Ambient Air Quality Standards from prescribed burning have occurred within the Planning Area, fire managers and burn bosses typically manage smoke based on aesthetic issues and public perception, which can be more restrictive than air quality standards. Tourism and, consequently, Visual Resource Management (VRM) is important to communities within and adjacent to the Planning Area. The fire program continues to work with the State's Air Pollution Control Division to find ways to increase the BLM's ability to burn more acres each year.

Benefits of Prescribed Fire. Given the trends presented above, the continued and increased use of prescribed fire as a management tool will take extraordinary effort on the part of fire managers, education specialists, resource specialists, and line management. The use of prescribed fire in the Planning Area is worth supporting and pursuing as a fuels and resource management tool, as well as for on-site ecological processes and as a landscape scale disturbance mechanism.

A Changing Climate. As wildland fires are managed and prescribed burns and mechanical treatments are planned and implemented, it will continue to be important to maintain resiliency and redundancy across the landscape so that the ecological system can adjust to changes in climate.

A Shrinking Fire Budget. Because future budgets cannot be forecast, it is important to maintain flexibility within the fire program so resources can be shifted to those emphasis areas being funded, while maintaining the long-term capability to perform all aspects of the fire management job.

3.1.10 Cultural Resources

The term cultural resource refers to historic or architectural objects, sites, structures, or places with potential public and scientific value, including locations of traditional cultural, ethnic, or religious significance to a specific social or cultural group. The following section describes the current conditions and characterization of cultural resource management in the Planning Area.

Current Conditions

Cultural resources include prehistoric and historic archaeological and architectural structures, features, and objects, as well as Native American traditional cultural and religious properties and properties important to other cultural groups. Prehistoric properties include lithic scatters, quarries, temporary camps, extended camps, wickiups, hunting/kill/butchering sites, processing areas, tree scaffolds, rock shelters, formative era stone structures, caves, rock art panels, trails, and isolated finds. Historic properties include homesteads, trails and roads, irrigation ditches, reservoirs, mining sites, corrals, line camps, cabins, trash scatters, and isolated finds. Together these properties represent human use of the area by Native American and Euroamerican cultures, covering a timeframe from the Paleoindian period (11,500 BC) through the present. **Table 3-24** (Cultural Periods) provides a description of these cultural periods.

During consultation, the Ute Tribes have indicated that the UFO encompasses part of their ancestral homeland, thereby increasing the potential of traditional cultural properties and sacred sites. At present, the Ute Tribes have identified several sacred/religious sites and special use areas.

Table 3-24
Cultural Periods

Era	Time Period	Cultural Adaptation
Paleoindian	Before 7000 BC	• Big game subsistence patterns • No dated sites from this period, although projectile points have been recovered • Sites are significant due to their scarcity
Archaic	7000 BC – AD 1	• Hunting and gathering lifestyle likely, with well-established seasonal rounds for resource procurement • Projectile points and camps have been found and further discoveries are likely

Era	Time Period	Cultural Adaptation
Formative	AD 1 – AD 1250	• Introduction of bow and arrow, ceramics, and farming with associated sedentary lifestyle and population growth • Permanent settlements associated with cultural resources remain from these cultures • Scientific uncertainty remains concerning their origin and disappearance • Identification of additional sites would be scientifically beneficial • Formative Era sites in the Planning Area are associated with both Anasazi and Gateway cultures in the West End and possibly with the Fremont complex
Post-Formative	AD 1250 – AD 1600	• Return to hunting-gathering traditions with limited use of ceramics and horticulture • Expansion of the historically known Numic (Ute, Paiute, Shoshone and Comanche) and Athabaskan (Navajo and Apache) peoples • Diagnostic artifacts include small unnotched or side-notched projectile points and Ute Intermountain Brownware ceramics • Later traits include equestrian rock art motifs, European trade goods, wickiups, and a possible increase in the use of obsidian • Identification of additional sites would benefit further research
Historic	Post AD 1600	• Euroamerican settlement patterns associated with agriculture, homesteading, limited ranching, farming, minerals development, and transportation
Multiple	Any	• Multi-component sites occupied over at least two identifiable time periods within the same geographical boundaries (e.g., Anasazi site with Historic campsite)
Unknown Prehistoric	Unknown	• Unknown prehistoric sites with general utility artifacts • Lack diagnostic materials making assignment to a specific prehistoric time period impossible

Assessing Resource Conditions

The condition of a cultural resource is assessed through field observation, inventory, and project review. Over the past five decades, various large and small cultural projects have been conducted in the Planning Area (Alpine Archaeological Consultants 2010). Range improvement projects, wildland fire rehabilitation, recreation projects, realty actions, oil and gas development, and minerals extraction, including uranium and coal, continue to expand the number of inventories completed and cultural resources identified.

Alpine Archaeological Consultants, Inc., under contract to the UFO, prepared a synthetic compilation of recorded cultural resources, cultural resource surveys, and excavations in the Planning Area (Alpine Archaeological Consultants 2010). The prehistoric site types and thematic historic categories used by Alpine Archaeological Consultants (2010) are condensed into ten different cultural resource management categories:

Open artifact sites. Open artifact sites are either prehistoric or historic cultural resources that are dominated by artifacts (e.g., flaked stone debris, tin cans, and glass) and lack visible architectural features, though other features (e.g., hearths) can be present. Open artifact sites are frequently recorded in all cultural resource units, are found throughout the varied topography encompassed by the Planning Area, and are the most common type of site, equaling 89 percent of the total prehistoric sites and 17 percent of the historic sites (Alpine Archaeological Consultants 2010). These sites are impacted by energy development, grazing, vegetation treatments, and recreational activities that disturb surface sediments.

Sheltered artifact sites. Sheltered artifact sites contain the same attributes as an open artifact site, with the exception of being located in a rockshelter or protected by a rock overhang. These resources are less common (5 percent of total prehistoric sites) than open artifact sites (Alpine Archaeological Consultants 2010). Sheltered artifact sites are frequently located in the Uncompahgre unit, though they have also been recorded in the West End unit. Any activity that disturbs surface sediments or the shelter, such as vandalism, energy development, and grazing has the potential to disturb this type of site.

Open architectural sites. Open architectural sites are prehistoric and historic cultural resources that contain structural features (e.g., stone circles or alignments, granaries, storage cists, masonry, hunting blinds, sweat lodges, wickiups, homesteads, and corrals), though other artifacts and features may be present. Open architectural sites are found in all four cultural resource units. This site type makes up a small portion (3 percent) of the total prehistoric cultural resources recorded, though they constitute a larger portion of the historic resources (45 percent) (Alpine Archaeological Consultants 2010). Activities that disturb the integrity of the structural components or associated sediments, such as vandalism, wildfires, energy development, vegetation treatments, and grazing negatively impact this type of site.

Sheltered architectural sites. Sheltered architectural sites are cultural resources that contain the same attributes as open architectural sites, with the exception of being located in a rockshelter or protected by a rock overhang. Prehistoric sheltered architectural sites have only been recorded in the West End and Uncompahgre cultural units and are a rare (less than 1 percent of total prehistoric sites) cultural resource. Because of geological constraints historic sheltered architectural sites are also expected to be more frequent in the West End and Uncompahgre units. Vandalism, recreational, and grazing activities negatively impact this type of site, though they can be disturbed by any activity that alter the structural components, local sediments, or associated shelter.

Open quarry sites. Open quarry sites are prehistoric and historic cultural resources that are defined by open pit lithic procurement and processing (e.g., prehistoric lithic procurement sites, prospecting pits, and gravel quarries), though artifacts and features may be present. In the Planning Area, prehistoric open quarry sites are generally associated with outcrops of Cretaceous and Jurassic sediments, being absent in the North Fork unit, and most frequently recorded in the West End unit (Alpine Archaeological Consultants 2010). Historic open quarry sites can be located in any cultural unit, though they are uncommon in the Planning Area. Energy development, erosion, wildfires, and recreational activities that disturb associated sediments, artifacts, or features have the potential to disturb this type of site.

Mining sites. Mining sites are prehistoric and historic cultural resources that are defined by extraction processes that occur in subsurface contexts (e.g., adits and mine shafts), though external structures, features, and artifacts may be present. While these types of sites occur across the Planning Area (20 percent of total historic sites), they most frequently occur in the West End and Ouray cultural units. Mining sites are often impacted by vandalism and recreational activities, though wildfires, which can damage external structures, and energy development also impact these sites.

Rock art sites. Rock art sites are prehistoric and historic cultural resources that include petroglyphs or pictographs, though other artifacts and features may also be present. Rock art sites are found in association with rock outcrops and are relatively uncommon in the Planning Area, accounting for 2 percent of the total prehistoric site count (Alpine Archaeological Consultants 2010). Rock art sites have been recorded in the Uncompahgre, Ouray, and West End cultural units and are unlikely to be found in the Ouray unit. Vandalism is the most common impact on rock art sites, though any activity (e.g., erosion, energy development, and grazing) that modifies the rock face can degrade this type of site.

Cambium trees. Cambium trees are pine trees that were culturally modified by removal of the bark to access the cambium as a food source. Cambium trees are rarely recorded in the Planning Area, being less than 1 percent of the total prehistoric site count (Alpine Archaeological Consultants 2010). Because cambium tree sites are tied to vegetation boundaries, they have only been recorded in the Ouray and West End cultural units. The integrity of cambium tree sites is dependent on the nature and location of logging operations and forest fires that damage and remove the trees.

Human burials. Human burial sites are uncommon in the Planning Area, consisting of less than 1 percent of the total prehistoric site count (Alpine Archaeological Consultants 2010). Although rarely encountered, human burials have been located in all cultural units except for the North Fork unit. Any activity, be it vandalism, erosion, energy development, or recreational, that disturbs the burial is considered to have a negative impact.

Linears. Linear sites are cultural resources that are functionally associated with transportation (e.g., roads, trails, and railroads) and infrastructure development (e.g., water control, communication, and energy transfer), though artifacts and other features can be present. Linear sites are relatively common (18 percent of total historic sites) and have been recorded throughout the Planning Area. Any activity that disturbs the structural integrity, associated deposits, or related features (e.g., energy development, wildfires, and recreational activities) has the potential to impact this type of site.

Cultural Resource Units

For ease of discussion, the cultural resources staff has divided the Planning Area into four cultural resource units (**Figure 3-16** [Cultural Resource Units]), which are described below.

Uncompahgre Unit. The Uncompahgre unit encompasses lands along the northeastern flank of the Uncompahgre Plateau in Ouray, Montrose, Delta, and Mesa counties, including the Dry Creek Basin, Roubideau Canyon, Escalante Canyon, Little Dominguez and the adobe badland flanks of Grand Mesa north of Delta. Existing data indicates that the unit covers some 498,952 acres, of which 19,859 acres (4.0 percent) have been surveyed for cultural resources. There are 314 survey reports and 2,473 recorded cultural resources, including 880 prehistoric sites, 284 historic sites, 1,226 prehistoric isolated finds, and 83 historic isolated finds in the Uncompahgre Plateau unit.

North Fork Unit. The North Fork unit includes all BLM-administered lands situated north and east of the Gunnison Gorge NCA. The unit encompasses some 433,810 acres, of which 15,240 acres (3.5 percent) have been surveyed for cultural resources. There are 253 survey reports and 371 recorded cultural resources in the North Fork unit. Of these resources, 51 are prehistoric sites, 188 are historic sites, 116 are prehistoric isolated finds, and 16 are historic isolated finds.

Ouray Unit. The Ouray unit is generally characterized by higher elevations and less intensive use. The unit extends along the eastern margin of the UFO from Ouray on the south to the Black Canyon on the north, and includes some 520,270 acres, of which 12,530 acres (2.4 percent) have been inventoried for cultural resources. There are 153 survey reports and 793 cultural resources in the Ouray unit, including 283 prehistoric sites, 311 historic sites, 157 prehistoric isolated finds, and 42 historic isolated finds.

West End Unit. The West End encompasses all BLM-administered lands in the western half of the UFO, including lands on the southern flank of the Uncompahgre Plateau, the San Miguel River drainage, Paradox Valley, and the Dolores River canyons south of Gateway. The unit covers some 631,290 acres, of which 51,090 acres (8.1 percent) have been inventoried for cultural resources. There are 410 survey reports and 4,050 recorded cultural resource sites in the West End. Of these resources, 2,153 are prehistoric sites, 457 are historic sites, 1,359 are prehistoric isolated finds, and 81 are historic isolated finds.

Trends

Factors influencing cultural resource trends include the presence and condition of cultural sites, landscapes, or places of traditional use. The current condition of cultural resources in the Planning Area is highly variable due to the diversity of terrain, geomorphology, access, visibility, and past and current land use patterns. Adherence to Section 106 of the National Historic Preservation Act and the BLM policy of avoiding impacts on cultural resources provides for the continued identification and preservation of cultural resource sites. Few research-based surveys or Class II inventories have been conducted, and much of the information used to help identify the characteristics of the Planning Area is generally based only on where disturbance has previously occurred, rather than where sites are likely to occur. Most surveys conducted in the Planning Area comply with Section 106, meaning that the surveys are conducted as needed to identify cultural resources in a project-specific context and generally are not statistically valid samples of a region.

Decline in Site Conditions

In general, site conditions are considered to be declining, mainly due to natural erosional processes, increased casual use of public lands, and limited site monitoring and protection. Exposed sites and associated artifacts, features, and structures are easily disturbed by natural elements such as wind and water erosion, deterioration, decay, animal and human intrusion, and development and maintenance activities. Vandalism to sites and cultural artifacts, such as illicit surface collecting, unauthorized digging, and pot hunting, has been documented, and is illegal under the Archaeological Resources Protection Act. Archaeological and historic sites are also known to be deteriorating from a variety of causes. Collectively, these agents have adversely affected many known cultural resources.

Conditions have remained stable for cultural resources identified through compliance activities associated with Section 106 and the State Protocol Agreement between the Colorado BLM and the Colorado State Historic Preservation Office. Although realty actions and energy and mineral activities continue to be conducted in proximity to cultural resources, potential impacts are avoided or mitigated under current NEPA guidelines and management measures. In these cases, the trend is toward a desired condition of conservation and protection. Qualitative observations indicate a downward trend in condition for recorded and unrecorded cultural resources not associated with formal surface disturbing management proposals. Illegal removal of artifacts, ground disturbance associated with recreational activity, limited law enforcement, livestock operations, and a trend toward more intensive use of public lands all contribute to this trend.

3.1.11 Paleontological Resources

Paleontology is the study of prehistoric life, its evolution, and its interaction with the environment (paleoecology). The term "paleontological resources," as used by the BLM, includes any fossilized remains or traces of organisms that are preserved in or on Earth's crust, are of scientific interest, and provide information about the history of life. Paleontological resources, whether invertebrate, plant, trace, or vertebrate fossils, constitute a fragile and nonrenewable record of the history of life on our planet. The BLM's policy is to manage paleontological resources for scientific, educational, and recreational values (e.g., hobby collecting of invertebrate fossils and petrified wood) and to protect these resources from adverse impacts. To accomplish this goal, paleontological resources must be professionally identified and evaluated, and paleontological data should be considered as early as possible any decision-making process.

Paleontological resources are integrally associated with the geologic rock units (formations, members, or beds) in which they are preserved, and the probability for finding paleontological resources can be broadly predicted from the geologic units present at or near the surface. Therefore, geologic mapping

paired with the BLM's Potential Fossil Yield Classification (PFYC) system can be used for assessing the occurrence potential of paleontological resources.

Paleontological resources are managed according to the BLM Manual Section 8270, Paleontological Resource Management, BLM Handbook H-8270-1, General Procedural Guidance for Paleontological Resource Management, and applicable BLM instructional memoranda and bulletins. It should be noted that additional protection measures were enacted under the Omnibus Public Lands Act of 2009 (123 Stat. 1174 Public Law 111–11, Subtitle D), giving paleontological resources protection under law. The BLM is currently developing regulations to implement the requirements of this law.

BLM guidance (Instruction Memorandum 2016-124, Potential Fossil Yield Classifications) describes and defines a new classification system for the classification of paleontological resources, the PFYC system. This system is intended to provide a uniform tool to assess potential occurrences of paleontological resources and to allow evaluation of potential impacts on these resources. It is intended to be applied in broad approach for planning efforts and as an intermediate step in evaluating specific projects.

Potential Fossil Yield Classification System

The potential for paleontological resources is currently identified using two indicators: The BLM Fossil Class Condition system, and the newer PFYC system. While the older BLM Fossil Class Condition system has been used extensively in the past, recent BLM guidelines encourage use of the more precise PFYC system. In the PFYC system, geologic units are classified from 1 (extremely low potential for significant fossils) to 5 (high potential for significant fossils) based on the relative abundance of vertebrate fossils or significant invertebrate or plant fossils and their sensitivity to adverse impacts. The BLM in Colorado has classified rock units both statewide and by BLM region (Trujillo 2010).

The following section describes the current conditions and characterization of paleontological resources and management in the Planning Area.

Current Conditions

Surface exposures of potentially fossil-bearing rock within the Planning Area consist of a large number of lithologic types and ages, and they range in age from Pennsylvanian (318-299 Ma) to Quaternary (2.6 Ma to present) (Green 1992). The majority of this rock was deposited during the Mesozoic Era, though older (e.g., Pennsylvanian) and younger (e.g., Tertiary) rocks are exposed. For detailed descriptions of the potentially fossil-bearing rock units in the Planning Area, see **Section 3.1.3**.

Because a wide variety of terrestrial and marine sedimentary deposits are found within the Planning Area (**Figure 3-8**), many types of vertebrate, invertebrate, plant, and trace fossils are known. **Table 3-25** (Sedimentary Rock Units, Their Fossil-bearing Potential, and Known Fossil Resources) lists the potentially fossil-bearing rock units in the Planning Area in stratigraphic order (from oldest at bottom to youngest at top), their PFYC category, and the known fossil resources from each unit both in general and specifically in the Planning Area. The distribution of PFYC categories across the Planning Area is displayed in **Figure 3-17** (Potential Fossil Yield Classification Distribution). Because specific geographic information for vertebrate fossil localities is considered confidential by the BLM in order to protect the resource, this information is not included here. Specific geographic information for fossil localities can be obtained through the BLM by qualified personnel.

The Upper Jurassic Morrison Formation rock unit deserves special mention. This formation crops out across a large part of the Planning Area, and it is one of the most prolific fossil-bearing rock units in the world. Many fossil localities are known from the Morrison Formation in the Planning Area, several of which are scientifically important. Among these are dinosaur quarries excavated by Brigham Young University (Foster 2005; Turner and Peterson 1999).

Classification for the Planning Area

As shown in **Table 3-25**, several formations with high potential for yielding fossil vertebrates crop out in the Planning Area, and the probability for impacting fossils during construction in these areas is high. Pedestrian surveys will typically be necessary prior to authorizing any surface-disturbing activities in these units, especially the Morrison Formation, and on-site monitoring may be necessary during construction activities.

Table 3-25
Sedimentary Rock Units, Their Fossil-bearing Potential, and Known Fossil Resources

Geologic Age	Group	Formation	Member	PFYC Rating	Known Fossil Resources	Known Fossil Resources in Planning Area[1]
Quaternary		unconsolidated sediments		3	Pleistocene mammals[7]	Mammoth teeth, camel, horse, rodents
Eocene		Uinta Formation		3	mammals[13]	none known
		Green River Formation	Parachute Creek Member	3	fish, bats, birds, mammals[12]	none known
Paleocene-Eocene		Wasatch Formation		3	mammals, reptiles, invertebrates[12]	none known
Upper Cretaceous	Mesa Verde	Hunter Canyon Formation Mt. Garfield Formation Sego Sandstone		3	dinosaurs, mammals, reptiles, fish[3, 8]	none known
		Mancos Shelf		3	marine reptiles, invertebrates, shark teeth, wood[6]	mosasaur, invertebrates, wood
Lower Cretaceous		Dakota Formation		3	invertebrates, plants, tracks, mammals[10, 18]	none known
		Burro Canyon Formation		3	dinosaurs, tracks, plants[9, 13]	theropod dinosaur, fish scales, plants, invertebrates
Upper Jurassic		Morrison Formation	Brushy Basin Member	4-5	dinosaurs, mammals, pterosaurs, lizards, amphibians, sphenodonts, crocodiles, turtles, fish, invertebrates[4, 15]	dinosaurs, mammals, pterosaurs, lizards, amphibians, crocodiles, turtles, fish, invertebrates
Middle Jurassic	San Rafael	Wanakah Formation		4-5	fish, plants, trace fossils, invertebrates[7, 11]	Hadrodon (bivalve)
			Salt Wash Member	4-5	dinosaurs, crocodiles, turtles, invertebrates[2, 11]	dinosaurs, crocodiles, turtles, invertebrates
		Entrada Sandstone		3	dinosaur tracks[9]	none known

Geologic Age	Group	Formation	Member	PFYC Rating	Known Fossil Resources	Known Fossil Resources in Planning Area[1]
Lower Jurassic	Glen Canyon	Navajo Sandstone		3	dinosaur tracks, rare dinosaur skeleton[9, 14]	none known
		Kayenta Formation		3	dinosaurs, dinosaur tracks[13]	none known
		Wingate Sandstone		3	dinosaur tracks[9]	theropod tracks
Lower Triassic		Chinle Formation		5	Phytosaurs, aetosaurs, dinosaurs, lizards, lungfish, invertebrates[5]	none known
		Moenkopi Formation		3	tracks[16], invertebrates[2]	plants
Pennsylvanian-Permian		Cutler Formation		3-4-5	amphibians, synapsids, reptiles, invertebrates[17]	Fish, large amphibians, microsaurian amphibians, various reptiles, plants
Pennsylvanian		Hermosa Formation			none known	none known

Sources: [1]Trujillo 2010; [2]Batten and Stokes 1986; [3]Breithaupt 1985; [4]Foster 2007; [5]Irmis 2005; [6]Kass 1999; [7]Kurten and Anderson 1980; [8]Lillegraven and McKenna 1986; [9]Lockley and Hunt 1995; [10]Merewether et al. 2006; [11]O'Sullivan et al. 2006; [12]Roehler 1992; [13]Schoch 1986; [14]Sertich and Loewen 2010; [15]Turner and Peterson 1999; [16]Untermann and Untermann 1964; [17]Vaughn 1962, 1964; [18]Weishampel 1990

Note: The PFYC assignments for individual units are subject to change as more is learned about them.

Trends

Qualitative observation indicates that the condition has remained stable for paleontological resources protected or mitigated through the permitting process and other standard operating procedures, such as pre-disturbance clearance, associated with federal management actions. In these cases, the trend has been toward conservation. For resources not associated with direct management actions, the trend has been slightly downward. The primary contributors to this trend include unauthorized collection of fossils, limited law enforcement resources, and ground disturbance associated with recreational activities.

3.1.12 Visual Resources

Visual resources refer to the visible features on a landscape (e.g., land, water, vegetation, animals, and structures). These features contribute to the scenic or visual quality and appeal of the landscape. The following section describes the current conditions and characterization of visual resources and management in the Planning Area.

Current Conditions

The scenic quality of the Planning Area is of national significance and an important part of the local and state economy. Many people live and recreate in the Planning Area because of its remoteness and visual qualities. The visual setting is an important part of local lifestyles, and for most travelers, the scenery or visual resource is an important part of their visit. Both tourists and local residents drive across this landscape expecting to see open mountain vistas, rushing water, forested slopes, and vast rolling sagebrush-covered lands.

Cumulative impacts on the landscape have resulted in an altered natural landscape from activities such as, but not limited to, increases in recreation and tourism, expanding urban interface and infrastructure due to population increase, and energy development.

Visual Resource Inventory

Visual resource inventory (VRI) is the first step in the visual assessment process and involves identifying the visual resources of an area and assigning them to inventory classes using the BLM's resource inventory process. The process involves rating the visual appeal of a tract of land, measuring public concern and values for scenic quality, and determining whether the tract of land is visible from travel routes or observation points. This process is described in detail in BLM Handbook H-8410-1, Visual Resource Inventory (BLM 1986a).

A VRI of the Planning Area was completed in September 2009 (Otak 2009). The inventory consisted of three components: Scenic Quality Evaluation, Sensitivity Level Analysis, and Delineation of Distance Zones. Based on these, lands in the Planning Area were placed into one of four VRI classes (as shown in **Figure 3-18** [Visual Resource Inventory]). The Scenic Quality, Sensitivity, and resulting VRI Class distribution for the UFO is presented in **Table 3-26** (Visual Resource Inventory Component Distribution).

Table 3-26
Visual Resource Inventory Component Distribution

Visual Resource Inventory Component	Acres	Percent of Decision Area
Scenic Quality		
A	75,530	11%
B	384,370	57%
C	208,000	31%
Not inventoried[1]	7,860	1%
Sensitivity		
High	187,580	28%
Medium	298,230	44%
Low	182,100	27%
Not inventoried[1]	7,860	1%
VRI Class		
Class I	8,080	1%
Class II	165,380	25%
Class III	313,960	46%
Class IV	180,520	27%
Not inventoried[1]	7,860	1%

Source: BLM 2012a

[1]Lands identified as Not Inventoried are part of the Curecanti National Recreation Area and are managed by National Park Service. Therefore, the BLM will defer to adjacent National Park Service visual ratings for the area's visual values.

Visual Resource Management System

The BLM VRM system is based on the VRI process and is composed of four classes. It is a way to identify and evaluate these scenic values in order to determine appropriate levels of management. VRM is a tool to identify and map essential landscape settings to meet public preferences and recreational experiences today and into the future.

Current VRM classes are summarized in **Table 3-27** (Visual Resource Management Classes) and displayed in **Figure 2-5** (Alternative A: Visual Resource Management).

Table 3-27
Visual Resource Management Classes

VRM Class	Acres
Class I	44,220
Class II	21,930
Class III	280,520
Class IV	9,260
No data	319,770

Source: BLM 2012a

Trends

Public lands in the Planning Area are highly fragmented. The landscape is experiencing a high degree of human modification due to urban development and its associated infrastructure and uses, as well as energy development. Management of multiple resources on public lands can alter scenic resources. With an increased amount of urban development throughout the resource area on adjacent private lands, increased management activities are also occurring on public lands. Growing pressure is being placed on visual resources due to activities such as oil and gas extraction, fire management, utility corridors, roads and trails, recreation activities, communication sites, pipelines, livestock grazing, and water tanks. Public concern is also on the rise regarding preservation of the visual and scenic qualities associated with open space and scenic backgrounds for recreation and in residential areas.

Cultural modification may be considered a detraction from the scenery in the form of a negative intrusion or may be considered a compliment or improvement to the scenery. As part of the visual resource inventory process, cultural modifications were analyzed. **Table 3-28**, Visual Resource Inventory – Cultural Modifications (acres)[1], shows the degree of modification by the number of acres (the lower the number, the more negative the modification is perceived).

Table 3-28
Visual Resource Inventory – Cultural Modifications (acres)[1]

Degree of Modification	BLM	Local (City, State, etc.)	Private	State (School Board)
-2	19,780	20	13,560	0
-1	58,230	0	380	0
-0.5	202,560	2,110	43,260	0
0	371,830	3,930	217,140	1,470
1	9,640	40	4,980	0
Not Rated	7,340	0	8,530	0

Source: BLM 2012a; Otak 2009

[1]Includes mineral estate

In response to growing concern from local communities, the current condition of visual resources is being assessed for major transportation corridors, population centers, and other scenic viewsheds to assess how the BLM can best manage these sensitive viewsheds and corridors.

Tourism also plays a major role in the economy of western Colorado, and much of the Planning Area is viewed en route to or from major tourist destination areas, such as Telluride. As the population of

Colorado grows, more visitors will be attracted to the natural landscapes of public lands. In addition, a high demand is being placed on scenic resources near population centers.

3.1.13 Lands with Wilderness Characteristics

Wilderness characteristics are considered a resource or value of BLM-administered lands. The BLM is required to inventory BLM-administered lands for wilderness characteristics, which include size, naturalness, outstanding opportunities for either solitude or a primitive and unconfined type of recreation, and supplemental values. Policy guidance is provided by BLM Manual 6310, Conducting Wilderness Characteristics Inventory on BLM Lands (BLM 2012e) and Manual 6320, Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process (BLM 2012f).

Wilderness characteristics considered in this analysis include size, naturalness, outstanding opportunities for solitude or a primitive and unconfined type of recreation, and supplemental values. Refer to BLM Manuals 6310 and 6320 for more information.

The following section describes the current conditions and characterization of existing lands with wilderness characteristics in the Planning Area.

Current Conditions

The 1989 Uncompahgre Basin RMP did not provide special management for areas with wilderness characteristics outside of WSAs. For this UFO RMP revision process, the BLM completed a review of BLM-administered lands within the UFO to determine whether they possess wilderness characteristics.

Numerous external groups have advocated for wilderness designations through legislation and participation in the land use planning processes. The latest proposal to consider protection of wilderness characteristics was submitted to the BLM in May 2007 by the Colorado Wilderness Network, a coalition of citizen groups. The BLM's most recent review of lands for wilderness characteristics considered internal and external nominations, areas identified through inventory and monitoring, and adjacent designations of other federal and state agencies. This review only pertains to BLM-administered lands, and does not include those portions of wilderness proposals on National Forest lands or within the Gunnison Gorge NCA, Dominguez-Escalante NCA, or within existing WSAs.

Table 3-29 (Units Inventoried for Wilderness Characteristics) identifies the areas assessed for wilderness characteristics outside of WSAs and the Tabeguache Area as part of the RMP revision process. Summaries are included following the table for inventory units that will be evaluated for management in at least one alternative in the RMP/EIS (see **Chapter 2**, Alternatives, and **Chapter 4**, Environmental Consequences). Areas found to have wilderness characteristics are depicted on **Figure 2-10** (Alternatives B and D: Lands Managed to Protect Wilderness Characteristics).

Table 3-29
Units Inventoried for Wilderness Characteristics

Inventory Unit	Acres Inventoried[1]	Acres with Wilderness Characteristics	Acres not Having Wilderness Characteristics
Adobe Badlands WSA Adjacent	16,520	6,180	10,340
Camel Back WSA Adjacent	8,700	6,950	1,750
Dolores River Canyon WSA Adjacent	3,750	550	3,200
Dry Creek Basin	7,030	7,030	0
Lower Tabeguache/Campbell Creek	11,200	11,060	140
Roc Creek	7,650	5,480	2,170
Shavano Creek	6,100	4,900	1,200

Inventory Unit	Acres Inventoried[1]	Acres with Wilderness Characteristics	Acres not Having Wilderness Characteristics
Norwood Canyon Unit 1	2,350	0	2,345
Norwood Canyon Unit 2	3,250	0	3,250
Total	**66,550**	**42,150**	**24,395**

[1]Reflects total BLM-administered acreage within the Planning Area submitted by the Colorado Wilderness Network, including acreage within existing WSAs. Acreages generated through GIS mapping may vary due to rounding inconsistencies and different mapping techniques.

More information on the evaluation of proposed wilderness units, including methodology for analysis, as well as detailed information on and location of all inventoried units, is in **Appendix F** (Summary of the Uncompahgre Planning Area Wilderness Characteristics Inventory: 2015 Update).

Adobe Badlands Wilderness Study Area Adjacent

This unit is contiguous with Adobe Badlands WSA. Of the 16,520 acres inventoried, 10,340 acres have been excluded, as they were found to either not meet any of the size criteria, or have substantially noticeable human modifications so as not to meet the naturalness criteria. The unit contains part of the Salt Desert Shrub Ecosystem ACEC, a supplemental value.

Camel Back Wilderness Study Area Addition

This unit is contiguous with the Camel Back WSA and includes 8,700 acres. A total of 1,750 acres have been excluded from the unit due to substantial evidence of human modification. The remainder of the area retains its natural appearance and provides outstanding opportunities for solitude and primitive and unconfined recreation. Supplemental values include areas of Fremont cottonwood/skunkbush sumac riparian woodland (*Populus deltoides ssp. wislizeni/Rhus trilobata*), which is classified as globally imperiled by the CNHP, as well as important habitat connectivity between the higher-elevation forested lands on the Uncompahgre Plateau and the lower-elevation desert scrub lands at the lower end of the unit.

Dolores River Canyon Wilderness Study Area Addition

This unit contains 3,750 acres adjacent to the Dolores River Canyon WSA. Portions of the unit on Davis Mesa between the WSA boundary on the northeast side of Wild Steer Canyon and Montrose County Road DD16 (approximately 550 acres) are natural in appearance; however, the unit does not contain outstanding opportunities for solitude due to an adjacent county road. Opportunities for primitive and unconfined recreation are available on the previously described 550-acre portion of the unit.

Dry Creek Basin

Single-track motorized trails and an all-terrain vehicle (ATV) trail within the unit are currently at a low level of use that is consistent with the findings of naturalness and outstanding opportunities for solitude and primitive and unconfined recreation. The Uncompahgre Field Office Resource Management Plan Amendment of OHV Designations and Travel Management Plan in the Dry Creek Travel Management Area (BLM 2009a) designated both routes. In the southwest portion of the unit, a constructed and maintained road extends into the unit for about two miles and terminates. The route is cherry-stemmed out of the unit. This unit also provides important wildlife habitat connectivity between the higher-elevation forested lands on the Uncompahgre Plateau at the south end of the unit and the lower-elevation lands to the north.

Lower Tabeguache/Campbell Creek

This unit is just west of the Shavano Creek Unit, separated by Montrose County Road Z-26. Of the 11,200 acres inventoried, 140 acres have been excluded due to substantially noticeable human

modification, leaving 11,060 acres of the unit that possess wilderness characteristics. The unit was determined to have no supplemental values.

Roc Creek

The portion of the proposed unit within the Planning Area is comprised of 7,650 acres near, but not contiguous with, the Sewemup Mesa WSA. A total of 250 acres on the west side of the remaining proposal were eliminated because they were non-contiguous with the remainder of the unit. Of the remaining acres inventoried, 5,480 acres are natural in appearance. Much of the unit contains steep terrain draining toward the north into Roc Creek. Vegetation is predominantly pinyon-juniper woodland. The southeast portion of the inventory unit (2,170 acres) is not natural in appearance and contains many vehicle routes and linear disturbances remaining from mineral exploration. Several road spurs have been cherry-stemmed out of the unit. Opportunities for solitude and primitive and unconfined recreation are present, and the area is notable for highly scenic views from the bluffs overlooking the deep drainages within the unit.

Shavano Creek

This unit is just north of but not adjacent to the congressionally designated Tabeguache Area. A total of 1,200 acres were excluded from the initial inventory area when it was found that Road U475 is a constructed and maintained road and, therefore, formed a new boundary for the unit. The remaining 4,900 acres contain wilderness characteristics and are of sufficient size to make practicable its management in an unimpaired condition. There are abundant opportunities for primitive and unconfined recreation. Opportunities for solitude are also outstanding throughout the unit. In addition, this area provides important habitat connectivity between the higher-elevation forested lands on the Uncompahgre Plateau at the northeast end of the unit and the lower-elevation lands to the southwest.

Trends

Lands within the Decision Area were not inventoried as part of the previous land use planning processes (BLM 1985; BLM 1989a) and have not been inventoried since the original wilderness characteristics inventory conducted in 1980. It is likely that these areas, found to possess wilderness characteristics during the inventory conducted for this RMP, would have possessed wilderness characteristics in 1980 had the inventory been conducted using current methods and technologies. Additionally, over the intervening decades as more of the natural landscapes in the United States have been developed, peoples' sensibilities of what constitutes naturalness, solitude, and primitive and unconfined recreation have changed.

3.2 RESOURCE USES

This section contains a description of the human uses of resources in the Planning Area and follows the order of topics addressed in **Chapter 2**:

- Forestry and Woodland Products
- Livestock Grazing
- Energy and Minerals
- Recreation and Visitor Services
- Comprehensive Travel and Transportation Management
- Lands and Realty, including Renewable Energy

3.2.1 Forestry and Woodland Products

BLM forests and woodlands are managed under the principles of multiple-use, sustained yield, and environmental quality protection in accordance with FLPMA and the Colorado Standards for Public Land

Health. Values and uses associated with forests, such as timber production, recreation, aesthetics, water quality, wildlife habitat, and wilderness, are managed through an ecologically-based program that emphasizes biological diversity, sustainability, and long-term forest health.

The following section describes the current conditions and characterization of forestry and woodland products and management in the Planning Area.

Current Conditions

Forest Resources

The BLM manages approximately 5,300 acres of forested land within the Planning Area (as shown in **Figure 3-19** [Vegetation Types]). Commercial species include ponderosa pine, Douglas fir, Engelmann spruce, subalpine fir, and aspen. Historically, the primary commercial species were ponderosa pine, Engelmann spruce, and aspen. The annual allowable harvest from suitable commercial forested lands established for the San Juan/San Miguel Decision Area is 14.5 thousand cubic feet. Annual allowable harvests for the Uncompahgre Basin Decision Area were to be developed as needed, but due to funding constraints and low demand, were never established. Recent harvest levels have averaged less than 36 hundred cubic feet of forest products per year. This figure is significantly less than annual sustainable harvest limits within the resource area. In Colorado, the low harvest levels have coincided with a reduction in national forest timber harvests and consequent closures and/or very low levels of capacity at the few remaining sawmills since the late 1970s through the early 1990s. **Table 3-30** (Forest and Woodland Products Sold (1998-2017)) shows the number of forest products sold in the UFO from 1998 to 2017.

Woodland Resources

In addition to commercial forestlands, approximately 107,000 acres of woodland within the Planning Area are suitable for harvest, consisting mainly of pinyon pine, juniper, and Gambel oak (as shown in **Figure 3-19**). The annual allowable harvest established for woodlands in the San Juan/San Miguel Decision Area is 10.2 thousand cubic feet; annual allowable woodland harvests for the Uncompahgre Basin Decision Area were not established. The average annual firewood harvest for the past decade has been 230 cords per year across the entire field office, which is well below sustainable harvest limits. The present demand for fuelwood has been steady and limited almost exclusively to pinyon and juniper. Currently, the collecting of other woodland species, including Gambel oak, is not permitted within the Planning Area, except on a case-by-case basis when other management objectives are desired. There are known cases of fuelwood and post and pole removal by the public without permits; however, the level of use has been difficult to document and quantify. Realistically this level of use is likely to comprise an additional 10 to 15 percent of known use (approximately 23-35 cords per year) which, combined with known harvest levels, remains well below sustainable harvest limits.

Christmas Trees and Transplants

Special forest products, including posts, poles, Christmas trees, and transplants, are sold commercially or by the individual item. Seasonal Christmas tree harvesting by local residents is also a common use of woodland resources, with an average of 514 trees sold per year. Pinyon pine and juniper are the only species currently permitted for Christmas tree harvest within the Planning Area. The annual harvest of Christmas trees has fluctuated, with the greatest demand occurring in 2004 and the lowest demand in 2011. The harvest of transplants has been minimal, reflecting public and commercial demand. Fewer than 60 transplant permits are sold annually, with a preference for pinyon used in the emerging trend of xeriscaping.

Table 3-30
Forest and Woodland Products Sold (1998-2017)

Fiscal Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Fuelwood Cords #[1]	285	167	309	126	262	199	224	192	291	214	254	438	394	370	418	381	438	381	296	220
Fuelwood Volume	232	136	252	103	214	162	183	157	237	174	207	359	322	310	342	312	359	312	242	180
Revenue	$2,850	$1,400	$2,440	$976	$1,966	$1,592	$1,680	$1,562	$2,220	$1,752	$1,270	$4,381	$3,947	$3,707	$4,180	$3,815	$4,388	$3,814	$2,969	$2,208
Round-wood [1,2]	33	11	16	20	22	25	16	19	79	150	3	Included with sales of fuelwood since 2009								
Revenue	$1,501	$395	$1,452	$759	$1,082	$1,140	$601	$776	$494	$182	$863	Included with sales of fuelwood since 2009								
Christmas Trees #[3]	607	625	603	438	463	289	673	636	580	374	370	317	271	238	367	316	284	348	247	285
Revenue	$3,269	$3,362	$2,412	$2,728	$2,963	$1,788	$3,438	$2,601	$2,008	$1,827	$3,700	$2,540	$2,169	$1,905	$2,940	$2,531	$2,274	$2,789	$1,977	$2,086
Boughs (pounds)	0	0	0	0	0	0	1,000	0	0	4,000	0	0	0	2	0	1	1	1	2	2
Revenue	0	0	0	0	0	0	$16	0	0	$16	0	0	0	$24	0	$20	$32	$80	$56	$72
Transplant #	0	6	62	14	55	242	32	32	20	15	0	3	3	4	3	1	1	1	6	8
Revenue	0	$24	$252	$56	$260	$512	$144	$128	$80	$68	0	$52	$52	$52	$40	$16	$16	$20	$385	$161
Total Yearly Revenue	**$7,620**	**$5,181**	**$6,556**	**$4,519**	**$6,271**	**$5,032**	**$5,878**	**$5,066**	**$4,802**	**$3,845**	**$5,833**	**$6,937**	**$6,196**	**$5,689**	**$7,161**	**$6,382**	**$6,710**	**$6,703**	**$5,115**	**$4,528**

[1]Beginning in 2009, all wood products (round wood and fuel wood) were sold as corded wood.
[2]Roundwood includes both saw timber and all non-saw timber and fuelwood products sold, which are convertible to cubic feet, such as posts, poles, and house logs.
[3]Collection of seedling or juvenile native vegetation from BLM-administered lands to replant on private property for personal use only and cannot be resold.

Forest Inventories

Given the minimal demand for pinyon-juniper products and relatively small volume contained within stands of commercially viable saw timber in the planning unit, labor-intensive stand inventories have not been utilized. Straight area calculations have traditionally been used to calculate allowable harvest limits under sustained yield principles. Harvest limits are calculated using the following equation:

$$\frac{\textit{Stand Acres}}{\textit{Return Interval/Regeneration Time + Reestablishment Lag}} \textit{ x Productive Capability = Sustainable Harvest}$$

An extensive inventory of the Planning Area known as the Timber Production Capability Classification was conducted in the late 1970s through 1980s in order to identify the various species present within a given stand and calculate the stand's production capabilities, as well as to map the stand on a 1:24,000 scale (commonly known as 7.5-minute quadrangle maps). Given current BLM funding and the decrease in demand for forest products from 1970-1989 levels, these inventories, and the straight area calculations used to determine sustainable allowable cuts, remain valid and useful.

Management Objectives and Practices

The primary focus of forest management practices in the UFO from the early 1950s through the early 1980s was to provide forage for livestock and big game species. These objectives were achieved through the practice of chaining and roller chopping, primarily in pinyon-juniper woodlands, and then seeding with non-native forage species. This practice was applied to approximately 35,000 acres of pinyon-juniper woodland within the Planning Area. Although the woodlands are lightly stocked, these treated acres are still considered part of the woodland base. These management objectives and practices have continued through the 1990s to the present.

While the emphasis had been on moving towards or maintaining pinyon-juniper woodlands in an early seral state for forage production, there has been a shift in the last decade toward a landscape approach for managing these treatment areas. For example, a percentage of the early seral woodlands within the Spring Creek and Dry Creek watersheds will be allowed to mature, while the remaining pinyon-juniper sites will be managed as early seral, with restoration of the native herbaceous and woody shrub component. Similar approaches could be utilized across the resource area to restore greater ecological integrity to forest and woodland communities.

With implementation of the National Fire Plan, the BLM has conducted numerous fuel treatments in the Planning Area to manage previously untreated stands through mechanical thinning or prescribed burning. Such efforts represent an attempt to restore areas of woodland and forest that have experienced an increase in numbers of trees per acre or crown closure due to past management practices, such as fire exclusion and grazing. The objective of the treatments has been to minimize fire danger by reducing stocking rates and the continuity of forest canopy.

Trends

Forest Health

Forest and woodlands in Colorado have been affected by drought, insects, and disease. Pinyon ips, mountain pine, spruce bark, and balsam fir beetles have all been increasing in population (Colorado State Forest Service 2009). Within the Planning Area, aspens are in varying stages of growth, although overall stands are declining. Many stands are on marginal sites exhibiting signs of a relatively unknown phenomenon called Sudden Aspen Decline Syndrome (Colorado State Forest Service 2005). Based on the 2017 update of the *Report on Health of Colorado Forests,* the recent insect and disease concerns in the

Planning Area region include spruce beetle and western spruce budworm (Colorado State Forest Service 2017).

Fluctuations in Tree Density. Concerns about tree invasion causing major land health problems are lessening in light of recent drought. In addition, recent research on pinyon dendrochronology and stand structure on the Uncompahgre Plateau indicates that many woodland stands have experienced density increases followed by density declines over the past several centuries, apparently linked to climate fluctuations (Romme et al. 2008).

Two prolonged wet periods over the past century have likely contributed to increases in tree density, both within woodlands and through invasion into new communities. Land management practices such as livestock grazing may enhance tree establishment as well, with young trees sprouting in woodland chainings from the mid-20th century. However, the drought has recently killed many of these young regenerating pinyon trees in parts of the landscape, with tree death in some areas as high as 90 percent. Because there is no evidence that frequent fire in shrub communities has repelled tree invasions, the effects of fire repression cannot be implicated thus far.

Demand for Forest Products

Saw Timber. Recent government initiatives, including the National Fire Plan, Healthy Forest Restoration Act, and Healthy Forest Initiative, have called for the treatment of forests and woodlands to reduce fire and insect threats and improve overall forest health, while also providing incentives for local community-based business development of forest products. Despite these initiatives, the demand for saw timber within Colorado and eastern Utah remains low. With the reopening of the sawmill in Montrose, Colorado, and the development of biomass plants in the region, demand may increase over the life of the RMP.

Fuelwood. The demand for fuelwood has remained steady over the last decade, and this trend is expected to continue, along with fluctuations in response to oil and natural gas price fluctuations. This is due, in part, to strict air quality regulations that deter wood burning within major population centers in the region, and the fact that fuelwood is more readily obtained on adjoining National Forest System lands. Posts and poles account for approximately 75 to 90 percent of all roundwood sales within the Planning Area over the past decade. This trend can be expected to remain constant, as modestly priced manufactured posts and poles enter the region, due in part to landscape-scale pest epidemics damaging forests throughout the intermountain west.

As communities along the Western Slope continue to grow, and water resources become more stretched, it is reasonable to expect that xeriscaping and xerogardening trends will accelerate, increasing the demand for native transplant trees from public lands. While difficult to project, as community planners impose water restrictions and promote green community development, the demand for water-conserving transplants can be expected to parallel community growth.

3.2.2 Livestock Grazing

The primary laws that govern grazing on public lands are the Taylor Grazing Act of 1934, FLPMA, and the Public Rangelands Improvement Act of 1978. The BLM manages grazing lands under 43 CFR Part 4100 and BLM Handbooks 4100-4180, and it conducts grazing management practices through BLM Manual H-4120-1: Grazing Management (BLM 1987). In addition, the BLM must meet or ensure progress is being made toward meeting the BLM Colorado Public Land Health Standards and Guidelines for Livestock Grazing Management (BLM 1997; **Appendix C**) for each grazing allotment. An allotment is a designated area or management unit that allows grazing and can be made up of multiple pastures. The allowed use of grazing on each allotment is determined based on allocated Animal Unit Months (AUMs).

An AUM is equal to the approximate amount of forage needed to sustain one cow, five sheep, or five goats for a month. An interdisciplinary approach ensures effective management of the multiple resource values and uses in the Uncompahgre RMP. Management strategies for livestock grazing are focused on achieving BLM Colorado Public Land Health Standards and meeting objectives for other resources, such as vegetation and soils.

The following section describes the current conditions and characterization of livestock grazing in the Planning Area.

Current Conditions

Currently 619,500 acres (92 percent) of BLM-administered land within the Planning Area are allocated for livestock grazing. The public range permitted level includes 35,520 active AUMs of forage, and 4,152 suspended use AUMs. Permittees paid to use 21,167 AUMs of forage in 2016. **Appendix E** (Livestock Grazing Allotments and Allotment Levels) details grazing allotments, acreages, permitted AUMs, and grazing periods within the Planning Area.

Within the Planning Area, there are 232 allotments and 120 permittees (see **Figure 3-20** [Grazing Allotments]). The allotments vary in size from 40 to 23,080 acres, with grazing allocations ranging from 1 to 802 AUMs in each allotment. In 2016, approximately 76 percent of the allotment permits were for cattle, with sheep and horse grazing accounting for the remaining 24 percent. Individual operators graze animals on 219 allotments, while the remaining fifteen are common allotments grazed by two or more operators.

Grazing within the Planning Area occurs throughout the year, with much of the use concentrated during spring and fall months. Spring and fall allotments are typically located adjacent to National Forest System land, and are utilized for short periods prior to "on" dates and after "off" dates for higher elevation summer allotments on National Forest System land. Summer use allotments are commonly found at higher elevations in the North Fork of the Gunnison River area. The Forest Service and BLM coordinate grazing management when a permittee uses lands managed by both agencies. Winter use allotments are primarily located in the west end of Montrose and San Miguel counties, at lower elevations associated with a semi-arid climate.

All grazing permits include terms and conditions regarding management of the allotment. In some cases, allotment management plans have been developed, which provide details about the location, amount, and timing of permitted grazing use, and incorporate allotment-specific planned grazing systems.

Some allotments in the Planning Area contain portions that are only slightly used or not used at all by livestock due to topography, distance from water, limitations caused by natural barriers, or other reasons. Rangeland improvement projects, water developments in particular, have been implemented within the UFO to better distribute livestock grazing.

Land health assessments conducted in the Planning Area between 1998 and 2009 identified causal factors in instances where BLM Colorado Public Land Health Standards were not met or were met with problems. **Table 3-31** (Status of Allotments in Relation to Public Land Health Standards) summarizes the status of grazing allotments in relation to BLM Colorado Public Land Health Standards. Washington Office Instruction Memorandum 2012-124, Implementation of Land Health Reporting Data Standard, and BLM Manual 4180, Land Health, acres of land meeting/not meeting standards are reported for each standard. This determination is not an RMP planning decision, and baseline information reflects current monitoring practices.

Table 3-31
Status of Allotments in Relation to Public Land Health Standards

Description	Number of Allotments	Acres
Upland Soils, Healthy Plant and Animal Communities, and Threatened and Endangered Species Standards		
Total number of allotments assessed	181	607,760
Allotments meeting standards with problems and/or NOT meeting standards, with current livestock grazing identified as the cause	6	8,070
Allotments meeting standards with problems and/or NOT meeting standards, with causes other than current livestock grazing identified	53	309,000
Riparian and Water Quality Standards		
Allotments meeting standards with problems and/or NOT meeting standards, with current livestock grazing identified as the cause	2	1,700
Allotments meeting standards with problems and/or NOT meeting standards, with causes other than current livestock grazing identified	15	188,510

Source: BLM 2018a

The results of the land health assessments assist the BLM in prioritizing allotment management. Three selective management categories for allotments have been developed: Custodial, Maintain, and Improve. Custodial allotments are those where investment in time or money would not be justified due to size or condition of the allotment. In Maintain category allotments, no serious resource use conflicts or controversy exist or current management is generally achieving desired results. Although some investment in time or money would be justified in these allotments, they are not as high a priority as Improve category allotments. Improve category allotments have resource use conflicts or controversies, opportunities exist to achieve the allotment's potential through management changes, or the allotment contains significant unique resources that would justify investments of time and money. These allotments are the highest priority for monitoring and increased range management.

Of the 619,500 acres available for livestock grazing, 43 allotments (336,840 acres) are in the improve category, 53 allotments (131,800 acres) are in the maintain category, and 136 allotments (148,000 acres) are in the custodial category (**Appendix E**). Changes in management may be due to conflicts with other uses, conflicts with other resources, adjustment in authorized active AUMs based on Ecological Site Inventory, or results of a land health assessment where livestock grazing has been determined to be a causal factor. Improve category allotments have priority in completing Allotment Management Plans, but due to new resource issues and increased focus in some areas, some Allotment Management Plans have been established for lower-priority allotments.

Trends

Between 2012 and 2016, billed use averaged 52 percent of the total active permitted use of 35,626 AUMs. This difference can be attributed to a number of variables. Seasonal variations in precipitation and temperature result in more or less available forage from one year to the next. Drought conditions have required a temporary reduction in grazing use in order to maintain good range conditions. Permittees may also opt for voluntary non-use for a variety of reasons, resulting in AUMs that are available but not used. In addition, grazing is typically deferred in an area for two years following land treatments and fire rehabilitation projects, accounting for lower use levels.

As grazing permits within the Planning Area become available for whatever reason, there is considerable interest among area livestock producers to acquire them. There is also interest in acquiring grazing authorization for lands not currently allocated for grazing. The anticipated demand for grazing on BLM-administered lands within the Planning Area is expected to continue into the near future.

3.2.3 Energy and Minerals

Energy and minerals are discussed in four separate subsections describing fluid leasable minerals, solid leasable minerals, locatable minerals, and mineral materials.

- **Fluid leasable minerals** are oil (including oil shale), gas (including shale gas), and geothermal.
- **Solid leasable minerals** are coal, sodium, potash, and phosphate.
- **Locatable minerals** are gold, silver, platinum, copper, lead, zinc, magnesium, nickel, tungsten, bentonite, uranium, vanadium, and uncommon varieties of sand, gravel, and dimension stone.
- **Mineral materials** are common varieties of construction materials and aggregates, such as, sand, gravel, cinders, roadbed, and ballast material.

Fluid Leasable Minerals – Oil and Gas

Oil and gas leasing in the UFO is guided by three RMPs or RMP amendments; none are inclusive of the entire Uncompahgre RMP Decision Area.

- Uncompahgre RMP (BLM 1989a). Applies to oil and gas leasing and development activities proposed on lands from the North Fork area to the eastern edge of the Uncompahgre National Forest boundary in the UFO.
- Colorado Oil and Gas Leasing and Development EIS and RMP Amendment for the San Juan/San Miguel Planning Area (BLM 1991a). Applies to oil and gas leasing and development activities proposed on lands southwest of the Uncompahgre National Forest in the UFO.
- San Miguel River Special Recreation Management Area (SRMA) and ACEC Amendment (BLM 1993a). Applies to lands within the San Miguel River SRMA and ACEC.

Most of the hydrocarbon production in the Planning Area is natural gas, with very little associated oil, natural gas liquids, or water. As of 2010, approximately 15,000 barrels of oil had been produced in the Planning Area, an indication that oil production is not a significant activity within the Planning Area (BLM 2012d). As such, only natural gas production is discussed in the remainder of this section.

Current Conditions

The *Reasonable Foreseeable Development Scenario for Oil and Gas for the Uncompahgre Field Office, Colorado* report (BLM 2012d) analyzes the oil and gas resource known to occur and potentially occur within the Planning Area. The estimated oil and gas potential is presented in **Figure 3-29** (Oil and Gas Potential (Noncoalbed Methane) and categorized into the following classes: Very high, High, Moderate, Low, Very Low, and Negligible. Based on this report, there are currently three types of natural gas occurrences within the Planning Area: conventional gas often found in sandstone formations, coal bed methane found in coal seam deposits, and shale gas produced from shale formations using horizontal drilling technologies. Natural gas resources are located generally in two areas within the Planning Area: the North Fork of the Gunnison River area (North Fork area) and the west end of Montrose and San Miguel counties area (West End area) (**Figure 3-21** [Oil and Gas Well Locations]). The North Fork area lies in the northeast corner of Delta County and the northwest corner of Gunnison County. In this area, the Mesa Verde Group in the Piceance Basin has gas potential for conventional gas in sandstone units, coal bed methane gas within its coal seams, and shale gas resources in sedimentary strata associated with the Mancos Shale. In the West End area, the Dakota Sandstone Formation has potential for conventional and coal bed methane gas, while the deeper Cutler Formation and Hermosa Formation Group have potential for conventional gas and a deep shale gas play, respectively (BLM 2011b) (**Figure 3-8**). These formations all lie within the Paradox Basin (**Figure 3-9**).

Between January 1, 2000, and December 31, 2009, drilling operations have resulted in 57 new exploratory and development natural gas wells. Of these, thirteen were in the Paradox Basin part of the Planning Area, while 44 were located in the Piceance Basin part of the Planning Area (BLM 2012d).

Leasing of oil and gas since 2000 has varied from zero acres in 2010 to 54,710 acres in 2005 (**Table 3-32** [Federal Oil and Gas Acreage Leased by Year (Active)]). As of May 2018, the Planning Area had 348 active leases containing 224,950 acres (including pre-2000 developed leases). This includes 160,510 acres (24 percent) of BLM-administered surface and 64,440 acres (27 percent) of split-estate lands (private, state, and local surface with federal fluid mineral subsurface). Because most leases expire after ten years, some of these lands may now be available for leasing. As a result, it is estimated that there are approximately 646,860 acres open to leasing (471,070 acres of BLM surface and 175,790 acres of split-estate lands (private, state, and local surface with federal fluid mineral subsurface) within the Planning Area.

Table 3-32
Federal Oil and Gas Acreage Leased by Year (Active)

Year	Average Lease Acres	Total Leased Acres[1]	Number of Leases
2000	745	16,130	21
2001	545	40,070	71
2002	490	2,240	5
2003	460	14,070	32
2004	635	4,250	7
2005	900	54,710	52
2006	510	15,850	29
2007	500	31,560	48
2008	490	23,540	37
2009	80	390	5
2010	0	0	0
2011	40	40	1
2012	800	800	1
2013	0	0	0
2014	0	0	0
2015	0	0	0
2016	0	0	0
2017	0	0	0

Source: BLM 2018a

[1]Includes all leased BLM-administered surface acres, plus all federal fluid mineral subsurface under private, local, and state surface. Values are limited to active leases and do not include pending leases.

North Fork Area. The North Fork area hosts the largest natural gas development activity in the Planning Area. As of 2010, wells in this area had produced over three billion cubic feet of gas. The bulk of the gas production in this area is from upper Cretaceous sandstone reservoirs in the Mesa Verde Group within the greater Piceance Basin. Primary targets for drilling in the Mesa Verde group include the Cozzette and Corcoran Sandstone members found within the Mount Garfield (or Iles) Formation.

In addition, a high potential exists for the occurrence of coalbed natural gas in the Mesa Verde Group. The South Canyon Coal and Cameo Coal units within the Williams Fork Formation are targets within

this group. Producers are also exploring potential sources of shale gas within the Mancos Shale (BLM 2012d).

Additional formations within the Cenozoic zone contain natural gas production potential but have not yet been productive (BLM 2012d). According to Colorado State historic records, 116 gas wells have been drilled in the North Fork area on federally managed oil and gas leases, including split-estate lands. Of these wells, 15 are currently producing, 29 are shut-in but capable of production, and 72 have been drilled, abandoned, and plugged (BLM 2011b).

West End Area. Gas exploration in the West End area is occurring in the Mailbox Park, Hamilton Creek, and Wray Mesa areas in portions of Montrose and San Miguel counties west of Telluride. The West End area has a high potential for the occurrence of oil and natural gas; however, the amount of historic oil and gas production to date in this area is very small. According to Colorado Oil and Gas Conservation Commission records, there have been 53 wells drilled on federally managed oil and gas leases (including split-estate lands). Of these wells, two are currently producing, two are shut-in; and 49 have been drilled, abandoned, and plugged (Colorado Oil and Gas Conservation Commission 2012).

The West End area formations lie in the Paradox Basin and are much older than those in the North Fork area. The Dakota Sandstone formation dates to the early Cretaceous period. Various members of the Permian Cutler Formation and the Pennsylvanian Hermosa Group are also targets for gas production. These formations are generally much deeper than the younger North Fork area formations, with total well depths averaging around 10,000 feet in the West End area as opposed to 5,000 feet in the North Fork area.

Trends

U.S. projections indicate continued industry emphasis on increasing natural gas supplies and searching for additional natural gas supplies in the Planning Area. Much of the Planning Area gas supply growth is expected to come from development of the coalbed natural gas resource and new reservoir discoveries potentially coming from exploration for nonconventional plays. An estimated 1,271 wells could be drilled in the Planning Area by 2030, with 418 of those wells falling under BLM management. Of those 1,271 wells, approximately 36 percent could be coalbed natural gas wells, and the remaining 64 percent could be conventional wells (including shale wells; BLM 2012d).

Although the number of wells drilled, both nationally and in the Planning Area, is projected to increase, the production per well has been decreasing and this trend is expected to continue. In response, producers are drilling more and more wells in an attempt to maintain current levels of total production (BLM 2012d).

Carbonaceous shale is expected to become an important future source of natural gas in the United States. Some exploration of the shale resources in the Planning Area has occurred, but it is still in early phases. When and if the Mancos, Gothic, or Hovenweep shale gas plays are fully characterized for the Planning Area and technology and well completion methods are optimized, these shale gas resources could become an important energy source (BLM 2012d).

Fluid Leasable Minerals – Geothermal Resources

A geothermal lease is for the heat resource of the Earth where there is federal mineral estate. Unless specifically owned in fee, the federal government does not own the hot water commonly associated with the heat; this falls under state water laws. Geothermal developers must obtain the appropriate water rights and state permits in addition to the federal lease for the resource.

Current Conditions

Of the 971,220 acres of federal mineral estate in the Decision Area, 44,220 are designated as closed to geothermal leasing. There are no geothermal facilities, pending applications for geothermal facilities, leases or lease nominations in the Planning Area.

According to the Programmatic EIS for Geothermal Leasing in the Western United States (BLM 2008b) and the Renewable Energy Potential Report prepared in support of this RMP, the Planning Area has 593,600 acres with geothermal potential. Aside from the westernmost portion, the entire Planning Area is considered to have geothermal potential. This is shown in Figure 2-2 of the Renewable Energy Potential Report (BLM 2010g). Specific geothermal surface features within the Planning Area are limited to Orvis Hot Spring (126 degrees Fahrenheit) and Ouray Hot Spring (156 degrees Fahrenheit), which have the potential for expansion of direct use applications for the communities near those resources. While neither of these hot springs are located on BLM-administered lands, such lands are nearby and could potentially be involved in future development of these geothermal resources.

Trends

The main long-term trend expected to influence geothermal energy development within the Planning Area is the ongoing national rapid expansion of renewable energy development and the possible future trend toward locally produced renewable energy.

Solid Leasable Minerals – Coal

Coal in the Planning Area is found in three Upper Cretaceous formations. From oldest to youngest, they are the Dakota Sandstone Formation, the Mesaverde Formation and Mesaverde Group (Mesaverde), and the Fruitland Formation. The Mancos Shale Formation lies between the Dakota Sandstone and the Mesaverde/Fruitland Formations. These Upper Cretaceous formations are found within two coal regions in the Planning Area: the Uinta coal region that is associated with the Piceance Basin, and the San Juan River coal region associated with the Colorado Plateau physiographic province.

The Uinta and San Juan River coal regions are comprised of seven coal fields, four of which are within the Planning Area and three adjacent to the Planning Area (**Figure 3-22** [Coal Fields]). The four fields within the Planning Area are the Tongue Mesa and Nucla-Naturita coal fields (San Juan River coal region), and the Grand Mesa and Somerset coal fields (Uinta coal region). The three coal fields adjacent to the Planning Area are the Book Cliffs, Carbondale, and Crested Butte. The Carbondale coal field extends into the northeast corner of the Planning Area; however, the coal resource in this area has been mostly mined out or is inaccessible due to wilderness status. As such, the coal resource potential for Carbondale is not further discussed in this section (BLM 2010h).

Current Conditions

The coal development potential area identified in the 1985 San Juan/San Miguel RMP (BLM 1985) and 1989 Uncompahgre Basin RMP (BLM 1989a) was carried forward to Alternative A (which reflects current management) in the Draft RMP/EIS. As part of development of the revised RMP, the BLM developed the *Coal Resource and Development Potential Report* (BLM 2010h) to assess the geographic areas where potential coal resource development may occur in the next 20 years. The coal potential area in Alternatives B, C, and D was expanded because of new technology that allows mining of deeper coal and because of the addition of Dakota coal west of Montrose and an expanded Nucla-Naturita Coal Field, neither of which were recognized in the 1985 and 1989 RMPs (as shown in **Figure 3-22**). **Table 3-33** (Coal Fields) illustrates the coal potential area for each coal field, by alternative.

Table 3-33
Coal Fields

Coal Field or Coal Resource Area	Federal Mineral Estate Acres[1] 1989 Data Alternative A	Federal Mineral Estate Acres[1] 2009 Data Alternatives B, C, and D
Coal Fields		
Grand Mesa	25,580	27,740
Nucla-Naturita	2,080	148,440
Tongue Mesa	15,920	16,570
Somerset	44,920	46,220
Coal Resource Areas[2]		
Piceance deep	57,350	57,360
Uncompahgre Plateau	No data	117,260
Other areas	No data	7,910
TOTAL	**145,850**	**421,500**

[1]Acreages shown are those within the Decision Area and, as such, do not include federal minerals underlying National Forest System lands.
[2]The coal resource areas of Piceance Deep and Uncompahgre Plateau, and other unnamed areas where the coal resource is present, contribute to the coal development potential area, but are not further discussed in this chapter because they have low coal potential and no interest from industry.

The coals in the Grand Mesa coal field are in the Mount Garfield Formation of the Mesaverde Group. The coal is found in the Paonia Shale and Bowie Shale Members. The Rollins Sandstone Member is a whitish, massive sandstone unit that underlies the Paonia Shale and Bowie Shale coal-bearing members and overlies the Mancos Shale Formation that is comprised of marine shale and mudstone and forms the adobe badlands on the lowest slopes of Grand Mesa (BLM 2010h).

The apparent rank of coal in the Grand Mesa coal field is high-volatile C bituminous to subbituminous A. Lee (1912) indicated that the Grand Mesa coal field (known at that time as the Rollins District of the Grand Mesa coal field) produced coal that was typically subbituminous and had lower energy than the bituminous coal in the "Somerset District" to the east. As with most Cretaceous coal in western Colorado, the coal is of high quality, with typically low ash and sulfur content and moderately high energy value. However, because of the lower energy (than coal in the Somerset field), deep overburden, and inaccessibility to coal-handling and transportation facilities, coal mining activity in this field has limited potential during the next 20 years (BLM 2010h).

Nucla-Naturita Coal Field. The Nucla-Naturita coal field is near the southwest corner of the Planning Area in the vicinity of the towns of Nucla and Naturita (**Figure 3-22**). There are 24 historic surface and underground coal mines in the Nucla-Naturita coal field. The New Horizon Mine, operated by Western Fuels Association, is the most recently active surface mine and is located on private land with private mineral estate. The New Horizon Mine ceased production after March 2017 when it produced its final 8,773 tons and entered into the reclamation phase (Colorado Department of Natural Resources 2017a). The mine had supplied coal to the Nucla Power Station, a 100-megawatt power plant owned by Tri-State Generation and Transmission Association, that is scheduled for complete shut down by 2022 (Denver Post 2017).

The coals in the Nucla-Naturita coal field are in the Middle Carbonaceous Shale Member of the Dakota Sandstone Formation. The Upper and Lower Sandstone Members contain massive sandstone, while the Middle Carbonaceous Shale Member contains coal, carbonaceous shale, and siltstone. Coal beds within the Middle Carbonaceous Shale Member are lenticular, discontinuous, and difficult to correlate across the field. In the Nucla-Naturita area, however, there are three beds of mineable thickness ranging from one to five feet. Due to the fragile nature of Mancos Shale, most of it has been eroded from above the

Dakota Sandstone. The Burro Canyon Formation, which underlies the Dakota Sandstone, is a massive sandstone and conglomerate that is often mapped as part of the lower member of the Dakota Sandstone (BLM 2010h).

The apparent rank of the coal in the Nucla-Naturita coal field is high-volatile A to C bituminous to low-volatile B bituminous. The lenticular and discontinuous nature of the coal, as well as the presence of partings (thin interbeds of impurities) and clastic dikes, has limited the quality and economic viability of this coal (BLM 2010h).

Somerset Coal Field. The Somerset coal field is located on the lower, southeastern flank of Grand Mesa, extending from the east side of the Leroux Creek drainage (where it abuts the Somerset coal field to the west), past Paonia and Somerset, and east to drainages near Paonia Reservoir in the North Fork of the Gunnison Valley (**Figure 3-22**). The UFO currently manages two active federal coal leases related to one coal mine in the North Fork Valley near Paonia. The West Elk Mine (operated by Mountain Coal Company) is the actively producing underground (longwall, continuous) coal mine. Many inactive historic mines are also distributed throughout this field. Highway 133 passes through the eastern end of this field. The field is roughly 38 miles long and two to ten miles wide. Most of this coal field is in Delta County, with the eastern portion extending into Gunnison County (BLM 2010h).

The coals in the Somerset coal field are in the Paonia Shale and Bowie Shale Members of the Mesaverde Formation. The alluvial plain deposits of the Barren and Ohio Creek Members overlie the coal-bearing members. The Rollins Sandstone Member, a tan, massive sandstone unit, underlies the coal-bearing members and overlies the Mancos Shale Formation (BLM 2010h).

The apparent rank of the coal in the Somerset coal field is high-volatile B and C bituminous. In the eastern portion of the field where the coal has been exposed to laccoliths and other intrusions, the rank of coal is marginal to premium high-volatile A and B bituminous, and some are of good coking quality. As with most Cretaceous coal in western Colorado, the coal is of high quality, with typically low ash and sulfur content and moderately high to high energy value (BLM 2010h). The Somerset coal field is the only active coal field in the Planning Area with production totals averaging approximately 5.5 million tons per year from the West Elk Mine.

Locally, coal mining has historically been an important industry; however, the Bowie #2 mine has been idle since March 2016 and the Elk Creek Mine idle since 2013, resulting in decreased economic contributions from this industry.

Tongue Mesa Coal Field (San Juan River Region). The Tongue Mesa coal field is along Cimarron Ridge, a prominent ridge southeast of Montrose between the Uncompahgre River and Cimarron Creek (**Figure 3-22**). It extends from south of Cerro Summit (Highway 50) in the vicinity of Coal Hill, south along the Cimarron Ridge to Owl Creek Pass east of Ridgway. Most of the historic mining in this field was on the west side of Cimarron Ridge from Buckhorn Lakes south to the Lou Creek drainage, but no active mining has occurred since 1950. The coal field is roughly 18 miles long from north to south and generally 2 to 3 miles wide. The coal field spans Montrose, Ouray, and Gunnison counties.

The Fruitland Formation is the primary coal-bearing formation in the Tongue Mesa coal field. It is poorly consolidated, typically forming side slopes, and is exposed mostly in landslide scarps. Coal-bearing strata are located in the lower 200 feet of the Fruitland Formation and correlate with the Fruitland-Kirtland Formation of the San Juan Basin section (south of Durango, Colorado) and with the Paonia Shale section in the Grand Mesa area. Early U.S. Geological Survey geologic quadrangle mapping by Dickinson (1965) identified the coal-bearing units as belonging to the Fruitland Formation, which was carried into the more recent mapping. However, others include the Tongue Mesa coal field as being in the Uinta Coal Region and consider the units to be the Mesaverde Formation. The Cimarron Ridge area is an outlier of

Upper Cretaceous age coal-bearing rocks capped and protected by Upper Cretaceous and early Tertiary volcanic and volcaniclastic rocks. Due to the proximity of the Tongue Mesa coal field to the Somerset and Grand Mesa coal fields, it has been determined that it is more closely associated with the stratigraphy and local variations of the Uinta Coal Region. However, for the purposes of this planning effort, it is included in the San Juan River Coal Region (BLM 2010h).

The apparent rank of the coal in the Tongue Mesa coal field is high-volatile B subbituminous and subbituminous C. Some of the coal is reported to be considerably oxidized and bony (impure). As with most Cretaceous coal in western Colorado, the coal in this is field is of high quality, with typically low ash and sulfur content and moderately high to high energy value. An exploration license exercised in the 1970s provided data that revealed the coal resource included one very thick seam but indicated faulting that would hamper longwall mining. There are no existing mines in this coal field and historic production has been minimal (BLM 2011b).

Trends

Over the five-year period from 2009 to 2015, the number of coal mines in the U.S. has declined from approximately 1,400 to approximately 850 mines (National Mining Association 2018). Within the Planning Area, the Somerset coal field has the greatest potential for continuing to produce the largest amount of coal. Projections by the U.S. Department of Energy's Energy Information Administration indicate that demand for Somerset's compliant to super-compliant coal will remain strong. The 2016 production records indicate that Somerset coal will likely continue to provide around 33 percent of Colorado's coal (Colorado Department of Natural Resources 2016).

Solid Leasable Minerals – Sodium and Potassium

Potash is the common name given to potassium carbonate. It commonly occurs in sedimentary marine environments in either solid form or in brines. It is used for the manufacture of phosphate fertilizers and animal feed supplements (U.S. Geological Survey 2018).

Current Conditions

Abundant evidence indicates high potential in the Paradox Valley area for the occurrence of potassium deposits within the Paradox Member of the Hermosa Group. The Hermosa Group is found throughout the Paradox Basin in the western portion of the Planning Area. Phosphate is currently mined to the west of the Planning Area, in Moab, Utah. The BLM has received applications to explore for phosphate in a part of the Paradox Basin south of the Planning Area (BLM 2011b). To date, no mineral exploration, development, or production on BLM-administered lands has occurred within the Planning Area.

Trends

Currently, exploration or mining for phosphate in the Planning Area is unlikely. There would be a high potential for exploration and mining in the Planning Area if supply to the United States were affected due to unforeseen events.

Locatable Minerals – Uranium-Vanadium

Uranium is used primarily to produce electricity. As of 2017, 440 nuclear plants were operating in 30 countries (World Nuclear Association 2017). Twenty percent of U.S. energy was generated by nuclear plants (U.S. Energy Information Administration 2018b).

Vanadium is used as an alloy to strengthen iron, steel, and titanium. Vanadium alloys are used in the aerospace industry, for surgical tools, and other industries that use metals with a high strength to weight. Some vanadium alloys have a high conductivity characteristic. It is considered to be a 'critical mineral' of the U.S.

Current Conditions

Uranium and vanadium resources are located within the historic mining area designated as the Uravan Mineral Belt in western Montrose County (the name "Uravan" is derived from the two primary ores—uranium and vanadium). The host rock for this resource is the Salt Wash Member of the Jurassic-age Morrison Formation. This uranium-rich member outcrops in several locations associated with the Uravan Mineral Belt (BLM 2010i). Historically, there have been mining booms for both uranium and vanadium in the Uravan Mineral Belt, including the Planning Area.

In the fall of 2017, one company conducted exploratory drilling for uranium-vanadium in the Planning Area portion of the Uravan Mineral Belt. Currently there are nine authorized plans of operations and mining notices on BLM-managed lands within the Planning Area. None of them are active at this time due to low commodity prices.

The uranium-vanadium mineral resource potential of the Planning Area is classified according to the system outlined in BLM Manual 3031. Under this system, occurrence potential ratings are based on the geologic likelihood of a mineral's presence in a particular area. The ratings do not reflect the economic feasibility of developing a resource as this can vary, depending on demand and technology. The potential for development of uranium-vanadium mineral resources from the Morrison Formation in the Uravan Mineral Belt part of the Planning Area as projected over the life of the RMP, for twenty years, is rated as high occurrence potential with a high level of certainty (BLM 2011b). **Figure 3-23** (Active Uranium Exploration Sites in the Morrison Formation) depicts active uranium exploration sites in the Morrison Formation within the Planning Area.

Trends

Uranium

Uranium is primarily used for fuel in nuclear power plants, Worldwide, 56 nuclear power plants are under construction and 156 more are planned (World Nuclear Association 2018). The demand for uranium is expected to grow. The last uranium mines in the region closed in 2009 due to declining commodity prices. However, because past mining operations did not completely remove all potential uranium and vanadium resources in the area, the potential for new economically profitable mines in the region would be likely if commodity prices increase or new technology reduces the production costs. It is reasonable to expect that new exploration and mining for uranium and vanadium would occur in the Uravan Mineral Belt in the Planning Area (BLM 2011b).

Vanadium

There has been an increasing interest in vanadium as used in batteries in direct relationship to the increasing development of renewable energy. Batteries employing vanadium technology could be used to store large amounts of electricity during high production periods and make it available to customers during nonproduction periods. There has been little interest in mining vanadium in the Uravan Mineral Belt since the early twentieth century. The demand for vanadium resources may increase in the future as renewable energy technology continues to develop.

Locatable Minerals – Gypsum

Gypsum is used widely by the construction industry as a major component of wallboard. Paradox Valley, located in the western portion of the Planning Area, is known for the potential and occurrence of gypsum deposits. However, there are no known commercial deposits of gypsum in the Planning Area (BLM 2011b).

Current Conditions

Gypsum is an evaporate mineral present at the surface of Paradox Valley, in the Paradox Formation of the Hermosa Group, located in the western portion of the Planning Area. The Planning Area does not have a history of exploration, development, or production of any kind for gypsum deposits from this formation. In 2010, an inquiry over the submittal of a mining plan of operations for a gypsum mine was submitted to the UFO, but thus far no plans have been made (BLM 2011b).

Trends

The demand for gypsum is entirely dependent on the status of the construction industry in the U.S. and abroad.

Locatable Minerals – Placer Gold

Other than uranium and vanadium, placer gold is the other primary mineral resource found in the Planning Area.

Current Conditions

Placer gold is mined along the San Miguel River in western Montrose County. The activity is centered on Pinon, Colorado, and east of Nucla, with placer mining claims located upstream from this location. Placer gold deposits in the Planning Area consist of random occurrences of gold particles that have eroded out of gold vein deposits, washed down to the Dolores, San Miguel, and Uncompahgre rivers, and become entrapped in riverbed sand, gravel, and cobble. Seasonal snowmelt and precipitation serve as an intermittent transport system to replenish the deposits annually. Deposits have been found in the Dolores, San Miguel, and Uncompahgre rivers and also on paleo-river deposits located on benches to either side and above these rivers. Mining occurred primarily in the late 1800s. Small operations were again active in the 1930s.

Independent operators and mining clubs both use up to a four-inch suction dredge to extract gold from the river bed. This activity is considered to be casual use and does not require BLM authorization. The UFO tracks this activity by asking users to submit a recreational placer notification form. The level of activity was observed to increase during the recession of 2008 and following period of recovery. The number of notifications then started to decrease. In 2017, the UFO received 38 notifications.

Trends

The two-year gold price history for 2016 to 2017 shows the price of gold fluctuated between a low of $1,050.80 per troy ounce and a high of $1,364.90 per troy ounce (Gold Price History 2017). It is anticipated that recreational use will fluctuate, depending on the health of the economy. Commercial exploration and mining may occur, depending on the price of gold. In the short term, moderate placer mining activity, on a very small and temporary scale, can be expected in the Planning Area. The historic nature of the mineral ensures a high degree of certainty that placer gold resources are present within the San Miguel River system into the Dolores River, giving the area a high potential rating (BLM 2011b).

Mineral Materials

Mineral materials include sand and gravel, and construction materials that are sold or permitted under the Mineral Materials Sale Act of 1947.

Sand and gravel, as construction aggregate, is an extremely important resource. County and state road departments are significant users. Extraction varies directly with the amount of road building and maintenance and urban development nearby. Even more so than other resources, the proximity of transportation and markets are key elements in the development of a deposit, and there are few markets for these materials within the Planning Area.

Current Conditions

The mineral materials program on BLM-administered lands within the Planning Area centers mainly around the use of sand and gravel for construction and paving activities. Deposits are found along the San Miguel, Uncompahgre, and Gunnison Rivers and their major tributary valleys. In the west side of the Planning Area, sand and gravel deposits are associated with Naturita Creek and older deposits in the Quaternary. Other sources include widespread glacial outwash, colluvium, and alluvial fans.

There are six county free-use permitted gravel pits: one for the Colorado Department of Transportation, one in Delta County, one in Ouray County, and three in Montrose County. There are also three common use pits that are open for sales to the public, one of which is for moss rock. In addition, there is one riprap site that is a noncompetitive sale.

The free-use sites consist of erratic use as conditions demand, with a few thousand tons extracted one year followed by no use for many years thereafter. Decorative moss rock is sold on a personal, small quantity basis, with over 50 permits typically sold per year (BLM 2011b).

Trends

It is expected that there will be a continued demand for free use permits to provide gravel for maintaining state highways and county roads. If economic conditions continue to improve and construction activity increases, it will result in an increased demand for construction materials, including gravel near larger towns inside the Planning Area. There is a high degree of certainty that high potential for sand and gravel deposits exist in a wide variety of locations within the Planning Area (BLM 2011b).

3.2.4 Recreation and Visitor Services

Management of recreation is guided by BLM regulations and policies, federal and state laws, current and emerging trends in public demand for recreational activities and opportunities, and an area's physical and natural surroundings. Current management direction is based on objectives in RMPs and RMP amendments, activity level plans, and recreation management guidance, including 43 CFR 8300. The following section describes the current conditions and characterization of recreation resources and management in the Planning Area.

Current Conditions

Popular recreation opportunities in the Planning Area include hunting, fishing, whitewater rafting, OHV use, canoeing, kayaking, camping, hiking, backpacking, mountain biking, horseback riding, rock climbing, photography, and scenery and wildlife viewing. Hunting within the Planning Area occurs in game management units 411, 52, 521, 53, 63, 64, 62, 61, 70, and 65. Dispersed target shooting also occurs throughout the UFO and is regulated with regard to public health and safety (43 CFR 8365.1-4) and in accordance with agency policy regarding the authorization of shooting sports (BLM 2008j).

Recreation activities have increased in most areas since the 1985 and 1989 RMPs were adopted, with the greatest increases in OHV use, mountain biking, river recreation use, and rock climbing. In accordance with BLM's multiple-use mandate, per FLPMA, the agency seeks to provide recreational opportunities that include dispersed, organized, competitive, and commercial uses. Recreation in the Planning Area is managed primarily through licensing, permit fees, and enforcement of federal regulations. Hunting and fishing are subject to regulations established by CPW. The BLM engages in partnerships with organizations such as The Nature Conservancy, San Miguel Watershed Coalition, and others to promote habitat quality, which supports recreation opportunities.

Recreation Tourism Elements

Western Colorado is a world-renowned destination for outdoor recreation enthusiasts, and recreation has emerged as the predominant activity on local BLM-administered lands and national forests. The Planning Area received around 320,000 visits per year in 2009 (BLM 2009d). This increased to approximately 910,413 visits in 2017 due to population growth and regional marketing efforts (BLM 2017b). Visitors come from not only the local area (including cities such as Montrose and Delta and smaller communities such as Ridgway and Paonia and other regions of Colorado), but also from other national and international locations.

Outdoor Recreation Service Providers. The UFO has a well-defined and diverse group of outdoor recreation service providers including informational and marketing providers such as the City of Montrose Office of Business and Tourism and active chambers of commerce in towns including Telluride, Nucla, Naturita, Delta, and Paonia. The Planning Area is home to dozens of outdoor gear providers, including bicycle shops, motorcycle and OHV shops, backpacking and sporting goods stores, and rafting and boating stores. In fiscal year 2018, the UFO recreation program has at least 50 active partnerships through its "connecting with communities strategy approach" (BLM 2017).

The UFO also supports a wide variety of permitted outfitters providing recreation services from big-game hunting and float trips to rock climbing excursions and mountain biking trips. Recreation and tourism opportunities are also supported by a number of large hotel chains in addition to locally owned lodging and full-service campgrounds that are privately owned or managed by Colorado State Parks.

Tourism. Recreation-based tourism, driven by a diverse set of year-round recreational opportunities, is critical to the local economies within the Planning Area. Outdoor recreation provides significant positive economic contributions to the local communities because recreationists tend to locally purchase meals, food, fuel, sporting goods, gifts, and lodging.

Regional public land marketing has historically focused on the BLM, NPS units, and Colorado State Parks. The UFO staff routinely attend regional tourism and marketing meetings to assist in the development of outreach campaigns that highlight BLM-administered lands.

Recreation Management Areas

Recreation planning guidance and the definitions for recreation management areas (i.e., SRMAs and extensive recreation management areas [ERMAs]) have changed since the San Juan/San Miguel and Uncompahgre Basin RMPs were issued.

Special Recreation Management Areas. Current BLM guidance identifies SRMAs as administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance and/or distinctiveness, especially as compared to other areas used for recreation. SRMAs are managed to protect and enhance a targeted set of activities, experiences, benefits, and desired recreation setting characteristics. SRMAs may be subdivided into recreation management zones (RMZs) to further delineate specific recreation opportunities. Within SRMAs, recreation and visitor service management is recognized as the predominant land use planning focus, where specific recreation opportunities and recreation setting characteristics are managed and protected on a long-term basis. SRMAs/RMZs must have measurable outcome-focused objectives. Supporting management actions and allowable use decisions are required to: 1) sustain or enhance recreation objectives, 2) protect the desired recreation setting characteristics, and 3) constrain uses, including non-compatible recreation activities that are detrimental to meeting recreation or other critical resource objectives (e.g., cultural or threatened and endangered species).

The BLM issues special recreation permits (SRPs) for commercial outfitters to operate and hold events in SRMAs. The Planning Area contains two SRMAs (**Figure 3-24** [SRMAs and Developed Recreation Sites]):

- San Miguel River SRMA: A 1993 amendment to the San Juan/San Miguel RMP designated 35,940 acres as the San Miguel River SRMA. The predominant recreation uses in the San Miguel River SRMA include whitewater rafting, kayaking, fishing, camping, picnicking, hiking, mountain biking, and sightseeing. BLM visitor patrols recorded 28,387 visitor days from October 1, 2008 through September 30, 2009. These visits were associated with rafting, fishing, camping, and hunting trips within the San Miguel River corridor (BLM 2009d). Use varies; when the SRMA has optimum water levels, like in fiscal year 2017, Dolores River use increased to 45,500 visitor use days. During the summer, the majority of campers are first-time visitors who spend at least two to four days in the area (BLM 2009d). Camping use peaks during the fall hunting and spring river seasons, and many of these visitors return every year for an average stay of seven days. Camping use occurs on developed and dispersed designated sites along the river corridor. Thirteen river rafting outfitters currently operate under provisional SRPs.
- Dolores River SRMA: The Dolores River SRMA, co-managed with the BLM Dolores Field Office, was designated in 1985 and encompasses the Dolores River corridor from McPhee Dam in Montezuma County to Bedrock, Colorado. The 13,380-acre portion within the Uncompahgre Decision Area extends from the BLM Dolores Field Office boundary to Bedrock. The Dolores River SRMA provides recreation activities and settings that are unique for BLM-administered lands. BLM visitor patrols recorded 875 visitor use days at the Bedrock boat launch from October 1, 2008 through September 30, 2009 (BLM 2009d). In fiscal year 2017, San Miguel River use increased to approximately 125,000 visitor use days, the result of increased knowledge of the area's recreational opportunities and a high water flow season. In most years, the Dolores River provides boatable flows from the end of April through mid-June.

Extensive Recreation Management Areas. Current BLM guidance defines ERMAs as administrative units that require specific management consideration in order to address recreation use, demand or recreation and visitor service program investments. ERMAs are managed to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. Management of ERMA areas is commensurate with the management of other resources and resource uses. Supporting management actions and allowable use decisions must facilitate the visitors' ability to participate in outdoor recreation activities and protect the associated qualities and conditions. Non-compatible uses, including some recreation activities, may be restricted or constrained to achieve interdisciplinary objectives. There are no ERMAs in the Decision Area.

BLM-administered Lands Not Designated as Recreation Management Areas. While planning guidance in place when the San Juan/San Miguel and Uncompahgre Basin RMPs were written directed that all BLM-administered land not designated as an SRMA should be designated as an ERMA, under current recreation guidance (Instruction Memorandum 2011-004, Revised Recreation and Visitor Services Land Use Planning Guidance, Updated Checklist, and Three Land Use Planning Templates), what was formerly the Uncompahgre ERMA would now be considered "undesignated. As such, 626,480 acres (93 percent of the Decision Area) is undesignated. BLM-administered lands not designated as Recreation Management Areas are managed to meet basic recreation and visitor services and resource stewardship needs.

Recreation Visits

Recreation data are recorded in the BLM's Recreation Management Information System. **Table 3-34** (Visitor Use on BLM-Administered Lands) displays the Recreation Management Information System

Table 3-34
Visitor Use on BLM-Administered Lands

	Visitor Days (October 1–September 30)							
Activity	**2005-2006**	**2006-2007**	**2007-2008**	**2008-2009**	**2013-2014**	**2014-2015**	**2015-2016**	**2016-2017**
Boating (Motorized)	416	592	325	636	259	1,218	1,579	3,517
Boating (Nonmotorized)	12,145	11,443	14,047	16.821	20,663	26,878	26,629	61,596
Camping and Picnicking	53,310	53,141	56,255	57,699	67,343	74,159	77,592	188,523
Driving for Pleasure	16,971	17,538	18,939	19,772	26,627	29,124	28,842	40,741
Fishing	7,340	6,814	7,709	7,718	8,805	9,697	9,875	14,431
Hunting	50,417	52,210	55,318	56,486	78,364	85,696	88,984	208,174
Interpretation, Education, and Nature Study	13,583	13,568	2,445	2,455	2,835	2,924	2,400	9,965
Nonmotorized Travel	21,886	23,065	24,614	25,380	38,505	41,287	41,403	84,685
OHV Travel	78,894	81,601	87,699	90,405	126,647	136,413	143,290	189,967
Snowmobile and Other Motorized Travel	4,656	4,807	5,186	5,350	7,047	7,752	8,116	8,585
Specialized Motor Sports, Events and Activities	6,014	6,214	6,714	6,929	9,170	10,109	10,595	47,271
Specialized Nonmotor Sports, Events, Activities	21,369	21,093	22,262	22,870	20,546	22,332	22,844	47,235
Swimming and Other Water Based Activities	4,749	4,630	4,769	4,865	N/A	N/A	N/A	N/A
Winter/Nonmotorized Activities	3,021	3,122	3,372	3,480	4,602	5,071	5,315	5,723
Total	**294,771**	**299,838**	**309,654**	**320,866**	**409,413**	**452,660**	**467,508**	**910,413**

Source: BLM 2009d; BLM 2017b

figures for BLM-administered lands within the Planning Area for fiscal years 2006 through 2017. The visitation figures provided are estimates as many areas lack direct visitation monitoring facilities, such as traffic counters or visitor registers. In addition, many popular trails and trail networks are not designated for a particular type of recreational use, making it difficult to assess the activity in which each visitor is engaging.

Growth in Recreation Activities. During the past four years, participation in some recreational activities has substantially increased. These activities include OHV travel, camping and picnicking, hunting, nonmotorized travel, pleasure driving, and nonmotorized winter activities. Increased recreation use is attributed to population growth, local marketing efforts, and a desire by local residents and visitors to enjoy a healthy, outdoors-oriented lifestyle.

OHV travel, the most popular recreation activity in the Planning Area, increased from 78,894 visitor days in 2006 to 189,967 in 2017, and has become one of the fastest growing activities. Consequently, management actions based on OHV use levels when the 1985 and 1989 RMPs were adopted are often inadequate. Due to its significance, OHV use is more thoroughly addressed in the Comprehensive Trails and Travel Management section of this chapter.

Seasonal Popularity. Recreation activities are common year-round, but the fall hunting and spring fishing seasons are the busiest times of year in the Planning Area. The CPW manages hunting, primarily through licensing and law enforcement. The CPW issues state rules and regulations, which Colorado State Park Rangers help to enforce. Elk, mule deer, small game, bears, and mountain lions are hunted throughout the Planning Area and fishing is popular on the Lower Gunnison, Uncompahgre, San Miguel, and Dolores Rivers.

Developed Recreation Facilities

Developed recreation facilities range from designated campgrounds equipped with restrooms and picnic tables, to trailheads with simple bulletin boards. They have been constructed to enhance recreation opportunities, protect resources, manage activities, or reduce recreation use conflicts.

The Decision Area includes 29 developed recreation facilities, which incorporate amenities such as roads, parking areas, and restroom facilities. Among these sites are 10 boat launches (some are associated with camping areas), 8 restrooms, 9 picnic areas, and 10 parking areas (**Figure 3-24**).

Developed recreation sites occur mainly in the San Miguel River and Dolores River SRMAs. There are several campsites along the San Miguel River corridor that have boat ramps, changing rooms for boaters, cabanas and picnic tables, grills, kiosks, parking areas, and toilets. The Dolores River SRMA has picnic tables, cabanas, a parking area, a boat ramp, and an informational kiosk.

The Dry Creek area, North Fork area, and North Delta OHV Area all contain dispersed staging areas and trailheads with kiosks, picnic tables, and parking areas. There is one developed site along the Uncompahgre River near Ridgway with cabanas and picnic tables, informational signs, benches, toilets, and a nonmotorized paved trail.

Developed Campgrounds. The UFO manages four developed campgrounds in the Decision Area containing 40 to 50 individual campsites. Both of the developed campgrounds are along the San Miguel River and have basic facilities, including toilets and picnic tables.

Recreation Administration

Cooperative Management. The UFO has been able to better meet the local demand for trail-based recreation through numerous partnerships. For the past several years OHV trails have been managed in cooperation with the Colorado State Parks State Trails Program. Grant funding has helped a seasonal work crew maintain trails, plan and build new trails, and provide information to OHV users. Without this cooperation, very little trail improvement or maintenance would occur on OHV trails.

Special Recreation Permits. As authorized by 43 CFR 2932, the following four types of uses require SRPs: commercial use, competitive events, organized groups, and recreation use in special areas. The BLM also issues SRPs for noncommercial use in certain special areas, including wilderness, rivers, the backcountry, and other areas where it is determined that resources require special protective management and control measures or a permit system for individual use would achieve management objectives.

In a typical year, the UFO issues approximately 70 SRPs for use within the Planning Area (BLM 2017b), most of which are authorized for river activities and upland hunting outfitting. Other SRPs include those for guided fishing, vehicle shuttles, horseback trail rides, jeep and motorcycle tours, camping, archery tournaments, mountain bike rides, rock climbing, and backpacking. Fifteen percent of SRP fees are expended on program administration, with the remainder going toward visitor services, monitoring, and maintenance.

The BLM also requires noncommercial recreation use permits for individual use of fee-site campgrounds and other uses such as large noncommercial group activities, although none have been issued for the Uncompahgre Decision Area thus far.

Accessibility

All construction in the Planning Area is reviewed for compliance with Uniform Federal Accessibility Standards and the Americans with Disabilities Act Guidelines. As new accessibility guidelines for outdoor developed areas are added, those standards will also be followed.

Recreation Monitoring and Evaluation

The UFO recreation staff and law enforcement officers monitor all forms of recreation activities and public use for user conflicts, recreation effects on natural and cultural resources, visitor health and safety issues, and conflicts with adjacent private landowners. In addition, recreation staff monitors implementation of recreation management actions and the attainment of management objectives.

Outcomes Focused Management

The BLM focuses on providing specific, positive recreational outcomes while at the same time attempting to minimize negative outcomes by engaging recreation-tourism participants, non-participating but affected community residents, and national and international visitors. This holistic approach attempts to satisfy the ever-increasing and competing demands, which are difficult to manage utilizing a traditional activity-based recreation management model (Driver et al. 2008).

Recreation Setting Character Conditions

Recreation Setting Character Conditions complement Outcomes Focused Management by allowing recreation planners to combine various setting components identified as either physical, social, or operational to produce a variety of recreation opportunities.

Physical Setting Character Conditions

The fundamental physical setting character trends for the Planning Area are clear and predictable, coinciding with physical changes in the region. The Planning Area has experienced rapid growth since the 1985 and 1989 RMPs were approved. During this time, the natural resource recreation settings have generally become physically less remote due to many factors, including energy development, urban growth, and mechanized/motorized use on public lands. This change in the physical setting has accelerated change in the social setting character of BLM-administered lands in the Planning Area.

Social Setting Character Conditions

Socially, BLM-administered lands in the Planning Area are generally busier than they were since the 1985 and 1989 RMPs were approved. This is especially true near communities and around popular destinations like the Dolores River, San Miguel River, Paradox Valley, Roubideau Canyon, Dry Creek, Tabeguache Trail, and Spring Creek. On weekends and in the evenings, interactions with other people are very common in the more popular recreation areas.

Upland areas (e.g., Tabeguache Area and Cottonwood Creek) receive lower levels of visitation (especially weekdays) and offer uncrowded social settings. However, resident and nonresident hunters utilize BLM-administered lands during big game hunting seasons, and the number of contacts with other visitors dramatically increases throughout the Planning Area. In addition, more people are seeking out these less-visited areas as relief from crowded areas, modifying the social setting of the less crowded areas. With use levels growing, impacts are also increasing. Evidence of alteration, including vehicle use, litter, manmade structures, tree damage, surface vegetation impacts, hardened campsites, and

compacted soils, can be found in more and more places. Recreational shooting and human-caused wildfire impacts are increasing as well.

Operational Setting Character Conditions

The UFO has rules and regulations in place to assist in achieving the following goals: maintain natural resource settings; direct recreation use; and protect resources. To achieve these goals, the UFO has implemented administrative tools such as limiting motorized use in specific areas and by season, increasing signage, increasing field staff, and improving visitor services by creating new brochures and maps. Many of these actions were precipitated by increased accessibility and crowding. Within some recreation areas and in urban-interface areas, new issues such as domestic animals, noise, and visual aesthetics are necessitating the BLM to consider additional administrative remedies for recreation use. Currently, no individual recreation user fees are charged on BLM-administered lands in the Planning Area.

Trends

Five key issues are causing the setting character of the Planning Area to change:

1. Population growth and changing demographics.
2. Changing public expectations and demand for outdoor recreation opportunities, especially for dispersed recreation.
3. Increased energy development.
4. Close proximity of BLM-administered lands to private property and the growing use of public lands as a backyard recreation destination.
5. Technological advances in OHVs as well as better outdoor equipment and clothing.

Increased Use and Demand for Recreational Opportunities

Concentrated camping use is increasing across the Planning Area, particularly during the fall hunting season, as well as in spring and summer. The impacts include rock fire rings, user-created routes, littering, soil compaction and vegetation loss at campsites, and vandalism of signs. As use continues to increase, user conflicts and possible effects on wildlife, cultural resources, soil, and vegetation may increase. Effective management is necessary to mitigate impacts from recreation on other resources in the Planning Area. Overall recreation use, especially motorized-based, may increase. Additional SRMAs may be prescribed to minimize possible resource impacts. These SRMAs would also address recreational demands in gateway communities. It would be beneficial for the BLM to coordinate with counties and communities to assist in identifying recreational opportunities that local users would enjoy.

3.2.5 Comprehensive Travel and Transportation Management

Comprehensive Travel and Transportation Management is the proactive management of public access, natural resources, and regulatory needs to ensure that all aspects of road and trail system planning and management are considered. This includes resource management, road and trail design, maintenance, and recreational and non-recreational use of the roads and trails. The planning scope includes all forms of travel, including foot, horseback and other livestock, bicycle, motorized vehicle (e.g., motorcycles, cars, and trucks), and travel by motorized and nonmotorized boats. To reduce the duplication of narrative between travel management and the other sections of this document, this section addresses only public travel and access (i.e., OHV management area designations, route designations, types of travel, and seasonal area limitations). The interrelated recreation component narrative is addressed under **Section 3.2.4** (Recreation and Visitor Services). The transportation component of Comprehensive Travel and Transportation Management addressing administrative access, agricultural use, commercial use, commodity use, and road maintenance is addressed in **Section 3.5.3** (Transportation Facilities).

Modes of Travel

Motorized travel in the Planning Area ranges from standard passenger vehicles driving on maintained roads to OHVs operating on primitive roads and trails. OHV is synonymous with off-road vehicle, as defined in 43 CFR 8340.0-5(a).

OHVs commonly used in the Planning Area include off-road motorcycles, all-terrain vehicles, utility terrain vehicles, jeeps, specialized four-wheel-drive trucks, and snowmobiles. Other modes of travel include mountain biking, cross-country skiing, snowshoeing, horseback riding, pack animal driving, hiking, boating, hang-gliding, paragliding, ballooning, and wheelchairs. The type and amount of use and the location of roads and trails influence physical, social, and administrative recreation setting and the overall quality of the recreation experience.

Travel Designations

While the BLM is not designating routes as part of this planning effort, this RMP sets criteria for future route designation. Travel management planning will commence after the ROD for this RMP is signed. Per Executive Order 11644 and CFR (43 CFR Part 8340), all BLM-administered lands within the Planning Area have been designated as open, closed, or limited for OHV use.

Open

The term "Open" is used in areas of intensive OHV or other transportation use where there are no special restrictions and analysis determines that there are no compelling resource protection needs, user conflicts, or public safety issues to warrant limiting cross-country travel.

Limited

For areas where OHV travel is limited to designated or existing roads and trails in order to meet specific resource/resource use objectives. Restrictions may include the number or types of vehicles, time, season of use, use of existing roads and trails only, use of designated roads or trails, or licensed use only. The BLM may also impose other restrictions to protect resource/resource use objectives. In addition, the BLM must provide specific guidance about the process for managing motorized vehicle access for authorized, permitted, or otherwise approved vehicles for those specific categories of motorized vehicle uses that are exempt from a limited designation.

Closed

Motorized travel and transportation is not allowed in areas designated as closed. Areas are closed in order to protect resources, ensure visitor safety, or reduce user conflicts. Nonmotorized uses are permitted in these areas.

Approximately 1 percent of the Decision Area is designated as open to OHV use, 91 percent is limited to designated or existing roads and trails, and 9 percent is closed to motorized and/or mechanized use (**Figure 2-48** [Alternative A: Comprehensive Travel and Transportation Management]).

Emergency Closures

Instruction Memorandum 2013-035 (Requirements for Processing and Approving Temporary Public Land Closure and Restriction Orders) (BLM 2012m) dictates that temporary closures or restrictions orders on BLM-administered lands must be 24 months or less in duration. If the justification for a closure or restriction order has not been addressed within the 24-month period, a new temporary closure or restriction order must be established in accordance with the Instruction Memorandum. Temporary closures and restrictions should be implemented for the shortest time and in the smallest area necessary to protect resources, public health, and safety.

Current Conditions

Primary factors influencing the current state of travel management within the Planning Area include:

- Lack of comprehensive travel management planning that considers the relationships between various resources, authorized access, and recreation uses
- Historic routes that predate planning for recreational opportunities
- Unauthorized uses (including user-created routes) emanating from existing routes and impacting other resources
- Subdivision of private property resulting in the creation of new access points to public lands
- Routes/areas open to motorized use, but accessible only to adjacent landowners
- Increasing conflicts between recreational users over route use

Figure 3-28 shows existing and designated BLM roads and trails in the Decision Area.

Emphasis on Minimizing Impacts

In the 1985 and 1989 RMPs, OHV designations were made solely to limit impacts by protecting resources, preventing recreation conflicts, and protecting public safety. Recent travel management plans for specific areas have been intended to manage routes and route systems to provide specific recreation opportunities and experiences. However, this planning has focused on a relatively limited area.

Furthermore, even designated routes were not built with recreation experiences in mind. Most follow historic non-recreational routes (such as grazing, mining, or administrative) or were created by repeated cross-country OHV travel. Such trails typically do not provide a desirable recreation experience. The user-created routes in particular are often unsustainable and cause resource impacts.

Increased OHV Use

OHV use has increased dramatically in the Planning Area since the 1985 and 1989 RMPs were written. Lands with little previous history of recreational use now commonly experience impacts on natural and cultural resources, as well as significant impacts on recreation. Areas like Dry Creek, the San Miguel River Basin, and Spring Creek, once considered remote and seldom-visited, are now becoming popular recreation destinations. **Table 3-35** (OHV Designations) shows how OHV use is managed throughout the Decision Area.

Table 3-35
OHV Designations

OHV Designation	Acres	Percentage of Decision Area
Closed to Motorized and Mechanized Travel	44,200	7%
Closed to Motorized Travel *(mechanized travel limited to designated routes)*	11,950	2%
Open to Cross-Country Motorized Travel	8,560	1%
Limited to Designated Routes for Motorized and Mechanized Travel	145,300	22%
Limited to Existing Routes for Motorized and Mechanized Travel	465,790	69%
Limited to Existing Routes with Seasonal Closures	59,070	9%
Total	**675,800**	**100**

Source: BLM 2012a

OHV use occurs nearly year-round in lower elevation areas, and for many users OHV riding is the primary reason for their visit to BLM-administered lands. Most of these visitors live within an hour's drive of their destination and enjoy practicing their technical skills, using their equipment, and spending time with family and friends. During autumn, most parts of the Planning Area experience heavy OHV use by hunters.

High Use Areas and Trails

The following provides a basic profile of high-use areas in the Planning Area.

Dry Creek Area. This area, encompassing 110,500 acres of BLM-administered land within a few miles of the towns of Montrose, Olathe, and Delta, is easily accessed nearly year round for a variety of purposes. Uses of the area include sightseeing, photography, hunting, hiking, cross-country skiing, camping, horseback riding, mountain bike riding, ATV riding, technical four-wheel driving, motorcycle riding, snowmobiling, livestock grazing management, decorative rock gathering, Christmas tree cutting, firewood gathering, rights-of-way management/operation/maintenance, BLM and Forest Service administrative purposes, and other uses. Much of the travel is heavily influenced by the regional population growth and nearby private land development. A travel management plan for this area was completed in 2009 and created a designated network of trails for motorized and nonmotorized uses (BLM 2009a).

North Delta OHV Open Area. This Open Area covers 8,560 acres of mostly Mancos Shale approximately six miles northeast of the town of Delta and receives heavy use in spring, summer, and fall by local and regional OHV enthusiasts. Facilities are limited but include a concrete unloading ramp and kiosk. Use is expected to continue to increase due to the area's close proximity to Delta.

San Miguel River SRMA. The 35,940-acre San Miguel River SRMA encompasses a stretch of the San Miguel River corridor, beginning between the towns of Telluride and Sawpit and terminating where the river intersects Highway 90 northeast of Naturita. The SRMA also encompasses portions of the Unaweep-Tabeguache Scenic Byway and San Juan Skyway. The SRMA sees heavy use in the spring, summer, and fall for hiking, biking, horseback riding, scenic touring, camping, and river recreation (including recreational mining, rafting, kayaking, and fishing). Hunting is also popular in the fall. There are a number of developed facilities, including campgrounds, picnic tables, kiosks, boat ramps, parking areas, cabins, and restrooms. Land ownership patterns within the SRMA provide management challenges in the form of providing education about public as opposed to private land and where those boundaries are located, as well as designating trail systems to avoid trespassing on private property or causing safety concerns along the highway.

Spring Creek. This 4,980-acre area is located on the southern portion of the Uncompahgre Plateau approximately 15 miles southwest of the town of Montrose. The area encompasses a long and deep canyon with narrow ridges and mesa tops. There is a designated nonmotorized trail system on approximately 800 acres and the larger area is popular in spring, summer, and fall for motorcycle and mountain bike riding, hiking, and horseback riding.

Tabeguache Trail. This trail crosses public land for 142 miles and connects Montrose and Grand Junction, Colorado. OHVs and mountain biking are the dominant uses and the trail includes several designated camping areas. It is difficult, but not impossible, for high-clearance 4-wheel drive vehicles to travel all but the single-track sections of the trail.

Effects of Urbanization and Increased Access

In addition to increased OHV use, urbanization of adjacent private lands has created additional nonmotorized and motorized use and new expectations for recreation experiences. Many users

recreate on BLM-administered lands because the lands are close to home and provide a convenient place to exercise, relieve stress, and spend time with family and friends. New and evolving BLM land uses include "backyard" hiking, mountain biking, dog walking, rock climbing, fly-fishing, and OHV riding. Recreational boating (fly-fishing, whitewater kayaking, and rafting) occurs heavily on the San Miguel, Dolores, and Lower Gunnison rivers.

At times, uses and expectations conflict with one another. Until recently, there has been very little demand, and consequently very few resources allocated, for nonmotorized recreation travel. This type of use has increased in all of the public lands that border municipalities. The counties of Montrose, Delta, Ouray, San Miguel, Mesa, and Gunnison have all experienced rapid population growth, and the subdivision of private lands adjacent to BLM parcels has accompanied the growth. BLM-administered lands are often isolated and provide limited public access. In these instances, enforcement of travel restrictions can be difficult, and motorized trespass from adjacent private land frequently occurs. Increasing high-density subdivision of private land is changing this scenario. Subdivisions are often designed to provide public access to BLM-administered lands. A new community can offer welcome stewardship to adjacent public lands, while the resulting increased access can make BLM monitoring and management more efficient.

Competing Non-Recreational Uses

Increased transportation demands for non-recreational uses, such as oil and gas exploration and development and livestock grazing, have greatly affected recreation travel in some areas. Recreation experiences can suffer when transportation systems for other uses are increased or created. As a result, there is a need for comprehensive travel management for all recreation uses in close coordination with transportation planning for non-recreational uses.

Types of Routes

The majority of the existing route system in the Decision Area was not built with consideration for sustainability, resource concerns or conditions, or recreation experiences. Most routes either follow historic routes, such as those for grazing, mining, timber, or administrative access, or are user created. Many routes were not necessarily intended to be left open for recreational use. As a result, these trails do not always provide desirable recreation experiences and can have unmitigated impacts on natural or cultural resources.

Travel management within the Planning Area has been completed for the following areas: Dry Creek; Ridgway; and Norwood-Burn Canyon.

The *Resource Management Plan Amendment/Environmental Assessment for the Uncompahgre Field Office Dry Creek Travel Management Plan* designated a total of 419 miles available to the public seasonally or year-round. This network includes 317 miles of routes open to motorized travel, 44 miles open to nonmotorized and nonmechanized travel, and 23 miles open to nonmotorized and mechanized travel. The plan also closed 258 miles of routes to motorized and mechanized travel, proposed 16 miles of route construction, reserved some routes for administrative motorized use, and implemented seasonal restrictions to protect resource values (BLM 2009a).

The *Ridgway Comprehensive Travel Management Plan Environmental Assessment* (BLM 2013a), approved on May 10, 2013, designated routes on over 1,050 acres of BLM-administered lands. The travel plan area is located approximately 3 miles north of the Town of Ridgway and is bounded on the north by Ouray County Road 8, on the south by Ouray County Road 10, on the west by U.S. Highway 550 and Ridgway State Park, and the east by private lands.

The *Norwood-Burn Canyon Comprehensive Travel Management Plan Environmental Assessment* (BLM 2014c), approved on November 14, 2014, designated routes on over 9,800 acres of BLM-administered lands. The travel plan area is located approximately 3 miles west of the Town of Norwood and is bounded on the south by Forest Service lands, and on the north, east, and west by private lands.

Nonmotorized Travel

Hiking, bicycling, and horseback riding have generally been increasing throughout the Planning Area, with pockets of growth concentrated along the urban interface (BLM 2009d). Foot and horse travel is not limited to existing or designated routes and areas closed to motorized use. Seasonal closures currently do not apply to foot, horse, or bicycle travel.

Trends

Local population growth is expected to drive a continued increase in OHV use, especially around the towns of Montrose, Delta, and Telluride and along the urban interface surrounding the towns of Paonia, Ridgway, Norwood, Naturita, and Placerville. Expanding oil and gas and mining operations in the western and northeastern portions of the Planning Area are expected to attract new residents and with them an increase in OHV use and requests for improved access. These new routes may also infringe upon current motorized and nonmotorized routes by fragmenting existing trails. Use may also become more concentrated in remote areas as suburbanization drives motorized users to look for areas with fewer recreation conflicts.

Current OHV use exceeds historic levels and new, more-powerful vehicles are capable of accessing steeper and rougher terrain. In the past, visitors drove principally Jeeps, trucks, and motorcycles. Today the BLM has seen an increase in use of OHVs of all types and sizes. Increased visitation and the use of more-powerful vehicles have contributed to the widening, deepening, braiding, and eroding of some existing vehicle routes, and an increasing number of hill-climb, play, and camping areas.

Nonmotorized uses close to urbanizing areas will likely increase as the population grows. It is expected that demand for new hiking and mountain biking trails adjacent to municipalities in the Planning Area will increase, as well as in areas close to major subdivisions outside of incorporated towns. In addition, the demand for floating and fishing access on the San Miguel River and Lower Dolores River is expected to increase. Continued and expanded collaboration between the BLM and local governments will help provide appropriate access to and stewardship of BLM-administered lands along the urban interface.

The existing travel network, especially those routes lacking professional design, is expected to cause increasing impacts on natural and cultural resources. Research from the past 20 years on the impacts of roads to resources, wildlife, and other users, and actual experience by the BLM on these impacts, is increasing the need for well-designed and integrated transportation planning.

3.2.6 Lands and Realty, including Renewable Energy

BLM-administered lands are used for a variety of purposes. Major focus areas for the lands and realty program include land tenure adjustments, ROWs, utility corridors, communication sites, and management and adjustment of withdrawals. Wind, solar, and hydropower renewable energy projects are also permitted by ROWs through the lands and realty program.

The following section describes the current conditions and characterization of lands and realty, including renewable energy, within the Planning Area.

Lands and Realty

Current Conditions

Twenty-five distinct and diverse communities exist within the UFO. Numerous communities and subdivisions are also in the wildland urban interface. The population in many of the communities is expected to grow faster than the statewide average over the next 25 years, which will contribute to an expanding urban interface zone. In addition, the Planning Area is crossed by several major power transmission lines critical for maintaining service to the western United States. Mineral development is also expected to continue at a rapid pace over the next decade, adding to the complexity of managing public lands and increasing the realty workload.

Land Tenure Adjustments

The BLM develops most RMPs to guide management of land over 20 or more years. The Secretary's policy is, generally, not to dispose of public lands. However, for long term planning purposes, the situation may arise, especially in areas where public land tracts are isolated and difficult to manage, where it is useful for BLM to identify these areas as suitable for leaving public ownership. Land tenure adjustments are typically accomplished through acquisitions, exchanges, or sales.

Land may be acquired when it is in the public interest, provides resource protection, improves land management through consolidation, provides recreational opportunities, enhances wildlife habitat, provides access to public lands or waters, or preserves archaeological and historical resources.

Lands identified for disposal are typically parcels that are difficult or uneconomical to manage, or will serve important public objectives such as community expansion and economic development. Land exchanges are preferred over sales for disposal of BLM-administered lands.

Acquisitions. Lands may be acquired through purchase, exchange, and donation. Acquisitions must be consistent with the BLM mission, regulations, and applicable land use plans.

Exchanges. An exchange must be determined to be in the public interest and enhance federal land management objectives. It must be determined that the values and objectives of the lands being acquired are greater than the values of the federal lands being conveyed.

Sales. The criteria to be used for disposal of BLM-administered lands must be identified for disposal in a land use plan, or an amendment to the plan, before being offered for sale. Sales are typically conducted through the competitive bid process and cannot be sold at less than fair market value. Public lands that are classified, withdrawn, reserved or have special designations are generally not available for sale.

Lands identified for disposal or exchange in the Decision Area are shown on **Figure 2-59** (Alternative A: Lands Identified for Disposal).

In the 1989 Uncompahgre Basin RMP (as amended), 10,350 acres of BLM-administered lands were considered suitable for disposal. Nonfederal lands are considered for acquisition through exchange opportunities if such lands met established criteria and enhanced resource management.

In the 1985 San Juan/San Miguel RMP, approximately 21,700 acres of BLM-administered lands were considered suitable for disposal. These tracts included parcels of land with limited public value scattered throughout the area. Disposal would be accomplished through sales, exchanges, or any other title transfer means.

Land Use Authorizations

BLM-administered lands throughout the Planning Area are generally made available for land use authorizations, which are analyzed and issued on a case-by-case basis. Certain lands within the Planning

Area are designated as areas to be avoided or excluded. Examples of designated areas include ACECs, Wild and Scenic Rivers (WSRs), SRMAs, and WSAs. Land use authorizations within designated areas generally are not allowed, or if allowed, are subject to stringent stipulations. Typical land use authorizations within the Planning Area currently include:

- Roads, including county roads or highways, as well as roads authorized for commercial use or access to private lands. Material storage sites and stock piles may also be included
- Off-lease oil and gas pipelines including transmission and distribution lines and other related facilities, such as compressor stations
- Water facilities including pipelines, irrigation ditches, and canals
- Power lines, including transmission and distribution lines, and other related facilities, such as substations
- Telephone and fiber optic cables
- Communication sites
- Railroads
- ROWs to other federal agencies
- Film permits
- Temporary use or short term permits (less than 3 years) such as temporary construction areas or storage sites

Locations in the Planning Area where trespass is more likely to occur include areas where residential and commercial development interface with public lands. Trespass is continually being discovered within the Planning Area and instances are pursued as time, personnel, and priorities allow.

Rights-of-Way. A ROW is an authorization to use a specific parcel of BLM-administered land for a certain project, such as roads, pipelines, power lines, and communication sites. A ROW authorizes nonexclusive rights and privileges for a specific use of the land for a designated time. A ROW is granted for a term appropriate to the life of a project. A ROW authorizes the holder to construct, operate, maintain, and terminate a facility over, under, upon, or through BLM-administered lands. Such authorizations are issued for commercial and non-commercial purposes such as roads and utilities and may be for energy or nonenergy-related uses. Permits are generally short-term authorizations (not to exceed three years) that have a minimal impact on the land, such as film permits and temporary storage areas. Leases are usually long-term authorizations requiring a significant capital investment, such as occupancy leases.

Existing ROW locations and corridors in the Planning Area are shown on **Figure 3-25** (Right-of-Way Locations and Corridors).

Utility Corridors and Communication Sites

Utility Corridors. Utility corridors are preferred routes that co-locate multiple linear ROWs and are generally located adjacent to existing highways or county roads. Facilities within these corridors may include gas and water pipelines, power lines, and communication lines such as telephone or cable. As a result of the Energy Policy Act of 2005, the BLM completed the 2009 West-wide Energy Corridor Programmatic EIS, which designated corridors on federal land in eleven western states for oil, gas, hydrogen pipelines, and power lines. Procedures for processing ROW applications within these corridors are in Appendix B, Interagency Agency Operating Procedures, of that EIS. The designated corridors are shown in **Figures 2-56** (Alternative A: Designated Utility Corridors) and **2-58** (Alternative C: Designated Utility Corridors).

Communication Sites. The BLM issues ROW Communications Use Leases for communications facilities on BLM-administered lands. The Planning Area currently has 10 existing communications sites with 35

authorized uses. Sites include Storm King, Flat Top, Alkali Creek, Sheeps Knob, Green Mountain, TV Hill, Jumbo Mountain, Young's Peak, Gobbler's Knob, Club Mesa, and Paradox Hill.

Withdrawals

Withdrawals are formal actions that segregate or reserve federal land by statute or administrative order for specific purposes. **Figure 2-32** (Alternative A: Lands Withdrawn and to be Recommended for Withdrawal from Locatable Mineral Entry) consists of a map showing withdrawn lands in the Planning Area. Withdrawals typically accomplish one or more of the following:

- Transfer total or partial jurisdiction of federal land between federal agencies, without the land leaving federal ownership
- Close, segregate, or suspend federal land to operation of all or some of the public land or mineral laws (withdraw land from settlement, disposal, location, or entry)
- Dedicate federal land to a specific purpose.

Current withdrawn areas within the Planning Area are outlined in **Table 3-36** (Current Withdrawals by Type), which shows the type, holder, and purpose of the withdrawal. These areas are also shown in **Figure 2-82** (Land Withdrawals and Power Site Classifications).

Table 3-36
Current Withdrawals by Type

Type of Withdrawal	Holder of Withdrawal	Purpose
Public Water Reserve	BLM	Water Resource Protection
Power Site Reserve	BLM	Power
BLM Special Designation	BLM	Tabeguache Special Management Area
BLM Miscellaneous	BLM	Administrative
Reclamation	BOR	Reclamation Projects
Department of Energy	Department of Energy	Energy
FERC	Grand Mesa Hydroelectric	Hydroelectric

Source: BLM 2012a

Trends

Land Tenure Adjustments

The BLM will process land exchanges, acquisitions, easements, and potential sales within the Decision Area on a case-by-case basis as staff and priority workload allow. Proposals will be reviewed giving careful consideration to management goals, public benefit, and FLPMA criteria.

Land Use Authorizations

Demand for land use authorizations in the Planning Area is anticipated to increase in correlation with future residential and commercial development, increasing population, and energy demand. There is potential for land use authorizations for renewable energy projects (wind, solar, and geothermal).

Utility Corridors

Use of utility corridors or the co-location of ROWs has become a more common practice within the BLM. As development in the Planning Area continues for both energy and increased population related needs, the demand for and use of utility or energy corridors will increase accordingly. As existing corridors become saturated, new corridors will need to be identified.

Communication Sites

Demand for communication sites is anticipated to increase in the future, given the fast pace of technological advances and the boom in wireless networking. Whenever possible, new applicants will be encouraged to co-locate their facilities in existing buildings and towers. Ultimately, new communication sites for new facilities will need to be identified as the existing sites become filled to capacity.

Withdrawals

The majority of withdrawals in the Planning Area were issued between 1915 and 1966, when the withdrawal orders were passed. Withdrawals since 2000 have primarily been designated for creation of special management areas, developed recreation areas, NCAs, and protection of threatened and endangered species or cultural sites. The lands program will continue to administer both new and existing withdrawals in accordance with FLPMA on a case-by-case, site-specific basis. If any existing withdrawals were revoked, the lands would be managed in accordance with the objectives of surrounding or similar lands.

Renewable Energy

Renewable energy includes solar, wind, hydropower, and biomass resources. In December 2005, the BLM signed a ROD for the *Wind Programmatic EIS* (BLM 2005b). In October 2012, the BLM signed a ROD for the *Solar Energy Development Programmatic EIS* (BLM 2012c). As part of this RMP effort, a *Renewable Energy Potential Report* containing information from various sources helped determine the potential for development of renewable energy resources within the Planning Area (BLM 2010g). These documents will serve as the baseline for the assessment of renewable energy resources in the UFO Decision Area.

Renewable energy potential within the Planning Area, excluding ROW exclusion areas, the Tabeguache Area, and WSAs, are discussed under the Current Conditions discussion in this section. Renewable energy potential for all lands within the Planning Area, including lands excluded under the Current Conditions discussion, is discussed below.

While geothermal is a renewable energy source, it is considered a leasable mineral and, therefore, is covered in **Section 3.2.3** (Energy and Minerals).

Current Conditions

Potential solar, biomass, wind, hydropower, and geothermal resources occur in various locations and forms within the Planning Area. Development of these resources would take into consideration the available/required infrastructure needs. There are no permit applications, authorized hydropower facilities, or current leases for renewable energy production within the Planning Area.

The Planning Area has been assessed for renewable energy potential (BLM and DOE 2003). Although state of Colorado policies and financial incentives are classified as favorable for renewable energy development, the UFO does not rank nationally among the top 25 BLM field offices with potential.

For solar energy, 557,000 acres of BLM-administered lands within the Planning Area have good concentrating solar power resource potential (6 to 7 kWh/m^2/day), and 118,400 acres have moderate (5 to 6 kWh/m^2/day) concentrating solar power resource potential. Photovoltaic solar potential is very good on all 675,800 acres of BLM-administered lands within the Planning Area. The identified high-potential areas for both concentrating solar power and photovoltaic solar resources are predominantly found in the western and central regions of the Planning Area. Figure 3-1 of the *Renewable Energy Potential Report* prepared in support of this RMP shows the solar potential areas within the Planning Area (BLM 2010g).

Wind energy potential is generally marginal to poor within the Planning Area. Outstanding wind potential areas (class 6) have been identified on 40 acres, while 50 acres have excellent (class 5) wind potential, and an additional 60 acres have good (class 4) wind potential. The identified high-potential areas are located on the eastern side of the Planning Area and are shown with these potential classes in Figure 4-1 of the *Renewable Energy Potential Report* prepared in support of this RMP (BLM 2010g).

Biomass potential has not been quantified for this report but vegetation types across the Planning Area are shown in Figure 5-1 of the *Renewable Energy Potential Report* prepared in support of this RMP (BLM 2010g). Biomass productivity from the lands supporting these vegetation types depends on how the BLM is managing the vegetation (i.e., how much of the vegetation is removed and how often), vegetation productivity and growth rate, how accessible those lands are to roads, the slopes of the lands (i.e., the technical feasibility of harvesting biomass), and the private-sector demand for biomass feedstock in the region. The UFO has not been involved in any biomass harvesting activities.

Trends

As part of the RMP effort, the *Renewable Energy Potential Report (*BLM 2010g) containing information from the various sources helped determine the potential for development of renewable energy resources within the Planning Area.

The demand for renewable energy-related ROWs should increase nationally, although within the Planning Area, the potential for wind, solar, and biomass energy is considered to be low relative to other field offices in BLM.

3.3 SPECIAL DESIGNATIONS

This section is a description of the special designation areas in the Planning Area and follows the order of topics addressed in **Chapter 2**:

- Areas of critical environmental concern
- Wilderness and wilderness study areas
- Wild and scenic rivers
- National trails and byways
- Watchable wildlife viewing sites

While there are no designated watchable wildlife viewing sites managed by the BLM in the Planning Area, management alternatives may include the identification, designation, or management of such areas.

3.3.1 Areas of Critical Environmental Concern

An ACEC is defined in FLPMA, Section 103(a), as an area on BLM-administered 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 ensure safety from natural hazards. BLM regulations for implementing the ACEC provisions of FLPMA are found in 43 CFR 1610.7-2(b).

To be designated as an ACEC, the area must meet both the criteria of relevance and importance found in 43 CFR 1610-7-2(a)(b) and as defined in BLM Manual 1613, Areas of Critical Environmental Concern (BLM 1988). The EIS for the RMP revision identifies a reasonable range of alternatives for analysis that includes current management for existing ACECs, as well as management for proposed ACECs. In addition, ACECs are protected by the provisions of 43 CFR 3809.1-4(b)(3), which requires an approved plan of operations for activities resulting in more than five acres of disturbance under the mining laws.

The following section describes the current conditions and characterization of ACECs in the Planning Area.

Current Conditions

The Decision Area contains five ACECs designated in the 1985 and 1989 RMPs totaling 30,000 acres: Fairview South Research Natural Area/ACEC, Needle Rock Outstanding Natural Area/ACEC, Adobe Badlands Outstanding Natural Area/ACEC, San Miguel River ACEC/SRMA, and Tabeguache Creek Outstanding Natural Area/ACEC (see **Figure 2-63** [Alternative A: Areas of Critical Environmental Concern]). The size of each area and the values it is designed to protect are listed in **Table 3-37** (Existing Areas of Critical Environmental Concern). Current ACECs were reevaluated as part of the RMP revision process to determine whether the relevance and importance of each ACEC were still present and required continued management attention; whether threats of irreparable damage to the values had been identified; and whether current management is sufficient to protect the values.

Table 3-37
Existing Areas of Critical Environmental Concern

Fairview South Research Natural Area/ACEC	
Acres in Planning Area	The south tract located within the Planning Area includes 210 acres. The north tract is in the Gunnison Gorge NCA Planning Area.
Natural Values	The ACEC contains a significant portion of one of the largest populations of the federally endangered clay-loving wild buckwheat (*Eriogonum pelinophilum*). This species is endemic to the adobe badlands of Montrose and Delta counties, with the known range restricted to less than 35 square miles. Fairview South Research Natural Area/ACEC also contains native plant communities representative of the sparsely vegetated adobe badlands.
Current Uses/ Management	• Managed to protect endangered and rare plant species. • Open to fluid mineral leasing with no surface occupancy stipulations. • Sheep grazing permits reauthorized in 2008. Recent grazing management changes include minimizing overall use, restricting sheep bedding activities in clay-loving wild buckwheat habitats, and incorporating longer rest periods for the affected allotments. • Mechanical vehicular travel is limited to a single designated route used for maintenance of an irrigation canal and associated facilities. • Closed to development of new pipelines. • Closed to mineral materials disposal.
Valid Existing Rights	A BOR irrigation canal and operation and maintenance road runs through the far northern portion of the ACEC.
Management Issues/ Trends	• Lack of patrol and enforcement of regulations. • Potential impacts on clay-loving wild buckwheat from authorized and trespass grazing. Monitoring plots for clay-loving wild buckwheat have been established to examine trend and potential impacts of sheep grazing. • ROW development increases the risk of noxious weeds; weeds dominate several roads and ROWs in the area, including the South Canal. However, these appear to pose minimal risk to clay-loving wild buckwheat populations at this time. • Recreation impacts, namely OHV activity, are an issue in the area.

Needle Rock Outstanding Natural Area/ACEC	
Acres in Planning Area	80
Natural Values	This site consists mainly of a volcanic geological structure with high-value scientific, interpretive, and scenic characteristics. The spectacular volcanic formation rises 800 feet above the Smith Fork River valley.
Current Uses/ Management	• Managed to protect the scientific, interpretive, and scenic qualities of the site. • Open to fluid mineral leasing with no surface occupancy stipulations. • Managed as unallotted for livestock grazing use. • Travel is limited to designated roads and trails. • Managed as VRM Class I • Closed to development of major utility facilities. • Closed to mineral materials disposal. • Recreation opportunities include sightseeing, picnicking, and geological study in a roaded but natural environment. BLM has constructed a small parking lot, interpretive sign, shelter, and walking trail.
Valid Existing Rights	A county road and utilities cross the southeast corner of the ACEC.
Management Issues/ Trends	• Lack of public information regarding recreation opportunities. • Lack of on-the-ground monitoring, patrol, and enforcement of regulations. • Lack of an effective information and education campaign promoting a sound land-use ethic.
Adobe Badlands Outstanding Natural Area/ACEC	
Acres in Planning Area	6,370
Natural Values	This area consists of Mancos Shale hills and flats which, through wind and water erosion, have formed unique scenic formations. The area's soils are highly erodible and saline, resulting in high sediment loads and high salinity runoff. The ACEC contains occupied habitat for the threatened Colorado hookless cactus (*Sclerocactus glaucus*) and other native plants. The area supports small populations of the BLM sensitive white-tailed prairie dog (*Cynomys leucurus*) and provides potential habitat for other sensitive species, such as burrowing owls, ferruginous hawks, and kit fox.
Current Uses/Management	• Managed to protect its unique scenic qualities, improve threatened and endangered species habitat, provide for semi-primitive nonmotorized recreation opportunities and use, and reduce active erosion. • There are a total of three sheep grazing allotments in the ACEC. • Open to fluid mineral leasing with no surface occupancy stipulations. • Closed to coal leasing. • Closed to mineral materials disposal. • Closed to off-road-vehicle use, managed for nonmotorized recreation opportunities. • Managed as VRM Class I. • Closed to major utility development. • Erosion and salinity control measures are prohibited from using structures or land treatments that would alter scenic values.
Valid Existing Rights	There are no valid existing rights in the ACEC.
Management Issues/Trends	• Lack of on-the-ground monitoring, patrol, and enforcement of regulations, particularly for recreational use. • Lack of an effective information and education campaign promoting a sound land-use ethic. • OHV incursions from adjacent North Delta OHV open travel area. OHV use may be impacting threatened species including Colorado hookless cactus, which has known populations in the ACEC boundary with the OHV open area.

San Miguel River ACEC/SRMA (BLM 1993a)	
Acres in Planning Area	22,780
Natural Values	The ACEC preserves the high quality riparian vegetation resources, relic riparian communities, habitat for many bird species, and the scenic value of the corridor. It protects high quality native riparian communities that are mainly due to the undammed San Miguel River and its intact hydrology. Such communities are becoming increasingly rare in Colorado. The ACEC has been designated as an Important Bird Area by the National Audubon Society. This site represents one of the finest protected southwest canyon riparian habitats in the United States, and it provides breeding sites for a wide variety of species and primary migratory routes for nearly all of the West's songbirds. More than 300 bird species have been observed at the site. The expanding black phoebe (*Sayornis nigricans*) population, which has been moving up the San Miguel River, reached the lower end of the original ACEC in 1999. The river also has yellow-billed cuckoo habitat.
San Miguel River ACEC/SRMA (BLM 1993a) *(continued)*	
Current Uses/ Management	• Managed to protect the high quality riparian habitat, including important bird habitat. • Managed to preserve scenic values. The majority of the ACEC is managed under VRM Class II guidelines, except for the forest management areas from the original RMP, which are managed under Class IV. • Recreational uses in the area include rafting and kayaking on the San Miguel River and dispersed recreational use such as hiking, cross country skiing, snowshoeing, camping, mountain biking, hunting, and off-highway-vehicle use. • Camping is limited along the river between Placerville and Sanborn Park Road to two designated sites only. • Maximum camping stay is 14 days. • Beaver Creek Canyon, Saltado Creek, and the San Miguel River Canyon from the Sanborn Park road to Horsefly Creek are closed to OHVs. Within the remainder of the ACEC, vehicle use is limited to designated roads or trails. • Contains 10 active grazing allotments for cattle. Riparian areas not currently allotted, including acquired lands, are unavailable to livestock use. • Open to oil and gas leasing subject to standard stipulations and timing limitations. • Mineral development is managed to minimize impacts on riparian and recreation values. • Closed to major utility corridors, with the exception of overhead electric transmission lines at Beaver and Saltado creeks. • All facility construction is required to protect riparian and scenic values. Where possible, facility development is located outside the 100-year floodplain. • BLM-permitted actions, such as ROWs, bike trails, camping areas, etc., are prohibited in relic riparian communities.
Valid Existing Rights	• Existing oil and gas leases are found throughout the ACEC, occurring on a total of 10,410 acres. • State Highway 145 runs the length of the ACEC adjacent to the river. • Two transmission lines run through portions of the ACEC.
Management Issues/ Trends	• Recreational demand is increasing. • Livestock grazing, existing oil and gas leases, and ROWs provide potential conflicts with protection of the area's natural values.

Tabeguache Creek ACEC/Outstanding Natural Area	
Acres in Planning Area	560
Natural Values	The Outstanding Natural Area is confined topographically. The ACEC/Outstanding Natural Area is within the Tabeguache Area, which was designated by congress in 1993. Historically there was no vehicle access into much of the canyon and, as a result, many cultural sites remain in pristine condition. The scientific value of the sites within the canyon, their association, and their setting qualify this district for National Register listing.
Current Uses/ Management	• Managed to protect cultural resources and aquatic/riparian values. • Has a no surface occupancy stipulation, but is in a no leasing area (Tabeguache Area). • Closed to off-road vehicle use. • Assigned as VRM Class II, but managed as Class I because it is within the Tabeguache Area, which is managed as Class I.
Valid Existing Rights	• There are no valid existing rights in the ACEC.
Management Issues/ Trends	• The ACEC/Outstanding Natural Area is within the congressionally designated Tabeguache Area (1993), and, as such, is managed to protect its wilderness values (see **Table 3-39** [Wilderness Study Areas]). There is no motorized or mechanized access.

Trends

In accordance with BLM Manual 1613, Areas of Critical Environmental Concern (BLM 1988), the BLM UFO Interdisciplinary Team reviewed all BLM-administered lands in the Planning Area to determine whether any areas should be considered for designation as ACECs. The BLM review included both internal and external nominations, areas identified through inventory and monitoring, and adjacent designations of other federal and state agencies. Areas determined to meet the relevance and importance criteria, as defined by 43 CFR 1610.7-2(a)(1) and 43 CFR 1610.7-2(a)(2), and guidance in BLM Manual 1613 (BLM 1988), are provided temporary management to protect human life and safety or significant resource values from degradation until the area is fully evaluated through the RMP process.

3.3.2 Wilderness and Wilderness Study Areas

In 1964, Congress passed the Wilderness Act, thereby establishing a national system of lands for the purpose of preserving a representative sample of ecosystems in a natural condition for the benefit of future generations. Until 1976, most land considered for, and designated as, wilderness was managed by the NPS and the Forest Service. With the passage of FLPMA in 1976, Congress directed the BLM to inventory, study, and recommend which public lands under its administration should be designated wilderness. Within the Decision Area, there are five wilderness study areas (WSAs) and the congressionally designated Tabeguache Area, which is not designated as wilderness, but receives similar protections.

Wilderness Study Areas

In 1991, the BLM Colorado issued its final wilderness study report, which included recommendations for 54 WSAs throughout Colorado (BLM 1991b). The recommendations were based on the findings of the 15-year wilderness study process that included each area's resource values, present and projected future uses, and manageability as wilderness; the environmental consequences of designating or not designating the areas as wilderness; mineral surveys; and public input. Until Congress acts on the recommendations and either designates them as wilderness or releases them for other uses, these areas are managed according to BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012b) to preserve their wilderness values. Activities that would impair wilderness suitability are prohibited in the WSAs.

Wilderness characteristics findings are discussed in **Section 3.1.13** (Lands with Wilderness Characteristics).

The following section describes the current conditions and characterization of wilderness and wilderness study areas in the Planning Area.

Current Conditions

Five WSAs lie completely or partially within the Decision Area: Camel Back (10,400 acres), Adobe Badlands (10,430 acres), Dolores River Canyon (13,340 acres within the Decision Area), Sewemup Mesa (1,740 acres within the Decision Area), and Needle Rock (80 acres within the Decision Area). The findings of the 1991 wilderness study report for areas within the Planning Area are shown in **Table 3-38** (1991 BLM Wilderness Recommendations).

In that ROD, the BLM recommended as nonsuitable for wilderness designation all of Camel Back and Adobe Badlands WSAs and the Needle Rock Instant Study Area (ISA). The Dolores River Canyon WSA was recommended as suitable for wilderness designation and Sewemup Mesa WSA was also recommended as suitable for wilderness designation with the exception of approximately 130 acres (BLM 1991b). It should be noted that the Sewemup Mesa WSA extends into the BLM Grand Junction Field Office to the north. The acreages discussed here are only for the portion of the WSA in the Decision Area. As such, acreage figures differ slightly from the 1991 study report and recommendation.

Table 3-38
1991 BLM Wilderness Recommendations

WSA/ISA	Acres Recommended for Wilderness
Camel Back	0
Adobe Badlands	0
Needle Rock ISA	0
Dolores River Canyon	13,340
Sewemup Mesa	1,740

Source: BLM 1991b, BLM 2012a

The status of these WSAs will not change as a result of the Uncompahgre RMP revision.

Tabeguache Area

Current Conditions

The Colorado Wilderness Act (HR 631) passed by Congress in 1993, designated the Tabeguache Area (8,060 acres within the Decision Area) as a special area, the management of which is similar to a Wilderness Area (**Figure 2-67** [Alternatives A, B, C, D, and E: Tabeguache Area and Wilderness Study Areas]).

A description of each WSA and the Tabeguache Area are provided in **Table 3-39** (Wilderness Study Areas) and **Table 3-40** (Tabeguache Area).

Table 3-39
Wilderness Study Areas

Camel Back Wilderness Study Area	
Acres in Planning Area	10,680
Description	WSA is located nine miles southwest of Delta and 20 miles northwest of Montrose, adjacent to the Uncompahgre National Forest. The northern boundary follows the cliffline of the east rim of Roubideau Canyon and private land boundaries. Its southern boundary is contiguous with the Uncompahgre National Forest. Private property also makes up a small part of the southern boundary.
Natural Values	• The geomorphic features include canyons, mesas, and the Camel Back ridge. • Opportunities for solitude are extensive due to a variety of factors including difficulty of access. • Opportunities for primitive and unconfined recreation including cross-country hiking and horseback riding, rock climbing, camping, hunting, photography, and sightseeing. • Approximately 19 miles of aquatic and riparian habitat are provided by perennial creeks within or immediately adjacent to the WSA.
Current Uses/Management	• The entire area is closed to motorized and mechanized travel. • Approximately 73 percent of the WSA is crucial deer and elk winter range. • Improvements for livestock include three stock ponds, one water catchment facility, and 1.25 miles of fence.
Existing Rights and Interests	• There are no unpatented or patented mining claims located in the WSA. • The Winter-Monitor Mesa Grazing Allotment comprises 15,750 acres, of which approximately 7,700 acres (76 percent) are in the WSA.
Camel Back Wilderness Study Area *(continued)*	
Management Issues/Trends	• The WSA is popular with local area residents for unauthorized off-road vehicle use and fuelwood cutting. There has been an increase in off-road vehicle use in and along the numerous roads and ways which border the WSA. This use highlights the infrequent on-the-ground monitoring, patrol, and enforcement of activities, as well as a conflict between management for wilderness qualities and unauthorized, incompatible uses. • Potential conflicts exist between management for wilderness qualities and livestock grazing.

Adobe Badlands Wilderness Study Area	
Acres in Planning Area	10,320
Description	Located three miles northwest of Delta, the area is surrounded by both public and non-public lands, and the northern boundary is contiguous with the Grand Mesa National Forest.
Natural Values	• Approximately 82 percent of the WSA is composed of Mancos Shale badlands formations. Topography of the area is characterized by abrupt sloping hills dissected by rugged serpentine canyons. The northern 18 percent of the WSA is characterized by the pinyon-juniper foothills of Grand Mesa. • Approximately 6,780 acres in the southern two-thirds of the area is managed as an Outstanding Natural Area and ACEC to protect scenic values, threatened and endangered plants, and reduce active erosion. • Provides many opportunities for solitude in the maze-like badlands and upper elevation pinyon-juniper vegetation. • Offers yearlong opportunities for hiking, backpacking, horseback riding, photography, and sightseeing. • Contains occupied habitat for the threatened Colorado hookless cactus, Adobe Hills beardtongue (*Penstemon retrorsus*), and other native plants. • Two BLM sensitive wildlife species, the white tail prairie dog and kit fox *(Vulpes macrotis)*, inhabit the area.
Current Uses/Management	• WSA is closed to motorized and mechanized travel. • Approximately 1,930 acres in the northern portion is managed for deer and elk winter range.
Existing Rights and Interests	• There are approximately 75 placer mining claims scattered throughout the WSA. These claims were located in 1982 and 1984, and no activity has occurred on them to date. • Three livestock grazing allotments are located within the WSA. There are no range facilities.
Management Issues/Trends	• Problems include infrequent on-the-ground monitoring and unauthorized, incompatible uses, particularly off-road vehicle use, which is damaging to the area's highly erodible, saline soils.

Dolores River Canyon Wilderness Study Area	
Acres in Planning Area	Contains 28,670 acres of BLM-administered land, with the northernmost 13,340 acres in the Decision Area. Approximately 29,420 acres, including an additional 950 acres outside the WSA boundary, were recommended for wilderness designation by the BLM.
Description	Located 18 miles west of Naturita and surrounded by BLM-administered land.
Natural Values	• Predominantly natural with negligible human imprints. The focal point of the area is the Dolores River Canyon characterized by massive, sheer canyon walls interspersed with several individually unique side canyons such as Bull, Leach, Spring, Coyote Wash, La Sal, and Wild Steer. The rugged canyon system is cut through a series of sedimentary strata which results in many colorful ledges and massive cliffs interspersed with talus slope. • Outstanding natural scenery, opportunities for solitude and primitive, unconfined recreation, and for its ecological diversity. The area is relatively low in elevation and can be reached by maintained roads on both the north and south boundaries making it accessible for year-round wilderness recreation opportunities such as hiking, backpacking, photography, geologic study, hunting, and rock climbing and scenic whitewater river opportunities for float boating, kayakers, and canoeists. • Contains pinyon-juniper woodland and Great Basin sagebrush vegetation zones. The WSA provides potential habitat for a number of threatened, endangered, and candidate plant and wildlife species.
Current Uses/Management	• Closed to motorized and mechanized travel. • Current use focus on wilderness recreational activities.
Existing Rights and Interests	• No pre-FLPMA oil and gas leases. • Several mining claims are located primarily in La Sal Creek, Wild Steer Canyon, Coyote Wash, and near Buck Mesa, which are peripheral areas and not in the main river canyon. • Contains all or portions of five grazing allotments.
Management Issues/Trends	• Infrequent on-the-ground monitoring and unauthorized, incompatible uses. • Lack of an effective information and education campaign promoting a sound land-use ethic. • Inadequate signing, posting, and maintenance of access routes, especially in spring and fall.
Sewemup Mesa Wilderness Study Area	
Acres in Planning Area	The WSA contains 19,140 acres of BLM-administered land, with the southernmost 1,740 acres in the Decision Area. Of the entire WSA, approximately 18,840 acres were recommended by the BLM as suitable for wilderness designation and 310 acres were recommended as non-wilderness.
Description	The Sewemup Mesa WSA is located south of Gateway, west of Highway 141, approximately 15 miles northwest of Uravan. The southwest portion is adjacent to Manti-La Sal National Forest.

Sewemup Mesa Wilderness Study Area *(continued)*	
Natural Values	• Sewemup Mesa is an isolated mesa top with sheer cliff faces that are 500 to 700 feet high. The mesa top is highly dissected by numerous shallow canyon systems. Pinyon-juniper woodlands are the predominate vegetation of the mesa top. • The upland area of Sewemup Mesa contains no human imprints and is considered to be a pristine natural environment. • Outstanding opportunities for solitude. • Outstanding opportunities for day hiking, backpacking, scenic viewing, nature study, and technical rock climbing. • Uncommon and sensitive plants occur in the WSA. Sensitive plants include Eastwood monkeyflower *(Mimulus eastwoodiae)*, spike pappusgrass *(Enneapogon desvauxii)*, purple lovegrass *(Eragrostis spectabilis)*, and wolftail *(Lycurus phleoides)*. • The geology of the WSA is of scientific, educational, and scenic value. • Sewemup Mesa WSA provides important wildlife habitat for deer, elk, peregrine falcon and golden eagles.
Current Uses/Management	• Suitable area is closed to motorized travel. • Contains critical deer winter range. • Managed to provide for nonmotorized recreation use such as hiking and backpacking in a natural or predominantly natural setting.
Existing Rights and Interests	• One unpatented mining claim within the UFO portion of the WSA. The surface has not been noticeably disturbed. • There are no oil and gas leases within the UFO portion of the WSA. Conventional oil and gas potential is high, with moderate potential for development (BLM 2012d). • Contains all or portions of two grazing allotments.
Management Issues/Trends	• Nonmotorized recreation use in the area is increasing. This use highlights the need for signing and maintenance of access routes as well as the need for additional access routes. • Infrequent on-the-ground monitoring, patrol, and enforcement of recreational use. • Lack of an effective information and education campaign promoting a sound land-use ethic.
Needle Rock ISA	
Acres in Planning Area	Contains 80 acres of BLM-administered land. Of the entire WSA, zero acres were recommended by the BLM as suitable for wilderness designation and 80 acres were recommended as non-wilderness.
Description	The ISA is in Delta County, approximately four miles northeast of Crawford and 25 miles northeast of Montrose. Needle Rock towers 800 feet above the floor of the Smith Fork of the Gunnison River valley. It originated as the throat of a large volcano about 28 million years ago (Miocene epoch) when molten rock intruded between existing sedimentary formations. As the surrounding country rocks eroded over millions of years, the resistant igneous core was exposed.
Current Uses/Management	• Needle Rock is an Instant Study Area (ISA), defined as an area formally identified as natural or primitive areas prior to November 1, 1975. • The WSA is closed to motorized and mechanized travel, except for on the county road.
Existing Rights and Interests	None
Management Issues/Trends	None

Table 3-40
Tabeguache Area

Tabeguache Area	
Acres in Planning Area	A total of 8,060 acres of the area lies within the Decision Area. The Congressionally designated area contains an additional 9,492 adjacent acres of land in the Uncompahgre National Forest.
Description	The Tabeguache Area is located on the west-central side of the Uncompahgre Plateau, approximately seven miles north of Nucla and adjacent to the Uncompahgre National Forest. The Colorado Wilderness Act (HR 631) passed by Congress in 1993 designated the Tabeguache Area to protect its wilderness values.
Natural Values	• One of the last pristine canyons along the Uncompahgre Plateau. Tabeguache Creek Canyon contains a perennial stream and characterized by steep talus slopes and rocky ledges of Wingate and Entrada sandstone. • Rugged terrain has excluded most human use of the area while enhancing opportunities for solitude. • Opportunities for hiking, backpacking, hunting, and fishing. • High potential for the existence of important archeological sites due to the topography, year-round water supply, and proximity to known archeological sites.
Current Uses/Management	The Tabeguache Area must be managed by the BLM and Forest Service in order to maintain the area's "presently existing wilderness character and potential for inclusion in the National Wilderness Preservation System." The entire Tabeguache Area is closed to motorized and mechanized travel, mineral entry, and leasing.
Existing Rights and Interests	There are no pre-FLPMA oil and gas leases and no patented mining claims. Contains all or portions of four grazing allotments.
Management Issues/Trends	• Infrequent on-the-ground monitoring and lack of specific policy/management direction for this unusual designation.

3.3.3 Wild and Scenic Rivers

Wild and scenic rivers are streams or segments of streams designated by Congress under the authority of the Wild and Scenic Rivers Act of 1968 (Public Law 90-542, as amended; 16 USC 1271-1287) for the purpose of preserving the stream or stream section in its free-flowing condition, preserving water quality, and protecting its outstandingly remarkable values (ORVs). ORVs are identified on a segment-specific basis and may include scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. Section 5(d)(1) of the Wild and Scenic Rivers Act directs federal agencies to consider potential wild and scenic rivers through their land use planning process.

Determination of Wild and Scenic River Eligibility

The initial step in the eligibility phase of the wild and scenic river analysis is to generate an inventory of all streams within the Planning Area. Every known stream with a perennial or intermittent flow regime within the Planning Area was identified using a variety of BLM and other data sources. Some waterways were further segmented based on differences in level of development, physiographic character, land status, or the existence of in-channel diversions or dams.

The stream segments were then evaluated to determine whether they meet the dual criteria of being free-flowing and possessing one or more outstandingly remarkable value, as defined in the Wild and Scenic Rivers Act. Eligible segments were preliminarily classified as wild, scenic, or recreational based on water quality and level of human development along the river corridor.

The *Final Wild and Scenic River Eligibility Report for the Uncompahgre Planning Area* (BLM 2010d) details stream segments determined to be eligible for inclusion in the National Wild and Scenic River System (NWSRS), as defined by the Wild and Scenic Rivers Act of 1968. The final eligibility report also lists all streams within the Planning Area that were evaluated and found to be not eligible, along with supporting rationale. The report, including detailed maps of eligible stream segments, is available at the UFO in Montrose, Colorado.

Determination of Wild and Scenic River Suitability

Stream segments found to be eligible for inclusion in the NWSRS are carried forward to the suitability phase of the wild and scenic river analysis. The suitability phase considers tradeoffs between corridor development and stream protection by applying 13 criterion to each eligible segment. The *Final Wild and Scenic Rivers Suitability Report* details the suitability study process and the suitability determinations for each segment (see **Appendix P** [Final Wild and Scenic River Suitability Report]). A final determination of suitability will be issued in the RMP ROD.

The following section describes the current conditions and characterization of wild and scenic rivers in the Planning Area.

Current Conditions

No streams in the Planning Area are designated as a Wild and Scenic River. In 1975, the Wild and Scenic Rivers Act was amended and identified 105 miles of the Dolores River, from McPhee to Bedrock, as a Study River (Public Law 93-621). In 1976, a joint study by the Colorado Department of Natural Resources, Forest Service, and DOI, Bureau of Outdoor Recreation identified the entire length as suitable for inclusion in the NWSRS and such a recommendation was made to Congress (Colorado Department of Natural Resources et al. 1976), but Congress did not act on the recommendation. The river was again studied in a joint effort between the BLM and the Forest Service as part of the San Juan Public Lands Draft Land Management Plan, and the river was again preliminarily determined to be eligible and suitable for inclusion in the NWSRS (BLM and Forest Service 2007). The draft plan acknowledges that the lowest 11.9 miles of the river is within the UFO and that the UFO has decision-making and on-the-ground management responsibility in this area. As such, the UFO reviewed the eligibility analysis of the San Juan Public Lands Center and concurred with the findings. As part of this plan, the UFO will review the segment for suitability.

After evaluating all streams identified during the inventory phase, 18 streams separated into 29 segments, were determined to be free-flowing and possessing one or more ORVs necessary for Wild and Scenic Rivers eligibility. While a portion of Gunnison River Segment 3 (0.5 mile) is within the Decision Area for this RMP, the entire segment was considered for suitability in the Dominguez-Escalante NCA RMP and Record of Decision; the referenced segment of the Gunnison River was determined not suitable for designation. The 18 streams (29 segments) are carried forward for suitability analysis (**Appendix P**) (**Figure 2-68** [Alternatives A and B: Segments Eligible (Alternative A) or Suitable (Alternative B) for Inclusion in the NWSRS]). **Table 3-41** (Eligible Stream Segments) shows those eligible segments in the Planning Area being studied for suitability analysis, the identified ORVs associated with each segment, and the preliminary classification assigned to each segment.

Trends

A discussion of trends specific to each eligible segment can be found in the *Final Wild and Scenic River Suitability Report* (**Appendix P**).

Table 3-41
Eligible Stream Segments

River or Creek	Length on BLM Land (miles)	Area on BLM Land (acres)	Preliminary Classification	Outstandingly Remarkable Values
Gunnison River Segment 2	0.4	90	Recreational	Fish
Monitor Creek	9.4	2,610	Wild	Vegetation
Potter Creek	9.8	2,830	Wild	Vegetation
Roubideau Creek Segment 1	10.0	2,700	Wild	Recreational, Wildlife, Cultural, Vegetation
Roubideau Creek Segment 2	3.5	1,330	Scenic	Wildlife, Vegetation
Deep Creek	0.6	130	Scenic	Fish
West Fork Terror Creek	0.5	150	Scenic	Fish
Beaver Creek	14.2	3,710	Scenic	Vegetation
Dry Creek	10.4	2,640	Wild	Scenic, Geologic
Naturita Creek	10.0	3,240	Scenic	Fish
Saltado Creek	4.1	1,450	Wild	Vegetation
San Miguel River Segment 1	17.3	6,680	Recreational	Scenic, Recreational, Wildlife, Historic, Vegetation, Paleontology
San Miguel River Segment 2	3.6	1,110	Wild	Scenic, Recreational, Wildlife, Vegetation
San Miguel River Segment 3	5.3	1,880	Scenic	Recreational, Fish, Wildlife, Vegetation
San Miguel River Segment 5	2.6	2,660	Recreational	Recreational, Fish, Historic, Vegetation
San Miguel River Segment 6	2.3	810	Recreational	Recreational, Fish, Historic, Vegetation
Tabeguache Creek Segment 1	3.6	1,080	Wild	Vegetation
Tabeguache Creek Segment 2	7.9	2,480	Recreational	Cultural, Vegetation
Lower Dolores River	6.9	1,990	Scenic	Scenic, Recreational, Geologic, Fish, Wildlife
North Fork Mesa Creek	5.8	1,740	Scenic	Vegetation
Dolores River Segment 1a* *(portion within the Dolores River Canyon WSA)*	8.7	1,880	Wild	Recreational, Scenic, Fish, Wildlife, Geology, Ecologic, Archaeology
Dolores River Segment 1b* *(portion from the Dolores River Canyon WSA to Bedrock)*	0.9	460	Recreational	Recreational, Scenic, Fish, Wildlife, Geology, Ecologic, Archaeology
Dolores River Segment 2	5.4	1,820	Recreational	Scenic, Recreational, Geologic, Fish, Wildlife, Vegetation
Ice Lake Creek Segment 2	0.3	100	Scenic	Scenic
La Sal Creek Segment 1	0.6	720	Recreational	Fish, Vegetation
La Sal Creek Segment 2	3.8	1,030	Scenic	Fish, Vegetation

River or Creek	Length on BLM Land (miles)	Area on BLM Land (acres)	Preliminary Classification	Outstandingly Remarkable Values
La Sal Creek Segment 3	3.4	900	Wild	Scenic, Recreational, Fish, Cultural, Vegetation
Lion Creek Segment 2	1.3	400	Scenic	Vegetation
Spring Creek	1.5	630	Recreational	Vegetation

Sources: BLM 2010d; BLM and Forest Service 2007

*The northernmost downstream portion of the Dolores River classified as Recreational was excluded from the segment in order to circumvent mining operations. Additionally, the segment was shortened to begin at the UFO boundary and terminate at the private land boundary south of Bedrock, due to management feasibility.

3.3.4 National Trails and Byways

According to BLM Manual 6280 (BLM 2012k), the resources, qualities, and values of a national trail are the significant scenic, historic, cultural, recreation, natural (including biological, geological, and scientific), and other landscape areas through which such trails may pass, as identified in the National Trails System Act.

The following section describes the current conditions and characterization of National Trails and Byways in the Planning Area.

Current Conditions

Trails in the Planning Area are listed in **Table 3-42** (Planning Area Trails and BLM-Administered Land), and are described below.

Table 3-42
Planning Area Trails and BLM-Administered Land

Trail Name	Miles on BLM-Administered Land	Miles Adjacent to BLM-Administered Land
Old Spanish National Historic Trail	10.2	47.5
Tabeguache National Trail	13.3	68.2
Paradox National Trail	34.1	58.1
San Juan Skyway	8.6	62.7
Grand Mesa Scenic and Historic Byway	0	19.1
Unaweep/Tabeguache Scenic Byway	23.9	41.6
West Elk Loop	8.7	77.1

Source: BLM 2018a

National Trails System

The National Trails System includes National Historic Trails, National Scenic Trails, and National Recreation Trails, which are congressionally designated by the Secretary of Interior per the National Trails System Act of 1968 (Public Law 90-543).

National Historic Trails

A National Historic Trail is a congressionally designated trail that is an extended, long-distance trail, not necessarily managed as continuous, that follows as closely as possible and practicable the original trails or routes of travel of national historic significance. The purpose of a National Historic Trail is the identification and protection of the historic route and the historic remnants and artifacts for public use and enjoyment. A National Historic Trail is managed in a manner to protect the nationally significant

resources, qualities, values, and associated settings of the areas through which such trails may pass, including the primary use or uses of the trail. Nationwide, the BLM manages 13 National Historic Trails.

National Historic Trails in the Uncompahgre Field Office

The Old Spanish National Historic Trail was designated on December 4, 2002, by the Old Spanish Trail Recognition Act of 2002 (Public Law 107-325). The Old Spanish National Historic Trail passes through a portion of the Planning Area. Fifty-one miles of the Old Spanish National Historic Trail are within the Planning Area. However, only nine miles of the trail are under BLM jurisdiction, as the remaining portions are on land with other surface ownership (**Figure 2-83** [Alternative A: National Historic Trails and State and BLM Byways]).

The Old Spanish National Historic Trail was a 2,700-mile trade route linking Santa Fe, New Mexico, and Los Angeles, California, passing through New Mexico, Colorado, Utah, Arizona, Nevada, and California. The trail had brief but heavy use between 1829 and 1848. During that period, Mexican and American traders took woolen goods west over the trail by mule train and returned eastward with California mules and horses for the eastern United States and Mexican markets (Old Spanish Trail Association 2010).

Spanish traffic was fairly constant between 1765 and 1821 to trade with the Ute Tribe. Some trail users chose to trade with the Utes as far north as Salt Lake, and followed a path now labeled the "North Branch," which led to Grand Junction, Colorado before heading south to rejoin the other major route from Santa Fe, New Mexico, via Green River, Utah. Mexican trader Antonio Armijo made the first commercial, round-trip journey along a southern variant of the route in 1829 to 1830. William Wolfskill and George Yount's commercial pack train of 1830 to 1831 inaugurated consistent use of the entire route from 1830 to 1848. Use lapsed after the end of the Spanish American War in 1848, and by 1853, the Old Spanish National Historic Trail had been abandoned as a principal trade route (NPS 2001). The various historical routes together make up what is today known as the Old Spanish National Historic Trail.

BLM and NPS jointly administer the Old Spanish National Historic Trail in collaboration with the Old Spanish Trail Association, which serves as the primary nonfederal partner. The *Old Spanish National Historic Trail Comprehensive Administrative Strategy* was released in December 2017. This collaborative effort between the BLM and NPS provides strategic direction and guidance for the future administration and management of the Old Spanish Trail. The plan includes identification of the nature and purposes, goals and objectives, high-potential sites and high-potential segments (historic trails), and the selection of the National Trail ROW.

National Trails

The Tabeguache Trail crosses public land for 142 miles, connecting Montrose and Grand Junction, Colorado. The trail begins in Shavano Valley and weaves through the canyons, mesas, and highlands of the Uncompahgre Plateau before ending in No Thoroughfare Canyon, a few miles west of Grand Junction. Most of the trail is on remote lands administered by the Forest Service and BLM (Colorado Plateau Mountain Bike Trail Association 2012).

The Paradox Trail was established in 1995 by the Colorado Plateau Mountain Bike Trail Association in collaboration with Montrose West Recreation, the Forest Service, and the BLM. The 110 mile long Paradox Trail traverses the unique landscape of western Montrose County, utilizing some of the hundreds of miles of backcountry jeep roads and trails that exist here. The route links two other long distant trails in the region, the Tabeguache Trail to the east on the Uncompahgre Plateau and the Kokopelli Trail to the west in the La Sal Mountains of Utah. Together, the three trails form the "Grand Loop," a grueling 360-mile backcountry system.

The Paradox Trail forms the southern leg of the Grand Loop and offers trail users some of the most rugged and remote backcountry terrain in the lower 48 states. There are six large tracks of public lands being administered as wilderness or wilderness study areas in the region, and the trail is predominantly on two-track. While there are trail sections that utilize some seasonally graded county roads, much of the Paradox Trail is inaccessible to motorized vehicles, although vehicle access points exist at many places (Colorado Plateau Mountain Bike Trail Association 2012).

Byways

The Planning Area includes portions of four byways. The UFO works cooperatively with each byway committee and considers each corridor management plan when making management decisions on BLM-administered lands that may affect a byway.

National Scenic Byways

The National Scenic Byways Program was established under the Intermodal Surface Transportation Efficiency Act of 1991, and reauthorized in 1998 under the Transportation Equity Act for the 21st Century. The program recognizes certain roads as National Scenic Byways or All-American Roads based on their archaeological, cultural, historic, natural, recreational, and scenic qualities. All-American Roads must exhibit multiple intrinsic qualities. To be considered for inclusion in the program, a highway must provide safe passage for passenger cars year-round, be designated a State Scenic Byway, and have a current corridor management plan in place. Installation of off-site outdoor advertising, such as billboards, is not allowed along byways. Within the UFO, there is one All American Road and one National Scenic and Historic Byway (**Figure 2-83**).

San Juan Skyway. The San Juan Skyway was designated as an All-American Road in 1996. This 236-mile scenic byway travels southwest from Ridgway over Dallas Divide and along Leopard Creek on Highway 62. The loop joins Highway 145 near Placerville and continues past Mountain Village through the San Juan National Forest to Cortez. From Cortez, the skyway heads east on Highway 160 to Durango, and then north along Highway 550, passing through Silverton and Ouray before returning to Ridgway.

Grand Mesa Scenic and Historic Byway. In 1996, Colorado Highway 65 over Grand Mesa was designated as a National Scenic Byway. This 63-mile route begins in Cedaredge, heads north through Mesa, and ends at the junction with Interstate 70. A spur road on top of the mesa leads to Land's End.

Colorado Scenic and Historic Byways

The Colorado Scenic and Historic Byways program is a statewide partnership intended to provide recreational, educational, and economic benefits to Coloradans and visitors. This system of outstanding touring routes provides travelers with interpretation and identification of key points of interest and services, while protecting significant resources. Scenic and Historic Byways are nominated by local partnership groups and designated by the Colorado Scenic and Historic Byways Commission for their exceptional scenic, historic, cultural, recreational, and natural features. There are two Colorado Scenic Byways within the Planning Area (**Figure 2-83**).

Unaweep/Tabeguache Scenic Byway. This 133-mile southwest Colorado route begins in Placerville on Highway 145 and heads northwest through Naturita and Uravan. The byway continues on Highway 141 through Gateway, past the Gateway Canyons Resort, and ends in Whitewater.

West Elk Loop. The 205-mile West Elk Loop begins in Carbondale, Colorado, and travels south along Highway 133 through the towns of Redstone and Paonia. The route continues south and then east along Highway 92 towards the town of Gunnison. At Gunnison, the loop heads north along Highway 135 through Crested Butte and meets up once again with Highway 133, where it continues north back to Carbondale.

Trends

National Historic Trails

The *Old Spanish National Historic Trail Comprehensive Administrative Strategy* examines trail resources along the entire route of the Old Spanish National Historic Trail. At the local level, the BLM will continue to work with the local branch of the Old Spanish Trail Association to manage trail use and provide educational opportunities.

Byways

Driving for pleasure is expected to increase through the Planning Area, particularly along the existing scenic byways. Development may occur along portions of the scenic and historic byways. The BLM continues to work with partnership groups to enhance and promote the scenic byways in the Planning Area.

3.3.5 Watchable Wildlife Viewing Areas

The federal Watchable Wildlife Program is a cooperative nationwide effort among 13 organizations, including the BLM, to foster the conservation of wildlife and wildlife habitats by:

- Providing enhanced opportunities for the public to enjoy wildlife
- Promoting learning about wildlife and habitat needs
- Contributing to local economies
- Enhancing active public support for resource conservation

Current Conditions

There are no existing watchable wildlife viewing sites within the Planning Area. However, the potential to develop watchable wildlife viewing sites exists on BLM-administered land near the Billy Creek State Wildlife Area, the Uncompahgre Riverway, and along the San Miguel River. These areas have been proposed as watchable wildlife viewing sites based upon their ability to provide exceptional opportunities for wildlife viewing, and to create opportunities for interpretation and education. Both the Billy Creek State Wildlife Area and the San Miguel River area are included as part of the Colorado Birding Trail, which is designed to provide opportunities for visitors to observe birds and other wildlife. The Ridgway State Park, which neighbors the Uncompahgre Riverway, is also part of the Trail.

The Billy Creek State Wildlife Area lies along Highway 550 in Ouray County, in southwest Colorado. The vegetation in the area consists largely of sagebrush, oakbrush, and pinon-juniper, with some cottonwood habitat in the riparian zones along Uncompahgre River and Billy Creek (Colorado Department of Natural Resources 2012a). The Billy Creek State Wildlife Area provides habitat for elk *(Cervus canadensis)*, bald eagles *(Haliaeetus leucocephalus)*, and golden eagles *(Aquila chrysaetos)*. Large stretches of Gambel Oak shrubland in the area provides habitat for a wide array of birds, including the Bushtit, Blue-gray Gnatcatcher, Virginia's Warbler, and Spotted Towhee (Colorado Field Ornithologists 2006).

The Uncompahgre Riverway provides habitat for bald and golden eagles, ospreys *(Pandion haliaetus)*, harriers *(Circus cyaneus)*, great horned owls *(Bubo virginianus)*, and several species of hawks. Over 140 species of birds have been identified in the neighboring Ridgway State Park (Colorado Department of Natural Resources 2012b).

The San Miguel River area is within the existing San Miguel River ACEC in southwest Colorado. The area consists primarily of high elevation and lowland riparian habitat, including southwest canyon riparian habitat, which is known for being the richest terrestrial bird habitat type in North America. The site provides habitat and breeding sites for a large array of bird species and is within the primary migratory

corridor for nearly all western songbirds. Over 300 bird species have been observed in the area. Because of the habitat and species richness found here, the Audubon Society recognizes it an Important Bird Area. Minor threats to the area include invasive plants, introduced animals, such as feral cats, and disturbance to birds and their habitat (National Audubon Society 2012).

Opportunities for wildlife viewing, education, and interpretation exist in these three proposed watchable wildlife viewing sites and would be enhanced in the event any of the three sites were identified as watchable wildlife viewing sites.

3.4 SOCIAL AND ECONOMIC CONDITIONS

This section is a description of the support conditions in the Planning Area and follows the order of topics addressed in **Chapter 2**:

- Native American Tribal Interests
- Public Health and Safety
- Socioeconomics
- Environmental Justice

3.4.1 Native American Tribal Interests

The BLM has traditionally viewed its responsibility toward Native American concerns and tribal interests within the narrow scope of consultation on specific issues, typically involving development and individual NEPA actions on public lands. The BLM is mandated to consult with Native American tribes concerning the identification of cultural values, religious beliefs, and traditional practices of Native American people that may be affected by actions on federal lands. The 1989 Uncompahgre Basin RMP does not contain any specific decisions or guidance relating to tribal interests. The BLM has developed several sets of guidelines for consulting with Native American groups and evaluating cultural resources, with an emphasis on traditional use values. BLM Manual 8160, Native American Coordination and Consultation (BLM 1990), and BLM Handbook H-1780-1, Improving and Sustaining BLM–Tribal Relations (BLM2016d), provide consultation requirements and procedural guidance to ensure that the consultation record demonstrates "that the responsible manager has made a reasonable and good faith effort to obtain and consider appropriate Native American input in decision making" (BLM 1994b). BLM Handbook H-8110, Identifying and Evaluating Cultural Resources (BLM 2004b), offers guidelines for determining authorized uses of a cultural resource, including considerations for traditional use values.

Current Conditions

The Planning Area is not contiguous with any current tribal lands and no trust assets or resources have been identified by tribes. Portions of the Planning Area in San Miguel and southern Ouray counties are within lands covered by the Brunot Agreement of 1873, which resulted in moving the Ute Tribe to lands away from the San Juan Mountains. The Brunot Agreement, ratified by Congress in 1874, withdrew over 5,000 square miles in the mountains of southwestern Colorado from the 1868 Ute Reservation. The agreement, entered into between the United States (represented by Felix Brunot) and the Ute Indians in Colorado, was passed into law (18 Stat., 36) by the House of Representatives and the Senate of the U.S. Congress on April 29, 1974. Under the "reserved rights doctrine," hunting rights on reservation lands relinquished by the Utes were retained; that is, the tribes retained such rights as part of their status as prior and continuing sovereigns. Article II of the Bruno Agreement specified that "the United States shall permit the Ute Indians to hunt upon said lands so long as the game lasts and the Indians are at peace with the white people." These hunting rights currently apply only to the Ute Mountain Ute Tribe, acknowledged when the Tribe sued the State of Colorado for their historical hunting rights in 1978. The rights were granted to the Tribe under a consent decree that gives enrolled members of the Ute

Mountain Ute Tribe the right to hunt deer and elk in the Brunot area for subsistence, religious, or ceremonial purposes. The consent decree specifies that tribal members may hunt deer and elk without a State license year-round, providing that they obtain a tribal hunting permit. Other game animals may be hunted without a license and without bag limits, but only during hunting seasons established by the CPW.

None of the provisions of that agreement or the subsequent memorandum of understanding between CPW and the Southern Ute Indian Tribe are administered by the BLM. The BLM and area tribes currently have not entered into any programmatic agreements, memoranda of understanding, or joint plans. The UFO has invited the Southern Ute Indian Tribe, the Northern Ute Indian Tribe, and the Ute Mountain Ute Tribe to become cooperating agencies during the RMP revision process. To date, none of the tribes have signed a memorandum of understanding with the BLM to become a Cooperating Agency.

As part of the cultural resource management planning program, the UFO, in cooperation with the BLM Grand Junction and Glenwood Springs field offices, has initiated consultation in connection with the Ute Ethnohistory Project. A series of face-to-face consultations and field visits were conducted with representatives of the Northern Ute Tribe inhabiting the Uintah and Ouray Reservation in Utah, and the Ute Mountain Ute Tribe. Representatives of the Southern Ute Tribe also participated in the initial planning stages. The project has thus far produced a report that will serve as the foundation for addressing tribal interests during this RMP revision. Titled "Perspectives on Ute Ethnohistory in West Central Colorado" (Ott et al. 2010), the report identifies the following key issues in the continued identification and protection of tribal interests:

- Legal, social, scientific and religious points of view attached to cultural resources on public lands. Each of those perspectives must be considered, in good faith, in land management planning, policy and programs.
- The traditional and historical culture of the Utes is based in nature and places deeply held values on the living landscapes that were home to their ancestors. Their spiritual and emotional connections to their Colorado homelands remain strong and are growing.
- Consultation and partnership with the Utes is vitally important to the BLM's planning and cultural resource management decisions in its efforts to keep pace with increasing development and population pressures on public lands in the project area.
- Cultural programs that provide opportunities for Ute people–including elders, families, and young people–to widely participate in and contribute to cultural resources research and preservation efforts are of immense benefit to all heritage stakeholders.
- Partnership and collaboration requires information parity. Much work is needed to improve information flow between tribal and agency cultural resource departments.
- Meaningful and effective tribal consultation, as well as informed land management decision-making, requires more than narrowly focused archaeological site information. Landscape-scale inventories, including environmental, ethnohistorical, and ethnographic contexts, are generally lacking in the project area.
- Consultation processes are inconsistent across both tribal and agency cultural programs. Past efforts to clarify and improve communication and procedural protocols, including those undertaken in the course of this project, should be continued and expanded.

A number of recent trends in cultural heritage preservation and cultural resource management, and within the disciplines of archaeology, anthropology, and history, are beginning to address past shortcomings in regard to Native American culture and history. This project is a good beginning toward integrating and applying these new ways of understanding to the challenges of preserving and protecting Ute heritage on the public lands of Colorado.

The report examines these themes in some detail, looks at how they may apply to current and future BLM planning activities, and recommends future actions that the BLM can take to more fully integrate Ute heritage concerns into cultural programs (Ott et al. 2010).

Trends

During previous consultation, the Ute Tribes have indicated that the UFO is part of their ancestral homeland, thereby increasing the potential for traditional cultural properties and sacred sites. At present, the Ute Tribes have identified several sacred/religious sites and special use areas. Continuing consultation with Native American tribes will help redevelop traditional ties to the landscape, and identify and protect sacred and traditional use areas. Native American consultation on both a programmatic and project-specific basis continues to identify traditional cultural properties, sacred/religious sites, and special use areas through letters, phone calls, and on-site visits. Field site visits have been conducted to share the results of compliance projects when sites affiliated with the Ute tribes are recorded.

Native American heritage considerations are just being discovered through consultation with the Ute tribes. The BLM perspective of managing significant cultural resources as distinct properties differs from that of traditional tribal leaders who view cultural resources as part of a larger heritage setting. The following management practices are seen as important for the UFO to continue in managing tribal interests within the Planning Area:

- Continue consultation with Ute tribal members to identify traditional areas of importance
- Continue programs to redevelop traditional ties to the landscape, and identify and protect sacred and traditional use areas
- Designate heritage areas as ACECs or special management areas to meet the BLM's commitment to the Ute tribes to recognize areas to manage as traditional landscapes and protect cultural resources holistically by focusing on community stewardship.

3.4.2 Public Health and Safety

Public health and safety topics include law enforcement, hazardous materials and sites, illegal dump sites, target shooting, abandoned mines, energy development, motor vehicle operations, and remoteness and natural hazards. Public health and safety management is intended to protect public health and safety on BLM-administered lands, to comply with applicable federal and state laws, to prevent waste contamination, and to minimize physical hazards due to any BLM-authorized actions or illegal activities on public lands. When health and safety hazards from past grazing, mining, or milling activities, illegal dumping, and natural hazards are identified, they are reported, secured, or cleaned up in accordance with federal and state laws and regulations, including the federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (or the Superfund Act). Parties responsible for contamination are liable for cleanup and resource damage costs, as prescribed by law.

Current Conditions

Visitor safety is a high priority for the UFO. The BLM is required to address abandoned mines, target shooting, unexploded ordnance, mass movement, hazardous waste, and other public hazards. The primary concern for public safety within the Planning Area is the illegal use, storage, and disposal of hazardous materials.

Major Safety Concerns in the Planning Area

Abandoned Mines. There are over 400 documented abandoned uranium mines in the Planning Area. Abandoned mines and prospects are found throughout the Planning Area. Workers conducting natural resource extraction and development may encounter hazardous, abandoned mine sites. In addition,

visitors often find abandoned mines and prospects attractive to explore and may be exposed to hazards at these sites. Features that could pose public safety hazards at abandoned mine sites include open and unstable shafts, adits, drifts, pits, tailings, wells, or other excavations, dilapidated, unstable, or collapsed buildings and other structures, mining implements, construction debris, and hazardous or toxic materials.

Energy Development. Energy development can include oil, gas, coal, and renewable energy sites. Energy development is often associated with concerns over public health and safety, and there are potential impacts on public health from materials used in production to workers. Citizen groups, environmentalists, and scientists noted concerns that oil and gas development, and hydraulic fracturing in particular, pose a threat to air and water quality in the Planning Area. Concerns are about the use of toxic chemicals and diesel fuel in fracturing fluid and the detrimental impacts on the environment and on human health that would result if these chemicals were to contaminate underground drinking water sources. Some studies have correlated increases in human health issues with proximity to unconventional natural gas development in Colorado (see for example, McKenzie et al. 2012). A recent report from the Colorado Department of Public Health and Environment, however, concluded that impact to human health from oil and gas operations are low (Colorado Department of Public Health and Environment 2017). The BLM requires operators to comply with applicable regulations designed to protect the environment and the public, and with additional requirements imposed by the BLM as part of the land use lease or ROW grant.

Recreation. There are potential risks associated with public participation activities on public lands in the Planning Area. Motorized vehicle use includes two- and four-wheel-drive vehicles, as well as ATVs, motorcycles, and snowmobiles. Single- or multiple-vehicle accidents and collisions involving vehicles and pedestrians, equestrians, or bicyclists are potential risks associated with participation in motorized and nonmotorized activities throughout the Planning Area. Risks may also occur due to interactions between recreationalists and guard dogs used for livestock grazing management.

Exposure to natural hazards such as inclement weather, wildfire, rough terrain, and dangerous animals is an inherent risk in any activity conducted within the Planning Area. Proper equipment and adequate planning should be taken prior to conducting activities in order to prepare for the remoteness and natural hazards present in much of the Planning Area.

Target Shooting. While there are no designated areas within the Planning Area, target shooting is generally allowed on BLM-administered lands. The Planning Area has several unofficial shooting areas in old barrow pits, gravel pits, and other disturbed areas where there is a history of such use. Cleanup of targets, shell casings, and trash is required. Due to public safety concerns, shooting is specifically prohibited at developed recreation sites per 43 CFR, 8365.2-5.

Unexploded Ordnance. An area known as the Delta Range (Delta National Guard Range) is located in Delta County approximately 7.5 miles northwest of the town of Delta, and covers approximately 14,510 acres. The Delta Range was used by the U.S. Army Reserve and Army National Guard for training exercises, which included firearms, mortars, artillery, light anti-tank rounds, 3.5-inch rockets, and practice grenades. An unknown amount of unexploded munitions remain on the site. The Army National Guard has designated the Delta Range a Munitions Response Site (**Figure 3-26** [Unexploded Ordnance]). A remedial investigation was completed in 2011. Work on characterizing the site and detonating munitions found is on-going.

Areas in and around northwest Delta where inherent ordnance dangers exist require continued regulated access, close monitoring, and user notification. In public access areas, any identified

unexploded ordnance reported would be cleared and disposed of according to applicable U.S. Army policies and procedures.

Hazardous Materials. There are no approved hazardous waste disposal facilities within the Planning Area. Hazardous materials may legitimately be brought onto BLM-administered lands during authorized weed and insect control or resource development projects. Hazardous materials used for weed and insect control include herbicides, algaecides, and pesticides. The general types of hazardous materials that may be present during resource development projects include, but are not limited to, petroleum products (e.g., fuels and lubricants), solvents, surfactants, paints, explosives, batteries, acids, biocides, gases, and antifreeze. Hazardous material incidents on BLM-administered lands typically involve illegal disposal of hazardous materials. These types of materials include, but are not limited to, petroleum products, household wastes, paints, biocides, and methamphetamine manufacturing wastes. The majority of illegal dumping activity within the Planning Area involves solid waste, which is problematic regardless of whether hazardous materials are involved.

Mass Movement. Unstable slopes occur on hillsides or cliffs, or in areas susceptible to landslides, mudflows, rock falls, or accelerated creep of slope-forming materials. Unstable slopes occur naturally and are widespread in the Planning Area. Most unstable slopes consist of weathered sedimentary strata and recent colluvium deposits that move downhill due to gravity.

Within the Planning Area, there is an area of mass movement in the Paonia-McClure Pass area. The Cretaceous Mesa Verde Group and Tertiary Wasatch Formations have resistant sandstone units overlying weaker, more easily erodible shale, siltstone, and mudstone units. These weaker units are easily weathered and eroded, undercutting the more competent sandstone. This differential weathering causes the sandstone to slide and fall once its underlying support is removed.

In general, mass movement is a dynamic process that can be activated by earthquakes, rapid snowmelt, intense rainstorms, or gravity. Whereas mass movement plays a major role in the evolution of a hillslope by modifying slope morphology and transporting material from the slope to the valley, it also poses a potential natural hazard. Prediction of the location and volume of transported mass on potentially unstable slopes is an important issue in the assessment of mass movement hazards and hillslope evolution. A promising approach is to examine the relationships of area, volume, length, height, and width of existing movements through ratio quantification (Regmi et al. 2008).

A technical study mapped 683 movement features in the Paonia to McClure Pass area of western Colorado from aerial photographs and field surveys. The area covers approximately 600 square kilometers. The total area of movement was classified as debris flows (29 percent), rockslides (26 percent), debris slides (23 percent), soil slides (15 percent), and forest road and highway-influenced landslides (7 percent) (Regmi et al. 2008). Future hazard analysis studies will produce landslide hazard zone maps that BLM can use in its planning process.

Flood and debris flow hazards are discussed in **Section 3.1.3** (Soils and Geology).

Trends

Hazardous Materials and Sites. The frequency of hazardous materials incidents in the past mirrored the rate of economic activity and population growth, with economic boom and population growth usually resulting in more illegal dumping and more materials transportation accidents and accidental spills.

Target Shooting. Requests for dispersed shooting areas are expected to increase. Concerns from adjacent landowners, especially in regards to dispersed target shooting, are also expected to rise.

Abandoned Mines. If abandoned mines are discovered, they will be addressed in accordance with the Abandoned Mine Lands program.

Energy Development. Trends in well activity on BLM-administered lands within the Planning Area have mirrored economic conditions and change in accordance with market demand. In addition, technological developments such as drilling and modern drilling rigs used to improve access to energy resources may increase development, while regulations or requirements that increase costs to developments may decrease development and associated risks.

Recreation. As population increases in the surrounding area, recreation is increasing; the potential for conflicts between users is also likely to increase.

3.4.3 Socioeconomics

This section discusses the social and economic conditions of the Planning Area. These conditions are discussed in greater detail in the Socioeconomic Baseline Assessment Report prepared in support of the Uncompahgre RMP planning effort (BLM 2010j). Multiple state and federal agencies released updated data since the publication of the Uncompahgre Draft RMP/EIS. This section has been updated to include this new information where possible to provide the latest description of the Planning Area.

Economic and demographic statistics are primarily reported by county. For these reasons, demographic, economic, and social data are presented for the socioeconomic study area, which is defined as all lands within the six counties that primarily comprise the Planning Area (Delta, Gunnison, Mesa, Montrose, Ouray, and San Miguel). These counties were identified as the socioeconomic Planning Area because the BLM-administered lands of the UFO lie within these counties, and most of the effects on the population and economy would occur within this region. The Draft RMP/EIS analysis has been amended to include Mesa County because it is recognized that, as a regional economic center, Mesa County influences jobs and economics in the Planning Area. However, it should be noted that Mesa County differs from other socioeconomic study area counties for the following reasons:

- The majority of BLM-administered lands within Mesa County are administered by the BLM Grand Junction Field Office.
- Mesa County contains the largest city in the region, Grand Junction, the Planning Area excludes Grand Junction and the surrounding metropolitan area and the portion of Mesa County within the Planning Area is largely rural. As a result, county-wide data, which include Grand Junction, may not be reflective of the portion of the county within the Planning Area.

Data for Colorado is presented for comparison and wider context. It is important to note that data reported for counties includes demographics outside the Planning Area. It is likely that the counties containing the most BLM-administered land, the most intensively used BLM-administered land, or the most split-estate minerals within the Planning Area would be most affected by changes in resource management. Similarly, the counties with the most BLM-administered lands are likely to be the most affected by funding to states and counties through federal payments in lieu of taxes (PILT) and uses of the public lands.

Information was collected from several sources, including Headwater Economics Economic Profile System (Headwaters Economics 2017), U.S. Census Bureau, U.S. Bureau of Economic Analysis, Colorado Department of Local Government, and other data for Planning Area counties and the State of Colorado. Current, historic, and forecasted population statistics, age distribution, housing, and education level are the demographic data provided. Economic characteristics discussed include employment levels and industries, major employers, income, government revenues and expenditures, and dependence on BLM resources.

Important general social and economic indicators for local communities include employment by job sector, personal income, population change, housing affordability, and ethnic and racial makeup of the area. Indicators specific to public lands include recreational use (including hunting and fishing visitor days, as well as recreational use), livestock grazing as measured in AUMs, and energy development and production, particularly for coal, oil and gas, and uranium mining. Right-of-way and other land use information are also important to examine. For additional information on subjects not included in this chapter, refer to the Socioeconomic Baseline Assessment Report (BLM 2010j).

The UFO encompasses a geographically and socioeconomically varied region. The population is diverse and includes recent immigrants and multigenerational families. Most residents have a strong connection to BLM-administered lands and the surrounding National Forests and view them as playing a role in their personal quality of life. For local residents, these lands provide economic opportunities, recreation, open space, a connection to the western historic landscape, and other intangible benefits. Current social issues related to public land management in the Planning Area include increased demand of public land use for recreation and continued importance of the local oil and gas, coal, and uranium industries. Additional social themes identified include a desire to preserve undeveloped areas of the UFO and the need to allow access for traditional land uses such as hunting and livestock grazing. This chapter describes the communities and interest groups whose social or economic interests are tied to public lands.

Current Conditions and Trends

Study Area Counties

The following section provides brief summaries of the demographic and economic trends for each of the six study area counties as reported in county-wide data. The current conditions and trends data have been modified to reflect changes since the publication of the *Socioeconomic Baseline Assessment Report* (BLM 2010j) and to reflect public input received on the Draft RMP/EIS.

Delta. Delta County has important agricultural lands and is home to the study area's third-largest city, Delta. Within the Planning Area, Delta is the second largest city. The North Fork Valley, including the towns of Hotchkiss, Paonia, and Crawford, has become known for wine and produce production. Locally, coal mining has historically been an important industry; however, the Bowie #2 mine has been idle since March 2016, and the Elk Creek Mine idle since 2013, resulting in decreased economic contributions from this industry.

The population of Delta County was estimated to be 30,442 in 2016 (U.S. Census Bureau 2016a), an approximately 2 percent decrease since 2010. Since 1975, population growth has been slower than the state but has outpaced the nation (Headwaters Economics 2017). Population density in 2010 was 27.1 people per square mile, compared to 48.5 for Colorado as a whole (U.S. Census Bureau 2010a). Per capita income for the County was $24,261 in 2016 data (U.S. Department of Commerce, Bureau of Economic Analysis 2016b), and 17.8 percent of people fell below the poverty level (U.S. Census Bureau 2017a). Unemployment rates in the County have ranged from a high of 10.7 percent in 2010 to a low of 5.0 percent in 2016 (U.S. Bureau of Labor Statistics 2017b).

Delta County contains approximately 120,700 acres of Planning Area public lands, not including additional acres in the Gunnison Gorge NCA which is excluded from the Planning Area. There are 85,590 acres of split-estate land.

Gunnison. Gunnison County is dominated by a mountain landscape and is home to a variety of recreational opportunities on the BLM-administered and National Forest System lands that dominate the County. Population density in 2010 was 4.7 people per square mile, the lowest in the study area, compared with 48.5 for Colorado as a whole (U.S. Census Bureau 2010a). The population of Gunnison

County was 16,408 based on 2016 data (U.S. Census Bureau 2016a), a 7 percent increase since 2010. The County has the lowest median age in the study area and highest level of people who have obtained bachelor's degrees or higher. Per capita personal income for the County was $43,473 in 2016 (U.S. Department of Commerce, Bureau of Economic Analysis 2016b), and 13.8 percent of people fell below the poverty level in 2016 (U.S. Census Bureau 2017a). Unemployment rates in the County ranged from a high of 6.4 percent in 2010 to a low of 2.3 percent in 2016 (U.S. Bureau of Labor Statistics 2017b).

Gunnison County contains approximately 13,400 acres of BLM-administered lands and 49,900 acres of split-estate land in the Planning Area.

Mesa. Mesa County is the most populous county in the study area with a population of 147,834 in 2016 (U.S. Census Bureau 2016a), an approximate 2 percent increase since 2010. Population density in 2010 was 35 people per square mile, compared to 48.5 for Colorado as a whole (U.S. Census Bureau 2010a). Mesa County represents the only county considered nonrural in the study area and contains the largest city in the area, Grand Junction. It should be noted, however, that the Planning Area excludes Grand Junction and the surrounding metropolitan area. Per capita personal income for the County was $39,118 in 2016 (U.S. Department of Commerce, Bureau of Economic Analysis 2016b), and approximately 15.0 percent of people fell below the poverty level (U.S. Census Bureau 2017a). Unemployment rates over the past two decades in the County have ranged from a low of 3.2 percent in 2006 to a high of 11 percent in 2010. The unemployment rate in 2016 was 5.4 percent (U.S. Bureau of Labor Statistics 2017b). Employment sectors of importance include retail, health services, accommodation and food services, and construction.

The majority of BLM-administered lands in the County, including McInnis Canyons NCA and almost one-half of the Dominguez–Escalante NCA, are lands administered under the BLM's Grand Junction Field Office or other management. A total of 11,900 acres of BLM-administered land in Mesa County is included in the Planning Area. In addition, the County contains three state parks, Highline, James M. Robb, and Vega. The County also contains land from three national forests; the Grand Mesa, Uncompahgre, and White River, totaling 94,100 acres. The County is also home to a portion of one national trail, Old Spanish National Historic Trail, and three national scenic byways, the Dinosaur Diamond Prehistoric National Scenic Byway, the Grand Mesa Scenic and Historic Byway, and the Unaweep/Tabeguache Scenic and Historic Byway.

Montrose. Montrose County is the second-most populous county in the study area with a population of 41,276 in 2016 (U.S. Census Bureau 2016a), an increase of 0.5 percent since 2010. Population density in 2010 was 18.4 people per square mile, compared with 48.5 for Colorado as a whole (U.S. Census Bureau 2010a). Montrose County contains the second-largest city in the study area and the largest city within the Planning Area, Montrose, a regional hub. Montrose is the most ethnically diverse county in the study area with a significant Hispanic/Latino population. Per capita personal income for the County was $23,144 in 2016 (U.S. Department of Commerce, Bureau of Economic Analysis 2016b), and 16.4 percent of people fell below the poverty level (U.S. Census Bureau 2017a). Unemployment rates in the County have ranged from a low of 3.6 percent in 2007 to a high of 11.1 percent in 2011. The unemployment rate in 2016 was 4.2 percent (U.S. Bureau of Labor Statistics 2017b).

The majority of Montrose County is administered by Federal agencies. Montrose County contains over 448,000 acres of BLM-administered surface lands in the Decision Area and additional acres in a portion of the Gunnison Gorge NCA, which is excluded from the Decision and Planning Areas. There are approximately 94,700 acres of split-estate land.

Ouray. Ouray County has a rich history of mining, and today has a local economy focused on tourism and recreation. Ouray County is the least populous in the study area with a population of 4,857 based

on 2016 data (U.S. Census Bureau 2016a), a 9 percent increase since 2010. Population density in 2010 was 8.2 people per square mile, compared with 48.5 for Colorado as a whole (U.S. Census Bureau 2010a). Per capita personal income for the County was $51,000 in 2016 (U.S. Department of Commerce, Bureau of Economic Analysis 2016b), the second-highest in the study area, and 8.8 percent of people fell below the poverty level (U.S. Census Bureau 2017a). Housing prices have increased in median value and decreased in affordability over the past decades (Headwaters Economics 2017). Unemployment rates in the County have ranged from a low of 2.7 percent in 2007 to a high of 10.2 percent in 2011. Unemployment in 2016 was 3.8 percent (U.S. Bureau of Labor Statistics 2017b). Major employment sectors include accommodation and food services, real estate, and construction. Nonlabor income and sole proprietors also provide significant contributions to the local economy.

Ouray County contains approximately 24,500 acres of BLM-administered surface lands and 32,800 acres of split-estate lands, and additional acres in the Gunnison Gorge NCA, which is excluded from the Decision and Planning Areas.

San Miguel. This County has a long history of mining and employment based in natural resource extraction. Today there is a dichotomy in the local social and economic structure in the communities. Agriculture in the west end of the County has long been valued and still plays an important role in the local economy. Recreation and tourism are increasingly dominating the economy, particularly in the area around Telluride and Mountain Village.

San Miguel County had a population of 8,017 based on 2016 data (U.S. Census Bureau 2016a), an increase of 9 percent since 2010. Population density is 5.7 people per square mile compared with 48.5 for Colorado as a whole (U.S. Census Bureau 2010a). San Miguel County has the highest per capita and median household income in the study area (U.S. Department of Commerce, Bureau of Economic Analysis 2016b; U.S. Census Bureau 2017a), likely influenced by the residents of the towns of Telluride and Mountain Village in particular. Housing prices in this county are the highest and least affordable in the Planning Area (Headwaters Economics 2017). Unemployment rates in the County have ranged from a low of 3.1 percent in 2007 to the high of 8.0 percent in 2011 (U.S. Bureau of Labor Statistics 2017b). Major employment sectors include accommodation and food services, real estate, arts and entertainment, and construction in the Telluride area, with agriculture locally significant in other parts of the county.

San Miguel County contains approximately 57,300 acres of BLM-administered lands in the Planning Area and approximately 32,100 acres of split-estate land.

Socioeconomic Units

As previously discussed, while data is available at the county level, county boundaries do not correspond with Planning Area boundaries. Furthermore, counties do not necessarily reflect the diversity of socioeconomic conditions within them due to natural topography boundaries and proximity to public lands in the area. Therefore, this analysis utilizes socioeconomic units with shared economic and/or cultural ties, as delineated in the Community Assessment report (BLM 2009e). Key issues identified for the different socioeconomic units are presented below, as modified from the Draft RMP/EIS based on current economic conditions. **Figure 3-27** (Socioeconomic Units) depicts these units.

Socioeconomic Unit 1. This unit encompasses the communities of Bowie and Somerset and contains land in Gunnison and Delta counties. Coal mining has historically represented a key component of the economy in this unit, along with oil and gas development and agriculture. Recreational use of land is important for local area residents. The key issues are changes in the local economy due to the local reduction in the coal industry.

Socioeconomic Unit 2. This unit encompasses the communities of Austin, Cedaredge, Crawford, Hotchkiss, Paonia, and Orchard City and contains land in Delta, Montrose, and Gunnison counties. Issues in this unit relate to growing the economy in concert with the natural landscape. Utilization of public land and enhancing environmental values, while preserving open space, are also important. The potential for conflict between development of natural resources with farming and recreational opportunities is a concern, particularly within the North Fork Valley. Concerns about the impacts of natural resource development on water and air quality, property values, and public health are a concern of residents in this unit.

In 2014, the North Fork Heart and Soul Project published a white paper containing information gathered from surveys of residents in Hotchkiss, Paonia, and Orchard City (North Fork Heart and Soul 2014). Values that were seen as most important for the community based on a survey of 1,600 residents are summarized as follows:

- Rural and natural environment that has an abundance of resources and opportunities for healthy living, quality food, work, recreation, and connection to the land
- Small town feel and sense of community
- Steady economy with work opportunities and the ability to grow traditional and emerging economic sectors
- Freedom to live the way we choose, our independence, and our personal responsibility to our communities
- Honoring traditions and heritage while looking to the future

Socioeconomic Unit 3. This unit encompasses the communities of Delta, Montrose, and Olathe and contains land in Delta, Mesa, and Montrose counties. The economy in this area is oriented toward agriculture, mining, and timber production. The area also contains geological features providing recreational opportunities for the local population and attracts visitors. The community of Delta along the U.S. Highway 50 corridor is within easy commuting distance of Grand Junction, the regional center for western Colorado. The key issue for the Delta area is providing maximum public land access for local residents and extracting resources for continued community economic support, while preserving ecologic features that attract visitors to the area.

Like the community of Delta, Montrose lies along the U.S. Highway 50 corridor and is the largest city within the Planning Area. The regional airport also provides Montrose ready access to areas outside the Planning Area. Also, the majority of county population resides within eastern Montrose County and thus gives the area an urban economic feel. Though there is less dependence on public lands for economic stability within the urban setting, access to public lands within the UFO attracts visitors to the recreational economic activities, which provides economic opportunities. The key issue in this unit is providing continued access to public lands for an area with a growing population center and increasing importance as a regional destination.

Socioeconomic Unit 4. This unit encompasses the communities of Mountain Village, Norwood, Ouray, Placerville, Ridgway, Sawpit, and Telluride, and contains land primarily in Ouray and San Miguel counties. The eastern portion of the unit is located in Ouray County and eastern San Miguel County. This area is destination-oriented and takes advantage of unique geologic features and remote access. Economic opportunities are limited to those activities that fit the landscape. Retaining local businesses and developing tourist- and recreation-oriented activities are important aspects of economic growth. Retirees and self-proprietors make a significant contribution to the local economy. The key issue in this unit is maintaining the landscape in its "old west" setting, while providing a "new west" economic structure.

The western portion of Socioeconomic Unit 4 is located in the area surrounding the town of Norwood in western San Miguel County. Agriculture represents a significant portion of the local economy. A number of residents commute to Telluride to work in the accommodation sector. Water is a limiting resource, which severely restricts development within the Norwood area. Hunting and fishing provide seasonal economic activity. Key issues include access to public lands for livestock grazing and hunting.

Socioeconomic Unit 5. This unit encompasses the communities of Naturita, Nucla, Redvale, and Paradox and contains land primarily in western Montrose County. Agriculture and mining represent significant portions of the area economy. Uranium mining is particularly significant, which has led to boom/bust cycles throughout the past 40 years. Some residents commute from Naturita and Nucla to Telluride for work in the accommodation sector. The remoteness of the area requires travel to Montrose, Delta, or Grand Junction for all major shopping activities. The key issue is making public land resources available for livestock grazing and extractive uses.

Communities of Interest/Affected Groups and Individuals

In addition to geographic regions within the Planning Area, there are specific groups to whom management of public lands is of particular interest. These include private livestock grazing permittees and lessees (see definitions in **Section 3.2.2**, Livestock Grazing, and the Glossary), mineral estate owners, oil and gas leaseholders, renewable energy leaseholders, and, as interest in using public lands in the Planning Area for recreation grows, recreational visitors. Furthermore, special interest groups and individuals who represent resource conservation or resource use perspectives constitute additional groups with an interest in Planning Area public lands management. Refer to the *Socioeconomic Baseline Assessment Report* (BLM 2010j) and to the *Community Assessment of the Uncompahgre Planning Area* (BLM 2009) for more information on the social values of affected groups and individuals.

Livestock Grazing Permittees and Lessees. Ranching is an important part of the Planning Area's history, culture, and economy. Ranchers face challenges such as fluctuating livestock prices, increasing equipment and operating costs, fluctuating water availability, and changing federal regulations. Additional income sources are often necessary to continue ranching, and ranchers or their family members may also work in other sectors of the economy. Livestock grazing is a historical use of public lands in the UFO and continues to be an important way of life in the region despite the decreasing contribution to the economy over the past 20 years (Headwaters Economics 2010).

Private Landowners. Much of the land within the Planning Area (approximately 1.1 million acres) is privately owned. Neighboring landowners adjacent to public lands are an important group to consider in the planning process. On the boundary between community and public lands, wildland-urban interface issues are important to consider in the planning process. The wildland-urban interface is defined as a geographical area where two diverse systems meet and affect each other, giving rise to conflicts between societal values and expectations concerning the management of natural resource systems. Issues in the wildland-urban interface include wildfire protection, recreational access, and land health, particularly related to the spread of invasive species. Additional planning issues of importance to private landowners include rural lifestyle preservation.

Minerals and Oil and Gas Leaseholders. Mineral estate leases cover the various extractable minerals found within the Planning Area, including oil and gas, coal, and uranium resources. Leaseholders are particularly interested in keeping restrictions on leasing minimal in order to keep and costs and delays of production low. Leaseholders involved in the economic strategy workshops held in March 2010 stated the importance of recognizing valid existing rights of those who hold mineral claims and leases.

Renewable Energy Leaseholders. Due to increasing fossil fuel prices and federal incentives for renewable energy development, interest in non-traditional energy leasing opportunities on public lands is of

increasing importance. Renewable energy resources available in the Planning Area include solar, biomass, wind, and direct use geothermal. Renewable energy leaseholders would be interested in management direction that supports development of these resources in a timely, cost-efficient manner.

Right-of-way Holders. The UFO currently manages approximately 2,500 rights-of-way for land uses such as roads, power lines, natural gas pipelines, water lines, telephone lines, communication sites, and ditches and canals on public land. Right-of-way holders are primarily concerned with continued access to right-of-way lands. Requests for rights-of-way are likely to increase in the next 20 years due to increased growth and development on private land, and the interface of private and urban land with public land. As energy development continues, energy rights-of-way, such as electric transmission lines and natural gas pipelines are likely to increase in importance.

Recreational Users. Recreational visitors to the Planning Area include both local residents and destination visitors from communities outside the Planning Area. Approximately 245,000 people live within the six county study area, and many of these residents utilize public lands for recreation activities such as off-highway vehicle use, horseback riding, hiking, mountain biking, camping, fishing, and hunting. In addition, the Planning Area has become a destination for visitors, particularly for big game hunting and fishing, as well as motorized and nonmotorized recreation. Rapid community growth within the Planning Area and in the region has led to an increased importance of public lands as open space and for recreation use. The population of the socioeconomic study area is expected to continue to increase over the next 20 years; therefore, the importance of recreation on public lands is likely to increase. Access, delineation of recreation types (e.g., quiet or passive recreation vs. motorized or intensive recreational opportunities), and sustainability are important to this user group.

Outfitters. Local recreational outfitters represent another important group with an economic interest in the management of public lands. Outfitters include retailers and guides who provide services for activities such as river rafting, hunting and fishing expeditions, and four-wheel-drive tours of the area. Outfitters, like all recreations users, have a vested interest in keeping access to public lands open and user fees low.

Individuals and Groups Who Prioritize Resource Protection. Various individuals and groups at the local, regional, and national levels are interested in how the BLM manages public lands. Many of their concerns regard wildlife, water quality, and visual quality. They value public lands for wildlife, recreation, education, scenic qualities, wilderness, and open space, among other aspects. While there are individuals who prioritize resource protection throughout the Planning Area, this group has a particularly strong presence in the Socioeconomic Units 1 and 4. In particular, the North Fork Valley, in Unit 1, represents a population that values resource protection and emphasizes creative and entrepreneurial opportunities.

Individuals and Groups Who Prioritize Resource Use. Many individuals and groups are concerned about limitations being put on the availability of public lands for commercial uses, such as mineral and energy development and livestock grazing. They indicate that public lands should be managed to be as productive as possible and that the survival of local economies and local communities depend upon resource-use industries. Public land resource use plays a large role in the local economy of some regions of the Planning Area, most notably those in western Montrose and San Miguel counties in Socioeconomic Unit 5, but also in units 1 and 2. In particular, development of energy resources including coal, oil and gas, and uranium is important for local economies.

Study Area Demographics

Population. **Table 3-43** (Study Area Population Totals (1980–2016)) shows that total population increased dramatically in all six study area counties since 1980, with the highest growth rates generally occurring from 1990 to 2000. It should be noted that despite the rapid growth, total population density remains low in the study area.

Population growth in the area is expected to continue over the next few decades, particularly in the current population centers along major travel arteries (**Table 3-44** [Study Area Population Projections (2020–2040)]). In-migration of people from other Colorado regions and throughout the West is the likely source of much of the anticipated population growth. Increasing population will continue to add pressure on area public lands as residents seek recreational activities close to home. Population growth is therefore likely to intensify conflicts between users public land resources.

Table 3-43
Study Area Population Totals (1980–2016)

Location	1980	1990	Percent Change 1980-1990	2000	Percent Change 1990-2000	2010	2016	Percent Change 2000-2016	Percent Change 1980-2016
Delta County	21,225	20,980	-1.15%	27,834	32.7%	30,952	30,442	9.37%	43.43%
Gunnison County	10,689	10,273	-3.89%	13,956	35.9%	15,324	16,408	17.57%	53.50%
Mesa County	81,530	93,145	14.2%	116,255	24.8%	146,723	150,083	29.10%	84.08%
Montrose County	24,323	24,423	0.3%	33,423	36.9%	41,276	41,471	24.08%	70.50%
Ouray County	1,925	2,295	19.2%	3,742	63.0%	4,436	4,857	29.80%	152.31%
San Miguel County	3,192	3,653	14.4%	6,594	80.5%	7,359	8,017	21.58%	151.16%
Colorado	2,889,733	3,294,394	14.0%	4,301,261	30.6%	5,029,196	5,540,545	16.9%	74.0%

Source: Colorado Department of Local Affairs, State Demography Office 2012, 2018
U.S. Census Bureau 2000, 2010a, 2016a

Table 3-44
Study Area Population Projections (2020–2040)

Location	2020	2025	2030	2035	2040
Delta	30,799	33,400	36,137	38,804	41,249
Gunnison	17,189	18,372	19,540	20,682	21,786
Mesa	158,742	172,070	185,258	198,096	210,831
Montrose	45,698	50,982	56,829	62,462	67,846
Ouray	5,053	5,159	5,224	5,287	5,355
San Miguel	9,162	10,538	11,947	13,424	14,926
Colorado	5,945,319	6,434,030	6,912,413	7,370,022	7,802,047

Source: Colorado Department of Local Affairs, State Demography Office 2016

For more detailed population information and data, including tables which describe population density, age of population, and immigration, refer to the Socioeconomic Baseline Assessment Report (BLM 2010j).

Household Characteristics. The number of housing units in the study area has increased since 2000 for all counties, ranging from a 17 percent increase in Delta County to a 49 percent increase for Ouray County. Refer to **Table 3-45** (Study Area Household Characteristics 2000–2016). Housing vacancy rates in the study area are extremely high for some counties. Housing vacancies can represent seasonal homes, those for rent or sale and not occupied, or other. Based on 2012-2016 American Community Survey Census data, the majority of the vacant housing units, including 79 percent in San Miguel, 74 percent in Gunnison, and 66 percent in Ouray counties, are second homes used for seasonal, recreational, or occasional use. In contrast, seasonal properties comprise 48 percent, 36 percent, and 27 percent of vacant units in Delta, Mesa, and Montrose counties, respectively (U.S. Census Bureau 2016a).

Table 3-45
Study Area Household Characteristics 2000–2016

Housing		Delta County	Gunnison County	Mesa County	Montrose County	Ouray County	San Miguel County	State
Total Housing Units	2016[1]	14,482	11,695	64,240	18,474	3,191	6,773	2,339,118
	2010	14,572	11,412	62,644	18,250	3,083	6,638	2,212,898
	2000	12,374	9,135	48,427	14,202	2,146	5,197	1,808,037
Housing Units Percent Change 2000–2016		17.0%	28.0%	36.8%	30.0%	49.0%	30.3%	29.4%
Occupied Housing Units	2016[2]	12,027	6,287	59,501	16,587	2,166	3,258	2,051,616
	2010	12,703	6,596	58,095	16,484	2,022	3,454	1,972,868
	2000	11,058	5,649	45,823	13,043	1,576	3,015	1,658,238
Vacant Housing Units	2016[2]	2,473	5,255	4,718	1,764	1,013	3,448	233,347
	2010	1,869	4,816	4,549	1,766	1,066	3,184	240,030
	2000	1,316	3,486	2,604	1,159	570	2,182	149,799

Source: U.S. Census Bureau 2000, 2010
[1]U.S. Census Bureau 2017f (2016 1-year housing estimates)
[2]U.S. Census Bureau 2016a (2012–2016 American Community Survey 5-Year Estimates)

Between 2000 and 2016, the cost of study area housing increased. Median monthly mortgage costs and gross rent were higher than the state average for Ouray and San Miguel counties, and lower than the state average in all other counties. When housing price was examined as a percent of household income, San Miguel County had the highest estimated percent of owner-occupied households (50.3 percent), where greater than 30 percent of household income was spent on mortgage costs. A large percentage of households also spent more than 30 percent of income on housing in Ouray County (48.3 percent) (U.S. Census Bureau 2016a).

Study Area Employment. Employment can be viewed as a key economic indicator, as patterns of growth and decline in a region's employment are largely driven by economic cycles and local economic activity. Employment patterns are shown for the six study area counties in **Table 3-46** (Study Area Employment Characteristics (2001-2016)).

Table 3-46
Study Area Employment Characteristics (2001-2016)

		County Employment Totals						
Industry	**Year**	**Delta**	**Gunnison**	**Mesa**	**Montrose**	**Ouray**	**San Miguel**	**Colorado**
Farm employment	2001	1,417	300	2016	1295	131	135	46,541
		10.6%	2.6%	2.8%	6.4%	5.6%	1.8%	1,6%
	2016	1,354	284	2,439	1,275	137	141	43,030
		8.9%	2.2%	2.8%	5.6%	4.0%	1.6%	1.2%
Forestry, Fishing, Related Activities	2001	324	70	285	287	NA	NA	8,588
		2.4%	0.6%	0.4%	1.4%	NA	NA	0.3%
	2016	252	NA	395	274	NA	NA	12,108
		1.7%	NA	0.5%	1.2%	NA	NA	0.3%
Mining, including Oil and Gas	2001	549	676	285	154	33	47	22,861
		4.1%	5.9%	0.4%	0.8%	1.3%	0.6%	0.8%
	2016	336	NA	2,980	273	76	NA	57,220
		2.2%	NA	3.4%	1.2%	2.2%	NA	1.6%
Utilities	2001	69	60	228	203	NA	15	8,348
		0.5%	0.5%	0.3%	1.0%	NA	0.2%	0.3%
	2016	52	66	211	NA	NA	15	9,307
		0.3%	0.5%	0.2%	NA	NA	0.2%	0.3%
Construction	2001	1,180	1,464	6,720	2,418	465	1,218	237,197
		8.8%	12.9%	9.5%	11.9%	18%	16.3%	8.1%
	2016	989	1,137	6,004	1,943	343	775	232,695
		6.5%	8.7%	6.9%	8.5%	10.0%	8.8%	6.4%
Manufacturing	2001	637	160	4,117	1,626	85	134	191,867
		4.8%	1.4%	5.8%	8.0%	3.3%	1.8%	6.5%
	2016	665	204	3,275	1,478	124	190	160,448
		4.3%	1.6%	3.8%	6.5%	3.6%	2.2%	4.4%
Wholesale Trade	2001	340	91	2,264	463	23	46	109,116
		2.5%	0.8%	3.2%	2.3%	0.9%	0.6%	3.7%
	2016	221	124	2,900	599	NA	56	125,312
		1.5%	1.0%	3.3%	2.6%	NA	0.6%	3.4%
Retail Trade	2001	1,702	1244	9,492	2556	224	586	306,545
		12.7%	10.9%	13.4%	12.5%	8.7%	7.8%	10.4%
	2016	1,803	1,263	10,360	2,702	266	629	339,114
		11.9%	9.7%	12.0%	11.8%	7.7%	7.1%	9.3%
Transportation and Warehousing	2001	171	160	2,596	614	44	86	84,783
		1.3%	1.4%	3.7%	3.0%	1.7%	1.1%	2.9%
	2016	188	150	2,919	665	39	69	106,414
		1.2%	1.2%	3.4%	2.9%	1.1%	0.%	2.9%
Information	2001	167	120	1,185	243	42	115	118,357
		1.2%	1.1%	1.7%	1.2%	1.6%	1.5%	4.0%
	2016	199	138	859	225	22	84	84,382
		1.3%	1.1%	1.0%	1.0%	0.6%	1.1%	2.3%
Finance and Insurance	2001	420	295	3,083	603	66	214	154,194
		3.1%	2.6%	4.3%	3.0%	2.6%	2.9%	5.2%
	2016	495	366	3,813	705	153	325	203,723
		3.3%	2.8%	4.4%	3.1%	4.4%	3.7%	5.6%

		County Employment Totals						
Industry	**Year**	**Delta**	**Gunnison**	**Mesa**	**Montrose**	**Ouray**	**San Miguel**	**Colorado**
Real Estate and Rental and Leasing	2001	495	772	3,087	949	225	998	134,138
		3.7%	6.8%	4.3%	4.7%	8.7%	13.3%	5.7%
	2016	1,026	1,146	5,462	1,486	374	1,211	213,314
		6.8%	8.8%	6.3%	6.5%	10.9%	13.7%	5.8%
Professional, Scientific, and Technical Services	2001	400	547	3,355	927	147	434	232,179
		3.0%	4.8%	4.7%	4.6%	5.7%	5.8%	7.9%
	2016	660	793	4,135	1,082	300	621	330,341
		4.4%	6.1%	4.8%	4.7%	8.7%	7.0%	9.0%
Management of Companies and Enterprises	2001	42	6	177	24	0	23	19,838
		0.3%	<0.0%	0.2%	0.1%	0.0%	0.3%	0.7%
	2016	80	51	242	164	40	49	42,495
		0.5%	0.4%	0.3%	0.7%	1.2%	0.6%	1.2%
Administrative and Waste Services	2001	582	355	4,148	765	63	305	176,090
		4.4%	3.1%	5.8%	3.8%	2.4%	4.1%	6.0%
	2016	469	415	2,429	854	88	402	205,604
		3.1%	3.2%	4.9%	3.7%	2.6%	4.6%	5.6%
Educational Services	2001	44	201	499	58	NA	63	38,961
		0.3%	1.8%	0.7%	0.3%	NA	0.8%	1.3%
	2016	130	164	969	148	36	179	75,378
		0.9%	1.3%	1.1%	0.6%	1.0%	2.0%	2.1%
Health Care and Social Assistance	2001	992	406	8,036	1,631	NA	150	219,240
		7.4%	3.6%	11.3%	8.0%	NA	2.0%	7.5%
	2016	1,639	452	11,266	2,355	126	305	338,661
		10.8%	3.5%	13.0%	10.3%	3.7%	3.5%	9.3%
Arts, Entertainment, and Recreation	2001	193	726	1,264	268	120	570	71,491
		1.4%	6.4%	1.8%	1.3%	4.6%	7.6%	2.4%
	2016	218	1,080	1,791	404	148	NA	98,223
		1.4%	8.3%	2.1%	1.8%	4.3%	NA	2.7%
Accommodation and Food Services	2001	837	1,703	5,299	1,281	413	1,175	218,283
		6.3%	13.1%	7.5%	6.3%	16%	15.7%	7.4%
	2016	920	1,418	7,031	1,387	536	NA	289,334
		6.1%	11.7%	8.1%	6.1%	15.6%	NA	7.9%
Other Services, except Public Administration	2001	744	783	4,111	1,214	119	448	151,816
		5.6%	6.0%	5.8%	6.0%	4.6%	6.0%	5.2%
	2016	955	676	4,944	1,465	175	610	197,503
		6.3%	5.6%	5.7%	6.4%	5.1%	6.9%	5.4%
Government and Government Enterprises	2001	2,133	1,604	8,457	2,863	295	752	390,666
		16.0%	14.1%	11.9%	14.1%	11.4%	10.0%	13.3%
	2016	2,494	2,168	10,367	3,193	399	829	486,267
		16.5%	16.7%	12.0%	13.9%	11.6%	9.4%	13.3%
Total Employment	2001	13,366	11,392	71,078	20,372	2,587	7,488	2,941,099
	2016	15,135	13,014	86,629	22,909	3,440	8,817	3,607,843

Source: U.S. Department of Commerce, Bureau of Economic Analysis 2001, 2016a
NA – Data not disclosed

Based on these data, government employment, retail services, and construction are major sectors of employment throughout the study area. Accommodation and food services are important sectors in Gunnison, Mesa, and Ouray counties, while real estate (including rental and leasing) is an important

sector in Gunnison, Ouray, and San Miguel counties. Health care is a significant employment sector in Delta, Mesa, and Montrose counties. Trends for employment sectors for 1970 to 2000 based on Standard Industrial Classification data are demonstrated in the *Socioeconomic Baseline Assessment Report* (BLM 2010j). Since the 1970s, service and government jobs have increased for all counties, while the role of agriculture has remained flat or decreased (Headwaters Economics 2017). From 2000 to 2010 similar trends were observed in North American Industry Classification System data (Headwaters Economics 2017).

It should be noted that for some industries average annual wages are higher than others. In the study area, data is not available for all sectors for all counties, and there is some variation between counties; however, highest average annual wages are typically seen in the natural resources extraction, as well as professional and business services. Average wage per job numbers are typically lower in the hospitality sector and in agriculture (Headwaters Economics 2017). See **Table 3-48**, Study Area Average Annual Pay by Industry
(2001-2016).

Income Source. Income is derived from two major sources: 1) labor earnings or income from the workplace; and 2) nonlabor income including dividends, interest, and rent (collectively often referred to as money earned from investments) and transfer payments (payments from governments to individuals; age-related, including Medicare, disability insurance payments, and retirements). Labor income is the main source of income for all study area counties, with the exception of Delta and San Miguel counties (with 52.8 and 50.5 percent nonlabor income, respectively). Nonlabor income from rent, dividends, and other sources provides a significant percent of income for all area counties, with all counties at 40 percent of total income or higher, compared with the state average of 34 percent (**Table 3-47**, Study Area Labor and Nonlabor Income (2015)). The high contribution of nonlabor income in these counties is likely related to high numbers of retirees and contributions from investment income, particularly in the case of Ouray County.

Table 3-47
Study Area Labor and Nonlabor Income (2015)

		Labor Income (net earnings)		Nonlabor Income (including dividends, interest, rent, and personal transfer receipts)	
County	**Personal Income Total (millions of $)**	**Millions of $**	**Percent of Personal Income Total**	**Millions of $**	**Percent of Personal Income Total**
Delta	962	454	47.1	509	52.8
Gunnison	691	385	55.7	306	44.3
Mesa	5,846	3,461	59.2	2,385	40.8
Montrose	1,443	748	52.2	685	47.8
Ouray	251	131	51.9	121	48.1
San Miguel	587	291	49.5	296	50.5
Study Area Total	*9,772*	*5,469*	*56.0*	*4,302*	*44.0*
Colorado	*281,342*	*185,925*	*66.1*	*95,417*	*33.9*

Source: Bureau of Economic Analysis 2015, as reported in Headwater Economics 2017
Percentages do not add to 100 due to adjustments for social security, residence, and other factors.

Table 3-48
Study Area Average Annual Pay by Industry
(2001-2016)

Sector	Year	Delta County	Gunnison County	Mesa County	Montrose County	Ouray County	San Miguel County	Colorado
Total	2001	22,374	23,254	27,426	24,856	23,466	28,010	37,952
	2016	32,765	35,477	40,842	37,630	33,998	39878	54,667
Private	2001	20,806	21,787	26,206	23,380	22,966	27,434	38,214
	2016	29,977	33,121	39,515	35,086	32,874	39,104	54,873
Service Providing	2001	18,232	17,081	24,818	22,225	17,087	24,287	36,834
	2016	27,074	29,306	36,874	33,651	28,666	37,534	53,162
Goods Producing	2001	27,986	34,802	31,614	26,070	33,314	38,051	43,686
	2016	40,241	50,050	51,659	40,150	45,446	48,763	64,044
Natural Resources and Mining	2001	33,882	49,053	30,996	25,570	41,328	33,372	47,033
	2016	42,935	76,506	67,594	38,684	64,069	29,648	81,876
Construction	2001	22,997	25,681	32,066	28,109	34,066	38,632	38,940
	2016	42,315	39,085	49,891	43,276	45,069	52,529	57,344
Manufacturing	2001	25,468	21,977	31,244	24,577	17,847	35,263	47,543
	2016	35,397	27,646	42,509	38,155	28,102	42,641	66,329
Trade, Transportation and Utilities	2001	19,212	19,400	25,330	24,923	16,142	23,452	33,578
	2016	28,574	28,239	36,220	34,278	23,754	32,923	46,603
Information	2001	23,951	23,975	32,873	24,688	28,633	18,901	65,782
	2016	36,979	49,782	45,423	35,586	55,686	35,700	95,511
Financial Activities	2001	27,593	26,066	33,179	26,918	31,234	35,294	48,743
	2016	41,794	39,460	52,816	43,458	38,138	52,672	79,183
Professional and Business Services	2001	19,463	24,164	25,370	26,737	29,733	32,614	46,647
	2016	34,973	55,721	41,625	45,161	58,807	51,117	73,677
Education and Health Services	2001	18,065	20,429	31,383	23,360	23,792	23,746	33,545
	2016	25,101	36,253	45,558	34,272	34,804	43,286	47,774
Leisure and Hospitality	2001	10,817	12,078	10,791	9,664	12,627	20,871	16,043
	2016	14,138	20,210	17,124	17,137	20,779	32,152	23,454
Other Services	2001	18,676	16,869	20,582	22,774	21,755	20,920	25,574
	2016	30,883	27,644	30,566	38,291	34,269	37,980	38,204
Unclassified	2001	18,634	10,920	NA	33,600	NA	29,699	47,535
	2016	64,992*	36,645	22,931	29,151*	NA	17,767	49,518

Source: U.S. Bureau of Labor Statistics 2017a
Note: Not adjusted for inflation; total government employment wage data not available at county level

Unemployment levels in the study area for 2016 ranged from a low of 2.3 percent in Gunnison County to a high of 5.4 percent in Mesa County. In comparison, the Colorado annual unemployment rate in 2016 was 3.3 percent, while the national level was 4.9 percent (U.S. Bureau of Labor Statistics 2017b). Refer to **Table 3-49** (Study Area Unemployment Levels) for additional information, including historical data from 1990 to 2010.

Income Distribution. The study area population represents a wide range of income levels. Among the study area counties, median household income in 2016 was highest in San Miguel County ($67,251) and lowest in Delta County ($41,798) (U.S. Census Bureau 2017a) (see **Table 3-50**, Study Area Income Distribution). Per capita income followed similar trends; the highest per capita personal income was reported in San Miguel County ($75,876) and the lowest in Delta County ($32,318).

Table 3-49
Study Area Unemployment Levels

Year	Delta	Gunnison	Mesa	Montrose	Ouray	San Miguel	State of Colorado
1990	7.1%	7.4%	6.0%	6.4%	9.9%	5.1%	5.2%
1995	5.9%	6.1%	5.3%	5.6%	4.9%	4.0%	4.0%
2000	3.7%	2.8%	3.3%	3.7%	2.6%	3.0%	2.8%
2005	5.0%	3.9%	4.9%	4.7%	3.4%	4.2%	5.0%
2006	4.1%	3.1%	4.0%	4.0%	3.1%	3.4%	4.3%
2007	3.%	2.8%	3.2%	3.6%	2.9%	3.1%	3.7%
2008	4.4%	3.6%	3.9%	5.0%	3.7%	3.9%	4.8%
2009	7.1%	5.4%	8.4%	8.1%	5.6%	5.9%	7.3%
2010	10.7%	6.4%	11.0%	11.0%	9.8%	7.8%	8.7%
2011	10.4%	6.0%	10.3%	11.1%	10.2%	8.0%	8.4%
2012	9.7%	6.0%	9.7%	10.3%	9.4%	7.8%	7.9%
2013	8.9%	5.5%	8.7%	9.4%	7.6%	6.6%	6.8%
2014	7.0%	4.0%	6.2%	6.8%	5.8%	4.7%	5.0%
2015	5.7%	3.0%	5.6%	5.1%	4.3%	3.8%	3.9%
2016	5.0%	2.3%	5.4%	4.2%	3.8%	3.3%	3.3%

Source: U.S. Bureau of Labor Statistics 2017b
Note: Levels are not seasonally adjusted

Table 3-50
Study Area Income Distribution

Income		Delta County	Gunnison County	Mesa County	Montrose County	Ouray County	San Miguel County	Colorado
Median Household Income[1]	2016	$41,798	$53,753	$49,825	$43,285	$66,813	$67,251	$65,718
	2010	$40,288	$47,698	$47,324	$44,002	$54,920	$62,368	$54,411
	2000	$33,356	$37,898	$37,138	$36,303	$43,707	$49,270	$47,505
Per Capita Personal Income[2]	2016	$32,318	$43,473	$39,118	$35,714	$51,100	$75,876	$51,999
	2010	$27,873	$33,162	$33,585	$29,218	$37,732	$46,146	$39,926
	2000	$21,757	$23,869	$25,696	$23,134	$27,255	$37,76	$34,026

Sources: [1]U.S. Census Bureau 2017a
[2]U.S. Department of Commerce, Bureau of Economic Analysis 2016b. Note that per capita personal income was computed using Census Bureau midyear population estimates. Personal income includes all income that persons receive in return for their provision of labor, land, and capital used in current production, as well as other income, such as personal current transfer receipts.
Data not adjusted for inflation

Economic Dependence. To provide policy-relevant information about diverse county conditions to policymakers, public officials, and researchers, the U.S. Department of Agriculture, Economic Research Service has reviewed social and economic data to assess economic dependence at the county level, as well as to identify key policy issues. The 2015 County Typology Codes classify all U.S. counties according to six mutually exclusive categories of economic dependence, including farming, mining, manufacturing, federal/state government, recreation, and nonspecialized counties. The policy categories examined are not mutually exclusive and included low education, low employment, persistent poverty, persistent child poverty, population loss, and retirement destination.

Study area data include an economic dependence on mining (including oil and gas extraction) in Delta and Gunnison counties, and on recreation in Ouray and San Miguel counties (see **Table 3-51**, County Economic Dependence and Policy Type). Typology economic dependence determinations were based on 2010 to 2012 economic data and may not be reflective of current conditions, due to fluctuations in level of mining employment. Policy issues identified at the county level included low employment in Delta County, as identified by less than 65 percent of employment in 2008 to 2012 (5-year average) data. In addition, Mesa and Montrose counties were identified as retirement destinations based on a growth of population over age 60 by 15 percent or more between 2000 and 2010 (U.S. Department of Agriculture, Economic Research Service 2015).

Table 3-51
County Economic Dependence and Policy Type

County	Economic Dependence Type	Key Policy Categories
Delta	Mining	Low Employment
Gunnison	Mining	-
Mesa	Nonspecialized	Retirement Destination
Montrose	Nonspecialized	Retirement Destination
Ouray	Recreation	-
San Miguel	Recreation	-

Source: U.S. Department of Agriculture, Economic Research Service 2015

Local Economic Activity Affected by Public Land Uses

Local economies realize direct and indirect contributions from expenditures and revenues generated by a variety of activities in the Decision Area. Activities that tend to have the greatest local economic influence include recreation, mining and energy resource development, and livestock grazing. BLM-administered lands in the UFO cover approximately 2.4 percent of total land area in the six county study area. Activities that are directly and indirectly impacted by BLM management decisions are discussed in the sections below.

Activities Directly Impacted by UFO BLM Management. The BLM collects revenues from recreational and commercial activities, and portions of these revenues are redirected back to the state and county governments. These revenues are collected from facilities, such as fees from campgrounds, from BLM recreation permits (special, competitive, organized group activity, and event use permits), mining leases and mineral revenues, grazing fees, and timber sales. Revenues collected in the UFO in recent fiscal years are listed in **Table 3-52** (UFO Receipts).

Table 3-52
UFO Receipts

Resource	Total
Recreation fees (Fiscal Year 2017)	$58,408
Grazing Fees (Fiscal Year 2016)	$44,662
Right-of-way (Fiscal Year 2017)	$106,619
Salable Mineral Materials (Fiscal Year 2017)	$1,014
Forestry (Fiscal Year 2017)	$5,856

Source: BLM 2017f

Revenues collected from royalty payments for oil and gas and minerals extraction also represent a significant source of revenue, with over $1.7 million directly distributed to Planning Area counties and

communities in 2016 (Colorado Department of Local Affairs, Division of Local Government 2016). Details of royalty distribution are provided below.

Nonmarket Values. Some of the most important socioeconomic factors associated with BLM-administered lands in the Planning Area are the nonmarket values offered by public lands management. Nonmarket values are the benefits derived by society from the uses or experiences that are not dispensed through markets and do not require payment. These values include unique and sensitive natural and cultural resources on public land. These values enhance the quality of life and enjoyment of place, thereby improving regional and local economic conditions. Proximity to undeveloped natural lands and the resources they harbor, including scenic vistas and recreational and wildlife viewing opportunities, add nonmarket value to the area.

Some general consensus had been established that certain areas set aside for protection, such as ACECs and other special management (such as managing areas as VRM Class I), would further maintain and perhaps enhance the nonmarket values associated with natural amenities protected on these lands. In particular, wilderness has been correlated with rapid population, income, and employment growth in those counties compared with nonwilderness counties. Services jobs are increasingly mobile, and many entrepreneurs locate their businesses in areas with a high quality of life (Lorah and Southwick 2003). In addition, wilderness has been linked with increased local property values (Phillips 2004). It appears that other special protection areas, such as ACECs, lands managed to protect wilderness characteristics, and VRM Class I areas, could also attract new residents and tourists to the area, which would then contribute to area economic activity. In some cases, land protection directly reduces employment growth; however, it has been shown that natural amenities can offset job losses due to increases in net migration (Eichman et al. 2010). Natural amenities and quality of life have been increasingly recognized as important factors in the economic prospects of many rural communities in the West (Rudzitis and Johnson 2000). In addition, nonlabor income is intimately tied to natural amenities. Rural county population change, the development of rural recreation, and retirement-destination areas are all related to natural amenities (McGranahan 1999). Some studies indicate that the importance of nonmarket values of federal lands are increasing in the West as the role of resource extraction decreases. Rasker and others (2004) found that only 3 percent of western counties were classified as resource-extraction driven.

Nonmarket values of open space and well-managed natural resources also include a broad range of human benefits resulting from healthy ecosystem conditions and functions. Ecosystem services are the benefits that people receive from appropriate structure and function of ecosystems and are often categorized as provisioning (such as food and water), regulating (such as climate, disease regulation, and fire regime), cultural (such as viewsheds and spiritual), and supporting (such as soil formation) (Millennium Ecosystem Assessment 2003). Some ecosystem services may involve market goods, such as timber and forage, as discussed above under the Market and Commodity Values discussion below, while others such as water quality, carbon sequestration, and aesthetics/amenity values, reflect nonmarket values (BLM 2013f).

Market and Commodity Values. Market and commodity values include economic contributions to the local economy from recreational visitors, mineral and energy development, and livestock ranching. Summaries of contributions are included below, additional details are provided in the *Socioeconomic Baseline Assessment Report* (BLM 2010j).

Recreational Use. Planning Area public lands provide recreational opportunities for both local residents and tourists from outside the area, and these recreational opportunities represent an important contribution. Trends in visitation and use are included in Section 3.2.4 (Recreation and Visitor Services). In terms of economic activity, recreation generates additional spending in the local economy that in-turn

supports jobs and income. Economic stimulus occurs as non-residents to the area spend money in the local economy, which may also generate additional spending by local residents. Impacts from recreation on BLM-administered land at the state level were estimated at $590.8 million in 2016 (BLM 2017g). Recreation provides local economic contributions directly through the purchase of access fees, special use permits, fishing and hunting licenses, and the services of local guides and outfitters, and indirectly through the purchase of commodities, such as gasoline, accommodations, and food and beverage. Employment in recreation and tourism is not collected as a separate industry category; therefore, data on jobs generated are estimates only. Jobs are generally reflected in the art, entertainment and recreation, accommodation services, transportation, and retail trade sectors. Together, those industries account for approximately 20 percent of the jobs in the study area, ranging from a high of 54 percent of jobs in San Miguel County to 13 percent in Delta County (Headwaters Economics 2017). It should be noted that not all of this employment is related to travel and recreation and that other industrial sectors may also contribute jobs. Furthermore, some of this employment is likely related to the other federal lands in the area, notably National Forest System lands, although the BLM contribution to employment is expected to be significant.

Specific recreational activities on BLM-administered lands may have unique social and economic contributions. Hunting and fishing attract visitors to area counties, and some of those visitors will hunt and fish on BLM-administered land. It is estimated that hunting and fishing represented 208,174 and 14,431 visitor days, respectively, in the UFO in fiscal year 2017 (**Table 3-34**, Visitor Use on BLM-Administered Lands, in Section 3.2.4, Recreation). CPW collects data on hunting and fishing at the state and county levels. Economic impacts from hunting on Planning Area counties are included in **Table 3-53** (Hunting Economic Impacts in Planning Area Counties, 2013), based on a 2013 study (Southwick and Associates 2013a). Impacts from fishing are not available by county, but for the southwest region of Colorado, which includes the Planning Area, total economic impacts from fishing were estimated at $110 million dollars, employment income at $37 million, and jobs supported at 1,119 (Southwick and Associates 2013a).

Wildlife watching is an activity on BLM-administered lands that also has a regional economic impact. According to 2013 data, wildlife watching in the southwest region of Colorado supported a total of $213 million in total economic output, $69 million in employment income, and 2,135 jobs (Southwick and Associates 2013a).

Not all of these impacts are related to use of BLM-administered lands because they include hunting and fishing on other federal and state lands; therefore, impacts may be overvalued. However, these represent just a few of the activities that recreationists may participate in on BLM-administered lands.

Table 3-53
Hunting Economic Impacts in Planning Area Counties, 2013

County	Economic Output	Employment Income	Jobs Supported
Delta	$7,303,000	$2,630,000	171
Gunnison	$17,041,000	$5,960,000	277
Mesa	$33,688,000	$12,468,000	484
Montrose	$12,021,000	$4,621,000	218
Ouray	$2,644,000	$918,000	55
San Miguel	$4,637,000	$1,926,000	63

Source: Southwick and Associates 2013a

Public comments on the Draft RMP/EIS noted the importance of recreational shooting in the Planning Area for some individuals. In Colorado as a whole, it is estimated that recreational target shooting in 2010 had approximately 364,699 participants, with a total of 7.2 million days. The national average for annual spending by a recreational target shooter was estimated at $543 in 2017 (Southwick and Associates 2013b). Target shooting may also represent an activity with important social components. Participants in the sport relaxation, social and family connections, and physical benefits as some reasons for pursuit of the sport (Yamane 2017).

Mineral and Energy Resources. The BLM manages all facets of environmental review and leasing on over 2.2 million acres of federal mineral estate within the Planning Area. Mineral resources are discussed in detail in **Section 3.2.3** (Energy and Minerals). The economic contributions of different categories of resources in the UFO are examined briefly below and in depth in the *Socioeconomic Baseline Assessment* Report (BLM 2010j).

- Leasable Minerals – Oil, Gas, and Coal. The UFO currently manages several federal coal leases related to one currently active coal mine known as the West Elk Mine located in the North Fork Valley near Paonia in an area known as the Somerset coal field. Employment for this mine totaled an average of 231 miners in 2016 and 2017 (Colorado Department of Natural Resources 2017a). A second mine in the area, Bowie # 2, closed in July 2016, employing an average of 105 miners in January and February 2016, and between 105 to 110 workers for the reminder of the year. A third mine, the Elk Creek Mine, ceased production in December 2012 and employs two people. See **Table 3-54**, Study Area Coal **Mine Summary**.

  A fourth previously active mine within the Planning Area, the New Horizon Mine located near Nucla, strip mined coal from privately owned mineral estate for use at the local power plant. Annual production from the New Horizon Mine in 2016 was 187,983 tons, and the mine provided employment for 21 people (Colorado Department of Natural Resources 2017a). The New Horizon Mine ceased production in March 2017 when it produced its final 8,773 tons and entered into the reclamation phase.

  In total for Colorado, economic contributions were $4,682.3 million from all energy development of BLM-administered resources (all federal mineral estate) in 2016. For the State, the largest contributions were from oil and gas ($3,547.1 million total impacts) and coal ($1,126.7 million total impacts) (BLM 2017g).

  County employment figures indicate for oil, gas, and coal extraction are included in the employment for mining industries category. This category varies from 3.4 percent in Mesa County to 1.2 percent in Montrose County (U.S. Department of Commerce, Bureau of Economic Analysis 2016a). Estimates can also be made for the economic contributions based on the production of levels reported.

  Coal production contributions for the UFO area BLM mines (West Elk and Bowie #2) in 2016, for a total production of 4,191,739 tons at the average Colorado price of $35.69 per ton, are estimated at $149,603,165 (U.S. Energy Information Administration 2016b).

Gunnison, Mesa, and San Miguel counties accounted for the majority of the natural gas produced and sold in the area in recent years (Gunnison with 4,309,611 thousand cubic feet produced in 2017, Mesa with 36,733,642 thousand cubic feet, and San Miguel with 1,408,583 thousand cubic feet produced; Colorado Oil and Gas Conservation Commission 2017). At a price of $3.83 per thousand cubic feet (U.S. Energy Information Administration 2018a), annual gas sales could represent total sales of more than $16.5 million in Gunnison, $140.7 million in Mesa, and $5.4 million in San Miguel counties, although

Table 3-54
Study Area Coal Mine Summary

County	Coal Field	Company Name	Mine Name	Technique	Yearly Coal Production (tons)		Average Number of Miners Employed	
					2016	2017 (Jan-Oct)	2016	2017 (Jan-Oct)
Delta	Somerset	Bowie Resources, LLC	Bowie No. 2	longwall (subsurface)	33,395[1]	0	47[1]	0
Gunnison	Somerset	Mountain Coal Company	West Elk	longwall (subsurface)	4,158,344	4,080,201	231	231
Montrose	Nucla-Naturita	Western Fuels Colorado, LLC.	New Horizon Mine	surface	187,983	31,229[2]	21	20[2]

Source: Colorado Department of Natural Resources 2017b
Note: No mines are in Ouray or San Miguel counties.
[1]The Bowie No. 2 Mine was active in January and February 2016, employing approximately 106 miners during these months, but was idle the reminder of the year, employing between 104 and 110 workers.
[2]The New Horizon Mine was active in January through March 2017, employing an average of 20 employees during producing and idle periods. This mine extracted coal from privately owned mineral estate.

much of this money would not be retained in the Planning Area counties. It should be noted that these counties are located only partially within the Planning Area; therefore, some of the reported production may occur outside of the Planning Area. Additionally, costs of drilling vary across the Planning Area based on technique used, and resource potential would impact net receipts.

According to Headwaters Economics (2017) data, oil and gas extraction for the six socioeconomic study area counties examined, including both drilling and support, accounted for an estimated 2,944 out of 82,702 jobs in the mining sector in 2016 (3.6 percent of total area private employment). Mesa County represents most of employment in the industry, with approximately 2,855 jobs. A total of 5.6 percent of total private employment in Mesa County is related to the oil and gas extraction industry. Jobs in Mesa County are likely to support oil and gas extraction activities occurring throughout western Colorado and are not limited to activities occurring within the Decision Area. When Mesa County is excluded, the socioeconomic study area counties support only 59 jobs in oil and gas extraction, approximately 0.3 percent of total private employment (Headwaters Economics 2017).

- Locatable Minerals. The Planning Area contains a portion of the Uravan Mineral Belt, which historically had high levels of uranium-vanadium mining. No major ore production was reported in Colorado in 2016 (U.S. Energy Information Administration 2017a). The proposed Pinon Ridge uranium processing mill received a license from the Colorado Department of Public Health and Environment in 2011, although the license was subsequently put on hold for appeal hearings before being reinstated in 2013. The mill is currently licensed and permitted, but development is on hold at least in part based on the current uranium prices (Durango Herald 2013). The timeline for future development is unknown. Should the mine be developed, it would likely increase demand for uranium mining and result in increased economic impacts. A 2010 analysis had suggested that mill would support over 300 direct, indirect, and induced jobs in construction, and between 500 to 600 jobs in mill operations (Economic and Planning Systems 2010).

Many residents of Montrose County's West End had viewed the mill in a positive light with its promise of jobs. But in the eastern part of San Miguel County, the mill proposal has resulted in opposition among residents who fear it could do irreparable harm to the health of the region's environment.

- Saleable Minerals. Sand and gravel deposits located throughout the Planning Area are primarily extracted for use as road base. These permits are generally issued as free use permit for local municipalities. In the UFO, approximately 67 moss rock permits were issued in fiscal year 2017, generating a total of $1,014 in receipts (BLM 2017g).
- Renewable Energy. The study area contains potential resources for renewable energy production including geothermal, solar, wind, and biomass (BLM 2010g). There is some potential that geothermal and solar resources will be developed on a commercial scale in the next 20 years.

Tax Revenue. Tax revenue from utilization of public lands in the Planning Area primarily results from coal extraction and oil and gas production. Two primary sources exist; the Colorado state severance tax and the state's share of federal mineral lease royalties.

Colorado Severance Tax is a tax imposed upon nonrenewable natural resources that are removed from the earth. Taxes are imposed on gross revenue from production. The calculation includes a deduction of processing and manufacturing costs, as well as a property tax credit (up to 87.5 percent of the property taxes paid on assessed value of oil and gas produced). The severance tax is graduated, ranging from 2 percent of gross revenue for income under $25,000 to 5 percent for income of $300,000 and over. Very small operations are exempt. Severance tax revenues are distributed with 50 percent to the Colorado Department of Natural Resources to fund water conservation, wildlife, and environmental programs and the remaining 50 percent to Local Impact Fund Department of Local Affairs. Of the amount that goes to the Local Impact Fund Department of Local Affairs, 70 percent goes to local government projects and 30 percent is directly distributed to local communities. The direct payments from Department of Local Affairs to Colorado communities are often used to offset the impacts of drilling on roads, schools and public services. Revenue received in direct distributions to area counties is shown in **Table 3-55**, Study Area Severance Tax Distribution (2016); note that additional funds are distributed to local communities.

Table 3-55
Study Area Severance Tax Distribution (2016)

County	Total
Delta County	$ 164,718
Gunnison County	$ 235,050
Mesa County	$490,462
Montrose County	$ 174,539
Ouray County	$ 68,095
San Miguel County	$ 122,013

Source: Colorado Department of Local Affairs, Division of Local Government 2016

Royalties to the State and county provide an additional economic contributions from mineral resource extraction. Federal mineral lease revenues are collected by the Office of Natural Resources Revenue of the Department of the Interior. Lease holders competitively bid and initially pay a "bonus" to use the land. Lease holders also pay rent for the right to develop mineral production on those lands. Finally, when minerals are extracted and sold, the federal government receives a royalty from the production from federal mineral estate at a rate of 12.5 percent based on the current on-shore federal royalty rate. Approximately 50 percent of the revenues are transferred to the Colorado State Treasurer. In Fiscal

Year 2016, Colorado received $83.9 million in royalties and rents distributed by the federal government from energy and mineral production on all state federal lands (Office of Natural Resources Revenue 2016). In turn, about 40 percent of federal royalties received by the state are then distributed to cities, and counties through the Department of Local Affairs direct and grant distributions based on Senate Bill 08-218.

Two factors determine the allocation of federal mineral lease revenue to each county pool for further distribution: 1) The proportion of residents in the county employed in mineral extraction to the total employed statewide, and 2) The proportion of the moneys credited to the mineral leasing fund generated in the county to the total generated statewide (Colorado Department of Local Affairs, Division of Local Government 2009). The contribution of federal mineral extraction directly to study area communities is shown in the distribution of federal mineral lease revenues to study area counties and select municipalities (**Table 3-56**, Study Area Federal Mineral Lease Revenue Distribution (Fiscal Year 2016)). Additional funds (1.7 percent) are distributed directly to area school districts. In Gunnison County, although much of the County is outside the field office boundaries, the large majority of mineral lease revenue is from the area within the UFO. In Mesa County, however, much of the mineral lease revenue is associated with lands outside of the UFO.

Table 3-56
Study Area Federal Mineral Lease Revenue Distribution (Fiscal Year 2016)

County/Municipality	Total
Delta County	$ 247,858
City of Delta	$ 72,823
Town of Paonia	$ 22,476
Town of Hotchkiss	$ 15,418
Town of Cedaredge	$ 18,647
Town of Crawford	$ 4,407
Gunnison County	$ 393,773
Mesa County	$809,829
Montrose County	$ 33,754
City of Montrose	$ 14,246
Town of Nucla	$ 2,025
Town of Naturita	$ 1,613
Town of Olathe	$ 1,184
Ouray County	$410
City of Ouray	$38
Town of Ridgway	$39
San Miguel County	$ 64,003
Town of Telluride	$ 10,067
Town of Norwood	$ 9,780
Town of Sawpit	$171
Town of Ophir	$797
Total	**$1,723,358**

Source: Colorado Department of Local Affairs, Division of Local Government 2016

An additional source of taxes for study area governments is ad valorum taxes. Ad valorum taxes are levied based on the assessed value of property. The assessed or taxable values for most properties are

established on a county basis by the appropriate County Assessor and property is taxed at fair market value.

Taxable real property classified as residential, commercial, industrial, agricultural, and vacant land. Assessment includes real property associated with oil and gas wells. Property taxes are determined by multiplying the assessed (taxable) value of the property by the tax rate. The tax rates are set by local government entities and vary by location. Since 2003, the residential assessment rate is 7.96 percent of assessed value. In contrast, the assessment rate for most classes of non-residential property is fixed at 29 percent. Total assessed value and property tax revenue is provided by County below in **Table 3-57** (Study Area Property Assessed Value and Revenue (2016)).

Table 3-57
Study Area Property Assessed Value and Revenue (2016)

County	Assessed Property Value	Revenue
Delta County	$312,185,665	$17,786,583
Gunnison County	$593,082,760	$37,302,578
Mesa County	$1,845,476,330	$113,199,946
Montrose County	$517,401,420	$34,528,661
Ouray County	$157,493,940	$8,649,761
San Miguel County	$791,030,770	$34,795,276

Source: Colorado Department of Local Affairs, Division of Property Taxation 2016

In 2016, Colorado as a whole showed a decrease in assessed value in four classes of property: vacant (-0.6 percent), producing mines (-0.1 percent), oil and gas (-5.0 percent), and natural resources (-0.03 percent). The remaining classes of property showed an increase in 2016, with the largest percentage increase in the residential and commercial classes of property (Colorado Department of Local Affairs, Division of Property Taxation 2016).

The taxable value of real property associated with oil and gas wells is calculated as a percentage of the revenue obtained for the product at the wellhead during the prior year. This makes oil and gas among the most volatile of property classes because the market prices of natural gas and crude oil can change considerably from year to year. At a statewide level, Colorado experienced a decrease of 38.2 percent in the total assessed value of the oil and gas class between 2015 and 2016. In oil and gas producing counties in the socioeconomic Planning Area (including Delta, Gunnison, Mesa, and San Miguel counties), decreases were more moderate, ranging from a decrease of 3.0 percent in Gunnison County to less than 1 percent change in Delta and San Miguel counties (Colorado Department of Local Affairs, Division of Property Taxation 2016).

The Colorado property tax system provides revenue exclusively for local government services. The largest share of property tax revenue (47.9 percent) goes to support the state's public schools. County governments claim the next largest share (28.5 percent), followed by special districts (17.9 percent), municipal governments (4.6 percent), and junior colleges (1.1 percent) (Colorado Department of Local Affairs, Division of Property Taxation 2016).

The state sales tax rate in Colorado is 2.9 percent. City and county local taxes vary. These local taxes would be in addition to the 2.9 percent state sales tax rate (Colorado Department of revenue 2013). Additional county taxes applied include the following: Delta 2.0 percent, Gunnison 1.0 percent, Mesa 2.0 percent, Montrose 1.75 percent, Ouray 2.0 percent, and 1.0 percent in San Miguel County. Additional local taxes are added based on municipality.

Agriculture and Livestock Grazing. Agriculture represents a traditional source of employment in the Planning Area. Based on 2016 employment numbers, the percentage of jobs in the agricultural industry ranges from a low of 1.6 percent in San Miguel County to a high of 8.9 percent in Delta County (U.S. Department of Commerce, Bureau of Economic Analysis 2016a).

A summary of agricultural statistics by county is shown in **Table 3-58**, County Agricultural Data (2012). These numbers include all agricultural activity, including farming and ranching on private and BLM-administered lands.

Table 3-58
County Agricultural Data (2012)

Data	Delta	Gunnison	Mesa	Montrose	Ouray	San Miguel	Colorado
Number of Farms	1,250	244	2,264	1,128	108	135	36,180
Acreage in Farms	250,761	190,243	386,932	329,653	81,321	126,539	31,886,676
Sheep and Lamb Inventory	13,611	NA	22,547	15,433	0	285	401,376
Cattle and Calf Inventory	33,208	17,526	42,376	56,083	5,786	6,891	2,630,083
Market Value of all Agricultural Products Sold ($1,000)	$55,639	$12,986	$84,582	$103,221	$4,274	$4,737	$7,780,874
Livestock, Poultry and their Products ($1,000)	$32,056	$11,193	$43,930	$69,521	$3,567	$4,204	$2,434,583
Crops including Nursery and Greenhouse Crops ($1,000)	$23,582	$1,793	$40,652	$33,700	$707	$533	$5,346,292

Source: USDA NASS 2014
NA – not disclosed for proprietary reasons

Impacts on local communities might be greater, as agriculture represents a traditional livelihood and plays an important role in the sense of place and history of these communities. For example, the North Fork Valley represents a region where traditional agricultural uses have maintained importance due to the presence of organic and conventional small-scale farms, orchards, and wineries. Delta County is home to the highest concentration of organic farms of any Colorado county, with 29 certified organic farms as of the most recent agricultural census (U.S. Department of Agriculture, National Agricultural Statistical Service 2012). Delta County also supports the West Elk American Viniculture Area. Additionally, the area provides opportunities for agritourism, including visits to farms and orchards to pick produce or view operations (U.S. Department of Agriculture, National Agricultural Statistical Service 2012). Based on the 2012 agricultural census, Delta County had contributions of $2,827,000 from farm-related sources, including $293,000 from agritourism operations (U.S. Department of Agriculture, National Agricultural Statistical Service 2012). Based on one report, roughly 15,000 annual agritourism visitors come to the North Fork Valley, resulting in an estimated $228,750 annually in state and local taxes as calculated based on Colorado Tourism Office estimates of $15.25 in local and state tax revenue per visitor (Citizens for a Healthy Community 2017).

Livestock grazing on public land continues to be important to local economies within the UFO. In the Planning Area, 619,500 acres (92 percent) of BLM-administered land are open for livestock grazing. The UFO currently has approximately 120 authorized permittees. From 2012 to 2016, billed use averaged 52

percent of total permitted use. Between 2006 and 2016, billed use has averaged 60 percent of total permitted use (BLM 2017). The BLM-administered range in the Planning Area is permitted at a level of 35,519 active AUMs and 4,152 AUMs of suspended use. The BLM calculates federal grazing fees annually in March based on a formula that is calculated using the 1966 base value of $1.23 per AUM for livestock grazing on public lands in western states. Annual adjustments are based on three factors: current private grazing land lease rates, beef cattle prices, and the cost of livestock production. The federal grazing fee for 2017 was $1.87 per AUM, down from $2.11 in 2016 (BLM and Forest Service 2017). The grazing fee formula was established by the Public Rangelands Improvement Act of 1978.

Generally, there is a correlation between ranch land values and federal grazing permits, with ranches that hold such permits having a higher value. This value is based on the premise that the permit's value reflects, at least to some extent, the capitalized difference between the grazing fee and the competitive market value of federal forage. The permit value is also based on access to additional forage and the capacity to raise more livestock than on the private base property alone. It also reflects the requirement for the permittee to hold private base property to which the federal permitted use is attached, giving the base property holder priority for renewal over other potential applicants. This value is recognized by lending institutions during a loan process and by the Internal Revenue Service when a property transfer occurs.

Permit values fluctuate based on market forces but generally depend on the number of AUMs and other terms of the lease or permit. Permit values may vary widely, depending on the location and the estimated average value of replacement forage. Grazing fees on public lands compared to equivalent fees on private lands represent one component of permit values. In 2016, the average fee per AUM on private lands in Colorado was estimated at $17.50 (U.S. Department of Agriculture, National Agricultural Statistical Service 2017). It should be noted, however, that additional "non-fee" costs (supplementary costs incurred by the lessee to utilize the leased forage) are also incurred by lessees. Non-fee costs associated with factors such as required upkeep on range improvements (e.g., fences, ponds, catchments, and springs), loss of animals, and transportation are often higher on public lands and not accounted for in this comparison (Rimby and Torell 2011; Tassel et al. 1997).

Payments in Lieu of Taxes. PILT are federal payments to local governments that help offset losses in property taxes due to nontaxable federal lands within their boundaries. Congress appropriates PILT annually, and the BLM administers disbursement to individual counties. PILT are determined according to a formula that includes population, the amount of federal land within the county, and offsets for certain federal payments to counties, such as timber, mineral leasing, and grazing receipts. PILT payments are transferred to state or local governments, as applicable, and are in addition to other federal revenues, including those from grazing fees. The study area counties received over $8.9 million in PILT in 2017 (**Table 3-59** [Study Area PILT (Fiscal Year 2017)]). It should be noted that this figure includes PILT for all federal lands in study area counties, including lands managed by other agencies and other BLM field offices.

Table 3-59
Study Area PILT (Fiscal Year 2017)

Location	PILT Amount*
Delta County	$709,603
Gunnison County	$790,000
Mesa County	$3,461,667
Montrose County	$2,457,786
Ouray County	$403,670
San Miguel County	$1,074,459

Location	PILT Amount*
Study Area Total	$8,897,185
Colorado	$35,618,440

*Includes payments for all federal lands in the county and is not limited to the Planning Area
Source: DOI 2017

3.4.4 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, states "each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations…". Executive Order 12898 also applies to federally recognized Tribes; therefore, it is important to determine whether any Tribes are present in the area, have treaty or reserved rights for lands and resources in the Planning Area, or have traditional cultural and historical use ties to lands and resources in the Planning Area.

The purpose of Executive Order 12898 is to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, or Native American tribes that may experience common conditions of environmental exposure or effects associated with a plan or project. It is important to note that minority populations, low-income populations, or tribes may experience common effects from a project even if they do not reside in the immediate study area. Executive Order 12898 requires federal agencies to ensure opportunities for effective public participation by potentially affected low-income populations, minority populations, or tribes. These populations are considered to be potential "environmental justice populations" of concern that should be addressed throughout the planning effort.

Minority populations as defined by Council on Environmental Quality guidance under the National Environmental Policy Act (Council on Environmental Quality 1997) include individuals in the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population is identified where "(a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater" (Council on Environmental Quality 1997). Additionally, "[a] minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds" (Council on Environmental Quality 1997). Total minority population refers to that part of the total population which is not classified as Non-Hispanic White Only by the U.S. Census Bureau. By using this definition of minority population, the percentage is inclusive of Hispanics and multiple race categories and any other minority single race categories. This definition is most inclusive of populations that may be considered as a minority population under Executive Order 12898.

Low-income populations are determined by the U.S. Census Bureau based upon poverty thresholds developed every year. Poverty thresholds are set by the U.S. Census Bureau. The Council on Environmental Quality guidance does not provide specific criteria for determining low-income populations as it does for minority populations, so for this planning effort, the BLM used the same criteria as is being used for minority populations (50 percent or greater of the population or a population that is "meaningfully greater" than a reference population). The BLM identifies low-income population and minority population percentages that are "meaningfully greater" as at least five percentage points higher than for the State of Colorado.

For this planning effort, the identification of environmental justice populations is primarily conducted at the county level due to the large geographic area, the rural nature of the geographic area, and the availability of data. Additionally, the focus at the county level is appropriate because management actions proposed across the alternatives are planning-level decisions rather than implementation decisions. At the county level, minority populations are identified using the U.S. Census Bureau Population Estimates Program, which provides the official annual estimates for the resident population by age, sex, race, and Hispanic origin at the national, state, and county scales. Data for the identification of low-income populations is from the U.S. Census Bureau, Small Area Income and Poverty Estimates. This program annually produces single-year poverty estimates for states, counties, and school districts. The U.S. Census Bureau suggests using Small Area Income and Poverty Estimates data for poverty estimates for counties or school districts, especially for areas with populations of 65,000 or less (U.S. Census Bureau 2016b). Estimates from Small Area Income and Poverty Estimates and the Population Estimates program are used in federal funding allocations.

Minority and poverty information is also available from the U.S. Census Bureau American Community Survey data; however, due to the smaller populations in many of the study area counties (less than 20,000 residents), data would only be available from the 2012 to 2016 American Community Survey 5-year period estimates. Because the Small Area Income and Poverty Estimates and Population Estimates Program data are the most current data, these data are being used to identify if any low-income populations or minority populations at the county level meet the criteria to be considered as environmental justice populations. Estimates from these data sources for Colorado are provided as well for comparison.

Although the focus for identifying environmental justice populations is at the county level for the reasons described above, the BLM is providing community level information to indicate that even if environmental justice populations are not identified at the county level, there could be populations identified if examined at a smaller geographic scale. At the community level, low-income and minority characteristics are provided based upon the 2012 to 2016 American Community Survey 5-year period estimates for the communities of interest, as well as for Colorado as whole for comparison. It should be noted that the American Community Survey 5-year period estimates should not be compared against the other data sets discussed (e.g., the Small Area Income and Poverty Estimates and Population Estimates Program data).

Current Conditions and Trends

Low-income Populations

The study area is characterized by a range of individuals in poverty, as demonstrated in **Table 3-60** (Poverty and Minority Percentages for 2016 by County), and **Table 3-61** (Study Area Key Community Poverty and Minority Information, American Community Survey 2012-2016 5-year Estimates). Based on U.S. Census Bureau Population Estimates Program data for 2016, 11.0 percent of the Colorado population was in poverty. In comparison, 17.8 percent of Delta County residents and 16.4 percent of Montrose County residents were in poverty in 2016, indicating that these populations meet the meaningfully greater criteria to be considered environmental justice populations. None of the other study area counties had low-income populations that met the criteria to be considered environmental justice populations. In fact, Ouray and San Miguel counties had lower percentages of their residents in poverty than the state as a whole in 2016 (**Table 3-60**, Poverty and Minority Percentages for 2016 by County).

Table 3-60
Poverty and Minority Percentages for 2016 by County

Area	Percent Poverty, All Ages[1]	Race Alone[2]							
		Percent White	Percent Black or African American	Percent American Indian and Alaska Native	Percent Asian	Percent Native Hawaiian and Other Pacific Islander	Percent Two or more races[2]	Percent Hispanic[2]	Percent Total Minority
Colorado	11.0	87.5	4.5	1.6	3.3	0.2	3.0	21.3	31.4
Delta County	17.8	94.8	0.8	1.4	0.9	0.1	2.0	15.2	18.8
Gunnison County	13.8	94.3	0.7	2.4	0.8	0.1	1.9	8.9	12.3
Mesa County	15.0	94.1	0.9	1.5	0.9	0.1	2.3	14.4	18.3
Montrose County	16.4	94.2	0.8	1.8	0.9	0.3	2.0	20.4	23.8
Ouray County	8.8	96.6	0.1	0.7	0.6	0.1	1.8	6.2	8.9
San Miguel County	10.1	95.1	0.8	1.3	0.9	0.1	1.8	10.7	14.1

Source: [1]U.S. Census Bureau 2017a
[2]U.S. Census Bureau 2017b

Table 3-61
Study Area Key Community Poverty and Minority Information, American Community Survey 2012-2016 5-year Estimates

		Colorado	Cedaredge	Crawford	Delta	Hotchkiss	Montrose	Naturita	Norwood	Nucla	Olathe	Paonia	Telluride
Percentage Poverty[1]		12.2	27.8	20.1	17.4	19.9	20.9	16.9	18.1	26.7	35.9	13.8	12.0
Race Alone[2]	Percentage White	84.3	96.9	97.5	92.5	94.2	91.6	99.5	100.0	95.0	98.6	92.0	94.7
	Percentage Black or African American	4.1	0.5	0.0	0.5	0.0	0.3	0.0	0.0	0.0	0.4	0.0	0.0
	Percentage American Indian and Alaska Native	0.9	0.0	1.8	0.0	1.3	1.3	0.0	0.0	0.6	0.9	4.4	0.0
	Percentage Asian	2.9	0.4	0.0	1.0	0.0	0.7	0.0	0.0	0.0	0.0	0.1	3.0
	Percentage Native Hawaiian and Other Pacific Islander	0.1	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0
	Percentage Other Race	4.2	0.4	0.0	4.5	1.0	3.7	0.5	0.0	0.0	0.0	1.3	0.0
Percentage Two or More Races[2]		3.4	1.9	0.7	1.5	3.4	1.5	0.0	0.0	4.4	0.2	2.2	2.3
Percentage Hispanic[3]		21.1	15.2	4.3	20.4	10.8	23.5	5.0	5.1	9.6	57.9	9.2	17.7
Percentage Total Minority		31.0	17.5	6.8	23.0	12.4	26.6	5.0	5.1	13.1	58.1	17.2	20.5

Source: [1]U.S. Census Bureau 2017c
[2]U.S. Census Bureau 2017d
[3]U.S. Census Bureau 2017e

When looking at the community level American Community Survey 2012-2016 5-year time period data (**Table 3-61**, Study Area Key Community Poverty and Minority Information, American Community Survey 2012-2016 5-year Estimates), only Naturita, Paonia, and Telluride had percentages of residents in poverty that did not meet the meaningfully greater criteria to be considered environmental justice populations. All other study area key communities had populations of residents in poverty that would be considered environmental justice populations.

Minority Populations

The study area counties, in general, have less minority diversity than Colorado as a whole, as indicated in **Table 3-60** (Poverty and Minority Percentages for 2016 by County). The percent of the population in Colorado that falls within the total minority category was 31.4 percent in 2016. Montrose County had the highest percentage of the population in the total minority category (23.8 percent) in 2016, whereas Ouray County had the lowest percentage (8.9 percent). The remaining study area counties had percentages of the population in the total minority category that ranged from 8.9 to 18.8 percent in 2016. Residents of Hispanic or Latin origin (of any race) in 2016 were the largest minority group across all of the study area counties, with the largest percentage in Montrose County at 20.4 percent, which is less than the 21.3 percent for Colorado as a whole. Only Gunnison County had a minority group, American Indian and Alaska Native, in a larger percentage than Colorado (2.4 percent and 1.6 percent, respectively). However, none of the study area counties had populations in any of the race and ethnic minority categories that met the criteria to be considered environmental justice populations.

At the community level, as presented in **Table 3-61** (Study Area Key Community Poverty and Minority Information, American Community Survey 2012-2016 5-year Estimates), only Olathe was identified as having populations that met the criteria to be considered as environmental justice populations, with 57.9 percent of the residents being of Hispanic or Latin origin (any race) and 58.1 percent in the total minority category for the time period of 2012 to 2016.

Native American Populations

The data discussed above indicate that Native American populations exist within the study area, albeit in relatively low percentages that do not meet the criteria to be identified as environmental justice populations. Nevertheless, Executive Order 12898 applies to federally recognized Tribes and, therefore, it is important to determine whether any Tribes are present in the area, have treaty or reserved rights for lands and resources in the Planning Area, or have traditional cultural and historical use ties to lands and resources in the Planning Area. As discussed in **Section 1.6.3**, Collaboration and Consultation with Tribes, **Section 3.1.10**, Cultural Resources, **Section 3.4.1**, Native American Tribal Interests, and **Section 5.2.1**, Consultation and Coordination – Tribes, the BLM UFO initiated consultation with tribes that are identified as having interests or traditional cultural properties in the Planning Area. The identified tribes are the Ute Indian Tribe of the Uinta and Ouray Reservation, Southern Ute Tribe, Ute Mountain Ute Tribe, and the Navajo Nation.

Environmental Justice and RMP Analysis

Environmental justice populations exist within the study area; however, it is unlikely that considerations for environmental justice populations will require modification of RMP alternatives or mitigation measures. This is because the management actions proposed across the alternatives are planning-level decisions rather than implementation decisions. Additionally, the UFO has considered all input from persons or groups regardless of age, income status, race, or other social or economic characteristics. Impacts on regional and local environmental justice populations are addressed in this RMP/EIS following standards and guidelines set forth in Executive Order 12898 and in the 2005 BLM Land Use Planning Handbook, H-1601-1, Appendix D (BLM 2005a).

3.5 SUPPORT

This section is a description of the support conditions in the Planning Area:

- Cadastral
- Interpretation and Environmental Education
- Transportation Facilities

3.5.1 Cadastral

Cadastral survey is one of the BLM's basic responsibilities as the keeper of over 200 years of federal survey records and plats. The cadastral program supports all other functions by conducting land surveys and resurveys to identify public land and public/private land boundaries. These surveys are often needed where there are unauthorized uses, land tenure adjustments, or BLM projects near a public/private land boundary. The costs of cadastral surveys are borne by the federal programs or private interests that benefit from the boundary identification.

Current Conditions

Cadastral survey is used throughout the Planning Area primarily associated with trespass issues. Cadastral survey is used to identify issues with potential unauthorized development such as agricultural, residential, road, and fence construction. Cadastral has also been used to survey boundaries related to actions and boundaries associated with land acquisitions, exchanges, and disposals throughout the Planning Area.

Trends

As development of urban areas adjacent to public lands increases throughout the Planning Area, so will the need for cadastral efforts. The need for accurate surveys will be critical in areas of mixed federal and private ownership, such as near communities.

3.5.2 Interpretation and Environmental Education

Interpretation is the voice for all BLM resource management programs. A well-developed program supports the goals and objectives of all resources and programs by serving customers; promoting land health; and enhancing the public's enjoyment, understanding, and appreciation of the public lands' natural and cultural resources and their management. An interpretive program reaches out to visitors across varied landscapes and serves visitors who are exploring many facets of public lands.

Management issues are addressed within the interpretive story in a way that relates those issues to the visitors' experiences. Interpretive planning is done collaboratively with internal and external groups, and clear measurable objectives are established to gauge the cost/benefit and the program's effectiveness. The BLM's interpretive program aims to respect and serve people with diverse backgrounds and abilities.

Current Conditions

Western Colorado Interpretive Association, founded in 1988 was organized as a non-profit group to assist the BLM and other government agencies in scientific, education, historical and interpretive activities of resource areas in the western portion of the State of Colorado. Through these efforts visitors to the public lands better understand the area and, it is hoped, develop a sense of value and desire to ensure their protection and sustainable use for current and future generations.

Interpretation and education opportunities in the Decision Area have not been extensively developed. Only a handful of small interpretive sites and a variety of single interpretive signs are scattered throughout the Planning Area. Currently, visitors receive information on opportunities in the Decision Area, as well as on safety concerns, from both off-site and on-site sources. Off-site sources include assorted resource brochures distributed throughout the area, maps, programs given by resource specialist or local historians, teacher information packets, fact sheets, and various Internet websites. Many program- or area-related brochures have been automated and are available on the Internet. Informational tours for volunteer groups and the general public are periodically given by BLM specialists.

On-site information is obtained from directional signs, road markers, ranger patrols, and interpretive signs. An integral part of the BLM's recreation outreach in UFO is the City of Montrose Office of Business and Tourism which provides interpretation, education, and information to visitors interested in route condition, recreation opportunities available in the region, and current events.

Trends

Interpretive opportunities at cultural sites are likely to increase. A developed interpretive program will focus on the BLM-administered lands and the interrelationship between the physical elements, biological systems, and cultural and historical events. Many of these efforts are accomplished in partnership with other land management agencies and involve local communities. The BLM will continue to partner with other organizations and government agencies, thereby sharing costs and more effectively delivering interpretive products and services to the public. Automating interpretive and educational resources and making them available on the Internet also furthers this goal.

3.5.3 Transportation Facilities

The BLM transportation system represents one of the most critical aspects in effectively managing public lands. It provides public access and the infrastructure that supports uses ranging from recreation to commercial activity on BLM-administered lands.

Current Conditions

Federal, State, and County Roads

A network of federal, state, and county roads provides access throughout the Planning Area. Numerous highways bisect the area, bringing traffic to the region from throughout the United States.

Traffic volume on the road network is highly variable. The highest volume counts are found on major roadways in or near the largest communities. Federal and State highways carry the largest traffic volumes, followed by county roads.

BLM Roads

BLM roads provide public and administrative (agency and permittee) access to public lands, through public lands, and to in-holdings of private land within the Planning Area. Reasonable administrative access is made available to the public for valid uses, such as mining claims, mineral leases, ROWs, livestock grazing, and recreation. Most use of BLM roads would be described as casual.

Transportation planning is related to travel management. Travel management is the identification, through RMP planning, of areas where foot, pack stock, bicycle, and motorized vehicle travel is appropriate, restricted, or not allowed, depending on resource objectives and use considerations.

Road System Maintenance. The BLM maintains roads under standards set forth in BLM 9100 series manuals, as well as RMPs. Road maintenance provides for resource protection, accommodation of users,

and protection of the public's investment. The BLM uses the road maintenance intensities described in BLM Roads and Trails Terminology, Technical Note 422 (BLM 2006b).

Road system maintenance has focused on maintaining major recreational access roads, which generally receive most of the traffic volume. The BLM engineering office annually maintains about 50 to 75 miles of road within the Planning Area, depending on road conditions and funding availability. Road maintenance generally consists of blading or grading, and is usually performed in the summer or fall. Additional corrective maintenance or water drainage work, such as installation of culverts, drains, or other water management devices, is performed as needed. Snow is not removed.

Maintenance intensities must be consistent with land use planning management objectives (e.g., natural, cultural, recreation and visual settings).

Functional Road Classification Types for BLM System Roads. In accordance with BLM Manual, Section 9113 (Roads), roads on BLM-administered lands are classified as collector, local, or temporary, based upon the amount of traffic movement.

Collector Roads. These BLM roads normally provide primary access to large blocks of land and connect with or are extensions of a public road system. They accommodate mixed traffic and serve many uses. They generally receive the highest volume of traffic of all roads in the BLM road system. User cost, safety, comfort, and travel time are primary road management considerations. Collector roads usually require application of the highest standards used by the BLM.

Local Roads. These BLM roads normally serve a smaller area than collectors serve and connect to collectors or public road systems. Local roads receive lower volume, carry fewer traffic types, and generally serve fewer users. User cost, comfort, and travel time are secondary to construction and maintenance cost considerations. Low volume local roads in mountainous terrain, where operating speed is reduced by terrain, may be single-lane roads with turnouts. Environmental impacts are reduced because steeper grades, sharper curves, and lower design speeds than would be permissible on collector roads are allowable.

Resource Roads. These BLM roads are spur roads that provide point access and connect to local or collector roads. They carry very low volume and accommodate only one or two types of use. Use restrictions are applied to prevent conflicts between users needing the road and users attracted to the road. The location and design of these roads are governed by environmental compatibility and minimizing bureau costs with minimal consideration for user cost, comfort, or travel time.

Energy Development-related Transportation Issues

Road capacity, maintenance, and safety issues from gas development and mining-related traffic are an issue in the western and northeastern part of the Planning Area, where mineral resources are being developed. A short-term increase in the volume of both heavy and light traffic occurs during the exploration and development phases.

Temporary conflicts, including a potential for delays, dust, road degradation and increased vehicle safety concerns, occur during the construction and development phases. County roads also are affected by heavy equipment use, fugitive dust, and traffic-related noise. All associated impacts are lower during operation because traffic levels drop.

Many existing unimproved roads have been repaired and improved to accommodate the increase traffic and heavy equipment. Many new roads have also been created to facilitate mineral development. These new roads across public lands are often only open to mineral development personnel.

Airports and Railroads

Six public airports are located within the Planning Area. Montrose Regional Airport, located in the city of Montrose, and Telluride Regional Airport west of Telluride (ceased commercial flight service in March 2018), while Nucla Hopkins Field near the town of Nucla and Blake Field near Delta provide general aviation services. In addition, North Fork Valley Airport near Paonia and Westwinds Airpark (Hawkins Field) near Delta operate with limited general aviation services.

One major rail line serves the Planning Area. The Union Pacific Railroad enters the Planning Area from the north along the Gunnison River, runs through the town of Delta and on to the coal mines near Somerset in Gunnison County. In addition, the Union Pacific runs intermittently from Delta to Montrose.

Trends

Maintenance costs are rising, and each year the BLM maintains fewer miles of BLM Roads. With flat federal budgets and rising fuel and equipment costs for contractors, it is likely that this trend will continue in the future.

Chapter 4, Part A

Environmental Consequences

CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter presents the likely direct, indirect, and cumulative impacts on the human and natural environment that would occur from implementing the alternatives presented in **Chapter 2** (Alternatives). This chapter is organized by resource and resource use, similar to **Chapter 3** (Affected Environment). Each resource and resource use includes the following sections:

Methods of Analysis – Describes methodologies and assumptions used to conduct the analysis of assessing impacts specific to the resource or resource use. It includes resource indicators which are factors that describe resource condition and change and can help the United States (US) Department of the Interior (DOI), Bureau of Land Management (BLM) determine trends over time. It also includes assumptions that set guidelines to help facilitate the analysis and provide reasonably foreseeable projected level of development that may occur in the Uncompahgre RMP Planning Area (Planning Area). These are in addition to those general assumptions and methodologies listed in **Sections 4.1.1** (Analytical Assumptions) and **4.1.2** (General Methodology for Analyzing Impacts).

Nature and Types of Effects – Describes in general terms the types of impacts on resources or resource uses from allowable uses or restrictions on allowable uses.

Effects Common to All Alternatives – Presents potential impacts to a resource and resource use from other resource or resource uses that would likely span across all five alternatives.

Analysis of Impacts for Each of the Five Alternatives – The baseline used for the impact analysis is the current condition or situation, as described in **Chapter 3**. Impact analysis is a cause-and-effect process. This impact analysis describes how the indicators would change the magnitude of the nature and type of effect (context and intensity) and identifies impacts that may enhance or improve a resource as a result of management actions, as well as those impacts that have the potential to impair a resource. However, the evaluations are confined to the actions that have direct, immediate, and more prominent effects. If an activity or action is not addressed in a given section, no impacts are expected, or the impact is expected to be negligible based on professional judgment.

Cumulative Impacts – Cumulative impacts are effects on the environment that result from the impact of implementing any one of the RMP alternatives in combination with other actions outside the scope of this RMP, either within the Planning Area or adjacent to it. See **Section 4.2** for more detail on the cumulative impacts analysis conducted for each resource and resource use.

A separate section describing irretrievable or irreversible commitment of resources is presented at the end of the chapter.

For ease of reading, impacts presented are direct, long term, and occur within the larger Planning Area unless they are noted as indirect, short term/temporary, or localized. Analysis shown under Alternative A may be referenced in the other alternatives with such statements as "impacts would be the same as, or similar to, Alternative A" or "impacts would be the same as Alternative A, except for . . .," as applicable.

For the analysis of Alternatives B and B.1 in this chapter, only those differences between the two alternatives are identified. If impacts (quantitative or qualitative) would be the same under both Alternatives B and B.1, then the analysis for Alternative B also applies to Alternative B.1, even if not specifically stated. Where analysis for Alternative B.1 differs from Alternative B, then that difference is identified immediately following the applicable analysis for Alternative B.

Irreversible and irretrievable commitment of resources is discussed in **Section 4.8**. Irreversible commitments of resources result from actions in which resources are considered permanently changed. Irretrievable commitments of resources result from actions in which resources are considered permanently lost.

4.1.1 Analytical Assumptions

Several assumptions were made to facilitate the analysis of the projected impacts. These assumptions set guidelines and provide reasonably foreseeable projected levels of development that would occur within the Planning Area during the planning period. These assumptions should not be interpreted as constraining or redefining the management objectives and actions proposed for each alternative, as described in **Chapter 2**. The following general assumptions apply to all resource categories. Any specific resource assumptions are provided in the ***Methods and Assumptions*** section for that resource.

- Each alternative in **Chapter 2** constitutes a possible RMP and would be implemented.
- Implementing actions from any of the RMP alternatives would be in compliance with all valid existing rights, federal regulations, BLM policies, and other requirements.
- Implementation-level actions necessary to execute the land use plan-level decisions in this RMP would be subject to further environmental review, including National Environmental Policy Act of 1969 (NEPA), as appropriate.
- The Uncompahgre Field Office (UFO) Reasonably Foreseeable Development Scenario (BLM 2012d), based on federal minerals and without any development restrictions, estimated that up to 418 new exploratory and development coalbed natural gas and conventional gas wells could be drilled on BLM surface and split-estate within the Uncompahgre RMP Decision Area (Decision Area) during the planning period (1,271 wells on all federal minerals, regardless of surface agency, and private minerals). If a well is successfully completed, the operator would be required to begin interim reclamation of the initial pad. Interim reclamation reduces the amount of disturbed surface on the pad area. If a well is unsuccessful, the entire well pad is reclaimed, and no long-term disturbance would occur. The anticipated short-term disturbance from drilling, road construction, and pipeline installation of new exploratory and development wells on BLM-managed wells would be approximately 3,580 acres for coalbed natural gas and conventional development. The long-term disturbance associated with operation of the new producing exploratory and development wells on BLM-managed wells would be approximately 1,460 acres for coalbed natural gas and conventional development. Actual acres of disturbance could differ from these estimates as a result of advances in technology, changing industry needs, and site-specific measures employed to protect resources.
- Direct and indirect impacts of implementing the RMP primarily occur on the Decision Area lands.
- Local climate patterns of historic record and related conditions for plant growth may change with warmer, drier conditions likely to occur throughout the life of the RMP.
- In the future, as tools for predicting climate changes in the Planning Area improve and changes in climate affect resources and necessitate changes in how resources are managed, the BLM may reevaluate decisions made as part of this planning process and adjust management accordingly.

- The discussion of impacts is based on the best available data. Knowledge of the Planning Area and professional judgment, based on observation and analysis of conditions and responses in similar areas, are used to infer environmental impacts where data are limited.
- Stipulations for fluid mineral leasing (i.e., no surface disturbance (NSO), controlled surface use (CSU), and timing limitation [TL]) and activities associated with fluid mineral leasing (e.g., truck-mounted drilling, stationary drill rigs in unison, geophysical exploration equipment off designated routes, and construction of wells and/or pads) would be applied as specified to BLM-administered lands overlying fluid federal mineral estate. In addition, stipulations may be recommended for private lands overlying federal mineral estate (known as split-estate). Within the Decision Area, the BLM administers 675,800 surface acres and 240,230 acres of fluid federal minerals underlying split-estate, for a total of 916,030 acres of fluid federal mineral estate.
- Restrictions applicable to surface-disturbing activities (i.e., no ground disturbance [NGD], site-specific relocation [SSR], and TL), other than those related to fluid mineral leasing, apply to other activities, including those conducted by the BLM. Because the BLM does not have jurisdiction over split-estate lands for surface-disturbing activities not related to fluid mineral leasing and development, NGD and SSR restrictions apply only to the 675,800 acres of BLM surface in the Decision Area. In cases where TLs are applied for surface-disturbing activities other than those related to fluid mineral leasing, they too would apply only to the 675,800 acres of BLM surface in the Decision Area.
- Restrictions on land use authorizations are identified as ROW avoidance or ROW exclusion, although TL restrictions may also be applied and would restrict construction activities during the specified timeframes. Because the BLM does not have jurisdiction over split-estate lands for land use authorizations, ROW avoidance and ROW exclusion restrictions apply only to the 675,800 acres of BLM surface in the Decision Area.
- Data from geographic information systems (GIS) have been used in developing acreage calculations and to generate the figures in **Appendix A** (Figures). Calculations depend on the quality and availability of data. Most calculations in this RMP are rounded to the nearest 10 acres or 0.1-mile. Given the scale of the analysis, the compatibility constraints between datasets, and lack of data for some resources, all calculations are approximate and are for comparison and analytic purposes only. Likewise, the figures in **Appendix A** are provided for illustrative purposes and are subject to the limitations discussed above. The BLM may receive additional GIS data; therefore, acreages may be recalculated and revised.
- Acreage figures and other numbers used are approximate projections; readers should not infer that they reflect exact measurements or precise calculations. Acreages were calculated using GIS technology, and there may be slight variations in total acres between resources.
- All livestock grazing allotments in the UFO were reevaluated between Draft RMP/EIS to the Proposed RMP/Final EIS, which revealed minor clerical errors of allotment acres and animal unit months (AUMs), and corrected any overlap with the Gunnison Gorge and Dominguez–Escalante NCAs in Alternative D. As a result, acres available and unavailable to grazing have been corrected under all alternatives. In addition, the section has been edited to change the term *open* to *available* and *closed* to *unavailable*, following the current preferred BLM terminology.

4.1.2 General Methodology for Analyzing Impacts

Potential impacts or effects are described in terms of type, context, duration, and intensity, which are generally defined as follows:

- *Type of Impact* – The analysis discloses impacts, beneficial and adverse, as well as relevant short-term and long-term. The presentation of impacts for key planning issues is intended to provide the BLM decision maker and reader with an understanding of the multiple use tradeoffs associated with each alternative.

- *Context* – Context describes the area or location (site specific, local, Planning Area wide, or regional) in which the impact would occur. Site-specific impacts would occur at the location of the action, local impacts would occur within the general vicinity of the action area, Planning Area-wide impacts would affect a greater portion of the UFO, and regional impacts would extend beyond the Planning Area boundaries.
- *Duration* – Duration describes the length of time an effect would occur, either short term or long term. Short term is defined as anticipated to begin and end within the first 5 years after the action is implemented. Long term is defined as lasting beyond 5 years to the end of or beyond the life of the RMP. For some resources (e.g., air quality and socioeconomics), a 20-year timeframe was used to assess long-term impacts.
- *Intensity* – Rather than categorize impacts by intensity (e.g., major, moderate, and minor), this analysis discusses impacts using quantitative data wherever possible.
- *Direct and Indirect Impacts* – Direct impacts are caused by an action or implementation of an alternative and occur at the same time and place. Indirect impacts result from implementing an action or alternative but usually occur later in time or are removed in distance and are reasonably certain to occur.
- *Cumulative Effects* – Cumulative effects are described in the Cumulative subsection for each resource or resource use. Cumulative effects are the direct and indirect effects of a proposed project alternative's incremental impacts when they are added to other past, present, and reasonably foreseeable actions, regardless of who carries out the action (40 Code of Federal Regulations [CFR] Part 1508.7). The list of actions used for cumulative impact analysis is provided in **Section 4.2.2** (Past, Present, and Reasonably Foreseeable Future Actions).

4.2 CUMULATIVE IMPACTS

Cumulative impacts are effects on the environment that result from the impact of implementing any one of the RMP alternatives in combination with other actions outside the scope of this RMP, either within the Planning Area or adjacent to it.

The following factors were considered in this cumulative impact assessment:

- Federal, nonfederal, and private actions
- Potential for synergistic effects or synergistic interaction among or between effects
- Potential for effects to cross political and administrative boundaries
- Other spatial and temporal characteristics of each affected resource
- Comparative scale of cumulative impacts across alternatives

Cumulative Impacts

The direct and indirect effects of a proposed project alternative's incremental impacts when they are added to other past, present, and reasonably foreseeable actions, regardless of who carries out the action.

Temporal and spatial boundaries used in the cumulative analysis are developed on the basis of resources of concern and actions that might contribute to an impact. The baseline date for the cumulative impacts analysis is 2012. The temporal scope of this analysis is the life of the RMP, which encompasses a 20-year planning period.

Spatial boundaries vary and are larger for resources that are mobile or migrate (e.g., elk populations) compared with stationary resources. Occasionally, spatial boundaries could be contained within the Planning Area boundaries or an area within the Planning Area. Spatial boundaries were developed to facilitate the analysis and are included under the appropriate resource section heading.

4.2.1 Past, Present, and Reasonably Foreseeable Future Actions

Past, present, and reasonably foreseeable future actions are considered in the analysis to identify whether and to what extent the environment has been degraded, maintained, or enhanced; whether ongoing activities are causing impacts; and trends for activities in and impacts on the area. Projects and activities are evaluated on the basis of proximity, connection to the same environmental systems, potential for subsequent impacts or activity, potential for similar impacts, the likelihood a project will occur, and whether the project is reasonably foreseeable.

Projects and activities identified as having the greatest likelihood to generate potential cumulative impacts, when added to the RMP alternatives, are displayed in **Table 4-1** (Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario).

Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario

Other Land Use Plans	BLM San Juan/San Miguel RMP (BLM 1985), as amended. This plan set management, protection, and use goals and guidelines for the portions of the BLM Uncompahgre and Tres Rios Field Offices, Colorado. These plans are being revised in new planning efforts: the Uncompahgre RMP, the Tres Rios RMP (BLM 2015c), and the San Juan National Forest Land and Resource Management Plan (Forest Service 2013).
	BLM Grand Junction RMP (BLM 2015a). This plan sets management, protection, and use goals and guidelines for the BLM Grand Junction Field Office, Colorado.
	BLM Colorado River Valley Field Office RMP (BLM 2015b). This plan sets management, protection, and use goals and guidelines for the BLM Colorado River Valley Field Office, Colorado.
	BLM Gunnison Field Office RMP (BLM 1993c), as amended. This RMP sets management, protection, and use goals and guidelines for the BLM Gunnison Field Office, Colorado.
	BLM Moab Field Office RMP (BLM 2008e). This plan sets management, protection, and use goals and guidelines for the BLM Moab Field Office, Utah.
	BLM Monticello Field Office RMP (BLM 2008f). This plan sets management, protection, and use goals and guidelines for the BLM Monticello Field Office, Utah.
	Black Canyon of the Gunnison National Monument and Curecanti National Recreation Area General Management Plan (US DOI National Park Service [NPS] 1997b). This plan sets management, protection, and use goals and guidelines for the Black Canyon of the Gunnison National Park.
	Curecanti National Recreation Area Final Resource Protection Study and Environmental Impact Statement (NPS 2008). This plan sets management, protection, and use goals and guidelines for the Curecanti National Recreation Area.
	BLM Dominguez-Escalante National Conservation Area (NCA) and Dominguez Canyon Wilderness RMP (BLM 2017d). This plan sets management, protection, and use goals and guidelines for the Dominguez-Escalante NCA and Wilderness, Colorado.

Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario

Other Land Use Plans *(continued)*	BLM Gunnison Gorge NCA and Wilderness RMP (BLM 2004d). This RMP sets management, protection, and use goals and guidelines for the BLM Gunnison Gorge NCA and Wilderness, Colorado.
	Amended Land and RMP for Grand Mesa, Uncompahgre, and Gunnison National Forests (Forest Service 1991). This plan sets management, protection, and use goals and guidelines for the Grand Mesa, Uncompahgre, and Gunnison National Forests, Colorado. A Proposed Land Management Plan was completed in 2007, but the revision process was postponed until a final Forest Service planning rule could be established. A plan revision began in 2017.
	RMP Amendment/Environmental Assessment for the Uncompahgre Field Office Dry Creek Travel Management Plan, approved on December 1, 2009, designated routes on over 110,000 acres of BLM-administered land in the UFO. The comprehensive travel management plan, located on the east flank of the Uncompahgre Plateau, is bounded on the north by 25 Mesa Road (known as Delta-Nucla Road), on the south by Dave Wood Road, on the west by the National Forest Service boundary, and the east by private lands in the Uncompahgre Valley.
	Ridgway Comprehensive Travel Management Plan Environmental Assessment, approved May 10, 2013, designated routes on over 1,050 acres of BLM-administered land in the UFO. The comprehensive travel management plan is located approximately 3 miles north of the Town of Ridgway and is bounded on the north by Ouray County Road 8, on the south by Ouray County Road 10, on the west by US Highway 550 and Ridgway State Park, and the east by private lands.
	Norwood-Burn Canyon Comprehensive Travel Management Plan Environmental Assessment, approved on November 14, 2014, designated routes on over 9,800 acres of BLM-administered land in the UFO. The comprehensive travel management plan is located approximately 2 to 3 miles west of the Town of Norwood and is bounded on the south by National Forest System lands and the north, east, and west by private lands.
	Delta County Recreation Master Trails Plan, in progress. This county level plan will inventory and evaluate the current trail systems, establishing a framework for improvements and connections to existing trails, and will make recommendations to guide future allocation of trail resources.
Energy and minerals development	Summary. Most oil and gas development on BLM-administered lands within the Planning Area has been in the North Fork of the Gunnison River area. Numerous mining claims exist, but the only significant mining activity is associated with past uranium/vanadium mining claims in the west end of Montrose and San Miguel counties. Most coal mining occurs in the North Fork of the Gunnison area. Several small individual placer mining claims exist along the San Miguel and Dolores Rivers, and a large group of uranium mining claims exist on BLM-administered lands in the UFO, Grand Junction Field Office, Tres Rios Field Office, and Moab Field Office. As such, additional mining and oil and gas development is possible.

Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario

Energy and minerals development *(continued)*	Piñon Ridge Mining may construct the Piñon Ridge Mill in Paradox Valley, between Naturita and Bedrock in Montrose County, Colorado. The uranium mill is expected to process ore from 5 to 9 mines at any one time. An increase in uranium exploration, mining, and permitting is possible.
	The Uravan mineral belt in western Colorado includes an estimated 1,200 historic mines, with production dating back to 1948. Total uranium ore production in Colorado was estimated to be over 255,000 pounds in 2005, and all mines have ceased production since then, partly due to high energy costs and the high cost of transporting ore to Cañon City, Colorado, for milling (US Department of Energy [DOE] 2012). In 2007, Denison Mines began mining uranium ore from their existing Sunday Mines Complex and shipping it to their White Mesa Mill in Blanding, Utah. Production at this mining complex ceased in 2009 due to declining uranium prices, but the BLM's Tres Rios Field Office is currently preparing an environmental assessment for reopening of the complex (DOE 2012, 2014). A mine plan for an expansion of the Sunday Mines Complex was prepared, but was ultimately remanded in 2009 on the basis of needing additional baseline data. Subsequent to this, some additional baseline data were collected, but the environmental assessment has not been completed. Sunday and West Sunday mines have mining permits; however, they are presently not mining and are in temporary cessation. In 2012, Denison Mines' US operations were acquired by Energy Fuels Resources (USA) Inc. and were sold again to Piñon Ridge Mining in 2014. Limited uranium production began at Bluerock Energy's J-Bird Mine in Montrose County in 2008, but production ceased when the mine was transferred to Rimrock Exploration and Development. No production is anticipated in the immediate future for this mine or the Prince Albert (Rimrock), Last Chance (Nuvemco), and Van No. 4 (Piñon Ridge Mining) Mines; however, it is possible if prices and demand increase. There are 28 actively permitted uranium mine projects in Colorado. No uranium production was reported from 2009 to 2017, and none of the actively permitted mine projects were producing as of 2017; 19 are in maintenance status, and 9 are being (or 3 have been) reclaimed. In addition to uranium, mines in the Uravan Mineral Belt also contain vanadium. If vanadium prices continue to increase, it is possible that some mines may reopen as primary vanadium producers.

Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario

Energy and minerals development *(continued)*

Coal. There is one active underground coal mine on federal mineral estate in the Planning Area (West Elk). Two inactive underground coal mines have closed within the past 5 years and have entered final reclamation (Bowie No. 2 and Elk Creek). The following table contains recent production data for the three coal mines in the North Fork Valley.

Raw Coal Production in the North Fork Valley
Year Averages (Tons)

Average Based on[1]	Bowie No. 2 Mine	Elk Creek Mine	West Elk Mine	Total
5 Year	2,897,076	2,553,310	5,806,743	11,257,129
1 Year	Closed July 2016	Closed April 2016	5,551,636	5,551,636

[1] 5-Year Period ends June 30, 2014. 1-Year period is August 1, 2016, through July 31, 2017.

- The Bowie No. 2 Mine and Elk Creek Mine are permanently closed and have entered final reclamation. Their coal leases are mined-out and expected to be relinquished when they are no longer necessary for right of entry to conduct reclamation.
- The West Elk Mine is a longwall operation located south and east of Somerset and is operated by Mountain Coal Company with a loadout about 1 mile east of Somerset. There are 17,160 acres permitted. The mine produces approximately 33 percent of Colorado coal.

The UFO issued a Coal Exploration License on Oak Mesa (in Delta County north of Hotchkiss, Colorado) in late 2012, and exploration drilling was completed by 2014. There has not been any interest expressed in leasing coal on Oak Mesa.

The New Horizon coal mine, on private surface and private minerals, near Nucla, Colorado, is a 20-acre surface coal mine owned and managed by Western Fuels Association. The mine ceased production after March 2017 and has entered final reclamation.

Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario

Energy and minerals development *(continued)*

Oil and Gas Leasing. The BLM routinely offers land parcels for competitive oil and gas leasing to allow exploration and development of oil and gas resources for public sale. Continued leasing is necessary for oil and gas companies to seek new areas for oil and gas production, or to develop previously inaccessible/uneconomical reserves.

Twenty-five percent (224,950 acres) of the federal fluid mineral estate in the UFO (916,030 acres) is already leased. This includes 160,510 acres (24 percent) of BLM surface and 64,440 acres (27 percent) of split-estate lands (private, state, and local surface with federal fluid mineral subsurface). Total fluid minerals acres leased annually by the BLM over the past 17 years are as follows:

Year	Average Lease Acreages	Total Leased Acres*	Total Number of Leases
2000	745	16,130	21
2001	545	40,070	71
2002	490	2,240	5
2003	460	14,070	32
2004	635	4,250	7
2005	900	54,710	52
2006	510	15,850	29
2007	500	31,560	48
2008	490	23,540	37
2009	80	390	5
2010	N/A	0	0
2011	40	40	1
2012	800	800	1
2013	0	0	0
2014	0	0	0
2015	0	0	0
2016	0	0	0
2017	0	0	0

Source: BLM 2018a
*Includes all leased BLM surface acres, plus all federal fluid mineral subsurface under private, local, and State surface. Values are limited to active leases and do not include pending leases.

Potash. There is no potash exploration or mining in the Planning Area, and no future activity is known. There is a potential undefined potash resource underneath Sinbad Valley, Colorado. In 2008, a company expressed interest in exploring the Sindbad Valley area (in the BLM Grand Junction Field Office) for potential development via solution mining. Prior to 2008 there had been no exploration activity for potash within the Grand Junction RMP Planning Area (BLM 2010n).

The BLM Tres Rios Field Office received 6 permit applications from RM Potash, Inc. for potash exploration, affecting 9,954 acres of land in the vicinity of Egnar, Colorado, in San Miguel County (BLM 2012p). The BLM prepared an environmental assessment to evaluate exploration drilling on some of these applications (BLM 2012p). The BLM determined the project would have no significant impact on the surrounding environment and approved the permits (BLM 2013b). Exploratory drilling is expected to last up to 1 year (BLM 2012p). No leasing or development of potash resources has been proposed.

Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario

Energy and minerals development *(continued)*	The South Canal Hydropower Project (BOR 2012, 2014, 2015). The four power houses (Drops 1, 3, 4, and 5) that comprise the South Canal Hydropower Project generate an estimated 51,280 megawatt-hours of electricity per year, roughly equivalent to the power used by -5,400 homes in Delta-Montrose Electric Association's service territory. Electricity is produced uniquely during the irrigation season to match the existing flow of water. Additional small hydropower projects on BOR facilities may be proposed and constructed to help meet the State of Colorado's renewable energy mandate, which requires that all electric cooperatives and each municipal utility serving more than 40,000 customers provide 10 percent of its retail electricity sales from renewable energy by the year 2020. Investor-owned utilities must provide 30 percent of their retail electricity sales from renewable energy by the year 2020 (Colorado Revised Statute 40-2-124). A hydropower facility at Ridgway Dam on the Uncompahgre River is currently being considered. Also, there are several other sites on the South Canal that may be potentially suitable for hydropower generation.
	Colorado Oil and Gas Leasing Amendment (BLM 1991a, 1999). The amendment evaluates the impacts of oil and gas leasing and development on BLM-administered lands and federally owned mineral estate under private lands in the Colorado River Valley (formerly Glenwood Springs) Field Office and a portion of the UFO.
	BLM Uncompahgre Field Office Reasonable Foreseeable Development Scenario for Oil and Gas (BLM 2012d). This document looks at oil and gas resources in the Planning Area and gives a 20-year prediction of development potential.
	BLM Uncompahgre Field Office Mineral Potential Report (BLM 2011b). This document looks at all minerals (non-oil and gas), except coal and renewable energy, in the Planning Area and gives a 20-year prediction of development potential.
	BLM Uncompahgre Field Office Coal Resource and Development Potential Report (BLM 2010h). This document looks at coal resources in the Planning Area and gives a 20-year prediction of development potential.
	BLM Uncompahgre Field Office Renewable Energy Potential Report (BLM 2010g). This document looks at renewable energy resources, including geothermal, in the Planning Area and gives a 20-year prediction of development potential.
	Forest Service Grand Mesa, Uncompahgre, and Gunnison National Forests (Forest Service 1993). The Final Oil and Gas Leasing EIS and Record of Decision (ROD) evaluate the potential effects of alternative programs for oil and gas leasing on the Grand Mesa, Uncompahgre, and Gunnison National Forests, Colorado.
	Gunnison County Energy Action Plan (Gunnison County 2009).
	Gunnison County North Fork Valley Coal Resource Special Area Regulations (Gunnison County 2003).
	Gunnison County Regulations for Oil and Gas Operations (Gunnison County 2012a).

Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario

Energy and minerals development *(continued)*	Bull Mountain Unit Master Development Plan. This involves the exploration and development of up to 201 new gas wells, 5 new water disposal wells, and associated infrastructure inside a 20,000 acre federal oil and gas unit. This includes 146 gas wells and 4 water disposal wells planned on federal mineral leases, and 55 gas wells and 1 new water disposal well planned on fee mineral estate. The ROD was approved on October 4, 2017, and seven federal Applications for Permit to Drill had been approved as of March 2018.
	The Gunnison Energy/SG Interests dual proposal for 25 federal natural gas wells and associated infrastructure on 5 multi-well pads was approved in 2015. This project is in the implementation phase. The development will be on an existing well pad (Aspen Leaf); four new multi-well pads will be constructed (11-90-9, Allen, Henderson, and Spadafora), along with associated gas gathering lines, subsurface water lines, temporary surface poly pipelines, and up to 25 total gas wells, which may be drilled within the next 5 years. Two wells have been drilled as of March 2018.
	Gunnison Energy is the sole oil and gas operator in Delta County. Since 2005, the company has drilled approximately 10 wells and installed a gathering line for the Spaulding Peak Unit north and east of Cedaredge, Colorado.
	Gunnison Energy permitted 16 wells on 9 pads (Hotchkiss Federal BLM-DOI-UF-2008-035 EA) in Gunnison County. To date, five pads have been constructed and nine wells have been drilled.
	Vessels Coal Mine Methane Capture Project Methane Drainage System. Situated above Oxbow Mining LLC's Elk Creek Mine near Somerset, this captures low-level coal mine methane emissions produced at the mine, a portion of which are used to generate electricity, with the remainder flared via an on-site combustor.
	Petrox 1 Application for Permit to Drill in Somerset Unit. One Application for Permit to Drill was submitted by Petrox Resources for development of a lease in the federal Somerset Unit, a 6,400-acre project area that largely overlies the Pilot Knob Roadless Area north of Somerset.
	Spadafora Waste Disposal Pits: The Gunnison County Planning Commission approved the Spadafora Water Storage Facility on March 6, 2015. Three water storage pits, each with a pump station and a volume of approximately 9,240,000 gallons, would sit on roughly 19 acres and would store and recycle produced water for drilling and gas well operations.
	Huntsman Unit Proposal. SG Interests proposed drilling in the Huntsman Unit (COC 74403X), which includes three SG Interests leases (COC 63886, 63888, and 63889). SG Interests has proposed one Application for Permit to Drill there for well 10-89-31 #1 inside lease COC 63886.
	Deadman Gulch Application for Permit to Drill. SG Interests proposed an Application for Permit to Drill (12-89-30#1) inside the Gunnison Energy Deadman Gulch Unit and next to the Petrox federal Somerset Unit in the Pilot Knob Roadless Area on lease COC 64169.

Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario

Energy and minerals development *(continued)*

COGIS records as of March 2018 for All Active Wells Within UFO Planning Area						Surface Mgt. Agency		
County Portions Within the UFO RMP Planning Area								
	Producing/ Work Over	Injection	Shut-in/ Temp Abd	Drilling	Total Wells	BLM	PRI	USFS
Gunnison	30	2	15	1	**48**	16	17	15
Delta	3	0	14	0	**17**	0	14	3
San Miguel	1	0	1	0	**2**	2	0	0
Ouray	1	0	1	0	**2**	0	2	0
Montrose	0	0	0	0	**0**	0	0	0
Mesa	0	0	0	0	**0**	0	0	0
Total	35	2	31	1	**69**	18	33	18

North Fork Mancos Master Development Plan. This Gunnison Energy, LLC project proposes drilling gas wells on four proposed multi-well pads and utilize one existing multi-well pad. Three of the locations would be constructed on National Forest System lands, one would be constructed on Fee lands (private surface underlain by private minerals), and an existing pad is also on Fee lands.

Natural gas pipelines. Bull Mountain Gathering line, Ragged Mountain Gathering, Sheep Gas Gathering System, Henderson Lateral pipeline, Aspen Leaf trunk pipeline, Hotchkiss Ranches Gas Gathering System, Vessels Oxbow facility connection line from Bore hole 1, local utility service pipelines.

Mesa County Mineral and Energy Resources Master Plan (Mesa County 2011). This plan identifies known energy resources and opportunities in Mesa County, Colorado, and recommends policies to guide regulation and development.

Vegetation Management

Forestry. Past, current, and foreseeable forestry uses in the Planning Area include personal and commercial harvest of pinyon and juniper fuel wood, poles and posts for fence building, wildings (live trees and shrubs), and Christmas trees.

Vegetation treatments. Prescribed fire and mechanical treatments of vegetation (e.g., chaining, rollerchops, Dixie-harrow, drill seeding, hydro-axing, and brush mowing) were very common in the past on public and private rangelands in the Planning Area. These treatments and maintenance of these vegetation treatments are still fairly common and will likely continue. In addition, manual and mechanical treatments of large woody invasive species such as tamarisk have occurred in the riparian areas of rivers and streams; this type of restoration work will likely continue in the foreseeable future.

Hazardous fuels reduction. Fuels treatments, including prescribed fires, chemical and mechanical treatment, and seeding, will likely continue and potentially increase in the future.

Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario

Vegetation Management *(continued)*	Sage-grouse habitat. Implementation of conservation plans for sage-grouse within the Planning Area includes active management techniques to improve habitat quality for sage-grouse, maintain or increase suitable habitat within population areas, and maintain or increase sage-grouse numbers. Plans include the San Miguel Basin Gunnison Sage-grouse Conservation Plan (San Miguel Basin Gunnison Sage-grouse Working Group 2009), Gunnison Sage-grouse Rangewide Conservation Plan (Gunnison Sage-grouse Rangewide Steering Committee 2005), Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats (Connelly et al. 2004), and Colorado Sagebrush: A Conservation Assessment and Strategy (Boyle and Reeder 2005). The North Rim Integrated Vegetation Management Plan (BLM 2011h) for sage-grouse within the Gunnison Gorge NCA Planning Area includes active management techniques to improve habitat quality for the Crawford population of sage-grouse.
	Biomass. Future use of woody biomass from forest management activities for energy production could occur. The BLM Uncompahgre Field Office Renewable Energy Potential Report (BLM 2010g) looks at renewable energy resources, including biomass, in the Planning Area and gives a 20-year prediction of development potential.
Livestock grazing	Livestock grazing has a long history in the region. Generally, livestock use has decreased over the past 100 years. Grazing in portions of the Planning Area has either remained stable or declined in the recent past, and demand on BLM-administered lands has remained stable in the last 10 years. Approximately 619,500 acres (92 percent) of Decision Area lands are allocated for livestock grazing within grazing allotment boundaries and are managed by the UFO in accordance with the current RMPs (BLM 1985, 1989a). Some allotments within the Planning Area (i.e., Wray Mesa) are managed by other BLM field offices, while the UFO manages portions of allotments that are within other field offices. Total active preference (permitted use) is 35,520 AUMs. Approximately 85 percent of the allotment permits were for cattle, with sheep and horse grazing accounting for the remaining 15 percent. Grazing on private lands within the Planning Area is expected to remain stable or slightly decrease as residential development increases.
Recreation and visitor use	Colorado's population has grown significantly in the past 10 years, and an increasing number of people are living near or seeking local BLM-administered lands for a diversity of recreational opportunities characterized by the "mountain resort or outdoor lifestyle." The primary recreational activities in the UFO are motorized vehicle touring, all-terrain vehicle use, motorcycling, mountain biking, big and small game hunting, fishing, hiking, backpacking, horseback riding, sight-seeing, target shooting, dog-walking, and river boating. Recreation-based visitor use in the UFO has increased in most areas in recent years and is expected to continue to increase on BLM and non-BLM-administered lands.
	Recreational trail construction. A local trails group and local branch of the Colorado Plateau Mountain Biking Association in Ouray County have been constructing trails within the Dennis Weaver Memorial Park and adjoining private property near Ridgway, Colorado. The objective of the groups is to connect the trail system to Ridgway State Park and to trails on BLM-administered lands adjacent to the east side of Ridgway State Park.

Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario

Recreation and visitor use *(continued)*	Recreation trail travel management planning: Ridgway State Park in Colorado conducted recreation trail travel management planning.
	A nonmotorized trail is proposed for construction between Crested Butte and Carbondale. It is a joint effort between West Elk Byway and the Forest Service.
	Local communities impacted by surrounding public lands are trying to develop recreation facilities on surrounding lands.
	Unauthorized travel. Travel off of designated or existing routes, as well as the creation of social trails, has occurred and will likely continue to occur within the Decision Area.
Lands and realty	BLM Uncompahgre Field Office Renewable Energy Potential Report (BLM 2010g). This report looks at renewable energy resources, including wind and solar, in the Planning Area, and gives a 20-year prediction of development potential.
	Designation of Energy Corridors on Federal Lands in the 11 Western States Programmatic EIS (DOE and BLM 2009). This multi-federal agency Programmatic EIS analyzes the environmental impacts of designating federal energy corridors on federal lands in 11 western states and incorporating those designations into relevant land use and resource management plans.
	The Paradox Valley Unit is located on the Dolores River near Bedrock, Colorado. Operated by the BOR, the plant prevents natural salt loads in groundwater from entering the Dolores River by intercepting and disposing of brine via deep-well injection. Major facilities include a brine production well field, brine surface treatment facility, and deep injection well. The BOR is preparing an EIS for the continued operation of the Paradox Valley Unit (BOR 2018). Facilities on BLM-administered lands are typically authorized under ROWs, but could comprise a withdrawal to the BOR. A decision and implementation of that decision will likely occur within the lifespan of the Uncompahgre RMP.
	BOR proposal to revocate the Whitewater Unit withdrawal may open to mineral entry approximately 800 acres of BLM-administered lands east of the Dominguez-Escalante NCA along the Gunnison River.
	Tri-State Montrose–Nucla–Cahone Transmission Line Improvement Project (BLM 2017i). Construction is in progress to upgrade the 80-mile 115-kilovolt power transmission line to a 230-kilovot transmission line across BLM-administered, National Forest System, and private lands.
	Tri-State Grand Junction to Montrose Access Road Amendment application is being processed. The Grand Junction–Montrose 115-kilovolt transmission line spans 50.9 miles in Mesa, Delta, and Montrose counties. The line spans lands administered by the BLM Grand Junction Field Office, BLM UFO, State, and private landowners. The proposed access for the transmission line is the same as the existing access for the parallel 345-kilovolt transmission line for 104.3 miles of the total 118.2 miles proposed length. The ROW Grant issued in 1984 for the 345-kilovolt transmission line incorporated access roads, and a large portion of the access roads requested for the 115-kilovolt transmission line are already authorized for the existing 345-kilovolt transmission line.

Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario

Lands and realty *(continued)*	Delta–Montrose Electric Association, Elevate fiber optic installation. Delta–Montrose Electric Association proposed installing approximately 3,000 miles of fiber optic cable to offer high-speed internet to its entire service area. Most of this fiber would be installed along existing infrastructure, and much of the installation would or has occur(ed) on BLM-administered lands through ROW grants.
	Montrose County proposed a Recreation and Public Purposes Act lease/conveyance of approximately 1,000 acres as a multi-use recreation area for nonmotorized single-track, OHV use, and as a staging area for the Rimrocker Trail. The proposal includes up to 40 acres for constructed facilities (e.g., parking, restrooms, and trailheads), a 10-acre OHV obstacle course, and up to 13 miles of single-track.
	An all-weather paved road has been proposed to be constructed over the Uncompahgre Plateau from Montrose to Nucla, Colorado, using existing graveled roads, with some realignment. The Forest Service Norwood Ranger District has begun environmental analysis.
	Delta County Master Plan (Delta County 1996). Countywide land use and growth plan for Delta County.
	Gunnison County Land Use Resolution (Gunnison County 2016).
	Mesa County Master Plan (Mesa County 2000). Countywide land use and growth plan for Mesa County; it has been amended several times annually from 2010 until 2016.
	Montrose County Master Plan (Montrose County 2010). Countywide land use and growth plan for Montrose County; it has been edited several times, including in 2006 and 2010.
	Ouray County Master Plan (Ouray County 1999). Countywide land use and growth plan for Ouray County.
	Ouray County Land Use Code (Ouray County 2005). Countywide land use code for Ouray County.
	San Miguel County Comprehensive Development Plan (San Miguel County 2008). Countywide land use and growth plan for San Miguel County.
Roadway development	Road construction has occurred in association with timber harvesting, historic vegetation treatments, energy development, and mining on BLM-administered lands, private lands, State of Colorado lands, and National Forest System lands. The bulk of new road building is occurring for community expansion and energy development. Road construction is expected to continue at the current rate on BLM and National Forest System lands; the future rate is unknown on private and State of Colorado lands.

Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario

Water diversions	The UFO has been and will continue to be affected by irrigation and drinking water diversions. Reservoir operations have affected water supply, aquatic conditions, and timing. Irrigation rights are expected to continue being bought and sold in the future, with some new property owners informally changing how the right was historically used. Due to population growth and land sales, more agricultural water rights may be converted to municipal and industrial uses. Future oil shale development in the region could also result in water diversions.
Water	The Natural Resources Conservation Service and BOR have been replacing irrigation ditches with buried pipe to conserve water and reduce salinity and selenium within the Colorado River system.
	In 2016, the Town of Paonia replaced its current 2-million-gallon water treatment plant, added an additional 2 million gallons of treated water storage, and incorporated hydropower components on the water lines in an effort to reduce plant costs with sustainable energy.
	Montrose County holds the following conditional water rights within the San Miguel watershed: Maverick Draw Reservoir No. 1 (6,700 acre-feet), Maverick Draw Reservoir No. 2 (5,600 acre-feet), Big Bucktail Reservoir (5,000 acre-feet), Tuttle Draw Reservoir (1,200 acre-feet), Nucla Pump Site and Pipeline (2.31 cubic feet per second), Highline Canal (3.11 cubic feet per second), Nucla Town Reservoir (1,200 acre-feet), and Paradox Valley Pipeline (1.0 cubic feet per second). The water right decree for these structures specifies that aggregate annual usage from all the decreed structures is limited to 3,200 acre-feet.
Spread of noxious/ invasive weeds	Noxious weeds, including tamarisk, have invaded and will continue to invade many locations in the Planning Area. Noxious weeds are carried by wind, humans, machinery, and animals. The BLM UFO currently manages weed infestations through integrated weed management, including biological, chemical, mechanical, manual, and educational methods. The 1991 and 2007 Records of Decision for Vegetation Treatment on BLM Lands in Thirteen Western States (BLM 2007a), and the 2007 Programmatic Environmental Report (BLM 2007g), guide the management of noxious weeds in western states. The BLM UFO finalized a noxious weed management strategy in 2010 (BLM 2010c) that guides the treatment of weeds in the field office. A programmatic environmental assessment for integrated weed management treatments was approved in 2013. Noxious and invasive weeds are expected to continue to spread on all lands. Due to their ability to tolerate certain conditions, some species are expected to remain a serious long-term challenge in the Planning Area.
	Delta County Noxious Weed Management Plan (Delta County 2010).
	Dolores River Riparian Action Plan: Recommendations for Implementing Tamarisk Control and Restoration Efforts (Tamarisk Coalition 2010).
	Gunnison River Watershed Integrated Weed Management Plan (Gunnison County 2012b).
	Mesa County Noxious Weed Management Plan (Mesa County 2017).
	Montrose County Weed Management Plan (Montrose County 2011).

Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario

Spread of noxious/ invasive weeds *(continued)*	Ouray County Weed Management Plan (Ouray County 2018).
	San Miguel County Weed Control Program (San Miguel County 2012).
	Town of Ridgway, Ridgway Comprehensive Plan; Integrated Weed Management and Native Plant Restoration (Town of Ridgway 2011).
	Horsefly Coordinated Weed Management Strategy, including Strategy by Species (Uncompahgre Plateau Project 2010)
	Tabeguache Coordinated Weed Management Area Plan (Uncompahgre Plateau Project 2007b)
	Paradox Coordinated Weed Management Area Plan (Uncompahgre Plateau Project 2008).
Wildland fires	Fires within the Planning Area are both naturally occurring and used as a management tool. Naturally occurring fires have been widely distributed in terms of frequency and severity. Increasing recurrence and severity of drought conditions have been predicted for this area as a result of climate change. This could, in turn, increase the occurrence and severity of wildfires on BLM-administered land.
Spread of forest insects and diseases	Several years of drought in western states have resulted in severe stress on pine trees. This stress has made the trees less able to fend off attacks by insects such as mountain pine beetles. Mountain pine beetle infestation has been occurring in Colorado since 1996, and some pinyon pine stands in the Planning Area have experienced ips beetle kill. Sudden Aspen Decline is also impacting parts of the Planning Area.
Drought	For much of the last decade, most of the western US has experienced drought. Inflows to Lake Powell (indicative of the Upper Colorado Basin) have been below average since 2000, and Colorado regularly goes through periods of drought that may be statewide, region-wide, or within a more localized area. Agriculture, drinking water supplies, and wildland fires are all impacted by drought.
Climate change	Increased concern over greenhouse gas emissions and global warming issues may lead to future federal and state regulations limiting the emission of associated pollutants.
Air Quality	The area near Telluride is in the Telluride PM10 maintenance area. The area is currently in compliance with all applicable National Ambient Air Quality Standards. For as long as the area remains in maintenance, the BLM will analyze any authorized activities in accordance with the provisions of the General Conformity Rule and document any findings in the applicable authorizing NEPA document.
Other	Forest Service Special Areas; Roadless Area Conservation; Applicability to the National Forests in Colorado; Final Rule (77 *Federal Register* 39576-39612, 3 July 2012). The Colorado Roadless Rule provides management direction for conserving and managing approximately 4.2 million acres of Colorado Roadless Areas on National Forest System lands.

4.3 RESOURCES

This section contains a description of the biological and physical resources of the Uncompahgre RMP Planning Area and follows the order of topics addressed in **Chapter 3**:

- Air quality and climate
- Soils and geology
- Water resources
- Vegetation
- Fish and wildlife
- Special status species
- Wild horses
- Wildland fire ecology and management
- Cultural resources
- Paleontological resources
- Visual resources
- Lands with wilderness characteristics

4.3.1 Air Quality and Climate

Air resources were evaluated within the Planning Area to determine how air quality could be affected by future federal actions implemented under this RMP. Actions that initiate or increase emissions of air pollutants can result in negative effects on air resources including increased concentrations of air pollutants, decreased visibility, increased atmospheric deposition on soils and vegetation, and acidification of sensitive water bodies. Actions that reduce or control emissions of air pollutants can be very effective at improving air quality and preventing degradation. This section addresses the potential effects of air pollutant emissions from specific activities that would be authorized, allowed, or performed by the BLM under each alternative within the Planning Area. The Colorado Air Resource Protection Protocol (**Appendix H**) provides details of the processes and the approach to protecting air quality and permitting/authorizing activities. The 2015 Annual Report on the Colorado Air Resource Protection Protocol (BLM 2015e) places up-to-date information on oil and gas development and the state of the atmosphere in the context of the Colorado Air Resource Management Modeling Study (CARMMS). The CARMMS provides cumulative analyses for multiple projected oil and gas development scenarios in Colorado through year 2021 (CARMMS 1.5; Vijayaraghavan et al. 2016) and year 2025 (CARMMS 2.0; Vijayaraghavan et al. 2017). The CARMMS 2.0 (Vijayaraghavan et al. 2017) future year 2025 results for the Uncompahgre RMP Planning Area source emissions and for cumulative (regional) source emissions are used to estimate potential impacts on air quality and air quality related values from RMP alternatives and cumulative sources. Data from the 2015 Annual Report on the Colorado Air Resource Protection Protocol (BLM 2015e) for the UFO is incorporated by reference in this analysis to describe the cumulative impacts associated with the potential Uncompahgre RMP projected emissions. Information for the sections of the Annual Report (BLM 2015e), where they can be found in the Report, that are specifically being incorporated is provided with the potential impact discussions in the subsections of this air resources section.

The air resource section is structured with an executive summary first followed by sub-sections with more detailed air quality potential impacts analysis and supplemental information. The following sub-sections analyzes air quality impacts that could occur if all projected resource growth and development under each RMP alternative occur relative to baseline conditions (**Chapter 3**). Note that regardless of the information provided in this air resource section, air quality is a constantly changing resource and air

quality modeling and analysis tools (e.g., CARMMS and annual reporting) will be continually updated with new information to reassess the current state of the atmosphere and the potential impacts that could occur due to any proposed action for authorizing new BLM UFO projects.

Executive Summary of Potential Impacts and Conclusions

The potential for BLM actions to contribute to future significant adverse impacts on air quality was analyzed in the context of existing air quality conditions within the Planning Area and predicted future growth in emission generating activities. Potential emissions of air pollutants were estimated for several BLM management actions and activities that are likely to occur under each alternative and that have the potential to generate quantifiable emissions of regulated air pollutants. The estimated emissions were compiled in an emissions inventory which is summarized in **Appendix Q** (Air Emission Inventory Technical Support Document). Total estimated emissions as well as predicted increases in emissions were analyzed to develop air resource management goals, objectives, and actions that would be effective in minimizing future impacts on air quality. The resulting adaptive management strategy is described in detail in **Appendix H** (Colorado BLM Comprehensive Air Resource Protection Protocol).

Emissions were estimated for five criteria pollutants, volatile organic compounds, hazardous air pollutants, and greenhouse gases. Emissions of lead were not calculated because there are no significant sources emitting lead emissions within the Planning Area. Fluorinated gases are not expected to be emitted in appreciable quantities by any category considered in this management action and were therefore not included in this analysis. A base year of 2015 was used to estimate actual (existing) emissions. Potential emissions were also estimated for reasonably foreseeable activities within the Planning Area out to year 2025 (Year 10) to serve as the basis for evaluating potential increases in emissions over the life of the RMP.

Estimated absolute emissions from BLM actions and estimated changes in emissions from BLM actions over base-year levels vary by pollutant and alternative. In general, the major contributor to total pollutant emissions growth over the life of the plan is predicted to be predominantly attributable to activities associated with oil and gas development. Activities associated with underground coal mining and surface uranium and vanadium mining are also predicted to be major contributors to particulate matter emissions, albeit at levels consistent with current conditions.

Existing air quality conditions, geographic characteristics, and estimated air pollutant emissions for each alternative were evaluated to identify pollutants of concern and activities that emit significant quantities of pollutants of concern and to identify potential adverse impacts on air quality. The identification of the following pollutants, activities, and potential impacts under each alternative was used to design air quality management goals and objectives listed in **Chapter 2** (Alternatives) and **Appendix H** (Colorado BLM Comprehensive Air Resource Protection Protocol):

- The magnitude of estimated non-greenhouse gas emissions from BLM-authorized oil and gas activities at the level of development predicted over the life of the RMP in Alternatives A, B, B.I, C, D, and E have the potential to contribute to increased ambient concentrations of ozone in, adjacent to, and outside and downwind of the Planning Area.
- The magnitude of and increases in estimated emissions from BLM-authorized oil and gas activities at the level of development predicted in Alternatives A, B, B.I, C, D, and E have the potential to degrade visibility and increase atmospheric deposition at sensitive areas such as the Maroon Bells – Snowmass Wilderness Area.
- The magnitude of and increases in estimated emissions from BLM-authorized oil and gas activities predicted in Alternatives A, B, B.I, C, D, and E could cause impacts related to short-term and long-term exposure to hazardous air pollutants.

- The magnitude of and increases in estimated emissions from solid mineral development, including underground coal mining and uranium and vanadium surface mining, at the level predicted for all alternatives over the life of the RMP could cause impacts related to fugitive dust, increased ozone formation, visibility degradation, and atmospheric deposition in, adjacent to, and outside and downwind of the Planning Area.
- The estimated levels of development predicted in all alternatives for solid mineral development and oil and gas development have the potential to result in increases of direct and indirect greenhouse gas emissions

Baseline and Projected Direct Potential Emissions (Non-Greenhouse Gas) Estimates for Each Alternative

In general, Alternative B.I emission estimates result in the lowest total air pollutant emissions in future planning years and decrease in emissions of some pollutants over the base year. Lower emissions are expected for Alternative B.I because it includes lower predicted reasonably foreseeable development for oil and gas than Alternatives A, B, B.1, C, D, and E. Alternative B.1 would likely result in the least adverse impacts on air quality.

Alternative C emission estimates result in the greatest increases in total air pollutant emissions. Alternative C imposes the least restrictions on solid mineral development and includes the highest rate of oil and gas development of the alternatives, generally resulting in the highest emissions. This alternative has the highest potential for adverse impacts on air quality. Alternative D has slightly higher sulfur dioxide emissions than the other alternatives due to increases in mechanical vegetation treatments; however, the overall potential for adverse impacts on air quality would occur under Alternative C.

The total direct (upstream and local midstream) emissions estimated for Alternative A result in the third-lowest emissions (non-greenhouse gas). The Proposed RMP (Alternative E) results in the second-highest estimated emission levels. **Table 4-2** (Estimated Direct Annual Emissions Summary BLM Actions in the Uncompahgre Planning Area) summarizes the estimated annual emissions for each alternative by pollutant.

Table 4-2
Estimated Direct Annual Emissions Summary BLM Actions in the Uncompahgre Planning Area

Scenario/Alternative	Emissions (tons per year)						
	VOC	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	HAPs
Baseline	204	731	256	620	165	6	23
Planning Year 10							
Alternative A	555	1,561	1,187	1,290	417	16	62
Alternative B	545	1,542	1,193	1,186	411	17	62
Alternative B.1	518	1,493	1,152	1,177	408	17	58
Alternative C	653	1,801	1,322	1,336	429	17	73
Alternative D	610	1,716	1,276	1,250	422	17	69
Alternative E	614	1,742	1,282	1,297	428	17	69

Source: Appendix Q (Air Emission Inventory Technical Support Document)
VOC = volatile organic compounds; CO = carbon monoxide; NO_X = nitrogen oxides; PM_{10} = particulate matter smaller than 10 microns in effective diameter; $PM_{2.5}$ = particulate matter smaller than 2.5 microns in effective diameter; SO_2 = sulfur dioxide; HAPs = Hazardous Air Pollutants

Project-Level Near-Field Analyses for Future Proposed Actions

Over the life of the plan, BLM will complete project-specific near-field analysis to support project-level NEPA assessments when emissions inventories for actual projects are developed. In instances when project-level oil and gas development plans compare well with levels analyzed in recent UFO oil and gas development Environmental Assessments, the BLM may utilize and apply the discussion and analyses that have already been completed for future Environmental Assessments. For new development plans that seem unique with respect to topography or location, or have levels of projected resource development / potential emissions beyond what has been already analyzed, new near-field modeling analyses will be conducted on a case-by-case basis using impact assessment tools developed by BLM Colorado and other agencies with air quality expertise.

Local Air Quality Monitoring to Support Resource Protection

In April 2018, the BLM began operating an air quality monitoring station at Paonia High School in the Planning Area. This station was established to assess potential impacts on nearby North Fork Valley communities as new oil and gas development and other emissions generating activities occur in the area. Ozone and nitrogen dioxide concentrations collected at this station will provide for useful information for assessing potential oil and gas-related impacts, while particulate matter (less than 10 and less than 2.5 microns in diameter) concentrations will assist in dust impacts analyses associated with local coal mining.

Regional Air Quality Modeling – Potential Cumulative and UFO Contributions to Cumulative Impacts

Information from the CARMMS 2.0 Report (Vijayaraghavan et al. 2017) is incorporated by reference into this EIS to support the quasi- (UFO emissions sources) and full cumulative impacts analysis. Summary-level CARMMS 2.0 air quality modeling impacts information specific to future activities in the UFO and for full cumulative inventories are provided in this RMP, as follows:

- CARMMS 2.0 (Vijayaraghavan et al. 2017) modeled three future year 2025 oil and gas emissions scenarios (low, medium, and high). For the low, medium, and high oil and gas modeling scenarios, there were no (0) days predicted with visibility change delta-deciview above 0.5 for all Class I and sensitive Class II areas, due to projected emissions for the UFO source group (source group G for CARMMS 2.0).
- For cumulative visibility changes from year 2011 to 2025 for the worst 20 percent days of visibility, the CARMMS 2.0 model predicted a 0.23 deciview improvement at Maroon Bells – Snowmass Wilderness for the high modeling scenario, and 0.28 deciview and 0.24 deciview improvements for the low and medium modeling scenarios, respectively.
- The largest annual nitrogen deposition impacts for the UFO oil and gas source group are predicted to occur at nearby sensitive Class II area Raggeds Wilderness. For the UFO source group, CARMMS 2.0 predicts 0.0243, 0.0171, and 0.0007 kilograms per hectare per year for the low, medium, and high scenarios, respectively, at nearby Raggeds Wilderness.
- For cumulative annual nitrogen deposition changes from year 2011 to 2025 for nearby Class I area Maroon Bells – Snowmass Wilderness (approximate same location as Raggeds Wilderness with respect to emissions sources), CARMMS 2.0 predicts an overall 0.34 kilograms per hectare per year improvement for the high scenario, and 0.46 and 0.35 kilograms per hectare per year for the low and medium scenarios, respectively.
- Overall ozone design values are predicted to improve throughout the region, with 19 Colorado (mostly along the Front Range) monitoring stations base year 2011 ozone design values above 70 parts per billion predicted to be reduced to 8 stations with future year 2025 ozone design values above the ozone standard (70 parts per billion) for the high scenario, and reduced to 6 and 8 monitoring stations above 70 parts per billion for the low and medium modeling scenarios, respectively.

- For UFO oil and gas source group contributions to cumulative ozone concentrations, the maximum contributions to the fourth-highest daily maximum 8-hour ozone concentrations are 0.8, 0.0, and 0.6 parts per billion for the high, low, and medium modeling scenarios, respectively.
- For UFO oil and gas source group contributions to cumulative particulate matter smaller than 2.5 microns in diameter concentrations, the maximum contributions to the eighth-highest 24-hour particulate matter smaller than 2.5 microns in diameter concentrations are 0.2, 0.0, and 0.2 micrograms per cubic meter for the high, low, and medium CARMMS 2.0 modeling scenarios, respectively.

As described above, there are no days that the model predicts that UFO emissions would result in significant visibility changes, and the predicted ozone concentration contributions from UFO emissions are below the EPA recommended (EPA 2018a) 1.0 parts per billion significant impact level for prevention of significant deterioration emissions source evaluations, UFO emissions are predicted to contribute at levels below the significant impact level for particulate matter smaller than 2.5 microns in diameter 24-hour for each CARMMS 2.0 modeling scenario. Overall cumulative annual nitrogen deposition is expected to improve at nearby and regional Class I / Class II areas, and UFO source group contributions to cumulative annual nitrogen deposition are predicted to be above the project-level deposition analysis threshold, 0.005 kilograms per hectare per year for the high and medium scenarios, and below the deposition analysis threshold for the low scenario. Note that the deposition analysis threshold is a project-level threshold that impacts for actual proposed projects should be compared with.

Baseline and Projected Potential Emissions (Greenhouse Gas) Estimates for Each Alternative and Climate Change Discussion

In addition, total direct (upstream and local midstream) greenhouse gas emissions estimates were developed for each alternative to compare direct greenhouse gas emissions totals across the alternatives. **Table 4-3**, Estimated Direct Annual Greenhouse Gas Emissions Summary for Decision Area BLM Activities by Alternative, shows greenhouse gas emissions totals by alternative for BLM/federal activities only and were developed using RMP-specific information for the alternatives, along with CARMMS 2.0 (Vijayaraghavan et al. 2017) calculators (for oil and gas).

Table 4-3
Estimated Direct Annual Greenhouse Gas Emissions Summary for Decision Area BLM Activities by Alternative

	Emissions (tons per year)			
Scenario	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Base Year	53,257	56,677	6	1,982,199
Planning Year 10				
Alternative A	283,988	63,374	10	2,441,879
Alternative B	295,458	63,147	13	2,446,351
Alternative B.1	280,175	62,535	12	2,410,207
Alternative C	318,375	64,758	10	2,523,144
Alternative D	313,313	64,122	12	2,497,194
Alternative E	314,717	64,532	12	2,512,570

Source: BLM 2018a; Vijayaraghavan et al. 2017
CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrogen dioxide; CO_2e = carbon dioxide equivalent

Direct greenhouse gas emissions are estimated to increase for all alternatives over the estimate base year emissions. Alternatives A and B show increases in greenhouse gas emissions from the base bear of approximately 23 percent. Alternative B.1 shows the lowest increase from base year, approximately 22 percent. Alternative D shows increases in greenhouse gas emissions from the base year of

approximately 26 percent, and Alternatives C and E show the highest increase from the base year of approximately 27 percent (percent increase for Alternative C is slightly larger than for Alternative E). Indirect (downstream end-use) greenhouse gas emissions estimates for 30 years of projected future UFO oil and gas production are provided in the *Greenhouse Gases and Climate Change* subsection below.

The Golder Associates (2017) Report developed for the BLM provides greenhouse gas and climate change information, and some of that information based on Intergovernmental Panel on Climate Change reports and studies can also be found in the BLM Colorado's Annual Report on the Colorado Air Resource Protection Protocol, incorporated by reference into this RMP. The Golder Associates (2017) Report uses future projected Intergovernmental Panel on Climate Change radiative forcing scenarios or global representative concentration pathways (greenhouse gas concentration trajectories) to describe the BLM's potential relative contribution to future global greenhouse gas concentrations / climate change forcing. For that Report Golder Associates (2017), it describes that if the BLM operates under the business-as-usual scenario, while all other contributors are reducing their emissions in line with representative concentration pathway 2.6 (the lowest Intergovernmental Panel on Climate Change radiative forcing scenario that will require substantial global greenhouse gas emissions reductions), the relative contribution of BLM-administered lands increase as the greenhouse gas emissions more closely resemble representative concentration pathway 4.5 (higher radiative forcing/climate change impact scenario). If the BLM operates under the decreased emissions scenario, keeping their reductions in line with representative concentration pathway 2.6 like all other contributors, the relative contribution of BLM-administered lands remains similar to current contributions. As described for the alternatives, natural gas development in the Planning Area is predicted to increase, which is consistent with the overall US energy forecasts. Coal mining rates are predicted to remain almost static for the Planning Area for all alternatives, and because overall nationwide and Colorado federal coal mining production is predicted to decrease, the contribution of Planning Area coal mining greenhouse gas emissions to overall US/global greenhouse gas emissions inventories may constitute a higher percentage, possibly resulting in a larger climate change impact contribution for future UFO coal mining operations. To stay consistent with the overall 2016 US Energy Information Administration 2016 Annual Energy Outlook energy production/consumption projections, Colorado federal coal production would need to be reduced by 2.71 percent by year 2030 for the normal growth rate scenario, and be reduced by 2.51 percent for the high energy growth scenario.

Potential Mitigation over the Life of the Plan

Colorado has some of the strictest emissions regulations in the US for the oil and gas industry. It is reasonable to assume that BLM Colorado oil and gas-related emissions will follow the US-wide emissions pathways/greenhouse gas emissions trends based on regulation/policy, and it is reasonable to assume that Colorado regulations will reduce Colorado-based emissions even more than other states due to increased oil and gas emissions control requirements for Colorado. Additional (beyond state and federal regulations) mitigation requirements for oil and gas and mining projects will be developed at the project-level stage when proposed actions are submitted to the BLM. The BLM will continue to require that project activities follow BMPs and will continue to encourage operators to control unnecessary emissions using common sense and feasible techniques.

In addition, as future oil and gas development occurs in Colorado, modeling results for all CARMMS scenarios will be used to correctly assess the levels (pace) of oil and gas development and corresponding air quality impacts for each BLM Colorado Planning Area / Field Office for making implementation decisions. The current (2015) Annual Report (BLM 2015e) assesses how current oil and gas development and emissions are tracking with respect to emissions and impacts modeled in CARMMS for each BLM Colorado Field Office (including the UFO Planning Area), and assesses the need for additional mitigation requirements for Federal oil and gas emissions sources in Colorado.

Methods and Assumptions

The air resource impact analysis consisted of a comparative emissions approach to evaluate existing emissions levels and air quality conditions compared to estimated future emissions for each alternative based on predicted rates of growth and decline and the potential for impacts on future air quality conditions. The purpose of conducting the emissions based analysis was to evaluate the magnitude of emissions of each pollutant from BLM-authorized activities to identify the potential for those emissions to cause adverse impacts on air quality in the context of existing air quality conditions. By identifying those activities with significant estimated emissions, the BLM can focus its air resource management efforts effectively. The emissions-based analysis was also used to evaluate increases in emissions from each activity over a base year for each alternative. This information is useful for evaluating the effect of various management actions on air emissions and for evaluating the effect of emission control strategies. This information is ultimately used to inform the selection of effective resource management actions under this RMP. This approach included the following steps:

1. Evaluating existing air quality conditions based on available air monitoring data and identifying air quality issues (see **Section 3.1.1** [Air Quality])
2. Identifying management actions and activities authorized, permitted, or allowed by BLM within the Planning Area that generate air pollutant emissions
3. Compiling base-year operational and production data for each identified emission-generating activity
4. Compiling projected future development, operational, and production data for each identified emission-generating activity for a selected future year (2025, which coincides with available CARMMS analysis data)
5. Calculating estimated current and projected future emissions of specific air pollutants for identified management actions and activities for each alternative and compiling the calculations in an emissions inventory (**Appendix Q**, Air Emission Inventory Technical Support Document)
6. Analyzing the magnitude of predicted emissions for each activity and changes in estimated emissions over the base year and between alternatives to determine the potential for future significant impacts on air quality
7. Evaluating increases in estimated emissions from future BLM actions in the context of potential cumulative emissions within the Planning Area

Refer to Appendix Q for list of emission-generating activities and air pollutants that could potentially be emitted by management actions and activities authorized, permitted, allowed, or performed under this RMP.

Operational, production, and construction activity data used to estimate emissions for proposed emission sources were obtained from UFO staff, the Reasonable Foreseeable Development Scenario for Oil and Gas for the UFO, Colorado (BLM 2012d), and from NEPA analyses currently being conducted for BLM actions within the Planning Area. Emission factors used to estimate proposed emissions were obtained primarily from EPA's AP-42 Compilation of Air Pollutant Emission Factors (EPA 1995), EPA's nonroad engines, equipment, and vehicles emissions model (EPA 2009), EPA's Motor Vehicle Emissions Simulator (EPA 2010a), American Petroleum Industry Compendium of Greenhouse Gas Emissions Estimation Methodologies for the Oil and Natural Gas Industry (American Petroleum Industry 2009), Colorado Department of Public Health and Environment, and Western Governors' Association – Western Regional Air Partnership (2005).

Given the uncertainties concerning the number, nature, and specific location of future emission sources and activities, the emission comparison approach provides an appropriate basis to compare the potential impacts under the various alternatives. Major assumptions used in this impact analysis include the following:

- Air pollutant emissions presented in this analysis are useful for comparing the relative impacts of each alternative and may not represent actual future emissions. Emissions estimates are based on predictions of future mineral resource development potential scenarios rather than actual development projects.
- Stationary sources associated with oil and gas development will operate in accordance with Colorado Department of Public Health and Environment's Regulation 7 (Colorado Department of Public Health and Environment 2012b).
- Emissions from the following management actions were not estimated because the potential for development was considered low or speculative: oil shale research and development; geothermal, potash, gold, copper, and silver exploration and development; and miscellaneous gems and other mineral material development.
- Emissions from the following management actions were not estimated because 1) the level of activity is not expected to change between alternatives, and 2) the magnitude of emissions from the activity is considered to be very small in comparison to other management activities, or 3) sufficient operational or production data was not available to reliably quantify emissions: wild (unplanned) fires, fire suppression aircraft, invasive species and pest management, grassland and shrub land management, wild horse management and activities related to heritage and visual resources, socioeconomic resources, and fish and wildlife resources.

For additional information on the emissions inventories (baseline and projected inventories for each Alternative), including a more detailed description of the methodologies and assumptions used in this analysis, and comparisons of potential emissions estimates across the Alternatives, refer to the Uncompahgre Field Office, Air Emission Inventory Technical Support Document (**Appendix Q**).

Effects Common to All Alternatives

Air pollutant impacts include changes in air quality (air pollutant concentrations) and air quality-related values (changes in visibility, impacts on soils and vegetation from atmospheric deposition, and changes in lake chemistry). Several key factors, such as the magnitude and chemistry of the air emissions, meteorological conditions, and topography, play a role in determining the severity of these impacts. Emissions were quantified for each of the alternatives and were compared to the base year to provide an indication of the potential magnitude of impacts on air quality that could be expected. All of the alternatives result in changes to emissions of air pollutants relative to the base year and will result in impacts that have the potential to both improve and degrade air quality, depending on the pollutant. The CARMMS analysis presented here summarizes the estimated impacts on air quality and air quality-related values from alternative emissions.

Several federally designated Class I airsheds and sensitive Class II areas are located within 62 miles (100 kilometers) of the Planning Area. Relative to the Planning Area, the Black Canyon of the Gunnison National Park Class I airshed is inside, Arches and Canyonlands National Parks Class I airsheds are west, the Class II Colorado National Monument is west-northwest, the Class I Flat Tops Wilderness Area is north, the Class I Eagles Nest Wilderness is northeast, the Class I Maroon Bells-Snowmass and West Elk Wildernesses and Class II Raggeds Wilderness are east, and the Class I La Garita and Weminuche Wildernesses and Mesa Verde National Park are south. For all of the alternatives, the magnitude of emissions from oil and gas and coal and uranium mining development has the potential to impact air quality and air quality-related values (i.e., visibility and atmospheric deposition) within these areas.

Emissions from oil and gas (fluid minerals) development are a major contributor to total estimated emissions under all alternatives. For the Planning Area, this category includes conventional oil and gas and coalbed natural gas development. Activities quantified in this category include well drilling and completion, road and well pad construction, flaring and venting, compressor operations, dehydrator and

separator operations, tank venting and load out, wellhead fugitives, pneumatic device operations, and vehicle traffic. The quantities of emissions estimated from these activities are based on reasonably foreseeable estimates of development rates, well counts, production rates, and existing technologies. The emissions numbers should not be considered definitive and may not reflect actual emissions at the time of development. Although the quantity of emissions calculated for this category may not represent actual emissions from eventual development, the magnitude of estimated emissions of several pollutants for this source category is considerable. Emissions of nitrogen oxides and volatile organic compounds from this category could impact air quality under each of the alternatives. These impacts could include increased ambient concentrations of nitrogen oxides and increased ozone formation.

Nitrogen oxides and $PM_{2.5}$ emissions from oil and gas development under all alternatives could contribute to visibility degradation and increases in atmospheric deposition. Emissions of PM_{10} from this category could potentially result in increases in ambient concentrations of fugitive dust resulting in localized impacts on vegetation, decreases in visibility, and increases in atmospheric deposition. Hazardous air pollutants emissions could increase the risk of localized human health impacts. The emissions estimated for carbon monoxide under each alternative for this category may have the potential to increase ambient concentrations and contribute to the formation of ozone. Estimated sulfur dioxide emissions for this category under each alternative are minor and would not significantly impact air quality and air quality-related values.

Another large contributor to total air pollutant emissions under each alternative is the category of solid minerals development. For the Planning Area, this category includes underground coal mining, uranium and vanadium surface mining, and sand and gravel sales. The primary pollutant of concern from this category is particulate matter, PM_{10} and $PM_{2.5}$. Particulate matter emissions (fugitive dust) are primarily caused by earth moving activities and vehicular traffic on unpaved roads and surfaces associated with mine development and operation. Particulate matter emissions from this category under all of the alternatives could impact air quality, including increases in ambient concentrations of fugitive dust resulting in localized impacts on vegetation and decreases in visibility. Estimated emissions of nitrogen oxides, volatile organic compounds, and carbon monoxide from combustion sources at mining facilities are potentially significant. Emissions of these pollutants could result in increased ozone formation. Estimated emissions of sulfur dioxide and hazardous air pollutants from this source category for all alternatives are minor and would not significantly impact air quality.

The Colorado Department of Public Health and Environment has the authority to implement emission controls for stationary sources that are required to obtain air permits under Colorado Air Quality Control Commission Regulations and to ensure that these sources do not contribute to an exceedance of an ambient air quality standard. The BLM works in cooperation with the Colorado Department of Public Health and Environment and other federal agencies to share, review, and analyze emissions data, modeling results, and mitigation measures for significant development projects. This cooperation would continue under all alternatives. In addition, the BLM could require implementation of BMPs and mitigation measures within its authority to minimize impacts on air quality from development projects. Determination and application of such measures would be completed during project approval and would be subject to NEPA analysis at that time. (See **Appendices G** [Best Management Practices and Standard Operating Procedures] and **H** [Colorado BLM Comprehensive Air Resource Protection Protocol] for additional information on BMPs.)

As described in **Table 4-1**, Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario, two recent proposed UFO oil and gas projects were evaluated for NEPA and approved, including the Gunnison Energy/SGI dual proposal (approximately 25 new wells) and the Bull Mountain Unit Master Development Pan (approximately 146 new wells). A

project-level modeling analysis using AERMOD[1], CALPUFF[2], and CARMMS was completed for both of these projects and compared predicted impacts of the proposed actions to applicable project-level air quality parameter impact thresholds. Appropriate mitigation and requirements were established as a result of the air quality modeling analyses for these projects. The wells for these projects, totaling approximately 170 new federal wells, are included in the total well counts for the alternatives. Because the development and operations of these approximately 170 wells has already been analyzed, the remaining wells for each alternative not analyzed in the completed projects would be the subject of future project-level impact assessments where project-specific modeling would be conducted for each proposed project, and any potential mitigation would be determined as needed.

The recently completed and adopted Forest Service Supplemental Final EIS for the Federal Coal Lease Modifications for the West Elk Mine (Forest Service 2017a) includes a comprehensive air resources assessment. The air resource section includes subsections with information that is incorporated by reference in this Uncompahgre RMP for future West Elk mined coal combustion, greenhouse gas emissions (upstream, midstream, and end-use), black carbon, and climate change, with an entire section dedicated to possible mitigation options for greenhouse gases. Alternative 3 of the Supplemental Final EIS was selected by the Forest Service and adopted by the BLM (see details in Forest Service 2017a and 2017b). No additional mitigation is being required for the mine expansion, and the supporting rationale for the Forest Service's decision is on page 15 of the Forest Service's ROD (Forest Service 2017b). The West Elk Mine operates under an air quality permit issued by the Colorado Department of Public Health and Environment, and activities associated with the approved mining expansion (lease modifications) are not anticipated to require a modification of existing, or the application for new, air quality permits. Air pollutant emissions from the West Elk Mine are expected to remain almost constant with current annual emissions rates, meaning that almost no air quality related impact changes from current impacts are expected.

Discussion of Potential Coal-Related Indirect Impacts for Non-Greenhouse Gas Pollutants

As described in the previous section, the BLM adopted the Forest Service's Supplemental Final EIS for the Federal Coal Lease Modifications for the West Elk Mine (Forest Service 2017a), which is incorporated by reference. Section 3.4.2.2 of that EIS (Forest Service 2017a) provides a detailed discussion of the potential non-greenhouse gas indirect impacts that could be associated with future UFO coal mining and subsequent activities (coal transport and combustion). As explained in the West Elk EIS (Forest Service 2017a), it can be reasonably assumed that the future coal mined from the West Elk Mine will be shipped and consumed by a coal-fired power plant, but it is unknown which facilities will use the coal, and what forms of emission control affecting air pollutant emissions and dispersion will be in place at those facilities. In addition, because critical parameters for a facility-level indirect impact analysis, including existing air quality conditions, proximity to receptors, and meteorological profiles, were unknown, it was not feasible to conduct a refined indirect impacts analysis for criteria and other hazardous air pollutants. This necessary information remains unavailable and continues to limit the agencies' ability to forecast indirect emissions from the coal produced at this mine. However, coal-fired power plants are required to meet state and federal standards and to follow an extensive New Source Review permitting process that usually requires facility-specific air quality modeling and emissions controls. Indirect greenhouse gas emissions and potential climate change impacts for future UFO coal production are discussed in the following section.

[1]A model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain
[2]A multi-layer, multi-species non-steady-state puff dispersion model that simulates the effects of time- and space-varying meteorological conditions on pollution transport, transformation, and removal

Greenhouse Gases and Climate Change

Concentrations of certain gases in the earth's atmosphere have been identified as being effective at trapping heat reflected off the earth's surface, thereby creating a "greenhouse effect." As concentrations of these greenhouse gases increase, the earth's surface warms, the composition of the atmosphere changes, and global climate is affected. Concentrations of greenhouse gases have increased dramatically in the earth's atmosphere in the past century. These increases, particularly for carbon dioxide, methane, nitrous oxide, and fluorinated gases, have been attributed to anthropogenic (human-made) sources and human activities (EPA 2010b).

The EPA has determined that six greenhouse gases are air pollutants and subject to regulation under the Clean Air Act: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Of these greenhouse gases, carbon dioxide, methane, and nitrous oxide are commonly emitted by the types of activities included in this analysis, while the remaining three greenhouse gases are emitted in extremely small quantities or are not emitted at all. Greenhouse gas emissions from management actions and activities were estimated for each alternative in this analysis for the following pollutants:

- Carbon dioxide
- Methane
- Nitrous oxide

As the major component of natural gas, methane emissions from underground mining operations and oil and gas exploration and development can be considerable. Emissions of carbon dioxide and nitrous oxide from fossil fuel combustion and fire can also be of concern. This analysis quantified emissions of carbon dioxide, methane, and nitrous oxide from the same management actions and activities for each alternative as for the criteria pollutants.

A greenhouse gas's ability to contribute to global warming is based on its longevity in the atmosphere and its heat trapping capacity. In order to aggregate greenhouse gas emissions and assess their contribution to climate change, the EPA has assigned each greenhouse gas a global warming potential that is used to calculate carbon dioxide equivalents. The carbon dioxide equivalence for each greenhouse gas is calculated by multiplying the quantity of emissions by the global warming potential for that greenhouse gas. Total carbon dioxide equivalents emissions for all greenhouse gases are then determined by adding the carbon dioxide equivalents emissions of each greenhouse gas. Global warming potential based on the Intergovernmental Panel on Climate Change Fifth Assessment Report (Myhre et al. 2013) used for greenhouse gas emission calculations and reporting are carbon dioxide = 1, methane = 28, and nitrous oxide = 265 for the greenhouse gas and climate change report (Golder Associates 2017) that is incorporated into this assessment for the RMP, and carbon dioxide = 1, methane = 34, and nitrous oxide = 310 for the greenhouse gas emissions estimates for each alternative presented in the table below. The long-term/100-year values are used and reasonable for this analysis because climate change modeling for assessing potential achievement of global goals (e.g., Paris Agreement) are projected out to year 2100, and the greatest projected changes in climate for the various modeled global concentration scenarios (representative concentration pathways) are realized over the long-term. Greenhouse gas (including methane) emissions associated with potential overall changes (reductions/increases) in mineral leasing/development in the foreseeable future (next 10 to 30 years) should use the long-term global warming potential values for assessing potential impacts for overall long-term global goals. Carbon dioxide equivalents were then converted to million metric tonnes, the typical reporting unit for greenhouse gas emissions.

As described above, information for cumulative analyses, such as greenhouse gases and climate change, as well as CARMMS from the BLM Colorado's Annual Report on the Colorado Air Resource Protection

Protocol, are incorporated by reference. The section of the Annual Report that describes the greenhouse gas and climate change analysis information applicable to describing potential greenhouse gas emissions and climate change impacts for this RMP is the "Climate Statistics and Change Analysis" section. This section describes Colorado's climate (as summarized from the Western Regional Climate Center's website), and the science, metrics, and trends accounting for recent and projected climate change (relative to future global emissions scenarios), as summarized from the Intergovernmental Panel on Climate Change's Fifth Assessment Report (Intergovernmental Panel on Climate Change 2014). This section also provides context for the estimates of various downstream combustion-related emissions from various federal and nonfederal contributors relative to total US and global emissions.

BLM estimated total 30-year (sum for years ~ 2020 to 2050) projected cumulative indirect (end-use) greenhouse gas emissions for "high" and "low" UFO oil and gas production scenarios. These greenhouse gas (carbon dioxide equivalent, CO_2e) emissions were calculated using 2018 US Energy Information Administration's Annual Energy Outlook (reference case) projected oil and gas production and associated carbon dioxide (CO_2) emissions estimates and CARMMS 2.0 oil and gas production projections for existing and future federal and nonfederal wells. The 30-year total estimated cumulative indirect emissions are approximately 129 million tons CO_2e for the "high" UFO oil and gas production scenario, and approximately 8 million tons CO_2e for the "low" UFO 30-year oil and gas projection scenario. The federal portion of these estimated cumulative greenhouse gas emissions is approximately 37 percent. For comparison, a global climate change study that modeled 30-year (years 2020 to 2050) total CO_2e emissions under Intergovernmental Panel on Climate Change representative concentration pathway 2.6 (the concentration pathway for smallest climate change impact scenario) for the region including the US (R50ECD World Region) predicted total emissions of approximately 2.7 x 10^11 million tons.

Greenhouse gas and climate change information from the West Elk EIS, Section 3.4.5.2 (Forest Service 2017a) is incorporated by reference in this assessment. That EIS concluded that it was not reasonable to assume that the "No Action" Alternative (not making UFO coal available) would result in overall cumulative (global) greenhouse gas emissions reductions.

In addition, information from the Greenhouse Gas and Climate Change Report (Golder Associates 2017) is incorporated to describe potential future (years 2020 and 2030) greenhouse gas emissions for two energy development scenarios: a normal rate of energy development and consumption, and an above-normal rate of energy production and consumption. Emissions were estimated for each BLM energy-related (oil, gas, coal) state, including Colorado, and included direct and indirect emissions from federal and nonfederal energy-related development and consumption of coal, oil, natural gas, and natural gas liquids. The study used coal, oil, and natural gas production and consumption data presented in the US Energy Information Administration's 2016 Annual Energy Outlook to determine growth factors to estimate 2020 and 2030 normal/high inventories. The following summarizes the projected future year greenhouse gas emissions and trends for Colorado federal resources:

- Total Colorado federal emissions due to coal production (direct) and consumption (indirect) are predicted to decrease from 40.92 $MMTCO_2e$[3] in base year 2014 to 26.28 $MMTCO_2e$ in the 2030 normal growth scenario, and to 27.55 $MMTCO_2e$ in the 2030 high growth scenario. The BLM has estimated the UFO portion of these statewide federal coal-related emissions based on an assumed rate of future annual coal mining ranging from 5.5 to 11 million metric tons per year. The UFO percentage of statewide federal coal-related CO_2e emissions (direct and indirect)

[3]Metric tons of carbon dioxide equivalent, a metric measure used to compare the emissions from different greenhouse gases based upon their global warming potential. The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by its associated global warming potential.

would range from approximately 50 percent at 5.5 million metric tons per year to almost 100 percent at 11 million metric tons per year. For the normal growth scenario and assuming 5.5 million metric tons per year, the total year 2030 UFO federal coal-related direct and indirect emissions are estimated to be approximately 13.26 $MMTCO_2e$, and would constitute a larger portion of the total statewide federal coal-related emissions in year 2030 than in base year 2014, because overall Colorado federal coal production is predicted to decrease in future years.

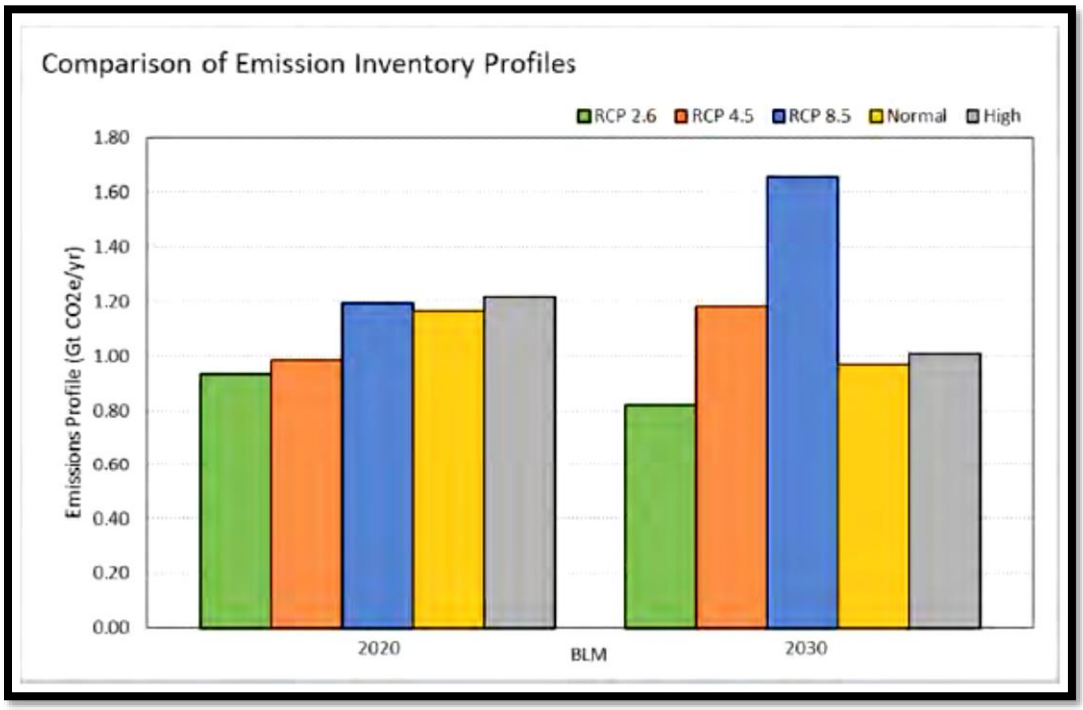
- Total Colorado federal emissions due to oil production (direct) and end-use consumption (indirect) are projected to remain almost static from baseline year 2014 to future years (2020 and 2030), with a slight decrease in greenhouse gas emissions for both the normal and high energy scenarios.
- Total Colorado federal emissions due to natural gas production (direct) and downstream consumption (indirect) are projected to increase into year 2030 for both the normal and high energy projection scenarios, from 42.91 $MMTCO_2e$ in base year 2014 to 44.55 and 45.03 $MMTCO_2e$ in the 2030 normal and high growth scenarios, respectively.
- Total Colorado federal emissions (direct and indirect) due to natural gas liquids are projected to decrease from baseline year 2014 to projected year 2030 by approximately 25 to 30 percent for both energy projection scenarios.

The Golder Associates (2017) report developed for the BLM provides greenhouse gas and climate change information, and some of that information based on Intergovernmental Panel on Climate Change reports and studies can also be found in the BLM Colorado's online Annual Report on the Colorado Air Resource Protection Protocol, incorporated by reference into this RMP. The Golder Report (Golder Associates 2017) uses future projected Intergovernmental Panel on Climate Change radiative forcing scenarios or Global representative concentration pathways (greenhouse gas concentration trajectories) to describe BLM's potential relative contribution to future global greenhouse gas concentrations / climate change forcing. Golder Associates (2017) examined the contribution of greenhouse gas emissions from coal, oil, natural gas, and liquid natural gas for states with BLM-administered lands in years 2020 and 2030 for both the normal and high production scenarios. Comparing the emissions estimates in the report with the derived BLM emissions profile under the Intergovernmental Panel on Climate Change scenarios, the calculated BLM/federal emissions most closely track representative concentration pathway 8.5 in year 2020, and track between representative concentration pathway 2.6 and 4.5 in year 2030, as shown in **Diagram 4-1**, Comparison of Emission Inventory Profiles. Within the BLM emissions profile, the relative mixture of coal, oil, and natural gas changes from baseline year to 2030. The dependence of coal is reduced, with increased usage of natural gas by year 2030.

In addition, Golder Associates (2017) provide a supplemental "Understanding Future Climate Impacts" section and summarizes that projected changes in climate are driven by the cumulative emissions, not the emissions profile. When considering the cumulative emissions on a global scale, the subnational emissions profile (e.g., by BLM-administered lands as a whole or by a BLM Field Office) is one of many emission contributions. Any single contribution on a subnational scale is dwarfed by the large number of comparable national and subnational contributors on a global scale. The best surrogate for understanding the potential impact of subnational (e.g., UFO) emissions on climate is the behavior of the BLM-administered lands subnational emissions relative to all the other contributors.

If the BLM operates under the business-as-usual scenario, while all other contributors are reducing their emissions in line with representative concentration pathway 2.6 (the lowest Intergovernmental Panel on Climate Change) radiative forcing scenario that will require substantial global greenhouse gas emissions reductions), the relative contribution of BLM-administered lands increase as the greenhouse gas emissions more closely resemble representative concentration pathway 4.5 (higher radiative

Diagram 4-1
Comparison of Emission Inventory Profiles



Source: Golder Associates 2017
Gt CO_2e/yr = gigatonnes of equivalent carbon dioxide per year; RCP = representative concentration pathway

forcing/climate change impact scenario). If the BLM operates under the decreased emissions scenario, keeping their reductions in line with representative concentration pathway 2.6 like all other contributors, the relative contribution of BLM-administered lands remains similar to current contributions.

If the BLM operates under the decreased emissions scenario, while all other contributors are maintaining constant emissions (business-as-usual) or increasing emissions, the relative contribution of BLM-administered lands greatly reduces (i.e., the BLM's greenhouse gas emissions footprint is small compared to other contributors). It is very unlikely that the global cumulative emissions will be strongly influenced by a single contributor (e.g., the UFO) at a national or subnational scale. However, the individual behavior of each contributor, through their relative contribution, has the ability to influence which representative concentration pathway global emissions most closely resemble, and therefore which climate change projections are most likely manifest towards the end of the century.

As described for the alternatives, natural gas development in the Planning Area is predicted to increase, which is consistent with the overall US energy forecasts. Coal mining rates are predicted to remain almost static for the Planning Area for all alternatives, and because overall nationwide and Colorado federal coal mining production is predicted to decrease, the contribution of Planning Area coal mining greenhouse gas emissions to overall US/global greenhouse gas emissions inventories may constitute a higher percentage, possibly resulting in a larger climate change impact contribution for future UFO coal mining operations. To stay consistent with the overall 2016 US Energy Information Administration 2016 Annual Energy Outlook energy production/consumption projections, Colorado federal coal production would need to be reduced by 2.71 percent by year 2030 for the normal growth rate scenario, and be reduced by 2.51 percent for the high energy growth scenario.

By staying consistent with these overall coal production reductions, the overall BLM/federal greenhouse gas emissions contribution relative to the national/global greenhouse gas emissions totals would reduce and be even lower by year 2030, tracking closer to the representative concentration pathway 2.6. The Planning Area coal mining-related greenhouse gas emissions inventory is just one subnational/project-level emissions inventory, and it would be feasible and reasonable to assume that overall total greenhouse gas emissions reductions can be achieved by taking actions other than reducing Planning Area mining operations. As described in US Energy Information Administration reports, US coal production peaked around year 2008 and has since declined. It is forecasted to continue this trend due to global oversupply, slowing demand, and competition from natural gas. As demand for coal slows and demand for other energy sources increases, global greenhouse gas emissions associated with coal production/consumption will continue to decrease, regardless of whether UFO mining operations continue at current production rates to satisfy the current and future demand for UFO coal.

Total direct greenhouse gas emissions estimates were developed for each alternative to compare totals across the alternatives. Please see the summary (including **Table 4-3**) of this section for alternative-specific direct greenhouse gas emissions estimates and discussion.

To further understand how BLM Colorado decisions for federal minerals translate into free energy market dynamics and potential climate related impacts, the BLM evaluated federal mineral development in Colorado using the US DOI, Bureau of Ocean Energy Management's Market Simulation Model (MarketSim). MarketSim models oil, gas, coal, and electricity markets to produce estimates of what the substitute energy source mix would look like from production changes that are likely to occur under various resource restricted scenarios. The model provides net substitution assessments for oil and gas imports, onshore oil and gas production, fuel switching (e.g., coal), and reduced energy consumption (demand) for a given period of time. Although the US DOI, Bureau of Ocean Energy Management developed MarketSim to produce substitution estimates specifically for the absence of a new Outer Continental Shelf leasing program, the basic model calculations allow for its use in modeling the substitutes for other oil and gas sources, including new onshore production. For additional details on MarketSim, refer to the full model documentation entitled "Consumer Surplus and Energy Substitutes for OCS Oil and Gas Production: The 2017 Revised Market Simulation Model (MarketSim)," (Industrial Economics, Inc. 2017).

BLM Colorado applied MarketSim to determine the effects of a statewide federal "No Development" scenario (i.e., no new federal mineral production) at the broader market scales, for the remainder of the CARMMS 2.0 projection period (2019 to 2025), at both the low and high development rates. The results for the low scenario predict that 71.3 percent of the projected production is offset by additional onshore production, 18.2 percent is offset by increased foreign imports, 8.3 percent is attributed to decreased demand, and the remainder (2.2 percent) is offset by increases in coal and electricity markets. The high scenario produced similar results, albeit with a slightly higher shift in demand (decreased consumption) substitution at 8.7 percent.

The US DOI, Bureau of Ocean Energy Management also developed a greenhouse gas lifecycle model to estimate the greenhouse gases associated with the MarketSim substitution results. The greenhouse gas estimates include emissions from oil and gas refining, processing, storage, consumption, and substitution. These calculations are not specific to the consumption of OCS production and are thus appropriate to use for calculating the greenhouse gas emissions from the consumption of oil and gas from Colorado federal minerals. The full Greenhouse Gas Model documentation is entitled "OCS Oil and Natural Gas: Potential Lifecycle Greenhouse Gas Emissions and Social Cost of Carbon" (Wolvovsky and Anderson 2016; see section 4). Note that the Greenhouse Gas Model does not provide estimates from the upstream (direct) portion of the emissions-generating activities, such as exploration and development (i.e., the emissions covered by CARMMS).

In absolute terms, the MarketSim predicts approximately 91 percent of the greenhouse gas emissions (as CO_2e) associated with both the low and high CARMMS production scenarios for the statewide federal "No Development" scenario. This result is applicable to any subregion of the state, including the UFO. The net difference between the total UFO federal oil and gas indirect emissions associated with the extended CARMMS projection period (30 years) used in the UFO RMP analysis and the "No Development" MarketSim scenario results is roughly 4.3 million tons of greenhouse gas on a CO_2e basis projected over 30 years (9 percent of the total downstream CO_2e emissions predicted under the full UFO 30-year oil and gas production scenarios).

Currently, Colorado has some of the strictest emissions regulations in the US for the oil and gas industry, not leaving much "available" emissions to reasonably control. The following highlights some of the additional greenhouse gas emissions controls that could be implemented for new federal oil and gas development in the Decision Area, and an approximate reduction in future annual greenhouse gas emissions that could result in the additional emissions control:

- Over 80 percent of methane emissions for new oil and gas wells are projected to be associated with pneumatic devices. The CARMMS 2.0 (Vijayaraghavan et al. 2017) calculators for oil and gas assume that in year 2025, 10 percent of pneumatic devices would be no-bleed and 90 percent would be low-bleed. By assuming that 100 percent of devices (although likely not feasible) would be no-bleed would reduce the overall methane emissions for each alternative by approximately 1,000 tons per year.
- A large fraction of carbon dioxide emissions for new oil and gas wells are associated with large oil and gas development-related engines. Nonroad engine[4] carbon dioxide emissions factors for large oil and gas development engines (drilling/completion) are projected to vary little over time, even though new equipment technology generally results in cleaner engines. As such, requiring oil and gas operators to develop new wells using Tier 4 engines would result in an almost negligible reduction in carbon dioxide emissions for new oil and gas well development.

It is reasonable to assume that BLM Colorado oil and gas-related emissions will follow the US-wide emissions pathways/greenhouse gas emissions trends based on regulation/policy, and it is reasonable to assume that Colorado regulations will reduce Colorado-based emissions even more than other states due to increased oil and gas emissions-control requirements for Colorado. Additional (i.e., beyond state and federal regulations) mitigation requirements for oil and gas and mining projects will be developed at the project-level stage when proposed actions are submitted to the BLM. The BLM will continue to require that project activities follow BMPs and continue to encourage operators to control unnecessary greenhouse gas emissions using common sense and feasible techniques, such as including reducing vegetation clearing when not needed (which offsets carbon dioxide emissions), reducing truck idling, double-checking equipment where fugitive emissions could leak (this is also a state and federal requirement for oil and gas operations).

Near-Field Impacts Analysis Tools

As described in the Colorado Air Resources Protection Protocol (**Appendix H**), project-specific near-field analyses based on actual resource development plans and details will be conducted on a case-by-case basis at the application for permit to drill/project-level stage. Currently, the BLM Colorado has

[4] An internal combustion engine (including the fuel system) that is: 1) used in a nonroad vehicle; 2) installed in or on equipment that is self propelled and/or performs another function while propelling itself (e.g., lawnmower); or 3) portable or not at the same location for more than 12 consecutive months (e.g., generators). Nonroad engines do not include those used in a motor vehicle, or a vehicle used solely for competition, or that is subject to standards promulgated under Section 111 (New Source Performance Standards) or Section 202 of the Clean Air Act (40 CFR 89.2).

several near-field modeling analyses and tools that could be used to assess project-specific impacts at the application for permit to drill/project-level stage for future oil and gas or other resource development. These analyses and tools include:

- BLM Colorado near-field modeling screening tool that estimates near-field impacts for 5 years of Colorado-based meteorology for various receptor distances and elevations from centralized point and volume sources. The modeling tool also includes air quality impacts analyses for approximately 0.5-mile of roadway development and traffic. This tool could be used to assess impacts associated with oil and gas and other resource development.
- The near-field modeling analyses completed for the BLM Grand Junction Field Office Fram Whitewater Master Development Plan Environmental Assessment (BLM 2013c) and Black Hills DeBeque Exploratory Proposal Environmental Assessment (BLM 2013d) are for multiple oil and gas well development projects in the Grand Junction Field Office. Near-field modeling analyses were conducted for both projects. The results indicated that pollutant impacts from the proposed development plans would be below acceptable thresholds for the applicable National and Colorado Ambient Air Quality Standards, and acute and chronic exposure risk assessment levels for predicted hazardous air pollutant concentrations (benzene, ethyl benzene, formaldehyde, n-hexane, toluene, and xylene). Near-field impacts from oil and gas field development and field production were analyzed.
- In instances when project-level oil and gas development plans compare well with levels analyzed in recent UFO oil and gas development Environmental Assessments, the BLM may utilize and apply the discussion and analyses that have already been completed for future Environmental Assessments. For new development plans that seem unique with respect to topography or location, or have levels of projected resource development beyond what has been already analyzed, new near-field modeling analyses will be conducted on a case-by-case basis.
- In addition, the BLM Colorado's air resources specialists have developed a new (2017) near-field air quality impacts assessment tool that will be used to assess potential project-specific and cumulative near-field air quality impacts associated with UFO proposed actions over the life of this RMP. This tool determines how much new federal and nonfederal oil and gas (emissions) were modeled in a CARMMS 2.0 (Vijayaraghavan et al. 2017) near-field domain (i.e., the 4-kilometer grid cell where the new proposed action would be located and the adjacent grid-cells, encompassing approximately a 10-kilometer radius from a proposed project) for all of the projected future year 2025 emissions scenarios (low, medium, and high). The tool also provides the range of corresponding cumulative modeled concentrations (for each scenario) of ambient nitrogen dioxide, ozone, and particulate matter (less than 10 and less than 2.5 microns in diameter), along with federal oil and gas-specific source apportionment concentrations that would contribute to the modeled cumulative ambient concentrations. These data are useful for determining the relative contribution of new proposed federal oil and gas emissions to the cumulative concentrations modeled within the domain.
- Air quality monitoring—In April 2018, the BLM began operating an air quality monitoring station at Paonia High School in the Planning Area. This station was established as oil and gas development in the local Bull Mountain Unit begins to assess potential impacts on nearby North Fork Valley communities. Ozone and nitrogen dioxide concentrations collected at this station will provide for useful information for assessing potential oil and gas-related impacts, while particulate matter (less than 10 and less than 2.5 microns in diameter) concentrations will assist in dust impacts analyses associated with local coal mining.

Colorado Air Resources Management Modeling Study (CARMMS)

As described above, information for cumulative analyses, such as regional/Field Office-scale air quality modeling (i.e., CARMMS) from the Annual Report on the Colorado Air Resource Protection Protocol

and other online reports, including the CARMMS 2.0 Report (Vijayaraghavan et al. 2017), are incorporated by reference. The sections of the Annual Report that provide CARMMS information for assessing UFO-specific and full cumulative air quality modeling impacts are the "Field Office Data/Analysis (UFO)" and "Field Office Data/Analysis (BLM Colorado)" sections. The following briefly describes these Annual Report sections:

- Field Office Data/Analysis (UFO)—This Annual Report section presents data for cumulative emissions from new federal oil and gas development within the UFO, compared with the emissions scenarios analyzed by CARMMS (UFO federal oil and gas is source group G for CARMMS 2.0), and qualitatively scales the CARMMS projected impacts to the cumulative report year emissions to provide a context for the current cumulative impacts (e.g., concentrations and air quality-related values) for the UFO. This section is referenced to set the context for the projects' current cumulative impacts at Field Office scales.
- Field Office Data/Analysis (BLM Colorado) —This Annual Report section provides data and analysis similar to those described above, except on a statewide basis (BLM Colorado Cumulative). This section is referenced to set the context for the projects' current cumulative impacts at BLM Colorado (i.e., state-level) scales.

The CARMMS 2.0 Report (Vijayaraghavan et al. 2017) is incorporated by reference. Summary-level CARMMS 2.0 air quality modeling impacts information specific to future activities in the UFO and for full cumulative inventories are provided in this RMP, as follows:

- CARMMS 2.0 (Vijayaraghavan et al. 2017) modeled three future year 2025 oil and gas emissions scenarios (low, medium, and high). **Table 4-4**, Estimated CARMMS 2.0 Year 2025 Annual Decision Area Oil and Gas Emissions (tons per year), shows annual emissions rates that were modeled for new UFO federal oil and gas (source group G for CARMMS 2.0).

Table 4-4
Estimated CARMMS 2.0 Year 2025 Annual Decision Area Oil and Gas Emissions (tons per year)

Source Group – Emissions Scenario	NOx	VOC	SO2	$PM_{2.5}$	PM_{10}
UFO – Low	12	11	0	1	3
UFO – Medium	333	225	1	19	53
UFO – High	464	358	1	30	113

Source: BLM 2018a; Vijayaraghavan et al. 2017
NO_x = nitrogen oxide; VOC = volatile organic compounds; SO_2 = sulfur dioxide; $PM_{2.5}$ = particulate matter smaller than 2.5 microns in diameter; PM_{10} = particulate matter smaller than 10 microns in diameter

- For the low, medium, and high oil and gas modeling scenarios, there were no (0) days predicted with visibility change delta-deciview above 0.5 for all Class I and sensitive Class II areas, due to projected emissions for the UFO source group.
- For cumulative visibility changes from year 2011 to 2025 for the worst 20 percent days of visibility, the CARMMS 2.0 model predicted a 0.23 deciview improvement at Maroon Bells – Snowmass Wilderness for the high modeling scenario, and 0.28 deciview and 0.24 deciview improvements for the low and medium modeling scenarios, respectively.
- The largest annual nitrogen deposition impacts for the UFO oil and gas source group are predicted to occur at nearby sensitive Class II area Raggeds Wilderness. For the UFO source group, CARMMS 2.0 predicts 0.0243, 0.0171, and 0.0007 kilograms per hectare per year for the low, medium, and high scenarios, respectively, at nearby Raggeds Wilderness.

- For cumulative annual nitrogen deposition changes from year 2011 to 2025 for nearby Class I area Maroon Bells – Snowmass Wilderness (approximate same location as Raggeds Wilderness with respect to emissions sources), CARMMS 2.0 predicts an overall 0.34 kilograms per hectare per year improvement for the high scenario, and 0.46 and 0.35 kilograms per hectare per year for the low and medium scenarios, respectively.
- Overall ozone design values are predicted to improve throughout the region, with 19 Colorado (mostly along the Front Range) monitoring stations base year 2011 ozone design values above 70 parts per billion predicted to be reduced to 8 stations with future year 2025 ozone design values above the ozone standard (70 parts per billion) for the high scenario, and reduced to 6 and 8 monitoring stations above 70 parts per billion for the low and medium modeling scenarios, respectively.
- For UFO oil and gas source group contributions to cumulative ozone concentrations, the maximum contributions to the fourth-highest daily maximum 8-hour ozone concentrations are 0.8, 0.0, and 0.6 parts per billion for the high, low, and medium modeling scenarios, respectively.
- For UFO oil and gas source group contributions to cumulative particulate matter smaller than 2.5 microns in diameter concentrations, the maximum contributions to the eighth-highest 24-hour particulate matter smaller than 2.5 microns in diameter concentrations are 0.2, 0.0, and 0.2 micrograms per cubic meter for the high, low, and medium CARMMS 2.0 modeling scenarios, respectively.

As shown above, the annual emissions rates modeled for source group UFO are very low for the CARMMS 2.0 low modeling scenario, compared with the medium and high modeling scenarios, and the predicted impacts described for CARMMS 2.0 reflect these emissions differences for the modeling scenarios. As described, there are no days that the model predicts that UFO emissions would result in significant visibility changes, and the predicted ozone concentration contributions from UFO emissions are below the EPA recommended (EPA 2018a) 1.0 parts per billion significant impact level for prevention of significant deterioration emissions source evaluations, UFO emissions are predicted to contribute at levels below the significant impact level for particulate matter smaller than 2.5 microns in diameter 24-hour for each CARMMS 2.0 modeling scenario. Overall cumulative annual nitrogen deposition is expected to improve at nearby and regional Class I / Class II areas, and UFO source group contributions to cumulative annual nitrogen deposition are predicted to be above the project-level deposition analysis threshold, 0.005 kilograms per hectare per year for the high and medium scenarios, and below the deposition analysis threshold for the low scenario. Note that the deposition analysis threshold is a project-level threshold that impacts for actual proposed projects should be compared with.

The magnitude of the CARMMS 2.0 modeled impacts for source group UFO (source group G in CARMMS 2.0 Report) for the three modeling scenarios (low, medium, and high) is highly dependent (proportional) to the magnitude of emissions modeled for the three scenarios. CARMMS 2.0 emissions modeled for source group UFO are for projected oil and gas development/operations to occur within the UFO through the next 10 years, but these emissions (and modeled impacts) can be used to describe potential air quality impacts associated with other activities, such as vegetation and travel management for the Planning Area. The magnitude of the CARMMS 2.0 modeled results/impacts is dependent on the magnitude of emissions loading into the atmosphere and this relationship exists almost regardless of the source type for a particular geographic location. Using the CARMMS 2.0 emissions rates modeled for UFO (shown in **Table 4-4**, Estimated CARMMS 2.0 Year 2025 Annual Decision Area Oil and Gas Emissions (tons per year)) with emissions rates for each alternative, an analysis summary is presented here using CARMMS 2.0 emissions and modeling results to deduce potential impacts for the various emissions-generating activities associated with each alternative. As described above, the UFO air quality impact contributions for each of the CARMMS 2.0 modeling scenarios are not significant with respect to

the applicable impact thresholds, except for nitrogen deposition where the nitrogen deposition impacts are above the project-level deposition analysis threshold for the level of emissions modeled for the CARMMS 2.0 scenarios. These project-level thresholds are appropriate for applying to project-level analyses, such as for a group of proposed oil and gas wells as part of a Master Development Plan (e.g., Bull Mountain Unit) or for an individual mining lease analysis or a planned vegetation management project for a season. These project-level thresholds/significant impact levels are not appropriate for applying to Field Office-wide inventories that would be comprised of multiple projects. While the CARMMS 2.0 modeled rates shown above result in predicted impacts below the significant impact levels/applicable thresholds for most impact parameters (except nitrogen deposition), an acceptable project-level nitrogen oxide emissions rate was determined for the Planning Area while conducting the modeling assessment for the Bull Mountain Unit Master Development Plan EIS (BLM 2016f). It was determined that approximately 143 tons per year of nitrogen oxide for an individual UFO project (not UFO-wide inventories) would result in acceptable (below deposition analysis threshold) nitrogen deposition levels at nearby Class I and sensitive Class II areas. As described for the alternatives, the number of new wells over the next 10 years could range from approximately 391 wells (Alternative B.1) to approximately 502 wells (Alternative C). As described for each alternative, several proposed oil and gas projects, including the Gunnison Energy/SGI dual proposal (approximately 25 new wells) and the Bull Mountain Unit Master Development Pan (approximately 146 new wells) have already been analyzed and approved. These projects, totaling approximately 170 new federal wells, would be part of the total new federal well counts for the Uncompahgre RMP alternatives. Air quality impacts analyses for these projects have been completed, meaning that no other analyses are needed for these future oil and gas developments, but would be needed for the remaining future oil and gas wells projected for each alternative. The following lists things to consider for future projects with respect to the CARMMS 2.0, UFO CALPUFF, and AERMOD modeling that has been recently completed, and the potential emissions estimated for this RMP:

- Oil and gas projections for each alternative are comprised of multiple projects. Refined project-level analyses will be conducted when proposed actions are submitted to the BLM. CARMMS 2.0 UFO emissions modeled for the high and medium oil and gas emissions scenarios are larger than the emissions remaining (not analyzed as part of completed projects) for each alternative, and because CARMMS 2.0 high and medium scenario results are acceptable for all impact parameters (except nitrogen deposition), it is reasonable to conclude that any project (regardless of size) for the remaining oil and gas development would result in impacts below applicable air quality impact thresholds. For nitrogen deposition, project-level CALPUFF modeling will be conducted for actual proposed projects that have calculated emissions greater than the 143 tons per year threshold that was determined acceptable in the Bull Mountain Unit Master Development Plan modeling analysis.
- Projected emissions for all sand and gravel, livestock management, and lands and realty annual projects combined would be at emissions levels well below that modeled for CARMMS 2.0 (projected UFO oil and gas emissions). It is reasonable to assume that impacts for these activities would be acceptable/below applicable impact thresholds. Particulate matter/dust analyses will be conducted for actual proposed projects to afford for additional air quality protection. Based on previous dust impact assessments, it is reasonable to assume that at a minimum routine water application achieving at least 50 percent dust control will be required for any future project. Other dust management practices would also likely be enforced.
- Projected emissions for travel management are much less than those modeled for CARMMS 2.0 (projected UFO oil and gas emissions), except for particulate matter. It is reasonable to conclude that potential impacts for the total of projects (or any individual project) would be minimal. For particulate matter/dust, a project-level dust analysis will be conducted for individual proposed travel management projects. Based on previous dust impact assessments, it is

reasonable to assume that at a minimum routine water application achieving at least 50 percent dust control will be required for any future travel management project. Other dust management practices would also likely be enforced.

In addition, emissions sources for future UFO coal mining (West Elk Mine) and uranium mining were specifically modeled for CARMMS 2.0. The following uses CARMMS 2.0 for various modeled source groups and other analyses to address potential impacts for future mining in the Planning Area.

- Coal mining operations are projected to continue at rates close to the current mining rates for all alternatives. As shown in the CARMMS 2.0 modeled tables for UFO oil and gas, nitrogen oxide and volatile organic compound emissions modeled for the high and medium scenarios are larger than the annual coal mining emissions rates. The projected annual nitrogen oxide emissions rate for coal mining is much less than the nitrogen oxide 143 tons per year emissions limit that was determined for the Bull Mountain Master Development Plan EIS (BLM 2016f) as being the acceptable project-level nitrogen oxide emissions level to result in project-specific annual nitrogen deposition below the deposition analysis threshold. Because CARMMS 2.0 high and medium scenario results are acceptable for all impact parameters (except nitrogen deposition), and projected annual nitrogen oxide emissions rate for coal mining is much less than the nitrogen oxide 143 tons per year emissions limit that was determined for the Bull Mountain Master Development Plan EIS (BLM 2016f), it is reasonable to conclude that projected coal mining operations would result in impacts below applicable air quality impact thresholds using these modeling results.

  For potential particulate matter impacts, the BLM's air quality monitor at Paonia High School (started in April 2018) monitors particulate matter concentrations, and data gathered at this station, along with project-level dust impacts analyses, will be used to assess potential impacts associated with the continuation of coal mining over the life of the RMP. Based on previous dust impact assessments, it is reasonable to assume that at a minimum routine water application achieving at least 50 percent dust control will be required for any future mining project. Other dust management practices would also likely be enforced.
- Projected annual nitrogen oxide and particulate matter smaller than 10 microns in diameter emissions associated with uranium mining for each alternative are slightly larger than the emissions rates modeled for CARMMS 2.0 oil and gas source group. For this reason, nitrogen deposition and visibility impacts, and local air quality modeling, will be conducted using refined project-level modeling techniques when projects are proposed by the BLM. Projected emissions are larger than those modeled for previous modeling, and modeled impacts were determined unacceptable with respect to project-level thresholds (e.g., deposition analysis thresholds and significant impact levels) for those analyses. Based on previous dust impact assessments, it is reasonable to assume that at a minimum routine water application achieving at least 50 percent dust control will be required for any future uranium mining project. Other dust management practices would also likely be enforced.
- As described above, CARMMS 2.0 modeling included a source group specifically for future Colorado federal mining (coal and uranium). Annual modeled emissions rates for future UFO coal mining for CARMMS 2.0 are much larger than the annual emissions projected for the alternatives (i.e., more coal mining was projected for CARMMS 2.0 than for the RMP alternatives). Annual emissions modeled for CARMMS 2.0 for future uranium mining are slightly less than rates shown for alternatives for nitrogen oxide and particulate matter smaller than 10 microns in diameter, and slightly larger than alternative rates for particulate matter smaller than 2.5 microns in diameter. Therefore, it is reasonable to conclude that the CARMMS 2.0 mining source group modeling results are likely overestimates of what could be expected to be associated with future UFO coal mining development/production at the Class I and Class II areas

closest to the UFO coal mining locations. For the CARMMS 2.0 mining source group (high emissions scenario), there were no (0) days predicted with visibility change delta-deciview above 0.5 for nearby Maroon Bells – Snowmass Wilderness (Class I) and Raggeds Wilderness (sensitive Class II) areas due to projected emissions for BLM Colorado mining (coal and uranium) source group. The predicted average annual nitrogen deposition impacts for the future (year 2025) Colorado federal mining source group at nearby Maroon Bells – Snowmass Wilderness (Class I) and Raggeds Wilderness (sensitive Class II) are 0.005 and 0.0068 kilograms per hectare per year, respectively. The CARMMS 2.0 modeled impact is predicted to be above the nitrogen deposition analysis threshold at nearby Raggeds Wilderness, but this impact is due to all future year 2025 Colorado federal mining operations around the state, and it is reasonable to conclude that impacts for a specific future project (e.g., West Elk mining operations) alone would be much closer to the nitrogen deposition analysis threshold. The maximum 8-hour fourth-highest ozone contribution predicted by CARMMS 2.0 for the future year 2025 Colorado federal mining source group (high emissions scenario) is minimal and much less than the 1 part per billion significant impact level. The maximum 24-hour average eighth-highest particulate matter smaller than 2.5 microns in diameter impact contribution for future Colorado federal mining operations is not projected to be significant and much less than the applicable significant impact level.

BLM Planning Efforts Using CARMMS and Potential Mitigation

As described earlier, the CARMMS 2.0 includes two other future modeling scenarios (other than the 2025 high oil and gas scenario): a low scenario, which was developed by projecting the current 5-year average development paces forward through year 2025, and a medium scenario, which includes the same oil and gas well count projections as the high scenario, but assumes additional air pollutant emission restrictions beyond current "on-the-books" regulations. As future oil and gas development occurs in Colorado, modeling results for all CARMMS scenarios will be used to correctly assess the levels (pace) of oil and gas development and corresponding air quality impacts for each BLM Colorado Planning Area / Field Office for making implementation decisions. The current (2015) Annual Report (BLM 2015e) assesses how current oil and gas development and emissions are tracking with respect to emissions and impacts modeled in CARMMS for each BLM Colorado Field Office (including the UFO Planning Area).

As part of an analysis process to validate the applicability of and apply modeling results for CARMMS (and other modeling studies) during the authorization of future emission-generating activities, the BLM Colorado will consider project-specific emissions and actual total regional air pollutant emissions estimates cumulatively to compare to the UFO oil and gas and other regional emissions rates modeled in CARMMS. The CARMMS results for each modeling scenario and emissions inventory will be evaluated to confirm that the activities being approved by the BLM Colorado are within the modeled/understood inventory levels that correlate with acceptable air quality impacts. Substantial emission-generating activities cannot occur without further BLM analysis and approval of proposals for exploration and development operations. Using CARMMS, new air pollutant monitoring data, and other air quality analyses, the BLM may make its approval of these activities subject to conditions of approval addressing air pollutant emissions, as appropriate.

New oil and gas development in the Bull Mountain Unit projected for the Master Development Plan (BLM 2016f) constitutes a large portion (approximately one-third) of the foreseeable oil and gas development for the UFO Planning Area, and is required to meet the air resource related requirements described in the Master Development Plan ROD (BLM 2017e). These requirements include tracking nitrogen oxide emissions for operations (post-development) for new federal oil and gas to ensure total operations-phase nitrogen oxide emissions do not ever exceed the Unit-wide 143 tons per year limit established in the Final EIS (BLM 2016f) and ROD (BLM 2017e). Other air quality-related requirements

for new Bull Mountain Unit Master Development Plan oil and gas development include evaluating project-specific information by comparing actual proposed development information to parameter values that were modeled for the EIS to ensure that actual new proposed oil and gas development will not cause unacceptable local air quality impacts.

Colorado has some of the strictest emissions regulations in the US for the oil and gas industry. It is reasonable to assume that BLM Colorado oil and gas-related emissions will follow the US-wide emissions pathways/greenhouse gas emissions trends based on regulation/policy, and it is reasonable to assume that Colorado regulations will reduce Colorado-based emissions even more than other states due to increased oil and gas emissions control requirements for Colorado. Additional (beyond state and federal regulations) mitigation requirements for oil and gas and mining projects will be developed at the project-level stage when proposed actions are submitted to the BLM. The BLM will continue to require that project activities follow BMPs and will continue to encourage operators to control unnecessary emissions using common sense and feasible techniques, including, for example, reducing vegetation clearing when not all is needed (which offsets carbon dioxide emissions), reducing truck idling and speeds on unpaved roads, and double-checking equipment where fugitive emissions could leak (which is also a state and federal requirement for oil and gas operations).

4.3.2 Soils and Geology

This section discusses impacts on soils and geology from proposed management actions of other resources and resource uses. Existing conditions are described in **Section 3.1.3** (Soils and Geology). Direct and indirect impacts of land uses on soil resources are generally best mitigated by avoiding or minimizing the impact to the degree practicable with stipulations (e.g., NSO and CSU). The various management action and allowable use decisions, including stipulations, outlined in **Chapter 2** emphasize this approach for maintaining, improving, and conserving soil resources. Impacts that cannot be avoided would at least be minimized by the application of condition of approvals, best management practices (BMPs), and standard operating procedures (SOP) (**Appendix G**).

Methods and Assumptions

Indicators

Indicators of impacts on soil resources are as follows:

- Soil surface health, specifically the ability of soils to support vegetation and biological soil crusts or to meet the needs of a particular ecological site (e.g., vegetation type, diversity, density, and vigor)
- Acres of anticipated land disturbance
- Acres of fragile soils open to ground-disturbing activities
- The ability to meet BLM Colorado Public Land Health Standards (BLM 1997). All land uses would conform to BLM Colorado Public Land Health Standards, which describe conditions needed to sustain land health and relate to all uses of BLM-administered lands. Standard 1 addresses soil resources and is incorporated as a goal in **Chapter 2**. Environmental consequences resulting from proposed management action or allowable use decisions are analyzed based on their ability to contribute to maintaining, achieving, or hindering meeting Standard 1.

Assumptions

In addition to the assumptions in **Section 4.1.1** (Analytical Assumptions), the analysis assumes the following:

- Soil resources would be managed to meet Standard 1 of the BLM Colorado Public Land Health Standards (BLM 1997).
- Soils would be managed to minimize erosion and maintain soil productivity.

Nature and Type of Effects

Soils

Soil resources, especially on steep slopes and in fragile soil areas, are susceptible to adverse impacts from surface disturbance and compaction, which can lead to accelerated erosion, soil loss, and reduced productivity. There are areas of particularly fragile soils in the Planning Area, specifically the Mancos shale areas, or adobe badlands. The highly erodible nature of the shale is contributed to by its steep slopes, which came about from natural rilling, gullying, and mass wasting. Steep slopes and sparse vegetation contribute to making the adobe badlands vulnerable to elevated rates of erosion during summer from monsoonal thunderstorms. Slopes of greater than 30 percent pose concerns for reclamation and long-term soil health and productivity. Areas with slopes greater than 40 percent are prone to accelerated erosion and require additional protection to ensure that site productivity is protected and surface runoff is minimized.

An area of particularly fragile soils known as the adobe badlands is located north of the city of Delta. This area has steep slopes and saline/selenium Mancos shale-derived soils that are highly erodible and with disturbance can degrade and contaminate downslope waterways during and after precipitation. Extensive research on the Mancos shale has been done via the Mancos Shale Landscapes Project, by a regional partnership among the US Geological Survey, the BLM, and the US Bureau of Reclamation. The project contributed to the development of predictive models that can be used to evaluate black shale landscapes in terms of their economic resource potential and their environmental sensitivity.

The primary impacts on soil resources in the Planning Area are grazing activities known to alter vegetative and biological soil crust communities (Belnap 2005) and surface disturbance associated with recreation (Grauch 2006). Livestock grazing can cause adverse impacts on fragile soils by reducing vegetative cover and organic material, resulting in increased erosion. Studies conducted on similar soils in Badger Wash outside of Grand Junction, Colorado, found reductions in sediment yield of 28 to 35 percent when grazing was excluded from previously grazed Mancos shale basins (Lusby 1979). Modified grazing management practices could be necessary where soils are found to be sensitive to livestock disturbances (for example, soil on steep slopes and fragile soils). Properly managed grazing can reduce soil erosion by promoting healthy plant communities.

Surface disturbance from underground coal mining occurs from the drilling of gob vent holes and the associated access roads. These roads can be extensive, and the vents can be numerous. In the case of a surface mine, topsoil would be removed and stockpiled for reclamation as mining progresses.

Uranium exploration and mining interests exist in the west end of the Planning Area and south of Naturita. Uranium exploration typically involves some road building and drilling holes across a large area in search of buried streambeds where erratically scattered uranium ore is found. Mining Law allows exploration of up to 5 acres of disturbance without requiring NEPA analysis. The BLM can issue a 3809 permit, which gives proponents the ability to conduct exploration. The permit gives the BLM limited authority to require proponents to mitigate impacts on soil and water. Mineral excavation typically involves vegetation removal and grading, both of which combine to decrease soil health and stability if not remove topsoil altogether from certain areas.

Fires occur across the Planning Area, destroying vegetation, decreasing soil health, and increasing soil susceptibility to erosion. A history of fire suppression has resulted in fuels build up and hotter fires. Hotter fires cause more extensive loss of vegetation and decreased soil health. Climate change models

predict hotter and drier summers, which would also adversely impact soil health and vegetation and would further intensify the effects of fires. Climate change could also result in more intense precipitation events, which would increase erosion.

Geology

An unprecedented increase in earthquakes in the US mid-continent began in 2009. Wastewater disposal is responsible for the vast majority of the increase, including the largest and most-damaging induced earthquakes (Rubinstein and Mahani 2015). Hydraulic fracturing is directly causing a small percentage of the felt-induced earthquakes observed in the US (Rubinstein and Mahani 2015).

High-rate injection wells (greater than 300,000 barrels per month) are much more likely to be associated with earthquakes than lower-rate wells (Weingarten et al. 2015). Increased fluid pressure is the probable driving mechanism to induce earthquakes, and wastewater disposal wells can raise fluid pressures more, over longer periods of time and over larger areas, than hydraulic fracturing and enhanced oil recovery (Rubinstein and Mahani 2015).

An estimated 5 to 40 percent of the water injected during hydraulic fracturing flows back to the surface (termed "flowback"). In addition to differences in injected volumes, the volume and chemical compositions of oil and gas wastewaters (i.e., the flowback water along with the water coproduced during the oil and gas production, termed "produced water") vary somewhat from region to region, depending on differences in hydrology, geology, and well-completion practices. These oil and gas wastewaters are stored at the surface and then disposed of, or treated and possibly recycled or reused. Despite the emergence of smallscale mobile wastewater treatment units specially designed to treat oil and gas wastewaters on site, deepwell disposal is currently the cheaper and often most expedient method of dealing with wastewaters, except in areas where deep-disposal wells are lacking or water is scarce. The disposal of the wastewater into deep wells following hydraulic fracturing, however, has triggered seismicity in some areas. Small earthquakes could occur when large volumes of fluid are injected over long periods of time, under high pressure, particularly in locations with active faults or faults in brittle rock formations. The likelihood of induced seismic events, therefore, differs on a regional basis given variations in geology (e.g., existence of faults, pore pressures, capacity of the geologic formation, and rock type), disposal and recycling practices, and in the amount of water used and wastewaters produced during hydraulic fracturing (Gallegos et al. 2015).

An ongoing fluid-injection project has been under way since 1996 in Paradox Valley in southwestern Colorado, where the saline shallow water table is being suppressed by pumping to prevent salt from entering the Dolores River as it crosses the valley and, eventually, the Colorado River further downstream. A local seismic network was established in 1985 to determine background levels of seismicity before the drilling of the well and initial injection tests. Between 1985 and 1996, 3 tectonic earthquakes were detected within 9 miles of the well and 12 within 22 miles. However, hundreds of earthquakes were induced during injection tests conducted between 1991 and 1995. Most of these earthquakes were concentrated within 0.6 mile of the injection point, although a few were located 1.9 to 3.1 miles from this site. All events were below magnitude 3. Continuous monitoring of injection pressures and volumes, along with seismicity, is being conducted to insure the safe operation of the project. The Paradox Valley experience illustrates how long-term, high-volume injection can lead to the continued expansion of the seismically activated region and the triggering of large-magnitude events many miles from the injection well more than 15 years after observation of the initial seismic response. This case study also illustrates the challenges for managing the risk once seismicity has been induced (Ellsworth 2015).

Effects Common to All Alternatives

Soils

The three primary sources of impacts on soils within the Planning Area would continue to be grazing, recreation, and the extraction of both energy and nonenergy minerals. These sources, in addition to fire and climate change, would result in the effects described above under ***Nature and Type of Effects***.

As described in **Section 4.4.3** (Energy and Minerals, Effects Common to All Alternatives, Solid Leasable Minerals—Coal), coal production is expected to remain the same across all alternatives. Coal mining activities capable of affecting soil resources would not occur in those areas identified as unacceptable. In acceptable areas, as described under ***Nature and Type of Effects***, coal mining and developments could impact soil resources, including compaction, erosion, and vegetation removal. The severity of these indirect impacts would vary, depending on the different types and intensities of coal mining and development.

Travel in the Planning Area could adversely impact soils through compaction, vegetation removal, and erosion, particularly in areas of fragile soils (e.g., steep slopes), saline and selenium soils, within riparian areas, and along stream banks. Protections from travel vary across alternatives and are shown in **Table 4-5** (Travel Area Management on All Soil Types), **Table 4-6** (Travel Area Management on Slopes Greater than 30 Percent), and **Table 4-7** (Travel Area Management on Saline and Selenium Soils).

Table 4-5
Travel Area Management on All Soil Types

	Alternative *(acres)*				
Travel Area Management	**A**	**B**	**C**	**D**	**E**
Open to all modes of travel	8,560	0	16,070	0	3,950
Closed to motorized; mechanized vehicles limited to designated routes	11,950	12,180	0	1,160	880
Closed to motorized and mechanized vehicles	44,200	102,790	45,170	57,400	55,770
Limited to existing routes	465,790	0	0	0	0
Limited to designated routes	145,300	560,830	614,560	617,240	615,200
Seasonal restrictions	59,070	218,230	19,580	104,940	28,550

Source: BLM 2012a, 2018a, 2019

Table 4-6
Travel Area Management on Slopes Greater than 30 Percent

	Alternative *(acres)*				
Travel Area Management	**A**	**B**	**C**	**D**	**E**
Closed to motorized and mechanized vehicles	18,830	40,950	19,310	26,640	25,700
Closed to motorized use	8,310	2,440	0	40	40
Open to all modes of travel	610	0	2,960	0	90
Limited to existing routes	104,450	0	0	0	0
Limited to designated routes	31,850	131,150	152,260	147,850	148,720
Seasonal restrictions	10,480	72,700	17,760	30,730	3,630

Source: BLM 2012a, 2018a, 2019

Table 4-7
Travel Area Management on Saline and Selenium Soils

Travel Area Management	Alternative *(acres)*				
	A	B	C	D	E
Closed to motorized and mechanized vehicles	7,740	13,000	7,710	8,320	8,320
Closed to motorized use	740	7,190	0	270	0
Open to all modes of travel	7,000	0	11,640	0	3,630
Limited to existing routes	67,270	0	0	0	0
Limited to designated routes	13,850	86,980	87,820	98,580	95,220
Seasonal restrictions	10,570	36,750	630	14,760	3,260

Source: BLM 2012a, 2018a, 2019

Operators would be required to meet the current BLM Gold Book standards for soil and water protection, plus other BMPs (Appendix G), for all permitted fluid minerals (i.e., oil and gas and geothermal) actions.

Implementing management for the following resources would have negligible or no impact on soils and are therefore not discussed in detail: air quality, wild horses, cultural resources, paleontological resources, visual resources, wilderness and wilderness study areas, national trails and byways, watchable wildlife viewing sites, Native American tribal uses, and public health and safety.

Geology

Induced seismicity is associated with wastewater injection from oil and gas development. Determining the volume of produced water generated by new oil and gas developments, as well as identifying the local, site-specific uses of produced water use, would be speculative due to the variations associated from one project to another. Consequently, the potential for induced seismicity as a result of this activity cannot be estimated at the planning stage. It is best to evaluate possible impacts when there is an application for a permit to drill and site-specific NEPA analysis can occur. Risks of induced seismicity will be evaluated at the leasing and permitting stage should a parcel be leased and a development proposal submitted. At present, however, it is anticipated that Alternatives A, B, B.1, C, D, and E would involve 10.0, 11.1, 7.3, 18.5, 15.7, and 15.7 (respectively) wells drilled annually on BLM-administered surface and split-estate based on BLM UFO minerals specialist and BLM UFO GIS specialist professional judgement. Occurrences of induced seismicity may increase as the number of wells increases.

Alternative A

Under Alternative A, soils would receive a certain level of protection through BLM-administered lands being managed according to BLM Colorado Public Land Health Standards (BLM 1997). Standard 1 is met when upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, land form, and geologic processes. Adequate soil infiltration and permeability allows for the accumulation of soil moisture necessary for optimal plant growth and vigor and minimizes surface runoff. Standard 1 is being achieved when:

- Expression of rills and soil pedestals is minimal
- Evidence of actively eroding gullies (incised channels) is minimal
- Canopy and ground cover are appropriate
- Litter is accumulating in place and is not sorted by normal overland water flow
- There is appropriate organic matter in soil
- There is diversity of plant species with a variety of root depths
- Upland swales have vegetation cover or density greater than that of adjacent uplands
- There are vigorous desirable plants

Adhering to Standard 1 would ensure a baseline level of soil health and provide a certain degree of protection against soil erosion, compaction, contamination, and vegetation removal.

Alternative A would continue to provide minimal management actions specific to protecting riparian areas or dry washes, both of which are areas of susceptible soils. Impacts on riparian areas may include vegetation trampling and soil disturbance by livestock grazing, recreation activities, or motorized use.

The BLM would continue to use prescribed fires to meet land and resource management objectives. Prescribed burn areas would be susceptible to erosion because of the lack of vegetation and loss of woody debris and biologic soil crusts in the short term. Reduced fire intensity associated with planned fire reduces the potential for post-fire erosion because not all soil-stabilizing characteristics are consumed. Restoration of burned areas would include enhancing plant communities, which would help protect soil resources.

The BLM would continue to manage 110,160 acres unsuitable for forest harvest and would continue to prohibit timber and woodland harvesting in riparian areas. This would protect vegetative cover, thereby limiting erosion and protecting soil health.

There would continue to be 56,300 acres unavailable and 619,500 acres available to livestock grazing. Improper grazing management could result in accelerated erosion rates, localized compaction, and disturbance to biological soil crusts. Riparian zones and stream banks in areas of livestock concentration could be susceptible to overuse and trampling. The severity of these impacts would vary depending on season of use, type of livestock, intensity of livestock grazing, soil moisture level, and soil structure (e.g., rocky, deep loam, and steep slope Mancos shale). On lands unavailable to livestock grazing, these types of soil impacts would not occur.

The BLM would continue to implement BMPs and BLM Colorado Public Land Health Standards and Guidelines for Livestock Grazing Management (BLM 1997). Range improvement projects (e.g., water ponds, pipelines and tanks, pasture fences, and vegetation treatments) could be constructed and maintained for proper management of livestock grazing and rangeland health.

The minimal restrictions on fluid mineral development would result in a reasonably foreseeable development scenario similar to that projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**. There would continue to be 44,220 acres of BLM surface/federal minerals closed to fluid minerals leasing and 631,580 acres BLM surface/federal minerals open to fluid minerals leasing. The severity of these direct and indirect impacts associated with fluid mineral development would vary, depending on the different types of activities and development intensity.

There would continue to be 24,890 acres of BLM surface/federal mineral estate where NSO stipulations would be applied. The NSO stipulations would protect soil resources. By prohibiting use or occupancy of the land surface, associated ground-disturbing actions would not occur, unless they were allowed by an exception. Reclamation efforts and following BLM-approved BMPs can reduce the intensity of impacts on soils. The severity of these impacts would vary depending on the different types of mineral leasing activities and development intensity. There would continue to be no areas with NSO stipulations in the North Fork area.

BLM-administered lands would continue to include farmland of statewide importance, farmland of unique importance, and prime farmland if irrigated, totaling 36,800 acres. The BLM would continue to apply NSO stipulations on 1,910 acres of farmland. This would continue to protect 5 percent of the surface of farmland from fluid mineral disturbances that could degrade the quality or quantity of farmland.

There would continue to be 110,180 acres of BLM surface/federal mineral estate where CSU stipulations would be applied. Specifically, the 59,480 acres of soils on slopes greater than 40 percent would be protected by a CSU stipulation to require approval of a professional engineering/reclamation plan prior to any fluid mineral development activities. The CSU stipulation would protect soils by constraining use or occupancy of the land surface. The severity of these impacts would vary, depending on the different types of surface-disturbing activities and development intensity.

There would continue to be 423,900 acres of BLM surface/federal mineral estate where TL stipulations would be applied for activities related to fluid mineral development. Specifically, the 28,670 acres of highly erodible and/or saline soils on BLM-administered lands would be protected by a TL stipulation to prohibit surface-disturbing activities from March 1 to May 31 when saturated soils are most vulnerable to damage. Impacts would be the same as NSO stipulations, but only for the duration specified in the stipulation.

As described under ***Nature and Type of Effects***, on lands open to locatable mineral entry, mineral material disposal, and mineral leasing, there is the potential for compaction, contamination, reduced productivity, erosion, biological soil crust degradation, and vegetation removal from mineral activities. The severity of these indirect impacts would vary, depending on the different types of locatable, mineral material, and leasable activities and intensity of development.

There would continue to be 28,060 acres of BLM surface/federal mineral estate withdrawn from locatable mineral entry and 27,690 acres recommended for withdrawal from locatable mineral entry. By withdrawing land, impacts on soil resources from associated mineral activities and developments would not occur in those areas. The severity of these indirect impacts would vary, depending on the different types of locatable mineral activities and intensity of development.

Under Alternative A, soils are subject to erosion, compaction, degradation of biological soil crust, and vegetation removal associated with dispersed camping, overnight use, and recreational mining (herein referred to as casual use mining). These activities are allowed in all areas, including those around developed recreation sites. Soils may be protected by including use stipulations or restrictions on special recreation permits (SRPs) for activities that could impact fragile soils.

The types of impacts from motorized travel designations are the same as those described under ***Effects Common to All Alternatives***. Alternative A would protect soil resources by placing the restrictions on travel and transportation specified in **Table 4-5**. Alternative A would continue managing the North Delta OHV Area as open to cross-country travel, thereby continuing OHV-related erosion of the fragile soils contained there.

Under Alternative A, there would continue to be 85,080 acres of ROW exclusion areas and 0 acres of ROW avoidance areas. New ROWs would not be authorized in ROW exclusion areas, which would offer long-term soils protection. On the 590,720 acres not identified as exclusion areas, development could, in the short term, compact and erode soils and remove vegetation. Some ROWs, such as pipelines and buried power lines, could be reclaimed after installation, resulting in fewer long-term impacts. Other projects, such as roads, would have long-term impacts on soils.

The BLM would continue to manage 30,000 acres of ACECs for purposes that directly or indirectly affect soil resources. ACEC management for soils and vegetation would directly affect soils. In areas of susceptible soils, such as the adobe badlands, restricting uses through an ACEC designation can preserve conditions and limit future impacts. Vegetation helps to stabilize soils.

There would be 29 stream segments along 154.1 miles of river segments crossing BLM-administered land managed as eligible for inclusion in the National Wild and Scenic Rivers System (NWSRS). The BLM

would continue to manage the eligible segments according to interim protective management guidelines, which would contribute to maintaining soil health through prohibiting or minimizing soil disturbing activities such as grazing and ROWs along these 29 segments. On the other hand, identifying streams as eligible for inclusion in the NWSRS could attract attention. Visitor use could increase with increased attention, which could lead to minor reductions in soil health due to increases in recreational activities such as fishing, boating, and camping. Wild and scenic river (WSR) protections on soils are reflected through other resource programs such as NSO under fluid minerals, ROW exclusion under lands and realty, and NGD under recreation. Protections afforded to soils from the WSR program are analyzed under these respective sections.

Alternative B

Compared with Alternative A, the BLM would implement more actions to protect and monitor soils. The types of impacts are the same as under Alternative A, but the additional management actions under Alternative B would provide more opportunities to protect soils in riparian corridors from such activities as recreational travel, livestock grazing, and fluid mineral development.

Unlike Alternative A, Alternative B would identify 325-foot buffers along perennial streams as ROW exclusion areas. This would protect fragile soils that often occur in riparian areas through minimizing ground-disturbing activities.

Under Alternative B, the BLM would implement specific actions to protect fragile soils, including 7,360 acres of potential biological soil crust in the East Paradox ACEC, saline/selenium soils (107,170 acres of which would be protected by an NSO/NGD restriction), biological crusts across the Planning Area, areas of 30 percent slopes or greater, and saturated soils. All of these actions would protect these identified fragile soils by reducing adverse impacts from surface disturbance, compared with no such protection under Alternative A.

Beyond the protection of saline/selenium soils under Alternative B, Alternative B.1 also would apply NSO restrictions within 0.25-mile of saline/selenium soils impacting an additional 860 acres in the North Fork area (a total of 108,030 acres of BLM surface/federal mineral estate in the Planning Area). Alternative B.1 would also prohibit oil and gas leasing on 12,660 acres of BLM surface/federal mineral estate with these soils in the North Fork area.

Alternative B allows for changing land uses, such as livestock grazing, recreation and mineral and ROW development, which have the potential in affected areas to compact soils, remove vegetation, reduce productivity, contaminate soils, and occasionally erode soils. Alternative B allows the BLM to exert greater discretion and to implement a wider range of land use strategies to protect soil health.

From a land health management perspective, Alternative B provides more protection over soil health than does Alternative A. This is because it directs the BLM to apply land health improvement projects in areas likely to be stabilized or improved to a higher health condition, regardless of land health status.

As mentioned under ***Nature and Type of Effects***, fires that burn at high heat can damage soil health through reducing moisture content, killing plant root structures, and killing the microorganisms that comprise the soil food web. The BLM would implement specific vegetation management actions to revegetate wildfire and development areas under Alternative B. By attempting to revegetate more areas, a larger soil surface area may be covered and, consequently, they would be less susceptible to erosion and sedimentation. The types of impacts from wildland fire management are the same as under Alternative A, except that more acres would be potentially treated, moving vegetation communities toward desired conditions. This would better protect soil resources.

Under Alternative B, the BLM would manage 42,150 acres for wilderness characteristics (compared with 0 acres under Alternative A). Management prescriptions would include such actions as ROW exclusion and avoidance areas, travel restrictions (e.g., closing areas to motorized travel or limiting mechanized travel to designated routes), and closure to mineral development (subject to valid existing rights). These restrictions on surface-disturbing activities would protect soil resources in these areas.

Under Alternative B, the BLM would close approximately 396,800 acres (4 times more acres than under Alternative A) to wood product sales and harvest and would prohibit timber and woodland harvesting in riparian areas, unless such sales or harvest would enhance resource values for which a given unit is designated, improve forest and land health conditions, or achieve vegetation mosaic objectives. This would provide more opportunities to protect soils from forestry activities through increased acres closed to wood product sales and harvest and through implementing specific forest/woodland management plans.

Under Alternative B, 158,220 acres would be unavailable to livestock grazing (nearly 3 times more acres than under Alternative A). The types of impacts from livestock grazing are the same as those described under Alternative A but would occur over a smaller area. Alternative B also excludes livestock grazing for a minimum of 3 years on disturbed areas, which would increase revegetation success, soil stabilization, and watershed health. Alternative B also directs the BLM to periodically evaluate allotments or portions thereof for grazing issues. Changes in grazing management strategies or allotment closures to address the impacts of livestock grazing on sensitive fish habitat, municipal watersheds, or waters downstream of soils with high selenium concentrations would be beneficial to soils and would provide a protective advantage over Alternative A.

Under Alternative B, NGD restrictions would be applied on 445,720 acres, SSR restrictions would be applied on 230,020 acres, and TL restrictions for other surface-disturbing activities would be applied on 494,580 acres (454,230 acres under Alternative B.1). Effects are described under ***Nature and Type of Effects***. By comparison, NGD restrictions are only applied to three existing ACECs under Alternative A (Adobe Badlands, Fairview South, and Needle Rock; 36,450 acres); there are no SSR or TL restrictions for other surface-disturbing activities under Alternative A.

Restrictions on fluid mineral development would result in fewer new and exploratory development wells drilled and associated surface-disturbance than Alternative A. There would be 181,220 acres of BLM surface/federal mineral estate closed to fluid minerals leasing (3 times more acres than under Alternative A), and 494,580 acres of BLM surface/federal mineral estate open to fluid minerals leasing (28 percent fewer acres than under Alternative A). Under Alternative B.1 there would be 221,570 acres of BLM surface/federal minerals closed to oil and gas leasing (4 times more acres than under Alternative A) and 454,230 acres of BLM surface/federal minerals open to fluid minerals leasing (28 percent fewer acres than under Alternative A). The types of impacts from fluid minerals leasing are the same as those described under Alternative A, but they would occur over a smaller area. The intensity and severity of impacts would depend on the type of activity or development and on the type or condition of soil resources in these areas.

Under Alternative B, NSO stipulations would be applied on 354,970 acres of BLM surface/federal mineral estate open to fluid mineral leasing (15 times more acres than under Alternative A). The types of impacts are the same as those described under Alternative A, but the additional 340,000 acres that would receive NSO stipulations under Alternative B would be protected from such impacts. An NSO stipulation would be applied to the 107,170 acres of BLM-administered lands mapped as soils with elevated levels of salinity/selenium and to 174,540 acres of BLM-administered lands mapped as having slopes greater than 30 percent. Surface occupancy and surface-disturbing activities would be prohibited within these areas, thereby protecting these soils.

BLM-administered lands include farmland of statewide importance, farmland of unique importance, and prime farmland if irrigated, totaling 36,800 acres. The BLM would apply NSO stipulations on 29,750 acres of farmland. This would increase the protection of the surface of farmland (from 5 percent under Alternative A to 80 percent under Alternative B) from fluid mineral disturbances that could degrade the quality or quantity of farmland.

Under Alternative B.1, NSO stipulations would be applied on 318,630 acres of BLM surface/federal minerals open to oil and gas leasing (13 times more acres than under Alternative A). The types of impacts are the same as those described under Alternative A. The NSO stipulations specific to the North Fork area cover 27,280 acres and include 7,390 acres of BLM-administered lands mapped as soils with elevated levels of salinity/selenium, lands with medium to high geologic hazard, and lands within 0.25-mile of prime and unique farmlands, livestock operations, organic farm, conventional farm, ranch, orchard, and the West Elks American Viticultural area, thereby protecting these agricultural soils from surface-disturbing activities associated with oil and gas development. For comparison, there are no areas with NSO stipulations in the North Fork area under Alternative A.

Under Alternative B, CSU stipulations would be applied to 139,560 acres of BLM-administered lands open to fluid mineral leasing (28 percent more acres than under Alternative A). The types of impacts are the same as those described under Alternative A; however, potential impacts are reduced on the 30,730 additional acres receiving a CSU stipulation under Alternative B. CSU/SSR restrictions would be applied to the 254,840 acres mapped as potential biological soil crust, thereby limiting the potential for harm to these soils.

Under Alternative B.1, CSU stipulations would be applied on 135,550 acres of BLM surface/federal minerals open to oil and gas leasing (23 percent more acres than under Alternative A). Fewer acres would have CSU restrictions than in Alternative B because of an increase in No Leasing (NL) areas and NSO stipulations. The types of impacts are the same as those described under Alternative A. The CSU restrictions would be applied on 7,280 acres of the North Fork area. CSU restrictions specific to the North Fork area include areas with moderate geologic hazard, which would prevent soil instability in these areas, and vistas and travel corridors, which would indirectly protect other soils.

Under Alternative B, TL stipulations would be applied to 494,580 acres of BLM surface/federal mineral estate open to fluid mineral leasing (19 percent more acres than under Alternative A). The types of impacts are the same as those described under Alternative A but would occur over a larger area. TL stipulations would be applied to areas where soils are saturated or demonstrating rutting of 2 inches or more. This TL would prohibit surface occupancy and surface disturbing activities thereby reducing erosion during this vulnerable timeframe for soils.

The types of impacts from locatable, mineral material, and nonenergy leasable minerals are the same as those described under Alternative A. However, Alternative B would close 499,960 acres of BLM surface/federal mineral estate to mineral materials disposal (nearly 5 times more than under Alternative A). There would also be 175,840 acres of BLM surface/federal mineral estate open for consideration for mineral material disposal on a case-by-case basis, far fewer than the 573,610 acres under Alternative A. At 289,400 acres, Alternative B would also have less than half the acres of BLM surface/federal mineral estate as Alternative A (631,580 acres) open for consideration of nonenergy solid leasable mineral exploration or development. Under Alternative B, fewer areas would be open to erosion, compaction, and vegetation removal from such activities, and soils would be more protected.

The types of impacts from motorized travel designations are the same as those described under Alternative A, but Alternative B would have fewer impacts on soil resources due to fewer areas being disturbed by motorized use through the restrictions specified in **Table 4-5**. Alternative B would have

more than doubled the acreage closed to motorized and mechanized travel than under Alternative A, and over 4 times more acres where motorized and mechanized travel is limited to designated routes than under Alternative A, and 0 acres where motorized and mechanized travel is limited to existing or designated routes.

Furthermore, as part of the NSO that restricts surface-disturbing activities within 500 feet of perennial streams, travel, including the creation of new routes associated with fluid mineral development would not be permitted in the area; this would protect soils near these water courses. Impacts from travel management under Alternative B would be further reduced by implementing comprehensive route designations for motorized and mechanized travel on 560,830 acres. This would minimize the likelihood of motorized and mechanized travel in other areas where soils may be more fragile.

Acquisition decisions under Alternative B would be protective of soils by identifying acquisitions and easements along the Gunnison, San Miguel, and Dolores Rivers that provide water quality protection values, such as those related to salinity/selenium sedimentation, by protecting fragile soils. Alternative A has no such action.

Under Alternative B, 431,040 acres would be managed as ROW exclusion areas (4 times more acreage than under Alternative A), and 195,460 acres would be managed as ROW avoidance areas (compared with none under Alternative A). The types of impacts are the same as those described under Alternative A. The intensity and severity of impacts would depend on the type of activity or development and on the type or condition of soils occurring in these areas. The 107,170 acres of saline/selenium soils within the Decision Area managed as ROW exclusion areas would be protected from any ROW-related disturbance and erosion. Additionally, 7,360 acres of potential biological soil crust in the East Paradox ACEC would be managed as a ROW exclusion area. Furthermore, slopes of 30 percent or greater (174,540 acres) would be managed as ROW exclusion areas under this alternative. No such protections are provided under Alternative A.

Alternative B would close several areas surrounding water bodies to dispersed camping and overnight use, and recreational mining would not be allowed. This would reduce the potential for adverse impacts in areas where activity is often otherwise concentrated, where topography is often steep, and where soils are often moist and more subject to erosion. Alternative B would further protect soils through closing several special recreation management areas (SRMAs) to competitive events and a few additional areas to motorized competitive events. Alternative B would not manage any areas as open to cross-country travel within the North Delta OHV Area, located in the adobe badland fragile soils, thereby protecting the fragile soils contained there from erosion associated with motorized uses.

Under Alternative B, 15 ACECs on 215,940 acres would be designated (7 times more acres than under Alternative A). The types of protections are the same as under Alternative A, but they would occur over a larger area. The East Paradox ACEC and the Adobe Badlands ACEC would be designated specifically to protect sensitive soils.

Under Alternative B, the BLM would determine that all of the 29 eligible stream segments are suitable for inclusion in the NWSRS. These segments would continue to be managed under interim protective management guidelines, which provide standards for ongoing protection of identified outstandingly remarkable values (ORVs) and adequate water quality to support those ORVs, free-flowing condition, and tentative classification (i.e., wild, scenic, or recreational). In addition to interim protective management guidelines, additional protections, such as NGD, SSR, and TL restrictions, may be applied within the WSR study corridor. WSR protections on soils are reflected through other resource programs such as NSO under fluid minerals, ROW exclusion under lands and realty and NGD under recreation. Protections afforded to soils from the WSR program are analyzed under these respective

sections. Additional protections also would include the designation of VRM classes based on the classifications of segments as wild, scenic, or recreational. As such, Alternative B would afford a higher level of administrative protections for these stream segments and adjacent riparian habitats than Alternative A; this would result in soil health protection and improvement. If Congress were to designate stream segments as part of the NWSRS (which is outside the scope of the RMP), they would become nationally recognized rivers. Visitor use could increase with increased attention, which could lead to minor reductions in soil health due to increases in recreational activities such as fishing, boating, and camping. Soils along any stream segments that Congress decides not to designate would be prone to degradation through ground disturbing activities that would not be allowed along designated segments.

Alternative C

Under Alternative C, the BLM would implement specific actions to protect fragile soils, including 360 acres of potential biological soil crust in the potential East Paradox ACEC, biological crusts in general, and areas of 40 percent slopes or greater. All of these actions would protect soils, compared with no such protection under Alternative A.

Alternative C allows for changing land uses, particularly livestock grazing and recreation, which have the potential to compact soils, remove vegetation, reduce productivity, contaminate soils, and occasionally erode soils. Alternative C allows the BLM to exert greater discretion and to implement a wider range of land use strategies to improve water quality and protect soil health.

Through specific land health management actions, Alternative C provides more protection of soils than does Alternative A. Alternative C directs the BLM to improve lands and wetlands rated as not meeting BLM Colorado Public Land Health Standards. In addition, Alternative C directs the BLM to manage lands to improve water quality and to promote the delisting of state-impaired water bodies in areas where BLM management actions are contributing to impaired water quality. Such improvements would largely be made by changing terrestrial management practices. Alternative A has no such actions.

Conversely, Alternative C lacks some protective actions that are included under Alternative A. While Alternative A directs the BLM to develop vegetation improvements or to reduce salinity/selenium soils erosion by mitigating already mobilized salts and selenium, Alternative C offers no such guidance; in this respect, it would be less protective of soils. Furthermore, unlike Alternative A, Alternative C does not direct the BLM to develop land treatment projects designed to reduce runoff and soil erosion that do not conflict with management of other resources.

In other categories of soils management, Alternative C presents qualitatively different approaches than Alternative A, and it is unclear if Alternative C would be more or less protective. For example, under Alternative C, SSR and CSU stipulations would be applied to saline/selenium soils and they would also be managed as ROW avoidance areas. This approach differs from the strategy under Alternative A for protecting these soils, which prohibits surface disturbance from March 1 to May 31, when saturated soils are most vulnerable to damage.

Unlike Alternative A, BLM would implement specific vegetation management to revegetate wildfire and development areas under Alternative C. By revegetating more areas, a larger soil surface area would be covered and, consequently, would be less susceptible to erosion. This would be more protective of soil health than Alternative A.

While fire prevention and treatment strategies would somewhat differ, the types of impacts from wildland fire management are generally the same as under Alternative A.

Under Alternative C, the BLM would close approximately 44,530 acres (60 percent fewer acres than under Alternative A) to wood product sales and/or harvest and would limit timber and woodland

harvesting in riparian areas to locations with the least impact. This smaller area that is closed from wood product sales and harvest means that larger areas are open for such activities and for associated soil erosion. Alternative C would be less protective of soils than Alternative A with respect to wood product sales and harvest.

Under Alternative C, 22,530 acres would be unavailable to livestock grazing (60 percent fewer acres than under Alternative A). The types of impacts from livestock grazing are the same as those described under Alternative A but would occur over a larger area. Alternative C also excludes livestock grazing on disturbed areas, to the extent needed to comply with BLM Colorado Standards for Public Land Health and Guidelines for Livestock Grazing Management (BLM 1997), which would increase revegetation success and soil stabilization.

The minimal restrictions on fluid mineral development would result in a reasonably foreseeable development scenario similar to that projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**. Acres open and closed to fluid minerals leasing would be the same as under Alternative A. The types of impacts are the same as under Alternative A.

Under Alternative C, NSO stipulations would be applied on 14,680 acres of BLM surface/federal mineral estate open to fluid mineral leasing (41 percent fewer acres than under Alternative A). The types of impacts are the same as those described under Alternative A but would occur over a larger area.

BLM-administered lands include farmland of statewide importance, farmland of unique importance, and prime farmland if irrigated, totaling 36,800 acres. The BLM would apply NSO stipulations on 1,980 acres of farmland. Compared with Alternative A, this would increase the protection of the surface of farmland (by 70 acres) from fluid mineral disturbances that could degrade the quality or quantity of farmland. Impacts would be similar to those under Alternative A.

Under Alternative C, CSU stipulations would be applied to 365,810 acres of BLM surface/federal mineral estate open to fluid mineral leasing (over 3 times more acres under Alternative A). The types of impacts are the same as those described under Alternative A but would occur over a smaller area. CSU/SSR restrictions would be applied to the 1,650 acres mapped as East Paradox biological soil crust and to the 115,080 acres of BLM-administered lands with slopes of or greater than 40 percent, providing a level of protection for these soils from disturbance and erosion. No such biological soil protection is present under Alternative A, but a similar CSU protection is afforded to 40 percent or greater slopes under Alternative A.

Under Alternative C, TL stipulations would be applied on 475,220 acres of BLM surface/federal mineral estate open to fluid mineral leasing (12 percent more acres than under Alternative A). The types of impacts are the same as those described under Alternative A but would occur over a larger area.

Under Alternative C, NGD restrictions would be applied on 42,660 acres, SSR restrictions would be applied on 241,400 acres, and TL restrictions for other surface-disturbing activities would be applied on 475,220 acres. Effects are described under ***Nature and Type of Effects***. By comparison, NGD restrictions are only applied to three existing ACECs under Alternative A (Adobe Badlands, Fairview South, and Needle Rock; 36,450 acres); there are no SSR or TL restrictions for other surface-disturbing activities under Alternative A.

The types of impacts from locatable, mineral material, and nonenergy leasable minerals are the same as those described under Alternative A. However, Alternative C would close 56,350 acres of BLM surface/federal mineral estate to mineral materials disposal (just over half as much as under Alternative A). There would also be 8 percent more acres open for consideration for mineral material disposal on a

case-by-case basis than the 573,610 acres under Alternative A. At 619,450 acres, Alternative C would have about 2 percent fewer acres (620,230 acres) of BLM surface/federal mineral estate than Alternative A (631,580 acres) open for consideration of nonenergy solid leasable mineral exploration or development. Overall, Alternative C would result in greater impacts on soils from locatable, mineral material, and nonenergy leasable mining activities than under Alternative A.

Soil protections under Alternative C would be greater than under Alternative A through prohibiting mining in developed recreational sites.

The types of impacts from motorized travel designations are similar to those described under Alternative A. Alternative C would protect soil resources by placing the restrictions on travel and transportation specified in **Table 4-5**. Alternative C would manage 4,760 acres as open to cross-country travel within the North Delta OHV Area, 44 percent less area open than under Alternative A, thereby protecting the fragile soils on 61 percent more acres contained there from motorized use erosion. Alternative C would also open 11,310 acres in the Kinikin Hills Extensive Recreation Management Area (ERMA) to OHV use, likely increasing OHV-related soil erosion in this area, compared with Alternative A. While Alternative C has 7,510 more acres open to cross-country motorized travel, it also limits motorized and mechanized travel to designated routes on nearly 470,000 more acres than under Alternative A. While open areas have the potential to increase adverse soil impacts such as erosion, the designation of trails is expected to reduce the overall acreage of disturbance associated with travel management in comparison with Alternative A. Overall, it is not clear whether motorized travel designations under Alternative C would offer greater protection, less protection, or the same protection of soils compared with Alternative A.

Under Alternative C, 44,550 acres would be managed as ROW exclusion areas (about half as much as under Alternative A), and 210,390 acres would be managed as ROW avoidance areas (compared with 0 acres under Alternative A). As a result, the types of impacts from ROW actions are the same as those described under Alternative A, but they could occur over a larger area. The 107,170 acres of saline/selenium soils and the 115,080 acres of slopes of or greater than 40 percent would be managed as ROW avoidance areas and would thereby be somewhat protected from any ROW-related disturbance and erosion. Additionally, the 360 acres of rare biological soil crust in East Paradox would be managed as ROW exclusion areas. No such protections are provided under Alternative A.

Under Alternative C, all but the Tabeguache Creek ACEC under Alternative A would be designated (totaling 29,440 acres). The types and extent of impacts are the same as under Alternative A.

Under Alternative C, the BLM would determine that none of the 29 eligible stream segments are suitable for inclusion in the NWSRS. The segments would not be managed under interim management guidelines and would not receive the associated protections of soils and vegetation within the eligible riparian areas. Soils along these 29 segments would not receive the interim management protections and would not have the long-term protections that would be afforded by a Congressional designation. These segments would be prone to degradation through ground-disturbing activities that would not be allowed along segments identified as eligible for designation.

Alternative D

Alternative D mandates that 325-foot buffers along perennial streams be managed as ROW avoidance areas. This would be protective of fragile soils that often occur in riparian areas through reducing ground-disturbing activities. Alternative A includes no such protection.

Under Alternative D, the BLM would implement specific actions related to protecting soils, largely to protect water quality. Overall, Alternative D provides greater protection to soils by such measures as

protecting riparian and perennial streams, imposing management measures related to saline/selenium soils, and directing the BLM to manage lands to improve water quality and to promote the delisting of state-impaired water bodies in areas where BLM management actions are contributing to impaired water quality.

Alternative A land health management actions direct the BLM to improve vegetation or reduce salinity/selenium to improve water quality by mitigating already mobilized salts and selenium. Alternative D allows the BLM to exert greater discretion and to implement a wider range of land use strategies, which would also include livestock grazing and recreation management options, to improve soil health.

The BLM would implement specific vegetation management actions to revegetate areas of degraded vegetation that are not included under Alternative A. By revegetating more areas, a larger soil surface area would be covered and, consequently, would be less susceptible to erosion. This would provide greater opportunities to maintain and improve soil conditions over the long term.

Compared with Alternative A, the BLM would implement more actions to protect and monitor riparian vegetation, which indirectly protects the associated soils. The types of impacts are the same as under Alternative A; however, the additional management actions under Alternative D would provide more opportunities to protect soils from activities such as recreational travel, concentrated livestock grazing, fluid mineral development, and wood products collection and harvest.

The types of impacts from wildland fire management are the same as under Alternative A, except that more acres could be treated, moving vegetation communities toward desired conditions. This would better protect soil resources.

Under Alternative D, the BLM would manage 18,320 acres for wilderness characteristics (compared to 0 acres under Alternative A). Management prescriptions would protect the wilderness characteristics found in these areas and would include such actions as ROW exclusion and avoidance areas, travel restrictions (e.g., closed to motorized travel or limiting mechanized travel to designated routes), and closure to mineral development (subject to valid existing rights). These restrictions on surface-disturbing activities would protect soils in these areas.

Under Alternative D, the BLM would close approximately 281,390 acres (over 2 times more acres than under Alternative A) to wood product sales and harvest and would prohibit timber and woodland harvesting in riparian areas, unless such sales or harvest would enhance resource values for which a given unit is designated, improve forest and land health conditions, or achieve vegetation mosaic objectives. Alternative D would provide more opportunities to protect soils from impacts associated with forestry activities by increasing acres closed to wood product sales and harvest and by implementing specific forest/woodland management plans.

Under Alternative D, 58,660 acres would be unavailable to livestock grazing (4 percent more acres than under Alternative A). The types of impacts from livestock grazing are the same as those described under Alternative A but would occur over a slightly smaller area. Alternative D also excludes livestock grazing on disturbed areas, to the extent needed to comply with BLM Colorado Standards for Public Land Health and Guidelines for Livestock Grazing Management (BLM 1997). This would increase revegetation success and soil stabilization.

Under Alternative D, there would be 53,700 acres managed as ROW exclusion areas (37 percent less acreage than under Alternative A) and 276,500 acres managed as ROW avoidance areas (compared with none under Alternative A). The types of impacts are the same as those described under Alternative A. The intensity and severity of impacts would depend on the type of activity or development and on the type or condition of soils occurring in these areas. The 360 acres of rare biological soil crust in East

Paradox would be managed as ROW exclusion areas with some exceptions, providing a limited degree of protection for these areas from disturbance and erosion. No such protections are provided under Alternative A.

The restrictions on fluid mineral development would result in a reduction in the number of new and exploratory development wells and associated surface-disturbance from those projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**. There would be 48,510 acres of BLM surface/federal mineral estate and 1,550 acres on private or state surface/federal minerals estate (totaling 50,060 acres) closed to fluid minerals leasing (13 percent more acres than under Alternative A) and 631,580 acres of BLM surface/federal mineral estate and 240,230 acres on private or state surface/federal minerals estate (totaling 865,970 acres) open to fluid minerals leasing (less than 1 percent fewer acres than under Alternative A). The types of impacts from fluid minerals leasing are the same as those described under Alternative A, but they would occur over a smaller area. The intensity and severity of impacts would depend on the type of activity or development and on the type or condition of soils in these areas.

Under Alternative D, NSO stipulations would be applied to 187,560 acres of BLM surface/federal mineral estate open to fluid mineral leasing (over 7 times more acres than under Alternative A). The types of impacts are the same as those described under Alternative A but would occur on a smaller area.

BLM-administered lands include farmland of statewide importance, farmland of unique importance, and prime farmland if irrigated, totaling 36,800 acres. The BLM would apply NSO stipulations on 7,820 acres of farmland. This would increase the protection of the surface of farmland (from 5 percent under Alternative A to 21 percent under Alternative D) from fluid mineral disturbances that could degrade the quality or quantity of farmland.

Under Alternative D, CSU stipulations would be applied to 265,140 acres of BLM surface/federal mineral estate open to fluid mineral leasing (over 2 times more acres than under Alternative A). The types of impacts are the same as those described under Alternative A, but the areas across which they would occur would be smaller. CSU/SSR restrictions would be applied to areas mapped as potential biological soil crust only when high levels of biological soil crust are found, thereby limiting the potential for harm to these soils when compared to Alternative A.

Under Alternative D, TL stipulations would be applied on 627,290 acres of BLM surface/federal mineral estate open to fluid mineral leasing (approximately 50 percent more acres than under Alternative A). The types of impacts are the same as those described under Alternative A but would occur over a larger area.

Under Alternative D, NGD restrictions would be applied on 36,180 acres, SSR restrictions would be applied on 512,570 acres, and TL restrictions for other surface-disturbing activities would be applied on 627,290 acres. Effects are described under ***Nature and Type of Effects***. By comparison, NGD restrictions are only applied to three existing ACECs under Alternative A (Adobe Badlands, Fairview South, and Needle Rock; 36,450 acres); there are no SSR or TL restrictions for other surface-disturbing activities under Alternative A.

The types of impacts from locatable, mineral material, and nonenergy leasable minerals are the same as those described under Alternative A. However, Alternative D would close 132,520 acres of BLM surface/federal mineral estate to mineral materials disposal (30 percent more than under Alternative A). There would also be fewer acres (543,280) of BLM surface/federal mineral estate open for consideration for mineral material disposal on a case-by-case basis than the 573,610 acres under Alternative A. At 507,670 acres, Alternative D would also have about 20 percent fewer acres of BLM surface/federal

mineral estate than Alternative A (631,580 acres) open for consideration of nonenergy solid leasable mineral exploration or development.

Soils under Alternative D would receive greater protection than under Alternative A because dispersed camping and overnight use would be closed in several areas, and recreational mining would be restricted. Alternative D would further protect soils through closing a few SRMAs to competitive events and several additional areas to motorized competitive events. Alternative D would not manage any areas as open to cross-country travel within the North Delta OHV Area, thereby protecting the fragile soils there from motorized use erosion.

The types of impacts from motorized travel designations are the same as those described under Alternative A, but Alternative D would have fewer impacts on soils because fewer areas would be disturbed by motorized use through the restrictions specified in **Table 4-5**. Alternative D would have 30 percent more acreage closed to motorized and mechanized travel than under Alternative A, and over 4 times more acres where motorized and mechanized travel is limited to designated routes than under Alternative A.

Furthermore, all lands within 325 feet of perennial streams would be protected from surface occupancy and would have SSR restrictions applied to them. The BLM would be less likely to approve new trails within these areas than it would under Alternative A, contributing to the protection of soils in these areas. Impacts from travel management under Alternative D would be further reduced by implementing comprehensive route designations for motorized and mechanized travel on 617,240 acres.

Under Alternative D, 8 ACECs on 51,320 acres would be designated (71 percent more acres than under Alternative A). The types of impacts are the same as under Alternative A but would occur over a larger area. The Biological Soil Crust ACEC and Adobe Badlands ACEC would be designated specifically to protect sensitive soils.

Under Alternative D, the BLM would determine that 16 of the 29 eligible stream segments, totaling 104.6 miles, are suitable for inclusion in the NWSRS and that the remaining 13 stream segments, totaling 49.5 miles, are not suitable. The 16 segments would continue to be managed under interim management guidelines, which provide standards for ongoing protection of identified ORVs and adequate water quality to support those ORVs, free-flowing condition, and tentative classification (i.e., wild, scenic, or recreational). In addition to interim protective management guidelines, additional protections, such as SSR restrictions, may be applied within the WSR study corridor. Additional protections also would include the designation of VRM classes based on the classifications of segments as wild, scenic, or recreational. The other 49.5 miles would lose interim protections currently afforded under Alternative A. As such, Alternative D would afford a higher level of interim protections for soils along 104.6 miles of streams, and would remove protections for 49.5 miles of soils. Overall, because the suitability determination would likely result in longer-term protections than the interim protections present under Alternative A, Alternative D would be more protective of soils along the 104.6 miles of streams, but would be less protective of the soils along the 49.5 miles of streams. On the other hand, if Congress were to designate stream segments as part of the NWSRS (which is outside the scope of the RMP), they would become nationally recognized rivers. Visitor use could increase with increased attention, which could lead to minor reductions in soil health due to increases in recreational activities such as fishing, boating, and camping. Soils along any stream segments that Congress decides not to designate would be prone to degradation through ground-disturbing activities that would not be allowed along designated segments.

Alternative E

Alternative E would require that 50-foot buffers along perennial streams be managed as ROW avoidance areas. This would be protective of fragile soils that often occur in riparian areas through reducing ground-disturbing activities. Alternative A includes no such protection.

Under Alternative E, the BLM would implement specific actions related to protecting soils, largely to protect water quality. Overall, Alternative E provides greater protection to soils by such measures as protecting riparian and perennial streams, imposing management measures related to saline/selenium soils, and directing the BLM to manage lands to improve water quality and to promote the delisting of state-impaired water bodies in areas where BLM management actions are contributing to impaired water quality.

Land health management actions under Alternative A would direct the BLM to improve vegetation or reduce salinity/selenium to improve water quality by mitigating already mobilized salts and selenium. Alternative E allows the BLM to exert greater discretion and to implement a wider range of land use strategies, which would also include livestock grazing and recreation management options, to improve soil health.

The BLM would implement specific vegetation management actions to revegetate areas of degraded vegetation that are not included under Alternative A. By revegetating more areas, a larger soil surface area would be covered and, consequently, would be less susceptible to erosion. This would provide greater opportunities to maintain and improve soil conditions over the long term.

Compared with Alternative A, the BLM would implement more actions to protect and monitor riparian vegetation, which indirectly protects the associated soils. The types of impacts are the same as under Alternative A; however, the additional management actions under Alternative E would provide more opportunities to protect soils from activities such as recreational travel, concentrated livestock grazing, fluid mineral development, and wood products collection and harvest.

Under Alternative E, NGD restrictions would be applied on 36,180 acres, SSR restrictions would be applied on 307,450 acres, and TL restrictions for other surface-disturbing activities would be applied on 494,340 acres. Effects are described under ***Nature and Type of Effects***. By comparison, NGD restrictions are only applied to three existing ACECs under Alternative A (Adobe Badlands, Fairview South, and Needle Rock; 36,450 acres); there are no SSR or TL restrictions for other surface-disturbing activities under Alternative A.

Wildland Fire Ecology and Management

The types of impacts from wildland fire management are the same as those under Alternative A, except that more acres could be treated, moving vegetation communities toward desired conditions. This would better protect soil resources.

Lands with Wilderness Characteristics

The BLM would manage 18,320 acres to minimize impacts on wilderness characteristics, while managing for other uses. Although the lands would not be managed to preserve wilderness characteristics, there would still be efforts that minimize impacts on wilderness characteristics. The BLM would conserve wilderness characteristics where possible through relocation, design criteria, and/or mitigation. In turn, this would also minimize impacts on soil resources. There would be no comparable lands managed to minimize impacts on wilderness characteristics under Alternative A.

Forestry and Woodland Products

Under Alternative E, the BLM would close approximately 171,970 acres (compared with 110,160 acres under Alternative A) to commercial wood product sales and harvest and would prohibit timber and woodland harvesting in riparian areas. The exception to the closure would be to allow wood product sales and/or harvest to enhance resource values for which a given unit is designated, to improve forest and land health conditions, or to achieve vegetation mosaic objectives. Alternative E would provide more opportunities to protect soils from impacts associated with forestry activities by increasing acres closed to wood product sales and harvest and by implementing specific forest/woodland management plans.

Livestock Grazing

Under Alternative E, 59,160 acres would be unavailable to livestock grazing. This apparent reduction in both available and unavailable acres from Alternative A actually reflects corrections to the existing grazing inventory and associated GIS; in reality, acres available and unavailable under Alternative E are similar to Alternative A and would have a similar potential for grazing impacts on soils. The types of impacts from livestock grazing are the same as those described under Alternative A. Alternative E also excludes livestock grazing on disturbed areas, to the extent needed to comply with BLM Colorado Standards for Public Land Health and Guidelines for Livestock Grazing Management (BLM 1997). This would increase revegetation success and soil stabilization.

Lands and Realty—Rights-of-Way

Under Alternative E, there would be 53,040 acres managed as ROW exclusion areas (37 percent less acreage than under Alternative A) and 66,030 acres managed as ROW avoidance areas (compared with none under Alternative A). The types of impacts are the same as those described under Alternative A. The intensity and severity of impacts would depend on the type of activity or development and on the type or condition of soils occurring in these areas. The 390 acres of rare biological soil crust in the potential Biological Soil Crust ACEC would be managed as ROW avoidance areas with some exceptions, providing a limited degree of protection for these areas from disturbance and erosion. No such protections are provided under Alternative A.

Fluid Leasable Minerals—Oil and Gas

The restrictions on fluid mineral development would result in a reduction in the number of new and exploratory development wells and associated surface-disturbance from those projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d), as discussed under **Section 4.1.1**. Acres open and closed to fluid minerals leasing would be the same as under Alternative A. The types of impacts are the same as under Alternative A.

Under Alternative E, NSO stipulations would be applied to 74,580 acres of BLM surface/federal mineral estate open to fluid mineral leasing (3 times more acres than under Alternative A). The types of impacts are the same as those described under Alternative A but would occur on a smaller area.

BLM-administered lands include farmland of statewide importance, farmland of unique importance, and prime farmland if irrigated, totaling 36,800 acres. The BLM would apply NSO stipulations on 4,490 acres of farmland. This would increase the protection of the surface of farmland (from 5 percent under Alternative A to 12 percent under Alternative E) from fluid mineral disturbances that could degrade the quality or quantity of farmland.

Under Alternative E, CSU stipulations would be applied to 290,880 acres of BLM surface/federal mineral estate open to fluid mineral leasing (over 2.5 times more acres than under Alternative A). The types of impacts are the same as those described under Alternative A, but the areas across which they would

occur would be smaller. CSU/SSR restrictions would be applied to areas mapped as potential biological soil crust only when high levels of biological soil crust are found, thereby limiting the potential for harm to these soils when compared to Alternative A.

Under Alternative E, TL stipulations would be applied on 494,340 acres of BLM surface/federal mineral estate open to fluid mineral leasing (70,440 more acres than under Alternative A). The types of impacts are the same as those described under Alternative A but would occur over a larger area.

Locatable Minerals, Mineral Materials, and Nonenergy Leasable Minerals

The types of impacts from locatable, mineral material, and nonenergy leasable minerals are the same as those described under Alternative A but would occur over a smaller area. Alternative E would close 121,740 acres of BLM surface/federal mineral estate to mineral materials disposal (20 percent more than under Alternative A). There would also be fewer acres (554,060) of BLM surface/federal mineral estate open for consideration for mineral material disposal on a case-by-case basis than the 573,610 acres under Alternative A. At 512,500 acres, Alternative E would also have approximately 19 percent fewer acres of BLM surface/federal mineral estate than Alternative A (631,580 acres) open for consideration of nonenergy solid leasable mineral exploration or development.

Recreation and Visitor Services

Soils under Alternative E would receive greater protection than under Alternative A because dispersed camping and overnight use would be closed in several areas. Alternative E would further protect soils through closing a few SRMAs to competitive events and several additional areas to motorized competitive events.

Comprehensive Travel and Transportation Management

The types of impacts from motorized travel designations are the same as those described under Alternative A, but Alternative E would have fewer impacts on soils because fewer areas would be disturbed by motorized use through the restrictions specified in **Table 4-5**. Alternative E would have 55,770 acres (26 percent more acreage) closed to motorized and mechanized travel than under Alternative A, and over 4 times more acres (615,200 acres) where motorized and mechanized travel is limited to designated routes than under Alternative A.

Alternative E would manage 3,950 acres as open to cross-country travel in portions of the North Delta SRMA, thereby protecting the soils from erosion associated with motorized uses, because over twice as much area is open to cross-country travel under Alternative A.

Furthermore, surface occupancy or use may be restricted and SSR restrictions may be applied on lands within 50 feet of the edge of the ordinary high-water mark (bank-full stage) of perennial streams. The BLM would be less likely to approve new trails within these areas than it would under Alternative A, contributing to soil protection in these areas. Impacts from travel management under Alternative E would be further reduced by implementing comprehensive route designations for motorized and mechanized travel on 615,200 acres.

Areas of Critical Environmental Concern

Under Alternative E, six ACECs on 30,190 acres would be designated (compared with five ACECs on 30,000 acres under Alternative A). The types of impacts are the same as under Alternative A but would occur over a slightly larger area. The Biological Soil Crust ACEC and Adobe Badlands ACEC would be designated specifically to protect sensitive soils.

Wild and Scenic Rivers

Impacts of wild and scenic rivers management would be the same as those described under Alternative D.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on soils includes the Uncompaghre RMP Planning Area. Surface-disturbing activities in the Planning Area are not expected to affect soil resources outside of the Planning Area.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect soils are mineral exploration and development, unauthorized travel, forestry, livestock grazing, recreation, road construction, ROWs, water diversions, weed invasion and spread, weed control, prescribed fire and wildfire, land planning efforts, and climate change. Combined with the proposed management actions, cumulative impacts on soil resources could present challenges to meeting BLM Colorado Public Land Health Standard 1 (BLM 1997) under Alternatives A and C. Impacts on soil resources would not be as substantial under Alternatives B, D, or E, when compared with Alternative A, due to the greater level of resource protections and the lower level of ground disturbance that would be allowed. Alternatives B, D, and E provide greater restrictions on ground-disturbing actions than Alternative A, and so cumulative effects in the Planning Area are not likely to affect soil health as substantially as under Alternatives A or C. Alternative B would provide the greatest protection of soil resources, followed by Alternatives D and E.

An important trend in the Planning Area is rapidly increasing recreational use. All forms of recreation can increase potential for erosion, sedimentation, gully creation, biologic soil crust damage, and riparian and upland vegetation damage. Recreation may also directly and indirectly impact water quality due to erosion and sediment production. However, the significance of such impacts varies with the nature and degree of disturbance as well as site-specific environmental conditions. Typically, larger disturbances in sensitive areas represent greater potential to damage soils and vegetation, degrade water quality, and impair overall watershed function and condition than smaller disturbances in less-sensitive areas. Increases in recreational use on private lands that are adjacent to BLM-administered lands can increase recreational uses and associated soil compaction, disturbance and erosion on those BLM-administered lands. Trails and other routes initiated on private lands are often extended directly onto BLM-administered lands adding cumulatively to impacts on soils in the Planning Area.

An amendment (Public Law 98-569) to the Colorado River Basin Salinity Control Act includes direction for the BLM to develop a comprehensive program for minimizing salt contributions from lands under its management. Gunnison Basin is recognized as the largest nonpoint source of salinity in the Upper Colorado River Basin, and much of the lands open to all modes of travel are situated in areas mapped to be highly erodible (i.e., fragile) or saline. The cumulative erosion in these areas resulting from a dispersed, expanding, unmaintained, and in many cases poorly designed route system is considered a nonpoint source of pollution.

Recent drought and potential climate change resulting in more frequent future droughts could decrease vegetation, increasing the potential for soil erosion, desertification, and fugitive dust production. Furthermore, increased fugitive dust production could elevate the severity of dust-on-snow events triggering earlier melting and earlier peak stream flows, as well as increasing water consumption through transpiration and evaporation. As a result, soil moisture in areas reliant on snowmelt or flooding would be depleted earlier in the season, stressing vegetation. These additional stresses to vegetation could contribute to vegetation loss and establishment of less-desirable species. Increased droughts, wildfires, insects, and diseases due to climate change, a loss of biodiversity, and increased human use are expected

to contribute to a loss of root structures holding soils in place and thereby a decrease in soil health and stability.

4.3.3 Water Resources

This section discusses impacts on water resources from proposed management actions of other resources and resource uses. Existing conditions are described in **Section 3.1.4** (Water Resources).

Methods and Assumptions

Indicators

Indicators of impacts on water resources are as follows:

- Alteration of the physical characteristics of streams, springs/seeps/fens, wetlands, riparian areas, and groundwater aquifers that affect the properly functioning condition and sustainability of these resources
- Changes in water quality that affect the survival rate of downstream aquatic or riparian species
- Number of spills of hazardous materials in water bodies
- Acre-feet of water depleted

Every management action that directly or indirectly has the potential to alter aquifer properties and water quality and quantity and the natural hydrograph can have accompanying temporary or permanent impacts on water resources. The discussion of impacts on water resources includes the effects of surface- and subsurface-disturbing actions on water quality, water quantity, and cumulative watershed health.

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- The degree of impact attributed to any one disturbance or series of disturbances would be influenced by several factors, including proximity to drainages and groundwater wells, location within the watershed, time and degree of disturbance, reclamation potential of the affected area, vegetation, precipitation, and mitigating actions applied to the disturbance.
- Transportation facilities would be properly designed to BLM minimum standards.
- In general, the shallower the depth to water, the more susceptible an aquifer is to contamination. Mineral development is the primary activity that could impact shallow groundwater quality and quantity. Locations in the Planning Area with depths to groundwater of less than 100 feet or unconfined aquifers are considered the most likely to be impacted by mineral development. Unconfined aquifers or those with water table elevations of 100 feet below ground surface are more vulnerable to leaks and spills of contaminants at the surface. However, groundwater at greater depths is vulnerable to mine dewatering, casing failure, contamination resulting from enhanced hydraulic conductivity caused by fracturing and drilling, and contamination from chemicals used in fracturing and drilling. Operators must comply with the Colorado Oil and Gas Conservation Commission's requirements for well bore integrity.

Nature and Type of Effects

Surface water quality impacts can result from a number of causes, including transport of eroded soils into streams due to improperly managed livestock grazing, introduction of waste matter into streams from domestic livestock, and "low-water" crossing points of roads, routes, and ways used by motorized vehicles. Additionally, as water flows downstream, the chemical and biological quality of water deteriorates as salts accumulate in irrigation return flows, ground cover diminishes, water temperature increases, fecal coliform from livestock and wildlife increases, and sediments accumulate from erosion.

Surface-disturbing activities can remove or disturb essential soil-stabilizing agents, such as vegetation diversity, soil crusts, litter, and woody debris. These soil features function as living mulch by retaining soil moisture and discouraging annual weed growth (Belnap et al. 2001). Loss of one or more of these agents increases potential erosion and sediment transport to surface water bodies, leading to surface water quality degradation. Surface-disturbing activities under certain circumstances can also lead to soil compaction, which decreases infiltration rates and elevates potential for overland flow. Overland flow can increase erosion and sediment delivery potential to area surface water bodies, leading to surface water quality degradation.

Surface-disturbing activities in areas of low reclamation potential are at higher risk for erosion. These areas include, but are not limited to "fragile soils," slopes greater than 40 percent, and soils derived from Mancos shale, fragile areas, such as stream channels, floodplains, riparian habitats, and the adobe badlands and North Delta OHV Area in the Planning Area.

In areas with NSO and NGD stipulations, and managed as ROW exclusion, water quality would be protected since ground disturbance would be prohibited and soil erosion limited to natural processes. In areas with CSU and SSR stipulations, and managed as ROW avoidance, water quality would receive some protection since ground disturbance would often be limited. ROW avoidance areas would generally result in lower impacts on water quality, compared with areas not managed as ROW avoidance.

Surface-disturbing activities within stream channels, floodplains, and riparian habitats are more likely to alter natural morphologic stability and floodplain function. Morphologic destabilization and loss of floodplain function accelerate stream channel and bank erosion, increase sediment supply, dewater near-stream alluvium, cause the loss of riparian and fish habitat, and deteriorate water quality (Rosgen 1996). Altering or removing riparian habitats can reduce the hydraulic roughness of the bank and increase flow velocities near the bank (National Research Council 2002). Increased flow velocities near the bank can accelerate erosion, decreasing water quality.

When surface-disturbing impacts are allowed to alter natural drainage patterns, the runoff critical to recharging and sustaining locally important aquifers, springs/seeps/fens, wetlands, and associated riparian habitats is redirected elsewhere. As a result, these sensitive areas can be dewatered, compromising vegetative health and vigor, while degrading proper function and condition of the watershed.

Subsurface disturbances can alter natural aquifer properties (e.g., enhance hydraulic conductivity of existing fractures, breach confining units, and change hydraulic pressure gradients), which can increase potential for contamination of surface and groundwater resources. Furthermore, altering natural aquifer properties can dewater locally important freshwater sources (e.g., groundwater, springs, seeps, fens, and streams).

Under dry conditions, surface-disturbing activities release dust into the air. During winter, wind-blown dust can settle on top of snow and affect the rate of snowmelt. Dust-covered snow versus clean snow can have albedo (reflectivity) values as low as 0.35, doubling the amount of absorbed solar radiation. Research and simulations based on observations in the Senator Beck Basin Study Area near Silverton, Colorado, approximately 20 miles south of the southern portion of the RMP Planning Area, indicate that excess dust on snow (versus pre-1800 conditions) increased the rate of snowmelt and advanced the timing of melting by about 3 to 4 weeks (Painter et al. 2007). Furthermore, results of studies conducted by Painter and others (2007) indicate that annual runoff is reduced by 5 percent under current dust conditions. Primary contributing factors for decreased runoff were identified as:

- Greater absorption of energy during snowmelt causes more of the snow to sublimate directly into the atmosphere.

- Earlier melting exposes the ground surface to sunlight and warmth, which both allow more water to evaporate directly from the soil and extend the growing season for plants that then can transpire additional water. It is this combined increase in evapotranspiration that appears to have the most impact on stream flow.

Surface water runoff depends on both natural factors and land management. Natural factors include climate, geology and soils, slope, channel conditions, and vegetation type and density. Land use or management actions that alter these natural factors play a role in altering surface water runoff. Such actions include grading or compacting soils for new roads or well pads and calling for management prescriptions that alter the type or density of vegetation.

Reducing water flow can have adverse impacts on the ecology of a watershed, its recreational potential, the availability of drinking water and water for other uses, and groundwater quality and quantity. Water quality impacts from reduced water supplies include increased water temperatures, pH levels, and alkaline levels. Reductions in water supply could result from consumptive uses of surface water or tributary groundwater sources that do not return water to the basin. Examples are evaporative loss from new surface water features, evapotranspiration from irrigation of vegetation, injection into deep wells, or use in drilling fluids that are later disposed of outside of the basin.

Lands that are open for fluid minerals leasing have the potential for future health and safety risks related to oil, gas, and geothermal exploration, development, operation, and decommissioning. The number of acres open for leasing is proportional to the potential for long-term direct health and safety impacts. Use, storage, and transportation of fluids, such as produced water, hydraulic fracturing fluids, and condensate, have the possibility of spills that could migrate to surface or groundwater, causing human health impacts.

A summary of spills across Colorado from the Colorado Oil and Gas Conservation Commission is presented in **Table 4-8**, Colorado Oil and Gas Conservation Commission Spill Analysis by Year (1999 – Fourth Quarter 2017).

Hydraulic fracturing occurs in the gas-producing formations at depths typically greater than 5,000 feet in the Planning Area. Water, sand, and chemical additives are pumped into the formation at extremely high pressure to create fractures that allow gas to flow into the well. Theoretically, improperly completed wells or perforations into zones of geological weakness (i.e., faults or fractures) could create conduits that allow hydrofracturing fluids, produced water, and methane to migrate to groundwater resources. If a groundwater source is contaminated, there are few cost-effective ways to reclaim that water; thus, the long-term impacts of groundwater contamination are considerable. In addition to BLM Onshore Orders (CFR 3160) and Colorado Oil and Gas Conservation Commission's requirements for well completions (BLM 2012g; Colorado Oil and Gas Conservation Commission 2008), the UFO protects surface and shallow groundwater through stipulations and site-specific condition of approvals for drilling, completions, and fluids management.

Directional drilling is a common practice in new gas wells because it enables operators to drill multiple wells from a single well pad. It is especially applicable in development areas with multiple downhole reservoir targets with reduced drilling spacing units (10 to 20 acres). Directional drilling greatly decreases the amount of potential surface disturbance and the potential for adverse impact on surface resources. It also enables drilling and testing of subsurface targets beneath areas with prohibitive surface-use conditions and restrictions, such as steep slopes, streams and rivers, sensitive plant and animal habitat, and NSO areas. Well bores are longer than vertical well bores, and there is a greater potential for multiple fracking zones over the length of a borehole. The amount of directional offset

Table 4-8
Colorado Oil and Gas Conservation Commission Spill Analysis by Year (1999 – Fourth Quarter 2017)

Year	Spills	Oil Spilled (Barrels)	Water Spilled (Barrels)	Oil Produced (Barrels)	Percent Produced Oil Spilled	Water Produced (Barrels)	Percent Produced Water Spilled	Active Wells
1999	263	2,283	41,363	19,702,336	0.012	229,903,675	0.018	21,745
2000	254	3,579	22,540	20,023,847	0.018	253,019,616	0.009	22,228
2001	206	1,939	10,582	20,181,232	0.010	266,146,443	0.004	22,879
2002	193	3,200	57,842	20,572,033	0.016	283,058,771	0.020	23,711
2003	213	2,924	19,528	21,601,373	0.014	302,780,820	0.006	25,042
2004	222	4,005	37,095	22,572,743	0.018	295,535,047	0.013	26,968
2005	326	5,014	24,638	23,231,140	0.022	347,069,144	0.007	28,952
2006	336	2,605	33,443	24,573,844	0.011	398,399,276	0.008	31,096
2007	376	4,074	27,096	26,190,355	0.016	393,806,340	0.007	33,815
2008	408	3,195	71,959	29,945,734	0.011	367,703,367	0.020	39,944
2009	368	2,787	22,213	30,364,519	0.009	358,918,106	0.006	37,311
2010	499	3,279	33,647	33,013,530	0.010	361,783,686	0.009	41,010
2011	501	3,286	33,801	39,472,783	0.008	343,853,173	0.010	43,354
2012	407	4,503	14,678	49,619,202	0.009	334,049,271	0.004	46,835
2013	633	3,946	14,345	66,114,185	0.006	329,531,615	0.004	50,067
2014	792	2,446	17,983	95,511,985	0.003	335,488,426	0.005	51,737
2015	624	1,471	28,126	122,859,590	0.001	329,194,865	0.009	53,054
2016	529	2,621	17,373	116,682,609	0.002	305,368,436	0.006	53,652
2017	605	2,216	12,060	102,023,981	0.002	239,621,419	0.005	54,035

Source: Colorado Oil and Gas Conservation Commission 2018

possible from the surface location to bottomhole location is not unlimited and has generally been less than 2,500 feet in most directional wells drilled as of 2012, although longer offsets have been drilled. Directional drilling will continue to play an increasing role in gas development drilling and will help resolve many of the surface access issues in the Planning Area.

If contamination of aquifers from oil and gas development occurs, changes in groundwater quality could impact downstream users diverting water from groundwater sources, such as municipal and public wells, domestic wells, springs, and surface water diversions that communicate with groundwater. The extent of potential contamination would depend on the point of contamination and volume of the contaminant.

Rigorous well casing protocols can reduce the risk of such contamination. The organic farming industry relies on clean water for agricultural production. Contamination of irrigation waters could affect the ability of local organic farms to maintain their designations.

The groundwater study of the Oak Mesa area of Delta County (Kolm and van der Heijde 2012) indicates that, traditionally, agricultural activities take place on the bottomlands and terraces of the valleys, while most grazing activities focus in a relatively small area on the uplands. Agricultural production is supported by surface water irrigation, often delivered through an extensive conveyance system. The main irrigation method in use is flood irrigation, which tends to provide more water to the fields than can be consumed by vegetation. Excess water from irrigation results in infiltration to the water table and recharge of the groundwater system (i.e., irrigation return flow).

The Oak Mesa study area consists primarily of mesa top, hillslope, bottomland, and terraces, limiting the irrigated areas to the top and lower portions of the subsystems. Here, there are a number of mostly unlined irrigation ditches that are excavated primarily in unconsolidated Quaternary deposits. When carrying water, the ditches may leak, as evidenced by the phreatophytes often found alongside them. The water leaking from the ditches may be used by vegetation and discharged as evapotranspiration, or may recharge the underlying groundwater system, forming a local groundwater mound or divide. As most of the groundwater systems in the study area are local in nature, ditch leakage may contribute significantly to the local water balance, increase the water table elevation, and alter groundwater flow patterns (Kolm and van der Heijde 2012).

The Upper North Fork River Valley and Terraces groundwater study from Hotchkiss to northeast of Paonia in Delta County (Kolm and van der Heijde 2013) indicates that the hydrology of a natural groundwater hydrologic system may be altered by the construction and operation of proposed oil and gas wells. During drilling and hydraulic fracturing, the oil and gas operations may behave like a connection mechanism between the deep and shallow aquifers, mixing water of various chemistries from various bedrock and shallow aquifers. Depending on management strategies for produced water disposal and use, groundwater levels in the shallow unconsolidated systems may be altered with respect to the amount, velocity, storage, and direction of the local groundwater system and related regional groundwater levels and discharges. Changes to the natural groundwater system will likely have ecological, geohydrological, and, potentially, legal consequences.

Water is used during fluid mineral development. The USFWS final programmatic biological opinion (USFWS 2017) addresses impacts on four endangered Colorado River fish species and their critical habitats from water depletions associated with the BLM's fluid mineral program authorized by BLM within the Upper Colorado River Basin in Colorado. The program area includes all areas within western Colorado draining into the Colorado River, except the San Juan River Basin. Water depletions analyzed for the consultation are composed of fresh water and are based on reasonably foreseeable development scenarios. The USFWS determined that the 607 acre-feet per year of water depletions from the Gunnison River Basin avoid the likelihood of jeopardy to the continued existence of the four

endangered fish species and avoid the destruction or adverse modification of their critical habitats (USFWS 2017).

The hydraulic fracturing water cycle describes the use of water in hydraulic fracturing, from water withdrawals to make hydraulic fracturing fluids, through the mixing and injection of hydraulic fracturing fluids in oil and gas production wells, to the collection and disposal or reuse of produced water. These activities can impact drinking water resources under some circumstances. Identified impacts generally occurred near hydraulically fractured oil and gas production wells and ranged in severity, from temporary changes in water quality to contamination that made private drinking water wells unusable. Impacts can range in frequency and severity, depending on the combination of hydraulic fracturing water cycle activities and local- or regional-scale factors. The following combinations of activities and factors are more likely than others to result in more frequent or more severe impacts:

- Water withdrawals for hydraulic fracturing in times or areas of low water availability, particularly in areas with limited or declining groundwater resources;
- Spills during the management of hydraulic fracturing fluids and chemicals or produced water that result in large volumes or high concentrations of chemicals reaching groundwater resources;
- Injection of hydraulic fracturing fluids into wells with inadequate mechanical integrity, allowing gases or liquids to move to groundwater resources;
- Injection of hydraulic fracturing fluids directly into groundwater resources;
- Discharge of inadequately treated hydraulic fracturing wastewater to surface water resources; and
- Disposal or storage of hydraulic fracturing wastewater in unlined pits, resulting in contamination of groundwater resources (EPA 2016).

Large volumes of fresh ground or surface water may be used for hydraulic fracturing, although increasingly, brackish and saline produced waters are used for mixing with injected fracturing fluids. Freshwater availability is affected by local water budgets, populations, agricultural practices, and climate. Water supply concerns can be acute in areas that are susceptible to drought. The extraction of freshwater for hydraulic fracturing can also alter the hydrologic regime of rivers and streams and impact biological species through the loss of habitat, especially if the water withdrawal rate is high at a single location within a water body during a low-flow season or drought (Gallegos et al. 2015).

There has been considerable concern regarding contamination of drinking water resources by chemicals either added to the hydraulic fracturing fluid or originally present in the geologic formation waters due to spills/leaks, stray gas migration, disposal of inadequately treated wastewater, or migration of hydraulic fracturing fluids or deep formation waters by hydraulic fracturing itself. Publications have highlighted evidence of fugitive gas migration along wellbores, likely due to faulty well construction. Detection of changes to groundwater quality in aquifers due to direct migration of fluids from the oil and gas formations is related to several factors that differ among petroleum producing regions. The travel time, travel distance, and the ultimate dilution and detection of oil-related and gas-related waters in aquifers depend on: (1) the depth of the oil and gas reservoir relative to the groundwater aquifer; (2) the geology of the subsurface strata (e.g., hydraulic conductivity, porosity, fractures, extent, depth, pressure, and temperature); and (3) the volume of injected water that does not flowback to the surface (an estimated 60 to 95 percent of water injected is "lost" into the formation) relative to both the capacity of the fractured formation and the volume of the "receiving" aquifer. Thus, in some areas, the oil- and gas-related waters are not likely to reach drinking water aquifers, whereas in other areas, constituents of concern simply may not have yet reached the aquifer or have been diluted to below detection limits (Gallegos et al. 2015).

Potential impacts from coal, locatable mineral, mineral material, and nonenergy leasable mineral activities and development include the release of pollutants capable of contaminating surface water during stormwater runoff or contaminating aquifers during groundwater recharge. Mineral activities and developments could also alter drainage patterns, which would affect stream hydrographs and water supplies. Discharge of mine water can alter water chemistry and impair natural stream morphologic conditions.

The effects of recreation on water quality include sedimentation (deposited solids), turbidity (suspended solids), disrupted soil crusts, and reduced vegetation. Removing vegetation can increase amounts and velocities of runoff, accelerating the rates at which sediments and other debris are eroded from intensive use and flushed to downslope aquatic systems. Pollutants from motorized vehicle emissions and spills of petroleum products may be absorbed by sediments and plant material or dissolved in runoff. Once mobilized, these contaminants may enter aquatic systems (Ouren et al. 2007). The severity of these impacts varies, depending on the different types (e.g., dirt motorcycles, dune buggies, sand rails, jeeps, four-wheel drive vehicles, snowmobiles, and all-terrain vehicles [ATVs]) and intensity of motorized use. Travel also disturbs soils and generates dust, both of which can increase suspended solids and other contaminants reaching waterways. In areas closed to travel, natural drainage patterns would be preserved, and excessive erosion of uplands, stream channels, and banks would be reduced. This would help preserve the natural stream morphologic conditions. Protections from travel vary across alternatives and are shown in **Table 4-5**.

Activities beneficial to water resources are primarily defined as improving conditions by enhancing or restoring degraded water quality or by reducing ongoing groundwater depletion. Road maintenance, which includes installing stormwater controls and replacing improperly sized and designed culverts, is beneficial to water resources. Changing grazing patterns in riparian areas and recreation uses in sensitive watersheds further benefits water quality and geomorphic function of streams. Management actions regarding closure or avoidance of specific areas, or restrictions of disturbance, protect environmental conditions and, thus, are beneficial. Mitigation measures also reduce the impacts on water resources from ongoing or future activities.

Effects Common to All Alternatives

Wildland fire can result in substantial water resource impacts in a short period. Fire can reduce soil infiltration rates, resulting in reduced water retention potential of the affected soils and more runoff following precipitation and snowmelt. Loss of vegetation also contributes to these effects. Fires also create openings where snow and ice accumulate to greater depths than in forested areas. These openings can produce high runoff during short periods of rapid thawing, resulting in soil erosion and high peak flows. Excessive sediment delivery to stream channels can result in water quality impacts for long periods, while sediment-clogged channels can cause flooding. Similarly, chemical products of wood combustion are carried into streams with runoff.

The BLM would continue to use surface water as a source of water for fire suppression. Because surface water sources for fire suppression are not specified, the primary general impacts on surface water sources used for fire suppression include the lowering of surface water levels and the loss of water for groundwater recharge.

The Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) identifies the cumulative volume of produced water from conventional oil, gas, and coalbed natural gas wells in the study area. Cumulative water production for 34 conventional oil and gas wells was 15,207 barrels between 1974 and 2012. Cumulative water production for 24 coalbed natural gas wells was 1,765,838 barrels. Projections in that report estimate 489 conventional oil and gas wells and 782 coalbed natural gas wells

could be drilled from 2010 through 2030. Produced water is expected to increase during that period, thereby affecting water supplies.

Proposed placement of infrastructure, such as well pads, pipelines, compressor stations, and access roads, will be reviewed at the site-specific analysis through an environmental assessment or other NEPA review associated with an application for permit to drill or master development plan.

Operators would be required to meet the current BLM Gold Book standards for soil and water protection, plus other BMPs (Appendix G), for all permitted fluid minerals (i.e., oil and gas and geothermal) actions.

Coal mining activities capable of affecting water resources would not occur in those areas identified as unacceptable. In acceptable areas, as described in Effects Common to All Alternatives, coal mining and development could impact water resources, including sedimentation, contamination, and alteration of water quality, stream morphology, and aquifer characteristics. The severity of these indirect impacts would vary, depending on the different types and intensities of coal mining and development. As described in **Section 4.4.3** (Energy and Minerals, Effects Common to All Alternatives, Solid Leasable Minerals—Coal), coal production is expected to remain the same across all alternatives. Impacts on water quality are expected to be the same under all alternatives.

Implementing management for the following resources would have negligible or no impact on water resources and are therefore not discussed in detail: air quality, wild horses, cultural resources, paleontological resources, visual resources, renewable energy, wilderness and WSAs, national trails and byways, watchable wildlife viewing sites, Native American tribal uses, and public health and safety.

Alternative A

The BLM would continue general activities to maintain or improve water quality, natural stream morphologic conditions, water resources sustainability (water quantity), groundwater aquifer properties, and natural stream hydrographs. These direct impacts would maintain or improve water resource conditions.

Under Alternative A, water resources would receive a certain level of protection through BLM-administered lands being managed according to BLM Colorado Public Land Health Standards (BLM 1997). Standard 5 requires that the water quality of all water bodies, including groundwater, where applicable, located on or influenced by BLM-administered lands, will achieve or exceed the Water Quality Standards established by the State of Colorado. Water Quality Standards for surface water and groundwater include the designated beneficial uses, numeric criteria, narrative criteria, and antidegradation requirements set forth under Colorado law (5 Code of Colorado Regulations, 1002-8), as required by Section 303(c) of the Clean Water Act. Standard 5 is being met when:

- Appropriate populations of macroinvertabrates, vertebrates, and algae are present
- Surface water and groundwater contain substances attributable only to humans (e.g., sediment, scum, floating debris, odor, and heavy metal precipitates on channel substrate) within the amounts, concentrations, or combinations directed by the Water Quality Standards established by the State of Colorado (5 Code of Colorado Regulations, 1002-8)

Adhering to Standard 5 would ensure a baseline level of soil health in the vicinity of water bodies and would provide a certain degree of protection against soil erosion and associated pollution of receiving water bodies.

Alternative A would continue to provide minimal management actions specific to protecting riparian areas or dry washes, both of which are important components of watershed health. Impacts on riparian

areas may include trampling of vegetation and soil disturbance by livestock, recreation activities, or motorized use. These types of alterations to riparian areas would destabilize stream banks and reduce water storage capacity and releasing capability. The large water storage capacity of alluvial deposits and stabilizing characteristics of riparian zones buffers the movement of water from upland areas into streams. Instead of allowing water to flow directly into streams following a rainstorm or snowmelt, healthy riparian areas hold and store water and are critical in sustaining the proper function and condition of stream channels and floodplains. Throughout the year, this water seeps slowly into adjacent streams, providing water for base flow in area streams. The indirect impacts described above would limit the ability of riparian areas to perform these beneficial functions.

The BLM would continue to use prescribed fires to meet land and resource management objectives. In the short term, prescribed burn areas would be susceptible to erosion and increased sedimentation in water bodies because of the lack of vegetation and loss of woody debris and biologic soil crusts. Reduced fire intensity associated with planned fire reduces the potential for post-fire erosion because not all soil-stabilizing characteristics are consumed. However, unlike unplanned wildfire, the BLM would avoid burning areas next to surface water in order to limit impacts on water resources. Also, restoration of burned areas would include enhancing plant communities, which would help protect water resources in the long term. These indirect impacts would threaten water resource conditions in the short term and would maintain or improve water resource conditions in the long term.

The BLM would continue to manage 110,160 acres as unsuitable for forest harvest (refer to **Table T-1** [Description of Alternatives A, B, C, and D] in Appendix T) and would continue to prohibit timber and woodland harvesting in riparian areas. This would protect vegetation, thereby limiting erosion and sedimentation during runoff. Increased sedimentation can degrade water quality and increase width/depth ratios in stream channels. Increased width/depth ratios can increase lateral stream bank erosion and further sedimentation to streams (Rosgen 1996). These management actions would help maintain water resource conditions.

There would continue to be 56,300 acres unavailable to livestock grazing and 619,500 acres available to livestock grazing. Improper grazing could accelerate erosion rates and nutrient loads to surface water from trampled vegetation and soil compaction. As a result, such contaminants as nutrients, selenium, salinity, and bacteria could wash directly into receiving waters from surface water runoff in grazed areas. Riparian zones and stream banks in areas of livestock concentration could be susceptible to overuse and trampling. The severity of these impacts would vary depending on season of use, type of livestock, intensity of livestock grazing, soil moisture level, and soil structure and slope. Range improvement projects (e.g., water ponds, pipelines and tanks, pasture fences, and vegetation treatments) would be constructed and maintained for proper management of livestock grazing and rangeland health.

The BLM would continue to implement BMPs and BLM Colorado Standards for Public Land Health and Guidelines for Livestock Management (BLM 1997) (e.g., periodic rest in areas available to grazing) to maintain plant vigor and health.

The minimal restrictions on fluid mineral development would result in a reasonably foreseeable development scenario similar to that projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**. There would continue to be 44,220 acres of BLM surface/federal minerals closed to fluid minerals leasing and 631,580 acres of BLM surface/federal minerals open to fluid minerals leasing for a total of 871,810 acres including split-estate lands. Closing lands to fluid minerals leasing would reduce the release of pollutants capable of contaminating surface water during runoff or contaminating aquifers during groundwater recharge. By managing lands as open to fluid mineral leasing, there is the potential for actions to occur in fluid minerals development areas that could alter drainage patterns, stream hydrographs, and water supplies. These impacts would be

avoided in areas closed to fluid mineral leasing. The severity of these direct and indirect impacts would vary, depending on the different types of fluid minerals leasing activities and the intensity of development, as well as the type and volume of contaminants released to the environment.

There would continue to be 24,890 acres of BLM surface/federal minerals where NSO stipulations would be applied. The NSO stipulations would protect water resources either directly or indirectly. By prohibiting use or occupancy of the land surface, associated actions capable of affecting water resources would not occur, unless allowed by an exception, in NSO areas. This would reduce the release of pollutants capable of contaminating surface water during runoff or contaminating aquifers during groundwater recharge. Also, actions that could alter drainage patterns, which affect stream hydrographs and water supplies, would not occur in NSO areas. Such practices as directional or horizontal drilling, which access resources from outside the boundary of an NSO stipulation, could impact water resources. In addition, impacts from downhole operations (e.g., well completion and hydraulic fracturing) would still occur. The severity of these impacts would vary, depending on the different types of mineral leasing activities and intensity of development.

There would continue to be 110,180 acres of BLM surface/federal minerals where CSU stipulations would be applied. The CSU stipulations would protect water resources either directly or indirectly by constraining use or occupancy of the land surface. There are no CSU stipulations designed specifically to protect water resources under Alternative A. The severity of these impacts would vary, depending on the different types of surface-disturbing activities and intensity of development.

Under Alternative A, activities associated with energy and mineral development would be allowed under appropriate circumstances in the following areas:

- Within 325 feet of perennial streams
- Within 100 feet of naturally occurring riparian and wetland areas, seeps, and springs
- Within 2,640 horizontal feet of either side of a classified surface water supply stream segment
- Within 1,000 horizontal feet of domestic water wells

Such activities could contaminate water resources from the use of hazardous chemicals that could infiltrate or percolate into domestic and municipal water resources. The potential direct impacts from these activities could compromise water resource conditions, given reasonably foreseeable development in the future.

There would be no specific vegetation management actions under Alternative A to restore and maintain healthy productive plant communities of native and other desirable species at self-sustaining population levels commensurate with the species' and habitats' potentials. By not restoring plant communities, the soil surface would remain exposed and, consequently, susceptible to erosion. Soil erosion during runoff and mineral constituents of eroded parent material affect surface water by depositing sediment in streams and other water bodies, thereby affecting water quality and stream morphology. Exposed soil also allows wind to more easily erode soil and deposit it on the surface of snow. Soil covering the surface of snow affects the melting rate and timing of melt, thereby altering stream hydrographs and water availability to downstream users.

By designating land closed to mineral material disposal and mineral leasing and withdrawn from locatable mineral entry, impacts on water resources from associated mineral activities and developments would not occur in those areas. However, as described in ***Effects Common to All Alternatives***, by designating land open to locatable, mineral material, and leasable minerals, there is the potential for these impacts occur in areas with mineral activities, including sedimentation, contamination, and alteration of surface and subsurface water bodies. The severity of these indirect impacts would vary, depending on the different types of locatable, mineral materials, and leasable activities and intensity of development.

There would continue to be 28,060 acres of BLM surface/federal minerals withdrawn from locatable mineral entry and 27,690 acres of BLM surface/federal minerals recommended for withdrawal from locatable mineral entry. By withdrawing land, impacts on water resources from associated mineral activities and developments would not occur in those areas. By not withdrawing land, there is the potential for impacts on water resources to occur in these areas from mineral activities. The severity of these indirect impacts would vary, depending on the different types of locatable mineral activities and intensity of development.

ROW actions that could release pollutants capable of contaminating surface water during runoff or contaminating aquifers during groundwater recharge would not occur in ROW exclusion areas. Also, ROW actions that could alter drainage patterns and recharge rates for groundwater, which affect stream hydrographs and water supplies, would not occur in ROW exclusion areas. Under Alternative A, there would continue to be 85,080 acres managed as ROW exclusion and 0 acres managed as ROW avoidance. On the 590,720 acres areas available for ROW location, these types of impacts could be experienced without proper siting and design. The severity of impacts would vary, depending on the type of ROW activity, intensity of development, and site-specific geomorphic conditions.

Under Alternative A, water quality is subject to soil disturbance and domestic waste and human waste associated with dispersed camping, overnight use, and recreational mining, which are allowed in all areas, including those around developed recreation sites. Water quality may be protected at the discretion of BLM Authorized Officer when they make decisions on whether to issue SRP applications that would permit activities that could impact water quality.

The types of impacts from motorized travel designations are the same as those described under ***Effects Common to All Alternatives***. Alternative A would protect water resources by placing restrictions on travel and transportation specified in **Table 4-5**. Under Alternative A, the North Delta OHV Area would continue to be open to cross-country motorized and mechanized use, which, with its particularly fragile soils, could continue to degrade and contaminate downslope waterways during and after precipitation.

The BLM would continue to manage 30,000 acres of ACECs for purposes that directly or indirectly affect water resources. ACEC management would indirectly affect water resources through the management for other special resource values, such as soils and vegetation. Water quality can be affected downstream from areas with highly erodible soils, such as the adobe badlands, depending on the uses allowed in that area. Vegetation helps filter contaminants from runoff, contributes to soil stabilization, and is an important component to floodplain function in riparian areas. Under Alternative A, the BLM would not designate additional ACECs, and there would be no additional protection of water resources from ACEC management.

There would be 29 stream segments along 154.1 miles of river segments crossing BLM-administered land identified as eligible for inclusion in the NWSRS. The BLM's interim protective management policy, which is fully described in BLM's Wild and Scenic Rivers 6400 Manual, requires the BLM to protect the identified ORVs, the water quality that supports those values, the free-flowing condition of the stream segment, and the classification of the segment (current level of stream corridor development.) The BLM would continue to manage the eligible segments according to interim protective management guidelines, which would contribute to maintaining water resource conditions in these 29 segments only. Identifying streams as eligible for inclusion in the NWSRS could attract attention and increase visitor use. Increased visitor use could degrade water quality if river-based recreation removes streamside vegetation.

Alternative B

Under Alternative B, the BLM would implement specific actions related to protecting and monitoring water quality. Alternative B allows for restricting and mitigating impacts caused by a variety of land use activities. This greater discretion on implementing a wider range of strategies would further improve water quality.

From a land health management perspective, Alternative B also provides more protection of water quality than does Alternative A because it directs the BLM to apply land and stream health improvement projects in areas likely to be stabilized or improved to a higher health condition, regardless of land status. Alternative B also directs the BLM to manage lands to improve water quality and to promote the delisting of state impaired water bodies in areas where BLM management actions are contributing to impaired water quality. Alternative A has no such similar action.

Additionally, Alternative B directs the BLM to acquire lands or easements along the Gunnison, San Miguel, and Dolores Rivers that provide water quality protection values, such as those related to salinity/selenium sedimentation. Alternative A has no such action.

Under Alternative B, a buffer of 2,640 horizontal feet (0.50-mile) on either side of a classified surface water supply stream segment would be closed to oil and gas leasing and geophysical exploration, coal leasing, mineral materials leasing, and solid minerals leasing. This would extend for a distance of 5 miles upstream of a public water supply intake. This area would also be managed as a ROW exclusion area. Alternative B would provide a level of water quality protection not provided under Alternative A. Under Alternative B.1, a buffer of 1,320 feet from public water supplies would be closed to oil and gas leasing and geophysical exploration, half the distance as under Alternative B. As such, Alternative B provides greater protection than Alternative B.1 for public water supplies from a classified surface water-supply stream segment. As protection plans are completed, land use activities on affected BLM-administered lands would be managed to provide adequate protection to public water supplies, in coordination with public water supply managers.

Under Alternative B, a buffer of 2,640 feet from public water supplies using a groundwater well or spring would be closed to oil and gas leasing and geophysical exploration, coal leasing, mineral materials leasing, and solid minerals leasing, compared with no such protection under Alternative A. Under Alternative B.1, a buffer of 1,320 feet from public water supplies using a groundwater well or spring would be closed to oil and gas leasing and geophysical exploration. Beyond 1,320 feet and up to 2,640 feet, such water supplies would be subject to NSO stipulations. This would offer more protection than Alternative A but less than Alternative B. Unlike Alternative B, Alternative B.1 also includes an NSO stipulation within 1,320 feet of any dam, ditch, irrigation intake, canal, or other water conveyance.

Alternative B would offer improved protection of domestic water wells by prohibiting surface occupancy within 1,000 horizontal feet of such features, compared with no such protection under Alternative A. Under Alternative B.1, a buffer of 1,320 feet from domestic water wells and private water systems (including ditches and domestic water decrees) would be closed to oil and gas leasing and geophysical exploration. Alternative B.1 would prohibit surface occupancy beyond 1,320 feet and up to 2,640 feet. Alternative B.1 offers the most protection of private water supplies and would only apply to the North Fork area.

Alternative B mandates that 325-foot buffers along perennial streams be managed as ROW exclusions areas. This would protect water resources by minimizing ground-disturbing activities that could cause sediment-laden runoff into waterways. Alternative A includes no such protection.

Compared with Alternative A, under Alternative B the BLM would implement more actions to protect and monitor riparian vegetation. The types of impacts are the same as under Alternative A, but the additional management actions under Alternative B would provide more opportunities to protect water resources during activities related to, for instance, recreational travel, concentrated livestock grazing, and fluid mineral exploration and development.

The types of impacts from wildland fire management are the same as those under Alternative A, except that more acres would be potentially treated. This would move vegetation communities toward desired conditions, which would better protect soil resources and increase water quality.

Unlike under Alternative A, the BLM would implement specific management actions to revegetate wildfire and development areas. By revegetating more areas, a larger soil surface area would be covered and, consequently, would be less susceptible to erosion as sedimentation to water bodies would be reduced. This would provide greater opportunities to maintain and improve water resource conditions, compared with Alternative A.

Under Alternative B, the BLM would manage 42,150 acres for wilderness characteristics (compared with 0 acres under Alternative A). Management prescriptions would protect the relevant and important values found in these areas and would include such actions as ROW exclusion and avoidance areas, travel restrictions (e.g., closed to motorized travel and mechanized travel limited to designated routes), and closure to mineral development (subject to valid existing rights). These restrictions on surface-disturbing activities would protect water resources in and next to these areas.

Under Alternative B, the BLM would close approximately 397,160 acres (4 times more acres than under Alternative A) to wood product sales and/or harvest and would prohibit timber and woodland harvesting in riparian areas, unless such sales or harvest would enhance resource values for which a given unit is designated, improve forest and land health conditions, or achieve vegetation mosaic objectives. Alternative B would provide more opportunities to protect water resources from forestry activities through both increased acres closed to wood product sales and harvest, and by implementing specific forest/woodland management plans.

Under Alternative B, 158,220 acres would be unavailable to livestock grazing (nearly 3 times more acres than under Alternative A). The types of impacts from livestock grazing are the same as those described under Alternative A, but they would occur over a smaller area. Alternative B also excludes livestock grazing for a minimum of 3 years on disturbed areas, which would increase revegetation success, soil stabilization, and watershed health. Alternative B also directs the BLM to periodically evaluate allotments or portions thereof for grazing issues, which can lead to changes in management strategies or allotment closures to protect sensitive fish habitat, municipal watersheds, and waters downstream of areas with high selenium concentrations in soils.

Restrictions on fluid mineral development would result in fewer new and exploratory development wells drilled and associated surface-disturbance than Alternative A. This lower number of wells drilled is expected to result in the same kinds of impacts discussed under ***Effects Common to All Alternatives*** and under Alternative A, but to a lesser degree. It would result in a relatively lower level of erosion-related water quality effects. Under Alternative B there would be 181,220 acres of BLM surface/federal minerals and 38,360 of split-estate lands (totaling 219,580 acres) closed to fluid minerals leasing (nearly 5 times more acres than under Alternative A) and 494,580 acres of BLM surface/federal minerals and 201,870 acres of split-estate lands (totaling 696,450 acres) open to fluid minerals leasing (20 percent fewer acres than under Alternative A). Under Alternative B.1 there would be 221,570 acres of BLM surface/federal minerals and 85,100 acres of split-estate lands (totaling 306,670 acres) closed to oil and gas leasing (almost 7 times more acres than under Alternative A) and 454,230 acres of BLM

surface/federal minerals and 155,130 acres of split-estate lands (totaling 609,360 acres) open to oil and gas leasing (30 percent fewer acres than under Alternative A). Under Alternative B.1, 104,750 acres in the North Fork area (75 percent of the North Fork area) would be closed to oil and gas leasing, 94,140 more acres than in Alternative B. The types of impacts from fluid minerals leasing would be the same as those described under Alternative A, but they would occur over a smaller area. The intensity and severity of impacts would depend on the type of activity or development and on the type or condition of water resources occurring in these areas.

Under Alternative B, NSO stipulations would be applied on 354,970 acres of BLM surface/federal minerals open to fluid mineral leasing (15 times more acres than under Alternative A but over a much greater area). The types of impacts are the same as those described under Alternative A, but the additional 340,000 acres that would receive NSO stipulations under Alternative B would be protected from such impacts.

Under Alternative B.1, NSO stipulations would be applied on 318,630 acres of BLM surface/federal minerals open to oil and gas leasing (13 times more acres than under Alternative A but over a much greater area). The types of impacts are the same as those described under Alternative A, and the 27,280 acres in the North Fork area that would receive NSO stipulations under Alternative B.1 would be protected from such impacts.

Under Alternative B, CSU stipulations would be applied on 139,560 acres of BLM surface/federal minerals open to fluid mineral leasing (28 percent more acres than under Alternative A). The types of impacts are the same as those described under Alternative A; however, potential impacts are reduced on the 30,730 additional acres receiving a CSU stipulation under Alternative B.

Under Alternative B.1, CSU stipulations would be applied on 135,550 acres of BLM surface/federal minerals open to oil and gas leasing (23 percent more acres than under Alternative A). Fewer acres would have CSU restrictions than in Alternative B because of an increase in NL areas and NSO stipulations. The types of impacts are the same as those described under Alternative A. CSU restrictions specific to the North Fork area include areas with moderate geologic hazard, which would prevent soil instability and erosion in these areas, and vistas and travel corridors, which, in some cases, could indirectly protect water resources.

The types of impacts from locatable, mineral materials, and nonenergy leasable minerals are the same as those described under Alternative A. However, Alternative B would close 499,960 acres of BLM surface/federal minerals to mineral materials disposal (nearly 5 times more than under Alternative A). There would also be far fewer (175,840) acres open for consideration for mineral material disposal on a case-by-case basis than the 573,610 acres under Alternative A. At 289,400 acres, Alternative B would also have less than half the acres as Alternative A (631,580 acres) open for consideration of nonenergy solid leasable mineral exploration or development.

Under Alternative B, NGD restrictions would be applied on 445,720 acres and SSR restrictions would be applied on 230,020 acres. Effects are described under ***Nature and Type of Effects***. By comparison, NGD restrictions are only applied to three existing ACECs under Alternative A (Adobe Badlands, Fairview South, and Needle Rock; 36,450 acres); there are no SSR restrictions for other surface-disturbing activities under Alternative A.

Water quality under Alternative B would receive greater protections than under Alternative A since dispersed camping and overnight use would be closed in several areas surrounding water bodies, and recreational mining would not be allowed. Alternative B would further protect water quality by closing several SRMAs to competitive events and a few additional areas to motorized competitive events. These

prohibitions would be protective of soils due to the decrease in soil disturbance, compaction and erosion.

Under Alternative B, competitive events would be prohibited in seven SRMAs and ten RMZs in four SRMAs totaling 122,830 acres. Motorized competitive events would be prohibited in five RMZs in four SRMAs totaling 121,220 acres.

The types of impacts from motorized travel designations are the same as those described under Alternative A, but Alternative B would have fewer impacts on water resources due to fewer areas disturbed or less water contaminated by motorized use through the restrictions specified in **Table 4-5**. At 102,790 acres, Alternative B would have more than double the acreage closed to motorized and mechanized travel than under Alternative A (44,200 acres), and nearly 4 times more acres where motorized and mechanized travel is limited to designated routes than under Alternative A. In addition, Alternative B would not manage any areas as open to cross-country travel within the North Delta OHV Area, thereby protecting the sensitive soils and downslope waters from contamination from saline/selenium runoff associated with motorized uses.

Furthermore, as part of the NSO that restricts surface-disturbing activities within 500 feet of perennial streams, travel, including the creation of new routes, associated with fluid mineral development would not be permitted in the area. Impacts from travel management under Alternative B would be further reduced by implementing comprehensive route designations for motorized and mechanized travel on 560,830 acres. This would minimize the likelihood of motorized and mechanized travel occurring in other areas where impacts on water resources could occur.

Under Alternative B, there would be 431,040 acres of ROW exclusion areas (nearly 5 times more acreage than under Alternative A) and 195,460 acres of ROW avoidance areas (compared with none under Alternative A). The types of impacts from ROW exclusion are the same as those described under Alternative A. The intensity and severity of impacts would depend on the type of activity or development and the type or condition of water resources occurring in these areas.

Under Alternative B, 15 ACECs on 215,940 acres would be designated (7 times more acres than under Alternative A). The types of impacts are the same as under Alternative A, but they would occur over a larger area. Under Alternative B, the BLM would determine that all of the 29 eligible stream segments are suitable for inclusion in the NWSRS. Impacts would be the same as those described for Alternative B in **Section 4.3.2** (Soils and Geology), but would apply to water quality.

Alternative C

Through specific land health management actions, Alternative C provides more protection to water quality than does Alternative A. Alternative C directs the BLM to improve lands, streams, and wetlands rated as not meeting BLM Colorado Public Land Health Standards (BLM 1997). In addition, Alternative C directs the BLM to manage lands to improve water quality and to promote the delisting of state impaired water bodies in areas where BLM management actions are contributing to impaired water quality. Alternative A has no such similar actions.

Conversely, Alternative C lacks some protective water quality actions that are included under Alternative A. Alternative A directs the BLM to develop erosion-control structures, vegetation improvements, or salinity/selenium-reduction measures to improve water quality through attempting to mitigate already mobilized salts and selenium. However, Alternative C offers no such guidance and, in this respect, would be less protective of water quality. Furthermore, unlike Alternative A, Alternative C does not direct the BLM to develop in-channel structures and land treatment projects designed to reduce runoff and soil erosion where they do not conflict with management of other resources.

Alternative C also does not call for the location and assessment of nonfunctional, eroding earthen check dams in the Mancos shale areas north of Delta.

In other categories of water quality management, Alternative C presents qualitatively different approaches than does Alternative A; it is unclear if Alternative C would be more or less protective as a management approach. For example, under Alternative C, saline/selenium soils would be managed as ROW avoidance areas and would have SSR and CSU stipulations applied. This approach differs from the strategy under Alternative A for the protection of these soils, which prohibits surface soil disturbance from March 1 to May 31 when saturated soils are most vulnerable to damage.

Under Alternative C, lands within 1,000 horizontal feet of either side of a classified surface water supply stream segment, for a distance of 5 miles upstream of a public water supply intake, would be managed as a ROW avoidance area, and an NSO stipulation would be applied for fluid mineral activities, providing a level of water quality protection not seen under Alternative A. For the distance between 1,000 feet and 2,640 feet, CSU restrictions would be applied, requiring several water quality protection measures to be applied to oil and gas exploration and development.

Under Alternative C, riparian vegetation protection varies when compared with Alternative A, and it is not clear whether the overall level of protection would be greater, less than, or the same as under Alternative A. In some cases, Alternative C provides protections not afforded under Alternative A, whereas in other cases the reverse is true.

While fire-prevention and treatment strategies would somewhat differ, the types of impacts from wildland fire management are generally the same as under Alternative A. Under Alternative C, the BLM would implement specific management to revegetate wildfire and development areas; Alternative A has no such direction at the planning level. By revegetating more areas, a larger soil surface area would be covered and, consequently, would be less susceptible to erosion because water body sedimentation would be reduced. This would provide greater opportunities to maintain and improve water resource conditions. As protection plans are completed, land use activities on affected BLM-administered lands would be managed to provide adequate protection to public water supplies, in coordination with public water supply managers.

Under Alternative C, the BLM would close approximately 44,530 acres to wood product sales and harvest (60 percent fewer acres than under Alternative A) and would limit timber and woodland harvesting in riparian areas to locations where there would be the least impact. This smaller area that is closed from wood product sales and harvest means that larger areas would be open for such activities and for associated soil erosion and water quality impacts. Alternative C would be less protective of water quality than Alternative A with respect to wood product sales and harvest.

Under Alternative C, 22,530 acres would be unavailable to livestock grazing (60 percent fewer acres than under Alternative A). The types of impacts from livestock grazing are the same as those described under Alternative A, but they would occur over a larger area. Alternative C also excludes livestock grazing on disturbed areas, to the extent needed to comply with BLM Colorado Standards for Public Land Health and Guidelines for Livestock Grazing Management (BLM 1997). This would increase revegetation success, soil stabilization, and watershed health.

The minimal restrictions on fluid mineral development would result in a reasonably foreseeable development scenario similar to that projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**. Acres open and closed to fluid minerals leasing would be the same as under Alternative A. The types of impacts are the same as under Alternative A.

Under Alternative C, NSO stipulations would be applied on 14,680 acres of BLM surface/federal minerals open to fluid mineral leasing (41 percent fewer acres than under Alternative A). The types of impacts are the same as those described under Alternative A but would occur over a larger area.

Under Alternative C, CSU stipulations would be applied on 365,810 acres of BLM surface/federal minerals open to fluid mineral leasing (over 3 times the acres under Alternative A). The types of impacts are the same as those described under Alternative A but would occur over a smaller area.

Under Alternative C, NGD restrictions would be applied on 42,660 acres and SSR restrictions would be applied on 241,400 acres. Effects are described under ***Nature and Type of Effects***. By comparison, NGD restrictions are only applied to three existing ACECs under Alternative A (Adobe Badlands, Fairview South, and Needle Rock; 36,450 acres); there are no SSR restrictions for other surface-disturbing activities under Alternative A.

The types of impacts from locatable, mineral materials, and nonenergy leasable minerals are the same as those described under Alternative A. However, Alternative C would close 56,350 acres of BLM surface/federal minerals to mineral materials disposal (just over half as much as under Alternative A). There would also be 8 percent more acres (619,450 acres) open for consideration for mineral material disposal on a case-by-case basis than the 573,610 acres under Alternative A. At 620,230 acres, Alternative C would have about 2 percent fewer acres of BLM surface/federal minerals as Alternative A open for consideration of nonenergy solid leasable mineral exploration or development (631,580 acres). Overall, Alternative C would result in greater impacts on water quality than Alternative A from locatable, mineral materials, and nonenergy leasable mineral activity. Water quality protections under Alternative C would be greater than under Alternative A by prohibiting mining in developed recreation sites.

The types of impacts from motorized travel designations are similar to those described under Alternative A. Alternative C would protect water resources by placing the restrictions on travel and transportation specified in **Table 4-5**. Alternative C would manage 4,760 acres as open to cross-country travel within the North Delta OHV Area, 44 percent less area open than under Alternative A. This would protect the sensitive soils on 61 percent more acres contained there from erosion associated with motorized uses and would reduce the potential for runoff of salts and selenium into downslope waterways. Alternative C would also open to OHV use 11,310 acres in the Kinikin Hills ERMA. This would likely increase OHV-related soil erosion and contaminated runoff in this area and downslope waters, compared with Alternative A. While Alternative C has 7,510 more acres open to cross-country motorized travel, it also limits motorized and mechanized travel to designated routes on nearly 470,000 more acres than under Alternative A. While the former measure would be less protective of soil erosion and water quality, the latter measure would have the opposite effect. Overall, it is not clear if motorized travel designations under Alternative C would offer greater protection, less protection, or the same protection of water resources when compared with Alternative A.

Under Alternative C, there would be 44,550 acres of ROW exclusion areas (about half as much as under Alternative A) and 210,390 acres of ROW avoidance areas (compared with 0 acres under Alternative A). As a result, the types of impacts from ROW actions are the same as those described under Alternative A, but they could occur over a larger area.

Under Alternative C, all but the Tabeguache Creek ACEC under Alternative A would be designated (totaling 29,440 acres). The types and extent of impacts would be the same as under Alternative A.

Under Alternative C, the BLM would determine that none of the 29 eligible stream segments are suitable for inclusion in the NWSRS. The 29 segments would not be managed under interim management guidelines and would not receive the associated water quality protections.

Alternative D

Under Alternative D, the BLM would implement specific actions related to protecting and monitoring water quality. Overall, Alternative D provides greater protections to water quality than Alternative A. It would do so by such measures as protecting riparian and perennial streams, implementing management measures related to saline/selenium soils, and directing the BLM to manage lands to improve water quality and to promote the delisting of state-impaired water bodies in areas where BLM management actions are contributing to impaired water quality.

Alternative A land health management actions direct the BLM to develop erosion-control structures, vegetation improvements, or salinity/selenium reduction measures to improve water quality by mitigating already mobilized salts and selenium. Alternative D allows the BLM to exert greater discretion and to implement a wider range of land use strategies to improve water quality.

Under Alternative D, lands within 1,000 horizontal feet of either side of a classified surface water supply stream segment, for a distance of 5 miles upstream of a public water supply intake, would be managed as a ROW avoidance area. These lands would also be closed to fluid mineral leasing (including geothermal leasing), geophysical exploration, and mineral exploration and development, providing a level of water quality protection not seen under Alternative A. Between 1,000 feet and 2,640 feet, CSU restrictions would be applied, requiring several water quality protection measures to be applied to oil and gas exploration and development operations.

Alternative D would offer improved protection of domestic water wells by providing stringent oil and gas well drilling requirements within 1,000 horizontal feet of such features, compared with no such protection under Alternative A. Public water supplies using a groundwater well or spring would also have a buffer of 1,000 feet that would be closed to fluid mineral leasing and geophysical exploration. As protection plans are completed, land use activities on affected BLM-administered lands would be managed to provide adequate protection to public water supplies, in coordination with public water supply managers.

Alternative D mandates that 325-foot buffers along perennial streams be managed as ROW avoidance areas. This would protect water resources by reducing ground-disturbing activities that could cause sediment-laden runoff into waterways. Alternative A includes no such protection.

Compared with Alternative A, under Alternative D, the BLM would implement more actions to protect and monitor riparian vegetation. The types of impacts are the same as under Alternative A, but the additional management actions under Alternative D would provide more opportunities to protect water resources during activities related to, for instance, recreational travel, concentrated livestock grazing and fluid mineral exploration and development, and woodland product harvest and collection.

The types of impacts from wildland fire management are the same as those under Alternative A, except that more acres would be potentially treated, moving vegetation communities toward desired conditions. This would better protect soil resources and increase water quality.

Under Alternative D, the BLM would manage 18,320 acres for wilderness characteristics (compared with 0 acres under Alternative A). Management prescriptions would include such actions as ROW exclusion and avoidance areas, travel restrictions (e.g., closed to motorized travel and mechanized travel limited to designated routes), and mineral development closure (subject to valid existing rights). These restrictions on surface-disturbing activities would protect water resources in and next to these areas.

Under Alternative D, the BLM would close approximately 281,390 acres to wood product sales and harvest (over twice as many acres as under Alternative A) and would prohibit timber and woodland harvesting in riparian areas, unless such sales or harvest would enhance resource values for which a

given unit is designated, improve forest and land health conditions, or achieve vegetation mosaic objectives. Alternative D would provide more opportunities to protect water resources from forestry activities by increasing acreage closed to wood product sales and harvest and by implementing specific forest/woodland management plans.

Under Alternative D, 58,660 acres would be unavailable to livestock grazing (4 percent more acres than under Alternative A). The types of impacts from livestock grazing are the same as those described under Alternative A, but they would occur over a slightly smaller area. Alternative D also excludes livestock grazing on disturbed areas, to the extent needed to comply with BLM Colorado Standards for Public Land Health and Guidelines for Livestock Grazing Management (BLM 1997). This would increase revegetation success, soil stabilization, and watershed health.

The restrictions on fluid mineral development would result in a reduction in the number of new and exploratory development wells and associated surface-disturbance from those projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**. This would result in a relatively lower level of erosion-related water quality. The BLM would implement specific management actions to revegetate degraded areas that are not included under Alternative A. By revegetating more areas, a larger soil surface area would be covered and, consequently, would be less susceptible to erosion and sedimentation to water bodies would be reduced. This would provide greater opportunities to maintain and improve water resource conditions.

There would be 48,510 acres of BLM surface/federal minerals and 1,550 acres on private or state surface/federal minerals estate (totaling 50,060 acres) closed to fluid minerals leasing (13 percent more acres than under Alternative A) and 631,580 acres of BLM surface/federal mineral estate and 240,230 acres on private or state surface/federal minerals estate (totaling 865,970 acres) open to fluid minerals leasing (less than 1 percent fewer acres than under Alternative A). The types of impacts from fluid minerals leasing are the same as those described under Alternative A, but they would occur over a smaller area. The intensity and severity of impacts would depend on the type of activity or development and the type or condition of water resources occurring in these areas.

Under Alternative D, NSO stipulations would be applied on 187,560 acres of BLM surface/federal minerals open to fluid mineral leasing (over 7 times more acres than under Alternative A). The types of impacts are the same as those described under Alternative A but would occur on a smaller area.

Under Alternative D, CSU stipulations would be applied on 265,140 acres of BLM surface/federal minerals open to fluid mineral leasing (over 2 times more acres than under Alternative A). The types of impacts are the same as those described under Alternative A, but the areas across which they would occur would be smaller.

Under Alternative D, NGD restrictions would be applied on 36,180 acres and SSR restrictions would be applied on 512,570 acres. Effects are described under ***Nature and Type of Effects***. By comparison, NGD restrictions are only applied to three existing ACECs under Alternative A (Adobe Badlands, Fairview South, and Needle Rock; 36,450 acres); there are no SSR restrictions for other surface-disturbing activities under Alternative A.

The types of impacts from locatable, mineral materials, and nonenergy leasable minerals are the same as those described under Alternative A. However, Alternative D would close 132,750 acres of BLM surface/federal minerals to mineral materials disposal (30 percent more than under Alternative A). There would also be fewer acres (543,030) open for consideration for mineral material disposal on a case-by-case basis than the 573,610 acres under Alternative A. At 507,500 acres, Alternative D would also have about 20 percent fewer acres of BLM surface/federal minerals as Alternative A (631,580 acres) open for consideration of nonenergy solid leasable mineral exploration or development.

Water quality under Alternative D would receive greater protections than under Alternative A since dispersed camping and overnight use would be closed in several areas surrounding water bodies, and recreational mining would be restricted. Alternative D would further protect water quality by closing a few SRMAs to competitive events and several additional areas to motorized competitive events.

Under Alternative D, competitive events would be prohibited in one SRMA and two RMZs within one SRMA totaling 25,020 acres. Motorized competitive events would be prohibited in nine RMZs within six SRMAs totaling 48,120 acres. Motorized and mechanized competitive events would be prohibited in RMZ 2 of the Spring Creek SRMA (2,710 acres).

The types of impacts from motorized travel designations are the same as those described under Alternative A, but Alternative D would have fewer impacts on water resources due to fewer areas disturbed or contaminated (water quality) by motorized use through the restrictions specified in **Table 4-5**. Alternative D would have 30 percent more acreage closed to motorized and mechanized travel than under Alternative A, and over 4 times more acres where motorized and mechanized travel is limited to designated routes than under Alternative A. In addition, like Alternative B, Alternative D would not manage any areas as open to cross-country travel within the North Delta OHV Area, thereby protecting the sensitive soils and downslope waters from contamination from saline/selenium runoff associated with motorized uses.

Furthermore, all lands within 325 feet of perennial streams would be protected from surface occupancy and would have SSR restrictions applied to them. Additional CSU restrictions would be applied to the corridor spanning from 325 feet to 500 feet from the edge of the ordinary high-water mark of perennial, intermittent, and ephemeral streams; riparian areas, fens, and/or wetlands; and water impoundments. The BLM would be less likely to approve new trails within these buffer zones than under Alternative A. Impacts from travel management under Alternative D would be further reduced by implementing comprehensive route designations for motorized and mechanized travel on 617,240 acres.

Under Alternative D, there would be 53,700 acres of ROW exclusion areas (37 percent less acreage than under Alternative A) and 276,500 acres of ROW avoidance areas (compared with none under Alternative A). The types of impacts are the same as those described under Alternative A. The intensity and severity of impacts would depend on the type of activity or development and the type or condition of water resources occurring in these areas.

Under Alternative D, 8 ACECs on 51,320 acres would be designated (71 percent more acres than under Alternative A). The types of impacts are the same as those under Alternative A, but would occur over a larger area.

Under Alternative D, the BLM would determine that 16 of the 29 eligible stream segments, totaling 104.6 miles, are suitable for inclusion in the NWSRS. Impacts would be the same as those described for Alternative D in **Section 4.3.2**, but would apply to water quality.

Alternative E

Under Alternative E, the BLM would implement specific actions related to protecting and monitoring water quality. Overall, Alternative E provides greater protections to water quality than Alternative A. It would do so by such measures as protecting riparian and perennial streams, implementing management measures related to saline/selenium soils, and directing the BLM to manage lands to improve water quality and to promote the delisting of state-impaired water bodies in areas where BLM management actions are contributing to impaired water quality.

Alternative A land health management actions direct the BLM to develop erosion-control structures, vegetation improvements, or salinity/selenium reduction measures to improve water quality by

mitigating already mobilized salts and selenium. Alternative E allows the BLM to exert greater discretion and to implement a wider range of land use strategies to improve water quality.

Under Alternative E, NSO-69 (Public Water Supplies), CSU-59 (Domestic Water Wells), and CSU-13 (Hydrology Source) would prohibit or limit surface disturbances in areas with water resources. Alternative E would provide a level of water quality protection not seen under Alternative A.

Alternative E mandates that 50-foot buffers along perennial streams be managed as ROW avoidance areas. This would protect water resources by reducing ground-disturbing activities that could cause sediment-laden runoff into waterways. Alternative A includes no such protection.

Under Alternative E, NGD restrictions would be applied on 36,180 acres, and SSR restrictions would be applied on 307,450 acres. Effects are described under ***Nature and Type of Effects***. By comparison, NGD restrictions are only applied to three existing ACECs under Alternative A (Adobe Badlands, Fairview South, and Needle Rock; 36,450 acres), and there are no SSR restrictions for other surface-disturbing activities under Alternative A.

Vegetation

Compared with Alternative A, under Alternative E, the BLM would implement more actions to protect and monitor riparian vegetation. The types of impacts are the same as under Alternative A, but the additional management actions under Alternative E would provide more opportunities to protect water resources during activities related to, for instance, recreational travel, concentrated livestock grazing and fluid mineral exploration and development, and woodland product harvest and collection.

Wildland Fire Ecology and Management

The types of impacts from wildland fire management are the same as those under Alternative A, except that more acres would be potentially treated, moving vegetation communities toward desired conditions. This would better protect soil resources and increase water quality.

Lands with Wilderness Characteristics

The BLM would manage 18,320 acres to minimize impacts on wilderness characteristics, while managing for other uses. Although the lands would not be managed to preserve wilderness characteristics, there would still be efforts that minimize impacts on wilderness characteristics. The BLM would conserve wilderness characteristics where possible through relocation, design criteria, and/or mitigation. In turn, this would also minimize impacts on water resources. There would be no comparable lands managed to minimize impacts on wilderness characteristics under Alternative A.

Forestry and Woodland Products

Under Alternative E, the BLM would close approximately 171,970 acres (compared with 110,160 acres under Alternative A) to commercial wood product sales and harvest and would prohibit timber and woodland harvesting in riparian areas. The exception to the closure would be to allow wood product sales and/or harvest to enhance resource values for which a given unit is designated, to improve forest and land health conditions, or to achieve vegetation mosaic objectives. Alternative E would provide more opportunities to protect water resources from forestry activities by increasing acreage closed to wood product sales and harvest and by implementing specific forest/woodland management plans.

Livestock Grazing

Under Alternative E, 59,160 acres would be unavailable to livestock grazing. This apparent reduction in both available and unavailable acres from Alternative A actually reflects corrections to the existing grazing inventory and associated GIS; in reality, acres open and unavailable under Alternative E are similar to Alternative A and would have a similar potential for grazing impacts on water resources. The

types of impacts from livestock grazing are the same as those described under Alternative A. Alternative E also excludes livestock grazing on disturbed areas, to the extent needed to comply with BLM Colorado Standards for Public Land Health and Guidelines for Livestock Grazing Management (BLM 1997). This would increase revegetation success, soil stabilization, and watershed health.

Fluid Leasable Minerals—Oil and Gas

Acres open and closed to fluid minerals leasing and the types of impacts would be the same as under Alternative A. Restrictions on fluid mineral development would result in a reduction in the number of new and exploratory development wells and associated surface disturbance from those projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d), as discussed under **Section 4.1.1**. This would result in a relatively lower level of erosion-related water quality. The BLM would implement specific management actions to revegetate degraded areas that are not included under Alternative A. By revegetating more areas, a larger soil surface area would be covered and, consequently, would be less susceptible to erosion and sedimentation to water bodies would be reduced. This would provide greater opportunities to maintain and improve water resource conditions.

Under Alternative E, NSO stipulations would be applied to 74,580 acres of BLM surface/federal mineral estate open to fluid mineral leasing (over 3 times more acres than under Alternative A). The types of impacts are the same as those described under Alternative A but would occur on a smaller area.

Under Alternative E, CSU stipulations would be applied to 290,880 acres of BLM surface/federal mineral estate open to fluid mineral leasing (over 2.5 times more acres than under Alternative A). The types of impacts are the same as those described under Alternative A but would occur on a smaller area.

Locatable Minerals, Mineral Materials, and Nonenergy Leasable Minerals

The types of impacts from locatable, mineral materials, and nonenergy leasable minerals are the same as those described under Alternative A. However, Alternative E would close 121,740 acres of BLM surface/federal mineral estate to mineral materials disposal (20 percent more than under Alternative A). There would also be fewer acres (554,060) of BLM surface/federal mineral estate open for consideration for mineral material disposal on a case-by-case basis than the 573,610 acres under Alternative A. At 512,500 acres, Alternative E would also have approximately 19 percent fewer acres of BLM surface/federal mineral estate than Alternative A (631,580 acres) open for consideration of nonenergy solid leasable mineral exploration or development. Effects on water quality would be less than under Alternative A.

Recreation and Visitor Services

Water quality under Alternative E would receive greater protections than under Alternative A because dispersed camping and overnight use would be closed in several areas surrounding water bodies. Alternative E would further protect water quality beyond Alternative A by closing a few SRMAs to competitive events and several additional areas to motorized competitive events. Under Alternative E, competitive events would be prohibited in portions of one SRMA (Dolores River Canyon Zone 1 and 2) and one RMZ (San Miguel River RMZ 2) totaling 21,410 acres. Motorized competitive events would be prohibited in nine RMZs within four SRMAs totaling 45,180 acres. Effects are described under ***Nature and Type of Effects***.

Comprehensive Travel and Transportation Management

The types of impacts from motorized travel designations are the same as those described under Alternative A, but Alternative E would have fewer impacts on water resources due to fewer areas disturbed or contaminated (water quality) by motorized use through the restrictions specified in **Table 4-5**. Alternative E would have 26 percent more acreage closed to motorized and mechanized travel than

under Alternative A, and over 4 times more acres where motorized and mechanized travel is limited to designated routes than under Alternative A.

Alternative E would manage 3,950 acres as open to cross-country travel in a portion of the North Delta SRMA, thereby protecting the soils from erosion and downslope waters from contamination or sedimentation associated with motorized uses, because over twice as much area is open to cross-country travel under Alternative A.

Furthermore, surface occupancy or use may be restricted and SSR restrictions may be applied on lands within 50 feet of the edge of the ordinary high-water mark (bank-full stage) of perennial, intermittent, and ephemeral streams; riparian areas, fens, and/or wetlands; and water impoundments. The BLM would be less likely to approve new trails within these areas than it would under Alternative A, contributing to the protection of waters in these areas. Impacts from travel management on water quality under Alternative E would be further reduced by implementing comprehensive route designations for motorized and mechanized travel on 615,200 acres.

Lands and Realty—Rights-of-Way

Under Alternative E, there would be 53,040 acres managed as ROW exclusion areas (37 percent less acres than under Alternative A) and 66,030 acres managed as ROW avoidance areas (compared with none under Alternative A). The types of impacts are the same as those described under Alternative A. The intensity and severity of impacts would depend on the type of activity or development and the type or condition of water resources occurring in these areas.

Areas of Critical Environmental Concern

Under Alternative E, six ACECs on 30,190 acres would be designated (compared with five ACECs on 30,000 acres under Alternative A). The types of impacts are the same as under Alternative A but would occur over a slightly larger area. The Biological Soil Crust ACEC and Adobe Badlands ACEC would be designated specifically to protect sensitive soils, which would protect waters from sedimentation associated with erosion.

Wild and Scenic Rivers

Impacts of wild and scenic rivers management would be the same as those described under Alternative D.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on water quality and watershed resources extends outside of the Planning Area, following fourth-order watershed boundaries. The cumulative impact analysis area also includes the Colorado River downstream to the US/Mexico border. This is because the BLM manages the resource to limit salinity delivery into the river, based on the Colorado River Basin Salinity Control Act. Fourth-order watersheds were used as the basic unit of analysis because impacts from most management actions proposed under the RMP and other activity plans are not expected to have cumulative hydrologic influence beyond this scale. Given that the hydrologic influence of the surrounding area is primarily focused in the stream channels and that delineation of the cumulative impact analysis area was based on watershed boundaries, the analysis area is sufficient. The hydrologic influence of the Planning Area on areas outside it is primarily the result of hydrograph alteration and quality of the water flowing from the area.

Potential cumulative impacts on water resources in the Planning Area would result from altering functional vegetative communities and could lead to increased runoff and sediment/contaminant delivery. Activities with impacts on water resources include management actions attributed to the following:

- The alteration of natural vegetative communities (e.g., invasion of exotic species and severe burns)
- Historic grazing practices
- Surface-disturbing actions in areas of low reclamation potential
- Conversion of native rangelands to irrigated agricultural lands (on non-BLM-administered lands)
- Improper maintenance of transportation facilities
- Spills and leaks of substances used to develop mineral resources
- Recreational use

These activities cause surface disturbances by removing vegetation cover, displacing and compacting soils, and altering soil structure and chemistry. The result is exposed surfaces that increase the potential for runoff and erosion, which delivers sediment and contaminants to nearby waterways. Sedimentation in waterways can cause changes in water chemistry, as well as geomorphic adjustments that could degrade stream function.

Urban growth and development is anticipated to have impacts on water quantity and quality as the demand for water increases with urban expansion. Water right applications for waters flowing from or through BLM-administered lands are also expected to rise along with the demand. This includes water used on National Forest and private lands upstream of BLM-administered lands. Impacts on quantity could affect wildlife habitat (e.g., riparian areas and wetlands, aquatic habitat, wildlife, water quality, and fisheries). Major water projects being initiated by counties and cities could have impacts on the Colorado River and other tributaries. Dust accumulating on snow is also estimated to cost the river an additional 800,000 acre-feet of water annually, or 5 percent of its annual flow (Painter et al. 2010). Cumulatively, the overall water diversions would be anticipated to have impacts on the Colorado River Compact. Loss of vegetation and disturbed soils associated with construction and development would leave denuded surfaces susceptible to soil detachment and transport during runoff. Increased runoff and erosion following runoff and mass wasting could further deliver sediment and contaminants to nearby waterways. In addition, agricultural runoff would introduce nutrients, pesticides, and herbicides to shallow groundwater and adjacent hydrologic features.

Unavoidable water quality impacts include temporary increases in suspended load in flowing streams as a result of culvert installation, vehicle use of low-water crossings, and livestock and wildlife use of stream banks and wetlands; permitted channel fills resulting from construction of oil and gas pads, roads, and pipelines; and the introduction of nutrients from irrigation of private lands. Water quantity impacts include water withdrawals for livestock use; oil and gas and other mineral resource exploration, development, and production; and watering of roads for dust mitigation. Dust on snow resulting from fugitive dust production outside of the Planning Area would continue to impact the timing of melt and the quantity of water available for downstream users.

Reasonably foreseeable future actions on federal, state, private, and other lands in and next to the Planning Area that could have an effect on water resources include energy and minerals development, vegetation management, livestock grazing, recreation and visitor use, lands and realty, roadway development, water diversions, spread of noxious/invasive weeds, wildland fires, spread of forest insects and diseases, drought, and climate change. Without proper mitigation, BMPs, and comprehensive planning, these activities could have similar impacts, as described above.

Under all alternatives, water resources would receive certain levels of protection due to management in accordance with the Clean Water Act, the Colorado River Salinity Control Act, the Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration, and other applicable state and federal water quality standards. Site-specific mitigation and BMPs for surface-disturbing activities would further reduce impacts on water resources. Adhering to these standards would reduce many of

the impacts from future actions. In addition, existing and proposed stipulations designed to protect water resources would minimize sediment and contaminant delivery potential by preventing or limiting surface-disturbing activities near sensitive areas, such as hydrologic features, designated municipal watersheds and source water protection areas, and domestic wells. Stipulations and limitations for other resources (e.g., fisheries and riparian) that prevent or limit surface-disturbing activities would provide additional protection for water resources.

Stipulations designed to protect water resources vary by alternative, as do stipulations for other resources that provide additional protection for water resources. Under all alternatives, the BLM would continue to oppose water right applications that could affect groundwater quantity available to wildlife and livestock.

Alternative actions that allow the least amount of soil disturbance, loss of vegetation, energy and minerals development, recreational use, and roadway/transportation facilities development would be the least impactful on water resources. Also, alternative actions that have the most restoration of plant communities, revegetation, and protected areas (such as ACECs or Wild and Scenic Rivers eligibility or suitability interim management) would have the most beneficial cumulative impacts on water resources.

4.3.4 Vegetation

This section discusses impacts on vegetation, forests and woodlands, rangelands, riparian areas, and weeds from proposed management actions of other resources and resource uses. Existing conditions are described in **Section 3.1.5** (Vegetation).

Methods and Assumptions

Impacts were determined by assessing which actions, if any, would change the upland vegetation, riparian and wetland vegetation, and weed indicators described below. Some impacts are direct, while others are indirect and affect vegetation through a change in another resource. Direct impacts on vegetation include disrupting, damaging, or removing vegetation, thereby reducing area, amount, or condition of native vegetation. Included among these are actions that reduce total numbers of plant species and actions that reduce or cause the loss of diversity, vigor, or structure of vegetation, or that degrade its function for wildlife habitat.

Indirect impacts are those that cannot be absolutely linked to one action, such as decreased plant vigor or health from dust or reduced water quality. Other indirect impacts include loss of habitat suitable for vegetation colonization due to surface disturbance; introduction of weeds that compete with desirable, native vegetation; conditions that enhance the spread of weeds; and general loss of habitat due to surface occupancy or soil compaction.

Indicators

Table 4-9 (Vegetation Indicators and Desired Trends) presents indicators and desired trends relating to upland vegetation, riparian and wetland vegetation, and weeds. The consolidated indicators are intended to incorporate and simplify the indicators listed under the BLM Colorado Public Land Health Standards 2 and 3 (BLM 1997) (see **Appendix C** [BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado]).

Table 4-9
Vegetation Indicators and Desired Trends

Consolidated Indicator	Desired Trend[1]
Upland Vegetation Communities	
Condition of native vegetation communities and individual native plant species	• Native plant communities are distributed across the landscape with a density, composition, and frequency of species suitable to ensure reproductive capability and sustainability. • Photosynthetic activity is evident throughout the growing season. • Diversity and density of plant species are in balance with habitat/landscape potential and exhibit resilience to human activities, insect infestations, disease, fire risks, and tree mortality rates. • Appropriate plant litter accumulates and is evenly distributed across the landscape.
Connectivity	• Landscapes exhibit habitat connectivity or corridors presence to prevent habitat fragmentation.
Age class distribution	• Plants are present in mixed age classes sufficient to sustain recruitment and mortality fluctuations; landscapes are composed of several plant communities that may be in a variety of successional stages and patterns.
Riparian and Wetland Vegetation	
Condition of riparian vegetation community and individual riparian plant species	• Vegetation is dominated by an appropriate mix of native or desirable introduced species. • Vigorous desirable plants are present. • There is vegetation with diverse age class structure, appropriate vertical structure, and adequate composition, cover, and density. • Plant species indicate maintenance of riparian moisture characteristics. • Vegetation colonizes point bars with a range of age classes and successional stages. • Vigorous desirable plants are present. • Stream bank vegetation is composed of species and communities that have root systems capable of withstanding high stream flows.
Hydrologic functionality	• Stream is in balance with the water and sediment being supplied by the watershed. • Vegetation and free water indicate high water tables. • An active floodplain is present. • Residual floodplain vegetation is available to capture and retain sediment and dissipate flood energies. • Stream channels have size and meander pattern appropriate for the streams' position in the landscape and parent materials. • Woody debris contributes to the character of the stream channel morphology.
Weeds	
Invasive species	• Noxious weeds and undesirable species are minimal in the overall plant community. • Appropriate plant litter accumulates and is evenly distributed across the landscape.

[1] Desired trends are adapted from the indicators in the BLM Colorado Public Land Health Standards (BLM 1997).

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- Annual climatic fluctuation would continue to influence the health and productivity of plant communities.

Nature and Type of Effects

All Vegetation Communities and Weeds

The type, abundance, and distribution of vegetation communities within the Decision Area would be affected under all alternatives. To simplify the discussion, impacts on vegetation are discussed in terms of different types of actions associated with BLM management programs. These are presented in **Table**

4-10 (Impacts on Vegetation from BLM Management Programs). The discussion that follows describes how each type of action affects the indicators listed above.

Table 4-10
Impacts on Vegetation from BLM Management Programs

Management Program	Types of Action
Land Health	Vegetation manipulation Direct protections
Air	Incidental protections
Soil and water	Incidental protections Natural processes
Vegetation	Vegetation manipulation Direct protections
Fish and wildlife	Vegetation manipulation Incidental protections Natural processes
Special status species	Vegetation manipulation Incidental protections Natural processes
Fire and fuels	Vegetation manipulation Natural processes Surface disturbance
Livestock grazing	Vegetation manipulation Surface disturbance related to range projects Resource use
Recreation	Surface disturbance
Travel and transportation	Surface disturbance
Mineral resources	Surface disturbance
Forestry	Surface disturbance Resource use
Visual resources	Incidental protections
Lands and realty	Surface disturbance Incidental protections
Special designations	Incidental protections Direct protections

Vegetation manipulation. Vegetation manipulation includes actions designed to alter vegetation from its current state such as weed treatments, habitat enhancements, forage improvement, fuels treatments, and restoration and rehabilitation activities. With the exception of weed treatments, vegetation manipulation associated with the management programs in **Table 4-10** would directly alter the condition of native vegetation communities by changing the density, composition, and frequency of species within the communities. Vegetation manipulations in a given area would favor some plant species to the detriment of other species (Wagner et al. 2010). They could also affect individual plant species through introduction of new genetic material into local populations by way of seedings or plantings. Despite the use of best management practices, desired results on vegetation condition may not always be achieved due to such factors as weather patterns, availability of seeds, or unproven restoration techniques.

Some vegetation manipulation would directly alter age class distribution by converting areas of later seral vegetation to an earlier seral stage. Some restoration treatments could encourage development of later seral vegetation by introducing later seral species through seeding or planting, or by speeding up

seral transition times through actions like thinning woodland stands. Fuels treatments could affect natural fire patterns and frequencies, thereby reducing the incidence of large or severe wildfire (van Leeuwen 2008) and the amount of early seral post-burn vegetation.

Vegetation manipulation that changes age class distribution within a larger area of a given age class could directly reduce habitat connectivity. Habitat connectivity could be increased through vegetation manipulation designed to restore vegetation, or seral transition of an area to better match the surrounding vegetation.

All types of vegetation manipulation affect invasive species, both directly and indirectly. Invasive species change vegetation condition by outcompeting native plants for space, water, nutrients (Sakai et al. 2001), and other resources, and by preventing native species seedling germination and establishment. Among the different types of vegetation manipulations, weed treatments are the most likely to directly reduce invasive species. However, they can also result in unintended damage to native, desirable species (Crone et al. 2009). Other vegetation manipulations often result in an unintended increase of invasive species through associated soil disturbance, seed and soil introductions, and reduced native species competition (Merriam et al. 2006).

The condition of the riparian vegetation community, individual riparian plant species, and hydrologic functionality would be directly improved with vegetation manipulations in the riparian zone. These include weed treatments, native species planting, fuels projects to protect riparian communities from fire, and channel manipulations to increase overbank flooding or reduce bank erosion. Other types of vegetation manipulations would not affect the riparian condition or hydrologic functionality.

Direct Protections. Direct protections are use restrictions specifically designed to protect high-priority native vegetation communities or fish, wildlife, and special status species habitat. These would limit or modify uses in special vegetation or habitat types. Such use restrictions would reduce damage to the condition of native vegetation communities and individual native plant species in areas that are important for regional vegetation diversity and quality. Likewise, use restrictions would minimize connectivity loss and would be more likely to retain existing age class distribution within these specific areas. Use restrictions would also minimize the introduction or spread of invasive species by prohibiting or limiting actions that cause soil disturbance, seed and soil introductions, and reduced native species competition.

Incidental Protections. Incidental protections are use restrictions designed to protect other resources in the Decision Area, such as cultural, soil, and water resources, viewsheds, recreation settings in SRMAs, or specially designated areas, such as WSAs. Incidental protections would restrict vegetation removal or other surface-disturbing activities to varying degrees in protected areas. This could reduce further damage from uses to the consolidated indicators. However, priority vegetation would not be targeted. Incidental protections could hinder some types of restoration actions needed to improve degraded vegetation conditions. Otherwise, with the exception of location, impacts are similar to those described for direct protections.

Incidental protections associated with VRM Classes I and II would preserve or retain the existing landscape character. They would restrict surface-disturbing activities and would retain existing vegetation. Areas managed as VRM Classes III or IV would be subject to actions that allow for greater landscape modification and therefore greater surface disturbance. However, vegetation management could be constrained in these areas so that vegetation objectives and desired trends could be difficult to achieve.

Incidental protections associated with BLM-administered land exchanges, disposals, and acquisitions could reduce the fragmentation of Decision Area BLM-administered lands. This could improve the BLM's ability to implement management actions that would improve the condition of native vegetation

communities and desired age class distribution in communities. Conversely, land disposals could increase fragmentation if the disposed land is developed. Land acquisitions would allow vegetation to be managed under BLM direction, although areas impacted by noxious and invasive species could impair the BLM's capacity to restore and maintain native vegetation conditions.

Natural processes. Natural processes are the disturbances under which ecosystems have developed, and the ecosystem's responses. They do not include human-related disturbances. Natural processes include vegetation succession, wildlife herbivory, wildland fire, drought, climate shifts, flooding and mass wasting events, and disease and parasite spread. Some BLM management programs affect the occurrence of some natural processes, which results in an indirect impact on one or more of the consolidated indicators. Generally, indicators benefit when natural processes are intact at the landscape level. However, natural processes can be damaging to the indicators at the site level, in fragmented landscapes, or when the natural processes themselves become altered. The primary indirect management impacts on vegetation that occur as a result of management influences on natural processes are discussed below.

Wildlife herbivory affects condition of the native vegetation community and individual species (Mothershead and Marquis 2000). The native vegetation communities are adapted to some level of wildlife herbivory, but alterations of use patterns and intensity can affect vegetation condition. Recreation management, travel and transportation, and vegetation manipulations to improve wildlife habitat are examples of activities that indirectly affect distribution of hunters and wildlife and consequently herbivory intensity and use. Where use is heavy, vegetation condition is likely to decline, with palatable species being particularly hard hit.

Wildland fire primarily affects age class distribution, connectivity, vegetation community condition, and invasive species (Keeley et al. 2003). When management reduces wildland fire frequency by controlling natural ignitions, the indirect impact is that vegetation ages across the landscape, and early successional vegetation communities and early seral plant species are diminished (Collins et al. 2001).

Fire suppression may directly preserve condition of some vegetation communities, as well as habitat connectivity. This is particularly important in areas where fire frequency has increased as a result of weed invasion, or where a fragmented landscape has reduced some vegetation communities or habitat types to a rare status. Fire also increases opportunities for invasive species to expand (Brooks et al. 2004; Brooks and Pyke 2001), so fire suppression can indirectly limit expansion.

Drought affects the condition of the plant community and age class distribution. Plant communities in the Planning Area are adapted to some level of drought, but vigor, composition, and density can all be reduced as a result of drought. Drought can create conditions that favor certain invasive species or communities, or promote insects and disease (Hellmann et al. 2007). Management interacts with drought primarily through livestock grazing and fire management. The degree to which drought impacts the plant community and future forage production depends on the intensity, frequency, and timing of grazing (Howery 1999). Natural fires are most frequent and intense during times of drought. Fire suppression during these times can result in larger deviations from the natural age class distribution than at other times.

Flooding affects riparian vegetation condition and hydrologic functionality. Most of the riparian plant communities, as well as the stream channels, have resulted from a regime of periodic flooding. Management can have a small influence on flooding processes, mainly by reducing the alteration and loss of floods. When instream flows are secured, riparian vegetation and hydrologic functionality are less likely to be degraded by water depletions and lack of flooding.

Surface disturbance. This could occur as a result of permitted activities (e.g., mineral exploration and development, ROWs, and forestry), casual use (e.g., recreation and motorized vehicle use), and

resource management (e.g., fire suppression and fuels treatments). Permitted surface-disturbing activities often involve vegetation removal, which would reduce condition of native vegetation communities and individual native plant species, alter age class distribution, reduce connectivity, and encourage the spread of invasive species. Resource management for fire, forestry, vegetation, and wildlife would cause surface disturbance in the short-term through vegetation removal and manipulation, but would ultimately improve vegetation conditions over the long term.

In addition, activities that would disturb soils could cause erosion, topsoil and biological soil crust loss, and soil compaction. This could affect vegetation's ability to regenerate and could facilitate weed introduction and spread. Soil compaction results in decreased vegetation cover and more exposure of the soil surface to erosion (Burton et al. 2008). Soil compaction may also affect the size and abundance of plants by reducing moisture availability and precluding adequate taproot penetration to deeper horizons (Ouren et al. 2007). Furthermore, surface-disturbing activities could increase dust, which could cover existing vegetation and impair plant photosynthesis and respiration. Resulting impacts could include lowered plant vigor and growth rate, altered or disrupted pollination, and increased susceptibility to disease, drought, or insect attack. As a result, surface-disturbing activities could affect the density, composition, and frequency of species in an area, thus affecting native vegetation condition.

Placing subsurface or temporary facilities in highly degraded areas may benefit vegetation if more desirable species become established following reclamation. Reclamation can reintroduce a native seed source into areas where noxious and invasive species dominate the landscape. Reclamation could also affect individual plant species through introduction of weeds or new genetic material into local populations by way of seedings or plantings. In most cases, soils in reclaimed areas would be recontoured, stabilized with topsoil spreading, and seeded during interim or final reclamation. Despite the use of best reclamation practices, desired results of vegetation condition may not always be achieved due to such factors as weather patterns, seed availability, or unproven restoration techniques.

Impacts are more likely to occur in easily accessible areas, where visitation would be high, and in areas open to cross-country travel, particularly motorized use, and to a lesser extent, mechanized use. Some vegetation communities, such as salt desert shrub and lower elevation sagebrush, take longer to recover from disturbance, especially during prolonged drought, and are more susceptible to weed invasion. Impacts on these communities would be greater than for other desired vegetation communities, such as mountain shrub or high-elevation sagebrush, which generally respond more favorably to disturbance and are less prone to weed invasion. Fewer impacts on vegetation would occur in previously disturbed or developed areas because past and current use has already impacted these areas (Marion and Cole 1996), although further impacts could still occur.

Impacts from surface-disturbing activities specific to certain management programs are:

- *Recreation.* Management of recreation management areas (RMAs) would aim to draw users to certain areas for certain recreational uses. Impacts on vegetation could be limited through specialized management tools that limit or prohibit surface-disturbing activities (e.g., campsite designation, permits, area closures, and limitations on the number of users, duration, and types of uses). However, impacts would occur where such facilities as campsites, parking lots, trails, roads, and restrooms are constructed. Impacts from recreation could also occur outside of RMAs. For example, RMAs managed for nonmotorized use could displace motorized use to other parts of the Decision Area, resulting in increased surface disturbance and fragmentation of vegetation communities outside of the RMA. Because recreation is not the focus of management attention outside of RMAs, impacts from dispersed recreation could be more difficult to monitor for.

- *Lands and Realty.* ROWs are often linear and may extend for many miles, increasing the potential for weeds to be introduced or spread over large distances. ROW avoidance and exclusion areas would be managed to reduce or avoid impacts on vegetation and weeds. ROW corridors would be managed to concentrate placement of large linear facilities and other ROW development in less-sensitive areas and to minimize the connectivity loss and total vegetation disturbance acreage. In general, the more acres that are identified as ROW avoidance and exclusion areas, the less likely the impacts on vegetation.
- *Mineral Resources.* The amount of land that is open to fluid minerals leasing or other mineral use does not necessarily indicate the number of acres that would be directly disturbed. No Leasing areas or NSO and NGD stipulations would protect vegetation from removal or disturbance in these areas. CSU and SSR stipulations would provide a lower level of protection by allowing surface-disturbing activities but protecting the most sensitive resources through relocating activities. TL stipulations would not protect vegetation in most instances, but might reduce the extent of damage, such as where soils are protected from surface-disturbing activities during sensitive periods, which could prevent destruction of plant crowns and roots. Stipulations that would be applied under each alternative are presented in **Table T-1**.
- *Livestock Grazing.* Stock ponds and other range developments would permanently remove vegetation within their footprint and would concentrate livestock, thus increasing surface-disturbing impacts in certain areas.
- *Travel and Transportation.* In general, the more acres that are closed to motorized vehicle use and cross-country motorized vehicle use, the fewer the impacts on vegetation from surface disturbance, as such uses can damage or destroy vegetation, increase dust, spread weeds, and compact soils (Ouren et al. 2007). Impacts would be reduced in areas that are limited to designated routes, as motorized vehicles that remain on routes would be less likely to damage or destroy vegetation, though weeds could still be spread.

Resource use. These impacts include vegetation consumption from livestock grazing, as well as forestry activities and collection of plant materials, where vegetation is removed for other uses. Forestry activities, particularly wood harvest, would alter vegetation age class distribution and connectivity by reducing standing biomass and altering age class distribution, stand structure, and vegetation patches size and distribution. However, forest and woodland product management could be used as a tool to directly and indirectly improve forest health. Seed collection could disturb vegetation and impair some species' reproduction or vigor. The more acres open to wood product harvest and plant material collection, the higher the potential for vegetation impacts.

Impacts from livestock grazing include changes to the native vegetation condition through vegetation removal, nutrient cycling rate changes (de Mazancourt et al. 1998), and species composition (Milchunas and Lauenroth 1993; Hayes and Holl 2003). Improper management of livestock grazing can also change vegetation condition by reducing palatable species, thereby giving a competitive advantage to unpalatable species. Livestock often use riparian and wetland areas for water and shade, which could reduce riparian community condition and hydrologic functionality. Furthermore, grazing can reduce litter and fine fuel loading, which could reduce fire size and severity. Impacts would vary depending on the timing of use, duration, type of vegetation impacted, and grazing intensity. In general, while livestock grazing management would play a large role in determining the extent of impacts, the more acres that are available to grazing and the higher the AUMs permitted under a given alternative, the greater the acreage that could be subject to the impacts listed above to varying degrees.

Effects Common to All Alternatives

Under all alternatives, the fire management plan would be maintained, which would provide consistent fire management across the Planning Area, regardless of land ownership. This would have landscape-

level effects on vegetation by coordinating efforts to manage fire activities over a large scale and with other types of vegetation manipulations.

Under all alternatives, the types of impacts from coal leasing are the same as those described for surface disturbance under ***Nature and Type of Effects***. As described in **Section 4.4.3** (Energy and Minerals, Effects Common to All Alternatives, Solid Leasable Minerals—Coal), coal production is expected to remain the same across all alternatives. Areas unacceptable for coal leasing, unsuitable for surface mining, and stipulations on open lands would reduce vegetation impacts from coal mining and surface disturbance on these lands. Under all alternatives, 28,060 acres of BLM surface/federal minerals would remain withdrawn from locatable mineral entry. This would prevent impacts caused by mineral resource development, as described under ***Nature and Type of Effects***, above.

Five WSAs (36,160 acres) would be managed under all alternatives. These areas would be managed as ROW exclusion, closed to mineral resource leasing and development, and closed to wood cutting, product sales, and harvest. This would reduce impacts on vegetation, as described above under ***Nature and Type of Effects***.

Implementing management for the following resources would have negligible or no impact on vegetation and are therefore not discussed in detail: air quality and public health and safety.

Under all alternatives, the BLM would implement integrated weed management using the UFO weed management strategy (BLM 2010c). Weed control and prevention measures would help reduce weed cover in the Planning Area and would prevent weed introduction and spread over the long term. The herbicide use protocols and standard operating procedures, as described in the Programmatic EIS for Vegetation Treatments Using Herbicides (BLM 2007a), would be followed to reduce impacts on nontarget vegetation from herbicide treatments.

Alternative A

Upland Vegetation

In general, Alternative A would rely on management guidance that would not reflect current conditions and issues and would lack a landscape-level approach to land planning. Inadvertent impacts on native vegetation condition, connectivity, and age class distribution could result from implementing this alternative.

Soil protections for erodible and saline soils and steep slopes, as well as water protections for waterfowl and shorebirds through the use of NSO, CSU, and TL stipulations, would reduce the potential for impacts from surface-disturbing activities in these areas, as described under ***Nature and Type of Effects*** (surface disturbance).

The lack of comprehensive planning for vegetation, fish and wildlife, and special status species would result in vegetation and habitat management that is applied on a case-by-case basis and could result in conflicting or inefficient actions. There would be no particular protection for vegetation beyond the BLM Colorado Public Land Health Standards (BLM 1997), although management flexibility would allow the BLM to adaptively manage resources. Vegetation and weed treatments and range improvements would be carried out, which would change vegetation condition, connectivity, and age class distribution to some degree, but current trends would continue.

Land health management would aim to meet the BLM Colorado Public Land Health Standards (BLM 1997).

Fire management under Alternative A would use mechanical treatments, prescribed fire, seeding, and herbicide to achieve desired objectives, but there would be no guidance for the use of minimum-impact suppression techniques or Emergency Stabilization and Rehabilitation. Managing unplanned natural ignitions would also be allowed. These would increase the potential for impacts from fire, as described under ***Nature and Type of Effects*** (natural processes).

Areas managed as VRM Class I and II on 66,150 acres would provide incidental protection of vegetation, as described under ***Nature and Type of Effects*** (incidental protections).

Alternative A would impose few restrictions on forestry activities within the Decision Area, as commercial harvest of all vegetation types would be allowed within forest management areas. Impacts would be reduced on 110,160 acres where wood product sales and harvest would be prohibited.

The types of impacts from grazing are the same as those described under ***Nature and Type of Effects*** (vegetation manipulation, surface disturbance related to range projects, and resource use). The BLM would manage 619,500 acres as available and 56,300 acres as unavailable to grazing under Alternative A.

The types of impacts from recreation under Alternative A are the same as those described under ***Nature and Type of Effects*** (surface disturbance). The BLM would have the ability to intensively manage SRMAs, though it could struggle to accommodate current and future levels of recreation as population and recreation use increase. This could increase impacts on vegetation from surface disturbance throughout the Decision Area. Two SRMAs would be managed on 49,320 acres, and no ERMAs would be managed under this alternative. The remaining 626,480 acres within the Decision Area would be managed to meet basic recreation needs, although recreation would not be the management priority in these areas.

The types of impacts from motorized use under Alternative A are the same as those described under ***Nature and Type of Effects*** (surface disturbance); open cross-country travel motorized use would be allowed on 8,560 acres. The potential for impacts would be eliminated on 56,150 acres that would be closed to motorized use and reduced on 145,300 acres that would be limited to designated routes for motorized and mechanized travel.

Lands and realty management actions would identify 85,080 acres as ROW exclusion, which would protect vegetation or minimize impacts from surface disturbance in these areas (see ***Nature and Type of Effects***, above). In addition, the designated West-wide Energy Corridor (26,880 acres) would be open to development of major utility corridors, and impacts on vegetation would be concentrated within that corridor.

The minimal restrictions on fluid mineral development would result in a reasonably foreseeable development scenario similar to that projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**. Under Alternative A, the types of impacts from fluid mineral leasing are the same as those described for surface disturbance under ***Nature and Type of Effects***; 631,580 acres of BLM surface/federal minerals and 240,230 acres on split-estate lands (totaling 871,810 acres) are open to fluid minerals leasing. Areas closed to fluid minerals leasing (44,220 acres), as well as stipulations on open lands, would reduce vegetation impacts from fluid minerals leasing on these lands. NSO stipulations would be applied on 24,890 acres of BLM surface/federal minerals, and CSU stipulations would be applied on 110,180 acres of BLM surface/federal minerals, which would reduce the impact of fluid mineral development on vegetation.

Under Alternative A, 27,690 acres would be recommended for withdrawal from locatable mineral entry. If withdrawn, these areas would provide additional protection to vegetation from surface-disturbing activities, as described above under ***Nature and Type of Effects***.

Five ACECs would be managed on 30,000 acres. Within these areas, vegetation would be protected from surface-disturbing activities through such measures as applying an NSO stipulation and closure to OHVs, major utility development, and mineral resource leasing and development. However, the BLM would not manage ecological emphasis areas under Alternative A, which would provide no associated protections to minimize the loss of vegetation community connectivity and would not improve the potential for plant migration in response to climate change.

No lands with wilderness characteristics would be managed under Alternative A, so no special protections would be afforded to those areas, and no incidental protections of vegetation would occur.

The Tabeguache Area (8,060 acres) would be managed to preserve its wilderness character. It would be closed to motorized and mechanized travel, managed as ROW exclusion, closed to mineral resource leasing and development, and closed to wood cutting and wood product sales and harvest. This would help to reduce impacts caused by surface-disturbing activities, as described under ***Nature and Type of Effects***.

Riparian and Wetland Vegetation

In addition to the impacts described above under ***Upland Vegetation,*** riparian and aquatic zones would be protected on 15,350 acres. There would be some riparian vegetation management to restore and enhance riparian vegetation, which would maintain or improve riparian vegetation conditions and hydrologic functionality. The BLM would apply a CSU stipulation within the riparian vegetation zone in the western half of the Decision Area, which would reduce impacts on the condition of riparian vegetation and hydrologic functionality.

Riparian areas within the San Miguel SRMA could be impacted by increased visitation. Over time, recreation would increase surface-disturbing impacts on riparian and wetland areas as regional population and subsequent recreation use increases.

Under Alternative A, the San Miguel River ACEC (22,780 acres) would be maintained to protect riparian and wetland vegetation. The protections are the same as those described under ***Upland Vegetation***. In addition, 29 river segments (154.1 miles) would be managed as eligible for inclusion in the NWSRS. Interim protective management guidelines would provide incidental protection to riparian and wetland vegetation from surface-disturbing activities in these areas.

Weeds

In addition to the impacts described above for ***Upland Vegetation***, over time, recreation would have increasing impacts on weed spread. This is because users and vehicles would introduce and spread weeds throughout the Decision Area, and population and recreation use would increase.

Alternative B

Upland Vegetation

Under Alternative B, the BLM would implement protective management measures for vegetation, stipulations, and restrictions to reduce impacts from resource uses. Management direction would have an ecological focus, with existing uses geared toward ensuring the protection of natural values.

Under Alternative B, protection of saline/selenium soils and steep slopes (ROW exclusion, NSO, and NGD), potential biological soil crust on 7,360 acres (ROW exclusion, CSU, and SSR), and saturated soils (TL) would be greater than those described for Alternative A and would reduce impacts from surface-disturbing activities, as described under ***Nature and Type of Effects***. The NSO/NGD restriction on saline/selenium soils under Alternative B would encompass 107,170 acres. For Alternative B, steep slopes are defined as having a slope equal to or greater than 30 percent.

Beyond the protection of saline/selenium soils described under Alternative B (i.e., managing these soils as ROW exclusion areas), Alternative B.1 also would apply NSO within 0.25-mile of saline/selenium soils (7,390 acres in the North Fork area) and would prohibit leasing (12,660 acres) on these soils in the North Fork area. Alternative B.1 also would apply NSO within the 100-year floodplain of any stream or river system. These protections would reduce vegetation impacts from surface-disturbing activities in the North Fork area beyond Alternative B.

Vegetation management under Alternative B would emphasize improving and restoring vegetation. The BLM would require the use of locally derived native species for revegetation, which would help to reestablish native vegetation, maintain local genetic characteristics, and reduce the potential of weed establishment. In addition, the BLM would open 444,160 acres to seed-collection permits. Exemplary, ancient, and rare vegetation communities would be closed to seed collection and would be managed as ROW exclusion; NSO and NGD stipulations would be applied, which would reduce the potential for disturbance or removal of vegetation in these communities.

Land health management would aim to fully meet or exceed BLM Colorado Public Land Health Standards (BLM 1997), which would be a higher standard than under Alternative A. To achieve this, the BLM would close areas, or limit or modify activities in areas not meeting the standards, to improve land health. The BLM would also manage these areas as ROW avoidance areas and would apply CSU and SSR stipulations. By doing so, impacts from surface disturbance on vegetation would be reduced.

Similarly, fish and wildlife and special status species management under Alternative B would improve and protect vegetation by managing 12 ecological emphasis areas (242,580 acres). Measures to reduce impacts from surface disturbance would be taken within these areas, as 186,070 acres would be ROW exclusion, and 56,490 acres would be ROW avoidance. In addition, NSO restrictions would be applied on 207,310 acres (239,320 acres under Alternative B.1) of ecological emphasis areas, CSU would be applied on 35,250 acres (234,690 acres under Alternative B.1), and SSR would be applied on 242,560 acres. Due to these restrictions, ecological emphasis areas would provide opportunities for reduced vegetation communities' fragmentation and improved plant migration potential in response to climate change. Occupied habitat of known populations of federally listed species would be ROW exclusion areas. Compared with Alternative A, other closures, NL areas, and NSO, CSU, SSR, and NGD restrictions to protect wildlife and special status species would further protect vegetation in these areas from surface disturbance, as described under ***Nature and Type of Effects***.

The BLM would transplant or seed local native species to improve long-term survival of plant populations. In addition, unnatural soil and vegetation disturbance would be minimized in ecological emphasis areas to reduce barriers to plant migration. This would help to improve vegetation connectivity and would preserve native vegetation condition by maintaining genetic diversity. These actions would reduce the potential effects of climate change on vegetation.

Under Alternative B, the BLM would emphasize the use of prescribed and managed fire over mechanical treatments and other methods to meet resource objectives. This could limit the BLM's ability to achieve resource objectives and desired trends, but it could reduce the potential for an uncharacteristically large or intense wildfire that could damage large expanses of vegetation. This could have impacts on vegetation condition, vegetation fragmentation, and vegetation conversion to an early seral stage. Minimum-impact suppression tactics would be used to reduce impacts on vegetation from fire suppression, and emergency stabilization and response treatments would be implemented after wildland fires occur. The types of impacts are similar to those described under ***Nature and Type of Effects*** (vegetation manipulation).

Under Alternative B, the types of impacts from visual resources management are the same as those described under Alternative A. However, under Alternative B, 229,880 acres (3 times more acres than under Alternative A) would be managed as VRM Class I and II. Under Alternative B.1, 235,510 acres would be managed as VRM Classes I and II (3 times more acres than under Alternative A, and slightly more than Alternative B). In addition, NSO and NGD restrictions would be applied in VRM Class I areas, and CSU and SSR restrictions would be applied in VRM Class II and III areas. Impacts are as described under ***Nature and Type of Effects*** (incidental protections and surface disturbance).

Under Alternative B, seven lands with wilderness characteristics units (42,150 acres) would be managed to protect those wilderness characteristics. Surface-disturbing activities would be restricted within these areas, which would include such management actions as designating ROW exclusion; closing to motorized and mechanized travel; closing to mineral materials disposal, nonenergy solid mineral leasing, and coal leasing; recommending for withdrawal from locatable mineral entry; and applying NL and NGD for fluid mineral leasing and geophysical exploration. These restrictions would reduce the potential for impacts from surface disturbance, as described under ***Nature and Type of Effects***.

Under Alternative B, forestry would be managed more intensively than under Alternative A, with 675,800 acres of forest management units designated. Harvest of minor forest and woodland products would be allowed for certain tree species in certain areas. Impacts are as described above under ***Nature and Type of Effects*** (resource use). Impacts would be eliminated on 397,160 acres (nearly 4 times more than under Alternative A) that would be closed to wood product sales and harvest.

The types of impacts from grazing are the same as those described under ***Nature and Type of Effects*** (vegetation manipulation, surface disturbance related to range projects, resource use). Under this alternative, the BLM would manage 517,580 acres as available (16 percent fewer acres than under Alternative A), and 158,220 acres as unavailable to grazing (nearly 3 times more acres than under Alternative A). Emphasis would be placed on decreasing grazing preference and improving rangeland health through grazing management strategies. In addition, the BLM would require a minimum of 3 years rest in disturbed areas, which would allow forage plants to fully or partially recover, resulting in improved vegetation condition through increased vegetative production, vigor, seed production, litter accumulation, and seedling establishment. Improved vigor and reproduction capabilities would allow native vegetation to compete more favorably with weedy species. In addition, the BLM would prohibit new range improvement projects and would thus prevent additional vegetation disturbance or removal.

The types of impacts from recreation are the same as those described under ***Nature and Type of Effects*** (surface disturbance). The BLM would manage 12 SRMAs on 246,760 acres (5 times more acres than under Alternative A) and no ERMAs. The remaining 428,940 acres within the Decision Area would be managed to meet basic recreation needs, although recreation would not be the management priority in these areas. Certain SRMAs or portions of SRMAs would be closed to dispersed camping and overnight use, and activities would be allowed if they were to support the management objectives of the overlying special designations or ecological emphasis areas. This would help to reduce vegetation impacts in those areas that have been identified for special management. The emphasis within many of the SRMAs would be largely on nonmotorized, nonmechanized trail and Back Country activities, which would reduce impacts as described above under ***Nature and Type of Effects***. Impacts would be more likely to occur in RMZs that are managed for motorized and mechanized trail riding, as these are associated with greater surface disturbance.

Cross-country motorized use would not be allowed within the Decision Area, which would prevent the types of impacts described above under ***Nature and Type of Effects*** (surface disturbance). Areas closed to motorized (12,180 acres) or motorized and mechanized (102,790 acres) use on 114,970 acres

(twice as many acres as under Alternative A) and limited to designated routes on 560,830 acres (4 times more acres than under Alternative A) would reduce the potential for these impacts.

Management of 195,460 acres of ROW avoidance and 431,040 acres of ROW exclusion areas (5 times more acres than under Alternative A) would reduce impacts on vegetation, as described under ***Nature and Type of Effects*** (surface disturbance). Furthermore, 14 additional utility corridors than under Alternative A would be managed on 37,300 additional acres, which would concentrate vegetation impacts and reduce the potential for widespread fragmentation within the Decision Area.

Under Alternative B, the types of impacts from fluid mineral leasing are the same as those described for surface disturbance under ***Nature and Type of Effects***. Restrictions on fluid mineral development would result in fewer new and exploratory development wells drilled and associated surface-disturbance than Alternative A. Under Alternative B, 494,580 acres of BLM surface/federal minerals and 201,870 on split-estate (totaling 696,450 acres) would be open to fluid minerals leasing (20 percent fewer acres than under Alternative A). Areas closed to fluid minerals leasing on 181,220 acres of BLM surface/federal minerals and 38,360 acres on split-estate (totaling 219,580 acres) (4 times more acres than under Alternative A), as well as stipulations on open lands, would reduce vegetation impacts from surface disturbance caused by fluid mineral leasing on these lands. Of the of BLM surface/federal minerals open to fluid mineral leasing, NSO stipulations would be applied on 354,970 acres (14 times more acres than under Alternative A), and CSU stipulations would be applied on 139,560 acres (28 percent more acres than under Alternative A).

Under Alternative B.1, the BLM would manage 609,360 acres of BLM surface/federal minerals and split-estate lands as open to oil and gas leasing (30 percent fewer acres than under Alternative A) and 306,670 acres of BLM surface/federal minerals and split-estate lands as closed (5 times more acres than under Alternative A), which would reduce vegetation impacts from surface disturbance caused by fluid minerals leasing. On BLM surface/federal minerals open to fluid mineral leasing, NSO stipulations would be applied on 318,630 acres (12 times more acres than under Alternative A), and CSU stipulations would be applied on 135,550 acres (23 percent more acres than under Alternative A). These actions would reduce the potential for impacts on vegetation in the North Fork area more than Alternative B.

Under Alternative B, 382,900 acres of BLM surface/federal minerals would be recommended for withdrawal from locatable mineral entry (14 times more acres than under Alternative A). If withdrawn, these areas would provide additional protection to vegetation from surface-disturbing activities, as described above under ***Nature and Type of Effects***.

Fifteen ACECs would be managed on 215,940 acres (7 times more acres than under Alternative A). All ACECs would be managed as ROW exclusion, recommended for withdrawal from locatable mineral entry, and closed to mineral materials disposal and nonenergy solid mineral leasing. Additional restrictions would be applied for each ACEC; as such, vegetation would generally be protected from surface disturbance within these areas.

Impacts from managing the Tabeguache Area are similar to those described for Alternative A, though Alternative B would require an SSR restriction in the area, thereby providing additional protection to vegetation from surface disturbance.

Riparian and Wetland Vegetation

In addition to the impacts described under ***Alternative B, Upland Vegetation***, the BLM would apply NL areas, NGD restrictions, and ROW avoidance areas around major river corridors (26,990 acres of BLM surface/federal mineral estate and 1,060 acres of split-estate); ROW exclusion within 325 feet of perennial streams; ROW exclusion within 100 feet of riparian and wetland areas, seeps, and springs;

mineral materials disposal closures within 500 feet of riparian areas; wood products collection and harvest and other plant products collection closures within 100 feet of riparian areas; and NSO and NGD stipulations within 660 feet of perennial and intermittent waters and naturally occurring wetlands, springs, and seeps (63,540 acres of BLM surface/federal mineral estate and 2,530 acres of split-estate). This would protect riparian vegetation condition and hydrologic functionality, as well as reducing impacts from surface-disturbing activities. Permitted recreation activities or events would be prohibited in riparian areas. The BLM would also consider acquiring riparian areas, which, if acquired, would minimize the loss of connectivity and would subject these areas to BLM protection measures. In addition to these Alternative B restrictions, Alternative B.1 would also apply NL areas within 0.5-mile of the North Fork of the Gunnison and Smith Fork of the Gunnison Rivers, lakes, ponds, naturally occurring wetlands and impounding reservoirs, streams, watercourses, and waterways; and would apply NSO within 0.5 to 1.0 mile of the North Fork of the Gunnison and Smith Fork of the Gunnison Rivers, and within the 100-year floodplain of any stream or river system. These NL areas (96,910 acres) and NSO restrictions (9,680 acres) would further protect riparian and wetland vegetation in the North Fork area.

Vegetation treatments in riparian areas would be limited to weed treatments and managed wildfire from natural ignition, which could reduce the potential for achieving vegetation objectives and desired conditions in certain areas.

Riparian areas within the Dolores River Canyon and San Miguel SRMAs could be impacted by surface disturbance associated with increased visitation.

Mechanized and motorized off-route travel would be prohibited in areas with riparian or wetland vegetation. This would reduce the potential for impacts described above under ***Nature and Type of Effects*** (surface disturbance).

Under Alternative B, several ACECs would be maintained or designated to protect riparian and wetland vegetation, including the San Miguel River Expansion and Roubideau-Potter-Monitor ACECs. The types of impacts are the same as those described under ***Alternative B, Upland Vegetation***. In addition, 29 river segments (154.1 miles) would be determined suitable for inclusion in the NWSRS. Interim protective management guidelines would provide incidental protection to riparian and wetland vegetation from surface disturbance in these areas.

Weeds

Soil and water protections described above under ***Alternative B, Upland Vegetation***, would decrease the potential for weed spread by maintaining topsoil and native seed banks and by reducing vegetation disturbance and clearing. In addition, all quarry pits on BLM-administered land would be managed as weed free for A, B, and C state-listed noxious weed species and for BLM weed species of concern. Alternative B would require more stringent seed requirements, compared with BLM policy for all seed used on BLM-administered lands and compared with Alternative A.

Recreation management under Alternative B would emphasize management of SRMAs, which would concentrate recreation facilities and visitor use. As such, while visitor use is expected to increase, thus increasing weed vectors, weeds could be easier to manage because use would be in concentrated areas.

Alternative C

Upland Vegetation

Under Alternative C, the BLM would emphasize vegetation management for commodities and resource uses, as well as for public use opportunities. While the BLM would comply with all laws and regulations, there would be less focus on resource protection and improvement or restoration of vegetation under

Alternative C. There would also be fewer measures to reduce or limit surface-disturbing activities, such as fewer NSO, CSU, and TL stipulations, and ROW avoidance and exclusion areas.

Protections for saline/selenium soils and steep slopes (ROW avoidance, CSU, SSR) and potential biological soil crust on 360 acres (ROW exclusion, CSU, SSR) would be greater than those described for Alternative A and would reduce impacts from surface-disturbing activities by maintaining topsoil and native seed banks and reducing erosion. For Alternative C, steep slopes are defined as having a slope of equal to or greater than 40 percent.

Vegetation management under Alternative C would emphasize minimizing native vegetation loss. The BLM would require the use of native species for revegetation, which would help to reestablish native vegetation and reduce the potential for weed establishment. In addition, 631,060 acres would be open to seed-collection permits, with impacts greater than those described for Alternative B, due to the increased acreage that would be open (42 percent more). Exemplary, ancient, and rare vegetation communities would be ROW avoidance areas, which would reduce the potential for disturbance or removal of vegetation from ROW development in these vegetation communities.

Land health management would aim to meet BLM Colorado Public Land Health Standards (BLM 1997) with problems as long as areas are stable or trend toward achieving BLM Colorado Public Land Health Standards (BLM 1997). This would be a lower standard compared with Alternative A.

Similarly, fish and wildlife and special status species management under Alternative C would improve and protect vegetation through management of two ecological emphasis areas (24,150 acres). These areas would be ROW avoidance, with CSU and SSR restrictions applied. Occupied habitat of known populations of federally listed species would be ROW avoidance. Compared with Alternative A, other closures, NL areas, and NSO, CSU, SSR, and NGD restrictions to protect wildlife and special status species would further protect vegetation in these areas from removal and disturbance.

The BLM would seed local native species to improve long-term survival of plant populations, which would reduce the potential effects of climate change on vegetation.

Under Alternative C, the BLM would emphasize the use of mechanical treatments over prescribed fire and other methods to meet resource objectives and would emphasize minimal treatments. This could limit the BLM's ability to achieve vegetation objectives and desired conditions over large areas. The use of minimum-impact suppression techniques and emergency stabilization and response would have impacts similar to those of Alternative B.

The types of impacts from visual resources management are the same as those described under Alternative A. However, under Alternative C, 75,480 acres would be managed as VRM Class I and II (14 percent more acres than under Alternative A).

Under Alternative C, no lands with wilderness characteristics would be managed to protect those characteristics. Impacts are the same as those described for Alternative A.

Impacts from forestry management under Alternative C are similar to those described for Alternative B. Impacts would be eliminated on 44,530 acres (60 percent fewer acres than under Alternative A), where wood product sales and/or harvest would be closed.

The types of impacts from grazing are the same as those described under ***Nature and Type of Effects*** (vegetation manipulation, surface disturbance related to range projects, resource use). Under Alternative C, the BLM would manage 653,270 acres as available (5 percent more acres than under Alternative A) and 22,530 acres as unavailable to grazing (60 percent fewer acres than under Alternative

A). Emphasis would be placed on increasing grazing preference. In addition, the BLM would exclude livestock grazing on disturbed areas to the extent needed to comply with BLM Colorado Public Land Health Standards (BLM 1997).

The types of impacts from recreation are the same as those described under ***Nature and Type of Effects*** (surface disturbance). The BLM would manage no SRMAs and 12 ERMAs on 215,880 acres. The remaining 460,000 acres within the Decision Area would be managed to meet basic recreation needs, although recreation would not be the management priority in these areas. Alternative C would place the greatest emphasis on recreation and visitation within the Planning Area. As use continues to increase without an emphasis on protecting recreation settings, the BLM would have a reduced capacity to concentrate use in areas managed for recreation. The potential for impacts from surface disturbance would increase. The types of impacts from recreation are the same as those described under ***Nature and Type of Effects*** (surface disturbance).

Cross-country motorized use would be allowed on 16,070 acres within the Decision Area (88 percent more than under Alternative A), which would cause more impacts, as described under ***Nature and Type of Effects*** (surface disturbance). Areas closed to motorized and mechanized use on 45,170 acres (2 percent more acres than under Alternative A) and limited to designated routes on 614,560 acres (4 times more acres than under Alternative A) would eliminate and reduce, respectively, the potential for these impacts, though to a lesser extent than under Alternative A.

Designation of 210,390 acres of ROW avoidance and 44,550 acres of ROW exclusion areas (48 percent fewer acres than under Alternative A) would reduce impacts on vegetation, as described under ***Nature and Type of Effects*** (surface disturbance), though to a lesser extent than under Alternative A. Impacts from designated utility corridors would be the same as those described for Alternative A.

The minimal restrictions on fluid mineral development would result in a reasonably foreseeable development scenario similar to that projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**. Under Alternative C, the types of impacts from fluid mineral leasing are the same as those described under ***Nature and Type of Effects*** (surface disturbance). The same amount of BLM surface/federal minerals acres as under Alternative A, 631,580 acres and 240,230 acres of split-estate (totaling 871,810 acres) would be open to fluid minerals leasing. Areas closed to fluid minerals leasing (44,220 total acres, the same amount of acres as under Alternative A), as well as stipulations on open lands, would reduce vegetation impacts from fluid minerals leasing on these lands. Of the of BLM surface/federal minerals acres open to fluid mineral leasing, NSO stipulations would be applied on 14,680 acres (80 percent fewer acres than under Alternative A), and CSU stipulations would be applied on 365,810 acres (4 times more acres than under Alternative A).

Under Alternative C, 9,550 acres of BLM surface/federal minerals would be recommended for withdrawal from locatable mineral exploration or development (66 percent fewer acres than under Alternative A). If withdrawn, these areas would provide additional protection to vegetation from surface-disturbing activities, as described above under ***Nature and Type of Effects***.

Under Alternative C, all but the Tabeguache Creek ACEC under Alternative A would be designated (totaling 29,440 acres). Within these four ACECs, areas vegetation would be protected through such measures as applying NSO and CSU stipulations, designating as ROW avoidance, and limiting travel and forestry actions.

Impacts from managing the Tabeguache Area are the same as those described for Alternative B.

Riparian and Wetland Vegetation

In addition to the impacts described under ***Alternative C, Upland Vegetation***, the BLM would apply CSU and SSR around major river corridors (26,990 acres of BLM surface/ federal mineral estate and 1,060 acres of split-estate) and within 325 feet of perennial streams (26,050 acres of BLM surface/ federal mineral estate and 12,730 acres of split-estate); would limit mineral materials disposal, wood products collection and harvest, and other plant products collection within riparian areas; and would apply CSU and SSR within 100 feet of perennial and intermittent streams and naturally occurring wetlands, springs, and seeps (10,280 acres of BLM surface/ federal mineral estate and 70 acres of split-estate). This would provide some protection to riparian vegetation and hydrologic functionality and would reduce impacts from surface-disturbing activities. There would be no restrictions on permitted recreation activities or events in riparian areas. Impacts from land acquisition are the same as those described for Alternative B.

Riparian areas within the Dolores River Canyon and San Miguel River Corridor ERMAs could be impacted by increased visitation. Because the BLM would manage these areas less intensively than SRMAs, it may have a reduced ability to remedy impacts in these areas.

Mechanized and motorized off-route travel would be prohibited in areas with riparian or wetland vegetation, with some exceptions. This would reduce the potential for impacts described above under ***Nature and Type of Effects*** (surface disturbance), though impacts could still occur.

Impacts from ACEC management under Alternative C would be similar to those described under Alternative A, although management under Alternative C would be less protective to vegetation in some ACECs (see **Section 4.5.1** [Areas of Critical Environmental Concern]). Under Alternative C, all eligible segments would be determined not suitable for inclusion in the NWSRS and would be released from interim protective management. As such, no incidental protection would be afforded to riparian and wetland vegetation.

Weeds

In general, the increased disturbance associated with Alternative C would result in the greatest potential for weed introduction and spread in the Decision Area. Impacts from weed management are similar to those described for Alternative B. However, under Alternative C, all quarry pits would be managed as weed free for A and B state-listed noxious weed species. Seed requirements for all seed used on BLM-administered lands are the same as for Alternative A.

Alternative D

Upland Vegetation

Under Alternative D, the BLM would emphasize balancing resources and resource uses while sustaining and enhancing ecological integrity across the landscape, including plant, wildlife, and fish habitat. This alternative incorporates a balanced level of protection, restoration, enhancement, and use of resources and services to meet ongoing programs and land uses. The BLM would target certain areas for protection or enhancement, such as ACECs, WSAs, lands managed to protect wilderness characteristics, ecological emphasis areas, and areas with exemplary, ancient, and rare vegetation.

Protections for saline/selenium soils (CSU and SSR), steep slopes (NSO, CSU, SSR, and ROW avoidance), saturated soils (TL), and potential biological soil crust on 1,900 acres (ROW exclusion, CSU, and SSR) would be greater than those described for Alternative A, which would reduce impacts from surface-disturbing activities. For Alternative D, steep slopes are defined as having a slope equal to or greater than 30 percent.

Vegetation management under Alternative D would emphasize maximizing native vegetation and natural processes. The BLM would require the use of locally derived native species for revegetation if available or not cost prohibitive, which would have impacts similar to those of Alternative B. In addition, the BLM would open 582,950 acres to seed-collection permits, resulting in greater impacts than under Alternative B due to the increased acreage that would be open (31 percent more). Exemplary, ancient, and rare vegetation communities would be closed to seed collection, would be managed as ROW avoidance areas, and would have CSU and SSR restrictions applied. This would reduce the potential for disturbance or removal of vegetation in these vegetation communities.

Land health management would aim to fully meet or exceed BLM Colorado Public Land Health Standards (BLM 1997) in special designations areas, ecological emphasis areas, and areas with exemplary, ancient, and rare vegetation communities. This would be a higher standard compared with Alternative A. To achieve this, the BLM would limit or modify activities in areas not meeting land health standards. In these areas, the BLM would require BMPs or condition of approvals that minimize conflict with land health improvement measures. By doing so, the BLM would reduce impacts from surface disturbance on vegetation.

Similarly, fish and wildlife and special status species management under Alternative D would improve and protect vegetation by managing 12 ecological emphasis areas (177,700 acres). These areas would be ROW avoidance areas, with CSU and SSR restrictions applied. Occupied habitat of known populations of federally listed species would be ROW avoidance areas. Compared with Alternative A, other closures, NL areas, and NSO, CSU, SSR, and NGD restrictions to protect wildlife and special status species would further protect vegetation in these areas from removal and disturbance.

Climate change management and effects are the same as those described for Alternative B.

Under Alternative D, the BLM would use mechanical treatments, prescribed fire, and other methods as ecologically appropriate to meet resource objectives. This would allow for management flexibility to use a range of treatments to increase wildfire manageability and conduct restoration treatments, habitat improvements, or other activities to improve native vegetation condition and age class structure. The impacts from using minimum-impact suppression techniques and emergency stabilization and response would be similar to those under Alternative B.

The types of impacts from visual resources management are the same as those described under Alternative A. However, under Alternative D, 158,980 acres would be managed as VRM Class I and II, 2 times more acres than under Alternative A.

Under Alternative D, three lands with wilderness characteristics units (18,320 acres) would be managed to protect those characteristics. Impacts are similar to those described for Alternative B.

Impacts from forestry management under Alternative D are similar to those described for Alternative B. Impacts would be eliminated on 281,390 acres closed to wood product sales and harvest (155 percent more acres than under Alternative A).

The types of impacts from grazing are the same as those described ***Nature and Type of Effects*** (vegetation manipulation, surface disturbance related to range projects, resource use). The BLM would manage 617,140 acres as available (less than 1 percent fewer acres than under Alternative A) and 58,660 acres as unavailable to grazing (4 percent more acres than under Alternative A) under this alternative. The temporary exclusion of grazing on disturbed areas would have the same impacts as described for Alternative C.

The types of impacts from recreation are the same as those described under ***Nature and Type of Effects*** (surface disturbance). The BLM would manage seven SRMAs on 124,400 acres (2.5 times more acres than under Alternative A) and four ERMAs on 73,310 acres. The emphasis within many SRMAs would be largely on nonmotorized, nonmechanized trail and Back Country activities, which would reduce impacts as described above under ***Nature and Type of Effects***. Impacts would be more likely to occur in RMZs that are managed for motorized and mechanized trail riding, as these are associated with greater surface disturbance. Impacts would also be harder to manage in ERMAs and outside of managed recreation areas (479,220 acres) where impacts would be more dispersed.

Cross-country motorized use would not be allowed under Alternative D. Areas closed to motorized or motorized and mechanized use on 58,560 acres (4 percent fewer acres than under Alternative A) and limited to designated routes on 617,240 acres (4 times more acres than under Alternative A) would eliminate and reduce, respectively, the potential for these impacts, as described under ***Nature and Types of Effects***.

Designation of 276,500 acres of ROW avoidance and 53,700 acres of ROW exclusion (37 percent fewer acres than under Alternative A) areas would reduce impacts on vegetation, as described under ***Nature and Type of Effects*** (surface disturbance), though to a lesser extent than under Alternative A. Impacts from designated utility corridors would be the same as those described for Alternative B.

Under Alternative D, the types of impacts from fluid mineral leasing are the same as those described under ***Nature and Type of Effects*** (surface disturbance). The restrictions on fluid mineral development would result in a reduction in the number of new and exploratory development wells and associated surface-disturbance from those projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**. The BLM would manage 627,290 acres of BLM surface/federal minerals and 238,680 acres on split-estate lands (totaling 865,970 acres) as open to fluid minerals leasing (less than 1 percent fewer acres than under Alternative A). Areas closed to fluid minerals leasing on 48,510 acres of BLM surface/federal minerals and 1,550 acres on split-estate lands (totaling 50,060 acres) (13 percent more acres than under Alternative A), as well as stipulations on open lands, would reduce vegetation impacts from fluid minerals leasing on these lands. Of the BLM surface/federal minerals acres open to fluid mineral leasing, NSO stipulations would be applied on 187,560 acres (nearly 8 times more acres than under Alternative A), and CSU stipulations would be applied on 265,140 acres (over 2 times more acres than under Alternative A).

Under Alternative D, 54,090 acres of BLM surface/federal minerals would be recommended for withdrawal from locatable mineral exploration or development (95 percent more acres than under Alternative A). If withdrawn, these areas would provide additional protection to vegetation from surface-disturbing activities, as described under ***Nature and Type of Effects***.

Eight ACECs would be managed on 51,320 acres (74 percent more acres than under Alternative A). Within these areas, vegetation would be directly and incidentally protected through such measures as applying an NSO stipulation, designating as ROW avoidance or exclusion, and closing lands to mineral resource development and motorized and mechanized travel.

Impacts from managing the Tabeguache Area are the same as those described for Alternative B.

Riparian and Wetland Vegetation

In addition to the impacts described under ***Alternative D, Upland Vegetation***, the BLM would apply NSO and SSR around major river corridors (26,990 acres of BLM surface/federal mineral estate and 1,060 acres of split-estate) and within 325 feet of perennial and intermittent streams and naturally occurring wetlands, springs, and seeps (26,050 acres of BLM surface/federal mineral estate and 12,730

acres of split-estate); ROW avoidance around major river corridors, within 325 feet of perennial streams, and within 100 feet of riparian and wetland areas, seeps, and springs; closure to mineral materials disposal, wood products collection and harvest, and other plant products collection within 100 feet of riparian areas. Additional riparian stipulations would be required for commercial SRPs. These measures would protect riparian vegetation and hydrologic functionality and would reduce impacts from surface-disturbing activities. The BLM would also consider acquiring riparian areas, which would minimize connectivity loss and would subject these areas to BLM protection.

Impacts on riparian areas from SRMA management are the same as those described for Alternative B.

Motorized off-route travel would be prohibited in areas with riparian or wetland vegetation. This would reduce the potential for impacts described above under ***Nature and Type of Effects*** (surface disturbance).

Under Alternative D, several ACECs would be maintained or designated to protect riparian and wetland vegetation, including the San Miguel River and Roubideau Corridors ACECs. The types of impacts are the same as those described under ***Alternative B, Upland Vegetation***. Under Alternative D, 16 river segments (104.6 miles) would be determined suitable for inclusion in the NWSRS. Interim protective management guidelines would provide incidental protection to riparian and wetland vegetation from surface-disturbing activities in these areas.

Weeds

Impacts from weed management are similar to those described for Alternative B. However, under Alternative D, all quarry pits would be managed as weed free for A, B, and C state-listed noxious weed species. Seed requirements for all seed used on BLM-administered lands are the same as for Alternative B.

Alternative E

Upland Vegetation

Alternative E is the agency's Proposed RMP, which is a reasonable combination of objectives and actions from the four alternatives (A, B, C, and D) presented in the Draft RMP/EIS. Protections for saline/selenium soils (CSU and SSR), steep slopes (CSU and SSR), saturated soils (TL), and potential biological soil crust on 390 acres (ROW exclusion, CSU, and SSR) would be greater than those described for Alternative A, which would reduce impacts from surface-disturbing activities. For Alternative E, steep slopes are defined as having a slope equal to or greater than 30 percent.

Vegetation management under Alternative E would emphasize maximizing native vegetation and natural processes by ensuring certain areas are within the range of natural variability. Impacts from the use of locally derived native species for revegetation would be as described for Alternative D, though Alternative E provides more flexibility when all other native revegetation options are ineffective. As a result, vegetation management would improve the likelihood for and efficiency of successful revegetation compared with Alternative A. Impacts from opening 631,060 acres to seed-collection permits would have impacts as described for Alternative C.

Land health management under Alternative E was developed based on the understanding that some vegetation communities in the Decision Area are irrevocably changed and may never meet ecological site potential, which, in some cases, can result in vegetation communities not meeting Land Health Standards despite the BLM's efforts to rehabilitate these lands. As a result, the BLM would manage most, but not all, lands in the Decision Area (80 percent of vegetation in ACECs, WSAs, suitable wild and scenic rivers, lands managed to minimize impacts on wilderness characteristics, and areas with exemplary, ancient, or rare vegetation, and 70 percent of remaining BLM-administered lands) to achieve

Land Health Standards. This would be a higher standard than Alternative A. To achieve this, the BLM would apply appropriate management prescriptions, modify, or limit activities in areas meeting Land Health Standards; however, this could result in additional lands not meeting Land Health Standards. In these areas, the BLM would require BMPs or conditions of approval that minimize vegetation impacts. By doing so, the BLM would reduce impacts from surface disturbance on vegetation.

Riparian and Wetland Vegetation

In addition to the impacts described under ***Alternative E, Upland Vegetation***, the BLM would apply CSU and SSR around major river corridors (26,990 acres of BLM surface/federal mineral estate and 1,060 acres of split-estate), within 50 feet of perennial streams, fens, and wetlands (1,740 acres of BLM surface/federal mineral estate and 2,330 acres of split-estate); CSU and SSR within 50 feet of perennial, intermittent, and ephemeral streams, riparian areas, fens, and wetlands (3,220 acres of BLM surface/federal mineral estate and 1,960 acres of split-estate); ROW avoidance around major river corridors and within 50 feet of perennial streams, riparian and wetland areas, seeps, and springs; closure of lands within 100 feet of riparian areas to mineral materials disposal; and closure to wood products collection and harvest. These measures would protect riparian vegetation and hydrologic functionality and would reduce impacts from surface-disturbing activities. The BLM would also consider acquiring riparian areas, which would minimize connectivity loss and would subject these areas to BLM protection.

Weeds

Impacts from weed management would be the same as those described for Alternative D.

Climate

Climate change management would have impacts as described for Alternative B.

Fish and Wildlife

Similarly, fish and wildlife and special status species management under Alternative E would improve and protect vegetation. Occupied habitat of known populations of federally listed species would be ROW avoidance areas. Compared with Alternative A, other closures and NSO, CSU, and SSR restrictions to protect wildlife and special status species would further protect vegetation in these areas from removal and disturbance.

Wildland Fire Ecology and Management

Fire management under Alternative E would have impacts as described for Alternative D.

Visual Resources

Under Alternative E, 151,930 acres would be managed as VRM Class I and II, over 2 times more acres than under Alternative A. Such management would provide incidental protections as described under ***Nature and Type of Effects*** (incidental protections), and there would be fewer impacts on vegetation than Alternative A.

Lands with Wilderness Characteristics

Under Alternative E, no lands with wilderness characteristics units would be managed to protect those characteristics. Instead, a slightly lower level of protection would be applied on the 18,320 acres that would be managed to minimize impacts to wilderness characteristics while managing for other uses. (This is consistent with an "Information/Briefing Memorandum for the Assistant Secretary - Land and Minerals Management" from acting BLM Director Michael Nedd, dated March 23, 2017"). In these areas, incidental protections for vegetation would result from the conservation of wilderness characteristics where possible through use of a CSU stipulation. The remaining 23,830 acres of wilderness characteristics units would be managed to prioritize other multiple uses. As such, no special protections

would be afforded to those areas, and no incidental protections of vegetation would occur, similar to Alternative A.

Forestry and Woodland Products

Impacts from forestry management under Alternative E are similar to those described for Alternative B. Alternative E provides more guidance on areas open and closed to commercial wood harvest and general wood cutting, which may reduce impacts to vegetation in some areas depending on the uses allowed. Impacts would be eliminated on the 171,970 acres that would be closed to wood product sales and harvest (over 1.5 times more acres than under Alternative A).

Livestock Grazing

The types of impacts from grazing are the same as those described under ***Nature and Type of Effects*** (vegetation manipulation, surface disturbance related to range projects, resource use). The BLM would manage 616,640 acres as available and 59,160 acres as unavailable to grazing. This apparent reduction in both available and unavailable acres from Alternative A actually reflects corrections to the existing grazing inventory and associated GIS; in reality, acres open and unavailable under Alternative E are similar to Alternative A and would have a similar potential for grazing impacts on vegetation. The temporary exclusion of grazing on disturbed areas would have the same impacts as described for Alternative C.

Fluid Leasable Minerals—Oil and Gas

Under Alternative E, the types of impacts from fluid mineral leasing are the same as those described under ***Nature and Type of Effects*** (surface disturbance). The 631,580 acres of BLM surface/federal minerals and 240,230 acres of split-estate lands (totaling 871,810 acres) that would be managed as open and closed (44,220 acres) to fluid mineral leasing would be the same as for Alternative A. Stipulations under Alternative E, including NSO and CSU, would restrict fluid mineral development in some areas. These stipulations would reduce the number of new and exploratory development wells and associated surface-disturbance from those projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d), as discussed under **Section 4.1.1**. Of the BLM surface/federal minerals acres open to fluid mineral leasing, NSO stipulations would be applied on 74,580 acres (3 times more acres than under Alternative A), and CSU stipulations would be applied on 290,880 acres (more than 2.5 times more acres than under Alternative A).

Locatable Minerals, Mineral Materials, and Nonenergy Leasable Minerals

Under Alternative E, 15,790 acres of BLM surface/federal minerals would be recommended for withdrawal from locatable mineral exploration or development (43 percent fewer acres than under Alternative A). If withdrawn, these areas would provide additional protection to vegetation from surface-disturbing activities, as described under ***Nature and Type of Effects***.

Recreation and Visitor Services

The types of impacts from recreation are the same as those described under ***Nature and Type of Effects*** (surface disturbance). The BLM would manage eight SRMAs on 122,130 acres (approximately 2.5 times more acres than under Alternative A) and three ERMAs on 64,790 acres. The emphasis within many SRMAs would be largely on nonmotorized, nonmechanized trail and Back Country activities, and other uses would be limited in these areas, which would reduce impacts as described above under ***Nature and Type of Effects***. Impacts would be more likely to occur in RMZs that are managed for motorized and mechanized trail riding, as these are associated with greater surface disturbance. Impacts would also be harder to manage in ERMAs and outside of managed recreation areas (488,870 acres) where impacts would be more dispersed.

Impacts on riparian areas from SRMA management are similar to those described for Alternative B. However, under Alternative E, the Dolores River Canyon SRMA would be 30 acres larger, and thus recreation may affect a larger amount of riparian vegetation in this SRMA.

Comprehensive Travel and Transportation Management

Open cross-country motorized use would be allowed on 3,950 acres (54 percent fewer than under Alternative A), which would cause fewer impacts such as those described under ***Nature and Type of Effects*** (surface disturbance). Areas closed to motorized travel (880 acres) or motorized and mechanized travel (55,770 acres) on a total of 56,650 acres (1 percent more acres than under Alternative A) and limited to designated routes on 615,200 acres (4 times more acres than under Alternative A) would reduce the potential for impacts associated with motorized and mechanized travel to a greater extent than under Alternative A.

Motorized off-route travel management would have the same impacts on riparian vegetation as described for Alternative D.

Lands and Realty

Management of 66,030 acres as ROW avoidance and 53,040 acres as ROW exclusion (38 percent fewer acres than under Alternative A) would reduce impacts on vegetation, as described under ***Nature and Type of Effects*** (surface disturbance), though to a lesser extent than under Alternative A. Impacts from designated utility corridors would be the same as those described for Alternative B.

Areas of Critical Environmental Concern

Six ACECs would be designated on 30,190 acres (less than 1 percent more acres than under Alternative A). Within these areas, vegetation would be directly and incidentally protected through such measures as applying an NSO stipulation, designating as ROW avoidance or exclusion, and closing lands to mineral resource development and motorized and mechanized travel.

Under Alternative E, management of the San Miguel River ACEC would have similar impacts on riparian vegetation as described for Alternative A. The size of the ACEC would be adjusted to 21,660 acres in Alternative E to further align the ACEC boundary to the relevant and important values. This was completed based on the topography of the area and facilitated by improvements in GIS mapping from when the ACEC report (**Appendix O**) was first drafted. As a result, changes in the size of the ACEC are unlikely to change the protection afforded to riparian vegetation by management of that ACEC.

Wilderness and Wilderness Study Areas

Impacts from managing the Tabeguache Area are the same as those described for Alternative B.

Wild and Scenic Rivers

Suitable wild and scenic river management would have the same impacts as described for Alternative D.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on vegetation follows fourth-order watershed boundaries that completely or partially overlap the Uncompaghre RMP Planning Area, because indirect impacts, such as increased dust, from certain activities, such as mineral development or recreation, could affect vegetation outside the Planning Area. The fourth-order watersheds were used as the basic unit of analysis because the scope of cumulative influence would be at the watershed scale and is not expected to extend beyond this scale. Noxious weeds can also be dispersed into the Planning Area by upstream waterways and carried downstream from the Planning Area.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect vegetation are mineral exploration and development, unauthorized travel, forestry, livestock grazing, recreation, road construction, ROWs, water diversions, weed invasion and spread, weed control, prescribed fire and wildfire, land planning efforts, vegetation treatments, habitat improvement projects, insects and disease, and drought. Many of these activities create conditions that cause or favor other vegetation changes. For example, wildland fire removes vegetation, which makes affected areas more susceptible to weed invasion and soil erosion. In addition, wildfire suppression in fire-adapted vegetation communities gradually shifts vegetation towards older age classes and away from a more natural age class distribution, whereas allowing natural ignitions to burn would have the reverse effect. Drought conditions reduce vegetation health, which makes it prone to insect infestation or disease. In general, resource uses have cumulatively caused vegetation removal, fragmentation, weed spread, soil compaction, and erosion. While land planning efforts and vegetation and weed treatments have reduced the level of or countered these effects in some cases, they have also been a source of vegetation degradation and fragmentation (e.g., pinyon-juniper chainings and nonnative crested wheatgrass plantings).

Climate change within the cumulative impact analysis area could increase or decrease temperatures and precipitation, which would affect soil conditions, vegetation distribution, water flows, water quality, and water temperature (Ficklin et al. 2010; Lenihan et al. 2003; McKenney et al. 2007; Hamann and Wang 2006; Eaton and Scheller 1996). Such changes would alter the conditions to which vegetation communities are adapted, potentially creating conditions that could favor certain species or communities, weeds, or pests (Hellmann et al. 2007).

Under the RMP alternatives, impacts on vegetation from resource use and development would be minimized to the extent practical and feasible through restrictions; stipulations; closures to mineral exploration and development, recreation, and motorized travel; condition of approvals; and by concentrating development in previously disturbed areas. Vegetation conditions would be improved through treatments, weed prevention and control, habitat improvements, prescribed fire and wildfire, forestry management, and proper grazing practices. In general, all alternatives would work toward achieving land health but would differ in the time and methods used to reach that goal. Alternative C would make the least progress toward improving land health compared with the other alternatives. As a result, impacts on vegetation communities would continue under Alternatives A and C, and these alternatives could substantially contribute to cumulative impacts on vegetation. Alternatives B, D, and E would likely make more progress toward improving land health and achieving vegetation objectives but would differ in the time and methods used to do so. Because Alternative E would open more areas to resource uses and thus surface disturbance, progress towards improving land health and achieving vegetation objectives would likely be slower compared with Alternatives B and D.

4.3.5 Fish and Wildlife

This section discusses impacts on fish and wildlife habitat from proposed management actions of other resources and resource uses. Habitat types are described in **Section 3.1.5** (Vegetation). Existing conditions concerning fish and wildlife and descriptions of habitat requirements for various species are described in **Section 3.1.6** (Fish and Wildlife).

Methods and Assumptions

Potential impacts on fish and wildlife could occur if anticipated future actions consistent with implementing the alternatives described in Chapter 2 were to result in any of the following:

- Disturbance to or loss of plant communities, food supplies, cover, breeding sites, and other habitat components necessary for population maintenance used by any species to a degree that

would lead to substantial population declines. This includes changes in habitat that make it nonfunctional for species or more conducive to competitive species.
- Disturbance to or loss of seasonally important habitat (e.g., critical for overwintering or successful breeding) to a degree that would lead to substantial population declines.
- Disruption of animals, including stress or interference with a species' movement pattern that decreases the ability of a species to breed or overwinter successfully to a degree that would lead to substantial population declines.
- Cause impacts specific to aquatic species and their habitats, including:
  - Increased sediment loading in waters containing sediment-intolerant fish species, loss of recruitment, stress, habitat alteration, and habitat loss
  - Changes to habitat that make it nonfunctional for species or more conducive to competitive species
  - Reduction or elimination of streamside cover, leading to increased temperatures, stress, reduced productivity, and impacts on food webs
  - Actions that alter important water quality parameters, including pH, dissolved oxygen, temperature, turbidity, metals, and other chemical constituents
  - Loss of physical habitat (e.g., water quantity), changes in water quality, sediment accumulation, habitat alteration, loss of habitat complexity, or food source reduction.
  - Potential direct mortalities from motorized travel

Indicators

Fish and wildlife resources include big game, upland game, waterfowl, raptors, migratory birds, small mammals, reptiles, amphibians, and fish, as well as their habitats. Fish and wildlife indicators include direct measurement or indices of species composition, structure, diversity, and relative abundance of fish, wildlife, and their habitats within the Planning Area, as well as distribution, pattern, and connectivity of populations and habitats. Each of these measurements reflects ecosystem function and sustainability.

Emphasis on Habitat

The BLM works closely with the Colorado Parks and Wildlife (CPW) to manage habitat for fish and wildlife to achieve and maintain suitable habitat for wildlife within the Planning Area. The CPW is directly responsible for managing population levels, while the BLM is responsible for managing fish and wildlife habitat quantity and quality in a condition that will sustain desired levels of species. Population data are tracked by the CPW for game animals and, increasingly, for key nongame species. For some species, the BLM assists the CPW in collecting this information.

The principal indicator for fish and wildlife used by the BLM is habitat condition based on plant community attributes and a site's capacity to sustain native wildlife species. Within this framework, the BLM focuses on key animal species and their habitats. Indicators of habitat condition include plant species composition, cover, vigor, production, and browse levels and animal indices, such as wildlife sign, including scat, tracks, and nests, and animal health.

Land Health Assessments

Land health assessments[5] employ both quantitative and qualitative methods for evaluating land health standards for wildlife and habitats. While all of the standards ultimately benefit wildlife and habitats, Standards 2, 3, and 5 specifically address wildlife, fish, and their habitats. Standard 2 addresses riparian and aquatic habitats, Standard 3 addresses wildlife communities and terrestrial habitats, and Standard 5

[5] Land health assessments from 1998 to 2014 were conducted with a determination category of "meeting with problems." Beginning in 2018, all land health determinations are conducted according to current BLM manuals and handbooks.

addresses water quality and aquatic condition. Special status species fall under Standard 4 and are addressed in **Section 4.3.6** (Special Status Species).

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- If monitoring reveals that mitigation would be unsuccessful in precluding significant impacts, immediate measures to prevent further impacts would be implemented as appropriate to the species affected before the accumulation of impacts on a level of significance.
- Disturbance of a key or critical component of a species habitat would be detrimental, with the degree of detriment depending on the importance of the habitat component to the maintenance of the population.
- Wildlife habitat needs vary substantially by species. It is generally true, however, that healthy and sustainable wildlife populations can be supported where there is a diverse mix of native plant communities with multiple seral stages to supply structure, forage, cover, and other specific habitat requirements. Managing for a diverse mix of native plant communities is thus an important component of managing for a diversity of species.
- Habitat conditions and quality are directly linked to the health, vigor, and cover of vegetative communities, particularly desired are those native plant communities that fish and wildlife species depend on, as well as soil conditions and water quality and quantity.
- Impacts on populations exceeding current carrying capacity that would not reduce those populations below carrying capacity would not be considered significant.
- Impacts on terrestrial wildlife from displacement depend on the location, extent, timing, or intensity of the disruptive activity. Furthermore, impacts from displacement would be greater for wildlife species that have limited habitat or a low tolerance for disruption and disturbance.
- Habitat would be managed in coordination with CPW herd objectives and species-specific plans.
- Currently, sufficient habitat exists to maintain CPW data analysis unit objectives for game species across the Uncompahgre RMP Planning Area.
- Human disruption would displace wildlife beyond the actual disruption/disturbance footprint, although some wildlife could adapt over time, depending on the nature of the disruption and the species being impacted.
- Short-term effects would occur over 2 years or less, and long-term effects would occur over longer than 2 years.
- In the context of this analysis, "avoidance" means reduced use and does not imply an absence of use by wildlife.

Nature and Type of Effects

Fish and wildlife habitats on Decision Area lands would be affected under all alternatives. Changes to fish and wildlife habitats would be caused by the following three types of disturbances: disruption from casual use; disruption from permitted activities; and disturbance to habitat condition, which is directly linked to vegetation conditions and water quality and quantity (**Section 4.3.4** and **Section 4.3.3**).

Casual uses, such as recreation and motorized vehicle use, are not subject to site-specific environmental review and monitoring requirements. Some species may adapt to disturbances over time and could recolonize disturbed habitats. Impacts are more likely to occur in easily accessible areas, where visitation would be high, and in areas open to intensive motorized use. Impacts would still occur in areas limited to designated routes due to noise disturbance, human presence, potential for weed spread and habitat degradation, and potential for injury or mortality to wildlife from vehicle collisions. In general, the more acres of routes that are designated in the Planning Area, the greater the likelihood of habitat fragmentation and disturbance to species and habitats.

Both short-term loud noise (such as from vehicles or construction) and long-term low-level noise (such as from industrial uses) cause stress responses in animals with variable responses among species and individuals (Radle 2007; Barber et al. 2009). Impacts would be both short and long term, depending on the type and source of noise.

Managing recreation within SRMAs is generally likely to cause greater impacts on fish and wildlife in these areas because SRMAs concentrate recreational activities in a specific area, and SRMA management emphasizes recreation over other uses. Impacts would result from noise, human presence, and habitat disturbance, which could alter fish and wildlife use of certain areas. Management tools, such as designated campsites, permits, area closures, and duration of use limits, would help reduce impacts to some degree. For example, seasonal route closure would prevent impacts on species during sensitive or critical times of the year, such as during winter or birthing. Recreation in ERMAs would generally cause fewer impacts, because recreation would be more dispersed in these areas, and lands would be managed with recreation having the same importance as other resources. There may be localized impacts on fish and wildlife in ERMAs, but not likely as great as within SRMAs.

Permitted surface-disturbing activities, such as conventional and unconventional mineral development and ROWs, potentially result in short-term direct impacts through mortality, injury, displacement, and noise or human disturbance caused by increased vehicle traffic and heavy machinery use. Long term, these activities can remove and fragment habitats due to construction of roads and facilities. Infrastructure, such as overhead transmission lines, provides perches for avian species, and thus may increase predation pressure on their prey. ROW avoidance and exclusion areas would be managed to reduce or avoid habitat impacts, and utility corridors would be used to concentrate utility and facility development and reduce disturbance and habitat loss and fragmentation.

Disruption from permitted surface-disturbing activities could impact fisheries by altering the hydrology and sediment regimes that can change channel form and sediment inputs (Dauwalter et al. 2008). Increasing sediment and turbidity in fish-bearing aquatic environments could result in stress, habitat alteration and loss, and loss of population growth. Increased sediment and turbidity would impact individual species differently, depending on their habitat needs and tolerance to turbidity. Increased sediment is more likely to impact species in the higher gradient stream reaches, which are generally less turbid than the lower gradient stream reaches (Dauwalter et al. 2008).

As described further in **Section 4.3.6**, fluid mineral development results in water depletions, which can then impact aquatic species. While fish and aquatic wildlife would not be directly affected, depending on the source of water and quantity used, water depletions would reduce the amount of water available to them, decrease the amount and quality of spawning and nursery habitat, increase the likelihood of water quality issues, and increase their vulnerability to competition and predation by nonnative fish (USFWS 2017).

During oil and gas production, wastewaters are most often injected back into deep water aquifers by means of designated disposal wells. However, there is a potential for accidental releases, which could result in water quality alterations, specifically increased concentrations of salts and total dissolved solids (Farag and Harper 2013). Large salt concentrations may disrupt ion balance and can result in toxic impacts on aquatic organisms.

Roads, mineral developments, and off-road recreation have been shown to affect terrestrial wildlife, particularly big game species (Wisdom et al. 2004; Rowland et al. 2004; Trombulak and Frissell 2000). Impacts on habitat may include weed spread, reduced water quality, habitat degradation, and fragmentation. Habitat fragmentation, whereby continuous habitat is subdivided into smaller pieces, results in loss of some original habitat, reduction in habitat patch size, and increased isolation of habitat

patches (Andren 1994). Such fragmentation of habitats alters the distribution of wildlife species across the landscape and affects life functions such as feeding, courtship, breeding, and migration (Wilbert et al. 2008). Impacts may be lower on species that are habitat generalists, as they are able to utilize different habitat types and thus may not be as affected if the habitat is changed or fragmented (Andren 1994).

Direct impacts on animals from roads, mineral developments, and off-road recreation may include injury or mortality, habitat avoidance, increased movement rates, and probabilities of flight response (Wisdom et al. 2004), as well as increased daily movements and home range (Rowland et al. 2004). Increased movement results in increased energy demands and could reduce fitness or reproduction if these demands are not met. For some species, such effects may extend to over a mile (Wyoming Game and Fish Department 2010). Hebblewhite (2008) reviewed other studies and found an average 0.6-mile avoidance response by big game from human disturbance. Powell (2003) found that elk avoided areas less than 0.3-mile from human development in the fall, winter, and spring. Impacts are greater in areas with high densities of well pads, roads, and facilities and areas of high traffic (Wyoming Game and Fish Department 2010).

ROW impacts can include bird and bat mortality or injury from electrocution or collision with transmission lines or other structures; collision hazards are most acute in areas where bird or bat use is concentrated for feeding or migration. Degradation of habitat can occur by vegetation and soil disturbance and invasive plant spread. Tall structures in open habitats can provide nest sites and hunting perches beneficial to raptors and other birds but could increase raptor predation on some wildlife species. Impacts would be reduced by siting ROWs in corridors and requiring stipulations where needed, such as installing flight diverters in bird concentration areas and adhering to Avian Power Line Interaction Committee (2006) guidelines for minimizing bird electrocution hazard.

Energy development and mining in the Planning Area is likely to include primarily exploration and mining of fluid minerals (oil and gas), coal, and uranium/vanadium. Limited wind or solar developments may also be permitted. Surface mining, other than small mines for mineral materials, such as sand and gravel or dimension stone, are not likely in the Planning Area. Underground mining can cause impacts on fish and wildlife from surface exploration, noise, dust, increased traffic on existing roads, and the construction and operation of new roads, facilities, waste rock storage areas, pipelines, utility lines, and surface vents. Underground mines may cause surface subsidence up to several feet, with disturbance to the natural land surface, vegetation, and hydrology and water quality. Venting methane gas into the air is commonly necessary in coal mines. In the case of a surface coal mine, topsoil would be stockpiled for reclamation as mining progresses. Oil and gas development causes relatively small site disturbance at individual well pads but generally occurs over wide areas and results in networks of new roads, pipelines, and other facilities. Hydraulic fracturing could disturb surface water and groundwater hydrology and impact water quality.

The impacts on fish and wildlife from energy development and mining are those associated with industrial developments, roads, utilities, and increased traffic described above. Direct and indirect habitat losses and fragmentation are most significant when the operations occur in specialized or sensitive habitats, or the development is widespread, as it is for oil and gas leasing. Big game and nesting raptors are among species that appear to have special sensitivities to widespread energy development. In Wyoming, mule deer were less likely to use habitat within 1.7 to 2.3 miles of well pads, suggesting that indirect habitat loss is substantially greater than direct habitat loss (Sawyer et al. 2006). Other studies have found that distances of wintering mule deer concentrations from well pads and roads averaged 0.44 to 2.30 miles and 0.27- to 0.60-mile, respectively (Sawyer et al. 2006). Well pads and roads generally reduce the presence of elk and other big game within 0.5- to 1.0 mile (see description of roads above). Greater sage-grouse in Wyoming and Montana have shown reduced lek attendance and nesting up to a mile of well pads and associated roads (Knick and Connelly 2011). Wastewater pits at drilling or mining

sites could injure or kill birds, bats, and other wildlife attracted to the surface water. Birds that contact oil or other pollutants in pits could die or be injured from ingesting contaminants or from incurring reduced feather functions. Bats and other wildlife could also die or be injured from ingesting or coming into contact with contaminants.

If used, pipeline boring activities to cross roads or streams during construction phases could include a "frac-out," which is caused when excessive pressure builds up, forcing drilling mud to the surface (Department of Fisheries and Oceans 2007). A frac-out would result in short-term displacement of terrestrial and aquatic wildlife or habitat avoidance as a result of excessive mud (terrestrial) or increased sediment and turbidity, as well as reduced water quality (aquatic). Activities associated with stream borings could also result in bank destabilization in the short term. In the long term, fish and wildlife species and their habitat would be at risk of hazardous materials contamination in the event of a pipeline rupture.

The greater the area that is open to leasing and development, the more likely impacts, such as habitat fragmentation and avoidance described above, are to occur. Application of NSO, NGD, CSU, SSR, and TL stipulations would limit surface disturbance and associated impacts on varying degrees in certain areas. During the permit application process, the BLM would provide site-specific environmental analysis and apply appropriate mitigation to authorizations to avoid and minimize impacts on fish and wildlife. In addition, special designations or other specially managed areas that restrict surface disturbances would maintain existing fish and wildlife habitats and retain habitat connectivity, allowing fish and wildlife to move undisturbed across the landscape.

Fish and wildlife habitat could be affected by vegetation and weed management, and forest and woodland thinning or harvest. Vegetation treatments may be applied for wildfire/fuels management and livestock forage improvement, to improve ecosystem health, to benefit specific wildlife species, or for some combination of these reasons for multiple benefits. Overall, the BLM would aim to achieve or trend toward achieving BLM Colorado Public Land Health Standards 2 (Riparian Systems) and 3 (Healthy Productive Plant and Animal Communities), which would improve habitat values for fish and wildlife. Short-term losses in habitat typically occur, followed by long-term improvement in habitat values as the desired vegetation develops.

Livestock grazing would be permitted on most Decision Area lands. Livestock grazing can affect fish and wildlife by impacting vegetation, soils, and streams, water developments and other range improvements; by disruptive activities necessary for construction, maintenance, and monitoring of facilities; and by disease transmission to wildlife. Livestock grazing removes herbaceous vegetation, which can reduce wildlife food and cover, thermal protection, and nest sites. Livestock grazing can also cause long-term shifts in vegetation community structure due to selective removal of certain plants, trampling and soil compaction, and spread of invasive plants. Such vegetation community shifts tend to be most pronounced and most difficult to correct in lower-elevation arid sites. Grazing can also affect riparian vegetation and water quality in streams by bank destabilization from livestock trampling and browsing on palatable riparian shrubs and by increased downcutting of destabilized streams, resulting in loss of subirrigated riparian areas bordering streams.

Water developments, such as constructing stock ponds and piping springs to tanks, can benefit wildlife by providing additional drinking water sources and aquatic and riparian habitat, but this could also adversely impact wildlife by introducing invasive plants or altering natural spring and seep habitats. Water developments may also impact wildlife movement patterns, and concentrated livestock use around ponds often results in degraded vegetation and increased weeds. Because stock ponds are usually subject to heavy trampling and large fluctuations in water levels, they usually do not provide aquatic or riparian habitat of similar quality to natural ponds. Seeding rangelands with nonnative plants,

such as crested wheatgrass, can adversely impact wildlife. Crested wheatgrass has been established in the past over wide areas of the Planning Area; it tends to dominate bunchgrass communities and outcompetes other native species and provides less forage value and structural diversity for ground-dwelling wildlife and their invertebrate prey. Fences to manage livestock are common throughout the Planning Area and can impede wildlife movements and injure or kill birds from collisions and young big game animals from entanglement. Disease transmission by livestock to wildlife is a concern in the Planning Area for desert and Rocky Mountain bighorn sheep, discussed in **Section 4.3.6** (Special Status Species).

Unplanned fire ignitions could cause short- or long-term damage to habitats, depending on the seral type affected and fire extent and severity, especially in the lower-elevation, more-arid sites. In the short term, fire removes forage and cover, and bare areas are susceptible to erosion and invasive weeds, which can significantly degrade aquatic habitats. In the long term and when they occur within the historic range of variability, wildland and prescribed fires improve habitat for most wildlife species by increasing vegetation structural diversity at both site and landscape scales. The BLM fire management program generally benefits fish and wildlife habitat and populations in the Planning Area by restoring natural fuel loads and fire frequencies and by improving vegetation structure.

Management actions to protect cultural and visual resources generally restrict surface-disturbing activities and provide beneficial impacts on fish and wildlife populations and habitats. VRM Classes I and II, which preserve or retain the existing character of the landscape, would restrict surface-disturbing activities, reduce direct impacts on fish and wildlife, and retain habitats. Areas managed as VRM Class III or IV would be subject to actions that allow for greater landscape modification and therefore greater surface disturbance. Lease notices and condition of approvals would be applied where necessary to protect resources, reducing impacts on fish and wildlife and their habitats. Management to protect wilderness characteristics in WSAs restricts site disturbance and motorized and mechanized travel, and similarly benefits fish and wildlife by minimizing disturbance and habitat loss.

Ecological emphasis areas would protect fish and wildlife species and habitats in several ways. These areas identify the most important remaining examples of native vegetation and wildlife habitat, and provide the basis for establishing protections for these areas. These areas are chosen to represent the most significant examples of high-quality vegetation communities and wildlife habitats in terms of size and location on the landscape, and also to provide connections across the landscape for short-term movement of wildlife and for long-term shift of plant and animal communalities in response to climate change.

ACECs protect fish and wildlife species and habitats in several ways. They can be recommended for withdrawal from locatable mineral entry, managed as ROW exclusion or avoidance areas, or managed for no net increase in travel routes. These special management prescriptions provide broad protection from habitat loss and help to protect and restore land health and ecosystem processes.

Realty actions, including land exchanges and disposals, could adversely impact fish and wildlife if key habitats were removed from BLM management. However, real estate actions receive environmental review under NEPA and generally would be authorized only where no significant impacts are identified.

Effects Common to All Alternatives

Five WSAs (36,160 acres) and the Tabeguache Area (8,060 acres) would be managed under all alternatives. These areas would be managed as ROW exclusion, closed to mineral resource leasing and development, and closed to wood cutting, product sales, and harvest. In addition, the Tabeguache Area would have SSR restrictions applied; this would reduce impacts on fish and wildlife by providing broad protection from habitat loss and helping to protect and restore land health and ecosystem processes.

Future projects will comply with the recovery goals and associated recommended flows of the Upper Colorado River Endangered Fish Recovery Program (2017).

Implementing management for the following resources would have negligible or no impact on fish and wildlife and are therefore not discussed in detail: wild horses, cultural resources, paleontological resources, national trails and byways, Native American tribal uses, and public health and safety.

Alternative A

In general, Alternative A would rely on management guidance that would not reflect current conditions and issues and would lack a landscape-level approach to land planning. Alternative A management direction for fish and wildlife focuses more on single-species management and provides less direction on protecting species and habitat diversity, intact ecosystems, and ecosystem processes. Ecological emphasis areas would not be identified and used to guide management and planning to protect special wildlife and fish habitats, protect landscape-scale ecosystem processes, integrate management of BLM-administered lands with management of adjacent lands, and help manage impacts from climate change.

The minimal restrictions on fluid mineral development would result in a reasonably foreseeable development scenario similar to that projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**. NSO (24,890 acres), CSU (110,180 acres), and TL (423,900 acres) stipulations would continue to be attached to oil and gas leases, and management emphasis for wildlife and fish would continue to be defined for some areas with important fish and wildlife values. However, planning and prioritization would lack the regional focus provided by ecological emphasis areas, and fish and wildlife habitats would continue to be managed with less recognition of regional contexts. As a consequence, there would be impacts on fish and wildlife indicators, including abundance, species diversity, distribution, population connectivity, and habitat conditions.

The five ACECs would remain, totaling 30,000 acres. Compared with the other alternatives, Alternative A would provide the least amount of Planning Area closed to fluid mineral leasing (44,220 acres) and generally less restrictive stipulations controlling surface-disturbing activities. For example, 27,690 acres recommended for withdrawal from locatable mineral entry, 85,080 acres identified as ROW exclusion, and cross-country travel motorized use would be allowed on 8,560 acres. As a consequence, Alternative A is likely to result in greater impacts on fish and wildlife and their habitats than the other alternatives.

For big game, Alternative A emphasizes wildlife management for some areas (primarily but not entirely to benefit big game), and provides direction to work with CPW to manage numbers for mule deer and elk, including reductions in some areas to resolve forage conflicts with livestock. The BLM would continue to work with CPW to identify appropriate herd objectives and key winter and birthing habitats and to seek cooperative funding for projects to improve habitats. Some planning objectives provide direction on allocating herbaceous forage between wildlife and livestock. Site-disturbing activities are prohibited in CPW-defined crucial winter ranges for mule deer, elk, pronghorn, and bighorn sheep, from December 1 to April 30, and in birthing areas for elk, pronghorn, and bighorn sheep during periods that vary by species.

Alternative A restricts motorized travel in elk birthing areas only in the Storm King area. Reintroduction of bighorn sheep is specified as a goal in the Winter Mesa and Dolores River areas. These actions would benefit these species.

For small game and nongame species, management emphasis is on special status species with no specific direction other than the BLM Colorado Public Land Health Standards (BLM 1997) to protect ecosystem integrity to sustain the potential biological diversity in the Planning Area. For migratory birds, direction

is to avoid large-scale disturbances in important bird habitats from May 15 to July 15, focusing on the US DOI Fish and Wildlife Service (USFWS) Birds of Conservation Concern. As a result, impacts on these species' habitats could occur, such as increasing invasive plants, declining structural and age-class diversity in some shrublands, and other landscape-scale trends.

For non-special status raptors, nests and breeding habitat are protected by NSO and TL stipulations at various distances, with NSO within 0.125-mile of active nests. These protections are less than the current CPW-recommended buffers for some species (CPW 2008a).

For aquatic species, Alternative A focuses on the management of sport fish over native fish and provides direction to maintain, improve, or enhance resource conditions associated with cold-water stream aquatic/riparian habitat. Objectives are to manage riparian areas, make structural stream improvements, and restore vegetation to improve aquatic habitat in seven streams designated for priority and to specifically manage sport fisheries habitat, primarily in the San Miguel and Dolores Rivers and their tributaries. No TL stipulation would be applied to protect cold-water sport fish and native fish from stream work or recreational mining during spawning, which could result in impacts on these species.

Alternative B

In general, compared with the other alternatives, Alternative B would provide the greatest protection for fish and wildlife and their habitats by implementing the greatest emphasis on ecosystem integrity and providing the most restrictions on surface-disturbing activities and other human uses that impact fish and wildlife. Goals are established to preserve, enhance, restore, and promote aquatic and terrestrial ecosystem integrity. Goals and objectives for aquatic resources emphasize native fish and cold-water sport fish. For terrestrial resources, the emphasis is on native nongame species, while allowing for habitat improvements for native game species. Alternative B would have the fewest impacts on most terrestrial and aquatic species.

Restrictions on fluid mineral development would result in fewer new and exploratory development wells drilled and associated surface-disturbance than Alternative A. Ecological emphasis areas would be identified and used to guide management and planning to protect core wildlife and fish habitats, to protect landscape-scale ecosystem processes, to integrate management of BLM-administered lands with adjacent lands, and to help manage impacts from climate change. Ecological emphasis areas are managed to take advantage of BLM land designations, such as ACECs and WSAs, adjacent protected areas on National Forest System lands, State Wildlife Areas, and private land conservation easements and on natural terrain features, such as drainages that help to enable animal movements across the landscape. Alternative B would create the most ecological emphasis areas (12), covering the most area (242,580 acres), and would provide the greatest protections from use impacts, with 186,070 acres of ROW exclusion and 207,310 acres with NSO stipulations (239,320 acres under Alternative B.1). As a consequence, compared with Alternative A, Alternative B would have reduced impacts on most fish and wildlife species. Within these special areas, it would provide the greatest protections for wildlife and reduced habitat fragmentation at the landscape level. Alternative B.1 would be more protective of fish and wildlife species in the North Fork area.

Alternative B provides the greatest number of ACECs (15) and area (215,940 acres), broadly distributed to include a diversity of habitat types for fish and wildlife. ACEC protections are the same for Alternatives B, C, and D and include ROW exclusion areas, mineral withdrawal, and closure to energy and mineral leasing and disposal. These ACEC designations provide important protections for core habitats for many fish and wildlife species, and impacts on fish and wildlife from most authorized uses would be least under Alternative B.

Alternative B provides the most restrictions on surface-disturbing activities. For instance, cross-country motorized use would not be allowed within the Decision Area, 114,970 acres would be closed to motorized (12,180 acres) and motorized and mechanized use (102,790 acres) (twice as many acres as under Alternative A), and 560,830 acres would be limited to designated routes (nearly 4 times more acres than under Alternative A). The BLM would manage 195,460 acres as ROW avoidance and 431,040 acres as ROW exclusion areas (5 times more acres than under Alternative A). As a consequence, impacts on fish and wildlife from these uses would be least for this alternative.

Alternative B would create the most SRMAs (12 SRMAs on 246,760 acres, 5 times more acres than under Alternative A). Types of impacts are described under ***Nature and Type of Effects***. All of the SRMAs overlap with important fish and wildlife habitat. For example, ten SRMAs overlap ecological emphasis areas (98,620 acres) and all SRMAs overlap critical big game winter range (205,840 acres). Seven SRMAs (North Delta, Jumbo Mountain, Roubideau, Dry Creek, Spring Creek, Kinikin, and Ridgway Trails) overlap big game crucial winter range on BLM-administered lands. Attracting and promoting recreation to these areas may have significant impacts on fish and wildlife, particularly through disruption of big game and other wildlife species that are sensitive to human presence and noise.

For big game, Alternative B would continue to provide management direction to protect and enhance crucial habitats. It provides a goal of improving at least 500 acres of wildlife habitat per year, for both nongame and game species. The objective for wildlife population management, of which big game is a major emphasis, is to develop a strategy with CPW to manage wildlife population numbers in a manner that meets BLM habitat objectives and BLM Colorado Public Land Health Standards (BLM 1997). Compared with Alternative A, which provides specific herd objectives for mule deer and elk, Alternative B provides more flexible guidance that would better allow the BLM to adapt to changing conditions and collaborate more closely with CPW on big game population objectives. Alternative B does not provide, as Alternative A does, objectives to allocate herbaceous forage in certain areas to wildlife versus livestock. Instead, Alternative B addresses the forage allocation issue by objectives for ecosystem management and achievement of BLM Colorado Public Land Health Standards (BLM 1997), providing a broader framework than single-species management that better addresses the needs of all wildlife and natural processes.

The TL stipulation for big game on crucial winter ranges provides more protection than Alternative A (495,360 acres, 2 times more than under Alternative A), with a more specific definition that prohibits "disruptive activities" and extends winter seasons for moose and bighorn sheep. The TL stipulation for big game birthing areas also provides more protection than Alternative A, with extended definition, addition of moose, and extended protection dates, though it would be applied over a slightly smaller area. Reestablishment of bighorn sheep populations is allowed in any suitable and historic habitat where domestic sheep and goats are not present. This provides more opportunities for bighorn sheep restoration than Alternative A, which limits reestablishment to Winter Mesa. Alternative B also provides a CSU and SSR stipulation to protect bighorn sheep summer ranges (39,530 acres), a protection lacking in Alternative A.

For small game and nongame terrestrial species, important emphasis would be given to managing for ecosystem diversity, productivity, viability, and natural processes through the use of vegetation mosaics. A TL stipulation would protect wild turkey from disturbance in winter habitat from December to April (18,030 acres), a protection lacking in Alternative A. For migratory birds, the TL stipulation prohibiting disturbance in breeding habitats for USFWS Birds of Conservation Concern and Partners in Flight species (675,800 acres) provides significantly more protection than under Alternative A and would lessen impacts from site-disturbing activities and recreation.

For non-special status raptors, active nests and breeding habitat are protected by TL and NSO stipulations similar to Alternative A, but with the addition of a CSU/SSR stipulation applicable within 0.50-mile of active nests. This would increase the protection of nesting raptors and breeding habitat from disturbance by most actions and would result in fewer impacts on raptors, compared with Alternative A. Under Alternative B.1, an NSO would be applicable within 0.25-mile of any active or historic bald eagle or golden eagle nest site, and within 0.50-mile of any active or historic peregrine falcon nest site. This would further protect these species within the North Fork area. Alternative B.1 also includes an NSO on mule deer and elk crucial winter range, including severe winter range and winter concentration areas, and in elk reproduction areas, as well as in big game migration corridors, which would further protect big game within the North Fork area. The NSO for big game and the raptors would be applied on 14,640 acres (an additional 49,600 acres of this habitat type would be closed to leasing because of other resources).

For aquatic species, an objective to annually restore or protect at least 5 miles of aquatic habitat with emphasis on native nongame fish would be beneficial to native fish. Management would focus on protecting native fish habitat and restoring native fish species where appropriate. Priorities for management would be based on CPW conservation and management priorities. A TL stipulation to protect cold-water sport fish and native fish from stream work during summer and fall spawning (4,170 acres) would result in fewer impacts on fish, compared with Alternative A.

Alternative C

In general, Alternative C provides the least protection of the action alternatives for aquatic and terrestrial wildlife by emphasizing resource uses. Goals and objectives for fish and wildlife would stress maintenance of current ecosystem integrity and productivity, with less emphasis on restoration. Emphasis would be given to sport fish and upland game species.

The minimal restrictions on fluid mineral development would result in a reasonably foreseeable development scenario similar to that projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**.

Alternative C would create two ecological emphasis areas, covering 24,150 acres, with no ROW exclusion areas, and with ROW avoidance areas and CSU/SSR stipulations throughout the ecological emphasis areas. Alternative C would have reduced impacts on most fish and wildlife species by providing some protections and habitat connectivity compared with Alternative A, but is the least protective of the action alternatives.

Except for Tabeguache Creek, the same ACECs would be designated as in Alternative A, although protections would differ. Some protections would be similar to those prescribed under Alternative B and represent increases in protection over Alternative A. Other protections under Alternative C would be less restrictive than Alternative A. For example, the Fairview and Adobe Badlands ACECs would have a CSU stipulation in Alternative C and an NSO in Alternative A. Also, all ACECs are closed to mineral material disposal in Alternative A, and none are in Alternative C.

Among the action alternatives, Alternative C provides the least restrictions on other surface-disturbing activities. For instance, open cross-country motorized use would be allowed on 16,070 acres (88 percent more than under Alternative A), 45,170 acres would be closed to motorized use (20 percent fewer acres than under Alternative A), and 614,560 acres would be limited to designated routes (4 times more acres than under Alternative A). The BLM would manage 210,390 acres as ROW avoidance and 44,550 acres as ROW exclusion areas (48 percent fewer acres than under Alternative A). Overall, this alternative provides restrictions similar to, and sometimes less than, Alternative A. As a consequence, impacts on fish and wildlife from these uses would be greatest among the action

alternatives and similar to Alternative A. This alternative provides the most ERMAs (12 ERMAs on 215,880 acres) for recreation management, which would result in reduced impacts on most fish and wildlife species and their habitats from recreation compared with Alternative A for reasons described under ***Nature and Type of Effects***.

Alternative C would provide the most emphasis on game species, with a goal of enhancing at least 3,000 acres per year of wildlife habitats, focusing on crucial habitats for game species. Wildlife population objectives, which are established primarily for big game, are the same as for Alternative B and provide better management opportunities than Alternative A. Forage allocation between wildlife and livestock is addressed as in Alternative B.

The TL stipulation for big game crucial winter ranges (493,360 acres, 2 times more than under Alternative A) has a definition of prohibited actions similar to Alternative A. It applies only to mule deer and elk (removing the winter protection that Alternative A provides to pronghorn and bighorn sheep) and reduces the protection period by 2 months, from January 1 to March 31. Similarly, the TL stipulation for big game birthing areas (3,020 acres, 33 percent fewer acres than under Alternative A) applies only to elk (removing the birthing area protection under Alternative A for pronghorn and bighorn sheep), and the protection period is shorter than under Alternative A. The less-restrictive TL stipulations for big game winter habitats and birthing areas would cause greater impacts on big game overall, and particularly on pronghorn and bighorn sheep, from surface-disturbing activities and disruptive activities, such as recreation. Unlike other alternatives, no actions target reestablishing bighorn sheep populations.

For small game and nongame terrestrial species, emphasis would be given to special status species and maintaining ecosystem conditions. Migratory birds would be protected to the extent required by the Migratory Bird Treaty Act and by general ecosystem management practices. Additionally, notification of Migratory Bird Treaty Act requirement would be conveyed to potential lessees. This represents some improvement over Alternative A, but the least protection of the action alternatives.

For non-special status raptors, active nests and breeding habitat are protected by a CSU stipulation applicable within 330 feet of active nests. This protection is less stringent than under Alternative A, and recommended buffer distances around the nests of most raptor species are considerably greater than 330 feet (CPW 2008a). Therefore, Alternative C would likely result in greater impacts on nesting raptors from disturbance and could reduce populations or contact ranges for some raptor species, compared with Alternative A.

For aquatic species, sport fisheries would be emphasized over native fish conservation and management. At least 2 miles of aquatic habitat would be improved annually, with emphasis on sport fish species and popular fisheries. Sport fisheries goals are the same as for Alternative A. A TL stipulation to protect cold-water sport fish from stream work during summer and fall spawning (4,170 acres) would reduce impacts on sport fish, compared with Alternative A, but would have the same impacts on native fish as Alternative A.

Alternative D

Alternative D would provide substantial protection and enhancement of fish and wildlife populations and their habitats. It also would provide for significantly fewer impacts on fish and wildlife than would Alternative A. Overall objectives for fish and wildlife are similar to those of Alternative C: to restore, enhance, conserve, and promote aquatic and terrestrial species conservation and ecosystem integrity with the use of vegetation mosaic objectives. The overall emphasis is on native species management, with objectives for ensuring habitat diversity, productivity, and viability, and on promoting ecosystem processes.

The restrictions on fluid mineral development would result in a reduction in the number of new and exploratory development wells and associated surface-disturbance from those projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**.

Alternative D would create 12 ecological emphasis areas, covering 177,700 acres, with no ROW exclusion areas, and with ROW avoidance areas and CSU/SSR stipulations throughout the ecological emphasis areas. ROW avoidance areas provide less protection for ecological emphasis areas than ROW exclusion areas, because ROWs would be allowed in ecological emphasis areas with siting restrictions to reduce impacts on fish and wildlife. Because ROWs are often linear and may extend for many miles, they may fragment habitats depending on where they are sited. Despite these limitations, this alternative would have reduced impacts on most fish and wildlife species by providing habitat protections and improved connectivity compared with Alternative A.

ACECs would be increased to eight, covering 51,320 acres, and protections would be the same as for Alternatives B and C. This would be a significant increase over Alternative A in the number of areas and the extent of protected area and diversity of habitats protected, resulting in fewer impacts from authorized uses.

Overall, Alternative D provides more restrictions than Alternative A on surface-disturbing activities. For instance, open cross-country motorized use would not be allowed, 58,560 acres would be closed to motorized (1,160 acres) and motorized and mechanized use (57,400 acres) (4 percent more acres than under Alternative A), and 617,240 acres would be limited to designated routes (4 times more acres than under Alternative A). BLM would designate 276,500 acres of ROW avoidance and 53,700 acres of ROW exclusion areas (37 percent fewer acres than under Alternative A). As a consequence, Alternative D would generally cause fewer impacts on fish and wildlife than Alternative A.

Under Alternative D the BLM would manage seven SRMAs and four ERMAs. Types of impacts are described under ***Nature and Type of Effects***. Some of the SRMAs (seven) overlap with important fish and wildlife habitat. For example, five SRMAs overlap ecological emphasis areas (66,390 acres), and seven SRMAs overlap critical big game winter range (106,970 acres). Four SRMAs (Roubideau, Dry Creek, Spring Creek, and Ridgway Trails) overlap big game crucial winter range on BLM-administered lands. Attracting and promoting recreation to these areas may have significant impacts on fish and wildlife, particularly through disruption of big game and other wildlife species that are sensitive to human presence and noise.

Alternative D would continue to provide for habitat protection and enhancement of game and nongame species, with objectives to enhance wildlife habitats by ecosystem management and sustaining natural processes. With less focus on single-species management, Alternative D provides the most focus on maintenance of species diversity, while still providing crucial habitats for game species.

Wildlife population objectives, which are established primarily for big game, are the same as for Alternative B and provide better management opportunities than Alternative A. Forage allocation between wildlife and livestock is addressed as in Alternative B.

The TL stipulations for big game crucial winter ranges and birthing areas include moose and a prohibition of disruptive activities; winter dates are the same as under Alternative A, except the dates are extended to November 1 to April 30 for bighorn sheep. The TL stipulation for big game birthing areas is the same as under Alternative B but with wider date ranges, which would benefit these species.

Overall, the protections for big game winter ranges and birthing areas are more extensive and inclusive than Alternative A and would result in fewer impacts on big game from surface-disturbing activities and

particularly disruptive activities, such as recreation. The allowance of bighorn sheep reestablishment into suitable and historic habitats, either where domestic sheep and goats are not present or where the Risk of Contact Model (or currently accepted model) predicts no high or moderate risk of disease transmission, is a significant improvement in bighorn sheep management over Alternative A and would allow for more effective restoration of bighorn sheep and management of disease transmission risk. Alternative D also provides a CSU/SSR stipulation to protect bighorn sheep summer ranges (39,530 acres), a protection lacking in Alternative A.

Small game and nongame terrestrial species would benefit from the protection and enhancement of ecosystem diversity and integrity. For most species and habitats, impacts are similar to those under Alternative B. A TL stipulation would protect wild turkey from disturbance in winter habitat from December to April (18,030 acres), a protection lacking in Alternative A. Migratory birds would be managed similar to Alternative C, providing more protection and less impact on migratory birds than Alternative A.

For non-special status raptors, active nests and breeding habitat are protected by TL and NSO stipulations similar to Alternative B but with buffer distances and applicable dates more tailored to sensitivities of individual species. An NSO/SSR stipulation would apply within 0.25- to 1.0 mile of nests, depending on species, and a CSU/SSR stipulation would apply within 1.0 mile of active nests to protect breeding habitat. The stipulations would increase the protection of nesting raptors and breeding habitat from disturbance by most actions, and would result in fewer impacts on raptors, compared with Alternative A.

For aquatic species, management emphasis is on a mix of cold-water sport fisheries and native fish management by promoting aquatic ecosystem health. Fish passage barriers and riparian vegetation management would be considered for management and improvement. Sport fisheries objectives are the same as for Alternative B. A TL stipulation to protect cold-water sport fish and native fish during spring spawning (4,170 acres) is applicable to stream work and recreational mining and would result in less impact on sport and native fish, compared with Alternative A.

Alternative E

Alternative E would provide substantial protection and enhancement of fish and wildlife populations and their habitats. Impacts from providing for habitat protection and enhancement of game and nongame species would have impacts as described for Alternative D. It also would provide for significantly fewer impacts on fish and wildlife than Alternative A. Overall objectives for fish and wildlife are similar to those of Alternative D, but Alternative E includes additional objectives directing the BLM to provide for effective wildlife and fish habitat and utilize current plans, agreements, and strategies. The overall emphasis would be as described for Alternative D.

Fluid Leasable Minerals—Oil and Gas

The restrictions on fluid mineral development would result in a reduction in the number of new and exploratory development wells and associated surface disturbance from those projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d), as discussed under **Section 4.1.1**.

Areas of Critical Environmental Concern

ACECs would be increased to six, covering 30,190 acres, and protections would be largely the same as for the other action alternatives. Management under Alternative E would represent a slight increase over Alternative A in the number of areas, extent of protected areas, and diversity of habitats protected, resulting in somewhat fewer impacts on fish and wildlife from authorized uses.

Comprehensive Travel and Transportation Management

Overall, Alternative E provides more restrictions than Alternative A on surface-disturbing activities. For instance, open cross-country motorized use would be allowed on 3,950 acres (54 percent fewer acres than under Alternative A), 56,650 acres would be closed to motorized (880 acres) or motorized and mechanized (55,770 acres) use (1 percent more acres than under Alternative A), and 615,200 acres would be limited to designated routes (4 times more acres than under Alternative A). Given these restrictions, Alternative E would generally cause fewer impacts on fish and wildlife than Alternative A.

Lands and Realty—Rights-of-Way

The BLM would manage 66,030 acres as ROW avoidance (compared with none in Alternative A) and 53,040 acres as ROW exclusion areas (38 percent fewer acres than under Alternative A). By managing more acres as ROW avoidance, the BLM could allow ROW development subject to site-specific review with special stipulations, but some impacts to fish and wildlife and their habitats could still occur compared with the greater acreage of ROW exclusion areas in Alternative A.

Recreation and Visitor Services

Under Alternative E the BLM would manage eight SRMAs and three ERMAs. Types of impacts are described under ***Nature and Type of Effects***. Some of the SRMAs overlap with important fish and wildlife habitat. For example, seven SRMAs (Dolores River Canyon, Roubideau, Dry Creek, San Miguel, Spring Creek, Ridgway Trails, and Jumbo Mountain) overlap crucial big game winter range (107,230 acres). Attracting and promoting recreation to these areas could have significant impacts on fish and wildlife, particularly through disruption of big game and other wildlife species that are sensitive to human presence and noise. However, the emphasis within many SRMAs would be largely on nonmotorized, nonmechanized trail and Back Country activities, and other uses would be limited in these areas, which would limit impacts to wildlife from noise associated with motorized uses and fragmentation from development.

Livestock Grazing

Forage allocation between wildlife and livestock is addressed as in Alternative B. The TL stipulations for big game crucial winter ranges and production areas would be the same as under Alternative D, except the dates would be shortened for all species to reflect CPW recommendations to BLM and updated knowledge of the species' biologies. As a result, application of the TL stipulations over a shorter timeframe is not anticipated to provide less protection to these species during sensitive time periods.

Fish and Wildlife

Overall, the protections for big game winter ranges and production areas are more extensive and inclusive than Alternative A and would result in fewer impacts on big game from surface-disturbing activities and particularly disruptive activities, such as recreation. Impacts from allowing bighorn sheep reestablishment into suitable and historic habitats would have similar impacts as described for Alternative D. However, under Alternative E, the BLM would use the Risk of Contact Model (or currently accepted model) to predict the risk of disease transmission, per direction provided in BLM Manual 1730, Management of Domestic Sheep and Goats to Sustain Wild Sheep (BLM 2016e). Impacts from the use of a CSU/SSR stipulation to protect bighorn sheep summer ranges would be as described for Alternative D. A more detailed description of impacts on bighorn sheep is provided in **Section 4.3.6**, Special Status Species.

Small game and nongame terrestrial species would benefit from the protection and enhancement of ecosystem diversity and integrity. For most species and habitats, impacts are similar to those under Alternative B. A TL stipulation would protect wild turkey from disturbance in winter habitat from December to April (18,030 acres), a protection lacking in Alternative A. Migratory birds would be

managed similar to Alternative B, with an added emphasis to use the best available science in applying restrictions and mitigations to minimize impacts. Together, this management would provide more protection and cause fewer impacts on migratory birds than Alternative A.

Impacts from management of non-special status raptors would be as described for Alternative D.

For aquatic species, management emphasis would be on native fish management by promoting aquatic ecosystem health and providing effective habitat that would sustain populations. Management of fish passage barriers and riparian vegetation would be as described for Alternative D. Alternative E includes additional management to maintain or enhance the quantity and quality of aquatic habitats, further supporting native and desired nonnative species. Sport fisheries objectives are the same as for Alternative B. Impacts from application of a TL stipulation to protect cold-water sport fish and native fish during spring spawning would have impacts as described for Alternative D.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on fish and wildlife resources is the Uncompahgre RMP Planning Area and adjacent areas within approximately 50 miles. This includes parts of the BLM Tres Rios, Moab, Grand Junction, Colorado River Valley, and Gunnison Field Offices; the Grand Mesa/Gunnison/Uncompahgre and Manti-La Sal National Forests; and other public and private lands. The extended analysis area is necessary because fish and wildlife move across this larger landscape and depend on ecological processes that extend over larger areas.

Many past, present, and reasonably foreseeable future actions contribute to cumulative impacts on fish and wildlife. The most significant effects are likely to result from mineral development and outdoor recreation. Other actions that may contribute to cumulative effects include forestry practices and wildfire management, vegetation and noxious weed management, and changes in water uses, including river and stream diversions. Impacts from construction of facilities, roads, and trails, combined with private land development for residential, commercial, and recreational uses, will likely contribute to ongoing regional habitat loss, degradation, and fragmentation and disturbance to terrestrial wildlife. Impacts are likely to be most significant for species that require large landscapes for seasonal movements and dispersal, such as mule deer and elk, and for species confined to specific habitats or limited geographical features.

Most resource management actions on federal and state lands adjacent to the Planning Area would have beneficial effects on fish and wildlife resources, as management plans and decisions are being improved to incorporate current conservation science and landscape-scale conservation objectives. One example of this is the Uncompahgre Partnership's actions to identify and implement regional conservation planning on the Uncompahgre Plateau.

Alternative A would generally have the greatest cumulative impacts, because it provides the least direction to consider landscape-scale effects in management decisions. Alternatives B, D and E would reduce cumulative effects on fish and wildlife, compared with Alternative A, due to fish and wildlife management emphasis based on current science and greater emphasis on landscape-scale management of habitats and populations. Alternatives D and E would contribute similar cumulative impacts, which would be slightly greater than those contributed under Alternative B, under which restrictions on resource uses (e.g., NL and NGD) would be greatest. Alternative C would result in marginally fewer cumulative effects than Alternative A, but its focus on resource uses with fewer conservation measures for fish and wildlife and less emphasis on landscape-scale management would contribute to cumulative effects.

4.3.6 Special Status Species

This section discusses impacts on special status species, including federally listed species, BLM sensitive species, and state-listed species, from proposed management actions of other resources and resource uses. Existing conditions are described in **Section 3.1.7** (Special Status Species).

Methods and Assumptions

Although data on known locations and habitats within the Planning Area are available, the data are neither complete nor comprehensive concerning all known special status species occurrences and potential habitat that might exist. Known and potential special status species and habitat locations were considered in the analysis; however, the potential for species to occur outside of these areas was also considered and, as a result, some impacts are discussed in more general terms.

Impacts specific to greenback cutthroat trout are not discussed, as impacts on this species are considered in the native cutthroat trout discussion provided below. Where impacts on native cutthroat trout are discussed, these impacts include those that could affect greenback cutthroat trout.

Indicators

Special Status Plants

Focus on Habitat and Populations. Special status plant indicators include population levels and density, distribution and range, genetic diversity, and overall habitat condition. Distribution and population-level data for several special status plant species are tracked by the BLM, the Colorado Natural Heritage Program (CNHP), the Colorado Natural Areas Program, and other partners. In addition, CNHP, Colorado Natural Areas Program, and other partners regularly assist in species tracking. The quantity and quality of suitable habitat and threats to species are evaluated. Indicators of habitat and population condition include population density, plant species composition, cover, vigor, reproductive success, herbivory levels, disease, and an assessment of management- or human-induced threats to occurrences.

Public Land Health Standard 4. Land health assessments[6], coupled with permanent demographic trend monitoring plots, are used as indicators of special status plants' population health. While each of the BLM Colorado Public Land Health Standards (BLM 1997) ultimately benefits wildlife, plants, and habitats, Standard 4 specifically addresses special status wildlife and plant species and their habitats (**Appendix C**). Standard 4 requires stabilizing and increasing the population of endemic and protected species in suitable habitats and protecting suitable habitat for recovery. Other indicators include all those listed for healthy plant and animal communities under Standard 3 and riparian systems under Standard 2, which are addressed in **Section 4.3.5**. The land health assessments employ both quantitative and qualitative methods for evaluating the standards for wildlife, rare plants, and habitats.

Healthy plant communities typically translate into healthy fish and wildlife habitats; therefore, most sites that meet Standard 3 (for healthy native plant and animal communities) are also found to meet Standard 4 (for special status species). However, because special status plant species are typically restricted in their range and have narrower habitat requirements, achieving Standard 3 does not necessarily guarantee that Standard 4 will be met. Conversely, an area may fail to meet Standard 3 but may meet Standard 4 because the narrow-niche habitats occupied by sensitive plant species are in relative good condition and are too small to be detectable at the landscape scale at which Standard 3 is evaluated, or the area being evaluated does not contain sensitive plants but does contain habitats suitable for other sensitive terrestrial wildlife species. Where a site fails to meet or falls short of meeting BLM Colorado

[6] Land health assessments from 1998 to 2014 were conducted with a determination category of "meeting with problems." Beginning in 2018, all land health determinations are conducted according to current BLM manuals and handbooks.

Public Land Health Standards (BLM 1997), the causes include habitat loss and fragmentation, invasive species, overgrazing, ROW development, recreation, and other human disturbances. Natural causes, such as drought and fire, can also cause a site to fall short of BLM Colorado Public Land Health Standards (BLM 1997).

Special Status Fish and Wildlife

Focus on Habitat. Special status species indicators include population levels and density, breeding status, distribution and range, age class structure, and genetic diversity. Distribution and population-level data for several special status species are tracked by the CPW, the BLM, the CNHP, and other partners. The CPW and CNHP focus primarily on population status and trends, while the BLM focuses its efforts on habitat management. The quantity and quality of preferred and suitable habitat, prey numbers, and threats to species are evaluated. Indicators of habitat condition include continuity of habitat, plant species composition, cover, vigor, production, browse levels, and other indices, such as wildlife sign, which includes scat, tracks, and nests. The BLM also tracks conditions and restricts certain activities in critical breeding, foraging, and wintering areas and migration corridors.

Public Land Health Standard 4. While each of the BLM Colorado Public Land Health Standards (BLM 1997) ultimately benefits wildlife, plants, and habitats, Standard 4 specifically addresses special status wildlife and plant species and their habitats. This standard requires stabilizing and increasing the population of endemic and protected species in suitable habitats and protecting suitable habitat for recovery. Other indicators include all those listed for healthy plant and animal communities under Standard 3 and riparian systems under Standard 2, which are addressed in **Section 4.3.5**. The land health assessments employ both quantitative and qualitative methods for evaluating the standards for wildlife and habitats.

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- Under all alternatives, no decision would be approved in this RMP revision or authorized on BLM-administered lands that would jeopardize the continued existence of special status species that are listed as or proposed or candidates for listing as threatened or endangered. Implementation of the special status species program is directed at preventing the need for listing of proposed or candidate species under the Endangered Species Act of 1973 (ESA), protecting special status species, and improving their habitats to a point where their special status recognition is no longer warranted.
- Ground-disturbing activities could positively or negatively modify habitat, or loss or gain of individuals, depending on the amount of area disturbed, the nature of the disturbance, the species affected, and the location of the disturbance.
- Disruptive activities could cause animals to move to less-optimal habitats or cause stress in animals. These effects could decrease reproduction or increase mortality, particularly during critical seasons, such as during reproduction or rearing of young, or during winter when animals have increase stress from cold weather, snow, and reduced food quantity or quality.
- Changes in air, water, and habitat quality could lead to direct impacts and could have cumulative impacts on species survival.
- Road density in a given area and the distance of roads from special status species habitat provides an indication of potential impacts on special status species. For fish and aquatic wildlife, road density is a relative measure of the potential for disruptive impacts, habitat fragmentation, and effects from erosion and off-site sediment transport. For special status plants, roads could increase dust, which can reduce photosynthesis, alter pollinator communities, and provide a niche for the invasion of noxious weeds. The degree of impacts depends on additional variables, such as the class of road (dirt, gravel, paved), road condition (rutted, bar ditched, properly

drained), the type of vegetation between the road and occupied or suitable habitat, the topography, the ecological condition of the suitable or occupied habitat, and the soil characteristics.
- Impacts on special status species would be more significant than impacts on common species because population viability is already uncertain for special status species.
- For implementation-level actions subject to further environmental review, including NEPA, as appropriate, additional field inventories would likely be needed to determine presence or absence of special status species in the project area.
- USFWS would be consulted for any actions that could affect federally listed species.
- BMPs and standard operating procedures, outlined in **Appendix G**, are used for analysis and would be implemented to reduce impacts on special status species. These are subject to modification based on subsequent guidance and new science.
- Impacts on Gunnison sage-grouse would be similar to those described from scientific literature on greater sage-grouse.
- Short-term effects are defined as those that would occur over a timeframe of 2 years or less, and long-term effects would occur over longer than 2 years.

Because special status species have specific habitat requirements and often thrive in a particular microhabitat, disturbance to the species or their habitat could result in population declines, which could affect survivability of local populations. Specific habitat requirements, population trends in the Planning Area, and factors affecting population trends in the Planning Area are detailed in **Section 3.1.7** (Special Status Species). Relevant recovery plans or conservation strategies are also described in **Chapter 3**. Three general categories of disturbance (to habitats) or disruption (to animals) would be the most influential on special status species and their habitat: 1) disturbance/disruption from casual use; 2) disturbance/disruption from permitted activity; and 3) changes in habitat condition, such as from fire or weed invasion. See **Section 4.3.5**, Fish and Wildlife, for a complete description of these three types of disturbances that could affect special status species. Impacts on special status species would be similar to those described for fish and wildlife in **Section 4.3.5**, but impacts could be magnified due to rarity and threats to special status species.

Nature and Type of Effects

Habitat loss, competition, predation, disease, and other factors are causes of species decline and imperilment. Habitat loss or modification due to human activity is the greatest threat to ecosystems, particularly for species adapted to specific ecological niches. BLM land management practices are intended to sustain and promote species that are legally protected and prevent species that are not yet legally protected from needing such protection.

Impacts on special status species would primarily result from surface-disturbing activities, such as construction of roads and facilities, cross-country motorized travel, wildfires, wildfire suppression, erosion, unauthorized collection or poaching, and trampling. Direct and indirect impacts on special status species result from surface-disturbing activity that alters habitats or disruptive activities that disturb animals. Without mitigation, surface-disturbing and disruptive activities can cause the following impacts on special status species:

- Violation of the ESA, Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act of 1918, or applicable state laws or BLM regulations (e.g., BLM Manual 6840 and related IMs)
- Harm, harassment, or adverse effects on any federally listed threatened or endangered species or federally proposed or candidate species

- Destruction or deterioration of federally listed threatened or endangered species' or federally proposed or candidate species' habitat, migration corridors, breeding areas, or designated or proposed critical habitat
- Decreased population viability or contribution to the need for a federal listing of any federal candidate species or BLM sensitive species
- Loss of habitat function or habitat value in BLM sensitive species habitats
- Direct loss of individuals, populations, or occurrences

All federal actions would comply with ESA consultation requirements. All implementation actions would be subject to further special status species review before site-specific projects are authorized or implemented. Federal protections and BLM policy protecting threatened, endangered, and sensitive species are considered methods for reducing the potential impacts from permitted activities. If adverse impacts were identified, mitigation measures would be implemented to minimize or eliminate the impacts, or, in some cases, project authorization could be denied. However, even with the above administrative processes, not all impacts could be avoided.

Special Status Plants

The types of impacts that could occur on special status plant species include direct loss of individuals or occurrences, loss of vigor or reduced reproductive success, changes in habitat structure, direct and indirect competition, loss of pollinators or pollinator habitat, soil compaction, erosion or sedimentation, alteration of hydrologic conditions, and changes in fire regime.

Direct Loss of Individuals or Occurrences

Direct surface disturbance such as conventional and unconventional fluid mineral development, OHV use, and off-route recreation (permitted and unpermitted) can result in direct loss of special status plant individuals or occurrences. Permitted use is less likely to result in direct loss because pre-authorization clearances are conducted, and mitigation would reduce the likelihood of direct loss.

Loss of Vigor or Reduced Reproductive Success

Trampling and contact with chemicals may not always result in direct mortality but can reduce plant vigor, which affects the ability of the plant to reproduce and sustain the population. Herbivory (when animals consume inflorescences, seeds, or vegetative parts of special status plants) can reduce reproductive success, or in some cases, can cause plant death. Dust deposition on special status plants could reduce photosynthetic ability or the ability of pollinators to transfer pollen between plants.

Changes in Habitat Structure

The habitat structure provided by some vegetation can act as nurse habitats for other plant species. For example, a canopy cover of shrubs offers habitat characteristics that appear to be favorable for the germination and establishment of several special status plant species, such as Colorado hookless cactus. Vegetation could provide protection for some special status plants from herbivory or trampling and could provide improved moisture availability or reduced moisture loss under the canopy. Surface-disturbing activities that significantly reduce the percent canopy cover of vegetation could allow increased herbivory and trampling or moisture loss, resulting in decreased vigor or mortality of special status plants. In addition, surface-disturbing activities could facilitate weed invasion or spread, which would change habitat structure. However, increases in canopy cover may not always be beneficial, as some special status plant species require more open habitats.

Competition

Changes in species composition also affect special status plant populations. Proliferation of noxious weeds or other invasive plants could render habitat unsuitable by outcompeting special status plants for water and nutrients or by preventing seedling germination and establishment. Occupied Colorado

hookless cactus habitat that is dominated by cheatgrass appears to inhibit germination of seedling cactus, thereby threatening the long-term viability of these populations. In some cases, increases in canopy cover and density of native species, particularly grasses, can compete with special status plants for limited water and nutrients.

Other special status plant species, such as the clay-loving wild buckwheat, thrive in environments where competition is low. Increases in vegetative cover (following disturbances such as fire or mechanical treatments or seeding) could cause competition with special status plants, resulting in decreased vigor or mortality.

Loss of Pollinators or Pollinator Habitat
Actions that disturb pollinators or destroy their habitat can have a detrimental impact on special status plant species that rely on them for reproduction. Long-term loss of pollinators can reduce the reproductive ability of these plant species and affect maintenance and genetic diversity of populations.

Soil Compaction
Soil compaction resulting from heavy equipment or vehicle travel could reduce soil pore size and water infiltration, reducing habitat suitability and water availability, thereby inhibiting maintenance or establishment of special status plants.

Erosion or Sedimentation
Special status plants could be washed away or have roots exposed by erosion resulting from surface-disturbing activities, such as blading or bulldozing roads. Special status plants could be buried by sedimentation resulting from disturbances that occur upslope of special status plant populations.

Alteration of Hydrologic Conditions
Some special status plant species that depend on seasonally flooded environments, subirrigated soils, or seeps could be adversely affected by changes in water flow.

Changes in Fire Regime
Changes in species composition, either within special status plant habitat or in adjacent plant communities, could alter the natural fire regime to which the plants are adapted. Cheatgrass, a highly flammable annual grass, could drastically increase the fire frequency in special status plant habitat, affecting the survivability and viability of the population.

Together, these impacts could lead to fewer and more fragmented special status plant populations that are more at risk for extirpation due to reduced habitat quality, diminished reproductive ability, and altered plant communities. Impacts would be more likely to occur on undiscovered special status plant populations.

Special Status Fish and Wildlife Species

As described in **Section 4.3.5**, Fish and Wildlife, surface-disturbing activities, including conventional and unconventional fluid mineral development, could impact fish and wildlife species or habitats through disturbance; direct habitat loss; reduced habitat effectiveness; habitat modification, degradation, and fragmentation; increased predation pressure; direct mortality; habitat avoidance; and interference with movement patterns. Surface disturbance and vegetation removal could remove or degrade habitat or certain wildlife species, depending on the size and location of the project.

As described in the Gunnison Sage-Grouse Rangewide Conservation Plan (Gunnison Sage-grouse Rangewide Steering Committee 2005) and throughout the scientific literature (see a summary of scientific literature in the Northwest Colorado Greater Sage-Grouse RMP Amendment and Final EIS [BLM and Forest Service 2015b]), mining, energy development, and infrastructure are threats to the

species. Disturbances associated with fluid mineral and infrastructure development may have direct impacts by disrupting Gunnison sage-grouse behavior and productivity, such as by causing flushing from a lek (Braun et al. 2002; Lyon and Anderson 2003; Robel et al. 2004). Indirectly, habitat fragmentation may force Gunnison sage-grouse to use less-optimal habitats, making the species more susceptible to predation. Other indirect impacts include those from powerlines or fences, such as collisions, which may cause injury or mortality, and increased perch sites, which may change Gunnison sage-grouse behavior or population growth rates (Gunnison Sage-grouse Rangewide Steering Committee 2005; Braun et al. 2002). Birds could perch on pipes used for flaring, which could cause injury or mortality to individuals. All of these impacts could occur even when development is outside, but adjacent to, Gunnison sage-grouse habitats, including designated occupied critical habitat.

Use of unconventional drilling technologies can often result in large volumes of hydraulic fracturing fluid that return to the surface (known as "flowback"). This flowback requires larger on-site storage, either through pits or tanks, compared with other types of fluid mineral exploration and production (EPA 2018b). Birds, including Gunnison sage-grouse, and other wildlife species could be impacted by waste pits because they are attracted to oil-covered ponds. Potential impacts are the following:

- Entrapment in oil and drowning
- Death or illness from ingestion of toxic quantities of oil
- Cold stress if oil were to damage the insulation provided by feathers
- Increased susceptibility to disease, such as West Nile virus, and predation (USFWS 2000; Gunnison Sage-grouse Rangewide Steering Committee 2005)

As described in **Section 4.3.5**, Fish and Wildlife, pipeline boring activities could lead to a "frac-out," having impacts as described above. Habitat for special status Colorado River fish species would continue to be reduced as a result of continued water depletions for ongoing drilling, completion, and dust-abatement activities.

In general, impacts from disturbance or disruption to black-footed ferret, Canada lynx, Mexican spotted owl, southwestern willow flycatcher, western yellow-billed cuckoo, and Uncompahgre fritillary butterfly are unlikely as a result of management actions described in Chapter 2 because these species either have not been documented in the Decision Area, are extirpated, or infrequently occur (see **Section 3.1.7**).

Effects Common to All Alternatives

Implementing management for the following resources would have negligible or no impact on special status species and are therefore not discussed in detail: wild horses, cultural resources, paleontological resources, national trails and byways, Native American tribal uses, and public health and safety.

Effects on All Special Status Species

All alternatives would allow casual use, such as motorized travel and dispersed recreation; special recreation management; permitted uses, such as mining, ROWs, and livestock grazing; realty actions; and actions that would affect vegetation and aquatic systems, such as habitat improvements and fire management. Effects on special status species from these actions are similar to those described for vegetation and fish and wildlife (**Sections 4.3.4** and **4.3.5**). As noted in ***Assumptions***, above, under any alternative the BLM would evaluate specific projects for potential effects on special status species, including site-specific species surveys or inventories where needed, and would not authorize projects or implement programs that would jeopardize the continued existence of special status species. All alternatives would provide some protection of Gunnison sage-grouse breeding habitat, special status raptor nests, sensitive bats, and waterfowl and shorebirds. Nonetheless, the alternatives differ in management emphasis, the degree of protection of habitats and landscape-scale ecosystem integrity, and the size and scope of special land designations that afford protection to special status species and their

habitats, as described for vegetation and fish and wildlife (**Sections 4.3.4** and **4.3.5**). Under all alternatives, projects authorized by the BLM that result in greenhouse gas emissions would continue to contribute to global climate change and the associated adverse effects on special status species.

Effects on Special Status Plants

Under all alternatives, recreation could affect special status plants, such as clay-loving wild buckwheat and Colorado hookless cactus. These species, particularly clay-loving wild buckwheat, occur in areas where OHV use is popular and compliance with OHV travel regulations has been limited, so populations could be trampled and destroyed. OHVs can also introduce or spread weeds or disturb or destroy habitats. In addition, motorized vehicles compact soils, which could cause impacts as described above under ***Nature and Type of Effects***. The potential for impacts decreases as the acreage closed to motorized vehicles increases.

ROW development could cause impacts on special status plants, particularly clay-loving wild buckwheat near Montrose and Colorado hookless cactus near Delta, as the greatest populations of these species are in these areas. ROWs would change habitat structure and could reduce habitat for pollinators, monarch butterflies, or butterflies, and allow for weed introduction and spread. ROW avoidance and exclusion areas would reduce the potential for impacts on special status plants.

Special status plant habitats, such as Colorado hookless cactus habitats, have been historically impacted by grazing, and populations are susceptible to trampling. In certain conditions (e.g., drought and overgrazing), impacts on special status plants, such as clay-loving wild buckwheat, could increase as more palatable forage decreases. Livestock grazing activities can reduce the vigor of species, change the habitat structure, be a vector for weed spread, and compact soils. The potential for impacts decreases as special status plant community locations are identified and avoidance or protection measures are implemented. Under all alternatives, the conservation measures in the *Biological Opinion for Livestock Grazing Program Effects on Three Listed Plants in the Bureau of Land Management Grand Junction, Colorado River Valley, and Uncompahgre Field Offices* (USFWS 2012) would be implemented to avoid, minimize, and/or remediate effects from livestock grazing on Colorado hookless cactus and clay-loving wild buckwheat.

Under all alternatives, the BLM would implement integrated weed management using the UFO Weed Management Strategy (BLM 2010c). Weed control and prevention measures would help to reduce the cover of weeds in the Planning Area and would prevent the introduction and spread of weeds over the long term. This would maintain and improve habitat for special status species in the Planning Area, such as Colorado hookless cactus, and would reduce competition. The herbicide use protocols and standard operating procedures described in the Programmatic EIS for Vegetation Treatments Using Herbicides (BLM 2007a) would be followed to reduce impacts on nontarget species from herbicide treatments. Where weeds are a substantial threat to special status plant populations, some deviations from the protocols and standard operating procedures could occur.

Fluid minerals development could impact special status plant populations and habitats through many of the mechanisms described above under ***Nature and Type of Effects***. In particular, natural gas development, including use of conventional and unconventional drilling technologies, could affect habitat for and populations of Colorado hookless cactus. This could result in a reduction in population levels and density and loss, degradation, or fragmentation of habitats, which could lead to a reduction in distribution, range, and flow of genetic material. The potential for impacts decreases as the acreage closed to fluid mineral leasing, and the acreage open subject to NSO stipulations, increases. CSU stipulations may not provide sufficient protection, as the locations of special status plant populations are often unknown.

As described in **Section 4.4.3** (Energy and Minerals, Effects Common to All Alternatives, Solid Leasable Minerals—Coal), coal production is expected to remain the same across all alternatives. The types of impacts from coal leasing are the same as those described for surface disturbance under ***Nature and Type of Effects***. Areas unacceptable for coal leasing, unsuitable for surface mining, and protective stipulations on open lands would reduce impacts from coal mining on special status species.

Locatable mineral development could similarly impact special status plant populations and habitats. In particular, uranium mining could affect habitat for and populations of Naturita milkvetch. Impacts would be reduced on 28,060 acres that would be maintained as withdrawn from locatable mineral entry under all alternatives. The potential for impacts would increase as the acreage available for locatable mineral exploration or development increases.

Effects on Special Status Fish

Under all alternatives, special status fish could be affected by water depletions associated with fluid mineral development; impacts would be as described above in **Section 4.3.5**, Fish and Wildlife.

Water depletions in the Colorado River Basin and the potential effects on federally listed Colorado River fish as a result of fluid mineral development were addressed in the Programmatic Biological Assessment for the BLM's Fluid Minerals Program in Western Colorado (May 2008 and reinitiated in May 2017; USFWS 2017). In response to BLM's Programmatic Biological Assessment, the USFWS issued a Programmatic Biological Opinion in 2008, superseded by their Programmatic Biological Opinion in 2017. The 2017 Programmatic Biological Opinion (USFWS 2017) determined that the 607 acre-feet per year of BLM water depletions associated with BLM approved projects in the Gunnison River Basin are not likely to jeopardize the continued existence of the Colorado pikeminnow, razorback sucker, bonytail chub, and humpback chub. However, reduced flows associated with freshwater depletions from approved projects within the Planning Area could exacerbate the effects of selenium and mercury on these fish, as reduced flows could lessen beneficial dilution effects on concentrations of each chemical in a given river (BLM 2017a). The project is also not likely to destroy or adversely modify designated critical habitats for these endangered fish (designated critical habitat occurs in the Decision Area only for Colorado pikeminnow and razorback sucker; see **Chapter 3**). Water depletions analyzed under the Programmatic Biological Opinion include water used for pre-development seismic exploration, well drilling and completion (including hydraulic fracturing), access road dust abatement, and hydrostatic pipeline testing. The Programmatic Biological Opinion requires the BLM to report the amount of water depleted each year to track compliance with the threshold depletion amount.

Alternative A

Effects on All Special Status Species

Alternative A provides overall direction to maintain or improve habitat for special status species, but it relies on outdated conservation priorities and practices. Alternative A lacks recognition of the importance of landscape-scale conservation to protect and enhance habitat quality and patterns that preserve ecosystem functions. It does not include management to address and minimize the effects of climate change. As a result, Alternative A would generally result in greater habitat fragmentation, loss of population connectivity, and increased likelihood for stresses on special status species' habitats induced by climate change, compared with other alternatives.

Five ACECs would be managed on 30,000 acres. Within these areas, terrestrial and aquatic habitats would be protected by various actions, including NSO stipulations (NSO-UB-2, NSO-UB-7) and closure to OHVs, major utility development, and mineral resource leasing and development. No ecological emphasis areas would be identified under Alternative A. As a result, BLM management would have less focus on landscape-scale habitat protection, habitat fragmentation prevention, and ecosystem function

maintenance and restoration. No lands with wilderness characteristics would be managed under Alternative A. The Tabeguache Area (8,060 acres) would be managed to preserve the wilderness character of the area and would be closed to motorized and mechanized travel, ROWs, mineral leasing and development, and wood product harvest. These measures would reduce impacts from land uses to special status species and their habitats.

Areas managed as VRM Classes I and II on 66,150 acres would incidentally protect special status species and their habitats by limiting or prohibiting development and other surface-disturbing activities in these areas.

Under the livestock grazing program, the BLM would manage 619,500 acres as available and 56,300 acres as unavailable to grazing. Range improvements would be implemented to improve vegetative conditions. Current impacts from grazing would continue and impacts would be similar to those described above under ***Nature and Type of Effects***.

Under Alternative A, two SRMAs would be managed on 49,320 acres (Dolores River and San Miguel River SRMAs), and no ERMAs would be managed. Recreation would be increasingly inadequate to manage impacts from current and future levels of recreation, which could result in habitat degradation and disruption of some special status species. In particular, impacts on federally listed plants in the Uncompahgre Valley and to BLM sensitive plants in western Montrose County could occur without the focused management attention that SRMAs and ERMAs afford.

Open cross-country motorized travel would be allowed on 8,560 acres, which is likely to cause adverse effects on some special status species and their habitats, particularly those in more arid habitats, where vegetation is less likely to recover from damage and the spread of weeds is more likely. Examples are the federally listed plants of the Uncompahgre Valley and sensitive species including Montrose bladderpod. Impacts would be reduced on 56,150 acres closed to motorized use (11,950 acres) and motorized and mechanized use (44,200 acres) and would be reduced on 145,300 acres where use would be limited to designated routes for motorized and mechanized travel.

ROW exclusion areas would be identified on 85,080 acres, which would avoid impacts on special status species in these areas from habitat disturbance or disruption of animals during construction or operation of facilities. Management of the designated West-wide Energy Corridor would cover 26,880 acres, with potential impacts on some species.

The minimal restrictions on fluid mineral development would result in a reasonably foreseeable development scenario similar to that projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**. The BLM would manage 631,580 acres of BLM surface/federal minerals and 240,230 acres of split-estate (totaling 871,810 acres) as open to fluid minerals leasing. Areas closed to fluid minerals leasing on 44,220 acres of BLM surface/federal minerals and 0 acres on split-estate lands and stipulations on open lands would reduce impacts from fluid minerals leasing on these lands. NSO stipulations would be applied on 24,890 acres, and CSU stipulations would be applied on 110,180 acres, with several stipulations specifically to protect special status species (e.g., NSO-UB-2, NSO-CO-8, NSO-CO-2, NSO-CO-3, NSO-CO-4, NSO-CO-5, TL-CO-15, TL-CO-18, and TL-CO-20).

The BLM would recommend for 27,690 acres for withdrawal from locatable mineral entry. Impacts on special status species from mining locatable minerals would be avoided on withdrawn lands.

Overall, Alternative A would result in continued habitat fragmentation for some special status species, because of limited control of ROW siting, no management of ecological emphasis areas, no additional ACECs, and fewer restrictions such as NSO.

Effects on Special Status Plants

Impacts on special status plants from recreation, travel, lands and realty, livestock grazing, fluid mineral leasing, locatable mineral exploration or development, and ACECs are similar to those described under ***Effects Common to All Alternatives***.

Particular protections for special status plants include an NSO applied in the Fairview South ACEC/Research Natural Area (NSO-UB-2), as well as in special status plant species habitat (NSO-CO-8). The 2 ACECs below (totaling 6,580 acres) under Alternative A would be designated to protect significant resource values, including special status and rare plant species (some species were formerly recognized as BLM sensitive and were factored into resource values for the ACEC designation):

- Adobe Badlands (6,370 acres)—Colorado hookless cactus, clay-loving wild buckwheat, and Adobe Hills beardtongue
- Fairview South (210 acres)—clay-loving wild buckwheat and Adobe Hills beardtongue

These special status and rare plants would receive direct protection in the ACECs through such measures as those described under ***Effects on All Special Status Species***.

Effects on Special Status Fish and Wildlife

For aquatic species, Alternative A does not provide direction to remove nonnative trout to protect native cutthroat trout populations. The alternative provides no stipulations to limit surface occupancy or site disturbance near occupied habitat for federally listed fish or native cutthroat trout. Riparian and aquatic zones would be protected on 15,350 acres. The San Miguel River ACEC would be maintained to protect riparian and wetland habitats, benefitting several special status species, including yellow-billed cuckoo. In addition, 29 river segments in the Planning Area, totaling 154.1 miles, would be managed as eligible for inclusion in the NWSRS. Interim protective management guidelines would help to prevent or reduce impacts on aquatic and riparian habitats in these areas.

For terrestrial wildlife species, Alternative A allows for management plans for special status species. However, it does not provide stipulations to limit surface occupancy or site disturbance within occupied habitats for some terrestrial species, or it applies stipulations based on buffer distances or seasonal timing that are outdated by more current information.

No use restrictions would apply specifically to Canada lynx. For Gunnison sage-grouse, restrictions on surface occupancy and surface disturbance would apply in sage-grouse winter habitats and within 0.25-mile of leks (NSO-CO-2), which is now recognized as an insufficient distance to avoid adverse effects on breeding sage-grouse (Knick and Connelly 2011). Additional restrictions on surface use would apply to sagebrush stands with sagebrush plants of a defined height and mean canopy cover as described in the alternative. This is independent of currently mapped sage-grouse habitats. This is now recognized as insufficient to describe nesting habitat at this time. Special status raptors would be protected by an NSO within 0.25-mile of active bald eagle, peregrine falcon, and Mexican spotted owl nests and roosts (e.g., NSO-CO-4, NSO-CO-5, and NSO-CO-6), and TLs would be applied to protect special status raptors during sensitive time periods (e.g., TL-CO-18, TL-CO-20, TL-CO-22, TL-CO-24, and TL-CO-19).

For other terrestrial special status species, Alternative A provides general guidance to protect species but does not provide management guidance or protective stipulations for most current BLM sensitive species, including Gunnison's and white-tailed prairie-dogs, kit fox, and sensitive bats. For desert and Rocky Mountain bighorn sheep, Alternative A does not address expansion of populations beyond the areas now occupied and does not address issues of disease transmission from domestic livestock, now recognized to be a significant management issue (Wild Sheep Working Group 2012). To protect sensitive bat species, the Cory Lode Mine would continue to be withdrawn from locatable mineral entry,

but no stipulations would be applied to protect other important bat habitats in the Planning Area. Various use restrictions would be applied in identified waterfowl habitats and shorebird rookeries to protect nesting birds, but no buffers are included in the protected areas, and protection from surface disturbance is not extended to all major rivers in the Planning Area, leaving many important breeding, foraging, and migration habitats unprotected.

Alternative B

Effects on All Special Status Species

Alternative B emphasizes protection of resources, including special status species and their habitats, and would result in less overall impacts on special status species than Alternative A. The alternative provides direction to restore and enhance special status species and their habitats and to promote the conservation of special status species. Alternative B recognizes all of the essential terrestrial and aquatic habitat types as priorities for special status species management, promotes greater management consistency over landscape scales, and provides the best management for population connectivity and movement corridors.

Under Alternative B, the BLM would apply appropriate management to attempt to reduce impacts associated with climate change on natural resources, including vegetation and habitats. Further, the BLM would plant seedlings or seed local native species to improve long-term survival of plant populations. Management of 12 ecological emphasis areas (242,580 acres) would preserve habitat connectivity and provide corridors for species to move from low to high elevation areas if climate change rendered lower elevation habitats unsuitable. Together, these actions would allow BLM to maintain suitable and connected habitats for special status species, enabling species to adapt to potential habitat alterations resulting from climate change.

Restrictions on fluid mineral development would result in fewer new and exploratory development wells drilled and associated surface-disturbance than Alternative A. Under Alternative B, the BLM would manage 12 ecological emphasis areas covering 242,580 acres, including 186,070 acres of ROW exclusion areas and 56,490 acres of ROW avoidance areas. Under Alternative B, NSO stipulations would be applied on 207,310 acres, and CSU stipulations would be applied on 35,250 acres within these ecological emphasis areas. Under Alternative B.1, NSO stipulations would be applied on 239,320 acres, and CSU stipulations would be applied on 234,690 acres within these ecological emphasis areas. Occupied habitat of known populations of federally listed species would be ROW exclusion areas. Other closures, NL, NSO, CSU, NGD, and SSR restrictions would provide additional protection for special status species habitats and populations (e.g., NL-10/NGD-12, NL-2/NGD-3, NSO-22/NGD-8, NSO-23/NGD-9, NSO-28/NGD-10, CSU-21/SSR-23, and CSU-26/SSR-30). Ecological emphasis areas and ACECs with ROW exclusion and NSO restrictions would result in the greatest protection among any alternatives for special status fish and wildlife in these more-sensitive areas. These protections would provide the most intact natural landscapes, the greatest amount of corridor conservation for species movements, and the greatest resiliency against climate change or other long-term changes that might require species or communities to move over time. Lands with wilderness characteristics and VRM, where not overlapping ecological emphasis areas or ACECs, would add additional protection against habitat fragmentation.

Fifteen ACECs would be designated on 215,940 acres (7 times more acres than under Alternative A). All ACECs would be managed as ROW exclusion, recommended for withdrawal from locatable mineral entry, and closed to mineral materials disposal and nonenergy solid mineral leasing, and additional restrictions would be applied for each ACEC. As a result, habitats and populations of special status species would be protected from most land use impacts in ACECs.

Under Alternative B, seven inventoried units (42,150 acres) would be protected as lands with wilderness characteristics. Surface-disturbing activities would be restricted within these areas, including management as ROW exclusion; closure to motorized and mechanized travel; closure to mineral materials disposal, nonenergy solid mineral leasing, and coal leasing; recommendation for withdrawal from locatable mineral entry; management as NL for fluid mineral leasing and geophysical exploration; and management as NGD. These restrictions would reduce the potential for impacts on special status species and their habitats. Management of the Tabeguache Area would be similar to management under Alternative A, although Alternative B would provide greater protection from land use impacts by applying an SSR restriction in the area.

For fire management, the BLM would emphasize the use of prescribed and managed fire over mechanical treatments and other methods where they are not detrimental to resource values. Over time, this management would reduce the potential of large or intense wildfires that could adversely affect special status species habitat or populations.

Under Alternative B, 229,880 acres would be managed as VRM Classes I and II (3 times more acres than under Alternative A). Under Alternative B.1, 235,510 acres would be managed as VRM Classes I and II (3 times more acres than under Alternative A, and slightly more than Alternative B). In addition, NSO and NGD restrictions would be applied in VRM Class I areas, and CSU and SSR restrictions would be applied in VRM Class II and III areas, which would further reduce impacts on special status species in these areas.

Forestry would be managed more intensively than under Alternative A, with designation of 675,800 acres of forest management units. Minor forest and woodland products from certain tree species in certain areas would be allowed to be harvested. Impacts would be reduced on 396,160 acres (4 times more than under Alternative A) closed to wood product sales and/or harvest.

The BLM would manage 517,580 acres (16 percent fewer acres than under Alternative A) as available and 158,220 acres (nearly 3 times more acres than under Alternative A) as unavailable to livestock grazing. Emphasis would be placed on decreasing grazing preference. The requirement for at least 3 years of rest in disturbed areas would enhance the recovery of native vegetation from grazing impacts over the short-term, but it may not necessarily improve habitat for special status species over the long term. Additional active habitat management (e.g., seeding and weed treatments) would be needed to sustain long-term habitat improvements and achieve desired conditions.

Recreation management under Alternative B would emphasize SRMAs, which generally cause greater impacts on special status species in these areas because SRMAs concentrate recreational activities in a specific area, and SRMA management emphasizes recreation over other uses (see the ***Nature and Type of Effects*** in **Section 4.3.5** [Fish and Wildlife]). The BLM would manage 12 SRMAs on 246,760 acres (5 times more acres than under Alternative A) and no ERMAs. Some SRMAs or portions would be closed to dispersed camping and overnight use, and activities would be allowed if they were to support the management objectives of the overlying special designations or ecological emphasis areas. This would help to reduce impacts on special status species in certain areas.

Open cross-country motorized use would not be allowed within the Decision Area, which would reduce impacts on special status species from casual use. Areas closed to motorized use (12,180 acres) and motorized and mechanized use (102,790 acres) totaling 114,970 acres (twice as many acres as under Alternative A) and limited to designated routes on 560,830 acres (4 times more acres than under Alternative A) would also reduce impacts.

Management of 195,460 acres as ROW avoidance (compared with none under Alternative A) and 431,040 acres as ROW exclusion areas (5 times more acres than under Alternative A) would reduce

impacts on special status species. Designating 14 additional utility corridors than under Alternative A on 37,300 additional acres would concentrate impacts and reduce habitat fragmentation.

Under Alternative B, the BLM would manage 494,580 acres of BLM surface/federal minerals and 201,870 acres of split-estate lands (totaling 696,450 acres) as open to fluid minerals leasing (22 percent fewer acres than under Alternative A) and 181,220 acres of BLM surface/federal minerals and 38,360 acres of split-estate lands (totaling 219,580 acres) as closed (4 times more acres than under Alternative A), which would reduce the potential for impacts on special status species from fluid minerals leasing. On BLM surface/federal minerals open to fluid mineral leasing, NSO stipulations would be applied on 354,970 acres (14 times more acres than under Alternative A), and CSU stipulations would be applied on 139,560 acres (27 percent more acres than under Alternative A), including many stipulations specifically protecting special status species (e.g., NL-10/NGD-12, NL-2/NGD-3, NSO-22/NGD-8, NSO-23/NGD-9, NSO-28/NGD-10, CSU-21/SSR-23, and CSU-26/SSR-30). These actions would reduce the potential for impacts on special status species.

Under Alternative B.1, the BLM would manage 454,230 acres of BLM surface/federal minerals as and 155,130 acres of split-estate lands (totaling 609,360 acres) open to oil and gas leasing (28 percent fewer acres than under Alternative A) and 221,570 acres of BLM surface/federal minerals and 85,100 acres of split-estate (totaling 306,670 acres) as closed (5 times more acres than under Alternative A), which would reduce the potential for impacts on special status species from fluid minerals leasing. On BLM surface/federal minerals open to fluid mineral leasing, NSO stipulations would be applied on 318,630 acres (12 times more acres than under Alternative A), and CSU stipulations would be applied on 135,550 acres (23 percent more acres than under Alternative A), including the same stipulations specifically protecting special status species as discussed above under Alternative B. These actions would reduce the potential for impacts on special status species in the North Fork area more than Alternative B.

Under Alternative B, 382,900 acres of BLM surface/federal minerals would be recommended for withdrawal from locatable mineral entry (14 times more acres than under Alternative A). If withdrawn, these areas would provide additional protection to special status species from mining impacts.

Weed management under Alternative B would require more-stringent requirements for weed management and reseeding following disturbances, compared with Alternative A. This Alternative B management would provide better protection for special status species habitats by protecting and enhancing native vegetation communities.

Alternative B would result in substantially less habitat fragmentation for special status species, because of the management of ecological emphasis areas and ACECs covering representative examples of most of the core habitats and connections between them. The greater control over ROW siting, and increased use of NSO stipulations in this alternative, also contribute to greater protection than Alternative A for preserving unregimented habitats.

Effects on Special Status Plants

Impacts on special status plants from recreation, travel, lands and realty, livestock grazing, fluid mineral leasing, locatable mineral exploration or development, and ACECs are similar to those described under ***Effects Common to All Alternatives***. Particular protections for special status plants include an NSO in federally listed and candidate plant species' occupied and historic habitat (NSO-22/NGD-8) and closure of all federally threatened, endangered, proposed, and candidate plant species' occupied habitat to mineral materials disposal and nonenergy solid mineral leasing. These protections would substantially reduce the likelihood of impacts on special status plants from mineral development compared to Alternative A.

Under Alternative B, unnatural soil and vegetation disturbance would be minimized in ecological emphasis areas to reduce barriers to plant migration that may be needed to adapt to changes in climate. This would help to improve habitat connectivity for special status plants and maintain genetic diversity, thereby reducing the potential effects of climate change on special status plants.

Under Alternative B, seven ACECs (total of 92,900 acres, 14 times more than under Alternative A) would be designated to protect special status and rare plant species:

- Fairview South (CNHP Expansion) (4,250 acres)—clay-loving wild buckwheat, Colorado desert parsley, Adobe Hills beardtongue, good-neighbor bladderpod
- Dolores Slickrock Canyon (10,670 acres)—kachina daisy, Naturita milkvetch
- East Paradox (7,360 acres)—Paradox Valley lupine, Paradox breadroot
- La Sal Creek (10,490 acres)—Paradox Valley lupine, Paradox breadroot
- Roubideau-Potter-Monitor (20,430 acres)—Grand Junction milkvetch
- Salt Desert Shrub Ecosystem (34,510 acres)—Colorado hookless cactus
- West Paradox (5,190 acres)—Paradox Valley lupine, Paradox breadroot

These special status plants and the ecosystems on which they depend would receive direct protection in the ACECs through such measures as those described above under ***Effects on All Special Status Species***. ACECs for special status and rare plant species under Alternative B would cover 14 percent of the Planning Area.

OHVs would be limited to designated trails on portions of the Kinikin Hills SRMA, where there are clay-loving wild buckwheat populations. However, due to the open nature of the landscape, this travel management action could be difficult to enforce, and impacts on clay-loving wild buckwheat populations could result.

Effects on Special Status Fish and Wildlife

For aquatic species, several actions under Alternative B provide enhanced protection for aquatic and riparian species and their habitats. The BLM would apply NL, NGD, and ROW avoidance around major rivers; ROW exclusion within 325 feet of perennial streams; ROW exclusion within 100 feet of riparian and wetland areas, seeps, and springs; closure to mineral materials disposal within 500 feet of riparian areas; closure to wood products collection and harvest and other plant products collection within 100 feet of riparian areas; and NSO and NGD within 660 feet of perennial and intermittent streams and naturally occurring wetlands, springs, and seeps. Permitted recreation activities and mechanized and motorized off-route travel would be prohibited in riparian areas. Also, 29 river segments (154.1 miles) would be determined suitable for inclusion in the NWSRS, with interim protective management guidelines that would reduce impacts from land uses on aquatic and riparian habitats in these areas.

In addition to these Alternative B restrictions, Alternative B.1 would apply NL within 0.50-mile of the North Fork of the Gunnison and Smith Fork of the Gunnison Rivers, lakes, ponds, naturally occurring wetlands, impounding reservoirs, and all streams, watercourses, and waterways (96,910 acres in the North Fork area). Alternative B.1 also would apply NSO within 0.50 to 1.0-mile of the North Fork of the Gunnison and Smith Fork of the Gunnison Rivers; within the 100-year floodplain of any stream or river system (9,680 acres in the North Fork area); and within 0.25-mile of northern leopard frog breeding sites. Overall, for aquatic species in the North Fork area, Alternative B.1 provides more enhanced protection of aquatic and riparian species and their habitats than Alternative B.

Alternative B provides direction to remove nonnative trout to protect native cutthroat trout populations, resulting in beneficial impacts on native fish. A stipulation would limit surface occupancy and site disturbance within 1.0 mile of habitat occupied by federally listed fish (NSO-23/NGD-9) and 0.25-mile for native cutthroat trout, reducing impacts from land uses in these areas (CSU-21/SSR-23). In

addition, Alternative B.1 would apply NSO within 0.50-mile of stream segments that have existing and potential habitat for native cutthroat trout, further protecting this species in the North Fork area.

For terrestrial wildlife species, Alternative B provides more-restrictive stipulations than Alternative A to limit surface occupancy and site disturbance within occupied habitats of most federally listed or candidate species, and within all habitat (mature deciduous riparian forest) for yellow-billed cuckoo (NSO-30/NGD-11). For Canada lynx, Alternative B would follow management guidelines in the current USFWS Management Plan and would apply a CSU/SSR stipulation in important lynx habitats (CSU-26/SSR-30), which would reduce disturbance and disruption impacts on lynx.

Raptors are discussed in general under **Section 4.3.5**. Alternative B provides specific enhanced protection for nesting and other key habitats for eagles and other sensitive raptor species, compared with Alternative A.

For Gunnison sage-grouse, a range of stipulations would increase protection for all seasonal habitats, compared with Alternative A. In breeding habitats, fluid mineral leasing stipulations under Alternative B would prohibit leasing and geophysical exploration within 0.6-mile of Gunnison sage-grouse leks. Buffering the lek polygons by 0.6-mile conforms to the disturbance guidelines in the Gunnison Sage-grouse Rangewide Conservation Plan (Gunnison Sage-grouse Rangewide Steering Committee 2005). This 0.6-mile buffer serves as a measure of protection to ensure that the entire lek polygon is captured within the buffer polygon and that potential direct or indirect impacts directly adjacent to a lek that could influence lekking behavior are evaluated. In addition, under Alternative B, the BLM would close future leasing in all occupied sage-grouse habitat and would prohibit disturbance/disruption within 6 miles of active leks during the breeding season (NL-10/NGD-12, TL-17). Other stipulations would provide general protection from disturbance/disruption within 4 miles of leks and in mapped breeding and early brood-rearing habitats (NSO-32/NGD-13). Alternative B.1 would apply NSO stipulations within 4 miles of any known Gunnison sage-grouse lek and within mapped Gunnison sage-grouse breeding, summer, and winter habitat outside of the 4-mile lek buffer. Currently there is 1 acre of occupied Gunnison sage-grouse habitat within the North Fork area; this NSO would apply to 1 acre.

Off-highway vehicles would be limited to designated trails on portions of the Kinikin Hills and Dry Creek SRMAs, where there is Gunnison sage-grouse designated critical habitat. However, due to the open nature of the landscape, this travel management action could be difficult to enforce, and impacts on Gunnison sage-grouse designated critical habitat could result.

For other special status wildlife species now recognized to be of significant management concern, Alternative B provides management direction and protective stipulations not included in Alternative A. For prairie dogs, stipulations would protect all active towns (NSO-28/NGD-17), which would reduce the likelihood of habitat degradation and disturbance to prairie dogs caused by surface-disturbing activities. In addition, the BLM would develop and manage prairie dog release areas on BLM-administered land to relocate prairie dogs from private lands threatened by development; this would help to mitigate the effects of habitat degradation or destruction on private lands, assuming the prairie dogs prefer and/or utilize the relocation areas. Stipulations would protect kit fox active dens (CSU-36/SSR-43) and sensitive bat species roosts (NSO-43/NGD-19). The existing withdrawal from locatable mineral entry at the Cory Lode Mine bat roost would be maintained, and additional withdrawals from locatable mineral entry would be sought for other important bat roost sites in the Planning Area. Stipulations to protect waterfowl and shorebirds would be extended to all major rivers in the Planning Area with appropriate buffers (NL-2/NGD-3).

For bighorn sheep, Alternative B includes an objective to manage grazing allotments to mitigate the effects of domestic sheep and goat grazing on desert and Rocky Mountain bighorn sheep populations.

This would reduce adverse effects of livestock grazing on bighorn sheep, compared with Alternative A, which provides no similar objective. Alternative B would cancel current and deny proposed domestic goat or sheep grazing and trailing permits within 9 miles of occupied bighorn sheep habitat. This would greatly reduce the potential for disease transmission to bighorn sheep from domestic livestock. It would eliminate authorized domestic sheep and goat grazing and trailing within the maximum area recommended by recent studies to avoid disease transmission to wild sheep (Wild Sheep Working Group 2012). Alternative B would also allow the expansion of wild sheep populations into suitable and historic habitat not currently stocked with domestic sheep and goats. This would provide a beneficial impact on desert and Rocky Mountain bighorn sheep, compared with Alternative A, which would provide no similar direction.

Alternative C

Effects on All Special Status Species

Alternative C emphasizes resource uses, commodity production, and visitation. Overall management is to maintain populations of special status species, with no specific direction to enhance or restore populations or their habitats. Alternative C recognizes fewer aquatic and terrestrial habitat types as priority for special status species, with sagebrush being the only upland type recognized. This would limit management at landscape scales for special status species.

Impacts from management of climate change would be similar to those described for Alternative A, though Alternative C includes seeding local native species to improve long-term survival of plant populations. This management action would improve the success of restoration and revegetation efforts, and may support species adaptation in the face of potential habitat alterations resulting from climate change. As a result, impacts from climate change would be reduced from Alternative A.

The minimal restrictions on fluid mineral development would result in a reasonably foreseeable development scenario similar to that projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**.

Under Alternative C, two ecological emphasis areas (24,150 acres) would be ROW avoidance areas, with CSU and SSR restrictions applied. Occupied habitat of known populations of federally listed species would be ROW avoidance areas. Other closures, NL, NSO, NGD, CSU, and SSR restrictions would extend protection to special status species and reduce impacts from land uses (e.g., NSO-42/NGD-18, CSU-22/SSR-24, CSU-24/SSR-27, and CSU-28/SSR-33).

Four ACECs would be managed on 29,440 acres, which is all but the Tabeguache Creek ACEC designated under Alternative A; within the four ACECs, NSO and CSU stipulations, ROW avoidance management, and limits on travel and forestry actions would reduce impacts on special status species, similar to Alternative A. Under Alternative C, no areas would be protected as lands with wilderness characteristics, and impacts are the same as those described for Alternative A. Impacts from management of the Tabeguache Area are the same as those described for Alternative B.

Under Alternative C, 75,480 acres (14 percent more acres than under Alternative A) would be managed as VRM Classes I and II, reducing impacts from land uses to special status species.

Impacts from forestry management under Alternative C are similar to those described for Alternative B. Wood product sales and/or harvest would be closed on 44,530 acres (60 percent fewer acres than under Alternative A), resulting in greater potential for impacts on some special status species from habitat disturbance or animal disruption.

For livestock grazing under Alternative C, the BLM would manage 653,270 acres (5 percent more acres than under Alternative A) as open and 22,530 acres (60 percent fewer acres than under Alternative A) as closed. Emphasis would be placed on increasing grazing preference, and the BLM would exclude livestock grazing on disturbed areas to the extent needed to comply with BLM Colorado Public Land Health Standards (BLM 1997). This would allow recovery of native vegetation to some degree from grazing impacts and would reduce impacts from grazing on some special status species.

The BLM would manage no SRMAs and 12 ERMAs on 215,880 acres. As described in **Section 4.3.5** (Fish and Wildlife), management of ERMAs under Alternative C would result in reduced impacts on most special status species and their habitats from recreation compared with Alternative A.

Open cross-country motorized use would be allowed on 16,070 acres within the Decision Area (88 percent more than under Alternative A), which would increase the potential for impacts on special status species. Areas closed to motorized use on 45,170 acres (20 percent fewer acres than under Alternative A) and limited to designated routes on 614,560 acres (4 times more acres than under Alternative A) would reduce the potential for impacts, though to a lesser extent than under Alternative A.

Management of 210,390 acres as ROW avoidance and 44,550 acres (48 percent fewer acres than under Alternative A) as ROW exclusion areas would increase protections for special status species, though to a lesser extent than under Alternative A since fewer acres would be managed as ROW exclusion areas. Impacts from designated utility corridors would be the same as those described for Alternative A.

Under Alternative C, the BLM would manage 631,580 acres of BLM surface/federal minerals and 240,230 of split-estate lands (totaling 871,810 acres) as open to fluid minerals leasing (the same amount as under Alternative A). BLM surface/federal minerals closed to fluid minerals leasing (44,220 acres) would be the same amount as under Alternative A. Of BLM surface/federal minerals open to fluid mineral leasing, NSO stipulations would be applied on 14,680 acres (80 percent fewer acres than under Alternative A), and CSU stipulations would be applied on 365,810 acres (4 times more acres than under Alternative A). Stipulations on open lands, some to specifically protect special status species, would reduce the potential for impacts from fluid minerals leasing on these lands, although the larger amount of land open to surface occupancy could increase the potential for some impacts.

Under Alternative C, 9,550 acres of BLM surface/federal minerals would be recommended for withdrawal from locatable mineral entry (66 percent fewer acres than under Alternative A). If withdrawn, these areas would provide additional protection to special status species from mining impacts.

Seed requirements for all seed used on BLM-administered lands would be the same as for Alternative A. In general, although weed management would be implemented and would reduce weeds to some degree, the increased disturbance associated with Alternative C would result in the greatest potential for weed introduction and spread in the Decision Area.

Alternative C would result in continued habitat fragmentation for special status species, similar to Alternative A. The designation of the four existing ACECs described above would result in roughly similar fragmentation compared to Alternative A. Establishment of three ecological emphasis areas would result in somewhat less fragmentation than Alternative A, although use restrictions in the ecological emphasis areas could still allow for fragmentation.

Effects on Special Status Plants

Impacts on special status plants from recreation, travel, lands and realty, livestock grazing, fluid mineral leasing, locatable mineral exploration or development, and ACECs are similar to those described under

Effects Common to All Alternatives. Particular protections for special status plants include closing all federally threatened, endangered, and proposed plant species' occupied habitat to mineral materials disposal and nonenergy solid mineral leasing. However, the greatest impacts on special status plants could occur from Alternative C, as up to 10 percent of sensitive plant populations could be damaged, injured, or removed, and there would be no stipulations to protect federally listed or candidate plant species. Impacts from ACEC management under Alternative C are the same as those described for Alternative A.

Impacts from recreation would be most likely to occur in the Kinikin Hills ERMA, which has clay-loving wild buckwheat populations and would be open to cross-country OHV use. Impacts are greater than those described for Alternative B, since the area would be managed as an ERMA where the BLM would have a reduced ability to manage recreation. The open nature of the landscape would exacerbate this problem of noncompliance, as OHV users could easily cross into the Kinikin Hills ERMA. As a result, populations of clay-loving wild buckwheat could be damaged in the Kinikin Hills ERMA.

Effects on Special Status Fish and Wildlife

For aquatic species, CSU and SSR stipulations would be applied around major river corridors (CSU-10/SSR-10) and within 325 feet of perennial streams (CSU-11/SSR-12). The BLM would limit mineral materials disposal and wood products collection and harvest within riparian areas. It would apply CSU and SSR stipulations within 100 feet of perennial and intermittent streams and naturally occurring wetlands, springs, and seeps (CSU-15/SSR-15). This would provide some protection to aquatic and riparian habitats for special status species and would reduce impacts from surface-disturbing activities, although there would be no restrictions on permitted recreation activities or events in riparian areas.

Mechanized and motorized off-route travel would be prohibited in riparian or wetland areas, with some exceptions. This would reduce some impacts on aquatic habitats. Under Alternative C, all eligible segments would be determined not suitable for inclusion in the NWSRS and released from interim protective management, providing no additional protections in these areas.

Alternative C, like Alternative A, does not provide direction to remove nonnative trout to protect native cutthroat trout populations, resulting in continued adverse impacts on native fish. As in Alternative A, no stipulations would limit surface occupancy or site disturbance near habitat occupied by federally listed fish or native cutthroat trout.

For terrestrial wildlife species, Alternative C would apply a CSU/SSR stipulation, but no NSO stipulation, within occupied habitat of federally listed and candidate species, except that no stipulation would be applied to Canada lynx habitats (CSU-24/SSR-27). This is more restrictive than Alternative A, except for Canada lynx, and would result in mixed impacts for federally listed and candidate species, with greater impacts for Canada lynx. For Gunnison sage-grouse, stipulations would provide some protection for key habitats but none in winter habitat. An NSO stipulation would apply to fluid mineral leasing within 0.6-mile of leks but would not close lek areas or occupied habitat to fluid mineral exploration or future leasing (NSO-31/SSR-32). A CSU/SSR stipulation would limit some disturbance/disruption within 4 miles of active leks, but it would not completely exclude surface occupancy (CSU-28/SSR-33). These restrictions would reduce impacts on Gunnison sage-grouse, compared with Alternative A, but they fall short of accepted minimum protection standards to maintain sage-grouse viability (Knick and Connelly 2011). Impacts from recreation would be most likely to occur in the Kinikin Hills and Dry Creek ERMAs, which have designated critical habitat for Gunnison sage-grouse, and would be open to cross-country OHV use. The open nature of the landscape would exacerbate the problem of noncompliance, as OHV users could easily cross into the Kinikin Hills or Dry Creek ERMAs. As a result, designated critical habitat for Gunnison sage-grouse could be damaged in the Kinikin Hills and Dry Creek ERMAs. (Raptors are discussed under **Section 4.3.5**.) Alternative C provides CSU stipulations to protect

nesting Mexican spotted owls, which is less protection than the NSO restriction in Alternative A and does not provide specific protection for suitable nesting habitat.

For other special status species, Alternative C provides protective stipulations not included in Alternative A. For prairie dogs, stipulations would protect major active towns above a size threshold (NSO-42/NGD-18). Stipulations would protect kit fox active dens (TL-26) and sensitive bat species roosts (CSU-38/SSR-45). Stipulations to protect waterfowl and shorebirds would be extended to all major rivers in the Planning Area, with appropriate buffers (CSU-10/SSR-10).

For bighorn sheep, Alternative C provides a livestock grazing objective to minimize contact and mitigate effects of domestic sheep grazing on desert or Rocky Mountain bighorn sheep populations and disease transmission. This would reduce impacts, compared with Alternative A, which provides no similar objective. Alternative C would exclude domestic goat grazing but would allow domestic sheep grazing within 5 miles of occupied wild sheep habitat. It provides other actions to reduce contact between domestic sheep/goats and wild sheep within 3 miles of occupied wild sheep habitat. These actions would reduce, but not eliminate, the risk of disease transmission to wild sheep.

Alternative D

Effects on all Special Status Species

Alternative D's overall management direction is similar to Alternative B, with additional direction to promote ecosystem integrity and protect and restore ecosystem processes. As a result, Alternative D would reduce adverse impacts on special status species, compared with Alternative A, and would provide beneficial impacts through active management to restore and enhance habitats. Alternative D recognizes priority habitats as occupied and suitable habitats for federally listed and candidate species and BLM sensitive species. These priorities would encompass most of the important habitats for special status species and would meet the goal of protecting and enhancing the species.

Impacts from management of climate change would be as described for Alternative B.

The restrictions on fluid mineral development would result in a reduction in the number of new and exploratory development wells and associated surface-disturbance from those projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**.

Under Alternative D, the BLM would manage 12 ecological emphasis areas (177,700 acres), with ROW avoidance and CSU and SSR restrictions applied. Impacts are similar to those described for Alternative B, although across fewer acres. Protections are reduced under Alternative D. Occupied habitat of known populations of federally listed species would be ROW avoidance areas. Other closures, NL, NSO, NGD, CSU, and SSR restrictions would protect special status species and their habitats from disturbance and disruption (e.g., NSO-9/SSR-11, NSO-24/SSR-22, NSO-36/SSR-36, CSU-19/SSR-20, CSU-20/SSR-21, and CSU-27/SSR-31).

Eight ACECs would be managed on 51,320 acres (71 percent more acres than under Alternative A). Protection measures, including NSO stipulations, management as ROW avoidance or exclusion, and closure to mineral resource development and motorized and mechanized travel, would reduce impacts on special status species from land uses.

Under Alternative D, three lands with wilderness characteristics units (18,320 acres) would be managed to protect those characteristics. Impacts are similar to those described for Alternative B, although protected areas would be smaller in size under Alternative D. Impacts from management of the Tabeguache Area are the same as for Alternative B.

Under Alternative D, the BLM would use mechanical treatments, prescribed fire, and other methods as ecologically appropriate to meet resource objectives. This would provide flexibility to use a range of treatments to reduce the potential for catastrophic wildfires. Impacts on special status species are similar to those under Alternative B.

Under Alternative D, 158,980 acres (2 times more acres than under Alternative A) would be managed as VRM Classes I and II, resulting in reduced impacts on special status species from land use impacts.

Forestry management would be similar to Alternative B, with wood product sales and/or harvest closed on 281,390 acres (155 percent more acres than under Alternative A). Impacts are similar to those under Alternative B.

Under livestock grazing, the BLM would manage 617,140 acres (less than 1 percent fewer acres than under Alternative A) as available and 58,660 acres as unavailable (4 percent more acres than under Alternative A). This would result in a lower potential for grazing impacts on special status species. Exclusion of grazing on disturbed areas would result in the same impacts as for Alternative C.

The BLM would manage seven SRMAs on 124,400 acres and four ERMAs on 73,310 acres. Impacts from recreation on special status species would be greater than those under Alternative A due to the increased concentration and management of recreation in SRMAs (see the ***Nature and Type of Effects*** in **Section 4.3.5** [Fish and Wildlife]).

Open cross-country motorized use would not be allowed under Alternative D and would result in fewer impacts on special status species than under Alternative A. Areas closed to motorized use (1,160 acres) and motorized and mechanized use (57,400 acres) totaling 58,560 acres (4 percent fewer acres than under Alternative A) and limited to designated routes on 617,240 acres (4 times more acres than under Alternative A) would overall reduce the potential for impacts on special status species.

Management of 276,500 acres as ROW avoidance (compared with none in Alternative A) and 53,700 acres (37 percent fewer acres than under Alternative A) as ROW exclusion areas would reduce the potential for impacts from ROWs, compared with Alternative A, including the potential for increased habitat fragmentation. Impacts from designated utility corridors would be the same as those for Alternative B.

Under Alternative D, the BLM would manage 627,290 acres of BLM surface/federal minerals and 238,680 acres on split-estate lands (totaling 865,970 acres) as open to fluid minerals leasing (less than 1 percent fewer acres than under Alternative A). Designation of more areas of BLM surface/federal minerals as closed to fluid minerals leasing (48,510 acres and 1,550 acres on private or state surface/federal minerals estate (totaling 50,060 acres;13 percent more acres than under Alternative A) and stipulations on open lands would reduce impacts on special status species from fluid minerals leasing on these lands. Of the acres of BLM surface/federal minerals open to fluid mineral leasing, NSO stipulations would be applied on 187,560 acres (nearly 8 times more acres than under Alternative A), and CSU stipulations would be applied on 265,140 acres (over 2 times more acres than under Alternative A).

Under Alternative D, 54,090 acres of BLM surface/federal minerals would be recommended for withdrawal from locatable mineral entry (95 percent more acres than under Alternative A), resulting in fewer impacts on special status species from mining locatable minerals in withdrawn areas.

Impacts from weed management are similar to those described for Alternative B. Seed requirements for all seed used on BLM-administered lands would be the same as for Alternative B.

Effects on Special Status Plants

Impacts on special status plants from recreation, travel, lands and realty, livestock grazing, fluid mineral leasing, locatable mineral exploration or development, and ACECs are similar to those described under ***Effects Common to All Alternatives***. The BLM would apply CSU stipulations on fluid mineral leasing for federally listed and BLM sensitive plant species (CSU-19/SSR-20 and CSU-20/SSR-21). This would provide less protection than an NSO stipulation, as development would still occur and could fragment habitats, particularly for Colorado hookless cactus. In addition, the location of special status plants is not always known, so populations could be impacted. Impacts from closure on mineral materials disposal and nonenergy solid mineral leasing are the same as those described for Alternative C.

Impacts from management of climate change would be as described for Alternative B.

Four ACECs (total of 25,480 acres, 4 times more than under Alternative A) under Alternative D would be designated to protect special status and rare plant species:

- Adobe Badlands (6,370 acres)—same as Alternative A
- Fairview South (BLM Expansion) (610 acres)—clay-loving wild buckwheat
- Dolores River Slickrock Canyon (9,780 acres)—kachina daisy, Naturita milkvetch
- Roubideau Corridors (8,720 acres)—Grand Junction milkvetch

These special status and rare plant species would receive direct protection in the ACECs through such measures as described under ***Effects on All Special Status Species***.

Impacts on clay-loving wild buckwheat from recreation in the Kinikin Hills ERMA are similar to those described for Alternative B.

Effects on Special Status Fish and Wildlife

For aquatic species, Alternative D would apply more protection for aquatic and riparian habitats and special status species than Alternative A. The BLM would apply NSO, SSR, and ROW avoidance around major river corridors and within 325 feet of perennial streams; ROW avoidance within 100 feet of riparian and wetland areas, seeps, and springs; closure to mineral materials disposal and wood products collection and harvest within 100 feet of riparian areas; and NSO and SSR stipulations within 325 feet of perennial and intermittent streams and naturally occurring wetlands, springs, and seeps. Motorized off-route travel would be prohibited in riparian or wetland areas, and additional riparian stipulations would be required for commercial SRPs. These measures would reduce impacts on aquatic and riparian special status species from surface-disturbing activities. Under Alternative D, 16 river segments (104.6 miles) would be determined suitable for inclusion in the NWSRS, and interim protective management guidelines would reduce impacts on riparian and aquatic special status species.

Alternative D provides direction to remove nonnative trout to protect native cutthroat trout populations, providing a beneficial impact on native fish compared with Alternative A. Stipulations limiting surface occupancy and site disturbance within 2,500 feet of a portion of the Gunnison River to protect federally listed fish and within 500 feet of streams occupied by native cutthroat trout (NSO-24/SSR-22) would reduce impacts from land uses to those species.

For terrestrial wildlife species, Alternative D includes NSO and SSR stipulations to occupied habitat for federally listed and candidate species, allowing surface occupancy in yellow-billed cuckoo habitat (CSU-25/SSR-29). As a result, this alternative would result in less impact on most species, compared with Alternative A. Stipulations and impacts for Canada lynx are similar to those under Alternative B (CSU-27/SSR-31). For Gunnison sage-grouse, stipulations would provide some level of protection from surface occupancy and site disturbance in all seasonal habitats. Breeding habitat would be protected with similar stipulations as Alternative C (NSO-31/SSR-32), and would similarly fall short of accepted minimum

protection standards to maintain sage-grouse viability (Knick and Connelly 2011). However, disturbance/disruption would be prohibited during the breeding season within 4 miles of active leks (CSU-29/SSR-34). Further, additional conservation measures could be applied as needed under the CSU stipulation within breeding (non-lek) habitats to conserve high-quality sage-grouse habitat and to avoid habitat fragmentation and cumulative effects, issues now recognized as critically important for sage-grouse conservation (Knick and Connelly 2011). In addition, sage-grouse lek habitat and designated critical habitat would be designated as ROW exclusion. These measures would further reduce impacts compared to Alternative C but do not provide as much protection as Alternative B. Impacts on Gunnison sage-grouse designated critical habitat from recreation in the Kinikin Hills ERMA are similar to those described for Alternative C. Impacts on Gunnison sage-grouse designated critical habitat from recreation in the Dry Creek SRMA are similar to those described for Alternative B. (Raptors are discussed under **Section 4.3.5**.) Alternative D provides substantial protection for Mexican spotted owl nests and breeding habitat through stipulations (NSO-40/SSR-41 and CSU-34/SSR-40) and would have fewer effects on Mexican spotted owl and sensitive raptor species, compared with Alternative A.

For other special status species, Alternative D provides protective stipulations not included in Alternative A for prairie dog colonies, kit fox active dens, and sensitive bat species roosts (NSO-44/SSR-46). Stipulations to protect waterfowl and shorebirds would be extended to all major rivers in the Planning Area, with appropriate buffers (NSO-9/SSR-11). These measures would reduce impacts on special status species.

For bighorn sheep, Alternative D includes the same objective as Alternative C to manage grazing allotments to mitigate the effects of domestic sheep and goat grazing on desert and Rocky Mountain bighorn sheep. This would reduce adverse effects of livestock grazing on bighorn sheep, compared with Alternative A, which provides no similar objective. Alternative D would prohibit domestic goat grazing in occupied wild sheep habitat and would manage domestic sheep grazing in accordance with BLM Manual 1730, Management of Domestic Sheep and Goats to Sustain Wild Sheep (BLM 2016e), in collaboration with CPW and livestock permittees, using current science summarized by the Wild Sheep Working Group. At permit renewal, the status of wild and domestic sheep will be reviewed with current data specific to the allotment, and permit renewal decisions will be guided by BLM Manual 1730, Management of Domestic Sheep and Goats to Sustain Wild Sheep (BLM 2016e). Conversion of cattle allotments to domestic sheep/goat allotments would be prohibited where the likelihood of disease transmission is at an unacceptable level. Twenty-five allotments in occupied wild sheep habitat would be closed to domestic goat use until current science can mitigate the risk of disease transmission to bighorn sheep; however, none of these allotments is currently permitted for goat grazing. Trailing of domestic sheep/goats in areas where there is a high or moderate likelihood of disease transmission would be managed to mitigate risk of disease transmission, and it would be limited to 1 to 2 days. These actions would reduce impacts of livestock grazing on desert and Rocky Mountain bighorn sheep, compared with Alternative A, which provides no similar direction.

Alternative E

Effects on all Special Status Species

The BLM's overall management direction under Alternative E would be similar to Alternative D. As a result, Alternative E would reduce adverse impacts on special status species, compared with Alternative A, and would provide beneficial impacts through active management to restore and enhance habitats. Management of priority habitats would have impacts as described for Alternative D.

Climate

Impacts from management of climate change would be as described for Alternative B.

Fish and Wildlife

Occupied habitat of known populations of federally listed species would be ROW avoidance areas. In addition, NSO, CSU, and SSR restrictions would protect special status species and their habitats from disturbance and disruption (e.g., CSU-19/SSR-20, NSO-22/SSR-21, NSO-24/SSR-22, NSO-26/SSR-25, NSO-29/SSR-28, CSU-25/SSR-29, CSU-27/SSR-31, NSO-31/SSR-32, and CSU-29/SSR-34). Such management would reduce surface disturbance and fragmentation of special status species habitats, as well as reducing direct disturbance to individuals. By providing mechanisms to protect these habitats, the BLM would support efforts to downlist or delist special status species.

Areas of Critical Environmental Concern

Six ACECs would be managed on 30,190 acres (less than 1 percent more acres than under Alternative A). Protection measures, including NSO stipulations, management as ROW avoidance or exclusion, and closure to mineral resource development and motorized and mechanized travel, would reduce impacts on special status species from land uses.

Lands with Wilderness Characteristics

Under Alternative E, no lands with wilderness characteristics units would be managed to protect those characteristics. Instead, a slightly lower level of protection would be applied on the 18,320 acres that would be managed to minimize impacts on wilderness characteristics while managing for other uses. In these areas, incidental protections for special status species would result from the conservation of wilderness characteristics where possible through use of a CSU stipulation. The remaining 23,830 acres of wilderness characteristics units would be managed to prioritize other multiple uses. As such, no special protections would be afforded to those areas, and no incidental protections of special status species would occur, similar to Alternative A.

Wildland Fire Ecology and Management

The available methods to manage fire and fuels and associated impacts under Alternative E would be the same as described for Alternative D.

Visual Resources

Under Alternative E, 151,930 acres (over 2 times more acres than under Alternative A) would be managed as VRM Classes I and II, resulting in reduced impacts on special status species from land use impacts and the resulting changes to the landscape.

Forestry and Woodland Products

Forestry management would be similar to Alternative B, though Alternative E provides more guidance on areas open and closed to commercial wood harvest and general wood cutting, which could reduce impacts to special status species in some areas depending on the uses allowed. Impacts would also be reduced on the 171,970 acres (over 1.5 times more acres than under Alternative A) where wood product sales and/or harvest would be closed.

Livestock Grazing

Under Alternative E, the BLM would manage 616,640 acres (less than1 percent fewer acres than under Alternative A) as available and 59,160 acres as unavailable to grazing (5 percent more acres than under Alternative A). This apparent reduction in available acres and apparent increase in unavailable acres actually reflects corrections to the existing grazing inventory and associated GIS; in reality, acres open and unavailable under Alternative E are similar to Alternative A and would have a similar potential for grazing impacts on special status species. Exclusion of grazing on disturbed areas would result in the same impacts as for Alternative C.

Recreation and Visitor Services

The BLM would manage eight SRMAs on 122,130 acres and three ERMAs on 64,790 acres. Impacts from recreation on special status species would be greater than those under Alternative A due to the increased concentration and management of recreation in SRMAs (see the ***Nature and Type of Effects*** in **Section 4.3.5** [Fish and Wildlife]).

Comprehensive Travel and Transportation Management

Open cross-country motorized use would be allowed on 3,950 acres within the Decision Area (54 percent fewer than under Alternative A), which would cause fewer impacts on special status species than under Alternative A. Areas closed to motorized use (880 acres) and motorized and mechanized use (55,770 acres) totaling 56,650 acres (1 percent more acres than under Alternative A) and limited to designated routes on 615,200 acres (4 times more acres than under Alternative A) would reduce the potential for impacts on special status species associated with motorized and mechanized travel to a greater extent than under Alternative A and would support efforts to downlist or delist special status species.

Lands and Realty

The BLM would manage 66,030 acres as ROW avoidance (compared with 0 in Alternative A) and 53,040 acres as ROW exclusion (38 percent fewer acres than under Alternative A). By managing more acres as ROW avoidance, the BLM could allow ROW development with special stipulations, but some impacts to special status species and their habitats could still occur, compared with the greater acreage of ROW exclusion areas in Alternative A. Impacts from designated utility corridors would be the same as those for Alternative B.

Fluid Leasable Minerals—Oil and Gas

Under Alternative E, the 631,580 acres of BLM surface/federal minerals and 240,230 acres of split-estate lands (totaling 871,810 acres) that would be managed as open and closed (44,220 acres) to fluid mineral leasing would be the same as for Alternative A. The restrictions on fluid mineral development, such as NSO and CSU stipulations, would result in a reduction in the number of new and exploratory development wells and associated surface-disturbance from those projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**. Of the acres of BLM surface/federal minerals open to fluid mineral leasing, NSO stipulations would be applied on 74,580 acres (3 times more acres than under Alternative A), and CSU stipulations would be applied on 386,820 acres (3 times more acres than under Alternative A).

Locatable Minerals, Mineral Materials, and Nonenergy Leasable Minerals

Under Alternative E, 15,790 acres of BLM surface/federal minerals would be recommended for withdrawal from locatable mineral entry (43 percent fewer acres than under Alternative A). If withdrawn, these areas would provide additional protection to special status species from mining locatable minerals in withdrawn areas. However, fewer areas would be protected compared with Alternative A, under which more acres would be withdrawn.

Vegetation

Impacts from weed management under Alternative E would be the same as those described for Alternative B.

Effects on Special Status Plants

The type of impacts on special status plants from recreation, travel, lands and realty, livestock grazing, fluid mineral leasing, locatable mineral exploration or development, and ACECs are similar to those described under ***Effects Common to All Alternatives***. Similar to Alternative D, the BLM would apply CSU/SSR stipulations on fluid mineral leasing for BLM sensitive plant species (CSU-19/SSR-20), but

Alternative E would provide additional protection for ESA-listed plant species through the use of an NSO/SSR stipulation (NSO-22/SSR-21). The use of an NSO stipulation would eliminate surface disturbance and prevent habitat fragmentation associated with mineral exploration and development, particularly for Colorado hookless cactus. Impacts from closure of mineral materials disposal would be similar to those described for Alternative C, as federally threatened, endangered, and proposed plant species' occupied habitat would be closed. However, Alternative E provides more protection to unoccupied habitats, candidate species, and BLM sensitive plant species by closing additional acres (125,780 acres; 20 percent more acres than under Alternative A). The closure of 163,300 acres (3.5 times more than Alternative A), portions of which are federally threatened, endangered, and proposed plant species' occupied habitat, to nonenergy solid leasable minerals would provide direct protections to federally protected plants.

Climate

Impacts from management of climate change would be as described for Alternative B.

Areas of Critical Environmental Concern

Two ACECs (totaling 6,980 acres, 6 percent more acres than under Alternative A) would be designated to protect special status and rare plant species:

- Adobe Badlands (6,370 acres)—same as Alternative A
- Fairview South (BLM Expansion) (610 acres)—clay-loving wild buckwheat

These special status and rare plant species would receive direct protection in the ACECs through such measures as described under ***Effects on All Special Status Species***, which could support the eventual downlisting or delisting for some special status plant species to a greater extent than under Alternative A. For instance, the expansion of the Fairview South ACEC would protect 98 percent of the clay-loving wild buckwheat rangewide population, and thus would provide mechanisms to ensure continued long-term management and protection of the species.

Recreation and Visitor Services

Impacts on clay-loving wild buckwheat from recreation in the Kinikin Hills ERMA are similar to those described for the Kinikin Hills SRMA under Alternative B.

Effects on Special Status Fish and Wildlife

For aquatic species, Alternative E would apply more protection for aquatic and riparian habitats and special status species than Alternative A. The BLM would apply CSU and SSR around major river corridors and within 50 feet of perennial, intermittent, and ephemeral streams, riparian areas, fens, and wetlands; ROW avoidance around major river corridors, within 50 feet of perennial streams, and within 50 feet of riparian and wetland areas, seeps, and springs; closure of lands within 100 feet of riparian areas to mineral materials disposal; and closure to wood products collection and harvest. In addition, motorized off-route travel would be prohibited in riparian or wetland areas. These measures would reduce impacts on aquatic and riparian special status species from surface-disturbing activities and would support efforts to downlist or delist affected special fish and wildlife species. Under Alternative E, wild and scenic river management would have the same impacts as described for Alternative D.

Impacts from removal of nonnative trout would be as described for Alternative B. Impacts from stipulations protecting the Lower Gunnison River and streams occupied by native cutthroat trout would be the same as described for Alternative D.

For terrestrial wildlife species, stipulations and impacts on nearly all special status wildlife would be as described for Alternative D. The exception would be management for Gunnison sage-grouse, which would be similar to but refined from Alternative D. This is because Alternative E reflects the designation

of critical habitat for the species since Alternative D was developed. Stipulations would be similar to Alternative D and would provide some level of protection from surface occupancy and site disturbance in all seasonal habitats; Alternative E specifies that these include designated critical habitat (both designated occupied and unoccupied), winter habitat, and nondesignated occupied breeding habitat. Gunnison sage-grouse lek habitat would be managed as ROW exclusion, and critical habitat would be ROW avoidance. By refining management in this way, Alternative E would better reflect the current status and biology of the species and would thus provide more protection compared with Alternative A, thereby supporting efforts to downlist or delist Gunnison sage-grouse. Impacts on Gunnison sage-grouse designated critical habitat from recreation in the Kinikin Hills ERMA are similar to those described for Alternative C. Impacts on Gunnison sage-grouse designated critical habitat from recreation in the Dry Creek SRMA are similar to those described for Alternative B. (Raptors are discussed under **Section 4.3.5**, Fish and Wildlife).

Impacts from allowing bighorn sheep reestablishment into suitable and historic habitats would have similar impacts as described for Alternative D. Impacts would be slightly reduced under Alternative E due to the reduction in acres (280 fewer acres under Alternative E) that would be open for sheep grazing. Under Alternative E, the BLM would use the Risk of Contact Model (or currently accepted model) to predict the risk of disease transmission, per direction provided in BLM Manual 1730, Management of Domestic Sheep and Goats to Sustain Wild Sheep (BLM 2016e). Conversion of grazing allotments from cattle to domestic sheep would increase the risk of contact between domestic and wild sheep, but that conversion would only be allowed in areas with lower risk of contact and likelihood of disease transmission. Areas of high, moderate, some, low, and very low risk for disease transmission are disclosed by allotment in **Appendix K**. For bighorn sheep, current levels of interaction and disease transmission would continue until the BLM renews grazing permits; at that time, the BLM would conduct NEPA analyses using more site-specific information and any new data to determine the bighorn herd's current condition and possible subsequent changes in management.

Trailing of domestic sheep/goats would be prohibited unless effective separation results in a high degree of confidence that there would be a low to no risk of contact with wild sheep, and it would be limited to 1 to 2 days. These actions would reduce impacts of livestock grazing on desert and Rocky Mountain bighorn sheep, compared with Alternative A, which provides no similar direction.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on special status species is within the Uncompahgre RMP Planning Area and adjacent areas within about 50 miles. This includes parts of the BLM Tres Rios, Moab, Grand Junction, Colorado River Valley, and Gunnison Field Offices; the Grand Mesa/Gunnison/Uncompahgre National Forest and Manti-La Sal National Forest; and other public and private lands. The larger analysis area is necessary because fish and wildlife move across this larger landscape, rare plant populations could extend beyond the Uncompahgre RMP Planning Area boundary, and animals and plants depend on ecological processes that extend over larger areas.

For special status species, cumulative effects of each alternative are similar to those for fish and wildlife resources (**Section 4.3.5**) and vegetation (**Section 4.3.4**). Federal and state agency actions would generally consider and mitigate impacts on special status species, and cumulative effects would be minimized. Actions on private lands may not receive such analysis and are more likely to contribute to cumulative effects.

For several special status fish and wildlife species in the Planning Area, regional conservation plans are in place or are being developed to improve conservation efforts across administrative boundaries. For example, for Gunnison sage-grouse, extensive conservation actions will continue on private and BLM-administered lands in the region, including vegetation treatments, private land conservation easements

and other conservation agreements, and sage-grouse population management. Regional planning is increasing collaboration among different agencies and stakeholders and helps to reduce cumulative effects of all the RMP alternatives by supporting the eventual downlisting or delisting of some federally listed species. For instance, protections provided by management in the adjacent Dominguez-Escalante National Conservation Area (e.g., ACEC and route density restrictions for Colorado hookless cactus) and Gunnison Gorge National Conservation Area (e.g., ACECs for clay-loving wild buckwheat and Gunnison sage-grouse) would provide mechanisms to ensure continued long-term management and protection for these species, in concert with the federally listed species management in the Uncompahgre RMP.

4.3.7 Wild Horses

Under all alternatives, the BLM would continue to maintain the closure of the Naturita Ridge Herd Area and would not reintroduce wild horses to the area. Wild horses would not be impacted. There would continue to not be conflict between wild horses and private land, wildlife, and livestock.

4.3.8 Wildland Fire Ecology and Management

This section discusses impacts on wildland fire management from proposed management actions of other resources and resource uses. Existing conditions are described in **Section 3.1.9** (Wildland Fire Ecology and Management).

Methods and Assumptions

Impacts on fire and fuels management generally result from activities that affect firefighter and public safety and fire intensity, frequency, and suppression efforts. As described in **Chapter 3**, national and state BLM fire policy requires that current and desired resource conditions related to fire management be described in terms of three condition classes and five fire regimes. The Fire Regime Condition Classification System measures the extent to which vegetation departs from reference conditions, or how the current vegetation differs from a particular reference condition. However, this system may not be an appropriate indicator for all areas in the Uncompahgre RMP Planning Area; in wildland-urban interface areas, for example, vegetation is often maintained in an altered state to reduce both fire intensity and the resistance to control near subdivisions, while in deer winter range an abundance of shrubs may be desirable for browse.

Indicators

Indicators of impacts on wildland fire management resources are the following:

- Alteration of vegetative cover (standing and downed) that results in a substantial shift in fire regime condition class across the Planning Area
- A substantial change in the likelihood or severity of wildland fire
- Management actions that substantially inhibit a response to wildland fire or fuels treatments to modify future wildland fire occurrence and behavior

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- Fire is an important functional natural process in many of the ecological systems in the Planning Area
- Most fires in the Planning Area have natural causes (e.g., lightning strikes)
- A direct relationship exists between the density of human use within the Planning Area and the frequency of human-caused fires
- A direct relationship exists between fuel loading and potential fire intensity and severity

- Demand for fuels treatments would likely increase over the life of this RMP

Nature and Type of Effects

Many factors can influence the level of fuels in the Planning Area and the ability to manage wildland fire. General impacts are described by resource below.

As described in detail in **Section 3.1.9**, development on private land next to BLM-administered lands dramatically increased over the past two decades. Based on data from 2012, there are approximately 704,140 acres of wildland-urban interface in the Planning Area (including urban/rural areas, energy corridors, and communication sites); wildland-urban interface on BLM-administered land in the Decision Area totals 195,600 acres. The wildland-urban interface introduces additional ignition sources, which increase the probability of wildland fire and the need for fire suppression. This expanding wildland-urban interface zone impacts the ability to manage wildland fire as a natural process due to the necessity of protecting property, infrastructure, and public safety. Fire management within the wildland-urban interface is often more dangerous, time-consuming, and expensive than fire management in undeveloped areas. The need for fuel treatments in these areas is similarly increased in order to protect these values. Similarly, increased recreation use in the Planning Area would increase the probability of unintentional fire starts and the need for fire suppression. In addition, surface disturbance caused by development would contribute to the modification of the composition and structure of vegetation communities (including increases in noxious weed proliferation) in the vicinity of developed areas, which could then be more likely to fuel high-intensity fires.

Air quality regulations can impact the ability to use prescribed fire as a management tool. If energy production or other resource uses in the Planning Area impair air quality beyond allowable standards, then use of prescribed fire could be restricted.

Fuels treatments can impact soil and water quality through risk of increased erosion. Best management practices, stipulations, or other measures to protect soils and water quality could therefore impact the location and methods of fuels treatments.

Fish and wildlife and special status species management could impact wildfire management when the management emphasis is on specific habitat components or vegetation types. The ability to manage for fire as a natural process may be limited when fire suppression is required to protect species or habitat. In addition, timing limitations to prevent disturbance of wildlife species could restrict the timing of mechanical fuels treatments and the scheduling of prescribed burns, impacting fire management effectiveness. Examples of seasonal restrictions are TLs for big game winter range and crucial winter habitat.

Vegetation and weed treatments that decrease both standing and downed vegetation (fuel load) could decrease the intensity of wildland fires and allow fires to be more easily controlled. For example, efforts to reduce incursion of nonnative annual grasses (primarily cheatgrass), encroachment of shrubby vegetation, and proliferation of other noxious and invasive weeds, would promote healthy plant communities and an associated lower risk of high-intensity wildfire. Used appropriately, prescribed fire can be compatible with noxious weed control; however, the presence of noxious weeds and the potential of weeds to spread after a prescribed fire would need to be monitored on a site-specific basis. The noxious weed management program could impose additional site-specific control measures or restrictions on prescribed fire to limit the domination or spread of weeds.

Livestock grazing management can impact the ability to manage fire as a natural process through changes in fine fuels availability (e.g., grasses). Livestock grazing reduces fuel loads, so retiring allotments and

creating forage reserves may lead to increased fuels in those locations. Conversely, increasing AUMs could reduce fuel loads.

Special designations and the management of sensitive resources can restrict fuels treatments on a site-specific basis. Restrictions are generally associated with the management of WSAs, sensitive viewsheds, and cultural and paleontological resources. For example, in areas where naturalness of setting is a management priority, fuels treatments may be limited to those that mimic natural processes and result in a natural-appearing landscape. Similarly, protection measures afforded to cultural and paleontological resources could preclude certain types of fire suppression in the vicinity of those resources, although acreage impacted would typically be limited.

Transportation and travel management may reduce access to certain areas for fuels treatments. Generally, impacts would be minimal due to provisions allowing for administrative and public safety access even when public access is limited.

Although forestry and woodland management can alter the quantity and compositions of fuels, impacts would be negligible due to a lack of commercial stands and relatively low level of forestry product collection for personal use within the Decision Area.

Effects Common to All Alternatives

Impacts of soils and water resources management on the wildland fire management program are similar across all alternatives. Impacts on the wildland fire management program could include alterations on fuels treatment design and methods. Slopes, soil types, distance from riparian areas, and other factors associated with these resources all impact the options available for wildland fire and fuels management.

Managing habitat for a variety of wildlife species could include performing vegetation manipulation, prescribing fire, or managing unplanned fires to obtain multiple benefits, including habitat benefits for wildlife. Under all alternatives, this could affect the wildland fire management program by reducing long-term costs and the potential for large, damaging, unplanned fires.

Through consultation, Native American traditional leaders have remarked that prescribed fire and human-caused wildland fire are a threat to cultural values, sites, and natural resources. The BLM would continue to consult with Native American traditional leaders regarding prescribed fire on a case-by-case basis. Natural ignition fires are not necessarily a threat because a natural fire is part of the natural world.

Forestry actions can impact wildland fire by rearranging fuels loadings, reducing canopy closure, or creating more fire-resilient stands. Forestry actions can also shift the fire regime condition class in an area toward or away from historic conditions. These actions typically lower the risk of catastrophic wildfire in the long term but could increase fire risk in the short term due to the temporary presence of slash (i.e., downed vegetation). Forest management activities could slightly increase the risk of human-caused fires by introducing the presence of potential ignition sources. However, forestry impacts in the Planning Area are negligible due to a lack of commercial stands and relatively low level of forestry product collection for personal use.

While recreation use increases the risk of human-caused ignitions, intensive recreation management could reduce this risk by providing targeted activities and outcomes. However, more overall recreation use equates to increased potential for human-caused ignition.

Across all alternatives, the development of energy and minerals resources (including coal) increases the risk of wildfires by introducing new ignition sources. Facilities, infrastructure, and transmission lines can increase fire and fuels program costs while decreasing fire management flexibility with regard to suppression options. Energy development also poses hazards to firefighters, including unknown toxins,

facility protection, industry personnel evacuation, and overhead power line danger. Fire programs could incur additional costs to train firefighting personnel for emergency situations associated with energy development. As described in **Section 4.4.3** (Energy and Minerals, Effects Common to All Alternatives, Solid Leasable Minerals—Coal), coal production is expected to remain the same across all alternatives.

Issuance of ROWs, which are considered part of the wildland-urban interface, can impact wildland fire management in several ways. Access and program costs are increased because of the increased potential for fire in the wildland-urban interface. There may also be slightly higher risk of human-caused ignitions from construction, maintenance, and use of ROWs. As new wildland-urban interface sites are developed, additional fuels treatments are necessary to address potential impacts on these areas from wildland fires.

Critical infrastructure ROW corridors would need maintenance throughout their life to keep vegetation at a level that would moderate fire behavior and allow for some protection from an unplanned fire. Vegetation maintenance would ensure that critical infrastructure would not fail at a time of need, such as during a wildland fire.

To preserve wilderness characteristics in WSAs, there would be little to no fuels management in these areas, which could result in a shift in fire regime condition class. Likewise, fire management response and tactical suppression options for wildfire in WSAs would be limited so as not to impair their suitability for wilderness designation.

Implementing management for the following resources would have negligible or no impact on wildland fire management and are therefore not discussed in detail: wild horses, paleontological resources, WSRs, national trails and byways, and public health and safety.

Alternative A

Vegetation management and weed treatments would result in a long-term decrease in standing vegetation across the Planning Area, which would decrease wildland fire intensity and allow fires to be more easily controlled. However, over the short term, vegetation treatments can increase the amount of downed vegetation in treated areas, thereby raising the risk of high-intensity wildfires until the downed vegetation decays. These activities would also modify the composition and structure of vegetation communities by creating mosaic vegetation patterns and natural fuel breaks and by promoting healthy, diverse vegetation communities that generally fuel lower-intensity fires. Specifically, efforts to reduce incursion of nonnative annual grasses (primarily cheatgrass), encroachment of shrubby vegetation, buildup of biomass in forested areas, and proliferation of noxious and invasive weeds would help to achieve this effect. Similarly, treatments for habitat improvement and forage would reduce fuels and reduce the likelihood for large-scale stand-replacing fire. However, potential for this type of fire would remain in untreated areas between the younger mosaics.

In the short term, the increase in mechanically treated surface fuel from vegetation treatments could result in increased suppression costs compared to baseline conditions. In the long term, management objectives to decrease standing vegetation and overall fuel loading would result in lowered suppression costs. Fire suppression costs under all alternatives are likely to increase over the life of the RMP if more homes and infrastructure are built in the WUI.

The wildland fire management program would continue to avoid implementing fuels treatments in areas with known cultural resources that would be adversely affected by fire and vegetation treatments. The presence of cultural resource sites could necessitate a modification to the design of fuels treatments and could sometimes cause the fuels treatment unit to be withdrawn from treatment. As a result, these areas would be at a higher risk for larger, more-intense wildfires.

The extent of prescribed fire and mechanical fuels treatments would be altered in design and potentially more difficult to implement in the 66,250 acres of VRM Class I and II lands.

The BLM would not manage any lands to protect their wilderness characteristics under Alternative A. The absence of such management would allow greater flexibility in hazardous fuels treatments, especially in those areas suited for mechanical treatments, and would assist in maintaining a desirable fire regime condition class.

No areas are closed to dispersed camping or overnight use, which results in potential for human-caused ignition. Intensive recreation management in the 49,320 acres of SRMAs could reduce the risk of human-caused ignitions by providing targeted activities and outcomes. However, more overall recreation use equates to increased potential for human-caused ignition.

Regarding comprehensive travel and transportation management, Alternative A would have the greatest potential for human-caused fire because it includes the least travel restrictions, thereby increasing the potential for the spread of invasive species and the presence of human-caused ignition sources.

The types of impacts from lands and realty management are the same as those described under ***Effects Common to All Alternatives***. Managing 85,080 acres as ROW exclusion and certain areas of the San Miguel ACEC as ROW avoidance would restrict access to respond to wildfires, but the lack of infrastructure in these areas would also discourage the spread of invasive weeds and human-caused ignitions.

Continuing to manage 30,000 acres as ACECs could result in fewer human-caused ignitions due to restrictive management actions. Vegetation treatments are those that benefit the identified relevant and important values of the particular ACEC. As a result, there is potential that little to no fuels treatments would be allowed in some ACECs, and the risk of catastrophic wildfire would not be reduced.

Alternative B

Temporarily closing OHV open areas and designated routes, and prohibiting surface-disturbing activities as needed during times of high winds, would reduce the risk of human-caused ignitions in those areas.

In general, actions to fully meet or exceed BLM Colorado Public Land Health Standards (BLM 1997) would lower the risk of impacts from large wildfires by improving vegetative communities and landscape-scale mosaics. It would also result in more acreage being classified as fire regime condition class 1.

Increased fuel loading could result from a reduction in mechanical treatments. For example, requiring that fuels treatments meet multiple interdisciplinary objectives could reduce their effectiveness from a wildland fire management perspective. Likewise, limiting fuels treatments in riparian areas would result in a greater risk of large wildfires and the impacts associated with wildfires. Costs of suppressing these larger wildfires would also be increased.

There are two restrictions unique to Alternative B: less use of mechanical hazardous fuels treatments in special status species habitat, and a target of only 500 acres annually when restoring terrestrial wildlife habitat, which could reduce acreage available for hazardous fuels treatment. These actions could increase fuel levels sufficient to produce a landscape that supports larger and more-costly fires. As described under *Nature and Type of Effects*, wildlife species TLs could restrict the timing of mechanical fuels treatments and the scheduling of prescribed burns, impacting fire management effectiveness.

Emphasizing prescribed fire to modify fuels complexes (as opposed to mechanical treatments or other methods) would likely increase the number of acres mitigated against fire, but it could also increase the chance of invasive species outcompeting native vegetation after treatment.

Overall, long-term fire suppression costs under Alternative B are likely to be the highest of any alternative due to reduced flexibility in management and a reduction in mechanical fuels treatments in the Planning Area.

As described under ***Nature and Type of Effects***, air quality regulations can impact the ability to use prescribed fire as a management tool. Under Alternative B.1, the largest percentage of the Planning Area of any alternative would be unavailable for leasing, and 51 percent of areas open to leasing would have major restrictions (i.e., NSO). As such, emissions from energy development would likely be reduced. As a result, restrictions on prescribed burning due to air quality regulations are less likely to occur; development outside the Planning Area, however, could occur and may influence air quality and air quality management in this and all alternatives.

Under Alternative B, land in vacated or relinquished allotments could be established as a grass bank. The increased forage in these areas could result in locally increased fuels and elevated potential for wildland fire. However, the change in forage, as compared with Alternative A, would depend on the active AUM usage before retirement.

The types of impacts from cultural resources management actions are the same as those described under Alternative A.

The types of impacts from visual resources management actions are the same as those described under Alternative A. However, under Alternative B, VRM Class I and II lands would be managed on 229,880 acres (3 times more acres than under Alternative A). Under Alternative B.1, VRM Class I and II lands would be managed on 235,510 acres (3 times more acres than under Alternative A, and slightly more than Alternative B). In the North Fork area, Alternative B.1 would have 36,360 acres of VRM Class I and II on BLM-administered lands, which is 6,080 acres more than Alternative B.

There could be reduced flexibility for hazardous fuels treatments on the 41,150 acres managed for wilderness characteristics under Alternative B. This could lead to a shift in fire regime condition class that could change the likelihood or severity of wildland fire in those areas.

Intensive recreation management in the 246,760 acres of SRMAs (5 times more acres than under Alternative A) could reduce the risk of human-caused ignitions by providing targeted activities and outcomes. However, more overall recreation use equates to increased potential for human-caused ignition.

The types of impacts from travel management are the same as those described under ***Effects Common to All Alternatives***. There would be no areas open to cross-country motorized and mechanized travel under Alternative B, resulting in fewer opportunities for unplanned ignition. Cross-country foot and horse travel would still present the potential for the spread of invasive species and human-caused ignition.

The types of impacts from lands and realty management are the same as those described under ***Effects Common to all Alternatives***. Managing 431,040 acres as ROW exclusion (5 times more than Alternative A) and 195,460 acres as ROW avoidance (compared to none under Alternative A) could restrict access to respond to wildfires, but the lack of infrastructure in these areas would also discourage the spread of invasive weeds and human-caused ignitions.

The types of impacts from ACEC management are the same as those described under Alternative A but would occur over 215,940 acres (7 times more than under Alternative A).

Alternative C

Unlike Alternative B, there would be no closure of OHV open areas and designated routes, and no prohibition on surface-disturbing activities during times of high winds. This would result in an increased risk of human-caused ignitions in those areas. In case of ignition, high winds could impair firefighter response to wildfires and could lead to larger, more-costly fires.

The types of impacts from air quality management are the same as those described under ***Nature and Type of Effects***. Under Alternative C, the availability of a larger portion of the Planning Area for energy development may result in a higher level of emissions and more constraints on prescribe burning for air quality concerns.

Alternative C would emphasize forage-producing vegetation treatments, which could increase grass and forb production, while decreasing the cover of woody species. This in turn could reduce the potential for high-intensity wildfires, though the size of fires may not be impacted. In addition, this alternative would be the most permissive in regard to fuels treatments in riparian areas and upland vegetation communities.

Wildlife habitat would be restored on at least 3,000 acres annually, expanding the area available for wildlife-related fuels treatments, compared with Alternatives A and B.

Emphasizing mechanical treatments (as opposed to prescribed fire) to modify fuels complexes would likely result in slightly fewer acres mitigated against fire, but this could also decrease the chance of invasive species outcompeting native vegetation post-treatment.

Fire suppression costs under Alternative C are likely to be similar to those under Alternative A. Costs could be slightly increased due to the higher potential for ignition due to increased human activities in the area.

The types of impacts from cultural resources management actions are the same as those described under ***Nature and Type of Effects***.

The types of impacts from visual resources management actions are the same as those described under Alternative A, but VRM Class I and II lands would be managed on 75,480 acres (14 percent more acres than under Alternative A).

As under Alternative C, the BLM would not manage any lands to protect their wilderness characteristics. This would allow greater flexibility in hazardous fuels treatments, especially in those areas suited for mechanical treatments, and would help maintain a desirable fire regime condition class.

Under Alternative C, there are dispersed camping closures in day-use areas, and overnight use closures in the Needle Rock, Adobe Badlands, and Fairview South ACECs. These closures would decrease the potential for human-caused ignition in these areas. Not designating any SRMAs would increase the risk of human-caused ignitions because the BLM would not provide targeted activities and outcomes to direct recreation.

The types of impacts from travel management are the same as those described under ***Effects Common to All Alternatives***. There would be 16,070 acres open to cross-country motorized and mechanized travel under Alternative C, resulting in more opportunities for unplanned ignition. Cross-country foot and horse travel would still present the potential for the spread of invasive species and human-caused ignition.

The types of impacts from lands and realty management are the same as those described under ***Effects Common to all Alternatives***. Managing 44,550 acres as ROW exclusion (48 percent fewer acres than under Alternative A) and 210,390 acres as ROW avoidance (compared to none under Alternative A) would restrict access to respond to wildfires. However, the lack of infrastructure in these areas would also discourage the spread of invasive weeds and human-caused ignitions.

Impacts from ACEC management are similar to those described under Alternative A but over a smaller area.

Alternative D

As under Alternative B, temporarily closing OHV open areas and designated routes, and prohibiting surface-disturbing activities as needed during periods of high winds, would reduce the risk of human-caused ignitions in those areas.

The types of impacts from air quality management are the same as those described under ***Nature and Type of Effects***.

Compared with Alternative A, use of managed fires to meet resource objectives, except as precluded by other decisions in the RMP, would, in the long term, further decrease fire intensity and fuel loading. Mechanical treatments in all vegetation types, but especially in forest communities, could also help reduce the potential for crown fires and make fires easier to manage and control.

Alternative D would emphasize a balanced approach to modifying fuels complexes. This would result in the types of impacts similar to those described under Alternative B, but with slightly fewer acres mitigated against fire and a decreased chance of invasive species outcompeting native vegetation after treatment.

Vegetation management objectives focused on reducing fuel loads and flexibility in the use of planned and unplanned fires are likely to resulting in the lowest long-term fire suppression costs of any alternative.

Management of vacated or relinquished livestock grazing allotments would allow for the establishment of forage reserves, as described under Alternative B. The change in forage, as compared with Alternative A, would depend on the active AUM usage before retirement, as well as the acres of allotments combined with open allotments versus those established as forage reserves.

The types of impacts from cultural resources management actions are the same as those described under ***Nature and Type of Effects***.

The types of impacts from visual resources management actions are the same as those described under Alternative A, but VRM Class I and II lands would be managed on 158,980 acres (2 times more acres than under Alternative A).

There could be reduced flexibility for hazardous fuels treatments on the 18,320 acres managed for wilderness characteristics under Alternative D. This could lead to a shift in fire regime condition class, which could change the likelihood or severity of wildland fire in those areas.

Intensive recreation management in the 124,400 acres of SRMAs (2.5 times more acres than under Alternative A) could reduce the risk of human-caused ignitions by providing targeted activities and outcomes. However, more overall recreation use equates to increased potential for human-caused ignition.

As under Alternative B, the types of impacts from travel management are the same as those described under ***Effects Common to All Alternatives***. There would be no areas open to cross-country motorized and mechanized travel under Alternative D, resulting in fewer opportunities for unplanned ignition. Cross-country pedestrian and equestrian travel could still present the potential for the spread of invasive species and human-caused ignition.

The types of impacts from lands and realty management are the same as those described under ***Effects Common to all Alternatives***. Managing 53,700 acres as ROW exclusion (37 percent fewer acres than under Alternative A) and 276,500 acres as ROW avoidance (compared to none under Alternative A) could restrict access to respond to wildfires. However, the lack of infrastructure in these areas would also discourage the spread of invasive weeds and human-caused ignitions.

The types of impacts from ACEC management are the same as those described under Alternative A, but they would occur over 51,320 acres (71 percent more than under Alternative A).

Alternative E

Air Quality

The types of impacts from air quality management are the same as those described under ***Nature and Type of Effects***. Continued emissions from energy development and other uses could result in constraints on prescribed burning should local air quality concerns occur.

Wildland Fire Ecology and Management

Use of managed fire to achieve resource objectives could decrease fire intensity and fuel loading in the long term, as discussed under Alternative D. Also, as under Alternative D, allowing a range of actions to modifying fuels complexes (i.e., mechanical treatment, prescribed fire, seeding, and herbicide) would improve ability to perform fuels treatments to modify future wildfire behavior. In addition, long-term fire suppression costs could be reduced compared with Alternative A.

Livestock Grazing

Management of vacated or relinquished livestock grazing allotments would result in potential changes to level of fine fuels. Impacts would vary by allotment, as discussed under Alternative D.

Cultural Resources

The types of impacts from cultural resources management actions are the same as those described under ***Nature and Type of Effects***, with the potential for site-specific impacts on ability to perform fuel treatments.

Visual Resources

As discussed under Alternative A, lands managed as VRM Classes I and II may also have restrictions on the extent of planned ignitions and mechanical fuels treatments. Under Alternative E, VRM Classes I and II cover 151,930 acres (over 2 times more acres than under Alternative A).

Recreation and Visitor Services

Intensive recreation management in the 122,130 acres of SRMAs (approximately 2.5 times more acres than under Alternative A) could reduce the risk of human-caused ignitions by providing targeted activities and outcomes. For example, recreation activities may be contained within a more limited geographic area (e.g., developed recreation at particular site), which could limit the overall dispersal of chances of human caused ignition. However, more overall recreation use equates to increased potential for human-caused ignition.

Comprehensive Travel and Transportation Management

As discussed under ***Effects Common to All Alternatives***, travel management regulations can impact potential for human caused ignition. Under Alternative E, areas open to cross-country motorized and mechanized travel would be reduced to 3,950 acres, 54 percent less than Alternative A, resulting in fewer opportunities for unplanned ignition. Cross-country pedestrian and equestrian travel could still present the potential for the spread of invasive species and human-caused ignition.

Lands and Realty—Rights-of-Way

Managing 53,040 acres as ROW exclusion (38 percent fewer acres than under Alternative A) and 66,030 acres as ROW avoidance (compared with none under Alternative A) would result in reduced infrastructure and would also discourage the spread of invasive weeds and human-caused ignitions.

Special Designations and Other Protected Areas

Management for special designations and other protected areas (i.e., ACECs, NGD areas, WSAs, areas with ancient or rare vegetation, and exotic or noxious species) can impact level and type of fuels treatments and the ability to modify future wildland fire occurrence and behavior, as well as the ability to respond to wildfire, as discussed under ***Nature and Type of Effects*** and Alternative A. Limitations would be based on values at risk and may not occur throughout the extent of the mapped special designation area or protected habitat. At the same time, restrictions on resource uses in these areas would also reduce the potential for human caused ignitions, due to a reduction in ignition causing activities. Specifically, impacts could occur in 30,190 acres of ACECs (less than 1 percent more than under Alternative A). Specific restrictions on management for individual areas would be indicated in implementation-level fire management plans.

Cumulative

The cumulative impact analysis area for wildland fire management is delineated by the fourth-order watersheds that partially overlap the Uncompaghre RMP Planning Area. Rather than following administrative boundaries, wildland fires burn based on fuels, weather, and topography. Because of continuous fuels, historic high fire occurrence, and many jurisdictional lines occurring at mid-slope, Uncompahgre RMP Planning Area fire management activities could affect fire management and resources outside of the Planning Area. For example, there is a high likelihood of fires burning from BLM-administered lands to National Forest System lands. There is also the potential for wildland fires to impact adjacent BLM-administered, private, and state lands; the MM125 fire burned from private land onto public lands administered by the adjacent BLM Gunnison Field Office during the Spring of 2012.

Past and present management actions and natural events in the cumulative impact analysis area have altered the condition of vegetation and natural fire regimes across the landscape. Examples include fire suppression, vegetation treatments, grazing, timber harvest, noxious and invasive weed spread, drought, and insect and disease outbreaks. In many cases, areas are now more prone to large, intense fires.

Urban development and recreation in the cumulative impact analysis area are expected to increase over the life of the RMP, creating additional potential ignition sources and the probability of wildland fire occurrence. Of these two factors, urbanization, especially the expansion of residential areas, is expected to be the larger contributor. The wildland-urban interface is a high-priority suppression area, and suppression in the wildland-urban interface can be more dangerous, time-consuming, and expensive than suppression in undeveloped areas. Additional wildland-urban interface would increase the need for hazardous fuels projects in order to reduce the risk of wildfires burning from BLM-administered lands onto the wildland-urban interface. Additional fire suppression resources could be needed, including federal, state, and local agency resources.

Increasing energy development on both BLM-administered lands and adjacent private lands increases the probability of human-caused ignitions and can require costly suppression efforts to protect life, property, and infrastructure. Coal development creates safety issues during wildland fires, including evacuations, unknown hazardous materials, and flammable materials hazards. These issues add to the suppression costs and complexity in coal development areas.

Changing land use patterns and increased recreation and visitation would also modify vegetative communities; both trends present new vectors for the introduction of noxious weeds and nonnative vegetation species. These introduced species could eventually alter the fire regime of certain areas and increase the frequency, size, and intensity of wildfires.

The alternatives' contribution to cumulative impacts would follow those impacts discussed above. Management that restricts resource uses, as emphasized under Alternatives B and B.1, would reduce potential for human-caused ignition sources. However, restrictions on vegetation management activities could result in increased fuel loading and potential for fires to increase in size and intensity in the cumulative impacts analysis area in the long-term. Conversely, management that allows for resource uses in a greater portion of the Planning Area (as emphasized under Alternative C) could increase potential for human-caused ignition. Allowing for a range of management to alter fuel complexes could promote reduced fuel loads and decrease potential for large, high-intensity fires in the long term.

4.3.9 Cultural Resources

This section discusses impacts on cultural resources from proposed management actions of other resources and resource uses. Existing conditions are described in **Section 3.1.10** (Cultural Resources). Cultural resource baseline information in **Section 3.1.10** was reviewed for current understanding of known resources and to determine the condition of the resources. Also, all laws pertinent to determining effects on cultural resources (e.g., National Historic Preservation Act of 1966 [NHPA) were considered and included in criteria for determining impacts. This known information was overlain with the actions found under each alternative in **Chapter 2** and conclusions were drawn based on an understanding of how these types of actions could affect known and potentially discoverable resources.

Methods and Assumptions

The term "cultural resource" can refer to archaeological, historical, and architectural sites, structures, or places with important public and scientific uses and can include locations (sites, natural features, resource gathering areas, or places) of traditional cultural or religious importance to specific social or cultural groups. Considering this perspective, cultural resources do not lend themselves to quantitative analysis.

Indicators

For cultural resources, a significant adverse impact would be the loss of those elements that make them eligible for listing on the National Register of Historic Places due to the extent or degree to which resources are damaged, their physical integrity is lost, or the setting of the resource(s) is damaged (36 CFR 800), and whether future opportunities for scientific research, preservation, or public appreciation of cultural resources are foreclosed or otherwise adversely affected by a proposed action. When assessing whether the actions would have significant impact, the following qualitative level-of-effect indicators are considered:

- Magnitude: The amount of physical alteration or destruction which can be expected. The resultant loss of archaeological value is measured in degree of disturbance.
- Severity: The irreversibility of an impact. Adverse impacts which result in a totally irreversible and irretrievable loss of archaeological value are of the highest severity.

- Duration: The length of time an adverse impact persists. Impacts may have short-term or temporary effects, or conversely, more persistent, long-term effects on cultural resources.
- Range: The spatial distribution, whether widespread or site-specific, of an adverse impact.
- Frequency: The number of times an impact can be expected. For example, an adverse impact of variable magnitude and severity may occur only once. An impact such as that resulting from farming may be of recurring or ongoing nature.
- Diversity: The number of different kinds of project-related actions expected to affect cultural resources.
- Cumulative Effect: A progressive alteration or destruction of resources owing to the repetitive or additive nature of one or more impacts.
- Rate of Change: The rate at which an impact will effectively alter the integrity or physical condition of cultural resources. Although an important level-of-effect indicator, it is often difficult to estimate and assessed during or following implementation actions.

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- The criteria of adverse effect provide a general framework for identifying and determining the context and intensity of potential impacts on other categories of cultural resources, such as Native American or other traditional community, cultural, or religious practices or resources, if these are present. Assessment of effects on these resources requires consultation with the affected group, as defined in 36 CFR Part 800.2.
- Native American heritage resources include locations (sites, natural features, resource gathering areas, or places) of traditional cultural or religious importance to Native American tribes. The types of resources may or may not be eligible for listing on the National Register of Historic Places. The types of effects, and an impact's magnitude, severity, duration, etc. upon Native American heritage resources are best determined through tribal consultation. Due to the confidential nature of the information, the resource descriptions and effects resulting from proposed actions may or may not be available as part of this EIS.
- Human occupation of North America over the last 10,000 years has left its mark on all landforms, and sites could be manifest on the surface or deeply buried. There could be areas of importance to contemporary Native Americans that are not readily identifiable outside of those communities.
- The information on cultural resources in the Planning Area is based on the results of industry and BLM inventory projects and depicts the relative potential for cultural resource sites in the Planning Area. However, as these data are geographically biased toward past project-oriented undertakings and cannot accurately predict where and how many resources may exist in unsurveyed areas, this analysis does not attempt to quantify affected resources.
- Cultural resource protection and mitigation measures apply to all proposed federal or federally assisted undertakings and would be applied at the project design and implementation phases.
- Cultural resource inventories, either federal undertakings or related programs, would result in the continued identification of cultural resources. The cultural resource data acquired through these inventories and evaluations would increase overall knowledge and understanding of the distribution of cultural resources in the region.
- Impacts on known cultural resource sites from authorized uses would be mitigated after appropriate Section 106 and Colorado Protocol consultation requirements are met. Mitigation can include project cancellation, redesign, avoidance, or data recovery.
- The number of sites that could be affected by actions correlates with the degree, nature, depth, and quantity of surface-disturbing activities in the Planning Area and the cultural sensitivity of the area.

Nature and Type of Effects

There would be no immediate impacts from the goals, objectives, and allocations noted in the alternatives, though there could be direct impacts associated with some future management actions. Indirect impacts are those that would result from implementing the planning decisions at a later time and those that are cumulative. Most impacts are difficult to quantify because the locations of most cultural resources in the Planning Area are unknown, an assessment of most known locations is limited to brief surface evaluations, monitoring known locations is difficult, and planning-level alternatives typically do not identify specific areas for surface-disturbing activities.

Any activities that would involve surface-disturbing activities could have direct and indirect impacts on cultural resources, including damaging, destroying, or displacing artifacts and features, and constructing modern features out of character with a historic setting. Damaging, displacing, or destroying cultural resources could include removing artifacts from their situational context, breaking artifacts, or shifting, obliterating, or excavating features without appropriate scientific recording.

Indirect impacts on cultural resources include changing the character of a property's use or physical features within a property's setting that contribute to its historic significance (e.g., isolating the property from its setting) and introducing visual, atmospheric, or audible elements that diminish the integrity of the property's historic features. Construction activities resulting from implementing the planning decisions, such as facilities associated with energy development, could result in placing modern features onto a landscape that did not have them previously, thereby juxtaposing "modern" industrial features onto a historic landscape. Additionally, any action that would result in increased human and worker presence (e.g., more people visiting a recreation area and workers brought in for construction operations) would risk illicit collecting of surface artifacts, resulting in a loss of scientific information.

The potential for undiscovered buried cultural resources and human remains exists despite previous archaeological surveys and investigations. Surface-disturbing activities would directly impact undiscovered cultural resources and human remains by exposing buried material, resulting in inadvertent artifact destruction or loss of scientific context. Indirect impacts could result from the increased human presence, leading to possible illicit collecting of newly exposed materials.

Any actions that would result in reclaiming landscapes to predisturbance conditions would eliminate the indirect viewshed or setting impacts for cultural resources. Reclamation would likely restore the natural landscape setting but may not result in restoring the historic setting. However, direct impacts on cultural resources or any unanticipated discoveries made would remain as they were, permanently destroyed or damaged by surface-disturbing actions. Reclamation impacts on undiscovered buried cultural materials or human remains would be similar to those noted above, namely that activities could expose buried materials, resulting in inadvertent artifact destruction or loss of scientific context. Additionally, the increased presence of site employees could lead to illicit collection of exposed materials.

Effects Common to All Alternatives

All alternatives would continue under current management direction and prevailing conditions derived from existing planning documents. Goals and objectives under Alternative A are based on the San Juan/San Miguel and Uncompahgre Basin RMPs, along with associated amendments, activity- and implementation-level plans, and other management decision documents. Goals and objectives for BLM-administered lands under Alternatives B, C, D, and E are to continue maintaining the integrity or characteristics of historic properties under legal guidelines for protection, preservation, investigation, and public use (i.e., development and interpretation) on a case-by-case or project-by-project basis. Laws, regulations, and BLM policies that supersede RMP decisions would apply.

Cultural resource and Section 110 proactive actions would continue under all alternatives. New management measures based on cultural resource use categories would be expanded under Alternatives B, C, D, and E and would vary among alternatives. Additional measures addressing protection of Native American resources and traditional uses would be expanded under the four action alternatives.

Under all alternatives, the BLM would continue to manage BLM-administered lands in a manner that accommodates Native American religious traditions, practices, and beliefs as guided by BLM directives.

Any action that disturbs or diminishes the integrity of a historic property's location, design, setting, materials, workmanship, feeling, or association, as defined in 36 CFR Part 800, is an adverse effect. Potential effects from subsequent undertakings for all resources, resource uses, and special designations would be addressed at the project design and implementation phase. Required separate compliance with Section 106 would result in the continued identification, evaluation, mitigation, and nominations to the National Register of Historic Places. Effects on cultural resources eligible for listing on the National Register of Historic Places would be avoided or mitigated. If previously undiscovered resources were identified during an undertaking, work would be suspended while the resource is evaluated and mitigated to avoid any further effects. Consultation would continue with Native American groups to identify any traditional cultural properties or resource uses and to address effects. Through this process, effects would be minimized or eliminated, although residual effects and adverse effects, as defined by 36 CFR Part 800, would be possible. Many cultural resources are evaluated only by their surface manifestations, and many resources evaluated as not eligible could actually be eligible for listing on the National Register of Historic Places but are lost through project implementation. Effects would continue, especially on unidentified resources, resulting from ongoing unevaluated or unsupervised activities, natural processes, and unanticipated events such as wildfire.

Actions to protect watersheds and municipal source waters through surface use restrictions and erosion controls would provide indirect protections from effects due to surface disturbance and erosion. Some water sources and features may be important to Native Americans, and actions that protect and maintain these water features and native plant and animal natural resources would help preserve these tribal values and traditional resources. Actions to modify or remove water-control structures, develop wells, acquire water rights and sources, and modify water features include risks of disturbance of cultural resources and traditional uses and values through ground-disturbing activities, livestock trampling, changes in access, visibility, and setting of water features and changes to the water features themselves. As for all resources, effects on cultural resources would be evaluated for these undertakings, and protections and mitigations would be applied at project design and implementation phases.

Soil-protection measures would limit erosion from ground-disturbing activities and actions on steep slopes. Many cultural resources are susceptible to erosion damage, including modifying spatial relationships of artifacts and destroying features and stratified deposits. The information loss is relevant to the site function, dates of occupation, subsistence, and past environments; all of these are important to understanding past culture. Nondestructive measures to protect soils could preserve the integrity of cultural deposits and prevent damage from natural processes.

Vegetation management measures addressing land health and plant diversity, restoring natural processes, promoting desired plant communities, maintaining forest health, reducing effects on rangeland during drought, and eliminating weeds would largely be compatible with cultural resource management goals and preservation. Many of the measures would reduce the potential for erosion of cultural sites, maintain and improve soil health, maintain or restore the historic setting, and protect plant resources that could be important to Native American communities. However, mechanical, biological, and chemical treatments could affect cultural resources and could restrict access to resources for cultural

purposes during treatment. Ground-disturbing mechanical vegetation treatments could modify the spatial relationships of artifacts and site features and break artifacts. Chemical treatments could alter the chemistry of soils and artifact residues and affect the reliability of dating surface features and affect artifact residue analysis. Use of fire as a treatment could affect flammable cultural resource artifacts and features, cause rock spalling and staining (either as a surface for rock art or as part of a feature or structure), and distort the temporal and functional analysis of artifacts.

Measures to protect special status species and measures protecting other fish, wildlife, and plants include protective designations and stipulations and restrictions on surface and vehicle use that would protect cultural resources from effects due to surface disturbance, erosion, effects on setting and access leading to vandalism, inadvertent damage, and unauthorized collection of cultural resources. Protective measures could inhibit Native American cultural uses in some areas.

The alternatives vary in current and proposed VRM class objectives. Cultural resources and landscapes can contribute to the visual character and could be considered in determining VRM classifications. VRM Class I and II designations protect cultural resources where visual setting is a contributor to the significance of the property or the traditional use. Effects would be directly and indirectly reduced where designations limit surface-disturbing activities in the more sensitive VRM class areas. Use of the visual resource contrast rating system during project planning could reduce the effect of visual intrusions on cultural resources, but projects could be directed to VRM Class IV or undesignated areas where cultural resources may be present. Visual intrusion on the setting of cultural resources must be considered in the Section 106 process and tribal consultation, regardless of VRM designation.

Wildland fire could result in direct disturbance or loss of cultural resources through the destruction or modification of structures, features, artifacts, cultural use areas, and culturally modified trees. Organic materials are especially vulnerable to heat damage. Fire management would involve ground-disturbing activities that could also directly affect cultural resources by altering the spatial relationships within archaeological sites. Also, fire retardant chemicals and heat could affect the accuracy of paleo-botanical or radiocarbon data obtained from cultural resources. Removing vegetation increases the visibility of cultural resources and exposes previously undiscovered resources.

Sites exposed by fire or prepared for fire avoidance in prescribed burns are more susceptible to unauthorized collection, vandalism, and subsequent erosion. The risk of adverse effects on cultural resources is greatest from unplanned wildland fire since the locations of cultural resources are less likely to be known and avoided. Effects from prescribed fire are similar to those of wildfire, but prescribed fire is subject to project-level analysis and Section 106 process. Native American leaders make a distinction between human intervention and ignition (both prescribed and arson) and natural ignition (e.g., lightning) fires.

Forestry resource uses can lead to effects, depending on the methods used, the amount of ground-disturbing activity permitted, and the potential for subsequent erosion. Increasing access for commercial harvesting of forest products can also lead to direct disturbance and erosion, alterations of the setting, vandalism, and unauthorized collection. Management measures vary between alternatives and include restrictions targeting culturally sensitive areas, as well as other areas where indirect protection of cultural resources would occur. Measures that include thinning and other less ground-destructive treatments and techniques would have less effect on cultural resources than intensive management. Measures that contribute to the restoration and preservation of forest health and structure could preserve Native American uses and their settings.

Livestock grazing is associated with ongoing effects on or near the ground surface. Improper grazing and trampling reduces vegetative cover and disturbs the soil, which accelerates erosion and weathering. The

modification, displacement, and loss of artifacts, features, and middens results in loss of valuable cultural resource information regarding site function, date of use, subsistence, past environments, and other research questions. Trampling and grazing can also affect Native American use areas and culturally important plants. Effects on cultural resources occur more frequently where livestock concentrate, such as permanent and intermittent water sources. The construction or maintenance of range improvements, such as springs, reservoirs, fences, corrals, and livestock trails, could affect cultural resources, especially if these areas have not been previously inventoried. File searches are conducted at the time of permit renewal with a recommendation for inventories or site evaluations in areas with a high potential for cultural resources where livestock congregate; if conflicts exist, mitigation measures are proposed. Range improvements are subject to project-level analysis and Section 106 process, and protections and mitigations would be applied at project design and implementation phases. Under all alternatives, cultural resources in areas unavailable to livestock grazing are protected from the possible impacts from that cause.

Actions under all alternatives to protect springs and wetland riparian areas through livestock grazing management strategies would help protect water features and sources that could be culturally important to tribes. Actions that improve rangeland health could reduce the potential for effects from direct disturbance, erosion, and wildland fire.

Potential effects associated with the exploration and development of coal resources, oil and gas, oil shale, geothermal resources, locatable minerals, mineral materials, and nonenergy leasable minerals include physical disturbance and loss of setting. Archaeological deposits, historic structures, cultural landscapes, and Native American resources are affected by disturbances for facilities and roads, visual and audible intrusions, interference with cultural uses, and increased access that can lead to vandalism and unauthorized collection. The alternatives vary in amount of land and locations available for each kind of exploration and development and the applicable requirements according to the objective of each alternative. The acreages in the Planning Area open to exploration and development vary widely by leasable, locatable, or mineral materials commodity. Depending on the alternative adopted, specific areas of the Planning Area could be subject to new disturbance and further development.

Discretionary mineral exploration and development are subject to further cultural resource review at each stage of development through the Section 106 process, mine regulations, or permitting stipulations. Measures restricting activities that could affect cultural resources sites or requiring additional mitigations would maintain protection for these resources. Withdrawals for preserving natural resources would provide additional indirect protection for cultural resources and Native American resources in those locations from ground disturbance and alterations. Potential ongoing effects in the vicinity of existing mines and drilling locations would continue.

Potential effects on Native American resources and their settings would likely be difficult or impossible to adequately mitigate across the entire Decision Area, and any alterations to the landscape could affect the setting of cultural and Native American resources. Surface use restrictions, completion of the NHPA Section 106 process, and permitting stipulations would mitigate or prevent many potential effects.

Nondiscretionary mining notices are not federal undertakings and are therefore not subject to NHPA regulations, but 43 CFR 3809, prohibits mining operators on claims of any size from knowingly disturbing or damaging cultural resources. Mining notices must be reviewed within 15 days, even though it could be difficult to determine the presence of resources in areas that have not been inventoried.

Increased recreational use can affect cultural resources and sensitive Native American resources through direct disturbance, soil compaction, altered surface water drainage, erosion, intrusions to setting, and unauthorized collection or vandalism. The potential for effects on cultural resources

increases when there is an increase in population, when there is a change in recreational use that alters the visual or audible character of the setting, or when recreation is concentrated in sensitive areas. The effect of repeated uses or visits over time could also increase the intensity of effects due to natural processes. Repeated visits to sites can create social trails, directing more people to sites that may not be recorded or sites that have not been allocated to public use. Increased access to more remote areas can lead to effects on undisturbed resources. Continuing and enhancing interpretation and public education can vest the public in resource protection and respect for Native Americans and cultural values.

Areas managed as SRMAs increase the intensity of permitted use of these areas and the risk for direct, indirect, and inadvertent damage to cultural and Native American resources from such activities as camping, visitor use, recreation, vandalism, and firewood gathering. An increase in human presence can also intrude on settings that could be important for cultural resources or Native American uses. NSOs or NGDs to preserve recreational areas or scenic landscapes could also provide indirect protection for cultural resources. Areas managed as ERMAs are subject to less-intensive, unstructured recreation, with corresponding potential for effects on cultural resources and potentially less monitoring of cultural resources. All of the alternatives, except Alternative C, include SRMAs. Alternatives B, D, and E include the Dolores River Canyon and Dry Creek SRMAs that contain high-priority and significant sites and areas designated for long-term conservation and protection. Alternative A includes the Dolores River Canyon.

Existing travel management without limitation or designation can result in serious effects. Restricting vehicle use to existing or designated trails reduces the risk of disturbing cultural resources located off trails and helps protect the integrity and setting of sensitive Native American resources from effects. Closing areas to multiple methods of travel provides the greatest protection for cultural resources, as long as administrative access is maintained to permit Native American access for identified cultural uses. The alternatives vary in the location and extent of travel restrictions. Direct effects should be identified through inventory, and adverse effects should be addressed through avoidance by redesign or mitigation. Ongoing indirect effects on cultural resources from use of designated trails are less likely to be detected or monitored, and enforcing restrictions is difficult. Unauthorized travel would probably continue, as would the potential risk of unauthorized collection or vandalism due to unauthorized access.

All alternatives include provisions to retain and acquire lands that contain significant cultural resources and culturally sensitive areas, to maintain access to resources, to reduce incompatible uses, and to minimize disturbance when issuing ROWs. The potential acquisition of new land would provide long-term federal consideration under the NHPA of any cultural resources included in the transaction. It also could enhance currently managed resources by consolidating holdings and potentially protecting the setting of cultural resources. Land tenure adjustments and new transportation facilities that allow for better access to BLM-administered lands could facilitate cultural uses but could also lead to vandalism or unauthorized collection of cultural resources. Exchange or disposal of lands to nonfederal entities would permanently remove federal protections for any significant cultural resources present, which would be an adverse effect under the NHPA. Exchanges, disposal, and subsequent landscape changes could also result in effects on the setting of cultural resources.

The development and operation of transportation systems, pipelines, transmission lines, communication sites, renewable energy resources, and other land use authorizations can disturb large tracts of land containing many cultural resources and can affect the setting of cultural resources over a great distance. Defining exclusion and avoidance areas for ROWs and other realty actions reduces the potential for effects on cultural resources resulting from discretionary actions at those locations. Siting ROWs along existing corridors may not always reduce the potential for effects on cultural resources.

Areas with special designations, such as ACECs, are afforded special management measures designed to protect a variety of resource values, including geologic, botanic, historic, cultural, scenic, and fish and wildlife resources and rare or exemplary natural systems or to protect human life and property from natural hazards. Protections afforded by the management measures for other resources would provide indirect protections for cultural resources. Management measures vary but include surface use restrictions, ground disturbance restrictions, prohibitions on motorized uses, VRM classifications, and other restrictions on incompatible activities. Designation may help preserve and enhance culturally important natural resources, but in some instances restrictions could impede Native American access and uses. Designations could attract more recreational use and the potential for inadvertent effects on cultural resources from recreation or intentional vandalism or unauthorized collection. Increased use of the Internet by interested individuals to disseminate site location and encourage visitation to sites that are unrecorded or have not been allocated to public use can expose cultural resources to impacts. The Paradox Rock Art ACEC is proposed under Alternative B, D, and E to protect Native American rock art.

Effects from managing WSAs are similar to those described for managing ACECs, but more restrictive management actions in WSAs would further reduce the potential for effects.

Measures for interpretation, environmental education, use of cultural resources in SRPs, and promotion of national, state, and BLM byways could enhance appreciation and understanding of the fragile and finite nature of cultural resources; however, it could also lead to effects from access, degradation from use, vandalism, and unauthorized collection. Therefore, resources that are not suitable for public uses are not allocated to that use category and are not included in interpretation or education projects or SRPs.

Implementing management for the following resources would have negligible or no impact on cultural resources management and are therefore not discussed in detail: air quality and paleontological resources.

Alternative A

Alternative A identifies cultural resource planning and proactive management for Dolores Cave, Hamilton Mesa, Hanging Flume, Indian Henry's Cabin, Tabeguache Canyon, Tabeguache Cave II, and Tabeguache Pueblo, but does not include proactive classification of sites for consideration of scientific, educational, recreational, traditional, or experimental purposes and the development of appropriate management proscriptions. Alternative A does not include proactive goals, objectives, and actions to accommodate and enhance Native American uses and values in their traditional homeland.

Impacts on cultural resources could occur from authorized surface-disturbing events, unregulated events, and natural events, as described under ***Effects Common to All Alternatives***. Natural and unregulated events (such as wildfires, illegal artifact collection, and unregulated OHV usage) would create unmitigated impacts. Authorized events (such as oil and gas development and vegetation management) could result in the discovery of additional resources. Specific acreages for the different nature and types of effects for stipulations driven by cultural resource management under Alternative A are unavailable, but stipulations would be applied for all resources on a case-by-case or project-by-project basis. The minimal restrictions on fluid mineral development would result in a reasonably foreseeable development scenario similar to that projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**.

Alternative B

Alternative B expands Alternative A's current management direction and prevailing conditions. Goals and objectives for BLM-administered lands under Alternative B are the same as Alternative A, while focusing on high-priority sites and areas. Under Alternative B, proactive management actions would be

implemented based on allocations of cultural resources to scientific, educational, recreational, traditional, or experimental use categories and incorporate additional actions to accommodate Native American traditional uses. The BLM would continue to meet its compliance obligations under the NHPA. Effects of all protective measures are the same as those described under ***Effects Common to All Alternatives***.

Alternative B would include managing 31,870 acres of the Lower Uncompahgre Plateau between the Dry Creek Basin and Roubideau Creek as a National Register District. Management actions would provide direct and indirect site protection by nominating the area to the National Register of Historic Places (NRHP); increasing protection of rock art sites and high site density areas in the Dry Creek, Coalbank Canyon, Roatcap Gulch, Big Sandy, and Cushman Creek areas; and including NSO stipulations throughout the area.

Proactive actions under Alternative B that would provide direct protective measures include NSO stipulations for resources eligible to the NRHP and a buffer surrounding the resource. Additional actions include the nomination of resources and areas within the Dolores River Canyon WSA to the NRHP; NSO, NGD, and ROW exclusion stipulations for Tabeguache Cave, Tabeguache Pueblo, and Tabeguache Canyon areas; and NSO stipulations within National Register Districts, which potentially include the Uravan Uranium Mining, Paradox Valley Rock Art, Tabeguache Pueblo, and Dolores River Rock Art areas. Restrictions on fluid mineral development would result in fewer new and exploratory development wells drilled and associated surface-disturbance than Alternative A.

Alternative B emphasizes the retention of relatively unmodified landscapes by decreasing areas of surface-disturbing activities. Specific acreages for the different effects of stipulations driven by cultural resource management under Alternative B are unavailable, but stipulations would be applied for all resources on a case-by-case or project-by-project basis.

Alternative C

Like Alternative B, Alternative C expands Alternative A's current management direction and prevailing conditions. Goals and objectives for BLM-administered lands under Alternative C are the same as Alternative B. Effects are the same as those described under Alternative B.

Alternative C would include managing 31,870 acres of the Lower Uncompahgre Plateau as an area of archaeological significance. Management actions would provide direct and indirect protection to sites by nominating individual sites to the NRHP for additional protection; managing for the protection of Formative and protohistoric Ute occupations; emphasizing off-site mitigation measures; protecting historic Ute sites; and managing for the protection of rock art panels in areas that include Dry Creek Overlook, Roatcap Gulch, Big Sandy, and Cushman Creek areas.

Alternative C would manage 1,080 acres in the Paradox Rock Art Complex as a National Register District with focused protection for petroglyph and pictograph sites by developing public routes in conjunction with an interpretive plan. Management actions would provide direct protection to resources by either closing routes or limiting motorized and mechanized travel in the Paradox Valley and implementing NSO stipulations.

The minimal restrictions on fluid mineral development would result in a reasonably foreseeable development scenario similar to that projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**. Additional proactive actions under Alternative C include CSU/SSR restrictions for resources listed in the NRHP and a buffer surrounding the resource, though individual resources would not be considered for nomination to the NRHP unless

they require added protective measures. Alternative C also includes assessing the eligibility of known resources within the Dolores River Canyon WSA to the NRHP.

Alternative C emphasizes the minimal management of cultural resources on a site-by-site basis as needed for surface-disturbing events. Specific acreages for the different effects of stipulations driven by cultural resource management under Alternative C are unavailable, but stipulations would be applied for all resources on a case-by-case or project-by-project basis.

Alternative D

Like Alternatives B and C, Alternative D expands Alternative A's current management direction and prevailing conditions. Goals and objectives for BLM-administered lands under Alternative D are the same as Alternative B. Effects are the same as those described under Alternative B.

Alternative D would include managing 31,870 acres of the Lower Uncompahgre Plateau as under Alternative C. Management actions would provide direct and indirect protection to sites by nominating individual sites to the NRHP for additional protection; managing Coalbank Canyon for the protection of Formative and protohistoric Ute occupations; protecting historic Ute sites; and managing for the protection of rock art panels in areas that include Dry Creek Overlook, Roatcap Gulch, Big Sandy, and Cushman Creek areas, including applying CSU/SSR restrictions.

The restrictions on fluid mineral development would result in a reduction in the number of new and exploratory development wells and associated surface-disturbance from those projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**. Proactive actions under Alternative D include NSO restrictions in a buffer around resources eligible to the NRHP, TCPs, and specific use categories. Under Alternative D, individual sites would be nominated to the NRHP, and the 1,080 acres in the Paradox Rock Art Complex would be managed as a National Register District. Additional actions under Alternative D include assessing the eligibility of individual resources within the Dolores River Canyon WSA to the NRHP; CSU/SSR stipulations and ROW avoidance for Tabeguache Pueblo and Tabeguache Canyon areas; and ROW avoidance for Tabeguache Caves.

Alternative D would emphasize a balance of economic and environmental outcomes. Some areas would emphasize the retention of relatively unmodified landscapes by decreasing areas of surface-disturbing activities. Other areas would focus on the management of cultural resources on a site-by-site basis. Specific acreages for the different effects of stipulations driven by cultural resource management are unavailable, but stipulations would be applied for all resources on a case-by-case or project-by-project basis.

Alternative E

Like Alternatives B, C, and D, Alternative E expands Alternative A's current management direction and prevailing conditions. Goals and objectives for BLM-administered lands under Alternative E are the same as Alternatives B, C, and D. Under Alternative E, proactive management actions would be implemented based on allocations of cultural resources to scientific, educational, recreational, traditional, or experimental use categories and would incorporate additional actions to accommodate Native American traditional uses. Effects are similar to those described under Alternative B, but with additional protective provisions, including explicit references to required tribal consultation, mitigation, and SHPO concurrence for disposal of lands containing historic properties, and consideration of indirect effects on setting. Effects of all protective measures are the same as those described under ***Effects Common to All Alternatives***.

Alternative E would not include special management of the Lower Uncompahgre Plateau as a National Register District as under Alternative B, or as an area of archaeological significance as under Alternatives

C and D. Likewise, Alternative E would not include certain standard NSO, CSU, or SSR buffers around resources eligible to the National or State Registers of Historic Places and specific use categories. However, protective measures would continue to be applied for resources on a case-by-case or project-by-project basis, like Alternative A.

Proactive actions under Alternative E that would provide direct and indirect protective measures include the inventory and evaluation of individual sites within the Dolores River Canyon WSA to the NRHP and nomination to the NRHP of properties meeting NRHP criteria. Under Alternative E, the 1,080 acres in the Paradox Rock Art Complex would be managed as a National Register District.

Fluid Leasable Minerals—Oil and Gas

The restrictions on fluid mineral development would result in a reduction in the number of new and exploratory development wells and associated surface-disturbance from those projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d), as discussed under **Section 4.1.1**. Alternative E specifies exceptions to ROW exclusions, but the BLM would continue to meet its compliance obligations under the NHPA in these areas.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on cultural resources is the Uncompahgre RMP Planning Area. Cumulative effects would result from the destruction and loss of known and unrecorded resources and unanticipated discoveries as well as the destruction or loss of known or unknown portions of Native American ancestral sites. Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect cultural resources include recreation, grazing, vegetation treatment, wildfire, mineral development, and energy development. Increased frequency of wildfire due to shifting environmental parameters, such as drought, climate change, and forest health, could lead to additional direct loss of cultural resources. These impacts would continue to affect cultural resources, through loss or disturbance to the integrity and setting of resources from incremental use or theft and vandalism of cultural resources.

Cultural resources next to areas of growth and development would be most susceptible to future effects. The construction of buildings, roads, and associated structures increases ground disturbance, causing effects on cultural resources and their settings. Development near BLM-administered lands also increases pressure from recreation. Designating travel corridors can protect cultural resources located off the routes, but restrictions are difficult to enforce, especially as population and recreational use grows and other areas are closed.

Increased use of the Internet and GPS devices to disseminate site location information and encourage visitation to sites can facilitate vandalism and unauthorized collecting.

All undertakings that could affect cultural resources on federal land or actions that are funded, licensed, or permitted by the federal government are subject to Section 106 of the NHPA and other applicable laws and regulations. Consideration of the future cumulative effects of undertakings on protected cultural resources would be required, and adverse effects would be resolved on a site-by-site or project-by-project basis. Adherence to appropriate predevelopment, development, and post-development protective measures would reduce most cumulative effects to an insignificant level. Implementation of the RMP is not anticipated to contribute to cumulative effects.

4.3.10 Paleontological Resources

This section discusses impacts on paleontological resources from proposed management actions of other resources and resource uses. Existing conditions are described in **Section 3.1.11** (Paleontological Resources).

Methods and Assumptions

Based on a reasonable prediction of possible future types of development, but not their timing or location, the following impact analysis provides a general description of common impacts on paleontological resources from planning-level actions.

Indicators

The primary overall indicator for paleontological resources is whether the characteristics that make a fossil locality or feature important for scientific use have been lost or diminished. Natural weathering, decay, erosion, improper collection, and vandalism can remove or damage those characteristics that make a paleontological resource scientifically important. Specific indicators used to assess the condition of in situ paleontological resources are the extent of erosion, rock fall and other natural processes, and human-caused disturbances. Resource condition is assessed through field observations, paleontological reports associated with paleontological use permits and construction activities, commercial site reports, and project reviews.

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- Occurrences of paleontological resources are closely tied to the geologic units (e.g., formations, members, or beds) that contain them. The probability for finding paleontological resources can be broadly predicted from the geologic units at or near the surface.
- Geologic mapping can be used for assessing the potential for paleontological resources using the BLM's Potential Fossil Yield Classification (PFYC) system.
- For assessing impacts, only those objectives and actions potentially affecting vertebrate and scientifically important paleontological resources are considered.
- Scientifically important fossils would continue to be discovered throughout the Planning Area. Discoveries are most likely in geologic units classified as high-potential PFYC Class 4 or 5, but known rich localities also have been found in the Planning Area in PFYC Class 3 units. For calculating acreages, only the PFYC 4 and 5 data layers were used to overlap with management actions.
- Inventories conducted before surface disturbance or construction monitoring in high-probability areas could result in the identification and evaluation of previously undiscovered resources, which the BLM would manage accordingly.
- Potential for impacts on both surface and subsurface paleontological resources is directly proportional to the amount of surface disturbance associated with a proposed action.
- At the programmatic level of analysis, it is not possible to identify and evaluate areas of higher paleontological sensitivity with respect to locations of proposed surface disturbance. Therefore, potential impacts on paleontological resources under each alternative can only be generally estimated, and they correlate directly to the amount of anticipated surface disturbance proposed under each alternative.

Nature and Type of Effects

There would be no direct impacts from the goals, objectives, and allocations noted in the alternatives; there could be direct impacts associated with some management actions. Exposed fossils can be damaged by natural weathering and erosion from wind and water, and this damage can be exacerbated

by concentration of human use and activity. Other sources of human-caused damage are ground-disturbing activity, vandalism, unauthorized collection, and over-collection of localities. Surface disturbance and excavations could impact fossils that could occur on or underneath the surface in areas containing paleontologically sensitive geologic units. Several formations with high potential for yielding fossil vertebrates, such as the Upper Jurassic Morrison Formation noted in **Section 3.1.11** crop out in the Planning Area, and the probability for impacting fossils during surface-disturbing activities in these areas is high.

Types of impacts include permanent loss of the paleontological resource and the scientific data it could provide through damage or destruction caused by surface-disturbing activities. Without removing some rock surrounding fossils, they would remain largely undetected; therefore, management actions that result in erosion do not necessarily result in damage to paleontological resources. Excessive erosion, especially from other surface disturbance on exposed localities, could damage fossils at the surface.

Impacts can typically be mitigated to below a level of significance by implementing paleontological mitigation identified in the BMPs or stipulations, such as construction monitoring, excavating materials, or avoiding surface exposures. Pedestrian surveys would typically be necessary before any surface-disturbing activities were authorized in those units with a high potential for yielding fossil vertebrates (e.g., the Morrison formation); on-site monitoring could be required during construction. If data recovery were the prescribed mitigation, this could also result in fossils being salvaged that may never have been unearthed as the result of natural processes. These newly exposed fossils would become available for scientific research, education, display, and preservation into perpetuity at a public museum. Unmitigated surface-disturbing activities could dislodge or damage paleontological resources and features that were not visible before surface disturbance.

An increase in visitors to, workers in, or access to paleontological localities or sensitive areas could result in an increased potential for loss of paleontological resources by vandalism and poaching (Eagles et al. 2002). These impacts are difficult to mitigate to below the level of significance, but they can be greatly reduced by increasing public awareness about the scientific importance of paleontological resources through education, community partnerships, and interpretive displays, and by informing the public about penalties for unlawfully destroying or poaching these resources from BLM-administered lands.

A summary of impacts in provided in **Table 4-11** (Summary of Impacts on Paleontological Resources (PFYC 4 and 5)).

Table 4-11
Summary of Impacts on Paleontological Resources (PFYC 4 and 5)

Total acres of PFYC 4 and 5 in the Decision Area: 493,320 acres (BLM surface/federal minerals)					
Management Action or Allocation	**Acres of PFYC 4 and 5 Overlap with Management Action or Allocation**				
	Alternative A	**Alternative B**	**Alternative C**	**Alternative D**	**Alternative E**
ACECs	19,810	157,960	19,250	38,860	19,230
SRMA allocation	41,670	197,890	0	173,940	102,210
ERMA allocation	0	0	166,410	50,280	50,300
Closed to motorized and mechanized travel	34,000	84,140	35,000	46,260	44,710
Closed to motorized travel	11,200	3,560	0	860	850

Total acres of PFYC 4 and 5 in the Decision Area: 493,320 acres (BLM surface/federal minerals)					
Management Action or Allocation	**Acres of PFYC 4 and 5 Overlap with Management Action or Allocation**				
	Alternative A	**Alternative B**	**Alternative C**	**Alternative D**	**Alternative E**
Motorized and mechanized travel limited to designated routes	448,150[1]	405,620	458,330	446,210	447,760
Open to cross-country motorized and mechanized travel	0	N/A	0	N/A	0
Available for fluid mineral leasing with standard stipulations[2]	309,240	*Alt. B:* 1,950; *Alt. B.1:* 1,950	234,660	86,820	284,470
Fluid mineral leasing with NSO[2]	23,360	*Alt. B:* 409,590; *Alt. B.1:* 425,370	12,060	165,230	52,820
Fluid mineral leasing with CSU[2]	111,960	*Alt. B:* 583,540; *Alt. B.1:* 583,540	246,010	375,420	234,700
Utility corridors	18,400	41,560	18,400	41,560	41,560
VRM Class III and IV[2]	440,770[3]	*Alt. B:* 370,580; *Alt. B.1:* 366,020	438,180	370,520	479,250
Available for coal leasing[2]	29,570	270,160	236,250	201,080	315,040
Available for locatable mineral exploration and development[2]	474,310	304,060	467,920	428,610	564,570
Available for mineral materials disposal[2]	415,290	142,260	453,360	388,870	502,330
No ground disturbance restriction	0	286,160	26,440	25,930	25,930
Site-specific relocation restriction	0	488,370	150,060	493,320	169,410

Source: BLM 2012a, 2018a, 2019

[1] Alternative A includes motorized and mechanized travel limited to designated and existing routes.

[2] The acreage number represents a combination of BLM-administered surface estate/subsurface mineral estate and nonfederal surface estate/BLM-administered subsurface mineral estate (split estate) acreages.

[3] Includes VRM Class III, Class IV, and undesignated areas.

Effects Common to All Alternatives

Implementing management for the following resources would have negligible or no impact on paleontological resources and are therefore not discussed in detail: air quality, ecological emphasis areas (under fish and wildlife), lands with wilderness characteristics, livestock grazing, and watchable wildlife viewing sites.

Alternative A

Under current management, several programs and allocations directly protect paleontological resources by prohibiting or severely restricting surface-disturbing activities that could damage or destroy paleontological resources. These areas are VRM Class I and II areas, ROW exclusion areas, areas closed to fluid mineral leasing and saleable minerals, areas withdrawn from locatable mineral entry, the Tabeguache Area, and WSAs.

Paleontological resources are directly protected via the paleontological resources lease notification, which requires an inventory be performed by an accredited paleontologist approved by the BLM Authorized Officer before surface-disturbing activities are authorized in Class 4 and 5 Paleontological

Areas. Paleontological resources are also indirectly protected via stipulations or actions that would protect other resources, such as those for wildlife or cultural resources. These are areas open to fluid mineral leasing that have NSO or CSU stipulations. These stipulations would protect approximately 23,360 acres of PFYC 4 and 5 areas that are covered by NSO stipulations, and 111,960 acres of PFYC 4 and 5 areas that are covered by CSU stipulations. The minimal restrictions on fluid mineral development would result in a reasonably foreseeable development scenario similar to that projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**.

ACEC designations with specific management actions protecting other resources would also protect approximately 19,810 acres of PFYC 4 and 5 areas in the San Miguel River and Tabeguache Creek ACECs.

Due to the BLM's mandate to protect scientifically important paleontological resources, there are few instances when a locality or fossil would be deliberately destroyed. However, as noted above in ***Nature and Type of Effects***, there are instances when human actions can inadvertently lead to damage or destruction of these resources. SRMAs generally have a protective effect on paleontological resources due to restrictions on surface-disturbing activities.

There are known scientifically important localities within the San Miguel SRMA and the San Miguel Jurassic Fish Fossil outcrops; under Alternative A, there are approximately 41,670 acres of PFYC 4 and 5 within all SRMAs. However, as these areas are focal points for river-oriented recreation rather than activities around the localities, recreation is unlikely to impact the localities due to plundering and vandalism damage.

Travel management actions are similar in that closed areas would protect against impacts from vehicles or increased number of people in or near sensitive resources (surface disturbance of exposed localities or plundering and vandalism). There are approximately 34,000 acres of PFYC 4 and 5 in areas closed to mechanized and motorized travel. In limited areas, travel would be on existing or designated routes, which could lessen damage from vehicles to surface-exposed localities. However, some routes could closely pass by sensitive localities or points of interest. In such cases, there is a possibility for recreational collection or inadvertent vandalism. There are approximately 448,150 acres of PFYC 4 and 5 within areas designated as limited to existing or designated routes in under Alternative A.

Paleontological resources can be directly protected in ACECs when paleontological resources or geologic formations known to contain fossil resources are located. For example, the Adobe Badlands ACEC has Mancos shale (known for invertebrate fossils and one vertebrate fossil) as a contributing factor for its designation. The Mancos shale formation is listed as PFYC 3 throughout the Planning Area. Considering this potential for fossil resources, the Adobe Badlands ACEC directly protects the resources within the ACEC.

Additionally, for river segments eligible for inclusion in the NWSRS under Alternative A, management direction would protect the ORVs, which include unique geology and paleontological resources, as noted for several segments along the San Miguel River.

Alternative B

Under Alternative B, the same programs noted under Alternative A would likely directly protect paleontological resources by prohibiting or severely restricting surface-disturbing activities that could damage or destroy paleontological resources. Additionally, NGD and SSR restrictions under Alternative B would protect paleontological resources similar to how NSO and CSU stipulations on open fluid mineral leasing areas would protect paleontological resources. Restrictions on fluid mineral development

would result in fewer new and exploratory development wells drilled and associated surface-disturbance than Alternative A. Under Alternative B, there are approximately 409,590 acres of PFYC 4 and 5 areas that are covered by NSO stipulations, and 583,540 acres of PFYC 4 and 5 areas that are covered by CSU stipulations as presented in **Table 4-11** above. Although there are no specific stipulations to protect paleontological resources under Alternative B, there are approximately 386,230 more acres of PFYC 4 and 5 areas covered by NSO stipulations and 471,580 more acres of PFYC 4 and 5 areas covered by CSU stipulations than under Alternative A. Under Alternative B.1, there are approximately 47,150 acres of PFYC 4 and 5 areas that are covered by NL (of oil and gas), 425,370 acres of PFYC 4 and 5 areas covered by NSO stipulations, and 583,540 acres of PFYC 4 and 5 areas covered by CSU stipulations. Although there are no specific stipulations to protect paleontological resources under Alternative B.1, of the 63,760 acres of PFYC 4 and 5 areas within the North Fork area, there are approximately 47,150 acres (74 percent) of PFYC 4 and 5 areas that would be closed to oil and gas leasing, 13,760 acres (22 percent) covered by NSO stipulations, and 2,730 acres (4 percent) covered by CSU stipulations.

Alternative B also allocates approximately 445,920 acres to VRM Classes III and IV (combined). The management actions and objectives for these allocations allow for moderate to major changes to the landscape and would likely result in surface-disturbing activities, which could impact approximately 370,580 acres of PFYC 4 and 5 that fall within VRM Classes III and IV. Alternative B.1 allocates approximately 440,290 acres to VRM Classes III and IV (combined). The management actions and objectives for these allocations allow for moderate to major changes to the landscape and would likely result in surface-disturbing activities, which could impact approximately 316,300 acres of PFYC 4 and 5 areas that fall within VRM Classes III and IV (26,780 acres of which are in the North Fork area).

Management actions that protect lands with wilderness characteristics would indirectly protect sensitive PFYC areas.

As noted under Alternative A, SRMAs generally have a protective effect on paleontological resources due to restrictions on surface-disturbing activities. The San Miguel SRMA and the San Miguel Jurassic Fish Fossil outcrops have known scientifically important localities; under Alternative B, there are approximately 197,890 acres of PFYC 4 and 5 in the SRMAs, 156,220 more acres than Alternative A.

There are approximately 84,140 acres of PFYC 4 and 5 in areas closed to motorized and mechanized travel. In limited areas, travel would be on designated routes, which could lessen damage from vehicles to surface-exposed localities. However, some routes could closely pass by sensitive localities or points of interest. In such cases, there is a possibility for recreational collection or inadvertent vandalism. Under Alternative B, there are approximately 405,620 acres of PFYC 4 and 5 within 0.25-mile of limited to designated routes for motorized and mechanized travel in limited OHV areas.

Also under Alternative B, there are 64,180 acres of utility corridors designated, which overlap with approximately 41,560 acres of PFYC 4 and 5 areas. The allocation of a utility corridor in and of itself does not create impacts on paleontological resources; however, any future implementation of the allocation (such as permitting a pipeline or power line) could impact paleontological resources. Stipulations applied to the permit could provide mitigation or protection of discovered paleontological resources during the subsequent NEPA and development processes, thereby lessening the possible impacts.

ACEC designations with specific management actions protecting other resources would indirectly protect approximately 157,960 acres of PFYC 4 and 5 areas. These include the Coyote Wash, Dolores Slickrock Canyon, East Paradox, La Sal Creek, Lower Uncompahgre Plateau Cultural, Paradox Rock Art, Roubideau-Potter-Monitor, Salt Desert Shrub Ecosystem, San Miguel Gunnison Sage-Grouse, San Miguel

River Expansion, Sims-Cerro Gunnison Sage-grouse, Tabeguache Pueblo and Tabeguache Caves, and West Paradox ACECs. Compared with Alternative A, Alternative B has approximately 138,150 more acres with ACEC protections.

Additionally, for river segments determined suitable for inclusion in the NWSRS under Alternative B, management direction would protect paleontological resources along several segments of the San Miguel River.

Alternative C

Under Alternative C, the same programs noted under Alternative A would likely directly protect paleontological resources by prohibiting or severely restricting surface-disturbing activities that could damage or destroy paleontological resources. Additionally, Alternative C includes NGD and SSR restrictions on surface-disturbing activities, which would protect paleontological resources similar to how NSO and CSU stipulations on open fluid mineral leasing areas protect paleontological resources.

The minimal restrictions on fluid mineral development would result in a reasonably foreseeable development scenario similar to that projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**. Under Alternative C, there are approximately 12,060 acres of PFYC 4 and 5 areas that are covered by NSO stipulations, and 246,010 acres of PFYC 4 and 5 areas that are covered by CSU stipulations. Under Alternative C, there are approximately 11,300 fewer acres covered by NSO stipulations and 134,050 more acres covered by CSU stipulations than under Alternative A, and, unlike Alternative A, there are no stipulations that directly protect fossil resources.

Alternative C also allocates about 600,320 acres to VRM Classes III and IV (combined). The management actions and objectives for these allocations allow for moderate to major changes to the landscape. They would likely result in surface-disturbing activities, which could impact approximately 438,180 acres of PFYC 4 and 5 that fall within VRM Classes III and IV.

As noted under Alternative A, SRMAs generally have a protective effect on paleontological resources due to restrictions on surface-disturbing activities; currently, there are known scientifically important localities in the San Miguel Jurassic Fish Fossil outcrops. However, Alternative C has 0 acres of PFYC 4 and 5 within allocated SRMAs, so there would be neither protection from the restrictions nor possible impacts from recreation. Approximately 166,410 acres of PFYC 4 and 5 overlap with ERMAs.

There are approximately 35,000 acres of PFYC 4 and 5 in areas closed to motorized and mechanized travel. In limited areas, travel would be on designated routes, which could lessen damage from vehicles to surface-exposed localities. However, some routes could closely pass by sensitive localities or points of interest. In such cases, there is a possibility for recreational collection or inadvertent vandalism. Under Alternative C, there are approximately 458,330 acres of PFYC 4 and 5 within 0.25-mile of areas limited to designated routes for motorized and mechanized travel.

Also under Alternative C, there are 26,880 acres of utility corridors designated, which overlap with approximately 18,400 acres of PFYC 4 and 5 areas. Effects are the same as those described under Alternative B.

Of the ACECs designated under Alternative C, the San Miguel River ACEC would directly and indirectly protect approximately 19,250 acres of PFYC 4 and 5,560 acres fewer than under Alternative A.

Alternative D

Under Alternative D, the same programs noted under Alternative A would likely directly protect paleontological resources by prohibiting or severely restricting surface-disturbing activities that could

damage or destroy paleontological resources. Under Alternative D, there are no specific paleontological resources stipulations that directly protect fossils; however, similar to Alternative A, stipulations applied to protect or conserve other resources also protect paleontological resources, such as areas open to fluid mineral leasing with NSO or CSU stipulations. The restrictions on fluid mineral development would result in a reduction in the number of new and exploratory development wells and associated surface-disturbance from those projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**. Under Alternative D, there are approximately 165,230 acres of PFYC 4 and 5 areas that are covered by NSO stipulations, and 375,420 acres of PFYC 4 and 5 areas that are covered by CSU stipulations. There are approximately 141,870 more acres covered by NSO stipulations and 263,460 more acres covered by CSU stipulations than under Alternative A.

Alternative D also allocates approximately 516,820 acres to VRM Classes III and IV (combined). The management actions and objectives for these allocations allow for moderate to major changes to the landscape. They would likely result in surface-disturbing activities, which could impact approximately 370,520 acres of PFYC 4 and 5 that fall within VRM Classes III and IV.

Management actions that protect lands with wilderness characteristics would also protect sensitive PFYC areas.

SRMAs generally have a protective effect on paleontological resources due to restrictions on surface-disturbing activities; there are known scientifically important localities in the San Miguel SRMA and the San Miguel Jurassic Fish Fossil outcrops. Under Alternative D, there are approximately 173,940 acres of PFYC 4 and 5 in SRMAs, which represents more protection, as compared with Alternative A. However, as these areas are focal points for river-oriented recreation, rather than activities around the localities, recreation is unlikely to impact the localities due to plundering or vandalism. Approximately 50,280 acres of PFYC 4 and 5 overlap with ERMAs.

There are approximately 46,260 acres of PFYC 4 and 5 in areas closed to motorized and mechanized travel. In limited areas, travel would be on designated routes, which could lessen damage from vehicles to surface-exposed localities. However, some routes could closely pass by sensitive localities or points of interest. In such cases, there is a possibility for recreational collection or inadvertent vandalism. Under Alternative D, there are approximately 446,210 acres of PFYC 4 and 5 within 0.25-mile of areas limited to designated routes for motorized and mechanized travel.

Also under Alternative D, there are 64,180 acres of utility corridors considered, which overlap with approximately 41,560 acres of PFYC 4 and 5 areas. Effects are the same as those described under Alternative B.

ACEC designations with specific management actions protecting other resources would also indirectly protect approximately 38,860 acres of PFYC 4 and 5 areas; these are the Biological Soil Crust, Dolores River Slickrock Canyon, Paradox Rock Art, Roubideau-Potter-Monitor, and San Miguel River ACECs. Compared with Alternative A, Alternative D has approximately 19,050 more acres with ACEC protections.

Additionally, for river segments determined suitable for inclusion in the NWSRS under Alternative D, management direction would protect paleontological resources along several segments of the San Miguel River.

Alternative E

Under Alternative E, the same programs noted under Alternative A would likely directly protect paleontological resources by prohibiting or restricting surface-disturbing activities that could damage or destroy paleontological resources. Under Alternative E, there are no specific paleontological resources

stipulations that directly protect fossils; however, similar to Alternative A, stipulations applied to protect or conserve other resources, such as areas open to fluid mineral leasing with NSO or CSU stipulations, would also protect paleontological resources. The restrictions on fluid mineral development would result in a reduction in the number of new and exploratory development wells and associated surface disturbance from those projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d), as discussed under **Section 4.1.1**. Under Alternative E, there are approximately 52,820 acres of PFYC 4 and 5 areas that are covered by NSO stipulations and 234,700 acres of PFYC 4 and 5 areas that are covered by CSU stipulations. There are approximately 29,460 more acres covered by NSO stipulations and 122,740 more acres covered by CSU stipulations than under Alternative A.

Visual Resources

Alternative E also allocates approximately 523,860 acres to VRM Classes III and IV (combined). The management actions and objectives for these allocations allow for moderate to major changes to the landscape. They may result in surface-disturbing activities, which could impact approximately 479,250 acres of PFYC 4 and 5 that fall within VRM Classes III and IV.

Recreation and Visitor Services

SRMAs generally have a protective effect on paleontological resources due to restrictions on surface-disturbing activities; there are known scientifically important localities in the San Miguel SRMA and the San Miguel Jurassic Fish Fossil outcrops. Under Alternative E, there are approximately 102,210 acres of PFYC 4 and 5 in SRMAs, which represents more protection than Alternative A. However, because these areas are focal points for river-oriented recreation, rather than activities around the localities, recreation is unlikely to impact the localities due to plundering or vandalism. Approximately 50,300 acres of PFYC 4 and 5 overlap with ERMAs.

Comprehensive Travel and Transportation Management

There are approximately 44,710 acres of PFYC 4 and 5 in areas closed to motorized and mechanized travel, which is less than Alternative A and the other alternatives. In Limited areas, travel would be on designated routes, which could lessen damage from vehicles to surface-exposed localities. However, some routes could closely pass by sensitive localities or points of interest. In such cases, there is a possibility for recreational collection or inadvertent vandalism. Under Alternative E, there are approximately 447,760 acres of PFYC 4 and 5 within 0.25-mile of areas limited to designated routes for motorized and mechanized travel.

Lands and Realty—Rights-of-Way

Also, under Alternative E, there are 64,180 acres of utility corridors considered, which overlap with approximately 41,560 acres of PFYC 4 and 5 areas. Effects are the same as those described under Alternatives B and D.

Areas of Critical Environmental Concern

ACEC designations with specific management actions protecting other resources would also indirectly protect approximately 19,230 acres of PFYC 4 and 5 areas; these are the Adobe Badlands, Biological Soil Crust, Fairview South, Needle Rock, Paradox Rock Art, and San Miguel River ACECs. Compared with Alternative A, Alternative D has approximately 580 fewer acres with ACEC protections.

Wild and Scenic Rivers

Additionally, for river segments determined suitable for inclusion in the NWSRS under Alternative E, management direction would protect paleontological resources along several segments of the San Miguel River.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on paleontological resources is the Uncompahgre RMP Planning Area. This is because impacts from most management actions proposed under the RMP and other existing activity plans are not expected to have cumulative influence beyond this scale. Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect paleontological resources are mineral exploration and development, unauthorized travel, forestry, livestock grazing, recreation, road construction, ROWs, water diversions, weed invasion and spread, weed control, prescribed fire and wildfires, land planning efforts, vegetation treatments, habitat improvement projects, insects and disease, and drought. Types of impacts from past, present, and reasonably foreseeable future actions that affect paleontological resources are the same as those discussed under ***Nature and Type of Effects***. They include destruction or damage of resources without the benefit of scientific study or interpretation due to construction, recreation, theft, vandalism, and the effects of natural processes without the benefit of recovery, scientific study, or interpretation.

Current and future trends are energy and minerals development, including fluid mineral leasing and development, coal mines, uranium mining, and mineral materials sales; population growth; urbanization; increase in recreational demand; and ROW projects, including pipeline and transmission line construction, road construction, and erosion. For actions on BLM-administered land and mineral estate, impacts would be minimized through existing laws, regulations, and stipulations addressing surface-disturbing activities in PFYC Class 4 and 5 areas and other sensitive areas. Other ground-disturbing activities, such as road construction and utility infrastructure, could be reviewed by other federal, state, or local agencies for the presence and scientific value of paleontological resources, and steps could be taken to recover or avoid significant finds. Actions on private land could result in the inadvertent destruction of paleontological resources or the removal of fossils without any scientific study. Increasing recreation demand could result from unauthorized removal, vandalism, incremental damage of surface resources, and subsequent erosion.

RMP decisions could contribute to cumulative impacts on paleontological resources, when combined with other past, present, and reasonably foreseeable actions. The cumulative effects of surface-disturbing activities, such as mineral development and lands and realty actions within PFYC Class 4 and 5 areas, could damage or destroy some resources. Some fossils would be destroyed in the course of legitimate uses of BLM-administered lands, as well as through natural weathering and erosion. Considered management actions that require identification of resources in high-potential areas would allow evaluation by paleontologists in areas that had not been previously studied. This would allow for fossils that would have otherwise been destroyed to be avoided or recovered and made available for study.

Beyond authorized ground disturbance, cumulative impacts could occur from intensive travel, dispersed recreation, wildfire suppression, erosion, unauthorized collection, and vandalism. These could result in the unmitigated loss of scientific information and could reduce the educational and interpretative potential of the resource. Protections provided by other resource measures under Alternatives B, C, D, and E would reduce the intensity of these effects. Adherence to appropriate protective measures before, during, and after development would reduce most impacts to a minimal level.

4.3.11 Visual Resources

This section discusses impacts on visual resources from proposed management actions of other resources and resource uses. Existing conditions are described in **Section 3.1.12** (Visual Resources).

Methods and Assumptions

This section identifies impacts on visual resources on 675,800 acres of BLM surface-administered lands. Impacts on visual resources are assessed by comparing the VRI class of an area to the VRM class for the same area and by examining how other resource and resource use management actions affect visual resources. Because the sensitivity level is expected to remain high, the analysis does not consider changes to sensitivity levels. Furthermore, the landscape is entirely within the foreground/middle ground distance zone. This is not expected to change from management under any of the alternatives, so the analysis does not further consider changes to distance zones. As such, the following impact analysis by alternative focuses on the potential for change in VRI classification due to a change in scenic quality. Under no alternative would the scenic quality be anticipated to significantly improve.

When assessing scenic quality, seven factors are considered: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications. Of these factors, decisions in the RMP have the highest potential to change vegetation, color, or cultural modifications. Where cultural modifications would be allowed, there could be a change in the variety of vegetation forms, patterns, or texture from such activities as construction, vegetation removal, soil composition changes. Furthermore, where cultural modifications would be allowed to the extent that the basic components of the landscape (e.g., vegetation, soil, and rock) changed drastically, the variety, contrast, and harmony of color could change as well.

Indicators

The scenic quality of the Planning Area is of national significance and an important part of the local and state economy. Many people live and recreate in the Planning Area because of its remoteness and visual qualities. The visual setting is an important part of local lifestyles and, for most travelers, the scenery or visual resource is an important part of their visit. Both tourists and residents drive across this landscape expecting to see open mountain vistas, deep canyons, dramatic cliffs and mesas, and vast rolling sagebrush-covered lands.

The VRI involves identifying the visual resources of an area and assigning them to inventory classes using the BLM's resource inventory process. The process involves rating the visual appeal of a tract of land, measuring public concern for scenic quality, and determining whether the tract of land is visible from travel routes or observation points. The results of the VRI become an important component of the area's RMP because they establish how BLM-administered lands will be used and allocated for different purposes.

The designation of VRM classes is ultimately based on management decisions made during the RMP process, which must take into consideration the value of visual resources. Current VRM classes are summarized in **Table 3-28** (Visual Resource Management Classes) and are displayed in **Figure 2-5** (Alternative A: Visual Resource Management). Objectives of the four VRM classes are included in **Section 3.1.12**.

The indicator of impacts on visual resources is the following: A proposed VRM class would allow changes to the landscape that could alter its character enough that future visual resource inventories would result in a reclassification. For example, an area currently managed for VRM Class IV has VRI Class II lands. The level of change allowed by VRM Class IV could alter the landscape to the point that future visual resource inventories could result in reclassifying the area to VRI Class III or IV.

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- The scenic vistas within the Planning Area would become more sensitive to visual change; in other words, they would increase in value over the next 20 years.
- Scenic resources would become increasingly important to residents of and visitors to the area.
- Visitors to BLM-administered lands or residents living near BLM-administered lands are sensitive to changes in visual quality.
- Activities that cause the most contrast and are the most noticeable to the viewer and the public would be considered to have the greatest effect on scenic quality.
- The severity of a visual effect depends on a variety of factors, including the size of a project (i.e., area disturbed and physical size of structures), the location and design of roads and trails, and the overall visibility of disturbed areas.
- The more protection that is associated with the management of other resources and special designations, the greater the benefit to visual resources of the surrounding viewsheds.
- VRM class objectives apply to all resources. Class objectives would be adhered to through project design, avoidance, or mitigation.
- Visual resource design techniques and BMPs would be implemented to mitigate potentially harmful impacts.
- Visual contrast ratings would be required for all projects. The visual contrast rating system would be used as a guide to analyze site-specific impacts from projects as well as project design and placement. Projects would be designed to minimize their visual impacts in order to conform to the area's VRM class objective. This would allow the BLM to reduce impacts on a site-specific basis to ensure compliance with the assigned VRM class.
- Areas without either VRI or VRM classes cannot be effectively managed for visual resources. Classes are identified for BLM-administered lands requiring comprehensive management of visual resources.

Nature and Type of Effects

Impacts on visual resources are assessed by comparing the VRI class of an area to the VRM class for the same area and examining how other resource and resource use management actions affect visual resources. At a landscape level, the more VRI Class I and II areas that are managed as either VRM Class I and II, the more protection would be afforded to areas with high visual quality. VRI Class III areas, for example, would also receive protection from VRM Class I management because fewer changes to the landscape would be allowed than under VRM Class III. Generally, VRI Class I and II areas are more susceptible to impacts from changes to the landscape because of the high-value visual resources in these areas.

Vegetation management actions involve using physical, mechanical, educational, biological, herbicidal, and fire treatments to control noxious weeds. In the short term, these methods can leave the ground surface scarred and void of vegetation. It can also introduce new colors to the treated area. In the long term, once desired vegetation becomes established and matures, it can create a landscape of vegetation and colors appropriate to the local landscape.

Prescribed fires alter landscape colors and vegetation forms, lines, and textures. These impacts on visual resources would be short-term, remaining until new vegetation becomes established. Prescribed fires also must comply with the VRM class objective for the area.

There are approximately 7,860 acres of lands lacking a VRI class designation. These lands are part of Curecanti National Recreation Area and are managed by the National Park Service. The visual resources on these lands may range from a VRI Class I to IV. Without knowing the visual resource attributes of these lands, it can be difficult to identify how the existing character of the landscape would change due to development and activities. For example, development and activities on these lands could degrade

visual resources beyond the ability of the landscape to accommodate changes to the character of the landscape. Similarly, it is difficult to comprehensively manage for visual resources on lands lacking a VRM class designation.

On lands with wilderness characteristics, visual character is related to the criteria used to determine the presence of wilderness characteristics. Criteria used to determine whether wilderness characteristics are present include the absence of roads, such structures as developed recreation facilities, fences, pipelines, and power lines, and such modifications as vegetation treatments. These structures can create visual contrast levels that cause them to be "substantially noticeable," and the presence of such structures changes the visual quality of the area. The proper VRM class is designated for protecting the visual integrity of the lands with wilderness characteristics that is commensurate with the decisions for managing these lands. If the wilderness characteristics are managed for their protection, then VRM Class I or II is designated, whereas lands that are not managed to protect these characteristics may be managed as VRM Class III or IV. VRM Class I and II may only protect the visual integrity of these lands, but would not necessarily protect the wilderness characteristics in full. For instance, if a road is designed to not be seen within these lands, then the visual integrity and values may be fully protected, while the wilderness characteristics would be changed.

Minerals and energy management identifies areas open and closed to development. There would be no development in areas that are closed to such uses, thereby preventing development that degrades visual resources. In open areas, development may be subject to BMPs or stipulations that restrict the location and types of mineral development. Minerals and energy development could disturb the surface, which would remove the top layers of soil or vegetation to reveal colors that contrast with the surrounding landscape.

New roads to access development sites would add artificial elements to the landscape. Improving roads typically enhances the contrast of the road with the adjacent landscape. Roads lack vegetation and create an abrupt vegetation edge along the roadside. Smooth roads would stand out against the moderately coarse texture of the terrain. This would affect visual resources by dividing the landscape with areas that lack vegetation and altering the natural topography and the texture and color of the land surface. The visibility of the new and improved roads would vary, depending on viewer distance and location, topography, screening vegetation, and the location of the route when designed and constructed.

Facilities associated with minerals and energy development would add artificial elements, such as cultural modifications, to the landscape. These areas would be cleared of vegetation, thereby contrasting with the surrounding landscape. The form, line, color, and texture of these facilities would not resemble nearby structures, unless they are collocated with similar existing industrial facilities. The visibility of the facilities would vary, depending on viewer distance and location, topography, color, and composition of the facilities, and screening vegetation.

In general, surface disturbance from minerals and energy development would directly decrease the scenic quality by changing vegetation and color. Actions to restrict, mitigate, or prohibit this surface disturbance can maintain the scenic quality of an area by preserving vegetation and color in the long term.

Casual recreation use generally would not impact visual resources or the visual character of the area. All forms of travel can impact visual resources. However, limiting use or travel to routes can provide a measure of assurance against trail proliferation and promote the recovery of natural processes in the area, thereby potentially maintaining scenic quality. These impacts are generally confined to the route itself. In contrast, areas open to intensive use can affect visual resources by affecting the visual character of the entire area. Impacts on visual resources include scarring of the terrain, trampled vegetation, and

fugitive dust. Impacts are most notable from motorized vehicles because routes can become noticeable after only a few passes.

Management objectives for SRMAs target the identified recreational activities which provide specific recreational outcomes (i.e., experiences, benefits, and settings). VRM classes are established to manage visual resources to achieve the targeted outcomes. VRM Classes I and II are established for SRMAs that require low levels of development to achieve the management objectives. VRM Classes III and IV are established for SRMAs that require more development to achieve the management objectives and, therefore, more associated alterations of the landscape. Although the VRM classes are used to provide the appropriate setting for identified recreational activities, they also influence the management of visual resources by, for example, limiting additional landscape modifications that may diminish the appeal of recreation and associated recreational outcomes.

Of the lands managed for motorized travel, lands open to cross-country motorized travel would receive the most degradation of visual resources because motorized travel is not confined to existing or designated routes and so can occur anywhere.

Managing ROW exclusion areas would protect visual resources by prohibiting new roads, pipelines, transmission lines, communication sites, wind, solar, and geothermal development, and other land use authorizations. ROW avoidance areas would provide limited protection by requiring mitigation measures to minimize alteration of the physical setting. In other areas, utilities, such as new transmission lines, access roads, and related development, could permanently alter the visual quality of an area, especially if they do not repeat the basic elements of the landscape.

Managing stream segments as eligible or suitable for inclusion in the NWSRS would apply interim protective management pending congressional action. Development and activities along stream segments classified as wild or scenic are limited in order to maintain stream segment values and to minimize disturbances to the character of the landscape. Furthermore, the BLM would manage stream segments with an identified scenic ORV to protect such value. The BLM would approve no action that would have an adverse effect on an eligible segment's identified ORVs and would enhance identified ORVs to the extent practicable. Therefore, visual resources along eligible or suitable stream segments would be maintained and, possibly, enhanced.

Effects Common to All Alternatives

The results of the VRI completed in 2009 are presented in **Table 3-28** (Visual Resource Inventory Component Distribution). **Table 4-12** (Summary of VRI Class by VRM Class) identifies how VRM class designations would be applied to lands with and without VRI classes for each alternative. Lands without VRI classes are part of the Curecanti National Recreation Area and are managed by the National Park Service. The impacts on visual resources are described directly below, and the differences between the alternatives for impacts on visual resources from visual resources management actions are discussed under each alternative further below.

Visual resources would be maintained where VRM classes are commensurate with VRI classes. For example, there are 8,060 acres of VRI class I lands. Under all alternatives, all VRI Class I lands would be managed as VRM Class I, which would maintain the scenic quality of these lands.

VRM class objectives are described in Chapter 3, Section 3.1.12 (Visual Resources). VRM Classes I and II are more protective than VRM Classes III and IV. VRM Classes I and II would preserve (VRM Class I) or retain (VRM Class II) the existing character of the landscape. The level of change should be low, which would make it more difficult to implement projects such as ROWs (e.g., power distribution lines and

Table 4-12
Summary of VRI Class by VRM Class

VRM Class by Alternative	Acres	VRI Class									
		VRI Class I (Acres & %)		VRI Class II (Acres & %)		VRI Class III (Acres & %)		VRI Class IV (Acres & %)		No VRI Class (Acres & %)	
		8,080	%	165,380	%	313,960	%	180,520	%	7,860[1]	%
Alternative A											
VRM Class I	44,220	8,060	100%	25,850	16%	10,280	3%	60	<1%	30	<1%
VRM Class II	21,930	0	0%	21,200	13%	0	0%	730	<1%	0	0%
VRM Class III	280,520	0	0%	49,690	30%	139,450	44%	84,180	47%	7,200	92%
VRM Class IV	9,260	0	0%	530	0%	20	>1%	8,710	5%	0	0%
Undesignated	319,870	0	0%	68,120	41%	164,220	52%	86,830	48%	620	8%
Alternative B											
VRM Class I	53,870	8,060	100%	32,800	20%	12,950	4%	60	<1%	0	0%
VRM Class II	176,010	0	0%	79,120	48%	47,550	15%	48,900	27%	0	0%
VRM Class III	427,580	0	0%	53,490	32%	253,460	81%	112,570	62%	7,860	100%
VRM Class IV	18,340	0	0%	0	0%	0	0%	18,340	11%	0	0%
Alternative B.1											
VRM Class I	53,860	8,080	100%	32,780	20%	12,950	4%	60	<1%	0	0%
VRM Class II	181,650	0	0%	79,120	48%	53,630	17%	48,900	27%	0	0%
VRM Class III	421,290	0	0%	53,480	32%	247,380	79%	112,570	62%	7,860	100%
VRM Class IV	19,000	0	0%	0	0%	0	0%	19,000	11%	0	0%
Alternative C											
VRM Class I	44,220	8,060	100%	25,300	16%	10,280	3%	50	<1%	0	0%
VRM Class II	31,260	0	0%	31,300	19%	0	0%	0	0%	0	0%
VRM Class III	431,330	0	0%	108,310	65%	303,680	97%	11,480	6%	7,860	100%
VRM Class IV	168,990	0	0%	0	0%	0	0%	168,990	94%	0	0%

VRM Class by Alternative	Acres	VRI Class									
		VRI Class I (Acres & %)		VRI Class II (Acres & %)		VRI Class III (Acres & %)		VRI Class IV (Acres & %)		No VRI Class (Acres & %)	
		8,080	%	165,380	%	313,960	%	180,520	%	7,860[1]	%
Alternative D											
VRM Class I	46,440	8,060	100%	28,000	17%	10,330	3%	60	<1%	0	0%
VRM Class II	112,540	0	0%	82,830	52%	23,150	7%	3,154	2%	0	0%
VRM Class III	398,410	0	0%	51,170	31%	280,460	89%	58,920	33%	7,860	100%
VRM Class IV	118,400	0	0%	0	0%	20	<1%	118,520	66%	0	0%
Alternative E											
VRM Class I	46,440	8,060	100%	28,000	17%	10,330	3%	60	0.03%	0	0%
VRM Class II	105,490	0	0%	83,090	50%	19,770	6%	2,630	1%	0	0%
VRM Class III	370,600	0	0%	54,310	33%	283,840	90%	24,600	14%	7,860	100%
VRM Class IV	153,260	0	0%	0	0%	20	0%	153,240	85%	0	0%

Source: BLM 2012a, 2018a, 2019

[1] These lands are part of These lands are part of the Curecanti National Recreation Area and are managed by the National Park Service.

roads to a residence), range improvements (e.g., water developments), and wildlife habitat improvement projects. In some cases, mitigation to mask the visual change could enable authorizing a project. VRM Classes III and IV would allow more contrast in the landscape, which would allow implementation of more types of projects.

ACECs are designated and managed to protect specific values. Under all of the alternatives, the BLM would manage certain ACECs with scenic values to maintain the natural character of the landscape and the scenic values that led to their designation. In order to maintain scenic values in ACECs with scenic values, development and activities are limited in order to minimize disturbances to the character of the landscape. Therefore, visual resources in ACECs with scenic values would be maintained.

Under all of the alternatives, the BLM would continue to protect and preserve Native American cultural and sacred sites and Native American access to these sites whenever possible. The BLM would take no action that would adversely affect these areas or locations without first consulting with the appropriate Native American tribes (Executive Orders 13007 and 13084). There would be no change to visual resources associated with these areas.

Implementing management for the following resources would have negligible or no impact on visual resources and are therefore not discussed in detail: air quality, climate change, land health, soils and water, special status species, wild horses, cultural resources, forestry and woodland products, paleontological resources, livestock grazing, wilderness and WSAs, watchable wildlife viewing sites, and public health and safety.

Alternative A

Compared with all of the alternatives, Alternative A assigns VRM Class I and II designations to the least amount of VRI Class II lands. Also, compared with all of the alternatives, Alternative A assigns VRM Class I, II, and III designations to the least amount of VRI Class III lands. This is due to lands lacking a VRM class designation.

There are approximately 7,860 acres of lands lacking a VRI class (these lands are part of the Curecanti National Recreation Area and are managed by the National Park Service). Under Alternative A, 7,200 acres of lands lacking a VRI class are managed as VRM Class III. The remaining lands are managed as VRM Class I, or they lack a VRM class altogether. Without a VRI class, it is difficult to identify if VRM Class III management objectives are appropriate for these lands.

The BLM would apply appropriate integrated noxious weed control methods (e.g., physical, mechanical, educational, biological, herbicide, and fire) to noxious/invasive weed infestations. Specific types of weeds are not identified for treatment. Impacts on visual resources would continue to occur where treatment occurs. Impacts are described under ***Nature and Type of Effects***.

Under Alternative A, the BLM utilizes mechanical, biological, or herbicide treatments when prescribed and managed fire cannot be used. Impacts are described under ***Nature and Type of Effects***.

There would continue to be no lands managed to maintain their wilderness characteristics under Alternative A. Maintaining visual resources on these lands, as described above under ***Nature and Type of Effects***, would not occur under Alternative A.

The BLM would continue to manage 496,510 acres (BLM surface/federal minerals) as open to fluid mineral leasing, subject to standard terms and conditions. None of these lands are assigned to VRI Class I. Although some of these lands lack a VRI class, the vast majority of the lands are assigned to VRI Class II, III, or IV. Of the inventoried lands, essentially only the VRI Class II lands (87,700 acres) are assigned to a less-protective VRM Class III (49,690 acres). This would allow visual resources on these lands to

degrade. Also, 40 percent of the VRI Class II, III, or IV lands lack a VRM class. This would allow activities to occur without regard to appropriate VRM objectives.

The BLM would continue to manage 110,180 acres (BLM surface/federal minerals) open to fluid mineral leasing, subject to a CSU stipulation. None of these lands are assigned to VRI Class I. Approximately 86 percent of the VRI Class II, III, and IV lands lack a VRM class. This would allow activities to occur without regard to appropriate VRM objectives.

Lights could be installed for safety and to illuminate work areas at night, which would reduce nighttime darkness by adding artificial light to areas lacking it. As a result, this could diminish opportunities for viewing visual resources between dusk and dawn, particularly stargazing.

Under Alternative A, the BLM would continue to manage the Dolores River Canyon and San Miguel River SRMAs as VRM Classes I and III, respectively, totaling 49,320 acres. These areas would continue to be managed to preserve or retain the character of the landscape. The impacts on visual resources are described above under ***Effects Common to All Alternatives***.

Under Alternative A, motorized travel would continue to occur on 619,650 acres. Alternative A would manage 8,560 acres open to cross-country motorized travel. Impacts are described under ***Nature and Type of Effects***. With the exception of 20 acres, which are managed as VRI Class III, lands open to cross-country motorized travel are managed as VRI Class IV. All of the lands open to cross-country motorized travel would be managed as VRM Class IV, which could degrade visual resources on 20 acres.

Lands with utility corridors are assigned to VRI Class II, III, or IV, or are not assigned to a VRI class. Of the inventoried lands, only the VRI Class II lands (2,410 acres) are designated as a less-protective VRM Class III (1,700 acres). This would allow visual resources on these lands to degrade. Also, approximately 29 percent of the VRI Class II, III, and IV lands lack a VRM class. This would allow activities to occur without regard to appropriate VRM objectives. Additionally, the lands lacking a VRI class (440 acres) are assigned to VRM Class III. Without a VRI, it is difficult to identify if VRM Class III management objectives are appropriate for these lands.

Under Alternative A, the BLM would continue to manage 29,240 acres of ACECs for scenic values, thereby protecting visual resources. Visual resources associated with these ACECs would be maintained.

Under Alternative A, the BLM would continue to manage 154.1 miles of stream segments as eligible for inclusion in the NWSRS. Impacts are described under ***Nature and Type of Effects***.

Alternative A would continue to have minimal actions managing visual resources associated with National Trails and BLM byways. This would continue to allow for development and activities that alter the character of the landscape. This could include, for example, structures that obstruct views.

Alternative B

Alternatives B and B.1 assign VRM Class I and II objectives to more VRI Class II lands than Alternative A. Alternatives B and B.1 assign VRM Class I, II, or III objectives to all of the VRI Class III lands. Alternatives B and B.1 are more protective than Alternative A.

The BLM would apply appropriate integrated noxious weed control methods (e.g., physical, mechanical, educational, biological, herbicidal, and fire) to noxious/invasive weed infestations of category A state-listed species and early detection rapid response species. These treatments would be applied to limited weed types. As a result, impacts on visual resources would occur in limited areas. Alternative B would treat the least amount of area of all the alternatives.

Under Alternative B, the BLM would utilize prescribed and managed fire to achieve resource objectives. Effects are described under ***Nature and Type of Effects***. Compared to Alternative A, Alternative B relies on only prescribed and managed fire, and no other forms of vegetation manipulation under wildland fire ecology and management.

Alternative B would preserve seven units with wilderness characteristics, totaling 42,150 acres, which would be managed as VRM Class II. As described above under ***Nature and Type of Effects***, lands with wilderness characteristics are characterized as VRI Class II. Visual resources on lands with wilderness characteristics would receive VRM protection equal to or greater than their VRI class.

The BLM would manage 50 acres (BLM surface/federal minerals) as open to fluid mineral leasing, subject to standard terms and conditions (i.e., no stipulations). None of these lands are assigned to VRI Class I. Although some of these lands lack a VRI class, the vast majority of the lands are assigned to VRI Class IV. Of the inventoried lands, none of the lands are assigned to a less-protective VRM Class. This would keep visual resources on inventoried lands from degrading.

The BLM would manage 139,560 acres under Alternative B and 135,550 acres under Alternative B.1 (BLM surface/federal minerals) as open to fluid mineral leasing, subject to a CSU stipulation. None of these lands are assigned to VRI Class I. Although some of these lands lack a VRI class, the vast majority of the lands are assigned to VRI Class III or IV. Of the inventoried lands, under Alternative B, only the VRI Class II lands (75,220 acres) are assigned to a less-protective VRM Class III (24,000 acres). This would allow visual resources on these lands to degrade. Also, it is important to note that most of the VRI Class IV lands are assigned to VRM Class II or III. This would keep visual resources on inventoried lands from degrading.

Like under Alternative A, lights could be installed for safety and to illuminate work areas at night. Impacts would be similar to those described under Alternative A, except that under Alternative B, any permanent or temporary lighting would be required to be downward-facing, which would minimize impacts on naturally dark night skies, compared with Alternative A.

Alternative B.1 would assign VRM Class II to several vistas and travel corridors. Within the North Fork area, Alternatives B and B.1 would both have 80 acres of VRM Class I. Alternative B.1 would have 36,280 acres of VRM Class II (6,080 acres more than Alternative B), and 27,030 acres of VRM Class III (6,080 acres fewer than Alternative B). Depending on the location, VRM Class II under Alternative B.1 would be closed to leasing, have an NSO stipulation, or have a CSU stipulation, compared to Alternative B where VRM Class II would have a CSU stipulation. VRM Class II would hinder or prevent, without appropriate mitigation, implementation of ROWs and other projects that visually contrast with the landscape.

Alternative B would be the most protective of visual resources associated with National Trails and BLM byways, with the exception that Alternative B.1 would provide more protection for the West Elk Scenic Byway. Under Alternative B, the BLM would manage National Historic Trails and National and BLM byways as VRM Class II within a half-mile of either side of centerline. Under Alternative B.1, VRM Class II management would extend to 1 mile of either side of centerline for just the West Elk Scenic Byway. This would retain the existing character of the landscape in that area, thereby limiting opportunities for development and activities to degrade visual resources by, for example, obstructing views.

The BLM would manage 12 SRMAs, totaling 246,760 acres, most of which would have a VRM Class II or III designation. The Dolores River Canyon SRMA, RMZ 4 of the Paradox Valley SRMA, and RMZ 1 of the Roubideau SRMA would be the only SRMAs managed as VRM Class I as they overlap WSAs. The VRM class would stay Class I until Congress releases a WSA from consideration as wilderness, and then

it would revert to the underlying VRM Class (i.e., VRM Class II). Alternative B would involve the fewest opportunities for alternations to the landscape.

There would be no lands open to cross-country motorized travel under Alternative B, so there would be no related impacts on visual resources, as described under ***Nature and Type of Effects***.

Lands with utility corridors are assigned to VRI Class II, III, or IV, or are not assigned to a VRI class. Of the inventoried lands, only the VRI Class II lands (21,310 acres) are assigned to a less-protective VRM Class III (11,530 acres). This would allow visual resources on these lands to degrade.

Under Alternative B, the BLM would manage 46,170 acres of ACECs for scenic values, thereby protecting visual resources. Compared with Alternative A, Alternative B would protect an additional 16,930 acres for scenic values.

Under Alternative B, the BLM would manage 154.1 miles of stream segments as suitable for inclusion in the NWSRS. Impacts are described under ***Nature and Type of Effects***.

Alternative C

Alternative C assigns VRM Class II objectives to more VRI Class II lands than Alternative A. Alternative C assigns VRM Class I and III objectives to all of the VRI Class III lands. Alternative C is more protective than Alternative A.

The BLM would apply appropriate integrated noxious weed control methods (e.g., physical, mechanical, educational, biological, herbicidal, and fire) to noxious/invasive weed infestations of category A and B state-listed species and early detection rapid response species. These treatments would be applied to a variety of weed types. As a result, impacts on visual resources would occur in a variety of areas.

Under Alternative C, the BLM would emphasize minimal mechanical, biological, and herbicide treatments and managed fire to achieve resource objectives. Effects are described under ***Nature and Type of Effects***. This alternative relies on the least amount of prescribed fire use.

Impacts on visual resources from lands with wilderness characteristics management are the same as those described under Alternative A.

Lands with utility corridors are assigned to VRI Class II, III, or IV, or are not assigned to a VRI class. Of the inventoried lands, only the VRI Class II lands (22,510 acres) are assigned to a less-protective VRM Class III (20,180 acres). This would allow visual resources on these lands to degrade.

The BLM would manage 251,090 acres (BLM surface/federal minerals) as open to fluid mineral leasing, subject to standard terms and conditions. None of these lands are assigned to VRI Class I. Although some of these lands lack a VRI class, the vast majority of the lands are assigned to VRI Class III or IV. Of the inventoried lands, only the VRI Class II lands (29,880 acres) are assigned to a less-protective VRM Class III (23,010 acres). This would allow visual resources on these lands to degrade.

The BLM would manage 365,810 acres (BLM surface/federal minerals) as open to fluid mineral leasing, subject to CSU stipulations. None of these lands are assigned to VRI Class I. Although some of these lands lack a VRI class (7,500 acres), the vast majority of the lands are assigned to VRI Class II, III, or IV. Of the inventoried lands, only the VRI Class II lands (104,760 acres) are assigned to a less-protective VRM Class III (80,950 acres). This would allow visual resources on these lands to degrade. Also, it is important to note that the lands lacking a VRI class would be assigned to VRM Class III. Without a VRI, it is difficult to identify if VRM Class III management objectives would be appropriate for these lands. Impacts of lights installed for safety and to illuminate work areas at night on naturally dark night skies would be the same as those described under Alternative A.

The BLM would manage 12 ERMAs, only four of which would be managed with a specific VRM Class, Class III, totaling 80,460 acres. Unlike SRMAs, ERMA recreation is managed to support and sustain targeted recreation activities and is commensurate with management of other resources and resource uses. As such, the management of other resources, such as mineral resources, may be considered more heavily when planning for recreation activities and facilities in these areas. Therefore, Alternative C would involve the most opportunities for alternations to the landscape.

Under Alternative C, motorized travel would occur on 630,630 acres. Alternative C would manage 16,070 acres as open to cross-country motorized travel. Impacts are described under ***Nature and Type of Effects***. With the exception of 30 acres, which are managed as VRI Class III, lands open to cross-country motorized travel would be managed as VRI Class IV. All of the lands open to cross-country motorized travel would be managed as VRM Class II or IV. Alternative C has almost twice as much land open to cross-country motorized travel than does Alternative A, thereby allowing for more visual resources to be affected by open cross-country motorized travel.

Impacts on visual resources from ACECs with scenic values are the same as those described under Alternative A.

Under Alternative C, the BLM would determine that all stream segments are not suitable for inclusion in the NWSRS and would release them from interim management protections afforded eligible segments. The identified scenic ORVs would no longer receive direct interim protection. Consequently, ROWs and surface disturbances could, for example, result in altered vegetation forms and built structures in relatively undeveloped areas along these segments, thereby degrading visual resources.

Under Alternative C, the BLM would manage as VRM Class III all national and BLM byways within 0.25-mile of either side of centerline and National Historic Trails within 0.5-mile of either side of centerline. This would partially retain the character of the landscape in that area, thereby partially limiting opportunities for development and activities to degrade visual resources by, for example, obstructing views. Compared with Alternative A, this would allow fewer disturbances to the visual landscape.

Alternative D

Alternative D assigns VRM Class I and II objectives to more VRI Class II lands than Alternative A. Alternative D assigns VRM Class I, II, and III objectives to almost all of the VRI Class III lands. Alternative D is more protective than Alternative A.

Impacts on visual resources from weed management are the same as those described under Alternative A.

Under Alternative D, the BLM would utilize mechanical treatment, prescribed fire, seeding, and herbicide in the most ecologically appropriate manner to achieve resource objectives. Effects are described under ***Nature and Type of Effects***. This alternative does not emphasize one type of vegetation manipulation over another.

For lands with wilderness characteristics, the impacts are similar to those described under Alternative B, but Alternative D would preserve only three units with wilderness characteristics, totaling 18,320 acres. These would be managed as VRM Class II. As described above under ***Nature and Type of Effects***, lands with wilderness characteristics are characterized as VRI Class II or III. All of the visual resources on lands with wilderness characteristics would receive VRM class protection equal to or greater than their VRI class.

The BLM would manage 174,590 acres (BLM surface/federal minerals) as open to fluid mineral leasing, subject to standard terms and conditions. None of these lands are assigned to VRI Class I. Although

some of these lands lack a VRI class, the vast majority of the lands are assigned to VRI Class III or IV. Of the inventoried lands, only the VRI Class II lands (14,100 acres) are assigned to a less-protective VRM Class III (870 acres). This would allow visual resources on these lands to degrade. Approximately 30 percent the VRI Class IV lands are assigned to VRM Class II or III. This would prevent visual resources degradation on inventoried lands.

The BLM would manage 265,140 acres (BLM surface/federal minerals) as open to fluid mineral leasing, subject to CSU. None of these lands are assigned to VRI Class I. Although some of these lands lack a VRI class, the vast majority of the lands are assigned to VRI Class III or IV. Of the inventoried lands, essentially only the VRI Class II lands (37,730 acres) are assigned to a less-protective VRM Class III (10,660 acres). This would allow visual resources on these lands to degrade. Approximately 31 percent of VRI Class IV lands are assigned to VRM Class II or III. This would keep visual resources on inventoried lands from degrading. Furthermore, lands lacking a VRI class would be assigned to VRM Class III. Without a VRI, it is difficult to identify if VRM Class III management objectives would be appropriate for these lands.

Impacts of lights installed for safety and to illuminate work areas at night on naturally dark night skies would be the same as those described under Alternative B.

The BLM would manage seven SRMAs and four ERMAs, totaling 197,710 acres. The SRMAs would have a VRM Class II or III designation. Only three ERMAs would be managed with a specific VRM class, which is either Class III or IV. Unlike SRMAs, ERMA recreation is managed to support and sustain targeted recreation activities and is commensurate with management of other resources and resource uses. As such, the management of other resources, such as mineral resources, may be considered more heavily when planning for recreation activities and facilities in these areas. Alternative D would involve fewer opportunities for alternations to the landscape than Alternative A.

Impacts on visual resources from comprehensive travel and transportation management are the same as those described under Alternative B.

Lands with utility corridors are assigned to VRI Class II, III, or IV, or are not assigned to a VRI class. Of the inventoried lands, only the VRI Class II lands (2,410 acres) are assigned to a less-protective VRM Class III (530 acres). This would allow visual resources on these lands to degrade.

Under Alternative D, the BLM would manage 39,020 acres of ACECs for scenic values, thereby protecting visual resources. Compared with Alternative A, Alternative D would protect an additional 9,780 acres for scenic values.

Under Alternative D, 104.6 miles of stream segments would be determined suitable for inclusion in the NWSRS. Impacts are described under ***Nature and Type of Effects***. Also, under Alternative D, the BLM would determine that 13 stream segments are not suitable for inclusion in the NWSRS and would release them from interim management protections afforded eligible segments. Impacts on visual resources for those stream segments are similar to those under Alternative C.

Under Alternative D, the BLM would manage National Trails and national and BLM byways as VRM Class II or III within a half-mile of either side of centerline. This would retain and partially retain the character of the landscape within that area, thereby limiting opportunities for development and activities to degrade visual resource by, for example, obstructing views. Compared with Alternative A, this would allow fewer disturbances to the visual landscape.

Alternative E

Alternative E assigns VRM Class I and II objectives to more VRI Class II lands than Alternative A. Alternative E assigns VRM Class I, II, and III objectives to almost all of the VRI Class III lands. Alternative E is more protective than Alternative A.

Vegetation

The BLM would apply appropriate integrated noxious weed control methods (e.g., targeted grazing, physical, mechanical, educational, biological, herbicide, and fire) to noxious/invasive weed infestations. These treatments would be applied to a variety of weed types. Specific types of weeds are not identified for treatment. Similar to Alternative A, impacts on visual resources would occur where treatment occurs. Impacts are described under ***Nature and Type of Effects***.

Wildland Fire Ecology and Management

Similar to Alternative D, under Alternative E, the BLM would utilize mechanical treatment, prescribed fire, seeding, herbicide, and pollinators in the most ecologically appropriate manner to achieve resource objectives. Effects are described under ***Nature and Type of Effects***. This alternative does not emphasize one type of vegetation manipulation over another.

Lands with Wilderness Characteristics

The BLM would manage 18,320 acres to minimize impacts on wilderness characteristics, while managing for other uses. Although the lands would not be managed to preserve wilderness characteristics, there would still be efforts that minimize impacts on wilderness characteristics. The BLM would conserve wilderness characteristics where possible through relocation, design criteria, and/or mitigation. In turn, this would also minimize impacts on visual resources. There would be no comparable lands managed to minimize impacts on wilderness characteristics under Alternative A.

Fluid Leasable Minerals—Oil and Gas

The BLM would manage 258,900 acres (BLM surface/federal minerals) as open to fluid mineral leasing, subject to standard terms and conditions. None of these lands are assigned to VRI Class I. Although some of these lands lack a VRI class, the majority of the lands are assigned to VRI Class III or IV. Of the inventoried lands, only VRI Class II lands are assigned to a less-protective VRM Class III (4,590 acres). This would allow visual resources on these lands to degrade.

The BLM would manage 298,100 acres (BLM surface/federal minerals) as open to fluid mineral leasing, subject to CSU. None of these lands are assigned to VRI Class I. Although some of these lands lack a VRI class, the majority of the lands are assigned to VRI Class III or IV. Of the inventoried lands, essentially only the VRI Class II lands are assigned to a less-protective VRM Class III (24,140 acres). This would allow visual resources on these lands to degrade. Nearly half of the VRI Class IV lands open to fluid mineral leasing subject to CSU are assigned to VRM Class II or III. This would keep visual resources on inventoried lands from degrading.

Impacts of lights installed for safety and to illuminate work areas at night on naturally dark night skies would be the same as those described under Alternative B.

Recreation and Visitor Services

The BLM would manage eight SRMAs and three ERMAs, totaling 186,920 acres. The SRMAs would have a VRM Class II or III designation, except for a VRM Class IV designation for North Delta SRMA. Only three ERMAs would be managed with a specific VRM class, which is Class III. Unlike SRMAs, ERMA recreation is managed to support and sustain targeted recreation activities and is commensurate with management of other resources and resource uses. As such, the management of other resources, such

as mineral resources, may be considered more heavily when planning for recreation activities and facilities in these areas. Alternative E would involve fewer opportunities for alternations to the landscape than Alternative A, because of areas being managed specifically for recreation.

Comprehensive Travel and Transportation Management

Under Alternative E, motorized travel would occur on 619,150 acres. Impacts would be similar to those under Alternative C, except motorized travel would occur on fewer acres, mostly in areas open to cross-country motorized travel. Impacts are described under ***Nature and Type of Effects***. Lands open to cross-country motorized travel are assigned to VRI Class IV. Lands open to cross-country motorized travel would be managed as VRM Class IV. Alternative E has approximately half as much land open to cross-country motorized travel than does Alternative A, thereby allowing for fewer visual resources to be affected by open cross-country motorized travel.

Lands and Realty—Rights-of-Way

Lands with utility corridors are assigned to VRI Class II, III, or IV, or are not assigned to a VRI class. Of the inventoried lands, only the VRI Class II lands are assigned to a less-protective VRM Class III (5,560 acres). This would allow visual resources on these lands to degrade.

Areas of Critical Environmental Concern

Impacts on visual resources from the management of ACECs with scenic values are the same as those described under Alternative A.

Wild and Scenic Rivers

Impacts on visual resources from wild and scenic river management are the same as those described under Alternative D.

National Trails and Byways

Under Alternative E, the BLM would manage National Trails and byways as VRM Class II or III within 0.5-mile of either side of centerline. This would retain and partially retain the character of the landscape within that area, thereby limiting opportunities for development and activities to degrade visual resource by, for example, obstructing views. Compared with Alternative A, this would allow fewer disturbances to the visual landscape.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on visual resources is the Uncompahgre RMP Planning Area. Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect visual resources are wildland fires, wildland fire management activities, mineral activities, cross-country travel, noxious weed invasion, urban and suburban sprawl, and road construction.

Actions likely to have the greatest future effect on visual resources in the cumulative impact analysis area are activities associated with energy and minerals development, continued urbanization, road construction, vegetation management, developed recreation, and utility development. Energy development, which depends on a variety of external factors, could have widespread and long-term effects on visual resources; although sites are required to be reclaimed, some visual impacts remain (e.g., well caps). Urbanization has resulted in, and is expected to continue to result in, residential and commercial development expanding incrementally closer to BLM-administered lands. This presents the UFO with further challenges in meeting visual resources goals and objectives. Continued urban growth and development of lands in the vicinity of BLM-administered lands could also increase demand for

energy resources, building materials, utilities, and minerals, all of which could spur development that would affect visual resources.

4.3.12 Lands with Wilderness Characteristics

This section discusses impacts on lands with wilderness characteristics from proposed management actions of other resources and resource uses. Existing conditions are described in **Section 3.1.13** (Lands with Wilderness Characteristics).

In accordance with the Federal Land Policy and Management Act of 1976, the Colorado BLM completed a wilderness inventory between 1978 and 1980 and delivered final recommendations, as documented in the Colorado Wilderness Study Report to Congress (BLM 1991b). In the Planning Area, seven areas outside of existing WSAs and the Tabeguache Area, with a total of 42,150 acres, were found to have wilderness characteristics, based on the BLM Wilderness Characteristics Assessment (**Appendix F** [Summary of the Uncompahgre Planning Area Wilderness Characteristics Inventory: 2015 Update]).

Methods and Assumptions

Indicators

Indicators of impacts on lands with wilderness characteristics are the management actions and allowable uses that would either protect or degrade the inventoried characteristics to a level at which the value of one or more wilderness characteristic would no longer be present within the specific area. The inventoried wilderness characteristics are as follows:

- Roadless areas of sufficient size—Impacts would result from issuing new rights-of-way and/or building roads that would reduce the roadless size.
- Naturalness (apparent naturalness, not ecological naturalness)—Impacts would result from developments or vegetation manipulations that make the area appear less natural.
- Opportunities for solitude or primitive recreation—Impacts would result from increases in visitation, development of facilities, increases in motorized or mechanized routes, or increases in management constraints on primitive recreational use (e.g., restrictions on campfires, limiting camping to designated sites, and closing areas to camping).
- Supplemental values—Impacts would result from any action that degrades the inventoried values.

Assumption

This analysis is based on the assumptions in **Section 4.1.1**.

Nature and Type of Effects

Wilderness characteristics are primarily influenced by the size of the roadless area, actions that impact the undeveloped nature of the area, or activities that increase the sights and sounds of other visitors. Generally, actions that create surface disturbance degrade the natural characteristics of lands with wilderness characteristics, as well as the setting for experiences of solitude and primitive recreation. In addition, restrictions on dispersed recreation (e.g., prohibited campfires and camping permitted only in designated sites) diminish the opportunities for unconfined recreation.

Management actions that could affect the roadless size of an area include authorization of new road construction, authorization to maintain old routes that are no longer passable for full-size vehicles, or issuing new rights-of-way. Management actions that could impact an area's natural appearance could include the presence or absence of roads and trails, use of motorized vehicles along those roads and trails, fences and other improvements, nature and extent of landscape modifications, or other actions that result in or preclude surface-disturbing activities. All of these activities affect the presence or

absence of human activity and, therefore, could affect an area's natural appearance. Prohibiting surface-disturbing activities and new developments within lands with wilderness characteristics would protect naturalness.

Outstanding opportunities for solitude, or primitive and unconfined types of recreation are related to the human experience in an area. People have outstanding opportunities for solitude when the sights, sounds, and evidence of other people are rare or infrequent, and where people can be isolated, alone, or secluded from others. People have outstanding opportunities for primitive and unconfined recreation when the use of the area is primarily through nonmotorized and nonmechanized means, where there are no or only minimal developed recreation facilities, and where there are few special regulations on recreation.

Management for wildland fire could impact lands with wilderness characteristics. In areas where suppression is a priority, there is the potential for vegetation modification to prevent the spread of fires, potentially reducing the naturalness of appearance.

While vegetation treatments are implemented, naturalness and opportunities for solitude could be reduced in the short-term. Naturalness would likely be enhanced over the long term by restoring natural vegetation structures and patterns.

There could be indirect impacts from management of other resources that would enhance wilderness characteristics. Stipulations associated with cultural resources, water, soils, and special status species could indirectly improve the naturalness of lands with wilderness characteristics and help protect those characteristics. Management actions that protect resources would impact lands with wilderness characteristics by preserving or enhancing naturalness, as well as opportunities for solitude and primitive recreation. For example, restrictions on soil and water resources management actions could preserve the naturalness of the landscape by preventing large-scale disturbances through the application of stipulations and other actions. Restrictions on surface use to protect cultural resources would limit visual impacts and habitat degradation, thereby protecting wilderness characteristics.

Ecological emphasis areas are the central and primary area of habitat for a population of a given species or group of species. This includes corridors, which are strips of land that aid in the movement of species between disconnected core areas of their natural habitat. Management of these areas to protect key habitat and corridors between habitats would enhance the naturalness of lands with wilderness characteristics by limiting surface-disturbing activities.

The designation of lands with wilderness characteristics as VRM Class II would contribute to the protection of the naturalness of these areas. Under VRM Class II objectives, management activities may be seen, but should not attract the attention of the casual observer.

Impacts on lands with wilderness characteristics are possible from livestock grazing, particularly from new developments in these areas (e.g., water developments and fences), which could lessen the naturalness of appearance or limit unconfined recreation. Existing range improvements used for grazing, such as fences, stock trails, springs, and stock ponds, would continue to be maintained. Structures could diminish the naturalness characteristic of lands with wilderness characteristics. Maintenance of range improvements could result in short-term impacts on solitude and naturalness.

High concentrations of recreation users (large group sizes or frequent group encounters) would decrease outstanding opportunities for solitude.

Allowing new motorized and mechanized travel on designated routes would impact wilderness characteristics. By increasing sights and sounds of other people, opportunities for solitude would be

reduced. New motorized and mechanized access would also reduce opportunities for primitive recreation. The existence of new motorized and mechanized trails could reduce the natural appearance in the vicinity of the trails. Effects would be localized and might not be experienced in the unit as a whole. Prohibiting motorized and mechanized use on lands with wilderness characteristics would protect wilderness characteristics by restricting activities that could impact natural appearance and opportunities for solitude and primitive/unconfined recreation. Exceptions to exclusions on motorized and mechanized vehicles could result in a short-term detraction from the naturalness characteristic of the areas. These impacts would be uncommon and short duration if they were to occur. On a more regular basis, activities such as motorized and mechanized use by established livestock grazing permittees would impact opportunities for solitude and naturalness of appearance.

Allowing any type of surface energy or mineral development (i.e., fluid, coal, nonenergy solid, locatable, and mineral materials and renewable energy) would result in surface disturbance that would diminish the area's naturalness characteristic. Any new roads authorized for access to the development area could eliminate wilderness characteristics of the entire unit if the road were to bisect the unit so that it would no longer be considered a roadless area of adequate size. In addition, regular access to the lease area or mine site by developers would reduce the opportunities for solitude. It should be noted that the Adobe Badlands WSA Adjacent, Lower Tabeguache/Campbell Creek, Roc Creek, Dolores River Canyon WSA Addition, and Shavano Creek units have higher potential for conventional oil and gas development, while the Camel Back WSA Adjacent and Dry Creek Basin units have lower potential. Only Adobe Badlands WSA Adjacent and a portion of the Shavano Creek unit has potential for coalbed natural gas development, so threats to wilderness characteristics from this type of development are minimal. While Roc Creek, Dolores River Canyon WSA Addition, Tabeguache/Campbell Creek, and Shavano Creek are within the area of potential occurrence for nonenergy solid leasable minerals (e.g., sodium and potassium), potential for exploration and development during the life of this RMP is low. As such, impacts from nonenergy solid mineral leasing are not discussed further, though acres closed to such development under each alternative are displayed in **Table 4-13** (Acreage Impacts on Lands with Wilderness Characteristics).

Table 4-13 displays the acres of lands with wilderness characteristics that overlap key allocations that could either enhance or diminish wilderness characteristics. Where lands with wilderness characteristics overlap these allocations, impacts on lands with wilderness characteristics could occur regardless of whether or not the lands are managed for the protection of those characteristics. As such, each column shows acres that would be impacted by each alternative regardless of wilderness characteristics protection under that alternative. Note that because Alternatives D and E protect (Alternative D) or minimize impacts on (Alternative E) only some of the areas identified as possessing wilderness characteristics, the table has two different columns each for Alternatives D and E. Each has one for areas managed for the protection of (Alternative D) or minimization of impacts on (Alternative E) wilderness characteristics, and one for those not managed for protection of (Alternative D) or minimization of impacts on (Alternative E) wilderness characteristics. The allocations overlapping lands with wilderness characteristics are discussed by alternative in the alternative-specific discussions below.

Wilderness characteristics of WSAs adjacent to lands managed for the protection of wilderness characteristics could be enhanced since the adjacency would result in additional contiguous acres of similar (though non-permanent) protection, adding to the integrity of those characteristics.

Where lands that possess wilderness characteristics overlap or are next to eligible or suitable WSR segments or ACECs, management of these other resources could also indirectly protect wilderness characteristics due to the protective measures proposed for the other resources. These protective measures would include complementary management objectives to lands managed for protection of

their wilderness characteristics, and could also offer some indirect protection of wilderness characteristics for units managed primarily for other resource considerations.

Effects Common to All Alternatives

Table 4-13 displays the acres of lands with wilderness characteristics that overlap key allocations that could either enhance or diminish wilderness characteristics, regardless of whether they would be managed for their protection. Note that because Alternatives D and E protect only some of the areas identified as possessing wilderness characteristics, the table has two different columns each for Alternatives D and E. Each has one for areas managed for the protection of wilderness characteristics, and one for those not managed for protection of wilderness characteristics. The overlapping allocations are discussed by alternative below.

Implementing management for the following resources would have negligible or no impact on lands with wilderness characteristics and are therefore not discussed in detail: air quality, wild horses, forestry and woodland products, nonenergy solid mineral leasing, mineral material disposal, national trails and byways, and watchable wildlife viewing sites.

Alternative A

The BLM would not manage any lands to protect their wilderness characteristics under Alternative A. Not managing for the explicit protection of the inventoried lands found to have wilderness characteristics would leave these lands vulnerable to surface-disturbing activities, which would likely diminish wilderness characteristics over time. Management actions to protect other resources and special designation areas (e.g., eligible WSR study segments) would offer some protection of wilderness characteristics, though surface-disturbing activities such as casual recreation could alter the natural setting and reduce opportunities for solitude or primitive recreation for all lands with wilderness characteristics. Management under Alternative A has led to current conditions that include wilderness characteristics existing in seven areas within the Uncompahgre RMP Decision Area. Wilderness characteristics would likely persist in many of these areas under Alternative A, although wilderness characteristics in at least some areas that currently possess wilderness characteristics could degrade under this alternative.

Under Alternative A, protective measures for soil resources, water resources, fish and wildlife, special status species, vegetation resources, cultural resources, and WSRs could provide limited protection to wilderness characteristics. As a result, natural landscapes and settings could be changed over time. Loss of naturalness would diminish the overall wilderness characteristics of the units.

Under Alternative A, lands with wilderness characteristics would be managed as VRM Class III (19,730 acres) and unclassified (22,030 acres), which would provide minimal protection (**Table 4-13**). Any human-made changes in the landscape would degrade an area's naturalness and, as a result, would diminish wilderness characteristics.

Under Alternative A, all lands with wilderness characteristics would remain available to livestock grazing (**Table 4-13**). Management actions associated with livestock grazing, such as range improvements, could result in impacts on wilderness characteristics. The result of manipulations in natural landscapes for livestock grazing would, by definition, make lands less natural and would diminish wilderness characteristics.

Under Alternative A, there is no overlap of SRMAs or ERMAs with lands with wilderness characteristics (**Table 4-13**). Despite the lack of recreation focus in these areas, a variety of recreation activities, such as motorized and mechanized uses, would be allowed, and there would be no constraints on the

Table 4-13
Acreage Impacts on Lands with Wilderness Characteristics[1]

Management Action	Alt. A *(Not Managed to Protect Wilderness Characteristics)*	Alt. B *(Managed to Protect Wilderness Characteristics)*	Alt. C *(Not Managed to Protect Wilderness Characteristics)*	Alt. D *(Not Managed to Protect Wilderness Characteristics)*	Alt. D *(Managed to Protect Wilderness Characteristics)*	Alt. E *(Not Managed to Minimize Impacts on Wilderness Characteristics)*	Alt. E *(Managed to Minimize Impacts on Wilderness Characteristics)*
Total	**42,150**	**42,150**	**42,150**	**23,830**	**18,320**	**23,830**	**18,320**
Ecological emphasis areas	0	34,650	3,370	1,780	13,420	0	0
Available to Livestock Grazing	42,150	38,020	42,150	23,450	18,310	23,760	18,300
VRM Class I	20	4,050	20	10	990	10	990
VRM Class II	0	37,730	1,360	6,690	17,330	6,690	12,950
VRM Class III	19,730	0	34,090	10,460	0	10,460	4,380
VRM Class IV	0	0	6,310	6,310	0	6,670	0
VRM Unclassified	22,030	N/A	N/A	N/A	N/A	N/A	N/A
SRMA	0	19,460	0	0	13,980	0	13,980
ERMA	0	0	13,980	0	0	0	0
Closed to motorized travel (*mechanized travel limited to designated routes)*	170	0	0	0	0	0	0
Closed to motorized and mechanized travel	20	42,150	20	10	6,290	10	6,290
ROW Avoidance	0	0	13,680	17,320	14,270	540	14,260
ROW Exclusion	20	42,150	20	10	4,060	10	4,060
Closed to fluid mineral leasing	20	42,150	20	10	10	10	10
NSO	14,770	N/A	1,240	1,490	18,320	110	4,160
CSU	1,750	N/A	23,320	16,950	N/A	12,910	14,140
TL	28,490	12,680	33,840	23,450	18,320	18,550	14,800
Closed to coal leasing	0	12,680	230	230	1,110	270	13,980

Management Action	Alt. A *(Not Managed to Protect Wilderness Characteristics)*	Alt. B *(Managed to Protect Wilderness Characteristics)*	Alt. C *(Not Managed to Protect Wilderness Characteristics)*	Alt. D *(Not Managed to Protect Wilderness Characteristics)*	Alt. D *(Managed to Protect Wilderness Characteristics)*	Alt. E *(Not Managed to Minimize Impacts on Wilderness Characteristics)*	Alt. E *(Managed to Minimize Impacts on Wilderness Characteristics)*
Recommend for withdrawal from locatable mineral entry	14,730	42,150	350	80	4,100	0	4,060
Closed to mineral material disposal	6,780	42,150	660	750	18,320	370	13,580
NGD	10	42,150	150	0	10	0	10
SSR	0	42,150	8,890	5,710	18,320	9,250	10,240
ACECs	0	24,360	0	0	3,370	0	0
Eligible/Suitable Wild and Scenic River Segments	5,800	5,800	0	0	4,060	0	4,060

Source: BLM 2012a, 2018a, 2019

[1] Acres refer to impacts on lands in the BLM's current inventory of lands with wilderness characteristics.

number of visitors to the areas. As a result, there would be no protections for opportunities for solitude or primitive and unconfined recreation. Additionally, any modifications for recreation uses, such as facilities needed to address public health and safety standards, would modify the natural landscape and therefore diminish wilderness characteristics.

Under Alternative A, less than 1 percent of lands with wilderness characteristics are closed to motorized or mechanized travel or both (**Table 4-13**). In areas not closed to motorized or mechanized travel, such use is limited to existing routes. In the Rock Creek unit, there is one route impassable by motorized or mechanized vehicles. Within the Camel Back WSA Adjacent and Dolores River Canyon WSA Adjacent, all motorized and mechanized travel is restricted to authorized use only; public travel is limited to nonmotorized/nonmechanized means. Authorized travel in these areas is for maintenance of livestock developments that are not often accessed. As such, naturalness and opportunities for solitude are not expected to be impacted throughout most of the units; any impacts would be localized and short term.

Within the Shavano Creek unit, there is a range access route that enters the unit from the west side off Montrose County Road Z26. It runs northeast, next to Shavano Creek, terminating about 2.5 miles in. The route was mechanically constructed (likely by bulldozer), but it is no longer used by full-size vehicles. There is evidence of some ATV use, likely for range-management or hunting. There is no sign of mechanical maintenance of this route, and it is becoming an ATV trail rather than a full-size vehicle route. Overall, the seasonal use of the route does not impact naturalness and opportunities for solitude, except during its use.

There is motorized and mechanized access into the Dry Creek Basin unit. A 3-mile ATV trail that runs along the bench above the East Fork of Dry Creek is used primarily for seasonal hunting. During hunting season use is moderate to heavy. A 2-mile road spur is cherry-stemmed out of the unit on the west bench above West Fork of Dry Creek. While this road is excluded from the unit, it could negatively affect perceptions of solitude for the adjacent lands within the unit. The road accesses a developed spring and trough and provides full-size vehicle access to the area. The road is primarily used for grazing allotment management and for seasonal hunting access. During hunting season, use is moderate, and the road is lightly used outside the hunting season. About 5 miles of motorized single-track trail exists on the west bench of Dry Creek, mostly on the northern half of the unit. This is primarily used for recreational trail riding in the spring and fall. Motorized and mechanized use of these trails is moderate in spring and fall and is light in summer and winter. Motorized and mechanized use of these routes would have a localized effect on perceptions of solitude during their primary seasons of use, but those effects would not be enough to preclude outstanding opportunities for solitude throughout most of the unit.

Energy and mineral development could result in impacts on wilderness characteristics under this alternative. The minimal restrictions on fluid mineral development would result in a reasonably foreseeable development scenario similar to that projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**. Less than 1 percent of lands with wilderness characteristics would be closed to fluid mineral leasing. Of the lands that would remain open, 35 percent would have an NSO stipulation. With the exception of closing lands to fluid mineral leasing, an NSO stipulation would afford the most protection for lands with wilderness characteristics by precluding surface-disturbing activities. Four percent of lands with wilderness characteristics would have a CSU stipulation. This would protect the wilderness characteristics if the proposed action were relocated beyond the boundary of lands with wilderness characteristics. About 68 percent of the lands with wilderness characteristics would have a TL stipulation, providing limited protection on a short-term basis (**Table 4-13**). Any new roads authorized for access to the lease area could reduce the roadless

size of the unit or eliminate wilderness characteristics of the entire unit if the road were to bisect the unit so that it would no longer be considered a roadless area of adequate size.

Approximately 35 percent of lands with wilderness characteristics would be recommended for withdrawal from locatable mineral entry, which would add to the protection of wilderness characteristics in those areas (**Table 4-13**). Because most mineral exploration and development require surface occupancy, these activities would make lands less natural and would, therefore, diminish wilderness characteristics. Any new roads authorized for access to the mine could reduce the roadless size of the unit or eliminate wilderness characteristics of the entire unit if the road were to bisect the unit so that it would no longer be considered a roadless area of adequate size. No impact from coal is expected under this alternative since there are no acres with coal potential overlapping lands with wilderness characteristics.

Management actions associated with lands and realty actions could result in impacts on wilderness characteristics. A small fraction (less than 1 percent) of lands with wilderness characteristics would be managed as ROW exclusion areas (**Table 4-13**). The remaining lands would be available for utility corridor development and open to development of major utility facilities, including required access roads. These types of lands and realty manipulations in natural landscapes would make lands less natural and would, therefore, diminish wilderness characteristics. Authorization of ROW corridors and access roads that bisect the unit would reduce the size of the units, possibly to the degree that they are no longer considered to be a roadless area of adequate size, eliminating the wilderness characteristics of the entire unit.

Monitor and Potter Creeks, identified as eligible for inclusion in the NWSRS, flow through the Camel Back WSA Adjacent, so it would receive some indirect protection from WSR management (**Table 4-13**). Managing these segments as eligible for inclusion in the NWSRS would provide indirect protection to the naturalness of lands with wilderness characteristics unit where they overlap the WSR study corridor because the BLM would take no action that would adversely impact the free-flowing condition, identified ORVs and adequate water quality to support those ORVs, or tentative classification of the eligible segments.

Alternative B

Under Alternative B, the BLM would manage seven units totaling 42,150 acres (7 percent of the Uncompahgre RMP Decision Area outside the Tabeguache Area and WSAs) to protect their wilderness characteristics. This would retain their specific characteristics (detailed in the **Appendix F**).

Management of lands with wilderness characteristics under this alternative would be fairly restrictive: All lands with wilderness characteristics would be closed to motorized and mechanized travel, would be managed as ROW exclusion, and would be closed to all types of energy development. Also, the BLM would recommend to the Secretary of the Interior that the lands be withdrawn from locatable mineral entry. In addition, other surface-disturbing activities would be prohibited (**Table 4-13**). All of these restrictions would prohibit activities and development that could impact wilderness characteristics, as described under ***Nature and Type of Effects***.

Under this alternative, 34,650 acres within the Adobe Badlands WSA Adjacent, Camel Back WSA Adjacent, Lower Tabeguache/Campbell Creek, Shavano Creek, and Dry Creek Basin units would overlap the Adobe, Monitor-Potter-Roubideau, Tabeguache, and Dry Creek Ecological Emphasis Areas, respectively (**Table 4-13**). Management of these areas to protect key habitat and corridors between habitats would enhance the naturalness of lands with wilderness characteristics by limiting surface-disturbing activities.

Under Alternative B, 4,050 acres (10 percent) would be managed as VRM Class I due to overlapping management with other resources. The remaining 37,730 acres (90 percent) would be managed as VRM Class II as described in **Chapter 2** (see **Table 4-13**). Lands managed according to VRM Class I objectives would retain the natural characteristic of the area. Managing lands with wilderness characteristics according to VRM Class II objectives would allow some modifications of the landscape but because VRM Class II objectives only allows landscape modifications that do not attract the attention of the casual observer, naturalness would largely be protected. However, because no surface-disturbing activities would be permitted in the lands with wilderness characteristics units, it is unlikely that any landscape modifications that might otherwise be allowed under VRM Class II would be permitted.

Impacts on wilderness characteristics would be influenced by activities associated with the established livestock grazing allowed under this alternative. Existing range improvements used for livestock, such as fences, stock trails, springs, and stock ponds, constitute an established use and would continue to be maintained. Impacts are the same as those described under Alternative A. New or expanded range improvements would be prohibited under this alternative, which would protect the natural/undeveloped characteristics of lands with wilderness characteristics in these areas. While 2,010 acres of lands with wilderness characteristics would be unavailable to livestock grazing under this alternative, naturalness is unlikely to be affected by this closure unless livestock range improvements are in this area. Abandoned range improvements would be considered for removal on a case-by-case basis. Removal of the improvements would enhance the naturalness of the areas; conversely, if improvements are allowed to fall into disrepair, the naturalness could be slightly diminished.

Because of proposed management for lands with wilderness characteristics under this alternative, recreational use would not impact the wilderness characteristics. Management objectives for the overlapping RMZs in the Dolores River Canyon, Roubideau, and Paradox Valley SRMAs are consistent with managing for wilderness characteristics. In fact, because the overlapping portions of these SRMAs would be managed for nonmotorized and nonmechanized recreation in primarily a Back Country setting, opportunities for primitive and unconfined recreation would be enhanced by the SRMAs. The portion of the Dry Creek SRMA overlapping the Dry Creek Basin unit would be managed for motorized recreation; however, management identified for lands with wilderness characteristics would be implemented in the area of overlap according to the hierarchy of management (discussed in **Chapter 2**). The closure of motorized routes within the Dry Creek Basin unit would enhance the naturalness of the area and the opportunities for solitude and primitive and unconfined recreation.

No SRPs would be issued for competitive events, thereby maintaining low visitor numbers and noise levels, naturalness, solitude, and opportunities for primitive and unconfined recreation.

The following ACECs overlap lands with wilderness characteristics: Lower Uncompahgre Plateau ACEC (Dry Creek Basin), Roubideau Corridors ACEC (Camel Back WSA Adjacent), Roubideau-Potter-Monitor ACEC (Camel Back WSA Adjacent), Salt Desert Scrub Ecosystem ACEC (Adobe Badlands WSA Adjacent), and Tabeguache Pueblo and Tabeguache Caves (Shavano Creek). Additionally, Monitor and Potter Creeks flow through the Camel Back WSA Adjacent. Management of ACECs for the protection of identified relevant and important values and suitable WSR segments to protect the free-flowing condition, identified ORVs and adequate water quality to support those ORVs, and tentative classification (in this case wild) would enhance the naturalness of the unit. Portions of WSR study corridors overlap the Roc Creek and Shavano Creek units, but only a small fraction indirectly enhances the wilderness characteristics in these areas. The Camel Back WSA Adjacent overlaps the Monitor Creek WSR study corridor (2,470 acres) and the Potter Creek WSR study corridor (1,660 acres). The Lower Tabeguache/Campbell Creek unit overlaps the Tabeguache Creek Segment 2 by 1,330 acres.

Alternative C

Under Alternative C, no lands with wilderness characteristics would be managed for their protection. However, some areas could receive indirect protection from the management of other resources.

Under this alternative, 3,370 acres within the Camel Back WSA Adjacent unit would overlap the Monitor-Potter-Roubideau Ecological Emphasis Area. Management of these areas to protect key habitat and corridors between habitats would enhance the naturalness of lands with wilderness characteristics by limiting surface-disturbing activities.

Under Alternative C, less than 1 percent of lands with wilderness characteristics would be managed as VRM Class I. An additional 1,360 acres (3 percent) would be managed as VRM Class II. Lands managed according to VRM Class I objectives would retain the natural characteristic of the area. Managing lands with wilderness characteristics according to VRM Class II objectives largely protect the naturalness characteristic by allowing only minor modifications to the landscape that do not attract the attention of the casual observer. An additional 34,090 acres (82 percent) would be managed according to VRM Class III objectives, which would allow landscape modifications that could impair the naturalness of the area as modifications would be allowed to attract the attention of the casual observer. The remaining 6,310 acres (15 percent) would be managed according to VRM Class IV objectives, which would allow major modifications to the landscape that could impair the naturalness of the area as modifications would be allowed to dominate the view and be the major focus of viewer attention (**Table 4-13**).

Impacts on wilderness characteristics would be influenced by activities associated with the established livestock grazing allowed under this alternative. Impacts are the same as those described under Alternative A.

The minimal restrictions on fluid mineral development would result in a reasonably foreseeable development scenario similar to that projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**. Alternative C would provide the least amount of protection to roadless areas, naturalness, and the outstanding opportunities for solitude from minerals and energy development. All areas would be open to fluid mineral leasing. Approximately 1,240 acres (3 percent) would be subject to NSO stipulations, which means nearly all lands with wilderness characteristics would be at risk from surface occupancy. Approximately 23,320 acres would be subject to CSU stipulations, and approximately 33,840 acres would be subject to TL stipulations (**Table 4-13**).

Only 230 acres of land within the area of coal potential would be closed to coal leasing. Approximately 350 acres would be recommended for withdrawal from locatable mineral entry. While development of these resources would impact naturalness and could eliminate wilderness characteristics altogether if new access roads were needed, as previously discussed, the development potential in these areas is fairly low.

Approximately 8,890 acres of lands with wilderness characteristics would be protected by an SSR restriction for surface-disturbing activities. This type of restriction would move or modify surface-disturbing activities to reduce impacts on the resource for which the restriction was designed. While surface-disturbing activities could still occur in the area, which could diminish its naturalness and, depending on the activity, opportunities for solitude and primitive or unconfined recreation, they may be moved or modified so as to indirectly minimize impacts on wilderness characteristics. Situations could arise where surface disturbing activities, even with SSR restrictions, would reduce naturalness to the degree that the unit would no longer meet the minimum size criteria, entirely eliminating wilderness characteristics of a unit.

Recreation use in Alternative C resulting from 13,980 acres of ERMAs overlapping lands with wilderness characteristics would decrease outstanding opportunities for solitude. Roubideau ERMA (Camel Back WSA Adjacent) and Dry Creek ERMA (Dry Creek Basin) overlap lands with wilderness characteristics. Unlike SRMAs, ERMAs are not managed for a specific recreational setting, only targeted recreation, so recreation management in these areas is less likely to account for other resources. Without targeted setting prescribed for SRMAs, the wilderness characteristics of naturalness and opportunities for primitive recreation could be impacted. Additionally, motorized and mechanized travel would be permitted on designated routes in all lands with wilderness characteristics, which would impact wilderness characteristics by affecting the presence of human activity and, therefore, affecting an area's natural appearance and opportunities for solitude and primitive recreation. Dry Creek is particularly at risk because of its proximity to Montrose and the use already occurring in the area.

Approximately 13,680 acres (33 percent) within the lands with wilderness characteristics units would be managed as ROW avoidance (**Table 4-13**). The location of ROWs, including utilities, access roads, and solar and wind development, would be avoided in these areas unless no feasible alternative is present. The remaining lands with wilderness characteristics could be subject to ROW location. Impacts are similar to those described under Alternative A.

Alternative D

Under Alternative D, the BLM would manage three wilderness characteristics units, totaling 18,320 acres (3 percent of the Uncompahgre RMP Decision Area outside of the Tabeguache Area and WSAs) to protect their wilderness characteristics. This would result in the retention of their specific characteristics (detailed in **Appendix F**).

Under this alternative, 13,420 acres within the Camel Back WSA Adjacent and Dry Creek Basin units would overlap the Monitor-Potter-Roubideau and Dry Creek Ecological Emphasis Areas, respectively. In addition, 1,780 acres of the Shavano Creek unit, not managed to protect wilderness characteristics under this alternative, would overlap the Tabeguache Ecological Emphasis Area (**Table 4-13**). Management of these areas to protect key habitat and corridors between habitats would protect the naturalness of lands with wilderness characteristics by limiting surface-disturbing activities.

Of the lands managed to protect wilderness characteristics under this alternative, 990 acres (5 percent) would be managed as VRM Class I and 17,330 acres (95 percent) would be managed as VRM Class II. The types of impacts are the same as those described under Alternative B. Of the lands with wilderness characteristics not managed for their protection, 6,690 acres (29 percent) would be managed as VRM Class II, providing some protection to the naturalness of the areas.

Similar to the other alternatives, impacts on wilderness characteristics would be influenced by activities associated with the established livestock grazing allowed under this alternative. Existing range improvements used for grazing, such as fences, stock trails, springs, and stock ponds, constitute an established use and would continue to be maintained. On lands with wilderness characteristics not managed for their protection, new structures, developments or management activities (constructed and maintained roads, water developments, fences, or vegetation manipulations) could result in the reduction or elimination of wilderness characteristics in those units.

Under Alternative D, all lands managed to protect wilderness characteristics would be closed to coal leasing, which would protect their naturalness. Approximately 4,100 acres would be recommended for withdrawal from locatable mineral entry; a mine plan would be required for locatable mineral development that minimizes impacts on naturalness on the remaining 14,230 acres. As stated previously, the development potential in lands with wilderness characteristics is fairly low. Finally, fluid minerals

would have an NSO stipulation applied to the lease, so any development would occur outside of the lands with wilderness characteristics units, providing protection to naturalness.

On lands not managed to protect wilderness characteristics, only 230 acres of land within the area of coal potential would be closed to coal leasing. Approximately 80 acres would be recommended for withdrawal from locatable mineral entry. While development of these resources would impact naturalness, as previously discussed, the development potential in these areas is fairly low. Finally, on 1,490 acres, fluid minerals would have an NSO stipulation applied to the lease, so any development would occur outside of the lands with wilderness characteristics units, providing protection to naturalness. The restrictions on fluid mineral development would result in a reduction in the number of new and exploratory development wells and associated surface-disturbance from those projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**.

All lands managed to protect wilderness characteristics would be protected by an SSR restriction for surface-disturbing activities. An additional 5,710 acres of lands not managed to protect wilderness characteristics would also be protected by an SSR restriction for surface-disturbing activities. Impacts are the same as those described under Alternative C.

Management objectives for the overlapping RMZs within the Roubideau and Dry Creek Basin SRMAs are consistent with managing for wilderness characteristics in the Camel Back WSA Adjacent and Dry Creek Basin units, respectively. Attracting more visitors for targeted recreation opportunities could impact the perceived or realized opportunities for solitude in these areas. On the other hand, 6,290 acres within the Camel Back WSA Adjacent would be closed to motorized and mechanized travel, which would protect the naturalness and opportunities for primitive recreation. In the remaining lands with wilderness characteristics, motorized and mechanized travel would be limited to designated routes. Except for the Dry Creek Basin unit, public use of routes is currently infrequent and is generally limited to hunting. In these areas, when motorized or mechanized travel does occur, the perceived impact on naturalness, solitude, and opportunities for primitive recreation could be diminished during the time of use. Use in the Dry Creek Basin unit is slightly more frequent, given its proximity to Montrose. Impacts on wilderness characteristics are the same for the other units but might occur more frequently.

Under Alternative D, SRPs could be issued for competitive events at the discretion of the BLM Authorized Officer, allowing an increase in visitor numbers and noise levels. This could impact solitude and unconfined recreation for the duration of the event.

Approximately 4,060 acres (22 percent) of lands managed to protect their wilderness characteristics would be managed as ROW exclusion areas. This would protect the wilderness characteristics, as discussed under ***Nature and Type of Effects***. The remaining lands managed to protect their wilderness characteristics would be managed as ROW avoidance areas in addition to 17,320 acres (74 percent) of lands not managed to protect their wilderness characteristics. The remaining lands with wilderness characteristics could be subject to ROW location. The types of impacts are the same as those described under Alternative C.

The Camel Back WSA Adjacent unit overlaps the Roubideau Corridors ACEC and the suitable Monitor and Potter Creeks also flow through the unit. Management of ACECs would enhance the naturalness of the unit for the protection of identified relevant and important values and suitable WSR segments to protect the free-flowing condition, identified ORVs and adequate water quality to support those ORVs, and tentative classification (in this case wild).

Alternative E

Considering wilderness characteristics in the land use planning process may result in several outcomes, including, but not limited to: 1) emphasizing other multiple uses as a priority over protecting wilderness characteristics; 2) emphasizing other multiple uses, while applying management restrictions (e.g., conditions of use, mitigation measures) to reduce impacts on wilderness characteristics; or 3) prioritizing the protection of wilderness characteristics over other multiple uses (BLM Manual 6320). Under Alternative E, the BLM would not manage lands to protect wilderness characteristics, and would instead manage to prioritize other multiple uses, while applying some management restrictions in order to minimize impacts on wilderness characteristics when and where possible. Because Alternative E would be managed to minimize impacts on wilderness characteristics, it would provide more protection of wilderness characteristics than Alternative A.

Inventoried wilderness characteristics would still exist in areas not managed to protect wilderness characteristics as a priority over other multiple uses. The BLM would provide protection when possible to preserve inventoried wilderness characteristics, while allowing for other resource uses. The BLM would manage 18,320 acres to minimize impacts on wilderness characteristics, while managing for other uses.

Visual Resources

Of the lands with wilderness characteristics that would be managed to minimize impacts, 990 acres (5 percent) would be managed as VRM Class I, protecting the areas' naturalness. An additional 12,950 acres (71 percent) would be managed as VRM Class II, providing some protection to the naturalness of the areas. An additional 4,380 acres (24 percent) would be managed according to VRM Class III objectives. This would allow landscape modifications that could impair the naturalness of the area because modifications would be allowed to attract the attention of the casual observer. Of the lands with wilderness characteristics that would not be protected, 10 acres (less than 1 percent) would be managed as VRM Class I, and 6,690 acres (28 percent) would be managed as VRM Class II. The types of impacts are the same as those described under Alternative B. Overall, VRM Class I and II management would provide some protection to the naturalness of the areas that would not occur due to VRM management under Alternative A.

Livestock Grazing

Similar to the other alternatives, impacts on wilderness characteristics would be influenced by activities associated with the established livestock grazing allowed under this alternative. Existing range improvements used for grazing, such as fences, stock trails, springs, and stock ponds, constitute an established use and would continue to be maintained. On lands with wilderness characteristics not managed for their protection, new structures, developments, or management activities (constructed and maintained roads, water developments, fences, or vegetation manipulations) would be designed to minimize impacts on wilderness characteristics, but could ultimately result in the reduction or elimination of wilderness characteristics in those units.

Fluid and Solid Leasable Minerals, and Locatable Minerals, Mineral Materials & Nonenergy Leasable Minerals

As stated previously, the development potential in lands with wilderness characteristics is fairly low. On 4,160 acres, fluid minerals would have an NSO stipulation applied to the lease (by other programs), so any development would occur outside of the lands with wilderness characteristics units, protecting naturalness. A CSU would apply on lands managed to minimize impacts on wilderness characteristics. Prior to authorizing disturbance activities in areas identified to minimize impacts on wilderness characteristics, the proponent may be required to submit a development plan that demonstrates that identified wilderness characteristics will be conserved. This would conserve wilderness characteristics where possible through relocation, design criteria, and/or mitigation. However, minimizing impact on

wilderness characteristics would not preclude the authorization of projects that would negatively impact, reduce the size of, or eliminate wilderness characteristics entirely from those units. The restrictions on fluid mineral development would result in a reduction in the number of new and exploratory development wells and associated surface-disturbance from those projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d), as discussed under **Section 4.1.1**.

On lands not managed to protect wilderness characteristics and lands managed to prioritize other uses, 14,250 acres within the area of coal potential would be closed to coal leasing (by other programs), and 4,060 acres would be recommended (by other programs) for withdrawal from locatable mineral entry. While development of these resources would impact naturalness, as previously discussed, the development potential in these areas is fairly low.

An additional 10,240 acres of lands managed to minimize impacts on wilderness characteristics, and 9,250 acres of lands managed to prioritize other multiple uses, would also be protected by an SSR restriction for surface-disturbing activities (applied by other programs). Impacts are the same as those described under Alternative C.

Recreation and Visitor Services

Recreation use resulting from 13,980 acres of SRMAs overlapping lands with wilderness characteristics would decrease outstanding opportunities for solitude. Additionally, motorized and mechanized travel would be permitted on designated routes in all lands with wilderness characteristics, which would impact wilderness characteristics by affecting the presence of human activity and, therefore, affecting an area's natural appearance and opportunities for solitude and primitive recreation.

Under Alternative E, SRPs could be issued for competitive events at the discretion of the BLM Authorized Officer, allowing an increase in visitor numbers and noise levels.

Lands and Realty—Rights-of-Way

Of the lands managed to minimize impacts on wilderness characteristics, 78 percent would overlap ROW avoidance areas, and 22 percent would overlap ROW exclusion areas, which would provide greater protection than ROW avoidance. Additionally, on lands with wilderness characteristics managed to prioritize other multiple uses, 2 percent would be ROW avoidance areas, and less than 1 percent would be ROW exclusion areas. The types of impacts are the same as those described under Alternative C.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on lands with wilderness characteristics is the Uncompaghre RMP Planning Area. The identified lands with wilderness characteristics are present today due to past actions, both on BLM-administered land and land not administered by the BLM. Potential recreational trail development in the Dry Creek Basin Unit can be expected to substantially reduce the acreage of wilderness characteristics in that unit.

The final Colorado Roadless Rule identified the Roc Creek Colorado Roadless Area, on National Forest System lands adjacent to the Roc Creek unit on BLM-administered land, and the Windy Gap Colorado Roadless Area, next to the Shavano Creek unit (77 *Federal Register* 39576-39612, July 3, 2012). With limited exceptions, the rule conserves roadless area characteristics by prohibiting tree cutting, sale, or removal, road construction and reconstruction, and linear construction zones. The Roc Creek Colorado Roadless Area was further identified for upper tier management, providing additional restrictions and fewer exceptions. This adjacent management would enhance the qualities of naturalness

and solitude of the areas by extending them over a larger area. In addition, the Roc Creek unit fully meets the size requirement with the addition of the Roc Creek Colorado Roadless Area.

4.4 RESOURCE USES

This section contains a description of the human uses of resources in the Uncompahgre RMP Planning Area and follows the order of topics addressed in **Chapter 3**:

- Forestry and Woodland Products
- Livestock Grazing
- Energy and Minerals
- Recreation and Visitor Services
- Comprehensive Travel and Transportation Management
- Lands and Realty, including Renewable Energy

4.4.1 Forestry and Woodland Products

This section discusses impacts on forestry from proposed management actions of other resources and resource uses. Existing conditions are described in **Section 3.2.1** (Forestry and Woodland Products).

Methods and Assumptions

This analysis focuses on management actions with physical disturbance potential to change the quantity or quality of forest and woodland products available for harvest. Forestry generally pertains to management of forest and woodland species, although areas of vegetation not classified as forests or woodlands could also contain forest products that are suitable for harvest. When possible, mitigation measures were incorporated in the analysis to reduce the effects of impacts on vegetation, rangelands, and riparian/wetland areas.

Indicator

The indicator of impacts on forestry is the alteration of the quality or quantity of forest and woodland products available for harvest to the extent that existing demand cannot be met.

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- Forest and woodland products could originate from other areas that are not dominated by forest and woodland vegetation.
- Several traditional woodland products (e.g., Christmas trees, pinyon nuts, and posts) could be harvested from tree species growing on sites not classified as forest or woodland.

The quality and quantity of forest and woodland products available for harvest in the long term is directly tied to forest health and vegetation management. As discussed in **Chapter 3**, such factors as insect and disease outbreaks, age class structure diversity, and forest succession rate can impact forest products available for harvest. Forestry under all alternatives would be undertaken with a goal of improving forest health and managing for sustained yield. Impacts on vegetation management for forest and woodlands are described in further detail in **Section 4.3.4**.

Nature and Type of Effects

Actions that would affect forestry primarily include restrictions on surface-disturbing activities and other allowable uses, such as limitations to protect sensitive resources and special designation areas. Applying restrictions on steep slopes disturbance, for example, would impose limitations on treatment methods

and harvest of forest and woodland products by reducing the area available for those practices. In the long term, however, many of these restrictions would benefit the forestry program by stabilizing soils and improving stand quality. Similarly, areas used for drinking water have surface restrictions to reduce soil erosion and prevent water contamination that could conflict with forestry objectives and limit forest product development in these areas.

Some management actions designed to protect sensitive vegetation communities, such as old growth forest or riparian areas, could restrict harvest. In the long term, such restrictions could increase overall forest or woodland health if areas are sensitive to disturbance. However, restrictions on harvest, thinning, prescribed burning, or other vegetation management in other cover types, such as ponderosa pine, would be detrimental to woodlands in the long term, as communities would be likely to move away from desired conditions. Additional details are included in **Section 4.3.4**.

Measures designed to protect special status species and fish and wildlife could also impose restrictions on forest product harvest in areas where sensitive habitat is collocated with areas potentially available forest harvest. Similarly, special designation areas, including lands with wilderness characteristics, ACECs, WSAs, the Tabeguache Area, and wild and scenic river corridors, could impact forestry by closing areas to harvest of forest or woodland products or restricting on-the-ground activities. These closures would lead to a decrease in the amount of forest products available for harvest to the public. However, forest management activities and product harvest would be considered to meet resource objectives. Therefore, forest health could be improved in these areas.

Wildland fire mitigation could impact forestry by reducing product available for harvest. However, fuels treatments could generate usable forest byproducts such as biomass or fuel wood from treatment, and restoration projects would be designed to improve forest health, both of which would have long-term positive effects on forestry. Unplanned fire can burn forest products, affecting their availability and condition, but it can improve stand health and open new areas for harvestable forest and woodland product through salvage.

Implementation of energy and minerals and ROW projects, such as pipelines, pads, and associated facilities, would have long-term impacts on the forestry program by reducing the area available for harvest. Impacts would be site specific in nature and are therefore not discussed in detail below.

Harvest of forest and woodland product would be impacted by restrictions for cultural resources that limit or prohibit actions and treatments in areas where they would conflict with cultural resource protection. These restrictions are typically localized and limited in the Planning Area, and are therefore not discussed in detail below.

Effects Common to All Alternatives

In general, vegetation management objectives would complement forestry objectives, as both programs manage for healthy forests and woodlands. Similarly, objectives to protect soil health and prevent erosion would lead to improved woodland conditions in the long term.

Under all alternatives, forestry and vegetation management treatments would generate woody biomass for production of various fuel types, in addition to traditional uses, such as posts, poles, and firewood. In addition, exceptions to closures to harvest are allowed under all alternatives when harvest would benefit forest health. All action alternatives allow for the use of forest management byproducts for biomass use, either unconditionally or where compatible with vegetation mosaics and other resource objectives.

Under all alternatives, acres open for forest harvest and collection overlap with crucial winter range for elk, mule deer, and bighorn sheep, so there is potential for seasonal limitations on woodland product

harvest. Acres affected vary by alternative, based on timing limitations on surface-disturbing activities during seasonally important periods in big game life processes. Similarly, temporary or permeant limitations on harvest of forest resources could be imposed on a site-specific basis to protect habitat for special status species. Impacts would vary by alternative, as discussed below.

Management of visual resources could have site-specific impacts, including mandated changes in treatment type, size, and location of allowable harvest to meet VRM class objectives. These impacts would vary by alternative and would be concentrated in VRM Class I and II areas where visual disturbance is more restricted. However, commercial harvest (saw log cover types) is not likely to occur in the Decision Area under any alternative, and woodland harvest is unlikely to be significantly impacted by the management of visual resources.

Under all alternatives, wood cutting would not be allowed in some special designation areas, including WSAs and the Tabeguache Area. Acres impacted would vary by alternative, but impacts would be as described under ***Nature and Type of Effects***.

Forest harvest is anticipated on a small portion of the Planning Area due to a lack of large-scale, commercially harvestable timber and low local demand for saw timber. As discussed in **Section 3.2.1**, forestry in the Planning Area is concentrated on harvest of woodland products for personal use.

Areas managed for recreational emphasis impose limits on forestry to reduce conflict with this use; of particular note are closures to harvest in some SRMAs. Closures and other limitations could limit harvest in areas previously open to use and could result in reductions in forest product availability overall. The specific SRMAs closed to harvest vary under each alternative.

Management of the following resources would have negligible or no impacts on forestry and are not discussed in this section: air quality, cultural resources, paleontological resources, livestock grazing, solid and fluid leasable minerals, locatable minerals, lands and realty, comprehensive travel and transportation management, national trails and byways, watchable wildlife viewing sites, and Native American tribal uses.

Alternative A

Under Alternative A, the continued focus of the forestry program would be managing suitable commercial forest lands and pinyon-juniper woodlands for sustained yield production within the allowable cut restrictions determined by the Timber Production Capabilities Classification inventory (BLM 1989a).

Under Alternative A, areas next to perennial and intermittent streams would be closed to harvest to protect water quality. This would result in a decrease in available product for harvest.

Under Alternative A, the commercial harvest of all vegetation types is allowed, and there are no plans to designate forest management units. No significant commercial harvest is anticipated over the life of the RMP. In total, 168,910 acres under Alternative A are open to forest product harvest. Fewer acres could be available for personal and commercial forest product use due to open forestry acres overlapping with areas that have restrictions on surface-disturbing activities. In total, 110,160 acres are closed to harvest to protect special designation areas (including the Tabeguache Area, WSAs, and some ACECs) and to protect water quality.

Under Alternative A, 260 acres overlap with lands managed as VRM Class II, which could have limited impacts on woodland harvest activity, as described under ***Effects Common to All Alternatives***.

Forest product harvest could be impacted on the 372,240 acres open to forest use that overlap TLs, particularly if overlapping TLs provide a narrow window during which harvest would be allowed.

Forest product disposal is prohibited on 300 acres of the San Miguel SRMA, with impacts as discussed under ***Effects Common to All Alternatives***.

Under Alternative A, 20,170 acres in ACECs would be closed to harvest, and an additional 450 acres of ACECs overlap with forestry management areas open to harvest. Some of these acres have restrictions on surface-disturbing activities and would therefore restrict forest activities and prevent the harvest of products from these areas.

There are 25,230 acres of eligible WSR study corridors that overlap with forestry management areas open to wood sale or harvest. Although no actions would be approved that impair the values of eligible WSR segments, there is no explicit prohibition of surface-disturbing activities. Development of new roads and trails would be limited in the study corridor of segments tentatively classified as wild or scenic, which could result in additional restrictions on harvest because of reduced access.

Alternative B

Under Alternative B, 396,800 acres would be closed to wood product sales and harvest to protect special designation areas and water quality (more than 3 times the acres closed under Alternative A). In addition to the closures discussed under Alternative A, there would be closures in areas to protect sensitive resources, such as ecological emphasis areas, fragile soils or steep slopes, ancient woodlands, riparian areas, federally threatened or endangered species habitat, and rare vegetation. As a result, additional acres would be unavailable for harvest, but woodland health is likely to improve in the long term due to protection of soils and sensitive habitat. In addition to products harvested for personal use, under Alternative B, by-products from forest management activities would be made available for biomass, thereby providing an additional source of product.

Approximately 278,640 acres would be managed to provide minor wood products (noncommercial saw timber). Though more acres are managed for wood product harvest under this alternative than under Alternative A, Alternative A allows the commercial harvest of all vegetation on acres open to forest product harvest, while Alternative B and all action alternatives allow the harvest of minor wood products only. Impacts of closure of commercial saw timber harvest are likely minimal due to the lack of current and projected commercial harvest demand, as well as limited acres occupied by such resources.

Under Alternative B, there is no overlap between VRM Class I and forest management units that permit wood cutting. There are 46,290 acres identified as VRM Class II and 221,140 acres identified as VRM Class III that overlap with forestry management units open to harvest with SSR restrictions, which would restrict some surface-disturbing activities, including forest product harvest. This would further limit harvest for personal use.

Special designation closures include those discussed under Alternative A, as well as lands with wilderness characteristics. Under Alternative B, 70,880 acres within ACECs are closed to harvest, and 26,500 acres within ACECs (59 times more than under Alternative A) overlap with forestry management units open to harvest, increasing the potential for impacts on forest product harvest, as described under Alternative A.

Fewer acres could cause impacts on forestry due to TLs under Alternative B than under Alternative A. Under Alternative B, there are 278,640 acres open to forest use that overlap with TLs. Impacts are described under Alternative A.

Under Alternative B, several SRMAs are closed to wood product sales and harvest, with the exception of harvest that would enhance resource values, improve forest and land health conditions, or achieve vegetation mosaic objectives. These SRMAs are Burn Canyon RMZ 1; Dolores River Canyon; Dry Creek RMZs 1, 2, and 4; Jumbo Mountain RMZ I; Kinikin Hills RMZs 1 and 2; North Delta; Paradox Valley RMZs 1 and 2; Ridgway Trails RMZ 1; Roubideau; San Miguel River; and the Spring Creek SRMAs. Impacts are as described for ***Effects Common to All Alternatives***.

There are 1,950 acres of stream segments suitable for inclusion in the NWSRS that overlap with forest management units open to wood sales and harvest, which is 92 percent fewer acres than under Alternative A. On suitable segments tentatively classified as wild, surface-disturbing activities would be prohibited. In addition, partial restrictions (SSR) would be placed on segments tentatively classified as scenic and recreational. Both NGD and SSR restrictions could result in impacts on forestry through restrictions on forest product harvest. Also under Alternative B, surface-disturbing activities are prohibited within the WSR study corridor, as defined in Appendix B of the draft Uncompahgre Wild and Scenic River Suitability Report. As such, development of new roads and trails would be limited in the study corridor of segments tentatively classified as wild or scenic, which could result in additional restrictions on harvest because of reduced access.

Alternative C

Under Alternative C, 44,530 acres would be closed to wood product sales and harvest (40 percent fewer acres than Alternative A). Closures include special designation areas, including the Fairview South ACEC, WSAs, and Tabeguache Area.

In total, 631,270 acres would be managed to provide minor wood products (noncommercial saw timber), some of which would be closed due to overlap with special resource areas. Under this alternative, due to few closures, woodland product harvest would be least restricted for personal use, but forest health is less likely to improve or remain stable in the long term. Biomass production is allowed where it would be compatible with other uses, thereby providing another source for this use.

There is no overlap between forest management units open to wood sale or harvest and VRM Class I under Alternative C. However, 31,260 acres identified as VRM Class II do overlap, which could impact forest product harvest through restrictions to protect visual resources, as described in ***Effects Common to All Alternatives***.

More acres could cause impacts on forestry due to TLs under Alternative C than under Alternative A. Under Alternative C, 474,930 acres open to forest product harvest overlap with areas identified for TLs, with impacts as described under Alternative A.

There are no SRMAs or eligible or suitable WSR segments in this alternative; there would be no related impacts, as described for ***Effects Common to All Alternatives***, on harvest or availability of forest products.

Under Alternative C, 210 acres of ACECs are closed to harvest, and an additional 21,630 acres open to forest product harvest overlap with ACECs. Open areas could be impacted as described under Alternative A.

Alternative D

Under Alternative D, 281,390 acres would be closed to wood product sales and harvest (2.5 times more than under Alternative A). Closures include special designation areas (lands with wilderness characteristics, specific ACECs, WSAs, and the Tabeguache Area) and sensitive resource areas (steep slopes, ecological emphasis areas, riparian areas, ancient woodlands, and rare vegetation). Closures

under Alternative D would limit forest product harvest but would likely improve forest and woodland health in the long term, as described under Alternative B. Under Alternative D, biomass production and use is allowed where it would be compatible with vegetation mosaics and other resource uses.

Approximately 394,530 acres would be managed to provide minor wood products (noncommercial saw timber) under Alternative D. Similar to Alternative B, commercial timber harvest of pinyon-juniper would be permitted in all forest management units where such an activity would be consistent with land health and vegetation mosaic objectives.

VRM Class I areas are closed under Alternative D, but there is no overlap between areas managed as VRM Class I and forestry management units that permit wood cutting under this alternative. There are 44,870 acres identified as VRM Class II that overlap with areas open to harvest, which could impact forest activity, as described under Alternative B.

Under this alternative, the following SRMAs are closed to wood product sales and harvest, with the exception of harvest that would enhance resource values, improve forest and land health conditions, or achieve vegetation mosaic objectives: Dolores River Canyon; Dry Creek RMZs 1, 2, and 4; Jumbo Mountain RMZ 1; Roubideau RMZs 1 and 2; San Miguel River; and Spring Creek. Impacts would be as described for ***Effects Common to All Alternatives***.

More acres could cause impacts on forestry due to TLs under Alternative D than under Alternative A. Under Alternative D, there are 394,340 acres open to forest product harvest that overlap with TLs, which is 22,100 more acres than under Alternative A. Impacts are as described under Alternative A.

Within ACECs, 41,960 acres would be closed to forest product harvest, and 2,570 acres would be open. Two of the three ACECs that are not closed to forest product harvest under Alternative D (Adobe Badlands and Paradox Rock Art ACECs) apply SSR restrictions, which would increase the potential for additional limitations on forest product harvest. The Biological Soil Crust ACEC does not have a forest product resource.

Fewer acres of stream segments suitable for inclusion in the NWSRS overlap with areas open to forest product harvest under Alternative D than under Alternative A. Under Alternative D, 1,770 acres overlap, which is 23,460 fewer acres than under Alternative A, thereby reducing the potential for restrictions to protect suitable WSR segments to impact forest product harvest.

Alternative E

Alternatives B, C, D, and E would manage 675,800 acres in five forestry management units. Under Alternative E, specific acres would be provided for each management unit for areas open and closed to commercial wood collection (e.g., commercial contracts for timber or biomass) and general wood collection (e.g., firewood permits). This would provide more specific management direction for implementation work to efficiently manage the resource and long-term forest health. In total, 503,830 acres would be open commercial wood collection and 444,220 acres open for general wood collection. A total of 171,970 acres would be closed to commercial wood collection and 231,580 acres closed to general wood collection. The acres of commercial and general wood cutting categories are overlapping, and are not directly comparable to acres open for woodland harvest discussed under Alternative A, or to noncommercial timber harvest discussed under Alternatives B, C, and D.

Similar to Alternative B, commercial timber harvest of pinyon-juniper would be permitted in all forest management units where such an activity would be consistent with land health and vegetation mosaic objectives. This would further promote land health while providing wood products.

Under Alternative E, 171,970 acres would be closed to commercial wood product sales and harvest (compared with 110,160 acres in Alternative A, a 56 percent increase). Closures include special designation areas (specific ACECs, WSAs, and the Tabeguache Area), sensitive resource areas (steep slopes, riparian areas, ancient woodlands, and rare vegetation), and specific recreation areas (some SRMAs). Closures under Alternative E would impose some site-specific limitations on forest product harvest, but exceptions would apply in many locations. This could contribute to improved forest and woodland health in the long term, as described under Alternative B, while allowing for resource use.

Under Alternative E, projects using Healthy Forest Restoration Act authority or similar acts passed to restore forest and woodlands would help to maintain forest and woodland health. As discussed under Alternative D, biomass production and use is allowed where it would be compatible with vegetation mosaics and other resource uses. Allowing for biomass use in areas effected by insects and disease could result in an increase in available products for biomass, compared with Alternative A.

Under Alternative E, personal use firewood and other special forest product harvest would be prohibited from December 31 to April 30, which could restrict the level and timing of personal wood collection, compared with Alternative A where no seasonal limitations are in place. In addition, TLs would result in commercial harvest restrictions in approximately 392,900 acres in Alternative E, which could result in decreased harvest, compared with Alternative A, where no such restrictions are in place.

Visual Resources

Under Alternative E, there are 53,350 acres identified as VRM Class I or II that overlap with areas open to noncommercial wood collection and 72,090 acres open to commercial wood collection. As discussed under ***Effects Common to All Alternatives***, this could result in site-specific limitations on forestry activity. Due to the low level of commercial saw timber harvest, impacts would be minimal. Woodland harvest is unlikely to be significantly impacted by the management of visual resources.

Recreation and Visitor Services

Under this alternative, the following SRMAs are closed to wood product sales and harvest, with the exception of harvest that would enhance resource values, improve forest and land health conditions, or achieve vegetation mosaic objectives: Dolores River Canyon, Dry Creek RMZs 1 and 2, Jumbo Mountain RMZ 1, North Delta, Ridgway Trails RMZ 1, Roubideau RMZs 1 and 2, San Miguel River, and Spring Creek RMZ 2. In comparison, under Alternative A, closures would be effect on only two areas, San Miguel River and Dolores River SRMAs. As discussed under ***Effects Common to All Alternatives***, these closures would decrease forest products available to the public but could promote land health and reduce potential for conflicts with recreation activities.

Areas of Critical Environmental Concern

Within ACECs, approximately 22,350 acres would be closed to forest product harvest and approximately 7,840 acres would be open. The Adobe Badlands ACEC, which would be open to forest product harvest under Alternative E, would have SSR restrictions applied, increasing the potential for additional limitations on forest product harvest. In addition, the Adobe Badlands ACEC prohibits motorized travel, limiting access to collect forest products. The Biological Soil Crust ACEC does not contain forest product resources. In the San Miguel River ACEC, allowing for on-site wood product collection (i.e., firewood) while prohibiting other wood product harvest or sales would provide flexibility for use of product while camping, but would limit impacts on land health.

Wild and Scenic Rivers

Under Alternative E, 2,000 acres open to general wood collection and 4,460 acres open to commercial wood collection overlap stream segments suitable for inclusion in the NWSRS. Some additional limitations on harvest methods or access could occur in these areas.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on forest resources is the Uncompaghre RMP Planning Area and adjacent lands. Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect forestry management are actions by the BLM within the Planning Area, actions by other landowners on private land, and natural causes. In addition to the current forestry practices discussed in **Chapter 3**, human actions that could impact forestry include mechanical treatment of vegetation on public and private rangelands, as well as conversion of land for agricultural or development purposes. Forestry products would continue to be impacted by natural events, including insect epidemics, which are likely to diminish forest health and the quality and quantity of available harvest products. Climate change could impact the occurrence and severity of drought and wildland fires that could also diminish forest health. Additionally, if Sudden Aspen Decline Syndrome continues to affect stands in the Planning Areas, this would also likely diminish aspen health and the quality and quantity of available harvest products. Mountain pine beetle infestations have been occurring in Colorado since 1996, and ips beetle outbreaks plague some pinyon pine stands in the Planning Area. These infestations would also likely diminish forest health and the quality and quantity of available harvest products if they continue.

Personal and commercial harvest of pinyon and juniper fuel wood, poles, and posts for fence building, wildings (live trees and shrubs), and Christmas trees are expected to continue into the foreseeable future. Particularly, the demand for native transplant trees is expected to increase over time as xeriscaping and xero-gardening trends accelerate and water resources become more stretched.

Harvest of forest and woodland products on other federal lands in the Planning Area is likely to contribute to cumulative impacts on forest resources, particularly on the 1.25 million acres of National Forest System lands in the Planning Area which is primarily within the Grand Mesa, Uncompahgre and Gunnison National Forests. These forests have historically been part of the largest commercial timber producing forests in the Rocky Mountain Region. Over the past decade, however, harvest levels have dropped substantially and total timber growth far exceeds harvest. It is estimated that an average of 3.1 million cubic feet per year will be produced by timber sales throughout these Forests (Forest Service 2007). Management actions for these forests would focus on maintaining and improving forest health and should help return the areas to historic conditions in the Planning Area in the long term.

Cumulative contributions of forestry activities would be minimal across all alternatives for commercial timber, due to the low amount of product anticipated to be harvested. Contributions from harvest of noncommercial products would follow the discussion under the impacts by alternative, above, with the fewest restrictions on harvest and greatest potential for increases in level of harvest in Alternatives A and C and lowest under Alternative B. Activities on Decision Area lands to promote forest health under all alternatives could support maintained forest product in the cumulative impacts analysis area in the long term. Ability to access products while maintaining land health would be most supported under Alternatives D and E.

4.4.2 Livestock Grazing

This section discusses impacts on livestock grazing from proposed management actions of other resources and resource uses. Existing conditions are described in **Section 3.2.2** (Livestock Grazing).

Criteria considered while developing livestock grazing alternatives included suitability for grazing, riparian issues, private land conflicts, recent use (10 years or longer since it was used or permitted), special use areas (e.g., threatened and endangered species), and the precipitation zone (16 inches) where salts and carbonates begin to be absent from the Mancos shale soil profile. Across all alternatives, the variation in permitted AUMs from high to low is 22 percent, and variation in areas available to livestock grazing is 22 percent.

Methods and Assumptions

Indicators

Indicators of impacts on livestock grazing are the following:

- A change in permitted AUMs in areas available to livestock grazing due to various resource issues or conflicts, or cumulative management actions
- An increase in forage levels that could allow an increase in permitted AUMs across the Decision Area
- Restrictions or prohibitions on the ability to construct or maintain range improvements and conduct treatments (infrastructure and vegetation)
- Making areas unavailable to livestock grazing
- Restrictions or prohibitions on the class of livestock permitted
- Changes in the timing, duration, season, or frequency of permitted use

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- All new and existing leases and permits would be subject to terms and conditions determined by the BLM Authorized Officer to achieve the management and resource condition objectives for BLM-administered lands and to meet BLM Colorado Public Land Health Standards (BLM 1997).
- Management actions would comply with section 4(d)(4) of the Wilderness Act (16 United States Code [USC] 1133[d][4]); and the guidelines set forth in Appendix A of the report of the Committee on Interior and Insular Affairs of the House of Representatives accompanying HR 2570 of the 101st Congress (H. Rept. 101-405). Livestock permittees would work toward achieving the BLM Colorado Public Land Health Standards (BLM 1997; **Appendix C**) on all grazing allotments.
- Range improvements (e.g., fences, pipeline, water wells, troughs, and reservoirs) could result in a localized loss of vegetation cover throughout the improvements' useful life. Vegetation would be reestablished through reclamation practices along water pipelines within 5 years to the extent possible, whereas areas with fences, water wells, troughs, and reservoirs could contain a portion of the area disturbed during their useful life and would be revegetated when abandoned.
- The construction and maintenance of existing range improvements would continue in the Decision Area as needed. New range improvements could be subject to limitations, as defined in the RMP. Range improvements lead to better livestock distribution and management options, which would maintain or improve rangeland health.
- By definition in this RMP, livestock grazing is not considered a surface-disturbing activity, but it could affect the surface in areas where livestock concentrate.
- Grazing preference is attached to base property owned or controlled by a permittee or lessee.
- Increases in forage availability could increase permitted AUMs for livestock permittees, except when specifically prohibited by RMP management actions.

Nature and Type of Effects

Impacts on livestock grazing are generally the result of activities that affect forage levels, areas available to grazing, class of livestock, season of use and timing, and ability to construct range improvements, as well as human disturbance or harassment of livestock in grazing allotments. Key types of impacts are detailed below.

Management of vegetation resources generally enhances vegetative conditions and indirectly affects livestock grazing by increasing vegetation productivity and improving forage conditions. Vegetation treatments designed to reduce the incursion of nonnative annual grasses, such as cheatgrass, encroachment of shrubby vegetation, and buildup of biomass in forested areas, could have short-term effects on livestock grazing by removing forage and required rest periods during which areas cannot be grazed. However, these treatments generally enhance rangeland conditions by maintaining the forage base (the amount of vegetation available for wildlife and livestock use) in the long term.

Improper livestock grazing can have adverse impacts on riparian ecosystems (Armour et al. 1991); therefore, managing riparian habitat can directly impact livestock grazing through excluding livestock at specific sites, implementing trailing only, increasing herding, adding range improvements (such as cross fences and water gaps), and adjusting season of use and livestock numbers. Allowing riparian habitat to maintain proper functioning condition would benefit grazing livestock by indirectly providing cleaner and more reliable water sources and more-dependable forage availability.

Livestock grazing can impact soils, particularly during high-intensity low-duration grazing systems in small pastures. Modified livestock grazing management practices could be necessary where soils are found to be sensitive to livestock disturbances (for example, soil on steep slopes and fragile soils). Properly managed grazing can protect soils and help provide healthy plant communities, which can benefit livestock grazing by maintaining or increasing the forage base in the long term.

Managing for healthy watersheds provides for necessary water sources and improved forage conditions for livestock grazing in the long term. Protecting water quality and watershed health could require changes in livestock management, such as deferring or shortening grazing periods, adding range improvements, excluding grazing from riparian areas, establishing riparian pastures, and increasing livestock herding.

In areas next to public water supplies, there could be stricter regulations for livestock management to limit contamination of water supplies. These limitations include exclusion areas or other restriction on livestock management. This could result in increased costs to permittees if changes resulted in AUM reduction or increased livestock management costs.

Similarly, management actions to enhance fish and wildlife habitat would generally affect livestock grazing through potential management changes to control livestock distribution and use of critical habitats. Uneven distribution of big game could result in some grazing allotments receiving a disproportionate use of forge by wildlife and could necessitate a change in livestock management. However, actions to improve or expand wildlife habitat could also improve forage conditions in the long term and indirectly maintain or increase forage production.

Rocky Mountain and desert bighorn sheep could impact domestic sheep and goat management. Domestic sheep can transmit diseases such as pneumonia to native bighorn sheep, which is thought to have caused bighorn sheep fatalities (Foreyt and Jessup 1982; Jessup 1985). Authorized use and new terms and conditions could be implemented to reduce risk of contact between domestic sheep and Rocky Mountain bighorn sheep, per BLM Manual 1730, Management of Domestic Sheep and Goats to Sustain Wild Sheep (BLM 2016e). A substantial change in livestock grazing management flexibility would

result when domestic sheep grazing is prohibited or restricted in bighorn sheep occupied habitat. If an allotment is converted from domestic sheep use to cattle use, the operators would need to either change the class of livestock in their operation or seek other grazing lands. This could result in financial hardship to permittees, to the extent they are forced out of the sheep industry.

In habitat for special status species, including clay-loving wild buckwheat and Colorado hookless cactus, BLM management limits land use activities that would damage, injure, or remove sensitive plants. As a result, grazing management activities may be modified or excluded from certain sensitive areas, resulting in increased time and cost to permittees.

Wildland fire would have varying effects on livestock grazing, depending on fire location and its size, intensity, severity, and timing. Initially, wildland fire would likely displace livestock, and, depending on the proximity to the fire, livestock could be stressed, injured, or killed. Wildland fire would remove vegetation and forage over the short term. Additional impacts on livestock operations could occur when BLM guidelines require a rest period following rehabilitation before grazing is reestablished. Over the long term, wildland fire could improve forage production, especially when post-fire management efforts are implemented, such as reseeding. Restoring natural disturbance regimes, such as fire, and using vegetative treatments to accomplish biodiversity objectives to improve plant community resilience, would also benefit livestock grazing by maintaining a balance of seral stages. In general, removing woodland species benefits livestock grazing by creating a healthier grass, forb, and shrub community.

Activities associated with the management of cultural resources would affect relatively small areas (typically less than 1 acre) and with minimal effects on livestock grazing. In general, information provided by cultural resource inventories can limit or eliminate livestock management activities (specifically the presence or location of range improvements) on a case-by-case basis.

Livestock and their handling facilities could be authorized under all VRM classes; however, the design and placement of new range improvements in VRM Class I and II areas would have to be constructed in manner to preserve or retain the existing landscape character. As a result, the cost of constructing fences, water tanks, and other range improvements could increase, which could increase costs for permittees. Areas classified as VRM Classes I and II could preclude the installation of certain range projects. In general, VRM classes that restrict surface-disturbing activities because of their potential effect on visual resources would indirectly help maintain forage levels by reducing activities from BLM-administered land uses. However, if surface disturbance limitations were to restrict livestock improvements and management opportunities, then permittees may not be able to distribute livestock to effectively use allotments; the result could be an overutilization in some areas of an allotment, a decrease in AUMs, or an increase in permittees' cost or time.

Implementing particular livestock grazing management actions could affect livestock grazing by increasing operators' costs or changing management actions. Short-term and long-term costs to permittees could increase, or AUMs could decrease for some permittees due to the following:

- Implementation of a grazing strategy
- Change in season-of-use or livestock class
- Modification to grazing systems
- Construction of range improvements or other approaches to meet rangeland conditions objectives or provide protection for other resources

Similarly, requiring trucking rather than livestock trailing could inhibit the ability of permittees to relocate livestock, or could increase transport costs. These limitations could result in economic impacts on individuals and the community at large. In particular, impacts on grazing operators could occur if closures or restrictions occur in currently active allotments, especially if an area proposed for closure or

restriction represents an allotment's primary use area. In addition, restriction on class of livestock allowed in an allotment would most likely have a substantial impact on the operator, both directly and indirectly. This type of change could cause the operator to seek grazing lands elsewhere to replace the area lost, and may necessitate purchase or rental of lands, or construction of new range improvements. If such costs are prohibitive to continuing grazing, operators could go out of business.

Construction of range improvements that would improve livestock distribution and allow use of a larger portion of the rangeland would generally enhance rangeland health in the long term; however, it could impact the livestock permittee economically in the short term. Constructing off-site water sources and fencing riparian and spring sources could keep livestock away from sensitive riparian areas and provide a cleaner, more-reliable water source for livestock. In other cases, rangeland management changes could be designed to protect other resources or resource uses, such as cultural resources or threatened and endangered species. In these instances, management changes could result in additional limitations on livestock grazing, and no changes or enhancement to rangeland conditions.

Energy and mineral development could impact grazing. During the exploration and testing phase of mineral development, there would be minimal acreage directly impacted. However, impacts on livestock dispersal and trespass could occur, increasing time and cost to permittees. In particular, should development occur in a small allotment, there is the potential for significant loss of AUMs for the affected permittee due to loss of available grazing acres. Surface-disturbing mineral development directly affects grazing areas in the short term during construction of well pads, roads, pipelines, and other facilities. Potential impacts include changes in available forage, reduced forage palatability because of dust on vegetation, limits on livestock movement, harassment, temporary displacement of livestock, and an increased potential for the introduction and proliferation of noxious weeds. This would cause a loss of livestock forage and associated AUMs. In the long term, a smaller amount of grazing acreage is permanently lost from mining operations following rehabilitation. Improving roads associated with mineral development could facilitate livestock management operations by maintaining or improving access to remote locations within allotments. Properly implemented BMPs and reclamation mitigation measures would likely improve rangeland health and forage levels for livestock.

Recreation can affect livestock grazing directly through human disturbance and indirectly through rangeland degradation. Direct disturbance can include undesired animal dispersing or trespassing due to gates left open by recreational users; animal displacement, harassment, or injury from collisions or shooting; or damage to range improvements, particularly from the use of recreational vehicles or from recreational shooting. In addition, OHV use results in indirect impacts, such as increased dust on forage in high-use areas, leading to lower forage palatability. Disturbance could occur during the hunting season due to increased presence of people, vehicles, and noise.

Other long-term recreation impacts include disturbance caused by increased levels of human activities. The degree of impacts would vary with the intensity of recreation (that is, large numbers of people for SRP activities may have a higher level of disturbance, as compared to frequent use by a small number of visitors due to habituation of cattle or sheep to such use), the timing of recreation activities (livestock could be more susceptible to disturbance during the spring when young are present), and location of recreation in the allotment (a higher level of disturbance could occur near areas frequented by livestock such as water sources or salt licks). Excluding livestock at major recreation sites could lead to a long-term loss for grazing in the Decision Area, depending on the specific locations impacted.

In SRMAs, grazing practices could be changed to accommodate recreation, whereas in ERMAs, there would be a balance, or compromise, between recreation and grazing. SRMAs are managed for visitor recreational experiences. Where visitor experience would be negatively affected by livestock grazing, modifications to grazing management could be required to accommodate recreation. Should these

changes result in increased costs or time required by permittees, this could result in permittees' inability to fully utilize an allotment. Impacts on grazing would depend upon the nature, timing, intensity, and duration of recreational use.

ERMAs are managed for specific activities. While conflicts are possible, these management areas focus on a balance of recreational activities and grazing management needs; therefore, there are likely to be fewer changes required to grazing systems as a result of recreation management in ERMAs.

Throughout SRMAs and ERMAs, development of recreation facilities could displace livestock and reduce area available for grazing on a given allotment. Dispersed recreation could also occur throughout the Planning Area. Impacts of dispersed recreation activities would be similar to impacts described above, though at reduced levels. Outside of SRMAs and ERMAs, grazing management needs would be assessed in concert with other resources requirements.

In general, transportation routes may provide access for permittees to range improvement and allow for expedited checking of livestock. Short-term impacts of road construction and temporary road closures include loss of forage, harassment, and livestock displacement. Long-term direct and indirect impacts on livestock from newly developed transportation routes include loss of forage, reduced forage palatability because of dust on vegetation, and disturbance and harassment caused by increased levels of human activities. Conversely, when travel is closed or limited to existing or designated trails within areas available to livestock grazing, but administrative access is maintained, permittees could benefit from reduced livestock disturbance. Closing road or trails not leading to range improvements would also increase forage availability when the area is rehabilitated or when natural rehabilitation occurs.

Lands and realty actions, such as small land transfers and ROW authorizations (e.g., for power lines, pipelines, and other structures), could have short-term impacts, including temporary forage removal, livestock displacement, and an increased potential for noxious weed introduction and spread. The time frame for short-term displacement of livestock from a ROW can vary from a few weeks to months during construction, or last as long as 2 years (or more) following reclamation depending on the activity permitted in the ROW. Livestock can also be injured or killed during the construction and use of ROWs from open trenches and vehicle collisions if proper mitigation measures are not in place. Management of ROW exclusion areas would prohibit development for utilities in these areas and, therefore, reduce short- and long-term impacts on grazing. Similarly, ROW avoidance areas would limit impacts. Long-term impacts on livestock from site-specific lands and realty actions include changes in and loss of forage, reduced forage palatability because of dust on vegetation, and livestock disturbance and harassment from increased levels of human activities.

Acquisition of private lands within allotments can improve access for permittees and management options for livestock movement, or can provide additional resources, such as water. Land disposals may alter previous grazing management due to loss of watering sites, ingress or egress to the allotment, or loss of historic trailing routes. Any of these would require additional management strategies and possible short-term stress on livestock. Forage- and range-improvement projects could be permanently lost as a result of land disposals or exchanges. Most disposal tracts, though, are small and isolated, meaning disposals would not likely result in the loss of desirable allotments. The BLM would be required to notify the permittee 2 years before any land disposal (43 CFR 4110.4-2[b]), except in an emergency. The BLM would have to compensate the permittees for the range-improvement projects constructed under a range improvement permit or cooperative agreement, in accordance with 43 CFR 4120.3-6(c).

Special management areas could impact livestock grazing when they are made unavailable to grazing to protect specific resources. When management decisions limit surface disturbances, grazing management options could be restricted or limited, as described for VRM classes, above. This would be the case if

surface disturbance limitations were to restrict livestock improvements and management opportunities, which could increase permittees' cost or time.

Most ACECs within the Decision Area would be designated to protect sensitive plant and wildlife habitat and significant cultural resources. Grazing availability depends on the designated ACEC management objectives. Restrictions can include total exclusion of grazing from the ACEC, to the limitations on the class of livestock animal, to the season, duration, or location that livestock are allowed to graze. As described for VRM classes and special designation areas, above, surface restrictions result in limitations on management options and increased costs or time for permittees.

Managing WSAs would have direct and indirect effects on livestock grazing. In general, limitations on surface-disturbing and other disruptive activities would likely reduce harassment of grazing animals and maintain and improve vegetation conditions, thereby maintaining or improving the livestock forage base. Management flexibility could be reduced, as described for special designation areas, above; therefore, permittees' costs to time could increase. Existing range improvements are considered valid rights and could be maintained in the same manner and to the same degree as they have been in the past. The construction of new range improvements would be limited, depending on their impact on wilderness values. WSA management would impose limitations on grazing to protect those wilderness values. If Congress were to release WSAs from wilderness consideration, impacts would vary by alternative and individual WSA.

When portions of grazing allotments overlay river segments eligible or suitable for inclusion in the NWSRS, livestock permittees along these segments could be required to change livestock management, including utilization levels, timing and duration of grazing, or maintaining and constructing range improvements to protect ORVs and adequate water quality to support those ORVs, free-flowing condition, and tentative classification.

Effects Common to All Alternatives

Across all alternatives, variation in permitted AUMs from high to low is 22 percent, and variation in areas available to livestock grazing is 22 percent. Additional differences are evident in the total acres unavailable to livestock grazing or trailing, as well as restrictions on grazing in specific sensitive areas and limitations on timing of access or class of livestock. Impacts on livestock grazing across all alternatives are likely to be related to changes in livestock management required as a result of such limitations. This would result in increased costs to permittees in order to maintain the same level of AUMs as under current conditions. Impacts from specific resources or resource uses are discussed in detail below.

Impacts from livestock grazing management on the livestock grazing program would primarily be related to annual forage removal. Implementing BMPs and grazing management systems that achieve BLM Colorado Public Land Health Standards (BLM 1997) would improve forage conditions over the long term, indirectly improving livestock health and production.

Total acres within allotments available to livestock grazing that are potentially affected by various described impacts are displayed in **Table 4-14** (Acreage Impacts on Grazing Allotments).

Implementing management for the following resources would have negligible or no impacts on livestock grazing and are therefore not discussed in detail: air quality, paleontological resources, forestry and woodland products, national trails and byways, watchable wildlife viewing sites, Native American tribal uses, and public health and safety.

Table 4-14
Acreage Impacts on Grazing Allotments

Management Action	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Available to all classes of livestock grazing	619,500	517,580	653,270	617,140	616,640
Unavailable to livestock grazing[1]	56,300	158,220	22,530	58,660	59,160
Available AUMs	35,520	28,958	36,950	35,558	35,520
Available for sheep grazing	619,500	121,870	653,270	617,140	616,640
Unavailable to sheep grazing[1]	0	395,800	0	0	0
Available to grazing with NGD restrictions[2]	33,340	287,940	42,580	30,220	29,190
Available to grazing with SSR restrictions[2]	N/A	507,720	251,150	489,290	259,020
Available to grazing with TL[3]	411,620	510,070	484,230	611,570	444,770
Available to grazing within SRMAs	22,570	171,580	N/A	89,290	88,840
Available to grazing within ERMAs	N/A	N/A	199,250	70,310	64,790
Available to grazing within ACECs	13,650	137,840	13,110	29,570	13,110
Available to grazing within WSAs	33,130	20,510	36,080	30,200	29,170
Available to grazing within Tabeguache Area	7,930	7,370	8,060	7,930	8,040
Available to grazing within lands managed for wilderness characteristics	N/A	38,020	N/A	18,310	18,300
Available to grazing within ROW avoidance areas	N/A	192,600	190,460	232,270	54,300
Available to grazing within eligible or suitable WSR corridors	38,250	28,250	N/A	18,520	19,380
Available to grazing and have lands for disposal	7,890	1,030	9,030	1,020	1,000
Available to grazing within ROW exclusion areas	N/A	269,890	44,470	45,350	43,400
Available to grazing in special status species areas	11,430	6,310	11,620	10,580	14,330
Unavailable to grazing in special status species areas[1]	0	5,320	0	1,050	1,750
Available to grazing in areas defined as fragile soils	N/A	30,410	105,690	100,140	101,170
Available to grazing in VRM Class I	41,060	33,980	44,140	40,170	39,260
Unavailable to grazing in VRM Class I[1]	80	19,880	80	6,270	4,320

Management Action	Alternative A	Alternative B		Alternative C	Alternative D	Alternative E
Available to grazing in VRM Class II	6,000	*Alt. B:* 132,000	*Alt. B.1:* 133,740	30,440	97,600	86,340
Unavailable to grazing in VRM Class II[1]	15,920	*Alt. B:* 43,580	*Alt. B.1:* 47,910	820	14,940	10,310
Available to grazing and Acceptable for coal leasing (in potential coal resource area)	32,080	163,400		249,230	212,150	210,890
Available to fluid minerals leasing	588,660	*Alt. B:* 418,620	*Alt. B.1:* 395,130	603,820	569,810	574,770
Available to grazing and open to nonenergy solid leasable mineral development	588,660	240,330		596,470	482,040	488,060
Available to grazing and open for mineral material disposal	556,260	137,710		591,130	508,390	523,580

Source: BLM 2012a, 2018a, 2019

[1] Acres unavailable to livestock grazing may be made unavailable for protecting other resources.

[2] Grazing is not considered a ground-disturbing activity. Restrictions would apply to management facilities only.

[3]Timing limitations on travel management do not apply to livestock management. Timing limitations would apply only to surface restriction on management facilities.

Alternative A

This alternative includes 619,500 acres available to livestock grazing and 35,520 permitted AUMs. As a result, limitations on livestock grazing management would be minimized. Detailed acreage impacts are included in **Table 4-14**.

Similarly, trailing limitations would occur only on 3,720 acres, where trailing would be limited as much as possible and would be confined to established roads. Terms and conditions for leases could require that trailing livestock be prohibited from bedding in riparian zones unless absolutely necessary. Overall impacts on trailing would be limited due to the minimal acreage affected.

Under Alternative A, vegetation treatments are authorized on a case-by-case basis. Management for riparian vegetation would require utilization of acceptable grazing systems and fencing where needed to maintain or improve riparian habitat to good or excellent ecological condition; livestock grazing impacts could occur if changes are required in grazing management. No ecological emphasis areas would be established under Alternative A. Current management actions to maintain or improve land health for allotments would remain in place.

Factors affecting soil and water conditions would be as described in **Section 3.2.2** and livestock forage and water condition trends identified there would continue. Stipulations to protect soil resources could restrict grazing management. For example, requirements to avoid surface-disturbing activities when soil is saturated could limit ability to manage livestock or construct range improvements. Under Alternative A, measures for municipal water protection would be limited to a lease notice requirement for the water supply of Norwood. Impacts on livestock management would be limited.

Management for special status species habitat could result in costs to permittees. Surface-disturbing activities in federally listed species habitat would require inventory, approval, and potential mitigation measures. Grazing would continue in allotments with special status species (i.e., clay-loving wild buckwheat and Colorado hookless cactus), although mitigation measures could impact grazing by altering grazing strategies or locations. In total, 11,430 acres of known, mapped, special status species

habitat are in areas available to grazing, although much of the Planning Areas represents potential habitat.

Under Alternative A, impacts from wildlife management are as described under ***Nature and Type of Effects***. TLs would restrict surface-disturbing activities for elk calving, pronghorn fawning, and sheep lambing in various locations between April and mid-July. Construction of range improvements would be prohibited during those times in those areas. Travel management TLs would not apply to grazing management.

Under Alternative A, no specific management actions are in place to prohibit domestic sheep grazing in adjacent or occupied bighorn sheep habitat. Allowing for domestic sheep grazing in allotments on a case-by-case basis would continue to allow permittees the flexibility of grazing livestock in areas next to bighorn sheep populations.

Under Alternative A, there are no provisions for the creation of forage reserves on abandoned or relinquished allotments. Forage reserves, especially when allotments are closed due to emergency situations, could result in a financial impact on those permittees affected by temporary closures.

Impacts from wildland fire management are as described under ***Nature and Type of Effects***.

Impacts from VRM management are as described under ***Nature and Type of Effects***. Acres available and unavailable to grazing are shown in **Table 4-14**.

Acres of allotments available to grazing that would be acceptable for coal leasing and development (32,080 acres), open to fluid mineral leasing (588,660 acres), open to nonenergy mineral leasing (588,660 acres), and open to mineral material disposal (556,260 acres) under Alternative A have the same type of impacts as those identified under ***Nature and Type of Effects***.

Under Alternative A, no SSR and a negligible amount of NGD restrictions would be applied to allotments, allowing for decisions to be made on a case-by case basis. TLs would apply to approximately 411,620 acres available to grazing, which could limit some management activities, such as relocating or prohibiting range improvements construction. In general, Alternative A has the fewest surface restrictions on range improvements and livestock management. As a result, there is potential for conflicts with other land uses, but permittees would have the greatest management flexibility.

Under Alternative A, livestock would continue to be impacted by area recreation because recreation is likely to continue at current levels or to increase. SRMAs are likely to impact livestock grazing through disturbance from, or conflict with, recreation. Changes in grazing management would be required to reduce conflicts, or permittees could be required to relocate livestock or restrict grazing, resulting in increased costs. A total of 22,570 acres available to grazing and trailing are managed as SRMAs. Within these areas, the priority for land use would be for recreation, with the potential to reduce livestock forage availability, and potentially increase livestock displacement, harassment, injury, or death, as described under ***Nature and Type of Effects***.

Impacts of land disposal on grazing are as described under ***Nature and Type of Effects***. In total, 7,890 acres for disposal would be available to livestock grazing. There would be no ROW exclusion or avoidance areas.

Under Alternative A, special management areas could restrict grazing management, as described under ***Nature and Type of Effects***. A total of 13,650 acres within ACECs would continue to be available to livestock grazing and trailing; no additional acres would be made unavailable to grazing.

Across all alternatives, impacts from managing WSAs on livestock grazing are as described under ***Nature and Type of Effects***. Differences between alternatives relate to management if the WSA were released by Congress and the different underlying management designations. Under Alternative A, 33,130 acres within WSAs are available to livestock grazing, and no additional acres are unavailable.

In addition, 38,250 acres next to river segments eligible for inclusion in the NWSRS would be available to grazing and trailing. In these areas, livestock permittees could be required to change management activities, including maintaining and constructing range improvements to protect ORVs and adequate water quality to support those ORVs, free-flowing condition, and tentative classification.

Alternative B

This alternative would provide the smallest area available to grazing, 517,580 acres (approximately 16 percent fewer acres than under Alternative A). In addition, permitted AUMs would be reduced to 28,958 (an approximately 18 percent reduction in AUMs from Alternative A). Of the 675,800 acres of surface lands in the Decision Area, a total of 158,220 acres (nearly 3 times that under Alternative A) would be unavailable to all classes of livestock grazing due to conflicts with steep slopes, soils, recreation sites, and special management areas. The types of impacts are described under ***Nature and Type of Effects***; details are provided below. In general, restrictions on grazing and adjustments to management practices would be the most extensive under this alternative, leading to the greatest limitations on livestock management options of all the alternatives.

Under Alternative B, adjusting grazing management (AUMs, periods of use, allotments, class of livestock, and distribution) to protect resources could help achieve BLM Colorado Public Land Health Standards (BLM 1997) or otherwise improve range conditions. This would provide benefits to long-term forage availability. Adjustments in management could, however, correspond to a decrease in AUMs or an increase in permittee costs or time required for management. Similarly, under Alternative B, allotments would be periodically evaluated to identify grazing issues and to determine if changes are needed in the grazing strategy or allotment management.

Implementing adaptive management would ensure range conditions are maintained or improved; however, this could result in impacts on permittees should AUMs be reduced or permittees be required to locate alternative forage. Under Alternative B, any additional forage would not be allocated for livestock, so the potential for adjustments to increase AUMs is limited. In addition, management that improves forage in the long term could not provide a direct benefit to permittees. Similarly, new range improvements would be prohibited, inhibiting the flexibility of livestock management and the ability to distribute livestock. Throughout the Decision Area, livestock trailing would be limited to established roads and trails to the extent possible. In addition, trailing livestock would be prohibited from overnighting or bedding in sensitive areas, such as riparian zones and occupied federally listed plant habitat. These restrictions would likely impose additional costs on livestock transportation.

Resting an allotment for a minimum of three growing seasons following fire rehabilitation or vegetation treatments could allow for forage to be restored following a disturbing event, but also could result in some short-term impacts on permittees who would be required to locate alternative forage.

Forage reserves on vacated or relinquished allotments would be permitted under Alternative B, which would allow permittees to continue grazing their livestock on Decision Area lands when their own allotment is closed due to an emergency, thus limiting financial impacts.

Vegetation structure management for maximum naturalness would preclude doing vegetation treatments solely for forage improvement, especially if the treatment does not simulate a natural disturbance in shape, size, and intensity. This could reduce AUMs or limit livestock-dispersal options.

Ecological emphasis areas under Alternative B could impact grazing by including restrictions (i.e., CSU and SSR) to protect sensitive areas. These stipulations could impose limits on the placement of structural range improvements and thereby impact livestock management. The 168,060 acres available to grazing may have impacts. A total of 74,510 acres in ecological emphasis areas are unavailable to grazing due to overlapping restrictions for protection of other resources.

Impacts from riparian area management are as described for Alternative A but at an increased intensity due to a larger area unavailable to grazing for riparian resource protection. In total, 23,930 acres would be unavailable to livestock grazing.

Actions to protect water and soil resources could modify grazing practices in order to reduce erosion, as discussed under Alternative A. Stipulations to protect soil resources include prohibiting ground disturbance on slopes equal to or greater than 30 percent (103,750 acres available to grazing) and fragile soils susceptible to erosion (30,410 acres available to grazing). Ground disturbance restrictions would limit construction of livestock improvements in the affected area; however, due to minimal use of livestock of steep slopes, impacts would likely be limited.

In addition, livestock grazing could be limited in areas with soils high in salinity and selenium in order to reduce sediment yield. Stock ponds, dams, and furrows would also require assessment and rehabilitation or removal as necessary to reduce erosion. As a result of these management actions, soil and water conditions would likely be improved in the long term, benefiting range health, but costs to permittees could be increased if adjustment in management practices is required.

Prohibiting grazing within 2,640 feet of classified public surface, groundwater, or springs used as public water supplies would impact grazing management on an estimated 13,670 acres, an increase over the limited closure for the Norwood public water supply in Alternative A. Effects could include loss of acres available for grazing and associated economic impacts on permittees.

In addition, grazing could be limited in order to promote the delisting of impaired (303[d]-listed) water bodies, which would impact grazing management and practices on a case-by-case basis. Short-term effects include loss of acres available for grazing if determined necessary in specific locations to improve water quality, while long-term effects include a potential increase in forage production as areas are rehabilitated and livestock are reintroduced.

Implementing adaptive drought management would require additional management actions by permittees in the short term, including coordination with the BLM and changes in livestock use on allotments affected by drought (depending on the drought severity classification). These actions would accelerate restoration of drought-stricken lands and improve forage resources in the long term.

Management for special status species habitat could increase costs for permittees by restricting new range improvements. Surface-disturbing activities in federally listed species habitat would require inventory and approval of potential mitigation measures, as discussed in Alternative A. In addition, surface-disturbing activities would be prohibited within 656 feet of occupied habitat of federally listed, candidate, and proposed plant species. Additional restrictions would be put in place for BLM sensitive plant species. In total, 6,310 acres of mapped special status species habitat are in areas available to grazing, and an additional 5,320 acres of mapped special status species habitat are unavailable to grazing. It should be noted that much of the UFO is potential habitat for special status species; closures are limited to currently mapped special species habitat.

Impacts from wildlife management are as described under ***Nature and Type of Effects***. TLs would prohibit surface-disturbing activities in deer, elk, and bighorn sheep and moose winter habitat from November to May, and in elk, moose, pronghorn, and sheep reproduction areas in various locations

between April and mid-July. Additional closures would be imposed during fall rutting. These closures could prohibit construction of range improvements. Travel management timing limitations would not apply to grazing management.

Under Alternative B, all domestic sheep and goat permits within 9 miles of occupied desert and Rocky Mountain bighorn sheep habitat would be canceled, and domestic sheep trailing and converting cattle to domestic sheep allotments would be prohibited in this area. As result, approximately 394,540 acres would be unavailable to domestic sheep and goat grazing. The cost to permittees associated with conversion of permits to cattle could be prohibitive and could result in a major change to permittees' operation or the hardship of finding grazing lands (private or public) to replace the area lost.

Impacts from wildland fire management are as described under ***Nature and Type of Effects***. Fuels projects would be designed to meet multiple interdisciplinary objectives, with emphasis on natural processes and intact landscapes; therefore, manipulation of vegetation and changes to forage from direct management actions would be minimized under this alternative.

Impacts from VRM management are as described under ***Nature and Type of Effects***; acres available and unavailable to grazing are shown in **Table 4-14**. VRM Class I areas unavailable to livestock grazing would cover 19,880 acres. Additional limitations could occur in areas managed according to VRM Class II objectives that are available to grazing (132,000 acres under Alternative B and 133,740 acres under Alternative B.1).

In addition, under Alternative B, lands would be managed for wilderness characteristics; 3,760 acres would be unavailable to grazing, with an additional reduction in AUMs. Additional impacts may occur in the 38,020 additional acres available to grazing due to potential restrictions on grazing management options.

The types of impacts from managing areas available to livestock grazing as open to fluid mineral leasing (418,620 acres under Alternative B and 395,130 acres under Alternative B.1), open to nonenergy mineral leasing (240,330 acres), and open to mineral material disposal (137,710 acres) are the same as those described under Alternative A; however, they would occur over a smaller area. As such, the intensity of impacts would be reduced. Acres available to grazing and acceptable for coal leasing would be increased from Alternative A (168,700 acres). However, this increase represents the revision of the potential coal area based on available techniques, and new information is not likely to result in increased impacts on livestock grazing management. As described in **Section 4.4.3** (Energy and Minerals, Effects Common to All Alternatives, Solid Leasable Minerals—Coal), coal production is expected to remain the same across all alternatives.

Under Alternative B, 171,580 acres available to grazing would be within SRMAs (nearly 8 times more than under Alternative A). The types of impacts are the same as those described under Alternative A, but could occur over a broader area. Impacts would vary by site-specific location and recreation focus of the SRMA.

Only 1,030 acres would be available for disposal under this alternative (87 percent fewer acres than under Alternative A). Impacts are the same as those described under ***Nature and Type of Effects***.

Under Alternative B, 192,600 acres available to grazing would be managed as ROW avoidance areas. Impacts are the same as those described under ***Nature and Type of Effects***. Similarly, the types of impacts from designating 269,890 acres available to grazing as ROW exclusion acres are the same as those described under ***Nature and Type of Effects***. Given the lack of ROW avoidance and exclusion areas under Alternative A, impacts on livestock from ROW development could be reduced under Alternative B.

Designation of additional acres as special management areas under Alternative B would increase impacts on livestock grazing. Of the 15 ACECs (215,940 acres) that would be designated under Alternative B, 137,840 acres are available to livestock grazing, and 77,990 acres are unavailable to grazing. The types of impacts from management of the ACECs available to livestock grazing are the same as those described under ***Nature and Types of Effects***, but they would occur over a larger area than under Alternative A.

Under Alternative B, 15,650 acres within WSAs are unavailable to livestock grazing. Impacts from WSAs are as described in ***Nature and Type of Effects***.

In addition, 28,250 acres next to river segments determined suitable for inclusion in the NWSRS would be available to grazing and trailing. In these areas, impacts are as described for Alternative A. An additional 21,000 acres would be unavailable to grazing, with potential reductions in AUMs.

Alternative C

Alternative C represents the fewest restriction on grazing and greatest level of permitted AUMs. Alternative C would increase areas available to grazing, compared with Alternative A; approximately 653,270 acres would be available to grazing (approximately 5 percent more acres than under Alternative A). Similarly, permitted AUMs would be slightly increased to 36,950 (a 4 percent increase in AUMs). A total of 22,530 acres would be unavailable to all classes of livestock grazing due to lack of suitability for grazing and to reduce private land conflict (60 percent less than under Alternative A).

Grazing management practices would be adjusted the same as described under Alternative B, with similar impacts. Under Alternative C, however, management strategies would emphasize increasing available forage and stocking rates where appropriate, while maintaining BLM Colorado Public Land Health Standards (BLM 1997). Additional forage under this alternative would be allocated to domestic livestock, and AUMs could be increased; therefore, this alternative is more likely to increase flexibility for livestock management in the long term. In addition, construction, modification, or removal of range improvements would be allowed if compatible with other resource uses. This would allow permittees additional flexibility, increasing management options. As under Alternative B, trailing would be limited to established roads and trails to the extent possible. Trailing livestock would be permitted to overnight or bed in sensitive areas, such as riparian zones, and in occupied federally listed plant habitat. But this would be allowed only with prior approval from the BLM, resulting in some additional limitations on livestock management options.

Under Alternative C, following fire rehabilitation or vegetation treatments, allotments or pastures would be rested to the extent needed to comply with BLM Colorado Standards for Public Land Health and Guidelines for Livestock Grazing Management (BLM 1997). This would allow for forage to be restored following a disturbing event, as under Alternative B, but would allow greater flexibility based on site-specific conditions, thereby reducing impacts on grazing management.

Vacated or relinquished allotments under Alternative C would be evaluated for combination with existing allotments, increasing potential for additional forage allocation and AUM increase, as well as increase management flexibility.

Vegetation management would emphasize resource production needs and fuels reduction; there would be less focus on resource protection and improvement or restoration of vegetation under Alternative C. As a result, limitations on manipulation of forage for livestock purposes would to lowest under this alternative.

Management for special status species would impact livestock grazing, as described under Alternative B, but to a lesser degree due to promotion of resource use under this alternative.

Additional SSR restrictions would apply on slopes equal to or greater than 40 percent (98,520 acres) and with highly erosive soils including the East Paradox biological soil crust (104,030 acres). Some minimal restrictions on range improvements could result, but to a lesser degree than under any other alternative.

Prohibiting grazing within 1,000 feet of classified public surface, groundwater, or springs used as public water supplies would impact grazing management, as described under Alternative B, but to a lesser extent; approximately 3,990 acres would be impacted.

Impacts from wildlife management are as described under ***Nature and Type of Effects***. TLs would prohibit surface-disturbing and disruptive activities in deer, elk, and bighorn sheep and moose winter habitat from January to April, and for elk and mule deer and in elk reproduction areas between May and June. This would prohibit construction of range improvements during those times. Travel management timing limitations would not apply to grazing management.

As under Alternative B, domestic goat and sheep grazing would be restricted to minimize disease transmission, but Alternative C would not specifically close existing domestic sheep allotments and would allow for greater management flexibility. There would be impacts similar to those described under Alternative B, but to a reduced degree, as goat grazing would be excluded within 5 miles of occupied bighorn sheep habitat, and cattle allotments would be prohibited from being converted to domestic sheep or goat grazing within 3 miles of occupied bighorn sheep habitat.

Impacts from wildland fire management are as described under ***Nature and Type of Effects***. Fuels projects would be designed with emphasis on supporting resource uses, so manipulation of vegetation and changes to forage from direct management action are likely to increase under Alternative C.

Impacts from VRM management are as described under ***Nature and Type of Effects***. Acres available and unavailable to grazing are shown in **Table 4-14**. As in Alternative A, 80 acres of VRM Class I areas are unavailable to grazing. Additional restrictions could occur in the 30,440 acres available to grazing with VRM Class II designation.

No lands would be managed to protect wilderness characteristics. There would be no grazing impacts.

The types of impacts from managing 249,230 acres available to grazing as acceptable for coal leasing and development, 603,820 acres open to fluid mineral leasing, 596,470 acres open to nonenergy mineral leasing, and 591,130 acres open to mineral material disposal are the same as those described under Alternative A and ***Nature and Type of Effects***.

Under Alternative C, no SRMAs would be established. ERMAs would be established on 199,250 acres available to livestock grazing. In contrast to SRMAs, ERMA management emphasizes multiple uses, and impacts on livestock from recreation are likely to be reduced compared to SRMAs, due to the management focus on interdisciplinary objectives rather than specifically on recreation.

Approximately 9,030 acres would be available for disposal under this alternative (14 percent more than under Alternative A). Impacts are the same as those described under ***Effects Common to All Alternatives***.

Under Alternative C, 190,460 acres available to grazing would be managed as ROW avoidance areas, and 44,470 acres available to grazing as ROW exclusion acres. Impacts are the same as those described under ***Nature and Type of Effects***. Given the lack of ROW avoidance and exclusion areas under Alternative A, impacts on livestock from ROW development could be reduced under Alternative C, compared to Alternative A.

Under Alternative C, some special designation areas, such as ACECs, WSAs, and the Tabeguache Area, would be unavailable to livestock grazing, the same as described for Alternative A.

Eligible WSR segments would be determined not suitable for inclusion in the NWSRS and released from interim protective management; therefore, no grazing impacts would occur.

Alternative D

Alternative D would have a similar level of areas available to grazing, as compared with Alternative A; approximately 617,140 acres would be available to grazing (less than 1 percent from Alternative A). Permitted AUMs would also be similar to Alternative A at 35,558 (less than 0.1 percent different than Alternative A). A total of 58,660 acres would be unavailable to all classes of livestock grazing to protect steep slopes.

Grazing management practices could be adjusted as described under Alternative B, with similar impacts. Under Alternative D, management strategies would emphasize improving rangeland health and forage quality; as a result, short-term impacts on permittees could increase if additional management actions are needed to implement an improved grazing strategy. In the long term, however, land heath and forage base is likely to improve, benefitting permittees. Additional forage under this alternative would be allocated to domestic livestock, wildlife, land health, or a combination of these, allowing for flexibility in livestock management while improving land health. In addition, construction, modification, or removal of range improvements would be allowed if compatible with other resource uses. This would allow permittees additional flexibility, increasing management options. Under Alternative D, livestock trailing would be limited to established roads and trails, to the extent possible, as for all action alternatives. Trailing livestock would be permitted to bed or overnight in riparian zones in areas identified by and only with prior BLM approval. This would allow for some flexibility in management but would restrict movement more than under current conditions described in Alternative A.

Resting allotments or pastures following fire rehabilitation or vegetation treatments would impact grazing, as described under Alternative C.

Forage reserves on vacated or relinquished allotments would be permitted under Alternative D, as would merging adjacent allotments to provide the maximum level of flexibility for permittees and land health.

As described under Alternative B, restrictions would apply to activities next to public water supplies. Under Alternative D, however, grazing would not be expressly prohibited but would be examined to ensure that impacts were minimized. As a result, some management alterations and associated increased costs to permittees could be required on 3,640 acres available to grazing adjacent to public water supplies.

Management for vegetation, drought, and special status species would impact livestock grazing, as described in Alternative B. However, this would be at a lower intensity due to an emphasis on multiple use and resource protection. Special status species protection under Alternative D includes SSR restrictions within federally listed species habitat. Under Alternative D, 1,050 acres of occupied habitat would be unavailable to grazing to protect special status species. In total, 10,580 acres of mapped special status species habitat would be available to grazing.

Ecological emphasis areas would be established as described under Alternative B; impacts could occur on 153,600 acres available to grazing.

Under Alternative D, stipulations to protect soil resources, including prohibiting surface-disturbing activities on slopes equal to or greater than 40 percent and on highly erosive soils, could limit range

improvements, as discussed under Alternative C. There also would be restrictions on livestock grazing on soils high in salinity and selenium, as discussed under Alternative B. As a result of these management actions, soil and water conditions would likely be improved in the long term, benefiting range health, but costs to permittees could be increased if adjustments in management practices were required.

Impacts from wildlife management are as described under ***Nature and Type of Effects***. TLs would prohibit surface occupancy and other surface-disturbing activities in deer, elk, and bighorn sheep and moose winter habitat from November to May, and for elk, moose, pronghorn, and bighorn sheep reproduction areas in various locations between April and mid-July. Construction of range improvements would be prohibited during those times. Under Alternative D, domestic goat grazing would be prohibited in occupied suitable bighorn sheep habitat. Travel management timing limitations would not apply to grazing management.

Restrictions on domestic sheep grazing would be based on the probability of interaction assessment prepared for the RMP (**Appendix K** [Bighorn/Domestic Sheep Risk of Association Modeling]), which examines allotments to determine probability for disease transmission for each individual allotment; results will direct management for permit renewal. Although there is still a potential for impacts on permittees, as described under Alternative B, decisions would be made based on site-specific needs; therefore, additional costs or management requirements would be limited to those allotments where an adverse impact on bighorn sheep is likely. Approximately 42,550 acres would be closed to domestic goat grazing, would not be permitted to be converted to domestic sheep grazing, and would have restrictions applied in existing domestic sheep grazing allotments. Allotments most likely to be impacted under this alternative are domestic sheep allotments with a high probability of interaction (located along the northeast Planning Area border, north of Camel Back WSA), and those with moderate probability (located east of Montrose, south of Paonia, next to State Highway 92, and on the northeastern boundary of the Planning Area, east of US Highway 50).

Impacts from wildland fire management are as described under ***Nature and Type of Effects***.

Impacts from VRM management are as described under ***Nature and Type of Effects***. Acres available and unavailable to grazing are shown in **Table 4-14**. A total of 6,270 acres of VRM Class I areas would be unavailable to grazing. Additional restrictions could occur in the 97,600 acres available to grazing with VRM Class II designation.

Under Alternative D, lands would be managed to protect wilderness characteristics. The 18,310 acres managed for wilderness characteristics and available to livestock grazing could impose some restrictions on grazing management.

The types of impacts from managing 569,810 acres available to grazing as open to fluid mineral leasing, 482,040 acres open to nonenergy mineral leasing, and 508,390 acres open to mineral material disposal are the same as those described under Alternative A and ***Nature and Type of Effects***, but would occur over a smaller area. Therefore, impacts could be decreased. As discussed for Alternative B, acres available to grazing as acceptable for coal leasing and development (249,620) represent an increase over Alternative A, but do not necessarily represent an increased likelihood of impacts on grazing management. As described in **Section 4.4.3** (Energy and Minerals, Effects Common to All Alternatives, Solid Leasable Minerals—Coal), coal production is expected to remain the same across all alternatives.

Under Alternative D, SRMAs would be established, with impacts similar to those described under Alternative A, but occurring over a larger area (4 times more than under Alternative A).

Approximately 1,020 acres would be available for disposal under this alternative (80 percent fewer acres than under Alternative A). Impacts are similar to those described under ***Effects Common to All Alternatives***.

Under Alternative D, 232,270 acres available to grazing would be managed as ROW avoidance areas. Impacts are the same as those described under ***Nature and Type of Effects***. Similarly, the types of impacts from managing 45,350 acres for ROW exclusion are the same as those described under ***Nature and Type of Effects***. Given the lack of ROW exclusion or avoidance areas under Alternative A, impacts from ROWs would be decreased in Alternative D.

Of the 51,320 acres of ACECs that would be designated under Alternative D, 29,570 acres are available to livestock grazing. The types of impacts from management of the ACECs available to livestock grazing are the same as those described under ***Nature and Type of Effects***.

Impacts from managing the Tabeguache Area are as described in ***Nature and Type of Effects***. Across all alternatives, management of WSAs would have impacts on livestock grazing, as described under ***Nature and Type of Effects***. Under Alternative D, 5,970 acres within WSAs would be unavailable to livestock grazing.

In addition, 18,520 acres next to river segments determined suitable for inclusion in the NWSRS would be available to grazing. In these areas, impacts are as described for Alternative A. An additional 12,920 acres would be unavailable to grazing, with potential reductions in AUMs.

Alternative E

Due to clerical corrections and eliminating overlap with NCAs, the acres available for livestock grazing under Alternative E were revised to be slightly fewer than Alternative A; 616,640 acres would be available to grazing (less than 1 percent fewer acres than under Alternative A). Similarly, permitted AUMs would be similarly revised to 35,520 (the same as under Alternative A). This apparent slight reduction in both available and unavailable acres from Alternative A actually reflects corrections to the existing grazing inventory and associated GIS; in reality, acres open and unavailable under Alternative E are similar to Alternative A. A total of 59,160 acres would be made unavailable to all classes of livestock grazing to protect steep slopes, avoid conflict with BLM recreation sites, or avoid sensitive resources.

As under Alternatives B and D, the level of permitted grazing or areas available to grazing management could be further adjusted based on resource issues identified in periodic allotment evaluation. Adjustment of permitted level of use or areas available to grazing could occur based on the following criteria:

- Allotments within lands identified for disposal or with minimal BLM-administered acreage, in order to improve management efficiency
- Allotments in areas unsuitable for grazing due to steep slopes
- Allotments found to have major impacts to fish and wildlife or sensitive species
- Allotments with identified conflicts with municipal watershed protection, cultural resource protection, high-intensity recreation areas, public health and safety, or adjacent private land development

Adjustments for any of the above reasons could result in reduced forage and/or require adjustments to grazing management with an increase in permittee costs or time required for management.

In addition, as under Alternatives B, C, and D, management strategies would emphasize improving rangeland health and forage quality. Short-term impacts on permittees could occur if additional management actions (e.g., changes to AUMs, periods of use, allotments, class of livestock, and

distribution) are needed based on land health assessment[7], resource monitoring, and trends data, including data provided via partners of cooperators. Similar to Alternatives B, C, and D, actions would be implemented through terms and conditions on grazing permits and/or through other resource activity plans. In addition to resource monitoring and land health assessment, Alternative E would further consider data provided by cooperators and partners. In the long term, land health and forage base would likely improve based on these adjustments and the consideration of data from numerous sources.

Resting allotments or pastures following fire rehabilitation or vegetation treatments would result in short-term reductions in forage, as described for Alternatives C and D.

Additional forage under Alternative E would be allocated to domestic livestock, wildlife, land health, or a combination. In contrast, under Alternative A, priority for increases in forage would be dictated by management zone. Alternative E would therefore provide additional flexibility in management, while improving land health.

Under Alternative E, livestock trailing would be limited to established roads and trails to the extent possible, similar to all other action alternatives. Trailing livestock would be permitted to bed or overnight in riparian zones in areas identified by and only with prior BLM approval. This would allow for some flexibility in management but would restrict movement more than in Alternative A, in which restrictions are only in place on 3,720 acres. Allowing trailing within the Camel Back pasture in the Winter-Monitor allotment would provide increased flexibility for livestock movement compared with Alternative A, but would not result in additional permitted forage.

Construction, modification, or removal of range improvements would be allowed if compatible with other resource uses (as described under Alternatives C and D). This would allow permittees continued flexibility and promote efficient management, as discussed under ***Nature and Type of Effects***. Under Alternative A, by comparison, range improvements would be implemented based on allotment-specific management objectives, which may not be as effective in determining the need to construct, modify, or remove range improvements to support or improve land health on the landscape level.

Establishment of forage reserves on vacated or relinquished allotments, or combining these allotments with active allotments, would be considered, as discussed under Alternative D, providing the maximum level of flexibility for permittees and land health.

Water Resources

Restrictions on livestock grazing would apply to activities next to public water supplies. Under Alternative E, grazing would not be expressly prohibited but would be examined to ensure impacts were minimized. As discussed under Alternative D, some management alterations and associated increased costs to permittees could be required on the 13,560 acres available to grazing adjacent to public water supplies.

Vegetation

Management for vegetation, drought, and special status species would impact livestock grazing, with similar impacts to Alternative D. Under Alternative E, 1,750 acres of occupied habitat would be unavailable to grazing to protect special status species. In total, 14,330 acres of mapped special status

[7] Land health assessments from 1998 to 2014 were conducted with a determination category of "meeting with problems." Beginning in 2018, all land health determinations are conducted according to current BLM manuals and handbooks.

species habitat would be available to grazing, but may have restrictions applied, which would impact permittees' time and management cost.

Soils and Geology

Under Alternative E, stipulations to protect soil resources (including prohibiting surface-disturbing activities on slopes equal to or greater than 30 percent, on highly erosive soils, and on soils high in salinity and selenium) on approximately 101,170 acres could limit range improvements. As a result, soil and water conditions would likely be improved in the long term, benefiting range health, but could increase permittees' costs if management practice adjustments were required, because no similar actions are included under Alternative A.

Fish and Wildlife

Impacts from wildlife management are as described under ***Nature and Type of Effects***. TLs would prohibit surface occupancy and other surface-disturbing activities in deer, elk, and moose winter habitat from December 1 to April 15; in various locations for elk, moose, and pronghorn from January 1 to March 31; and in Rocky Mountain and desert bighorn sheep reproduction areas from November 1 to April 15. Construction of range improvements would be prohibited during those times. Travel management TLs would not apply to livestock grazing management.

Similar to Alternative D, restrictions on domestic sheep grazing would be based on accepted peer-reviewed modeling techniques. **Appendix K** (Domestic/Bighorn Sheep Probability of Interaction Assessment) examines allotments to determine probability for disease transmission for each individual allotment. The model results represent the current best available data, and results will direct management for permit renewal. No specific closures would directly be in place, and additional costs or management requirements would be limited to those allotments where an adverse impact on bighorn sheep is likely. A total of 57,460 acres available to livestock grazing are located in occupied desert and Rocky Mountain bighorn sheep habitat. Allotments most likely to be impacted under Alternative E are the same as those discussed under Alternative D. It is likely that restrictions on domestic sheep and goat grazing would be increased from Alternative A.

Under Alternative E, 18 allotments in occupied sheep habitat (approximately 43,630 acres) would be unavailable to domestic goat grazing.

In addition, prohibiting domestic sheep and goat trailing (unless effective separation results in a high degree of confidence that there will be low to no risk of contact with wild sheep) could reduce options for movement of livestock and increase livestock management time and cost, compared with Alternative A.

Wildland Fire Ecology and Management

Impacts from wildland fire management are as described under ***Nature and Type of Effects***.

Visual Resources

Impacts from VRM management are as described under ***Nature and Type of Effects***. Acres available and unavailable to grazing are shown in **Table 4-14**. A total of 4,320 acres of VRM Class I areas would be unavailable to grazing. Additional restrictions on range improvement could occur in the 1,256,000 acres available to grazing with VRM Class I or II designation (over 2.5 times more acres than Alternative A).

Lands with Wilderness Characteristics

Under Alternative E, no lands would be managed to protect wilderness characteristics. In the 18,320 acres managed to minimize impacts on wilderness characteristics, while managing for other uses, and 23,830 acres managed to prioritize other multiple uses, impacts on grazing would be minimal.

Fluid Leasable Minerals—Oil and Gas

The types of impacts from managing 574,770 acres available to grazing as open to fluid mineral leasing (2 percent less than Alternative A), 488,060 acres open to nonenergy mineral leasing (17 percent less than Alternative A), and 523,580 acres open to mineral material disposal (6 percent less than Alternative A) would have similar effects to those described under ***Nature and Type of Effects***, including the potential for disturbance of forage and livestock. The minor reductions in acres impacted, and the inclusion of additional acres with fluid mineral stipulations, could reduce the level of surface disturbance and conflicts with livestock grazing from Alternative A.

Solid Leasable Minerals—Coal

As discussed for Alternative B, acres available to grazing and acceptable for coal leasing and development (210,890 acres) are an increase over Alternative A, but do not represent an increased likelihood of impacts on grazing management, because coal production is expected to remain the same under all alternatives.

Recreation and Visitor Services

Under Alternative D, eight SRMAs would be established, with potential conflicts with livestock and recreation as described under Alternative A. Due to the inclusion of additional SRMA acres in Alternative E (nearly 4 times more total RMAs than Alternative A), impacts could occur over a larger area.

Locatable Minerals, Mineral Materials, and Nonenergy Leasable Minerals

Impacts from lands identified for disposal would be the same as those described under Alternative D.

Lands and Realty—Rights-of-Way

Under Alternative E, 54,300 acres available to grazing would be managed as ROW avoidance areas and 43,400 acres as ROW exclusion areas. As described under ***Nature and Type of Effects,*** these areas may have decreased potential for disturbance of forage or livestock from Alternative A, where no similar restrictions are in place.

Areas of Critical Environmental Concern

Of the 30,190 acres of ACECs that would be designated under Alternative E, approximately 13,110 acres would be available to livestock grazing (4 percent fewer than under Alternative A), and 17,080 total acres would be unavailable to grazing (4.5 percent more than under Alternative A) for protection of ACEC values. Areas available to grazing could have additional surface restrictions and limitations on management options with increased costs or time for permittees, as described under ***Nature and Type of Effects***.

Wilderness and Wilderness Study Areas

Across all alternatives, management of the Tabeguache Area and WSAs would impact livestock grazing, as described under ***Nature and Type of Effects.*** Limitations could still apply to structural range improvements if WSAs are released from consideration by Congress, due to underlying land management, including ACECs.

Wild and Scenic Rivers

Impacts of NWSRS management would be the same as those described for Alternative D.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on livestock grazing includes actions that occur on or next to all allotments located entirely or partially in the Uncompaghre RMP Planning Area. Generally, livestock use has decreased over the past 100 years. Grazing in portions of the cumulative impacts analysis area has either remained stable or declined in the recent past, and demand on BLM-administered lands has remained stable in the last 10 years. These trends are expected to continue. Past actions that have affected livestock grazing are human-caused surface disturbances (mineral development, recreation, prescribed burning, and historic grazing practices) and wildland fires that have contributed to current ecological conditions. Present actions affecting livestock grazing are mainly those that reduce available grazing acreage or the level of forage production in those areas. Key examples are wildland fires, land disposals, motorized vehicle use, mineral and energy development, habitat restoration, and special designations that restrict grazing. Future actions affecting livestock grazing are similar to present actions, including any restriction associated with future species listings under the ESA and changes to forage due to drought or climate change. The presence and potential expansion of bighorn sheep populations and management to protect bighorn sheep from disease could affect the ability of local livestock permittees to convert from cattle use to domestic sheep use on specific allotments.

Cumulative projects that increase human disturbance in grazing areas could also indirectly impact grazing by increasing weeds and invasive species. Cumulative projects that increase human disturbance in grazing areas could also directly impact grazing by displacing, injuring, or killing animals. Cumulative impacts would be greater on livestock grazing if the cumulative projects were to occur simultaneously.

The contributions to cumulative impacts under each alternative would parallel the impacts of the alternatives in the general impact analysis, above.

Alternative C would result in the highest levels of permitted grazing, but could also result in the greatest level of surface-disturbing activities with the potential to impact forage availability. Alternative B would have the lowest level of permitted grazing and the highest level of restrictions on grazing management and structural range improvements for protection of other resources. Alternative A would provide limited restrictions on grazing management, but would not include specific actions to promote forage improvement or minimize impacts from other resource uses. Alternatives D and E would provide some restrictions on forage on BLM-administered lands with potential to impact area permitees. Standard mitigation identified in the BLM Colorado Public Land Health Standards (BLM 1997) would be implemented for projects on BLM-administered lands. This would reduce or minimize contributions to cumulative impacts on livestock forage conditions on Decision Area lands. It should be noted that because permittees often rely on BLM forage on a seasonal basis, making areas unavailable to grazing on BLM-administered lands has the potential to impact operation on both BLM-administered lands and private lands, and could result in larger cumulative impacts. Additional details are included in **Section 4.6.3**, Socioeconomics.

4.4.3 Energy and Minerals

This section discusses impacts on fluid leasable minerals, solid leasable minerals, locatable minerals, and mineral materials from proposed management actions for other resources and resource uses. Existing conditions are described in **Section 3.2.3** (Energy and Minerals).

Methods and Assumptions

Impacts on fluid leasable minerals, solid leasable minerals, locatable minerals, and mineral materials could result from management actions proposed for other resource and resource use programs.

Indicators

Indicators for impacts on energy and mineral resources are as follows:

- The amount of land made unavailable for mineral resource activities in areas where mineral resources occur
- Changes in land uses, including changes in nearby populations
- Changes in socioeconomics, which could change the demand for jobs and energy
- Additions or removals of transmission lines, roads, or railways, which changes economic feasibility of developing a site
- Changes in restrictions that can be placed on mineral claiming, leasing, or development activities
- The potential for the presence of mineral resources on these lands

Withdrawal or closure of an area to mining development removes the mineral resources in that area from being able to be accessed and extracted. This represents an impact on the potential discovery, development, and use of those resources by decreasing the availability of mineral resources. Where information is available, consideration is given to the potential for mineral resources within the lands withdrawn or closed. For example, an indicator of a significant impact on mineral resources is if there were substantial reductions in any of the following:

- Federal leasing and development of oil, gas, geothermal resources, or potash in high potential areas
- Federal leasing and development of coal, sodium, and potassium
- Areas open for mineral location under the Mining Law of 1872 for the locatable minerals
- Areas open and available for the disposal of mineral materials

In areas that are open to mineral development, factors that affect mineral extraction and prospecting include permitting, regulatory policy, public perception and concerns, travel management, transportation, proximity to sensitive areas, low commodity prices, taxes, and housing and other necessities for workers.

The amount of area that would fall under restrictions outlined in **Chapter 2** and the impact of those restrictions on mineral development are considered below in the analysis of each alternative.

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- Existing mineral leases and valid mining claims would not be affected by the closures or withdrawals proposed under this RMP.
- Operations on existing leases would be subject to condition of approvals existing at the time of authorization.
- Existing leases would be managed under the stipulations in effect when the leases were issued; new stipulations proposed under this RMP would apply on new leases.
- Leasing and development could occur throughout the entire Decision Area, except where restricted by the management actions described in **Chapter 2**.
- If an area were leased, it could be developed; however, not all leases would be developed within the life of this RMP.
- As the demand for energy increases, so would the demand for energy resources.

Nature and Type of Effects

The following analysis describes the nature and type of effects that could affect mineral resources in the Uncompahgre RMP Planning Area. Details on how each impact would vary by alternative are described under the various subheadings.

General

Limiting vehicle access on lands managed to protect wilderness characteristics would restrict development. Instead of having vehicle access, these areas would be limited to foot or equestrian travel, thereby preventing most types of mineral exploration and development that could occur.

Management actions needed to protect resource values or uses could restrict mineral development. Where protected areas coincide with mineral resource potential areas or where the management actions concerning the specific area result in closing, withdrawing, or restricting development, an adverse impact on the minerals program would occur.

Permission from landowners to cross their land to access BLM-administered lands is sometimes denied and could result in mineral resources not being discovered and developed on lands available to mineral development. Mineral resources in other ownerships may not be developed if the adjacent BLM-administered lands are withdrawn, closed, or restricted from mineral development because the resource may not be economically feasible to develop if only a portion is available for development.

Fluid Leasable Minerals—Oil, Gas, and Geothermal Resources

As discussed in **Section 3.2.3**, natural gas resources are generally in two areas in the Planning Area: the North Fork of the Gunnison River area (North Fork area) and the west end of Montrose and San Miguel counties area (West End area). Management actions that prohibit or restrict surface occupancy or disturbance in these areas would impact the development of leasable mineral resources.

For this analysis, development potential for oil and gas was broken into two categories, conventional oil and gas and coalbed natural gas.

- Conventional oil and gas:
  - **Higher development potential** refers to areas identified as having very high, high, or moderate conventional oil and gas development potential.
  - **Lower development potential** refers to areas identified as having low, very low, or negligible conventional oil and gas development potential.
- Coalbed natural gas:
  - **Development potential** refers to areas identified as having high, moderate, low, and very low coalbed natural gas development potential.
  - **No potential** refers to areas identified as having no coalbed natural gas development potential.

Except for the far western portion of the Planning Area in the West End, the entire Planning Area is considered to have potential for geothermal resources (Idaho National Engineering and Environmental Laboratory 2003).

Presence of special status species or cultural or paleontological resources could affect mineral exploration and development. Such effects could increase the cost of mineral resource extraction.

Wildfire could adversely affect fluid mineral operations by threatening and burning infrastructure, requiring evacuations, and interrupting production.

There are no ROW exclusion areas that lie outside of areas identified as closed to leasing (NL) or open to leasing with NSO restrictions. As such, identifying areas as ROW exclusion will not impact placement of fluid mineral development under any of the alternatives.

Stipulations, while not directly closing an area to fluid mineral leasing, would impact the availability of fluid mineral resources by restricting the location of surface facilities and methods of development. NSO, CSU, and TL stipulations restrict where surface-disturbing activities for fluid mineral leasing could occur, the manner in which they could be implemented, and when they could occur in areas where they are applied.

Most programs apply restrictions to fluid minerals via stipulations attached to leases (NSO, CSU, and TL) to protect resources.

- Programs that contribute to total acres of NSO are soil and water, vegetation, special status species, fish and wildlife, cultural resources, wilderness characteristics, recreation, coal, congressional designations (e.g., National Trails), and administrative designations (e.g., ACECs).
- Programs that contribute to total acres of CSU are soil and water, vegetation, special status species, fish and wildlife, cultural resources, wilderness characteristics, recreation, coal, congressional designations (e.g., National Trails), and administrative designations (e.g., ACECs).
- Programs that contribute to total acres of TL are soil and water, special status species, fish and wildlife, and administrative designations (e.g., ACECs).

The extent of the resource contributions to the total acreage for each stipulation varies by alternative (see **Appendix B** [Restrictions Applicable to Fluid Minerals Leasing and Other Surface-disturbing Activities]). Because the VRM system does not preclude leasing activities, impacts are discussed in detail under each alternative.

In areas where NSO stipulations are applied, federal fluid minerals could be leased, but the leaseholder/operator would have to use off-site methods, such as directional drilling to access the mineral resource. If directional drilling is employed near areas with NSO stipulations, the area where directional drilling can be effectively used is limited, meaning some minerals could be inaccessible in areas where an NSO stipulation covers a large area or where no leasing is allowed on surrounding lands.

While less restrictive than an NSO, a CSU stipulation allows the BLM to require special operational constraints, such as to shift the surface-disturbing activity associated with fluid mineral development more than the standard 200 meters (656 feet), or to require additional protective measures (e.g., special construction techniques for preventing erosion in sensitive soils) to protect the specified resource or value. While not prohibiting surface-disturbing activities, a CSU stipulation does influence the location of operations within the subject area.

TL stipulations are necessary to protect some resources from impacts of development. These stipulations are necessary if impacts cannot be mitigated within the standard 60-day suspension of operation period afforded by regulation. Areas where TL stipulations are applied are temporarily closed to fluid mineral exploration and development, surface-disturbing activities, and intensive human activity during identified time frames, usually based on seasons or species breeding times. While some operational activities would be allowed at all times (e.g., vehicle travel and maintenance), construction, drilling, completions, and other operations considered to be intensive in nature would not be allowed during the restricted time frame.

Solid Leasable Minerals—Coal

Before offering federal coal reserves for lease, a screening process, as outlined in 43 CFR 3420.1-4 must be completed. The process includes four specific land use screening steps that are unique to developing land use planning decisions for federal lands:

1. Identification of coal with potential for development
2. Determination of whether the lands are unsuitable for coal development
3. Determination of whether the lands are unacceptable for coal development (consideration of multiple use conflicts)
4. Consultation with surface owners

For the coal resource to be defined as potentially available for coal leasing and development in the following analysis, it must pass the first three screens, as defined in 43 CFR 3420. Areas that do not pass any of the screens are defined as unacceptable for coal leasing and development. Screen 4 was not evaluated as part of this planning process. Refer to **Appendix L** (Coal Screening Criteria for the Uncompahgre Planning Area) for a complete description of the coal screening process carried out for the Uncompahgre RMP Decision Area.

Areas determined to be acceptable for coal leasing in this RMP would be further evaluated prior to any future exploration or leasing. To explore for coal, a company must submit an application to explore. NEPA analysis is completed on the application, and the application is approved, disapproved, or approved with modifications. When a company applies for a coal lease, the four steps of the coal screening process are applied again. If it is determined that the area is still acceptable for coal leasing, NEPA analysis is completed on the lease application and the lease is approved, disapproved, or approved with modifications. If approved, the BLM includes conditions and stipulations on the lease to address resource concerns. The US DOI, Office of Surface Mining Reclamation and Enforcement is a cooperating agency on the NEPA document. Once a company obtains a lease, it can submit a mine plan to the state and apply for state permits. The Office of Surface Mining Reclamation and Enforcement is the lead on approval of the mine plan and will do additional NEPA analysis prior to approval.

The Coal Resource and Development Potential Report developed by the BLM in 2010 (BLM 2010h) predicts that coal production would continue at 12 to 16 million tons per year. Based on more recent observed trends and averages in coal production in the UFO, the BLM has adjusted this assumption to 9 to 11 million tons per year. This estimate is expected to remain constant across all alternatives and would not be impacted by the planning decisions. No increase is expected as a result of planning decisions.

Better mapping and a recognition of additional Dakota coal resulted in more acres of coal potential for Alternatives B, C, and D, compared with Alternative A. The increase is a result of recognizing additional Dakota coal resource in the Nucla-Naturita coal field and Uncompahgre Plateau and other unnamed areas where the coal resource exists. While the coal resource is present in the Uncompahgre Plateau and Piceance Deep resource areas, development potential is expected to be low and industry has not shown much interest. For these reasons, these areas are not further discussed in the following analysis.

As discussed in **Section 3.2.3**, there are four coal fields within the Planning Area: Tongue Mesa, Grand Mesa, Nucla-Naturita, and Somerset. For this analysis, each coal field was evaluated separately because coal types and mining methods (i.e., surface versus underground) vary across coal fields.

Tongue Mesa Coal Field

Although there is no coal mining in the Tongue Mesa coal field, it is the primary area with coal potential for the Fruitland Formation. Fruitland coal in the Tongue Mesa field is difficult to access and heavily faulted. In addition to the discontinuous nature of the formation, there are no railway lines to transport

the coal. Due to difficult access, the dispersed nature of the coal resource, and lack of a nearby power plant to the Tongue Mesa coal field, it is not likely large-scale mining development could be justified over the next 20 years, and small-scale mining development is not anticipated (BLM 2010h). As a result, coal mining in the Tongue Mesa coal field has limited potential during the next 20 years and is therefore not likely to be impacted by management actions proposed in this RMP.

Grand Mesa Coal Field

There have been no active mines in the Grand Mesa coal field since 1984 (BLM 2010h). The lack of coal development in this area is due to lower quality coal (compared with the adjacent Somerset coal field), deep overburden, and inaccessibility to coal-handling and transportation (rail) facilities. As the coal moves farther away from the railroad, the economic viability of recovery diminishes. As such, coal mining in this field has limited potential during the next 20 years and is therefore not likely to be impacted by management actions proposed in this RMP.

Nucla-Naturita Coal Field

There is high potential for Dakota coal in the Nucla-Naturita coal field, but the lenticular and discontinuous nature of this coal, as well as the presence of partings (thin interbeds of impurities) and clastic dikes (tabular-shaped sedimentary dikes composed of clastic material) has limited its quality and economic viability (BLM 2010h). There is one surface coal mine (the New Horizon coal mine) on private coal near Nucla, Colorado. The mine ceased production in March 2017 and has entered final reclamation. Since the seams for Dakota coal in this coal field are relatively thin, lenticular, and near the surface, strip mining is the preferred method for mining this coal. As a result, management actions that preclude surface-disturbing activities could impact coal mining in the Nucla-Naturita coal field. In addition to not having a rail line to haul coal out of the area, the coal is not in high demand outside of the area because of its low quality.

Somerset Coal Field

The Somerset coal field has the greatest potential for continuing to produce the largest amount of coal in the Planning Area (BLM 2010h). There is one active mine in this coal field that is mining coal from the Paonia Shale member of the Mesaverde and two inactive mines that have closed within the past 5 years and have entered final reclamation. All of the coal is being mined using underground methods due to multiple thick coal seams and thick overburden. The Mesaverde coal in this coal field is accessible with a rail line via the North Fork Valley, and the coal is considered to be of high quality. A limiting factor to the amount of production is the capacity of the railway line from the area, which is approximately 16 million tons per year. Management actions that preclude or restrict coal mining in the Somerset coal field would result in an impact on coal resources.

Solid Leasable Minerals—Nonenergy Leasables, Potassium

There is high potential for sodium and potassium deposits in the Paradox Valley area, which is the far western portion of the Planning Area in the West End. Although resource potential is high, to date there has been no exploration, development, or production of sodium or potassium in the Planning Area. Proposed management actions that would reduce or restrict availability of extracting these minerals would be an impact on this program. However, due to lack of interest in these deposits, proposed management actions are not anticipated to impact nonenergy leasable minerals.

Locatable Minerals

Mineral exploration and the development of locatable mineral deposits are allowed under the General Mining Law of 1872 on all BLM-administered lands, unless they are withdrawn from mineral entry by Secretarial Public Land Order or an act of Congress. Subject to valid existing rights, these areas are withdrawn from further location of mining claims or sites. Stipulations do not apply to locatable mineral

development. However all operations under a notice or plan of operations would have to follow the performance standards in 43 CFR 3809.420. To restrict locatable mineral development, the BLM must recommend withdrawal actions to the Secretary of the Interior, with subsequent review of existing claims.

As discussed in **Section 3.2.3**, uranium, vanadium, gypsum, and placer gold are the primary mineral resources found in the Uncompahgre RMP Planning Area. A portion of the Planning Area lies within the Uravan Mineral Belt, one of several known uranium mining districts within the Colorado Plateau Uranium Province (see **Figure 3-8** [Geology of the Uncompahgre RMP Planning Area]). For this analysis, the Uravan Mineral Belt within the Uncompahgre RMP Planning Area (totaling approximately 192,580 acres) was determined as the area of potential for assessing impacts on uranium/vanadium resources from the proposed management actions in **Chapter 2**.

There is high potential for the occurrence of gypsum deposits within the Paradox Valley portion of the Planning Area (BLM 2011b). As a result, this area (totaling approximately 2,180 acres) was the focus of the analysis for assessing impacts on gypsum resources from the proposed management actions in **Chapter 2**.

Placer gold is mined along the San Miguel and Dolores Rivers in western Montrose County. Gold mining is mainly recreational which does not necessarily require a placer mining claim. Finding placer gold in these areas in the past ensures a high degree of certainty that placer gold resources are in the San Miguel River system into the Dolores River, giving the area a high potential rating (BLM 2011b). As a result, this area (totaling approximately 6,380 acres) was the focus of the analysis for assessing impacts on placer gold resources from the proposed management actions in **Chapter 2**.

Any increase in lands withdrawn from mineral entry would reduce the acreage available for locatable mineral development, thereby impacting the locatable minerals program. Impacts on locatable minerals would be greater in areas identified with potential.

Mineral Materials

Most of the past and current demand for mineral materials in the Decision Area has been for sand, gravel, and riprap. The potential for development is judged to be moderate to high on BLM-administered lands, with widespread deposits found along the San Miguel, Dolores, Uncompahgre, and Gunnison Rivers and their major tributary valleys and other areas. Increased oil and gas development in areas such as the North Fork and the West End could lead to an increase on demand for mineral materials.

The predominant mining method for mineral materials is surface mining; therefore, any restrictions on surface-disturbing activities effectively close the subject areas to mineral material disposal.

Effects Common to All Alternatives

Implementing management for the following resources would have negligible or no impact on energy and minerals and are therefore not discussed in detail: climate, wild horses, forestry, livestock grazing, comprehensive travel and transportation management, lands and realty, renewable energy, watchable wildlife viewing sites, Native American tribal uses, and public health and safety.

Fluid Leasable Minerals—Oil, Gas, and Geothermal Resources

Prescriptions and restrictions developed under each alternative for surface resource management and protection would impact the rate of exploration, development, and extraction of leasable mineral resources. These prescriptions and restrictions would also increase the cost to both the producer and user of the end products.

Through continued regional air quality monitoring efforts, oil and gas developers may be required to implement design feature to address adverse impacts on air quality.

Lease stipulations and lease notices would be applied to all new leases and to expired leases that are reissued. On existing leases, the BLM would seek voluntary compliance or would develop Conditions of Approval for Applications for Permit to Drill to achieve resource objectives of lease stipulations contained in this RMP.

The amount of area that would fall under restrictions outlined in **Chapter 2** and the impact of those restrictions on mineral development are presented in **Table 4-15** (Quantitative Impacts on Fluid Mineral Resources) and are discussed below in the analysis of each alternative.

Table 4-15
Quantitative Impacts on Fluid Mineral Resources

Leasable Minerals (Fluid)	Alternative A	Alternative B	Alternative B.1	Alternative C	Alternative D	Alternative E
Closed to fluid mineral leasing and geophysical exploration	44,220	219,580	306,670	44,220	50,060	44,220
BLM surface/ federal minerals	*44,220*	*181,220*	*221,570*	*44,220*	*48,510*	*44,220*
Private or state surface/ federal minerals	*--*	*38,360*	*85,100*	*--*	*1,550*	*--*
Open to fluid mineral leasing and geophysical exploration	871,810	696,450	609,360	871,810	865,970	871,810
BLM surface/ federal minerals	*631,580*	*494,580*	*454,230*	*631,580*	*627,290*	*631,580*
Private or state surface/ federal minerals	*240,230*	*201,870*	*155,130*	*240,230*	*238,680*	*240,230*
Open to fluid mineral leasing and geophysical exploration subject to standard terms and conditions (i.e., not subject to NSO or CSU stipulations)	726,340	5,510	5,510	392,390	294,500	373,760
BLM surface/ federal minerals[1]	*496,510*	*50*	*60*	*251,090*	*174,590*	*258,900*
Private or state surface/ federal minerals	*229,830*	*5,460*	*5,450*	*141,300*	*119,910*	*114,860*
Open to leasing with NSO stipulation	25,610	452,930	404,690	22,300	238,140	103,460
BLM surface/ federal minerals	*24,890*	*354,970*	*318,630*	*14,680*	*187,560*	*74,580*
Private or state surface/ federal minerals	*720*	*97,960*	*86,060*	*7,620*	*50,580*	*28,880*
Open to leasing with CSU stipulation	119,860	238,010	199,170	457,120	333,330	394,590
BLM surface/ federal minerals	*110,180*	*139,560*	*135,550*	*365,810*	*265,140*	*298,100*
Private or State surface/ federal minerals	*9,680*	*98,450*	*63,620*	*91,310*	*68,190*	*96,490*

Leasable Minerals (Fluid)	Alternative A	Alternative B	Alternative B.1	Alternative C	Alternative D	Alternative E
Open to leasing with TL stipulation	501,100	696,450	609,360	582,390	865,970	635,430
BLM surface/ federal minerals	*423,900*	*494,580*	*454,230*	*475,220*	*627,290*	*494,340*
Private or state surface/ federal minerals	*77,200*	*201,870*	*155,130*	*107,170*	*238,680*	*141,090*

Source: BLM 2012a, 2018a, 2019
Note: The total acreage for stipulations (NSO, CSU, and TL) is greater than the total Decision Area acreage for the federal mineral estate because TL stipulations may overlap with either NSO or CSU stipulations. Acreages reported in this table for NSO and CSU do not overlap.

Within the Decision Area, the total federal fluid mineral estate is approximately 916,030 acres (675,800 BLM-administered lands with federal minerals and 240,230 acres private or state surface with federal minerals). The Tabeguache Area and the WSAs would be closed to mineral leasing under all alternatives (44,220 acres). Congress closed the Tabeguache Area, in accordance with PL 103-77, and WSAs are closed to leasing, in accordance with BLM Manual H-8550-1 (BLM 1995a).

As outlined in **Table 4-15**, all alternatives have NSO, CSU, and TL stipulations on a portion of lands available for mineral leasing, which preclude or constrain surface occupancy and use. Development of mineral resources in these areas could require off-site methods, such as directional drilling.

Solid Leasable Minerals—Coal

Under all alternatives, the Tabeguache Area, the Curecanti National Recreation Area, and Congressionally designated national trails would remain closed to coal leasing, in accordance with congressional mandates. Additionally, the Adobe Badlands ACEC and WSAs would remain unacceptable for further coal exploration and leasing consideration.

Stipulations proposed under the RMP alternatives would not apply on existing leases; new stipulations could be applied once the lease is readjusted or to new leases.

Under all alternatives, ACEC designations could impact coal leasing and development. In accordance with the Federal Coal Leasing Amendment Act of 1976, 960 acres of contiguous lands can be added to an existing coal lease noncompetitively. However, if the BLM designates an area as an ACEC that has an existing lease, this privilege would be eliminated. Under all alternatives, no active lease areas are within proposed closed areas identified for the Grand Mesa, Nucla-Naturita, and Tongue Mesa coal fields.

Impacts on coal leasing and development are described in **Table 4-16** (Quantitative Impacts on Coal Leasing). The quantitative analysis is broken down by the four coal fields within the Uncompahgre RMP Decision Area, plus coal resource areas. As described under ***Nature and Type of Effects***, ***Solid Leasable Minerals—Coal***, the two coal resource areas (Piceance Deep and Uncompahgre Plateau) and other unnamed areas are not discussed in this analysis because the coal resource potential, if any, is expected to be low, and industry interest has been nonexistent. As stated under ***Nature and Type of Effects, Solid Leasable Minerals—Coal***, the coal production estimate is expected to remain constant across all alternatives and would not be impacted by the planning decisions.

Table 4-16
Quantitative Impacts on Coal Leasing

	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Coal Fields					
Grand Mesa					
Area of potential	25,580	27,740	27,740	27,740	27,740
Area closed	0	3,460	1,270	660	660
Nucla-Naturita					
Area of potential	2,080	148,440	148,440	148,440	148,440
Area closed	490	49,820	5,430	8,810	7,800
Screen 2—Specific to surface-mining and surface mining operations					
Area of potential for surface mining only	1,090	21,950	21,950	21,950	21,950
Area closed, per Screen 2	490	2,500	2,500	2,500	2,500
Area with SSR restrictions	n/d	21,950	3,680	13,790	3,180
Area with TL stipulation	990	21,950	19,740	21,950	21,940
Somerset					
Area of potential	44,920	46,220	46,220	46,220	46,220
Area closed	0	5,610	2,660	1,110	2,280
Tongue Mesa					
Area of potential	15,920	16,570	16,570	16,570	16,570
Area closed	580	1,390	850	700	700
Coal Resource Areas[1]					
Piceance Deep					
Area of potential	57,350	57,360	57,360	57,360	57,360
Area closed	0	1,480	610	140	140
Uncompahgre Plateau					
Area of potential	No data	117,260	117,260	117,260	117,260
Area closed	0	39,080	5,240	38,460	38,460
Unnamed Areas					
Area of potential	No data	7,910	7,910	7,910	7,910
Area closed	0	210	210	210	210

Source: BLM 2012a, 2018a, 2019

[1]The coal resource areas of Piceance Deep and Uncompahgre Plateau, and other unnamed areas where the coal resource is present, contribute to the coal development potential area, but they are not further discussed in this analysis because they have low coal potential and no interest from industry.

Solid Leasable Minerals—Nonenergy Leasables, Potassium

Under all alternatives, restricting activities that require surface occupancy would result in impacts on exploration and development. The intensity of impacts varies by alternative; the greater the acreage administratively unavailable, the greater the impact on this resource.

Locatable Minerals

Under all alternatives, approximately 28,060 acres (3 percent) of the total federal mineral estate for locatable minerals would remain withdrawn to the location of mining claims, precluding new exploration and mining. **Table 4-17** (Quantitative Impacts on Locatable Minerals) illustrates the change in acres open to locatable mineral entry and recommended for withdrawal from locatable mineral entry across the alternatives.

Table 4-17
Quantitative Impacts on Locatable Minerals

Locatable Minerals	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Total federal mineral estate for locatable minerals	896,190	896,190	896,190	896,190	896,190
BLM surface/ federal minerals	675,800	675,800	675,800	675,800	675,800
Private, state, or Bureau of Reclamation project lands surface/federal minerals	220,390	220,390	220,390	220,390	220,390
Total acreage withdrawn from locatable mineral entry[1]	28,060	28,060	28,060	28,060	28,060
Total acreage recommended for withdrawal from locatable mineral entry	27,690	382,900	11,250	55,880	15,790
BLM surface/ federal minerals	27,690	378,530	9,550	54,090	15,790
Private, state, or Bureau of Reclamation project lands surface/federal minerals	0	4,370	1,700	1,790	0
Increase from Alternative A	N/A	14x	59%	2x	57%
Total acreage of open active mining claims within areas recommended for withdrawal from locatable mineral entry	140	37,090	460	2,180	740
BLM surface/ federal minerals	140	37,010	460	2,180	740
Private, state, or Bureau of Reclamation project lands surface/federal minerals	0	80	0	0	0
Total acreage open to locatable mineral exploration or development	840,440	495,870	856,880	812,250	853,360
BLM surface/ federal minerals	620,050	280,390	638,190	593,650	633,070
Private, state, or Bureau of Reclamation project lands surface/federal minerals	220,390	216,020	218,690	218,600	220,300

Source: BLM 2012a, 2018a, 2019

[1] All lands withdrawn from locatable mineral entry are on BLM surface with federal minerals.

The management actions being considered in this RMP could affect both existing and future mining claims. Exploration and development on mining claims would require that a notice be submitted to the BLM with a cumulative surface disturbance of 5 or fewer acres and a plan of operations for exploration and development greater than 5 acres, as outlined in 43 CFR 3809.

Likely the most impacting effect on existing claims from management actions proposed under the alternatives would be the requirement of a plan of operation (including NEPA analysis) for any surface-disturbing activities in special status areas, such as ACECs, regardless of the acreage involved, in accordance with 43 CFR 3809. The requirement for plan of operations within an ACEC could result in longer delays, would increase permitting costs, and would affect market timing, profit, and return on

investment scenarios for projects than would be expected if the operation were permitted under a mining notice. This would be true even when the surface disturbance proposed is on fewer than 5 acres.

In addition are the costs associated with compliance with mitigation measures required to minimize impacts on the resource or value being protected. Unless withdrawn from mineral entry by a Secretarial Public Land Order or by an act of Congress, future claims could continue to be in areas newly designated as special status areas. However, as with existing claims, exploration and development on future claims could result in longer delays and increased costs and could require extensive costly modifications to minimize impacts on a resource or value being protected in a particular area. All operations under a notice or plan of operations would have to follow the performance standards in 43 CFR 3809.420.

Mineral Materials

Under all alternatives, restrictions on mineral materials could result in impacts on exploration and development since those activities require surface occupancy. The intensity of impacts varies by alternative; the greater the restriction and acreage administratively unavailable, the greater the impact on this resource.

Alternative A

Fluid Leasable Minerals—Oil, Gas, and Geothermal Resources

This alternative would be the least restrictive to oil, gas, and geothermal exploration and development because a larger percentage of the Planning Area would be open to leasing without major restrictions. As noted in **Table 4-15**, under Alternative A, 871,810 acres would remain open to leasing, 726,340 acres of which are not subject to NSO or CSU stipulations, providing the most flexibility for oil, gas, and geothermal exploration and development. The minimal restrictions on fluid mineral development would result in a reasonably foreseeable development scenario similar to that projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**.

Conventional Oil and Gas

Leasing decisions for conventional oil and gas are presented in **Table 4-18** (Acres of Conventional Oil and Gas Leasing Decisions by Potential, Alternative A).

Under this alternative, 23,140 acres of federal mineral estate with higher development potential and 21,080 acres with lower development potential would be closed to leasing. Of the 871,810 acres of federal mineral estate currently open to leasing for conventional oil and gas, 459,650 acres (53 percent) are categorized as having higher development potential and 412,150 acres (47 percent) are categorized as having lower development potential and would remain open under Alternative A. In the higher development potential areas, approximately 25,390 acres would be constrained by an NSO stipulation, 126,650 acres would be constrained by a CSU stipulation, and 282,650 acres would be constrained by a TL stipulation. In the lower development potential areas, approximately 220 acres would be constrained by an NSO stipulation, 4,650 acres would be constrained by a CSU stipulation, and 218,450 acres would be constrained by a TL stipulation. Stipulations in lower potential areas usually have less of an impact than those in higher potential areas because lower potential areas generally receive less interest in development than higher potential areas. However, the BLM has received lease nominations or expressions of interest in both higher and lower development potential areas so the impacts for either area are the same and are described under ***Nature and Type of Effects***. The remaining 319,050 acres of the federal mineral estate in high development potential areas and 407,270 acres in low development

Table 4-18
Acres of Conventional Oil and Gas Leasing Decisions by Potential, Alternative A

Conventional Oil and Gas	Higher Development Potential	Lower Development Potential
Federal Mineral Estate Potential	482,790	433,230
Closed to Leasing	23,140	21,080
Open to Leasing	459,650	412,150
Open with No Stipulations[1]	*319,050*	*407,270*
Open with NSO Stipulations[2]	*25,390*	*220*
Open with CSU Stipulations[2]	*126,650*	*4,650*
Open with TL Stipulations[2]	*282,650*	*218,450*

Source: BLM 2012a
[1] TLs overlap some of this area but were not included in this calculation due to the temporal nature of the TL stipulation.
[2] Total acreage for stipulations is greater than the total acreage within the Planning Area because stipulations could overlap.

potential areas would be available for fluid mineral leasing and development subject to standard lease terms and conditions; these lands would not be subject to additional NSO or CSU stipulations, providing the most flexibility for conventional oil and gas exploration and development.

Coalbed Methane

Leasing decisions for coalbed natural gas are presented in **Table 4-19** (Acres of Coalbed Natural Gas Leasing Decisions by Potential, Alternative A).

Table 4-19
Acres of Coalbed Natural Gas Leasing Decisions by Potential, Alternative A

Coalbed Natural Gas	Development Potential	No Potential
Federal Mineral Estate Potential	466,700	449,330
Closed to leasing	10,510	33,730
Open to Leasing	456,190	415,600
Open with No Stipulations[1]	*437,750*	*288,570*
Open with NSO Stipulations[2]	*5,460*	*20,140*
Open with CSU Stipulations[2]	*15,010*	*116,300*
Open with TL Stipulations[2]	*232,570*	*268,560*

Source: BLM 2012a
[1] TLs overlap some of this area but were not included in this calculation due to the temporal nature of the TL stipulation.
[2] Total acreage for stipulations is greater than the total acreage within the Planning Area because stipulations could overlap.

Approximately 10,510 acres of federal mineral estate with development potential and 33,730 acres with no development potential would be closed to leasing. Of the 870,810 acres of federal mineral estate currently open to leasing for coalbed natural gas, 456,190 acres (52 percent) are identified as having development potential and 415,600 acres (48 percent) are identified as having no potential and would remain open under Alternative A. In the development potential area for coalbed natural gas, approximately 5,460 acres would be constrained by an NSO stipulation, 15,010 acres would be constrained by a CSU stipulation, and 232,570 acres would be constrained by a TL stipulation. The impact from applying stipulations on lands open to fluid mineral leasing for coalbed natural gas are the same as those described under ***Nature and Type of Effects***. About 437,750 acres with development potential for coalbed natural gas would be available for leasing and development subject to standard

lease terms and conditions; these lands would not be subject to additional stipulations and would therefore provide the most flexibility for coalbed natural gas exploration and development.

Geothermal Resources

Leasing decisions for geothermal resources are presented in **Table 4-20** (Acres of Geothermal Leasing Decisions by Potential, Alternative A).

Table 4-20
Acres of Geothermal Leasing Decisions by Potential, Alternative A

Geothermal	Acres of Geothermal Potential Area
Federal Mineral Estate Potential	832,980
Closed to Leasing	29,900
Open to Leasing	803,080
Open with No Stipulations[1]	*598,120*
Open with NSO Stipulations[2]	*31,180*
Open with CSU Stipulations[2]	*109,460*
Open with TL Stipulations[2]	*479,060*

Source: BLM 2012a

[1] TLs overlap some of this area but were not included in this calculation due to the temporal nature of the TL stipulation.

[2] Total acreage for stipulations is greater than the total acreage within the Planning Area because stipulations could overlap.

Approximately 832,980 acres of federal mineral estate within the Planning Area has been estimated to have the potential for the development of geothermal resources. Approximately 29,900 acres of this area is closed to leasing under Alternative A. Of the 803,080 acres of federal mineral estate with geothermal potential currently open to geothermal leasing, approximately 31,180 acres are constrained by an NSO stipulation, 109,460 acres are constrained by a CSU stipulation, and 479,060 acres are constrained by a TL stipulation. The remaining 598,120 acres of the federal mineral estate are available for geothermal mineral leasing and development subject to standard lease terms and conditions; these lands are not subject to additional NSO or CSU stipulations and provide the most flexibility for geothermal development.

Other Constraints

Apart from leasing stipulations, VRM classifications could impose the largest constraint on oil and gas exploration and development because of restriction inherent to the VRM Classes (described below). VRM classifications under this alternative would be the least restrictive to mineral development in the Planning Area because the least amount of land (10 percent of the federal mineral estate) would be categorized as VRM Class I or II.

Under Alternative A, approximately 44,220 acres (7 percent) of BLM-surface acres in the Planning Area would be managed as VRM Class I comprised of the Tabeguache Area, WSAs, and two ACECs (Adobe Badlands and Needle Rock). The objective of VRM Class I is to preserve the existing character of the landscape, in effect precluding mineral exploration and development unless appropriate mitigation can be incorporated and adhered to. In this instance, the two ACEC also have an NSO stipulation so regardless of the required mitigation efforts to meet VRM Class I objectives, surface-occupancy would not be permitted due to other restrictions.

Approximately 21,930 acres (3 percent) of BLM-administered surface acres in the Planning Area would be managed as VRM Class II. Because surface-disturbing activities in VRM Class II areas can be visible but

must not attract the attention of the casual observer, meeting this objective could require relocating certain projects, combining them in areas out of view, or otherwise mitigating them. Relocation would then require the use of directional drilling to reach the original target. If the relocation were to an area where the resources are beyond the technical and economic reach of directional drilling, some mineral resources could become unrecoverable.

About 280,520 acres (42 percent) of BLM-administered surface acres in the Planning Area would be managed as VRM Class III. Under this classification, the level of change in the landscape can be moderate. Projects can be visible but still should not dominate the viewshed. Less impacting measures, such as facility design, arrangement, and coloration, could be sufficient to meet the VRM Class III objectives. Extensive redesign could render some oil and gas wells uneconomic, and some project relocation could still be required. Relocation impacts are the same as those described in the preceding paragraph.

About 9,260 acres (1 percent) of BLM-administered surface acres in the Planning Area would be managed as VRM Class IV. Under this classification, the level of change and visibility can be high, but measures should still be taken to reduce the visibility. Centralized facilities, facility arrangements, and coloration should meet the VRM Class IV objectives. Project relocation warranting direction drilling would typically not be needed.

The remaining 319,870 acres (47 percent) of BLM-administered surface acres in the Planning Area would be unmanaged. No VRM classes have been established on these lands, in accordance with BLM guidance (BLM 1986a); nevertheless, in undesignated areas the VRI class would be used as interim guidance for visual resource objectives until VRM classes are established through an RMP amendment or revision. So while undesignated areas would seemingly provide the most flexibility to mineral development, project modification and compliance with mitigation measures could still be required.

Solid Leasable Minerals—Coal

Under Alternative A the coal resource development potential area is 145,850 acres (Screen 1). Within the newly defined coal potential area, this alternative would be the least restrictive to coal development. The existing RMPs did not identify any unacceptable areas and, therefore, only those areas meeting the unsuitability criteria or closed due to congressional mandate would be unavailable for coal leasing. Within the previously considered coal potential area, 0.75 percent of the area would be unavailable for coal leasing. With existing restrictions applied to the current coal potential area (including current unsuitability), 1.0 percent of the area would be unavailable for leasing.

As discussed under ***Effects Common to All Alternatives***, Congressionally designated areas would remain closed to coal leasing. Under this alternative, these areas account for 580 acres within the coal resource development potential area, along the Old Spanish National Trail (Tongue Mesa coal field). Approximately 1,090 acres of the Nucla-Naturita coal field passed Screen 1 and were then evaluated against Screen 2. The application of Screen 2 eliminated 110 acres, defining these lands as unsuitable for surface mining and surface mining operations. An additional 990 acres within the Nucla-Naturita coal field would continue to have a TL stipulation that precludes surface-disturbing activities (e.g., surface mining) and intensive human activity during an identified time frame (usually based on seasons or a species' breeding times). Screen 2 (which applies *only* to surface mining and surface mining operations) was not applied to the remaining three coal fields in the Planning Area that have deep coal deposits and no clearly defined areas where surface operations would occur. No additional acreage would be closed, in accordance with Screen 3; private surface owners (Screen 4) were not consulted for this land use planning process. Refer to **Appendix L** for a complete description of the coal screening process for the Uncompahgre RMP Planning Area.

Outside of the 580 acres closed to coal leasing due to congressional mandate, the remaining lands within the coal resource development potential area would continue to be acceptable for further consideration of leasing and development under this alternative; thus, there would be no additional impacts on current and potential near-future coal mining besides those discussed under ***Effects Common to All Alternatives***.

Solid Leasable Minerals—Nonenergy Leasables, Potassium

Approximately 44,220 acres (5 percent) of the federal mineral estate would remain closed to the leasing of nonenergy solid minerals. This acreage is comprised of the Tabeguache Area and WSAs, precluding future mining in these areas. The types of impacts from these closures are the same as those discussed under the ***Nature and Type of Effects***.

Locatable Minerals

Under Alternative A, 28,060 acres (3 percent) of mineral estate underlying BLM-administered lands would remain withdrawn from location under the Mining Law of 1872, and an additional 27,690 acres (3 percent) would continue to be recommended for withdrawal. About 140 acres of open active mining claims are within the area recommended for withdrawal. If the Secretary issues a Public Land Order to formally withdraw these lands, subject to valid existing rights, the location of new mining claims under the Mining Law of 1872 would be forbidden. Exploration and mining would be allowed on prior existing, valid mining claims. Impacts on existing and future mining claims are similar to those described under ***Effects Common to All Alternatives***.

With the exception of 20 acres, the areas with high gold potential along the San Miguel and Dolores Rivers would remain open to future claim staking. As a result, the impact on placer gold mining is expected to be negligible.

No acres within the gypsum potential area would be recommended for withdrawal under Alternative A, so no impact on gypsum mining in anticipated.

Approximately 12,350 acres of the uranium/vanadium potential area would be recommended for withdrawal under Alternative A. If the Secretary of the Interior were to issue a Public Land Order, subject to valid existing rights, to formally withdraw these lands from location under the Mining Law of 1872, the uranium/vanadium potential area could be reduced by 6 percent, pending resolution of the required mining claim validity exams.

Mineral Materials

Approximately 104,690 acres (12 percent) of the federal mineral estate would remain closed to the disposition of mineral material, precluding future mining in these areas. The types of impacts from these closures are the same as those discussed under the ***Nature and Type of Effects***.

Alternative B

Fluid Leasable Minerals—Oil, Gas, and Geothermal Resources

This section describes the impacts on fluid leasable minerals in the Decision Area under Alternative B. A separate analysis for impacts on fluid leasable minerals under Alternative B.1 is described later in this section.

Alternative B would be more restrictive than Alternatives A, C, and D to oil and gas exploration and development activities because a larger percentage of the Planning Area would be unavailable for leasing, and areas open to leasing would have major restrictions. As noted in **Table 4-15**, under Alternative B, approximately 219,580 acres of BLM-administered and split-estate would be unavailable for fluid mineral

leasing, exploration, development, or production, 5 times the acreage under Alternative A. About 696,450 acres would be open to leasing, 20 percent less than under Alternative A. Restrictions on fluid mineral development would result in fewer new and exploratory development wells drilled and associated surface-disturbance than Alternative A.

Conventional Oil and Gas

Leasing decisions for oil and gas are presented in **Table 4-21** (Acres of Conventional Oil and Gas Leasing Decisions by Potential, Alternative B).

Table 4-21
Acres of Conventional Oil and Gas Leasing Decisions by Potential, Alternative B

Conventional Oil and Gas	Higher Development Potential	Lower Development Potential
Federal mineral estate potential	482,790	433,230
Closed to Leasing	106,890	79,810
Open to Leasing	375,900	353,420
Open with No Stipulations[1]	*480*	*5,150*
Open with NSO Stipulations[2]	*235,220*	*274,010*
Open with CSU Stipulations[2]	*372,860*	*345,860*
Open with TL Stipulations[2]	*375,720*	*353,600*

Source: BLM 2012a

[1] TLs overlap some of this area but were not included in this calculation due to the temporal nature of the TL stipulation.

[2] Total acreage for stipulations is greater than the total acreage within the Planning Area because stipulations could overlap.

Under this alternative, 106,890 acres of federal mineral estate with higher development potential and 79,810 acres with lower development potential would be closed to leasing. Of the 696,450 acres of federal mineral estate that would be open to leasing for conventional oil and gas, 375,900 acres (52 percent) are categorized as having higher development potential and 353,420 acres (48 percent) are categorized as having lower development potential. In the higher development potential areas, approximately 235,220 acres would be constrained by an NSO stipulation, 372,860 acres would be constrained by a CSU stipulation, and 375,720 acres would be constrained by a TL stipulation. In the lower development potential areas, approximately 274,010 acres would be constrained by an NSO stipulation, 345,860 acres would be constrained by a CSU stipulation, and 353,600 acres would be constrained by a TL stipulation. Stipulations in lower potential areas usually have less of an impact than those in higher potential areas because lower potential areas generally receive less interest in development than higher potential areas. However, the BLM has received lease nominations or expressions of interest in both higher and lower development potential areas so the impacts for either area are the same and are described under ***Nature and Type of Effects***. The remaining 480 acres of the federal mineral estate in high development potential areas and 5,150 acres in low development potential areas would be available for fluid mineral leasing and development subject to standard lease terms and conditions; these lands would not be subject to additional NSO or CSU stipulations, providing the most flexibility for conventional oil and gas exploration and development.

Coalbed Methane

Leasing decisions for coalbed natural gas are presented in **Table 4-22** (Acres of Coalbed Natural Gas Leasing Decisions by Potential, Alternative B).

Table 4-22
Acres of Coalbed Natural Gas Leasing Decisions by Potential, Alternative B

Coalbed Natural Gas	Development Potential	No Potential
Federal Mineral Estate Potential	466,700	449,330
Closed to Leasing	47,240	139,430
Open to Leasing	419,460	309,900
Open with No Stipulations[1]	*4,430*	*0*
Open with NSO Stipulations[2]	*273,190*	*206,350*
Open with CSU Stipulations[2]	*412,490*	*306,200*
Open with TL Stipulations[2]	*419,380*	*309,910*

Source: BLM 2012a
[1] TLs overlap some of this area but were not included in this calculation due to the temporal nature of the TL stipulation.
[2] Total acreage for stipulations is greater than the total acreage within the Planning Area because stipulations could overlap.

Approximately 47,240 acres of federal mineral estate with development potential and 139,430 acres with no development potential would be closed to leasing. Of the 726,360 acres of federal mineral estate that would be open to leasing for coalbed natural gas, 419,460 acres (58 percent) are identified as having development potential and 309,900 acres (42 percent) are identified as having no potential. In the development potential area for coalbed natural gas, approximately 273,190 acres would be constrained by an NSO stipulation, 412,490 acres would be constrained by a CSU stipulation, and 419,380 acres would be constrained by a TL stipulation. The impact from applying stipulations on lands open to fluid mineral leasing for coalbed natural gas are the same as those described under ***Nature and Type of Effects***. The remaining 4,430 acres of the federal mineral estate with development potential would be available for fluid mineral leasing and development subject to standard lease terms and conditions; these lands would not be subject to additional NSO or CSU stipulations, providing the most flexibility for conventional oil and gas exploration and development.

Geothermal Resources

Leasing decisions for geothermal resources are presented in **Table 4-23** (Acres of Geothermal Leasing Decisions by Potential, Alternative B/B.1).

Table 4-23
Acres of Geothermal Leasing Decisions by Potential, Alternative B/B.1

Geothermal	Acres of Geothermal Potential Area
Federal Mineral Estate Potential	832,980
Closed to Leasing	164,040
Open to Leasing	668,940
Open with No Stipulations[1]	*5,640*
Open with NSO Stipulations[2]	*442,000*
Open with CSU Stipulations[2]	*658,340*
Open with TL Stipulations[2]	*668,940*

Source: BLM 2012a
[1] TLs overlap some of this area but were not included in this calculation due to the temporal nature of the TL stipulation.
[2] Total acreage for stipulations is greater than the total acreage within the Planning Area because stipulations could overlap.

Approximately 164,040 acres of federal mineral estate with geothermal potential in the Planning Area would be closed to leasing under Alternative B, which is more than 5 times the area closed under Alternative A. Of the 668,940 acres that would be open to geothermal leasing, approximately 442,000 acres would be constrained by an NSO stipulation (more than 14 times the acreage under Alternative A), 658,340 acres would be constrained by a CSU stipulation, and 668,940 acres would be constrained by a TL stipulation. The remaining 5,640 acres of the federal mineral estate are available for geothermal mineral leasing and development subject to standard lease terms and conditions; these lands are not subject to additional NSO or CSU stipulations and provide the most flexibility for geothermal development. These acres subject to standard lease terms and conditions are less than 1 percent of the acreage under Alternative A. Overall, Alternative B would place greater restrictions on the development of geothermal resources across the Planning Area by limiting where projects can be sited and by imposing restrictions that could render implementation infeasible.

Other Constraints

VRM classifications under this alternative would be the most restrictive to mineral development in the Planning Area because approximately 8 percent of BLM-administered surface acres would be categorized as VRM Class I (53,870 acres) and would either be closed to leasing due to other resource concerns or have an NSO stipulation under this alternative. Approximately 66 percent of BLM-administered surface acres would be categorized as VRM Class III (427,580 acres) and VRM Class IV (18,340 acres), both of which would have a CSU stipulation. As discussed under Alternative A, VRM Class II management requires a high degree of screening to ensure that man-made intrusions do not attract the attention of the casual observer. Where this degree of screening cannot be achieved, the intrusion would not be allowed. The expansion of VRM Class I and Class II areas would result in an increase of 2.4 times the acreage compared with Alternative A that would largely be unavailable for mineral development. The CSU stipulation that would be applied to all VRM Class III and IV areas would prohibit or restrict surface-disturbing activities, but development could still occur if the impact on the resource or value being protect were mitigated.

Solid Leasable Minerals— Coal

Under Alternative B, the coal development potential area is 421,500 acres, 57 percent of which is within the four analyzed coal fields (discussed under the ***Nature and Type of Effects***). Within the coal potential area, this alternative would be the most restrictive, with 24 percent of the coal potential area unavailable for leasing.

As discussed under ***Effects Common to All Alternatives***, Congressionally designated areas would remain closed to coal leasing. Under this alternative, these areas account for 1,910 acres of federal mineral estate within the expanded coal resource development potential area. Additionally, under this alternative, 3,770 acres of WSAs would be within the coal resource development potential area and would therefore be unacceptable for further consideration of leasing and development.

Impacts on underground coal mining from applying Screen 3 were evaluated by analyzing impacts on the Grand Mesa, Somerset, and Tongue Mesa coal fields. Under this alternative, 12 percent of the Grand Mesa coal field, 12 percent of the Somerset coal field (including 3,390 acres of active lease areas), and 8 percent of the Tongue Mesa coal field would be unacceptable for further consideration of leasing and development. The types of impacts from these closures are the same as those discussed under the ***Nature and Type of Effects***.

Approximately 21,960 acres in the Nucla-Naturita coal field were found to be suitable for surface mining and surface mining operations under Alternative B, following the application of Screen 1, more than 10 times the acreage found suitable under Alternative A. Screen 2 was then applied to the acres found suitable, which eliminated 2,500 acres and defined those lands as unsuitable for surface mining and

surface mining operations. On the remaining 19,500 acres found suitable, an SSR restriction would cover 19,490 acres (99 percent) and a TL restriction would cover 19,490 acres (99 percent; note: SSR and TL restrictions could overlap). Placing these types of restrictions in areas suitable for surface mining and surface mining operations would be tantamount to managing these areas as unsuitable since SSR and TL restrictions would preclude surface mining operations.

Solid Leasable Minerals—Nonenergy Leasables, Potassium

Approximately 396,520 acres (43 percent) of the federal mineral estate would be closed to the leasing of nonenergy solid minerals (9 times the acreage under Alternative A), precluding future mining in these areas. Under Alternative B, an additional 488,300 acres (98 percent) of areas open to the leasing of nonenergy solid minerals would have an SSR restriction. As a result, special constraints could be applied to the mining activity to mitigate impacts. If impacts cannot be mitigated, the activity could be prohibited. Approximately 289,400 acres (100 percent) of areas open to the leasing of nonenergy solid minerals would have a TL restriction, which would close the area during specified timeframes. SSR and TL restrictions could overlap. The types of impacts from these closures are the same as those discussed under the ***Nature and Type of Effects***.

Locatable Minerals

Under Alternative B, 387,270 acres (including 4,370 acres of split-estate) would be recommended for withdrawal from location under the Mining Law of 1872. Combined with the 28,060 acres previously withdrawn (under Alternative A), locatable minerals would not be available on 415,330 acres, or 47 percent of the federal mineral estate (7 times the acreage under Alternative A and the most restrictive for locatable minerals). Approximately 37,090 acres of open and active mining claims are within the area recommended for withdrawal. The types of impacts are the same as those described under ***Nature and Type of Effects*** and ***Effects Common to All Alternatives***.

About 5,580 acres (88 percent) of the high gold potential area along the San Miguel and Dolores Rivers would be recommended for withdrawal from location under the Mining Law of 1872 under this alternative, compared with 20 acres under Alternative A. This alternative would be the most restrictive for placer gold mining. The types of impacts are the same as those described under ***Nature and Type of Effects***.

Approximately 1,930 acres (89 percent) of the gypsum potential area would be recommended for withdrawal from location under the Mining Law of 1872, compared with 0 acres under Alternative A. This alternative would be the most restrictive for gypsum mining. The types of impacts are the same as those described under ***Nature and Type of Effects***.

Approximately 79,740 acres (41 percent) of the uranium/vanadium potential area would be recommended for withdrawal from location under the Mining Law of 1872, 6.5 times more than Alternative A. This alternative would be the most restrictive for uranium/vanadium mining. The types of impacts are the same as those described under ***Nature and Type of Effects***.

Mineral Materials

Approximately 568,270 acres (62 percent) of the federal mineral estate would be closed to the disposition of mineral material (5 times the acreage under Alternative A), precluding future mining in these areas. Under Alternative B, an additional 318,540 acres (100 percent) of areas open to mineral material disposal would have an SSR restriction. As a result, special constraints could be applied to the mining activity, or the activity could be shifted to a new location. Approximately 318,540 acres (100 percent) of areas open to mineral material disposal would have a TL restriction, which would close the area during specified time frames. SSR and TL restrictions could overlap. The types of impacts from these closures are the same as those discussed under the ***Nature and Type of Effects***.

Alternative B.1

The impacts on geothermal resources, coal, nonenergy leasable minerals, locatable minerals, and mineral materials are the same as under Alternative B.

This section describes impacts on fluid leasable minerals (oil and gas) under Alternative B.1. The difference in impacts (described in acreages) between Alternative B and Alternative B.1 are specific to the North Fork area.

This alternative would be the most restrictive to oil and gas exploration and development activities because a larger percentage of the Planning Area would be unavailable for leasing, and areas open to leasing would have major restrictions. As noted in **Table 4-15**, under Alternative B.1, approximately 306,670 acres of federal mineral estate would be unavailable for oil and gas leasing, exploration, development, or production, 7 times the acreage under Alternative A. In the North Fork area, 104,750 acres would be closed to leasing, 94,140 acres more than in Alternative B. Approximately 609,360 acres of federal mineral estate would be open to leasing, 31 percent less than under Alternative A. In the North Fork area, 34,790 acres would be open to leasing, 94,140 acres fewer than in Alternative B.

Alternative B.1 would apply NL (of oil and gas) within 0.25-mile of active (and future) and existing (inactive, retired) coal leases. The NL would not apply to operations that capture methane for commercial use. This NL area is included in Chapter 2 as submitted by the proponents of the North Fork Alternative Plan; however, it is not implementable as described. The BLM oil and gas regulations do not provide for leasing gas, regardless of the source or reason, in an area that is closed to leasing. This NL is being analyzed for illustrative purposes. In the North Fork area, 104,750 acres (75 percent of the North Fork area) would be unavailable for leasing, compared to 10,610 acres in Alternative B, and 27,280 acres (20 percent of the North Fork area) would have an NSO stipulation, compared to 79,750 acres in Alternative B.

Conventional Oil and Gas

Leasing decisions for oil and gas are presented in **Table 4-24** (Acres of Conventional Oil and Gas Leasing Decisions by Potential, Alternative B.1).

Table 4-24
Acres of Conventional Oil and Gas Leasing Decisions by Potential, Alternative B.1

Conventional Oil and Gas	Decision Area: Higher Development Potential	Decision Area: Lower Development Potential	North Fork Area: Higher Development Potential	North Fork Area: Lower Development Potential
Federal mineral estate potential	482,790	433,230	51,720	87,820
Closed to Leasing	138,770	145,660	36,010	68,740
Open to Leasing	344,020	287,570	15,710	19,080
Open with No Stipulations[1]	*480*	*5,150*	*0*	*120*
Open with NSO Stipulations[2]	*214,850*	*212,230*	*11,460*	*15,820*
Open with CSU Stipulations[2]	*343,480*	*281,110*	*15,700*	*18,740*
Open with TL Stipulations[2]	*346,340*	*288,840*	*15,710*	*19,080*

Source: BLM 2012a

[1] TLs overlap some of this area but were not included in this calculation due to the temporal nature of the TL stipulation.

[2] Total acreage for stipulations is greater than the total acreage within the Planning Area because stipulations could overlap.

Approximately 138,770 acres (36,010 acres of which are in the North Fork area) of federal mineral estate with higher development potential and 145,660 acres (68,740 acres of which are in the North Fork area) with lower development potential would be closed to leasing. Of the 631,590 acres (34,790 acres of which are in the North Fork area) of federal mineral estate currently open to leasing for conventional oil and gas, 344,020 acres (54 percent) (15,710 acres [45 percent] of which are in the North Fork area) are categorized as having development potential, and 287,570 acres (46 percent) (19,080 acres [55 percent] of which are in the North Fork area) are categorized as having lower potential. In the higher development potential areas for conventional oil and gas, approximately 214,850 acres (11,460 acres of which are in the North Fork area) would be constrained by an NSO stipulation, 343,480 acres (15,700 acres of which are in the North Fork area) would be constrained by a CSU stipulation, and 346,340 acres (15,710 acres of which are in the North Fork area)would be constrained by a TL stipulation. In the lower development potential areas, approximately 212,230 acres (15,820 acres of which are in the North Fork area) would be constrained by an NSO stipulation, 281,110 acres (18,740 acres of which are in the North Fork area) would be constrained by a CSU stipulation, and 288,840 acres (19,080 acres of which are in the North Fork area) would be constrained by a TL stipulation.

Stipulations in lower potential areas usually have less of an impact than those in higher potential areas because lower potential areas generally receive less interest in development than higher potential areas. However, the BLM has received lease nominations or expressions of interest in both higher and lower development potential areas so the impacts for either area are the same and are described under ***Nature and Type of Effects***. The remaining 480 acres (none of which are in the North Fork area) of the federal mineral estate in high development potential areas and 5,150 acres (120 acres of which are in the North Fork area) in low development potential areas would be available for oil and gas leasing and development subject to standard lease terms and conditions; these lands would not be subject to additional NSO or CSU stipulations, providing the most flexibility for conventional oil and gas exploration and development.

Coalbed Methane

Leasing decisions for coalbed natural gas are presented in **Table 4-25** (Acres of Coalbed Natural Gas Leasing Decisions by Potential, Alternative B.1).

Table 4-25
Acres of Coalbed Natural Gas Leasing Decisions by Potential, Alternative B.1

Coalbed Natural Gas	Decision Area: Development Potential	Decision Area: No Potential	North Fork: Development Potential	North Fork: No Potential
Federal Mineral Estate Potential	466,700	449,330	134,090	5,450
Closed to Leasing	137,420	143,390	100,590	4,160
Open to Leasing	329,280	305,940	33,500	1,290
Open with No Stipulations[1]	*4,430*	*1,210*	*120*	*0*
Open with NSO Stipulations[2]	*222,880*	*204,200*	*25,990*	*1,290*
Open with CSU Stipulations[2]	*322,320*	*302,240*	*33,150*	*1,290*
Open with TL Stipulations[2]	*329,200*	*305,950*	*33,500*	*1,290*

Source: BLM 2012a
[1] TLs overlap some of this area but were not included in this calculation due to the temporal nature of the TL stipulation.
[2] Total acreage for stipulations is greater than the total acreage within the Planning Area because stipulations could overlap.

Under this alternative, 137,420 acres (100,590 acres of which are in the North Fork area) of federal mineral estate with higher development potential and 143,390 acres (4,160 acres of which are in the North Fork area) with lower development potential would be closed to leasing. Of the 635,220 acres

(34,790 acres of which are in the North Fork area) of federal mineral estate that would be open to leasing for coalbed natural gas, 329,280 acres (52 percent) (33,500 acres [96 percent] of which are in the North Fork area) are identified as having development potential and 305,940 acres (48 percent) (1,290 acres [4 percent] of which are in the North Fork area) are identified as having no development potential. In the development potential area, approximately 222,880 acres (25,990 acres of which are in the North Fork area) would be constrained by an NSO stipulation, 322,320 acres (33,150 acres of which are in the North Fork area) would be constrained by a CSU stipulation, and 329,200 acres (33,500 acres of which are in the North Fork area) would be constrained by a TL stipulation. The impact from applying stipulations on lands open to oil and gas leasing for coalbed natural gas are the same as those described under ***Nature and Type of Effects***. The remaining 4,430 acres (120 acres of which are in the North Fork area) of the federal mineral estate in the development potential area would be available for oil and gas leasing and development subject to standard lease terms and conditions; these lands would not be subject to additional NSO or CSU stipulations, providing the most flexibility for conventional oil and gas exploration and development.

Geothermal Resources

Analysis of leasing decisions for geothermal resources is the same as Alternative B.

Other Constraints

VRM classifications under this alternative would be the most restrictive to mineral development in the Planning Area because approximately 8 percent of BLM-administered surface acres would be categorized as VRM Class I (53,860 acres) and would either be closed to leasing due to other resource concerns or have an NSO stipulation under this alternative. Approximately 89 percent of BLM-administered surface acres would be categorized as VRM Class II (181,650 acres, 36,280 acres of which are in the North Fork area) and VRM Class III (421,290 acres, 27,030 acres of which are in the North Fork area). VRM Class II in the North Fork area would, depending on the location, be closed to leasing, have an NSO stipulation, or have a CSU stipulation, and VRM Class III would have a CSU stipulation, unless there are more restrictive stipulations in place due to other resource concerns. As discussed under Alternative A, VRM Class II management requires a high degree of screening to ensure that man-made intrusions do not attract the attention of the casual observer. Where this degree of screening cannot be achieved, the intrusion would not be allowed. The expansion of VRM Class I and Class II areas would result in an increase of 4 times the acreage compared with Alternative A that would largely be unavailable for mineral development. The CSU stipulation that would be applied to all VRM Class II and III areas would prohibit or restrict surface-disturbing activities, but development could still occur if the impact on the resource or value being protect were mitigated.

Alternative C

Fluid Leasable Minerals—Oil, Gas, and Geothermal Resources

This alternative would be slightly more restrictive to oil and gas exploration and development activities than Alternative A. Although the amount of land available and unavailable for leasing are the same as under Alternative A (871,810 acres and 44,220 acres, respectively), fewer acres would be open to leasing subject to standard terms and conditions (i.e., not subject to additional NSO and CSU stipulations; 392,390 acres, compared with 726,340 acres under Alternative A). Areas open to leasing that are devoid of NSO and CSU stipulations provide the most flexibility for oil and gas exploration and development, so reducing this acreage by 46 percent would result in an impact on oil and gas exploration and development. However, it is worthwhile to note that CSU stipulations account for most stipulations applied on areas open to leasing under this alternative. While influencing the location and level of operations within a subject area, CSUs do not prohibit surface-disturbing activities and are therefore less restrictive than NSO stipulations. The minimal restrictions on fluid mineral development

would result in a reasonably foreseeable development scenario similar to that projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**.

Conventional Oil and Gas

Leasing decisions for oil and gas are presented in **Table 4-26** (Acres of Conventional Oil and Gas Leasing Decisions by Potential, Alternative C).

Table 4-26
Acres of Conventional Oil and Gas Leasing Decisions by Potential, Alternative C

Conventional Oil and Gas	Higher Development Potential	Lower Development Potential
Federal Mineral Estate Potential	482,790	433,230
Closed to Leasing	23,140	21,080
Open to Leasing	459,650	412,150
Open with No Stipulations[1]	*257,420*	*134,950*
Open with NSO Stipulations[2]	*11,210*	*11,090*
Open with CSU Stipulations[2]	*182,140*	*289,850*
Open with TL Stipulations[2]	*340,010*	*242,370*

Source: BLM 2012a

[1] TLs overlap some of this area but were not included in this calculation due to the temporal nature of the TL stipulation.

[2] Total acreage for stipulations is greater than the total acreage within the Planning Area because stipulations could overlap.

Like Alternative A, under this alternative, 23,140 acres of federal mineral estate with higher development potential and 21,080 acres with lower development potential would be closed to leasing. Of the 871,810 acres of federal mineral estate that would be open to leasing for conventional oil and gas, 459,650 acres (53 percent) are categorized as having higher development potential and 412,150 acres (47 percent) are categorized as having lower development potential. In the higher development potential areas, approximately 11,210 acres would be constrained by an NSO stipulation, 182,140 acres would be constrained by a CSU stipulation, and 340,010 acres would be constrained by a TL stipulation. In the lower development potential areas, approximately 11,090 acres would be constrained by an NSO stipulation, 289,850 acres would be constrained by a CSU stipulation, and 242,370 acres would be constrained by a TL stipulation. Stipulations in lower potential areas usually have less of an impact than those in higher potential areas because lower potential areas generally receive less interest in development than higher potential areas. However, the BLM has received lease applications in both higher and lower development potential areas so the impacts for either area are the same and are described under ***Nature and Type of Effects***. The remaining 257,420 acres of the federal mineral estate in high development potential areas and 134,950 acres in low development potential areas would be available for fluid mineral leasing and development subject to standard lease terms and conditions; these lands would not be subject to additional NSO or CSU stipulations, providing the most flexibility for conventional oil and gas exploration and development.

Coalbed Methane

Leasing decisions for coalbed natural gas are presented in **Table 4-27** (Acres of Coalbed Natural Gas Leasing Decisions by Potential, Alternative C).

Table 4-27
Acres of Coalbed Natural Gas Leasing Decisions by Potential, Alternative C

Coalbed Natural Gas	Development Potential	No Potential
Federal Mineral Estate Potential	466,700	449,330
Closed to Leasing	10,510	33,730
Open to Leasing	456,220	415,560
Open with No Stipulations[1]	*81,880*	*43,630*
Open with NSO Stipulations[2]	*12,810*	*9,480*
Open with CSU Stipulations[2]	*253,470*	*218,500*
Open with TL Stipulations[2]	*246,010*	*336,380*

Source: BLM 2012a
[1] TLs overlap some of this area but were not included in this calculation due to the temporal nature of the TL stipulation.
[2] Total acreage for stipulations is greater than the total acreage within the Planning Area because stipulations could overlap.

Similar to Alternative A, approximately 10,510 acres of federal mineral estate with development potential and 33,730 acres with no development potential would be closed to leasing. Of the 871,810 acres of federal mineral estate currently open to leasing for coalbed natural gas, 456,220 acres (52 percent) are identified as having development potential and 415,560 acres (48 percent) are identified as having no potential. In the development potential area for coalbed natural gas, approximately 12,810 acres would be constrained by an NSO stipulation, 253,470 acres would be constrained by a CSU stipulation, and 246,010 acres would be constrained by a TL stipulation. The impact from applying stipulations on lands open to fluid mineral leasing for coalbed natural gas are the same as those described under ***Nature and Type of Effects***. About 81,880 acres with development potential for coalbed natural gas would be available for leasing and development subject to standard lease terms and conditions; these lands would not be subject to additional stipulations and would therefore provide the most flexibility for coalbed natural gas exploration and development.

Geothermal Resources

Leasing decisions for geothermal resources are presented in **Table 4-28** (Acres of Geothermal Leasing Decisions by Potential, Alternative C).

Table 4-28
Acres of Geothermal Leasing Decisions by Potential, Alternative C

Geothermal	Acres of Geothermal Potential Area
Federal Mineral Estate Potential	832,980
Closed to Leasing	29,900
Open to Leasing	803,080
Open with No Stipulations[1]	*342,480*
Open with NSO Stipulations[2]	*27,910*
Open with CSU Stipulations[2]	*452,550*
Open with TL Stipulations[2]	*546,110*

Source: BLM 2012a
[1] TLs overlap some of this area but were not included in this calculation due to the temporal nature of the TL stipulation.
[2] Total acreage for stipulations is greater than the total acreage within the Planning Area because stipulations could overlap.

Approximately 29,900 acres of federal mineral estate with geothermal potential in the Planning Area would be closed to leasing under Alternative C, which is the same as under Alternative A. Of the 803,080 acres that would be open to geothermal leasing, approximately 27,910 acres would be constrained by an NSO stipulation (approximately 10 percent less than Alternative A), 452,550 acres would be constrained by a CSU stipulation, and 546,110 acres would be constrained by a TL stipulation. The remaining 342,480 acres of the federal mineral estate are available for geothermal mineral leasing and development subject to standard lease terms and conditions; these lands are not subject to additional NSO or CSU stipulations and provide the most flexibility for geothermal development. These acres subject to standard lease terms and conditions are 57 percent of the acreage under Alternative A. Overall, Alternative C would have fewer acres with NSO but more acres with CSU and TL stipulations. The net effect on the ease of geothermal development in the Planning Area under Alternative C, when compared with Alternative A, is unclear since there is much variation and many possibilities for restrictions that fall under the CSU and TL categories.

Other Constraints

VRM classifications under this alternative would be the least restrictive to mineral development in the Planning Area because most of the land (89 percent) would be categorized as VRM Class III (431,330 acres) or Class IV (168,990 acres). Approximately 11 percent of the land would be categorized as VRM Class I (44,220 acres) or VRM Class II (31,260 acres). Although the acreage within each VRM classifications is different under this alternative, the impacts are the same as those described under Alternative A.

Solid Leasable Minerals—Coal

As under Alternative B, the coal development potential area is 421,500 acres, 57 percent of which is within the four analyzed coal fields (discussed under the ***Nature and Type of Effects***). Within the coal potential area, 4 percent would be unavailable for leasing.

As discussed under ***Effects Common to All Alternatives***, Congressionally designated areas would remain closed to coal leasing. Same as Alternative B, these areas account for 1,910 acres of federal mineral estate within the expanded coal resource development potential area. Additionally, same as Alternative B, 3,770 acres of WSAs would be within the coal resource development potential area and would therefore be unacceptable for further consideration of leasing and development.

Impacts on underground coal mining from applying Screen 3 were evaluated by analyzing impacts on the Grand Mesa, Somerset, and Tongue Mesa coal fields. Under this alternative, 5 percent of the Grand Mesa coal field, 6 percent of the Somerset coal field (including 1,140 acres of active lease areas), and 5 percent of the Tongue Mesa coal field would be unacceptable for further consideration of leasing and development. The types of impacts from these closures are the same as those discussed under the ***Nature and Type of Effects***.

Similar to Alternative B, approximately 21,960 acres in the Nucla-Naturita coal field were found to be suitable for surface mining and surface mining operations following the application of Screen 1, more than 10 times the acreage found suitable under Alternative A. Screen 2 was then applied to the acres found suitable, which eliminated 2,500 acres and defined those lands as unsuitable for surface mining and surface mining operations. On the remaining 19,500 acres found suitable, an SSR restriction would cover 3,030 acres (15 percent) and a TL restriction would cover 17,470 acres (90 percent; note: SSR and TL restrictions could overlap). Placing these types of restrictions in areas suitable for surface mining and surface mining operations would be tantamount to managing these areas as unsuitable since SSR and TL restrictions would preclude surface mining operations.

Solid Leasable Minerals—Nonenergy Leasables, Potassium

Approximately 57,390 acres (6 percent) of the federal mineral estate would be closed to the leasing of nonenergy solid minerals (29 percent more acres than under Alternative A), precluding future mining in these areas. Under Alternative C, an additional 285,500 acres (34 percent) of areas open to the leasing of nonenergy solid minerals would have an SSR restriction. As a result, special constraints could be applied to the mining activity to mitigate impacts. If impacts cannot be mitigated, the activity could be prohibited, or the activity could be shifted to a new location. Approximately 560,540 acres (67 percent) of areas open to the leasing of nonenergy solid minerals would have a TL restriction, which would close the area during specified time frames. The types of impacts from these closures are the same as those discussed under the ***Nature and Type of Effects***.

Locatable Minerals

Under Alternative C, 11,250 acres (including 1,700 acres of split-estate) would be recommended for withdrawal from location under the Mining Law of 1872. Combined with the additional 28,060 acres previously withdrawn (under Alternative A), the availability of locatable minerals would be limited on 39,310 acres, or 4 percent of the federal mineral estate (29 percent fewer acres than under Alternative A). About 460 acres of open and active mining claims are within the area recommended for withdrawal. The types of impacts are the same as those described under ***Nature and Type of Effects***.

About 130 acres (2 percent) of the high gold potential area along the San Miguel and Dolores Rivers would be recommended for withdrawal from location under the Mining Law of 1872 under this alternative, compared with 20 acres under Alternative A. The types of impacts are the same as those described under ***Nature and Type of Effects***.

Approximately 340 acres (16 percent) of the gypsum potential area would be recommended for withdrawal from location under the Mining Law of 1872, compared with 0 acres under Alternative A. The types of impacts are the same as those described under ***Nature and Type of Effects***.

Approximately 630 acres (less than 1 percent) of the uranium/vanadium potential area would be recommended for withdrawal from location under the Mining Law of 1872, a 95 percent decrease from Alternative A. The types of impacts are the same as those described under ***Nature and Type of Effects***.

Mineral Materials

Approximately 58,610 acres (7 percent) of the federal mineral estate would be closed to the disposition of mineral material (44 percent less acres than Alternative A), precluding future mining in these areas. Under Alternative C, an additional 279,530 acres (33 percent) of areas open to mineral material disposal would have an SSR restriction. As a result, special constraints could be applied to mining or the activity could be shifted to a new location. Approximately 558,320 acres (67 percent) of areas open to mineral material would have a TL restriction, which would close the area during specified timeframes. The types of impacts from these closures are the same as those discussed under the ***Nature and Type of Effects***.

Alternative D

Fluid Leasable Minerals—Oil, Gas, and Geothermal Resources

This alternative would be more restrictive to fluid mineral exploration and development than Alternative A because a larger percentage of the Planning Area would be unavailable for leasing and greater restrictions would be placed on the development of fluid mineral resources across the Planning Area that limit where projects can be sited or that could render implementation infeasible. Under Alternative D, 50,060 acres of federal mineral estate would be unavailable to leasing, and about 865,970 acres of federal mineral estate would be available to leasing, a slight decrease from Alternative A. The

restrictions on fluid mineral development would result in a reduction in the number of new and exploratory development wells and associated surface-disturbance from those projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d) as discussed under **Section 4.1.1**.

Conventional Oil and Gas

Leasing decisions for oil and gas are presented in **Table 4-29** (Acres of Conventional Oil and Gas Leasing Decisions by Potential, Alternative D).

Table 4-29
Acres of Conventional Oil and Gas Leasing Decisions by Potential, Alternative D

Conventional Oil and Gas	Higher Development Potential	Lower Development Potential
Federal Mineral Estate Potential	482,790	433,230
Closed to Leasing	27,420	22,630
Open to Leasing	455,370	410,600
Open with No Stipulations[1]	*198,360*	*96,130*
Open with NSO Stipulations[2]	*110,830*	*127,310*
Open with CSU Stipulations[2]	*202,180*	*298,860*
Open with TL Stipulations[2]	*455,370*	*410,600*

Source: BLM 2012a

[1] TLs overlap some of this area but were not included in this calculation due to the temporal nature of the TL stipulation.

[2] Total acreage for stipulations is greater than the total acreage within the Planning Area because stipulations could overlap.

Under this alternative, 27,420 acres of federal mineral estate with higher development potential and 22,630 acres with lower development potential would be closed to leasing. Of the 865,970 acres of federal mineral estate that would be open to leasing for conventional oil and gas, 455,370 acres (53 percent) are categorized as having higher development potential and 410,600 acres (47 percent) are categorized as having lower development potential. In the higher development potential areas, approximately 110,830 acres would be constrained by an NSO stipulation, 202,180 acres would be constrained by a CSU stipulation, and 455,370 acres would be constrained by a TL stipulation. In the lower development potential areas, approximately 127,310 acres would be constrained by an NSO stipulation, 298,860 acres would be constrained by a CSU stipulation, and 410,600 acres would be constrained by a TL stipulation. Stipulations in lower potential areas usually have less of an impact than those in higher potential areas because lower potential areas generally receive less interest in development than higher potential areas. However, the BLM has received lease applications in both higher and lower development potential areas so the impacts for either area are the same and are described under ***Nature and Type of Effects***. The remaining 198,360 acres of the federal mineral estate in high development potential areas and 96,130 acres in low development potential areas would be available for fluid mineral leasing and development subject to standard lease terms and conditions; these lands would not be subject to additional NSO or CSU stipulations, providing the most flexibility for conventional oil and gas exploration and development.

Coalbed Methane

Leasing decisions for coalbed natural gas are presented in **Table 4-30** (Acres of Coalbed Natural Gas Leasing Decisions by Potential, Alternative D). Approximately 14,410 acres of federal mineral estate with development potential and 35,650 acres with no development potential would be closed to leasing. Of the 865,970 acres of federal mineral estate currently open to leasing for coalbed natural gas, 452,330

Table 4-30
Acres of Coalbed Natural Gas Leasing Decisions by Potential, Alternative D

Coalbed Natural Gas	Development Potential	No Potential
Federal Mineral Estate Potential	466,700	449,330
Closed to Leasing	14,410	35,650
Open to Leasing	452,330	413,650
Open with No Stipulations[1]	*0*	*0*
Open with NSO Stipulations[2]	*87,420*	*150,730*
Open with CSU Stipulations[2]	*271,820*	*229,210*
Open with TL Stipulations[2]	*452,330*	*413,650*

Source: BLM 2012a
[1]TLs overlap some of this area but were not included in this calculation due to the temporal nature of the TL stipulation.
[2] Total acreage for stipulations is greater than the total acreage within the Planning Area because stipulations could overlap.

acres (52 percent) are identified as having development potential and 413,650 acres (48 percent) are identified as having no potential. In the development potential area for coalbed natural gas, approximately 87,420 acres would be constrained by an NSO stipulation, 271,820 acres would be constrained by a CSU stipulation, and 452,330 acres would be constrained by a TL stipulation. The impact from applying stipulations on lands open to fluid mineral leasing for coalbed natural gas are the same as those described under Nature and Type of Effects. Zero acres with development potential for coalbed natural gas would be available for leasing and development subject to standard lease terms and conditions. In other words, all lands with development potential for coalbed natural gas would be subject to additional stipulations (i.e., NSO, CSU, or TL).

Geothermal Resources

Leasing decisions for geothermal resources are presented in **Table 4-31** (Acres of Geothermal Leasing Decisions by Potential, Alternative D).

Table 4-31
Acres of Geothermal Leasing Decisions by Potential, Alternative D

Geothermal	Acres of Geothermal Potential Area
Federal Mineral Estate Potential	832,980
Closed to Leasing	35,720
Open to Leasing	797,260
Open with No Stipulations[1]	*193,130*
Open with NSO Stipulations[2]	*221,960*
Open with CSU Stipulations[2]	*549,060*
Open with TL Stipulations[2]	*797,260*

Source: BLM 2012a
[1] TLs overlap some of this area but were not included in this calculation due to the temporal nature of the TL stipulation.
[2] Total acreage for stipulations is greater than the total acreage within the Planning Area because stipulations could overlap.

Approximately 35,720 acres of federal mineral estate with geothermal potential in the Planning Area would be closed to leasing under Alternative D, which is nearly 20 percent (or 5,820 acres) more than the area closed under Alternative A. Of the 797,260 acres that would be open to geothermal leasing, approximately 221,960 acres would be constrained by an NSO stipulation (7 times more acres than

Alternative A), 549,060 acres would be constrained by a CSU stipulation, and 797,260 acres would be constrained by a TL stipulation. The remaining 193,130 acres of the federal mineral estate are available for geothermal mineral leasing and development subject to standard lease terms and conditions; these lands are not subject to additional NSO or CSU stipulations and provide the most flexibility for geothermal development. These acres subject to standard lease terms and conditions are 32 percent of the acreage under Alternative A.

Other Constraints

Under this alternative, approximately 24 percent of the land would be categorized as VRM Class I (46,440 acres) or VRM Class II (112,540 acres). Approximately 76 percent of the land would be categorized as VRM Class III (398,410 acres) and VRM Class IV (118,410 acres). As discussed under Alternative A, VRM Class II management requires a high degree of screening to ensure that man-made intrusions do not attract the attention of the casual observer. Where this degree of screening cannot be achieved, the intrusion would not be allowed. The expansion of VRM Class I and Class II areas would result in 2.4 times more acreage compared with Alternative A that would largely be unavailable for mineral development.

Solid Leasable Minerals—Coal

As under Alternative B, the coal development potential area is 421,500 acres, 57 percent of which is within the four analyzed coal fields (discussed under the ***Nature and Type of Effects***). Within the coal potential area, this alternative would be more restrictive than Alternative A. Twelve percent of the coal potential area would be unavailable for leasing.

As discussed under ***Effects Common to All Alternatives***, Congressionally designated areas would remain closed to coal leasing. Same as Alternative B, these areas account for 1,910 acres of federal mineral estate within the expanded coal resource development potential area. Additionally, same as Alternative B, 3,770 acres of WSAs would be within the coal resource development potential area and would therefore be unacceptable for further consideration of leasing and development.

Impacts on underground coal mining from applying Screen 3 were evaluated by analyzing impacts on the Grand Mesa, Somerset, and Tongue Mesa coal fields. Under this alternative, 2 percent of the Grand Mesa coal field, 2 percent of the Somerset coal field (0 acres of active lease areas), and 4 percent of the Tongue Mesa coal field would be unacceptable for further consideration of leasing and development. The types of impacts from these closures are the same as those discussed under the ***Nature and Type of Effects***.

Similar to Alternative B, approximately 21,960 acres in the Nucla-Naturita coal field were found to be suitable for surface mining and surface mining operations, following the application of Screen 1, more than 10 times the acreage found suitable under Alternative A. Screen 2 was then applied to the acres found suitable, which eliminated 2,500 acres and defined those lands as unsuitable for surface mining and surface mining operations. On the remaining 19,500 acres found suitable, an SSR restriction would cover 11,750 acres (60 percent) and a TL restriction would cover 19,490 acres (100 percent; note: SSR and TL restrictions could overlap). Placing these types of restrictions in areas suitable for surface mining and surface mining operations would be tantamount to managing these areas as unsuitable since SSR and TL restrictions would preclude surface mining operations.

Solid Leasable Minerals—Nonenergy Leasables, Potassium

Approximately 170,490 acres (19 percent) of the federal mineral estate would be closed to the leasing of nonenergy solid minerals (3.8 times the acreage under Alternative A), precluding future mining in these areas. Under Alternative D, an additional 470,120 acres (65 percent) of areas open to the leasing of nonenergy solid minerals would have an SSR restriction. As a result, special constraints could be

applied to the mining activity to mitigate impacts. If impacts cannot be mitigated, the activity could be prohibited. Approximately 725,700 acres (100 percent) of areas open to the leasing of nonenergy solid minerals would have a TL restriction, which would close the area during specified time frames. The types of impacts from these closures are the same as those discussed under the ***Nature and Type of Effects***.

Locatable Minerals

Under Alternative D, 55,880 acres (including 1,790 acres of split-estate) would be recommended for withdrawal from location under the Mining Law of 1872. Combined with the additional 28,060 acres previously withdrawn (under Alternative A), the availability of locatable minerals would be limited on 83,940 acres, or 9 percent of the federal mineral estate (1.5 times the acreage under Alternative A). About 11,080 acres of open and active mining claims are within the area recommended for withdrawal. The types of impacts are the same as those described under ***Nature and Type of Effects***.

About 2,360 acres (37 percent) of the high gold potential area along the San Miguel and Dolores Rivers would be recommended for withdrawal from location under the Mining Law of 1872 under this alternative, compared with 20 acres under Alternative A. The types of impacts are the same as those described under ***Nature and Type of Effects***.

Approximately 1,580 acres (73 percent) of the gypsum potential area would be recommended for withdrawal from location under the Mining Law of 1872, compared with 0 acres under Alternative A. The types of impacts are the same as those described under ***Nature and Type of Effects***.

Approximately 5,200 acres (3 percent) of the uranium/vanadium potential area would be recommended for withdrawal from location under the Mining Law of 1872, a 58 percent decrease from Alternative A. The types of impacts are the same as those described under ***Nature and Type of Effects***.

Mineral Materials

Approximately 135,370 acres (15 percent) of the federal mineral estate would be closed to the disposition of mineral material (29 percent more acres than Alternative A), precluding future mining in these areas. Under Alternative D, an additional 491,120 acres (65 percent) of areas open to mineral material disposal would have an SSR restriction. As a result, special constraints could be applied to mining or the activity could be shifted to a new location. Approximately 756,760 acres (99 percent) of areas open to mineral material disposal would have a TL restriction, which would close the area during specified time frames. The types of impacts from these closures are the same as those discussed under the ***Nature and Type of Effects***.

Alternative E

Fluid Leasable Minerals—Oil, Gas, and Geothermal Resources

This alternative would be more restrictive of oil and gas exploration and development activities than Alternative A. Although the amount of land available and unavailable for leasing is the same as under Alternative A (871,810 and 44,220 acres, respectively), fewer acres would be open to leasing, subject to standard terms and conditions (i.e., not subject to additional NSO and CSU stipulations; 373,760 acres, compared with 726,340 acres under Alternative A). Areas open to leasing that are devoid of NSO and CSU stipulations provide the most flexibility for oil and gas exploration and development, so reducing this acreage by 49 percent would impact oil and gas exploration and development. Because a larger percentage of the Decision Area would be subject to restrictions on the development of fluid mineral resources, siting of projects may be limited. The restrictions on fluid mineral development could reduce the number of new and exploratory development wells and would reduce associated surface-

disturbance from those projected in the Reasonably Foreseeable Development Scenario for the UFO (BLM 2012d), as discussed under **Section 4.1.1**.

Conventional Oil and Gas

Leasing decisions for oil and gas are presented in **Table 4-32** (Acres of Conventional Oil and Gas Leasing Decisions by Potential, Alternative E).

Table 4-32
Acres of Conventional Oil and Gas Leasing Decisions by Potential, Alternative E

Conventional Oil and Gas	Higher Development Potential	Lower Development Potential
Federal Mineral Estate Potential	482,790	433,230
Closed to Leasing	23,140	21,080
Open to Leasing	459,650	412,150
Open with No Stipulations[1]	*246,970*	*101,340*
Open with NSO Stipulations[2]	*52,350*	*41,210*
Open with CSU Stipulations[2]	*160,160*	*208,490*
Open with TL Stipulations[2]	*364,280*	*270,340*

Source: BLM 2018a, 2019

[1] TLs overlap some of this area but were not included in this calculation due to the temporal nature of the TL stipulation.

[2] Total acreage for stipulations is greater than the total acreage within the Planning Area because stipulations could overlap.

Stipulations in lower potential areas usually have less of an impact than those in higher potential areas because lower potential areas generally receive less interest in development than higher potential areas. However, the BLM has received lease applications in both higher and lower development potential areas so the impacts for either area are the same and are described under ***Nature and Type of Effects***. The remaining 246,970 acres of the federal mineral estate in higher development potential areas and 101,340 acres in lower development potential areas would be available for fluid mineral leasing and development subject to standard lease terms and conditions; these lands would not be subject to additional NSO or CSU stipulations, providing the most flexibility for conventional oil and gas exploration and development. This acreage does not include TL stipulations, which would be applied to all acres with higher or lower development potential but which are temporary in nature.

Coalbed Methane

Leasing decisions for coalbed natural gas are presented in **Table 4-33** (Acres of Coalbed Natural Gas Leasing Decisions by Potential, Alternative E).

The impacts from applying stipulations on lands open to fluid mineral leasing for coalbed natural gas are the same as those described under ***Nature and Type of Effects***. Approximately 185,430 acres with development potential for coalbed natural gas would be available for leasing and development subject to standard lease terms and conditions; these lands would not be subject to additional stipulations and would therefore provide the most flexibility for coalbed natural gas exploration and development. This acreage does not include TL stipulations, which would be applied to all acres with coalbed methane potential but which are temporary in nature.

Table 4-33
Acres of Coalbed Natural Gas Leasing Decisions by Potential, Alternative E

Coalbed Natural Gas	Development Potential	No Potential
Federal Mineral Estate Potential	466,700	449,330
Closed to Leasing	10,510	33,730
Open to Leasing	456,190	414,180
Open with No Stipulations[1]	*185,430*	*187,610*
Open with NSO Stipulations[2]	*45,010*	*58,330*
Open with CSU Stipulations[2]	*225,770*	*168,160*
Open with TL Stipulations[2]	*281,470*	*353,110*

Source: BLM 2018a, 2019
[1]TLs overlap this area but were not included in this calculation due to the temporal nature of the TL stipulation.
[2] Total acreage for stipulations is greater than the total acreage within the Planning Area because stipulations could overlap.

Geothermal Resources

Leasing decisions for geothermal resources are presented in **Table 4-34** (Acres of Geothermal Leasing Decisions by Potential, Alternative E).

Table 4-34
Acres of Geothermal Leasing Decisions by Potential, Alternative E

Geothermal	Acres of Geothermal Potential Area
Federal Mineral Estate Potential	832,980
Closed to Leasing	29,900
Open to Leasing	803,080
Open with No Stipulations[1]	*335,960*
Open with NSO Stipulations[2]	*101,410*
Open with CSU Stipulations[2]	*365,720*
Open with TL Stipulations[2]	*598,800*

Source: BLM 2018a, 2019
[1] TLs overlap some of this area but were not included in this calculation due to the temporal nature of the TL stipulation.
[2] Total acreage for stipulations is greater than the total acreage within the Planning Area because stipulations could overlap.

Other Constraints

Visual Resources. Under this alternative, approximately 22 percent of the land would be categorized as VRM Class I (46,440 acres) and VRM Class II (105,490 acres). Approximately 78 percent of the land would be categorized as VRM Class III (370,600 acres) and VRM Class IV (153,260 acres). As discussed under Alternative A, VRM Class II management requires a high degree of screening to ensure that man-made intrusions do not attract the attention of the casual observer. Where this degree of screening cannot be achieved, the intrusion would not be allowed. The expansion of VRM Class I and Class II areas would result in 2.3 times more acreage than Alternative A that would largely be unavailable for mineral development.

Solid Leasable Minerals—Coal

As under Alternative B, the coal development potential area is 421,500 acres, 57 percent of which is within the four analyzed coal fields (discussed under the ***Nature and Type of Effects***). Within the coal

potential area, this alternative would be more restrictive than Alternative A. Twelve percent of the coal potential area would be unavailable for leasing.

As discussed under ***Effects Common to All Alternatives***, congressionally designated areas would remain closed to coal leasing. The same as Alternative B, these areas account for 1,910 acres of federal mineral estate within the expanded coal resource development potential area. Additionally, the same as Alternative B, 3,770 acres of WSAs would be within the coal resource development potential area and would therefore be unacceptable for further consideration of leasing and development.

Impacts on underground coal mining from applying Screen 3 were evaluated by analyzing impacts on the Grand Mesa, Somerset, and Tongue Mesa coal fields. Under this alternative, 2 percent of the Grand Mesa coal field, 5 percent of the Somerset coal field (0 acres of active lease areas), and 4 percent of the Tongue Mesa coal field would be unacceptable for further consideration of leasing and development. The types of impacts from these closures are the same as those discussed under the ***Nature and Type of Effects***.

Similar to Alternative B, approximately 21,960 acres in the Nucla-Naturita coal field were found to be suitable for surface mining and surface mining operations, following the application of Screen 1, more than 10 times the acreage found suitable under Alternative A. Screen 2 was then applied to the acres found suitable, which eliminated 2,500 acres and defined those lands as unsuitable for surface mining and surface mining operations. On the remaining 19,500 acres found suitable, an SSR restriction would cover 3,180 acres (16 percent), and a TL restriction would cover 19,500 acres (100 percent; note that SSR and TL restrictions could overlap). Placing these types of restrictions in areas suitable for surface mining and surface mining operations would be tantamount to managing these areas as unsuitable because SSR and TL restrictions would preclude surface mining operations.

Solid Leasable Minerals—Nonenergy Leasables and Potassium

Approximately 167,330 acres (19 percent) of the federal mineral estate would be closed to the leasing of nonenergy solid minerals (3.8 times the acreage under Alternative A), precluding future mining in these areas. Under Alternative E, an additional 299,080 acres (41 percent) of areas open to the leasing of nonenergy solid minerals would have an SSR restriction. As a result, special constraints could be applied to the mining activity to mitigate impacts. If impacts cannot be mitigated, the activity could be prohibited. Approximately 529,290 acres (73 percent) of areas open to the leasing of nonenergy solid minerals would have a TL restriction, which would close the area during specified time frames. The types of impacts from these closures are the same as those discussed under the ***Nature and Type of Effects***.

Locatable Minerals and Mineral Materials

Under Alternative E, 15,790 acres (all on BLM surface/federal mineral estate) would be recommended for withdrawal from location under the Mining Law of 1872. Combined with the additional 28,060 acres previously withdrawn (under Alternative A), the availability of locatable minerals would be limited on 43,850 acres, or 5 percent of the federal mineral estate (21 percent fewer acres than under Alternative A). About 740 acres of open and active mining claims are within the area recommended for withdrawal. The types of impacts are the same as those described under ***Nature and Type of Effects***.

About 470 acres (7 percent) of the high gold potential area along the San Miguel and Dolores Rivers would be recommended for withdrawal from location under the Mining Law of 1872, compared with 20 acres under Alternative A. The types of impacts are the same as those described under ***Nature and Type of Effects***.

Approximately 350 acres (15 percent) of the gypsum potential area would be recommended for withdrawal from location under the Mining Law of 1872, compared with 0 acres under Alternative A. The types of impacts are the same as those described under ***Nature and Type of Effects***.

None of the uranium/vanadium potential area would be recommended for withdrawal from location under the Mining Law of 1872, compared with 12,350 acres under Alternative A. This area would not be impacted by additional recommendations for withdrawal under Alternative E.

Approximately 125,780 acres (14 percent) of the federal mineral estate would be closed to the disposition of mineral material (20 percent more acres than Alternative A), precluding future mining in these areas. Under Alternative E, an additional 239,650 acres (31 percent) of areas open to mineral material disposal would have an SSR restriction. As a result, special constraints could be applied to mining or the activity could be shifted to a new location. Approximately 553,020 acres (72 percent) of areas open to mineral material disposal would have a TL restriction, which would close the area during specified time frames. The types of impacts from these closures are the same as those discussed under the ***Nature and Type of Effects***.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on energy and minerals is the Uncompahgre RMP Planning Area because management activities occurring within the Planning Area are not expected to affect mineral resources outside of the Planning Area. Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area, which includes National Forest System lands, that have affected and will likely continue to affect energy and minerals are mineral exploration and development, recreation, weed invasion and spread, weed control, prescribed and wildfires, land planning efforts, vegetation treatments, and habitat improvement projects.

The BLM has no control over many of the factors that affect mineral extraction and prospecting, such as public perception and concerns, transportation, low commodity prices, taxes, and housing and other necessities for workers. Issues under the BLM's control are discussed earlier in this section, and most preclude the leasing or development of mineral resources or the additional costs to projects.

Fluid Leasable Minerals—Oil, Gas, and Geothermal Resources

Cumulative impacts on mineral development would occur from surface use restrictions (e.g., closures/withdrawals, VRM designations, and NSO, CSU, TL stipulations) that ultimately would decrease the number of oil and gas wells drilled during the planning period. Surface use restrictions, such as TL restrictions, could also cause an operator to move to nearby private or state land with no such restrictions. Surface restrictions are implemented to protect sensitive resources and prevent user and resource conflicts. Over the past 18 years, federal oil and gas leases have ranged from 71 leases in 2001 to 0 leases in 2010 and 2013-2017. Federal leasing is subject to market conditions, changes in public administration, and interest in the resource itself, all of which making forecasting for leasing challenging. The evaluation of cumulative impacts on mineral development considers the relative changes in the level of mineral resource development among the various alternatives (see **Table 4-15**). Well spacing and other regulatory requirements from the State would also add to cumulative impacts.

Oil and gas development is expected to continue under all alternatives, but Alternative B would be the most restrictive to the development of leasable minerals, primarily because a greater amount of the Planning Area would be unavailable for leasing or a greater array of leasable mineral development activities would be subject to NSO, CSU, and TL stipulations. These actions could lead to a delay in development or moving of well locations, access roads, pipeline, or ancillary facilities. Resources underlying areas unavailable for leasing but with remnant leases would require substantial mitigation or off-site development, such as directional drilling, and would experience increased development costs.

Alternative A would be the least restrictive to oil and gas exploration and development because a larger percent of the Planning Area would be available for leasing without major restrictions. This would result in the greatest potential for well development. Cumulative impacts from Alternatives C, D, and E are fairly similar since the amount of land unavailable for oil and gas leasing are comparable (less than a 6,000-acre difference between the three alternatives); however, Alternative C has considerably fewer acres with NSO stipulations (22,300 acres), compared with Alternative D (238,140 acres) and Alternative E (103,460 acres). As a result, a greater number of wells could be developed under Alternative C than under Alternatives D and E.

Solid Leasable Minerals—Coal

The UFO manages two active federal coal leases related to one underground coal mine in the North Fork Valley near Paonia (the West Elk Mine). The 2016 production records indicate that Somerset coal will likely continue to provide approximately 33 percent of Colorado's coal (Department of Natural Resources 2016). The production totals from the West Elk Mine average approximately 5.5 million tons per year, and are expected to remain about the same. Additionally, the UFO issued a coal exploration license on Oak Mesa (Delta County, North of Hotchkiss) in late 2012, and exploration drilling has been completed. There has not been any interest expressed in leasing coal on Oak Mesa. The New Horizon Coal Mine in the West End is within the Planning Area but is on private land with private mineral estate. The mine ceased production after March 2017 and has entered final reclamation.

Coal exploration and development on BLM-administered lands would continue under all alternatives on existing leases. However, new coal leases and development would be impacted from an increase in the amount of lands allocated as unacceptable for coal leasing and development and unsuitable for surface mining and surface mining operations. Cumulatively, Alternative B would be the most restrictive for coal leasing and development since 10 percent of the Grand Mesa coal field, 12 percent of the Somerset coal field (including 3,490 acres of active lease areas), and 8 percent of the Tongue Mesa coal field would be unacceptable for further consideration of leasing and development. Additionally, 9 percent of the Nucla-Naturita coal field would be unsuitable for surface mining and surface mining operations; moreover, the remaining lands found suitable would have SSR or TL restrictions, which would impact surface mining on all lands within the Nucla-Naturita coal field. Alternative A would be the least restrictive for coal leasing and development (Tongue Mesa would have 580 acres managed as unacceptable for further consideration of leasing and development, and Grand Mesa and Somerset coal fields have 0). Additionally, under Alternative A, 110 acres in the Nucla-Naturita coal field would be unsuitable for surface mining and surface mining operations, less than one percent of the coal field. Alternatives C, D, and E fall between the two alternatives, with Alternative C having slightly more restrictions, particularly in the Somerset coal field.

Solid Leasable Minerals—Nonenergy Leasables and Potassium

Mineral exploration and development of nonenergy leasable minerals would continue to occur under all alternatives. However, acreages open to exploration and development would vary by alternative. Overall, Alternative B would be the most restrictive to mineral development (44 percent of the Planning Area would be closed to nonenergy leasable minerals) and could result in the greatest number of cumulative impacts. Alternatives A and C would be the least restrictive to mineral development (5 and 6 percent of the Planning Area, respectively, would be closed to nonenergy leasable minerals) and could result in the fewest cumulative impacts. Alternatives D and E would close 19 percent of the Decision Area to nonenergy leasable minerals. Despite abundant evidence indicating high potential for sodium and potassium deposits in the Paradox Valley area, activities associated with developing these minerals on BLM-administered lands within the Planning Area have been nonexistent, so cumulative impacts are expected to be negligible.

Locatable Minerals

Notable locatable mineral development in the Uncompahgre RMP Planning Area includes placer gold, uranium, and vanadium. Exploration and mining of these resources would continue under all alternatives. To restrict locatable mineral development, the BLM must recommend withdrawal actions to the Secretary of the Interior. If the Secretary were to issue a Public Land Order to formally withdraw lands identified by the BLM, subject to valid existing rights, the location of new mining claims under the Mining Law of 1872 would be forbidden. Rights associated with valid mining claims would be honored. When necessary, the BLM would conduct a validity examination of a mining claim prior to authorizing any activities for these claims.

Piñon Ridge Mining may construct the Piñon Ridge Mill in Paradox Valley, between Naturita and Bedrock in Montrose County, Colorado. The uranium mill is expected to process ore from five to nine mines at any one time. While there are currently no active uranium mining operations in the Planning Area, the construction of this mill could lead to a surge in uranium exploration, mining, and permitting. Furthermore, a large group of recently staked uranium mining claims exist on BLM-administered lands in the UFO, Grand Junction Field Office, Tres Rios Field Office, and Moab Field Office. Any increase in lands withdrawn from mineral entry in the uranium/vanadium potential area would reduce the acreage available for uranium/vanadium mineral development within the Planning Area. Alternative B recommends withdrawal of 40 percent of the uranium/vanadium potential area, the most restrictive of all the alternatives. Alternatives A and D are substantially less restrictive than Alternative B (6 and 3 percent, respectively). Alternative C would be the second-least restrictive, recommending for withdrawal less than one-half percent of the uranium/vanadium potential area. None of the uranium/vanadium potential area would be recommended for withdrawal under Alternative E.

Placer activities (panning and dredging) in the Planning Area are expected to remain strong. Any increase in lands withdrawn from mineral entry in the high gold potential area would reduce the acreage available for commercial placer gold mining. Individuals would still be allowed to collect gold for noncommercial uses using nonmechanical techniques, such as panning. Dredging activities would require a permit, however. Alternative B, which recommends withdrawing 88 percent of the high gold potential area, would be the most restrictive of the alternatives. Alternative D recommends withdrawing 37 percent of the high gold potential area, followed by Alternative E (7 percent), Alternative C (2 percent), and Alternative A (less than 1 percent).

Gypsum is present in the western portion of the Planning Area, in the Paradox Formation of the Hermosa Group. Although there is no history of exploration, development, or production of gypsum in the Planning Area, the demand for gypsum in the US is expected to increase with recovery from the recession (BLM 2011b). Any increase in lands withdrawn from mineral entry in the gypsum potential area would reduce the acreage available for gypsum mining. Alternative B proposes to withdraw 89 percent of the gypsum high potential area, making it the most restrictive of the alternatives. Alternative D is slightly less restrictive (73 percent), followed by Alternative C (16 percent) and Alternative E (15 percent). Alternative A would be the least restrictive on gypsum since no acres within the high potential area would be recommended for withdrawal.

Mineral Materials

If construction activity increases and economic conditions improve, mineral material extraction and use is expected to increase to support construction, mining, and recreation. Particularly, areas with increased oil and gas development, such as the North Fork, could increase demand for mineral materials. Gravel mining on private lands in and surrounding the Planning Area is very common. As these resources are depleted on private lands, demand for mining BLM-administered lands would increase. As the amount of BLM-administered land available for disposition of mineral materials is

reduced, demand for mineral materials would increase in other areas. Overall, Alternative B would be the most restrictive, proposing to close 63 percent of the federal mineral estate to the disposition of mineral material. Alternatives D and E propose closing 15 and 14 percent of the federal mineral estate, respectively, followed closely by Alternative A at 12 percent. Alternative C proposes closing 7 percent of the federal mineral estate to the disposition of mineral material, making it the least restrictive to extraction and use of mineral materials.

4.4.4 Recreation and Visitor Services

This section discusses potential impacts on recreation from proposed recreation management actions and management actions of other resources and resource uses. Existing conditions are described in **Section 3.2.4** (Recreation and Visitor Services).

Methods and Assumptions

Indicators

Indicators of impacts on recreation are the following:

- Changes to the essential recreation opportunities and recreation setting characteristics in SRMAs
- Impediments to defined recreation activities and the associated qualities and conditions in ERMAs
- Management actions that result in short- or long-term elimination or reduction of recreation opportunities, activities, or experiences throughout the Planning Area
- Management actions and allowable use restrictions that result in increased conflict between recreation users and between other resource uses and recreation

Assumptions

In addition to the assumptions in **Section 4.1.1** the analysis assumes the following:

- Substantial increases in recreation could create risks to public health and safety.
- Traditional recreational uses in the Planning Area would continue as populations grow, and an anticipated increase would occur in motorized recreation, wildlife viewing, hiking, mountain biking, camping, pleasure driving, heritage appreciation, and new technology-based recreation.
- The potential for resource impacts and conflicts between all types of users would increase with increasing use.
- Development of improved facilities, especially recreation trails, would result in increased use.
- The incidence of conflicts between motorized and nonmotorized recreationists would increase with increasing use, especially in ERMAs where objectives target protection of a wide range of both motorized and nonmotorized activities.
- Demand for SRPs would increase.
- Shooting restrictions would restrict only target/projectile shooting. Shooting restrictions would not affect the lawful taking of game.
- Managing areas as SRMAs would lead to economic growth and improved quality of life in surrounding communities.
- Recreation planning guidance and the definitions of recreation management areas (RMAs), which include SRMAs and ERMAs, have changed since the San Juan/San Miguel Planning Area RMP (BLM 1985) and the Uncompahgre Basin RMP (BLM 1989a). Alternative A management complies with the old definitions and guidance, while Alternatives B, C, D, and E management complies with current definitions and guidance.

Nature and Type of Effects

Recreation experiences and the attainment of a variety of outcome-focused objectives are vulnerable to any management action that would alter the settings and opportunities in a particular area. Recreation settings are based on a variety of attributes, such as remoteness, the amount of human modification in the natural environment, evidence of other users, and restrictions and controls (see **Appendix J** [Description of Recreation Management Areas] for a description of recreation settings). Management actions that greatly alter such features could affect the capacity of a particular landscape to support appropriate recreation opportunities and corresponding outcome-focused objectives.

Impacts on recreation are generally the result of conflicts between recreational uses (for example, motorized versus nonmotorized use), management actions related to other resources and resource uses (for example, habitat protection/restoration and livestock grazing), and stipulations placed on resource uses. The analysis of impacts on recreation focuses on these three types of impacts and is structured under three subheadings: the Decision Area, SRMAs, and ERMAs.

Management of soils and water quality, vegetation, fish and wildlife, and special status species would include the application of NGD, NSO, CSU, and TL restrictions (refer to **Table 2-1** [Comparative Summary of Alternatives] for acreages). These restrictions would improve recreation by limiting or prohibiting development that could conflict with recreational activities, experiences, and outcomes. However, NGD restrictions could prevent construction of recreation facilities, including new trails and campgrounds, which would diminish recreation in those areas. The magnitude of impacts on recreation would be directly related to the acreage affected by NSO, CSU, and seasonal restrictions and closures under each alternative.

Temporary or permanent restrictions associated with cultural resource areas, especially when they are collocated in recreation emphasis areas, could result in closing these areas to certain recreation activities. However, if impacts could be properly mitigated by, for example, interpretive signing and stabilization to protect these sites, then visitors would be able to enjoy them over the long term.

In VRM Class I and II areas, recreation objectives would be protected by maintaining the scenic quality of those lands. VRM Class I and II designations could restrict development of recreation facilities, such as campgrounds and trails, which could alter the opportunity to enhance recreation in these areas. However, VRM Class I and II designations would protect the naturalness of the physical setting, thereby enhancing opportunities to participate in recreation in less-developed settings. VRM Classes III and IV would not likely affect the type or amount of recreation use because management would generally be consistent with the construction of facilities to support recreation; however, VRM Classes III and IV would allow more change and contrast to the natural landscape, at the expense of visitors who prefer recreating in less-developed settings.

Impacts on recreation from areas open to all classes of livestock grazing could include conflicts with unsocialized sheep guard dogs, as well as trampling and manure impacts at popular recreation sites (e.g., campsites and trails). The intensity of the impact would vary with the visitor's expectation for recreating in areas where livestock grazing is present. In addition, developing livestock grazing facilities can impact the naturalness of the physical setting over the long term because features such as stock ponds and catchments contrast with the natural landscape. However, properly placed range improvements that protect and promote land health enhance the naturalness of an area by managing utilization in support of the natural surroundings. Range improvements could help to reduce conflicts with recreationists by prohibiting animals from wandering onto roads, trails, or developed recreation sites.

On lands open to fluid mineral leasing and geophysical exploration, if developed, any additional oil and gas facilities, equipment, noise, dust, vehicles, night lighting, pipelines, and human activity would alter the

recreation setting in certain areas during construction and operation. This would interfere with recreationists' goals and would influence their opportunities and activities. However, applying NSO stipulations would preserve the natural character of the landscape, while maintaining recreation opportunities in those areas in the long term. Applying CSU stipulations could reduce recreation opportunities by permitting development that conflicts with desired recreation.

Managing lands as available for coal leasing, if developed, could result in short- and long-term impacts by displacing recreation opportunities or degrading scenic qualities in areas during construction and operation.

Minerals development and disposal would result in short- and long-term impacts during construction and operations by displacing recreation opportunities and degrading scenic qualities in the areas.

Areas managed as unsuitable for public utilities (i.e., ROW exclusion areas) would protect recreation opportunities and the natural setting. The naturalness and remoteness could change over the short term and long term by the continued presence of communication sites (regardless of whether additional facilities were allowed at each site). These qualities also could be changed by areas identified as open to development of major utility corridors, or they could be impacted by developed recreation sites and trails during construction and operation. This all would depend on the location of the corridor or development. In turn, the social and operation setting characteristics could change in these areas. Managing areas as ROW avoidance would limit development that could be incompatible with recreation in these areas.

Development of renewable energy projects could result in the loss of recreation opportunities.

Managing ACECs would restrict surface-disturbing activities in those areas and would help maintain the existing physical setting by preserving natural landscapes.

In the WSR eligibility analysis, recreation, specifically boating, is identified as an ORV for Gunnison River Segment 2; San Miguel River Segments 1, 5, and 6; Tabeguache Creek Segment 2; Dolores River Segments 1b and 2; La Sal Creek Segment 1; and Spring Creek. As such, recreational boating, including ensuring sufficient flows, would be protected or enhanced as a result of protecting the recreational ORV. On the other hand, along segments where recreation is not an ORV, recreation could be restricted if found to adversely impact the identified ORVs and adequate water quality to support those ORVs, free-flowing condition, or the tentative classification, particularly for those segments tentatively classified as wild or scenic.

Effects Common to All Alternatives

In areas not managed as RMAs (Alternative A, 626,480 acres; Alternative B, 432,880 acres; Alternative C, 459,920 acres; Alternative D, 479,220 acres; and Alternative E, 482,390 acres), recreation experiences and outcomes could be diminished by mineral materials sales, development of nonenergy leasable minerals, or other uses potentially incongruous with stated recreation objectives because recreation opportunities, activities, and experiences would not purposefully be protected. Consumptive uses could also pose visitor health and safety and resource protection risks and could increase conflict among the different types of recreational users and between other resource uses and recreation.

Under all alternatives, land tenure adjustments, including acquisition and disposal of land, would benefit recreation, as BLM is required to consider public access for outdoor recreation in lands identified for disposal (Secretarial Order 3373, Evaluating Public Access in BLM Public Land Disposals and Exchanges [March 21, 2019]). Acquisitions can improve public access in areas with intermingled land ownership and can facilitate increased or improved access to recreation areas, such as river access points. Acquiring private or state inholdings would improve access and user enjoyment of BLM-administered lands,

especially in SRMAs, which are managed for specific recreation experiences. The acquisition of access easements can also increase recreation use across the Planning Area.

Under all alternatives, development of potential pipelines and electricity transmission and distribution facilities in the West-wide Energy Corridor could directly impact recreation during construction through temporary loss of access or closure of facilities. Indirect impacts from development in this corridor could include changes to scenic resources over the long term due to the presence of transmission lines and other facilities, which could degrade user experiences.

Opportunities for solitude or primitive and unconfined recreation and undeveloped recreation setting characteristics within the Tabeguache Area would be protected under all alternatives. Primitive and Back Country settings, and a desirable area for nonmotorized/nonmechanized recreation, would be retained. Primitive and unconfined recreation within the WSAs also would be protected under all alternatives.

Equestrian and foot travel would be allowed on existing and/or designated routes and cross-country on Decision Area lands, unless otherwise stated. This would provide for access into remote areas by equestrian users and those traveling by foot.

Closures or mitigation measures implemented in response to Native American tribal uses or public health and safety management could result in site-specific short- or long-term reductions in recreation.

Implementing management for the following resources would have negligible or no impact on recreation and are therefore not discussed in detail: climate change, wild horses, wildland fire ecology and management, and forest and woodland products.

Alternative A

Certain parts of the Planning Area, such as Spring Creek and Jumbo Mountain, receive heavy recreation use that currently falls under undesignated RMA management. Not providing special recreation management for these areas would likely inhibit desired opportunities, outcomes, and experiences and would result in user conflict and displacement. Similar impacts would be expected where outdated management plans for popular areas, such as Dry Creek, North Delta, Burn Canyon, and the Paradox Valley, fail to provide adequate management direction for emerging recreation trends and increased visitation. These impacts would likely become significant in certain areas over the life of the RMP.

Decision Area

Under Alternative A, the BLM would seek to meet BLM Colorado Public Land Health Standards (BLM 1997) through current management actions. Closures or other management of biological resources (soils and water quality, vegetation, fish and wildlife, and special status species) under Alternative A could affect the design or creation of new recreation projects, such as trails and campground facilities, as well as projects or maintenance in existing recreation developments or areas with established use patterns. Also, management actions related to biological resources could enhance recreation by improving opportunities to experience wildlife. Habitat improvements would also protect scenic values. However, management of biological resources would provide minimal enhancements of wildlife viewing and scenic resources.

All of the Dolores River Canyon SRMA and 160 acres, or less than 1 percent, of the San Miguel River SRMA has NSO stipulations. Effects are described under ***Nature and Type of Effects***.

Applying a TL stipulation to protect erodible and saline soil areas would continue to seasonally limit recreation in those areas. In addition, water quality mitigation or improvement measures would continue to temporarily or permanently reduce recreation access near aquatic features and wetlands throughout the Decision Area.

Applying seasonal surface-disturbance restrictions (TLs) for wildlife and special status species would continue to benefit hunting and nonconsumptive wildlife viewing opportunities in certain habitats. However, seasonal restrictions would temporarily preclude the development of recreational infrastructure. Alternative A would continue to apply seasonal travel closures on 58,970 acres to protect biological resources, temporarily reducing the area available for motorized recreation.

Compared to the action alternatives, the absence of more-stringent management actions, such as NGD or SSR restrictions, or ecological emphasis areas, would continue to limit recreation for visitors who value recreating in a protected setting; however, it would also maintain the area available for more multi-use recreational opportunities and developed recreational facilities.

Recreational mining would continue to be allowed throughout the Decision Area.

Effects of temporary or permanent restrictions associated with cultural resource areas are as described under ***Nature and Type of Effects***.

The BLM would continue to manage 66,150 acres as VRM Class I and II areas; effects are as those described under ***Nature and Type of Effects***. The 319,870 acres without a VRM class allow the potential for development that could degrade recreation objectives due to diminished scenic quality.

Impacts on recreation on the 619,500 acres available to all classes of livestock grazing are described under ***Nature and Type of Effects***.

Under Alternative A, 631,580 acres of BLM-administered lands would continue to be managed as open to fluid mineral leasing and geophysical exploration, and 44,220 acres would be closed to fluid minerals leasing. Effects are described under ***Nature and Type of Effects***. However, continuing to apply NSO stipulations on 24,890 acres of BLM-administered lands, including the Dolores River Canyon area, would preserve the natural character of the landscape, while maintaining recreation opportunities in those areas in the long term. Continuing to apply CSU stipulations on 110,180 acres could reduce recreation opportunities by permitting development that conflicts with desired recreation.

Leasing lands for coal would result in the short- and long-term impacts described under ***Nature and Type of Effects***. As described in **Section 4.4.3** (Energy and Minerals, Effects Common to All Alternatives, Solid Leasable Minerals—Coal), coal production is expected to remain the same across all alternatives.

Under Alternative A, 620,050 acres of BLM-administered surface land would continue to be available for locatable mineral entry and development, 27,690 acres would be recommended for withdrawal from entry, and 28,060 acres are withdrawn from entry. In addition, 573,610 acres of BLM-administered surface land are open for mineral materials disposal entry, and 102,190 acres are closed to disposal. Effects are described under ***Nature and Type of Effects***.

Under Alternative A, existing recreation attractions (such as trails, trailheads, campsites, boat ramps) would continue to be insufficient to meet recreation demand in many parts of the Decision Area over the long term. In particular, seasonal crowding at attractions could diminish user enjoyment because use exceeds management capability. The anticipated increase in recreation over the RMP's lifespan could result in demand for additional or expanded developed recreation sites because of user conflicts and degraded recreation experiences. Without adequate facilities, the associated service providers and affected communities could lose desired social and economic influences over the long term.

Lack of specific recreation management and the continuation of dispersed camping in most of the Decision Area could continue to increase the number of campsites in areas near existing and designated

routes and along the Dolores and San Miguel Rivers over the long term. This dispersed, unmanaged use would not foster specific recreation outcomes and could lead to increased user conflict. Similarly, allowing recreational shooting (except in developed recreation sites) and recreational mining without restrictions would provide recreation opportunities but could increase surface disturbance and visitor conflicts in specific areas with frequent use.

Issuing SRPs on a case-by-case basis would continue to provide opportunities for visitors to experience competitive and noncompetitive events, commercial outfitting services, and large organized group outings. However, continuing to allow special events and large groups could change the naturalness and social settings for other users not participating in the events. Alternative A would continue to limit group size to no more than 16 people in the Dolores River Canyon SRMA. As a result, demand beyond this capacity would be displaced, and the associated service providers and affected communities could lose desired social and economic influences.

Under Alternative A, travel and transportation management would continue to recognize 8,560 acres (1 percent) as open, 611,090 acres (91 percent) as limited, and 56,150 acres (8 percent) as closed to motorized travel. The North Delta OHV Area (8,560 acres) would be open to cross-country motorized travel, thereby providing opportunities to those who wish to travel by motorized vehicle cross-country. **Table 4-35** (Travel Management Area Designations in SRMAs, Alternative A) provides travel area acreages for SRMAs.

Under Alternative A, the lack of planning and proper route designation may cause users to create new routes due to poor location of routes. Within 5 years, the BLM would initiate a separate planning process to create a comprehensive designated route system, which would enhance safety and reduce user conflict, in addition to limiting the creation of unauthorized routes.

Table 4-35
Travel Management Area Designations in SRMAs, Alternative A

Travel Area Management	Dolores River Canyon SRMA	San Miguel River SRMA
Closed to motorized and mechanized vehicles	13,230	0
Closed to motorized vehicles	0	11,200
Limited to designated routes	0	23,980
Limited to existing routes	140	410

Source: BLM 2012a

Continuing to manage areas as closed to motorized travel (56,150 acres) and mechanized travel (44,200 acres) would prohibit these types of travel and the opportunities they provide in these areas.

Under Alternative A, the BLM would continue to manage 85,080 acres as unsuitable for public utilities (i.e., ROW exclusion areas). No areas would be managed as ROW avoidance areas. The BLM would continue to manage 26,880 acres as open to development of major utility corridors. Effects are described under ***Nature and Type of Effects***.

Managing 30,000 acres as ACECs under Alternative A would restrict surface-disturbing activities in those areas, as described under ***Nature and Type of Effects***.

Effects of managing stream segments as eligible for inclusion in the NSWRS are the same as those described under ***Nature and Type of Effects***.

The Old Spanish, Tabeguache, and Paradox Trails would continue to attract users, but a lack of supporting management objectives and actions would limit effective management and could allow for increased conflict between recreation and competing uses along the trail.

Dolores River Canyon SRMA

The Dolores River Canyon SRMA would continue being managed to protect outcomes associated with primitive values and settings. Management of the Dolores River Canyon SRMA does not identify the relationship between settings and desired recreational outcomes, depriving the BLM of management tools necessary to facilitate beneficial outcomes. The area receives heavy seasonal use when water is flowing in the Dolores River. Use is minimal the rest of the year, but visitation is expected to grow over the RMP lifespan. Without specific management actions and facility investments to support desired experiences and outcomes, visitation growth would lead to user conflict, resource damage, and users dispersing to other areas perhaps less capable of facilitating recreation.

San Miguel River SRMA

The San Miguel SRMA receives heavy use (including river-related activities, scenic touring, mountain and road biking, and hiking) during the fall, spring, and summer. Visitation is expected to grow over the RMP lifespan. While the San Miguel SRMA currently has facilities to support activities, management does not identify the relationship between settings and desired recreational outcomes, depriving the BLM of management tools necessary to facilitate beneficial outcomes.

Alternative B

In general, this alternative attempts to identify the areas most likely to require or continue to require management actions to support recreation and the attainment of outcome-focused objectives. Twelve SRMAs would be managed to protect and enhance a targeted set of activities, experiences, benefits, and desired recreation setting characteristics. Management actions from other resource programs generally facilitate SRMA objectives.

Decision Area

Under Alternative B, closing OHV open areas and/or designated routes during high winds would temporarily reduce the amount and variety of motorized recreation opportunities in the Decision Area.

Under Alternative B, the BLM would seek to fully meet or exceed BLM Colorado Public Land Health Standards (BLM 1997) and would stress active management for biological restoration. Site-specific impacts could result where such actions are undertaken, reducing the area available for certain types of recreation. However, the increased protection of resources would result in more enhancements to habitat, which would improve natural landscapes, as well as hunting and wildlife viewing opportunities. For example, the density of travel routes would be the most heavily impacted under this alternative because routes leading to any conflicts with resource protection would need to be mitigated or closed, resulting in fewer opportunities for trail-based recreation, while also reducing risk for user conflict.

Overall, Alternative B would include more management measures to protect biological resources than Alternative A. In addition to the stipulations proposed under Alternative A, Alternative B would protect recreation opportunities near perennial streams with NSO/NGD stipulations. Impacts from stipulations are similar to those under Alternative A, but there would be more areas restricted by NSO, CSU, and TL (refer to **Table 2-1** for acreages). Also, Alternative B would apply NGD restrictions over 445,720 acres and SSR restrictions over 219,580 acres. Effects are described under ***Nature and Type of Effects***.

Alternative B would manage 242,580 acres as ecological emphasis areas with specific measures designed to protect or enhance resource values. These areas would provide recreation opportunities for visitors seeking less developed landscapes.

Like Alternative A, water quality mitigation or improvement measures under Alternative B could temporarily or permanently reduce recreational access near aquatic features. For example, reducing route density (where practicable) throughout the Decision Area to reduce habitat fragmentation would reduce opportunities for trail-based recreation. In addition, these measures would limit recreation opportunities over the long term by prohibiting disturbance or construction of new routes in areas of sensitive vegetation communities and special status species sensitive habitat, closing riparian areas to permitted events, and minimizing routes in riparian areas.

Seasonal disruptive and surface-disturbance restrictions would benefit nonconsumptive wildlife opportunities in affected habitat areas. Impacts from applying seasonal travel closures on 138,510 acres to protect biological resources are similar to those under Alternative A; however, Alternative B would restrict seasonal travel on more than twice as many acres as Alternative A. This would provide fewer opportunities for motorized and mechanized recreation during certain times of the year.

Recreational mining would be prohibited in the Decision Area. Users would have to go elsewhere (e.g., either on private land or outside the Decision Area) to engage in this activity.

Effects of temporary or permanent restrictions associated with cultural resource areas are as described under ***Nature and Type of Effects***. In addition, identifying potential trails to link individual sites and developing an interpretive program could improve opportunities to experience cultural, archaeological, and historical resources over the long term.

Effects of managing 229,880 acres (3 times more than under Alternative A) under Alternative B and 235,510 acres (almost 4 times more than under Alternative A) under Alternative B.1 as VRM Classes I and II are the same as described under ***Nature and Type of Effects***. The remaining 445,920 acres under Alternative B and 440,280 acres under Alternative B.1 would be managed as VRM Classes III and IV (no areas would be undesignated like under Alternative A). The types of impacts are described under ***Nature and Type of Effects*** but would occur over fewer acres than under Alternative A.

Managing to protect 42,150 acres of lands with wilderness characteristics would provide opportunities for solitude or primitive and unconfined recreation. Prohibiting target shooting in these areas would represent a site-specific loss of this recreational opportunity, compared to Alternative A.

Impacts on recreation on areas available to livestock grazing are described under ***Nature and Type of Effects***. Not allowing livestock grazing in areas that conflict with recreation sites would generally improve recreation opportunities by eliminating animals and their waste from these areas over the long term. Similar impacts would result if high-intensity recreation areas and facilities are unavailable to livestock grazing based on the results of monitoring.

Under Alternative B, 494,580 acres of BLM-administered lands would be open to fluid mineral leasing and geophysical exploration (22 percent less than under Alternative A), and 181,220 acres would be closed to leasing (3 times more than under Alternative A). Impacts are described under ***Nature and Type of Effects***. Impacts on recreation are similar to those under Alternative A, but having fewer acres available to fluid minerals leasing would result in fewer areas impacted from construction and operation. Applying NSO stipulations on 354,970 acres of BLM-administered lands would preserve the natural character of the landscape and would maintain existing recreation opportunities. The type of impacts on recreation from applying CSU stipulations on 139,560 acres of BLM-administered lands are the same as under Alternative A but would occur over 30,730 more acres.

Under Alternative B.1, 454,230 acres of BLM surface/federal mineral lands and 155,130 of split-estate lands (totaling 609,360 acres) would be open to fluid mineral leasing and geophysical exploration (30 percent less than under Alternative A), and 221,570 of BLM surface/federal mineral lands and 85,100 of split-estate lands (totaling 306,670 acres) acres would be closed to leasing (nearly 7 times more than under Alternative A). Impacts are described under ***Nature and Type of Effects***. Impacts on recreation are similar to those under Alternative A, but having fewer acres available to fluid minerals leasing would result in fewer areas impacted from construction and operation. Applying NSO stipulations on 318,630 acres of BLM-administered lands would preserve the natural character of the landscape and would maintain existing recreation opportunities. The type of impacts on recreation from applying CSU stipulations on 135,550 acres of BLM-administered lands are the same as under Alternative A but would occur over 25,770 more acres.

Impacts from mineral development and disposal are similar to those under Alternative A, although to a lesser extent because Alternative B includes more mineral withdrawals (and less area open to mineral entry) and more areas closed for disposal. Impacts are described under ***Nature and Type of Effects***. Overall, management of minerals development under Alternative B would result in less short- and long-term impacts on recreation settings (naturalness and remoteness) and activities than under Alternative A.

Under Alternative B, closing certain areas to overnight use (e.g., day-use areas, developed sites along the San Miguel River, SRMAs, and ACECs) would reduce the availability of camping and overnight use in the Decision Area over the long term and could push camping to sensitive areas less equipped for this activity.

Prohibiting target shooting in certain areas would reduce opportunities for this activity but would increase public safety in many parts of the Decision Area by focusing target shooting in appropriate locations. The prohibited areas include developed recreation sites, prairie dog habitat with burrowing owls, certain SRMAs, near residences, three ACECs, lands with wilderness characteristics, the Tabeguache Area, and WSAs.

Prohibiting recreational mining would force users to go outside the Decision Area for this activity, resulting in a loss of a close-to-home recreation opportunity for residents.

Issuing SRPs as discretionary actions would continue to provide opportunities for visitors to experience competitive and noncompetitive events, commercial outfitting services, and organized group outings.

Compared to Alternative A, travel areas managed as limited would decrease by 49,550 acres (8 percent), and areas managed as closed to mechanized use would increase by 57,880 acres (twice as many acres as under Alternative A). Additionally, areas closed to motorized use would increase by 58,110 acres, reducing the opportunity for this type of recreation. Eliminating open area designations would have a long-term direct effect on OHV use by eliminating this type of recreation. In particular, the North Delta OHV area would be directly affected, as OHV users in that area would be limited to existing routes until future route designation is completed. Managing 83 percent of the Decision Area as limited to designated routes would provide similar route-based opportunities than would Alternative A but over 8 percent fewer acres. The reduction in OHV opportunities in some areas could increase route densities in other areas.

Impacts from managing 431,040 acres as ROW exclusion (5 times more acres than under Alternative A) would occur over a larger area than under Alternative A. Managing 197,370 acres as ROW avoidance (compared to none under Alternative A) would limit development that could be incompatible with recreation in these areas. Types of impacts are described under ***Nature and Type of Effects***. As under

Alternative A, managing the West-wide Energy Corridor plus 14 additional major utility corridors could also result in the loss of recreation opportunities if development were to occur.

Alternative B would manage 215,940 acres as ACECs. Short- and long-term impacts from surface-disturbing activities are the same as under Alternative A but would occur over 186,400 additional acres. Recreation opportunities would be restricted for many users, while benefiting those who prefer to travel on foot or horse in a quiet setting. Specifically this entails limiting motorized and mechanized travel to designated routes, and in certain ACECs managing for day-use only, issuing no SRPs, prohibiting or restricting camping, and prohibiting campfires, wood collecting, rock climbing, recreational mining, and target shooting.

In addition to the impacts on WSAs and the Tabeguache Area described under ***Effects Common to All Alternatives***, Alternative B would also prohibit competitive events and target shooting in WSAs; impacts would be negligible because current and forecasted demand is very low.

Effects of managing stream segments as suitable for inclusion in the NSWRS are the same as those described under ***Nature and Type of Effects***. In addition, those segments classified as recreational (as defined by the Wild and Scenic Rivers Act) would also be managed as VRM Class III and ROW avoidance areas to allow for development along those segments.

If the Secretary of the Interior were to designate the Tabeguache and Paradox Trails as national recreation trails, the potential for increasing use could require additional management measures to ensure that user conflict and crowding are kept to a minimum over the long term.

Designating 25,790 acres of watchable wildlife viewing sites under Alternative B would provide improved opportunities for nonconsumptive wildlife viewing in the UFO.

All SRMAs

Three SRMAs partially or wholly overlap WSAs, where recreation setting characteristics would be managed for consistency with WSA management, thus providing nonmotorized and nonmechanized experiences. **Table 4-36** (WSA Overlap with SRMAs, Alternative B) displays the acreages of SRMA and WSA overlap.

Table 4-36
WSA Overlap with SRMAs, Alternative B

SRMA	Acres Overlapping WSAs
Dolores River Canyon	13,230
Paradox Valley	1,780
Roubideau	10,690

Source: BLM 2012a, 2018a

Portions or all of seven SRMAs would overlap ACECs, where recreation setting characteristics would be managed for consistency with ACEC management, thus a variety of nonmotorized and motorized recreational experiences would be provided in a way that protects ACEC values. **Table 4-37** (ACEC Overlap with SRMAs, Alternative B) provides the acreages of ACECs overlapping SRMAs.

Table 4-38 (NSO Overlap with SRMAs, Alternative B) displays the number of acres of overlapping SRMA and NSO designation. Generally, NSO stipulations would protect recreation experiences and settings by prohibiting surface-disturbing activities from fluid mineral development.

Table 4-37
ACEC Overlap with SRMAs, Alternative B

SRMA	Acres Overlapping ACECs
Dolores River Canyon	15,310
Dry Creek	14,310
Kinikin Hills	1,630
Paradox Valley	13,630
Roubideau	22,130
San Miguel River	34,740
Spring Creek	3,120

Source: BLM 2012a

Table 4-38
NSO Overlap with SRMAs, Alternative B

SRMA	Acres Overlapping NSO	
Burn Canyon	9,160	
Dolores River Canyon	0*	
Dry Creek	31,590*	
Jumbo Mountain	*Alt. B:* 4,710*	*Alt. B.1:* 5,020
Kinikin Hills	11,320	
North Delta	8,520	
Paradox Valley	74,060*	
Ridgway Trails	1,080*	
Roubideau	0*	
San Miguel River	0*	
Spring Creek	1,420	
Youngs Peak	2,710	

Source: BLM 2012a
*SRMA or portion of SRMA is closed to leasing.

Table 4-39 (Travel Management Area Designations in SRMAs, Alternative B) displays the travel and transportation management for each SRMA. No SRMAs would be managed as open to cross-country travel. In general, closures and seasonal limitations would preserve Back Country recreation setting characteristics, as discussed in the analysis for individual SRMAs, below.

Table 4-39
Travel Management Area Designations in SRMAs, Alternative B

SRMA	Closed to Motorized and Mechanized Travel (acres)	Closed to Motorized Travel (acres)	Limited to Designated Routes (acres)	Seasonal Limitations (acres)
Burn Canyon	3,490	0	5,670	8,800
Dolores River Canyon	13,370	0	0	9,810
Dry Creek	7,030	0	35,140	14,300
Jumbo Mountain	0	290	4,730	5,020
Kinikin Hills	510	3,900	6,910	6,270
North Delta	0	3,260	5,250	2
Paradox Valley	7,230	0	79,770	110

SRMA	Closed to Motorized and Mechanized Travel (acres)	Closed to Motorized Travel (acres)	Limited to Designated Routes (acres)	Seasonal Limitations (acres)
Ridgway Trails	0	1,130	0	1,100
Roubideau	18,330	0	7,020	24,670
San Miguel River	11,310	0	24,720	25,240
Spring Creek	0	3,560	1,420	4,910
Youngs Peak	0	0	2,710	0

Source: BLM 2012a

Of the 246,760 acres managed as SRMAs, 90,980 acres are in areas of very low to low oil and gas potential, 125,960 acres are in moderate potential areas, and 10 acres are in very high potential areas. Stipulations, discussed in the analysis for each SRMA, where applicable, would protect recreation experiences and settings by restricting or prohibiting fluid mineral development.

Burn Canyon SRMA

The Burn Canyon SRMA would target visitors who seek opportunities to participate in the following:

- Nonmotorized, nonmechanized, quiet trail activities (RMZ 1)
- Motorized and nonmotorized trail activities, including challenging natural-surfaced, disabled-accessible trails with adaptive equipment (RMZ 2)
- Backcountry activities (RMZ 3) with the realization of specific experience and beneficial outcomes identified in each SRMA zone objective

Allowing camping in designated areas only and prohibiting competitive events and target shooting in the SRMA would represent the loss of certain recreation opportunities but could maintain naturalness in certain areas where these activities would no longer occur and could increase the quality of targeted recreation opportunities. Prohibiting competitive events would also maintain the social setting expectations throughout the SRMA.

Dolores River Canyon SRMA

The Dolores River Canyon SRMA would target visitors who seek opportunities to participate in quiet water-based activities (RMZ 1) and nonmotorized, nonmechanized, quiet trail activities (RMZ 2), with the realization of specific experience and beneficial outcomes identified in each SRMA zone objective. Impacts on recreation from allowing camping in designated areas only and prohibiting competitive events and target shooting in the SRMA are the same as in the Burn Canyon SRMA. Motorized and mechanized recreation use would be prohibited, so motorized and mechanized use would be displaced to other areas of the Uncompahgre RMP Planning Area or outside it. Prohibiting motorized and mechanized recreation would help achieve desired Primitive and Back Country social recreation setting characteristics and achieve the overall SRMA objective of facilitating quiet activities.

Dry Creek SRMA

The Dry Creek SRMA would target visitors who seek opportunities to participate in the following:

- Motorized and mechanized technical riding activities (RMZ 1)
- Rock climbing and observing natural landscapes activities (RMZ 2)
- A variety of recreation activities (RMZ 3)
- Close to town nonmotorized activities, including natural-surfaced, disabled-accessible trails (RMZ 4), with the realization of specific experience and beneficial outcomes identified in each SRMA zone objective

Supporting management actions, including ROW avoidance, closure to mineral materials sales, and closure to coal and nonenergy solid leasable minerals leasing would facilitate attainment of desired Front Country physical recreation setting characteristics. Due to the wide range of restrictions on development, restrictions could cause some physical recreation setting characteristics to drift toward the Middle Country or Back Country. Managing RMZs 1, 3, and 4 as VRM Class III, and RMZ 2 as VRM Class II, would also be consistent with desired physical recreation setting characteristics. Proposed group sizes, access, and limitations on issuing SRPs would likely protect desired Middle Country social and operational recreation setting characteristics by moderating the amount and intensity of use in all RMZs. In the portion of RMZ 3 that is managed to protect wilderness characteristics, motorized and mechanized recreation would be lost, while opportunities for primitive and unconfined recreation would be enhanced.

Jumbo Mountain SRMA

The Jumbo Mountain SRMA would target visitors who seek particular recreation opportunities. These are the ability to participate in day-use, stacked loop, nonmotorized trail activities in RMZ 1 and in motorized and mechanized trail riding activities in RMZ 2, with the realization of specific experience and beneficial outcomes identified within each SRMA zone objective. Restrictions associated with RMZs in this SRMA would facilitate attainment of desired Front Country physical recreation setting characteristics. Restrictions include ROW avoidance, closure to mineral materials sales, and closure to coal and nonenergy solid minerals leasing. Under Alternative B, RMZ 1 would be closed to fluid mineral leasing and exploration while such activity in RMZ 2 would be subject to an NSO stipulation. Under Alternative B.1, the entire SRMA would be subject to an NSO stipulation. The wide range of restrictions on development could cause some physical recreation setting characteristics to drift toward the Middle Country or Back Country. The proximity of RMZ 1 to the town of Paonia could result in increased demand over the life of the RMP. This would require a Middle- or Front Country access setting instead of the proposed Back Country setting.

Kinikin Hills SRMA

The Kinikin Hills SRMA would target visitors who seek opportunities to participate in the following, with the realization of specific experience and beneficial outcomes identified within each SRMA zone objective:

- Day-use, nonmotorized, nonmechanized, single-track trail activities (RMZ 1)
- Day-use, nonmotorized, stacked loop, single-track trail activities (RMZ 2)
- A variety of day-use motorized and mechanized trail activities (RMZ 3)

Management as VRM Class III would allow development consistent with desired Middle- and Front Country physical recreation setting characteristics. However, due to the wide range of other actions that restrict development, some physical recreation setting characteristics could drift toward a Back Country setting.

North Delta SRMA

The North Delta SRMA would target visitors who seek opportunities to participate in day-use, nonmotorized, nonmechanized, single-track trail activities (RMZ 1) and in motorized, single- and two-track trail activities (RMZ 2), with the realization of specific experience and beneficial outcomes identified within each SRMA zone objective. In RMZ 1, supporting management actions, including ROW avoidance, closure to mineral materials sales, and closure to coal and nonenergy solid leasable minerals leasing, would help physical recreation setting characteristics to drift toward Middle country over the life of the RMP. The same actions in RMZ 2 would have a similar effect and could cause physical recreation setting characteristics to move away from desired Front Country recreation setting characteristics.

Allowing facility construction in both RMZs to achieve SRMA objectives would facilitate desired educational experiences in RMZ 2.

Paradox Valley SRMA

The Paradox Valley SRMA would target visitors who seek opportunities to participate in the following:

- Water-based and scenic/historical touring activities (RMZ 1)
- Rock climbing and observing natural landscapes activities (RMZ 2)
- A wide variety of motorized and nonmotorized activities (RMZ 3)
- Quiet nonmotorized, nonmechanized activities (RMZ 4) with the realization of specific experience and beneficial outcomes identified within each SRMA zone objective

Allowing target shooting in RMZs 3 and 4 would provide opportunities for visitors seeking a shooting experience, but it could result in the potential loss of naturalness in localized areas and impair the quality of other recreation experiences, especially those users seeking opportunities for primitive and unconfined recreation in the proposed Roc Creek lands with wilderness characteristic unit.

In RMZs 1 through 3, supporting management actions could cause physical recreation setting characteristics to drift toward back- or Middle Country settings, instead of desired Front Country and Rural settings. These management actions include ROW avoidance, closure to mineral materials sales, and closure to coal and nonenergy solid leasable minerals leasing. In RMZ 4, the same actions would likely be compatible with attainment of Middle and Back Country settings, especially where the RMZ overlaps the proposed Roc Creek lands with wilderness characteristic unit.

Ridgway Trails SRMA

The Ridgway Trails SRMA would target visitors who seek opportunities to participate in day-use nonmotorized and educational activities (RMZ 1) and day-use, stacked loop, nonmotorized trail activities (RMZ 2), with the realization of specific experience and beneficial outcomes identified within each SRMA zone objective. Prohibiting camping, competitive events, and target shooting in the SRMA would mean the loss of certain recreation opportunities but could maintain naturalness in certain areas and increase the quality of other recreation opportunities. Motorized recreation would not be protected. As a result, motorized visitors would be displaced to other parts of the Planning Area or outside of it, which would result in negligible social and economic effects. The Ridgway community would gain social and economic influences from nonmotorized developed recreation near town.

The BLM's ability to adequately provide day-use, outdoor living, classroom activities could be limited by a desired Middle Country visitor services recreation setting characteristic. As in other SRMAs, management actions could be too restrictive for desired physical recreation setting characteristics.

Roubideau SRMA

The Roubideau SRMA would target visitors who seek opportunities to participate in the following:

- Nonmotorized, nonmechanized, backcountry activities (RMZ 1)
- Nonmotorized, nonmechanized, canyon-viewing activities (RMZ 2)
- Quiet use, nonmotorized recreation (RMZ 3)
- Canyon-overlook activities (RMZ 4), all with the realization of specific experience and beneficial outcomes identified within each SRMA zone objective

Limiting permits for nonmotorized events to two annually in RMZ 4 would provide opportunities for these activities in these areas of the SRMA, but it would alter the desired Middle Country social recreation setting characteristic of the RMZ during events. Impacts on recreation from prohibiting target shooting in the SRMA are the same as in the Burn Canyon SRMA.

Management actions for RMZ 1, including closure to fluid minerals leasing, would be consistent with desired Back Country recreation setting characteristics.

Prohibiting motorized and mechanized travel in RMZ 3 would limit hunting to foot traffic, potentially displacing some users to other less-desirable parts of the Decision Area.

San Miguel River SRMA

The San Miguel River Canyon SRMA would target visitors who seek opportunities to participate in the following:

- Motorized and nonmotorized scenic touring and nonmotorized water-based activities (RMZ 1)
- Nonmotorized, nonmechanized canyon exploring, with the exception of a few motorized routes (RMZ 2)
- Nonmotorized, nonmechanized, remote river canyon-viewing activities (RMZ 3)
- Scenic viewing through camping and nonmotorized water-based activities (RMZ 4), all with the realization of specific experience and beneficial outcomes identified within each SRMA zone objective

Allowing camping only in Lower Beaver and Caddis Flats in RMZ 1 would reduce the opportunities for a camping experience in this area and would cause camping use to move elsewhere in the surrounding area. Camping in RMZs 2, 3, and 4 would also be more restrictive, limiting camping to designated sites and for a maximum of 7 days. As a result, there could be an increase in illegal camping across the SRMA and in adjacent areas less equipped for this use.

In RMZs 1 and 2, prohibiting competitive events and limiting commercial outfitters to seven outfitters with up to two launches a day may not be adequate to meet expected demand over the life of the RMP. Similar impacts could be expected in RMZs 3 and 4, where competitive events would be prohibited and commercial outfitters would be restricted to seven outfitters with up to two launches a day above the Norwood Bridge, and restricted to five outfitters with up to two launches a day below the Norwood Bridge. Proposed management actions in each RMZ would be consistent with the attainment of desired recreation objectives.

Impacts on recreation from prohibiting target shooting in the SRMA are the same as in the Burn Canyon SRMA.

Spring Creek SRMA

The Spring Creek SRMA would target visitors who seek opportunities to participate in the following:

- Day-use, nonmotorized, single-track, stacked loop trail activities (RMZ 1)
- Canyon viewing through nonmotorized, single-track trail activities (RMZ 2)
- Camping and scenic viewing through motorized and nonmotorized trail activities (RMZ 3), all with the realization of specific experience and beneficial outcomes identified within each SRMA zone objective

Allowing camping at designated sites in RMZs 2 and 3 would provide opportunities to camp in this SRMA. In RMZ 3, a limit of up to three nonmotorized competitive events may not meet demand throughout the life of the RMP, but it would help preserve desired Middle Country social recreation setting characteristics during most of the year. Restrictive management actions would largely help attain desired physical recreation setting characteristics, but they could be too stringent for desired Front Country recreation setting characteristics for remoteness. Impacts on recreation from prohibiting target shooting in the SRMA are the same as in the Burn Canyon SRMA.

Youngs Peak SRMA

The Youngs Peak SRMA would target visitors who seek opportunities to participate in the following:

- Day-use, nonmotorized, single-track, stacked loop trail activities (RMZ 1)
- Canyon viewing through nonmotorized, single-track trail activities (RMZ 2)
- Camping and scenic viewing through motorized and nonmotorized trail activities (RMZ 3), all with the realization of specific experience and beneficial outcomes identified within each SRMA zone objective

Allowing camping at designated sites in RMZs 2 and 3 would provide opportunities to camp in this SRMA. In RMZ 3, a limit of up to three nonmotorized competitive events may not meet demand throughout the life of the RMP, but it would help preserve desired Middle Country social recreation setting characteristics during most of the year. Restrictive management actions would largely help attain desired physical recreation setting characteristics, but they could be too stringent for desired Front Country recreation setting characteristics for remoteness. Impacts on recreation from prohibiting target shooting in the SRMA are the same as in the Burn Canyon SRMA.

Alternative C

Under Alternative C, 12 ERMAs would be managed to support principal recreation activities. Recreation would be managed commensurate with other resources within ERMAs. There would be no SRMA management, so recreation outcomes would not be protected under this alternative. Over time, specific valued outcomes desired by current visitors, service providers, and affected communities may not be available in the future. However, opportunities for a variety of recreation activities would be protected. Recreation management actions to protect and provide recreation (trail design, construction, maintenance, and access points) would help mitigate conflict among user groups and with important biological resources.

Decision Area

Under Alternative C, the BLM would seek to manage at a minimum BLM Colorado Public Land Health Standards (BLM 1997) through proposed management actions, resulting in fewer restrictions on recreation.

Less-restrictive stipulations than Alternative A would be implemented. Impacts are similar to those under Alternative A, although there would be fewer areas restricted and additional less-restrictive actions implemented (CSU and SSR) (refer to **Table 2-1** for acreages). Effects are described under ***Nature and Type of Effects***. By implementing fewer restrictions on recreation, biological resources management would facilitate more opportunities to participate. Less-restrictive measures under Alternative C include allowing construction of new routes in sensitive vegetation communities and riparian areas, instead of closing these areas to new routes and allowing surface disturbance closer to riparian areas. Both could provide more opportunities for recreation over the long term.

Alternative C would apply seasonal disruptive and surface-disturbance restrictions, which would benefit hunting and nonconsumptive wildlife viewing opportunities. However, Alternative C would also apply seasonal travel closures on 19,580 acres (67 percent fewer acres than under Alternative A). This would result in site-specific temporary losses of motorized recreation access. The types of impacts are similar to those under Alternative A, but they would occur over a smaller area.

Alternative C would manage 24,150 acres as ecological emphasis areas, with specific measures designed to protect or enhance resource values, enhancing opportunities for activities that depend on or improved by natural-appearing landscapes.

Restrictions on recreational mining in developed rec sites and the type of recreational mining would result in fewer opportunities to engage in this activity.

Effects of temporary or permanent restrictions associated with cultural resource areas are the same as those described for Alternative B.

Effects of managing 75,480 acres (14 percent more than under Alternative A) as VRM Classes I and II are the same as those described under ***Nature and Type of Effects***, but they would occur over a greater area. Alternative C would manage the remaining lands as VRM Classes III and IV (no areas would be undesignated like under Alternative A). The types of impacts are described under ***Nature and Type of Effects*** and would occur on fewer acres.

Impacts on recreation on areas available to livestock grazing are described under ***Nature and Type of Effects***. The impacts would occur over a larger area than under Alternative A because there would be 5 percent, (10,640 acres) more acres available for livestock grazing under Alternative C. As a result, conflicts with unsocialized sheep guard dogs, as well as trampling and manure impacts at popular recreation sites (e.g., campsites and trails) could be slightly increased under Alternative C.

Under Alternative C, 631,580 acres would be managed as open to fluid mineral leasing and geophysical exploration, and 44,220 acres would be closed to leasing (the same as under Alternative A). Impacts are described under ***Nature and Type of Effects***. Impacts on recreation are similar to those under Alternative A. Applying NSO stipulations on 14,680 acres of BLM-administered lands would preserve the natural character of the landscape and would maintain existing recreation opportunities in these areas. The types of impacts on recreation from applying CSU stipulations on 365,810 acres of BLM-administered lands are the same type as those under Alternative A; however, more areas would be impacted.

The types of impacts from mineral development are similar to those under Alternative A, but they would occur over a smaller area. Recommending 9,550 acres for withdrawal from entry would result in the same types of impacts as under Alternative A, but they would occur over a larger area. Managing 619,450 acres as open for mineral materials disposal would also result in the same types of impacts as under Alternative A, but they would occur over a smaller area.

Alternative C would close fewer areas to overnight use (e.g., day-use areas, three ACECs, and the San Miguel River SRMA) than under Alternative A. Compared to Alternative A, more recreation opportunities would be lost in the long term by continuing to prohibit target shooting within developed recreation sites, and by prohibiting recreational mining in developed recreation sites. However, this could maintain naturalness in specific areas where these activities would no longer occur and would increase the quality of other recreation opportunities. Designated target shooting areas and ranges would be allowed, which could increase recreational opportunities by providing managed, accessible, and designated areas for shooting; however, they would not be allowed until BLM policy changes on designating target shooting areas and ranges (BLM Instruction Memorandum 2008-074, Authorizing Shooting Sports). Impacts from Issuing SRPs are the same as those under Alternative A.

Types of impacts of travel management are described under ***Nature and Type of Effects***. The magnitude of change would directly affect the intensity of the impact; compared to Alternative A, areas managed as open would increase by 1 percent, and areas managed as closed would decrease by 1 percent. Areas closed to motorized and mechanized use, and where such use is limited to designated routes, would increase by less than 1 percent. Expanding open area designations would have a long-term direct effect on OHV use by increasing the area available for open cross-country motorized recreation in the North Delta OHV area and the Kinikin Hills ERMA. The reduction in OHV opportunities in some areas could increase route densities in other areas.

Under Alternative C, a total of 44,550 acres would be ROW exclusion areas (48 percent fewer acres than under Alternative A), and 210,390 acres would be ROW avoidance areas (compared with none under Alternative A). The types of short- and long-term impacts from ROW management actions are the same as those described under ***Nature and Type of Effects***. They would occur over a smaller area than under Alternative A. Impacts from communication sites and utility corridors are similar to those under Alternative B; however, less-restrictive management would further decrease naturalness and remoteness.

Similar to Alternative A, Alternative C would designate 29,440 acres as ACECs (all ACECs except the Tabeguache Creek ACEC). However, restrictions on activities would be greater than under Alternative A, further reducing opportunities to participate in some activities, while providing greater protection for others, such as hunting, hiking and horseback riding.

The types of impacts on recreation from managing the Tabeguache Area and WSAs are the same as those described under Alternatives A and B.

Under Alternative C, releasing all 29 WSR segments from interim management protections afforded to eligible segments would result in the loss of protections for recreational activities that are enhanced by protection of recreational ORVs. However, fewer restrictions to protect other ORVs or tentative classifications could also lead to a greater diversity of recreational opportunities along those stream segments.

Impacts on recreation from managing National Trails are the same as those described under Alternative B.

All ERMAs

Table 4-40 (WSA Overlap with ERMAs, Alternative C) provides the acreages of WSAs overlapping WSAs. WSA management would generally facilitate nonmotorized, nonmechanized activities.

Table 4-41 (ACEC Overlap with ERMAs, Alternative C) provides the acreages of ACECs overlapping ERMAs. ACEC management would generally facilitate quiet recreation.

Table 4-40
WSA Overlap with ERMAs, Alternative C

ERMA	Acres Overlapping WSAs
Adobe Badlands	6,360
Dolores River Canyon	13,210
Roubideau	10,390

Source: BLM 2012a

Table 4-41
ACEC Overlap with ERMAs, Alternative C

ERMA	Acres Overlapping ACECs
Adobe Badlands	6,360
San Miguel River Corridor	22,410

Source: BLM 2012a

Table 4-42 (NSO Overlap with ERMAs, Alternative C) displays the number of acres of overlapping ERMA and NSO designation. Generally, NSO stipulations would protect recreation by prohibiting surface-disturbing activities from fluid mineral development.

Table 4-42
NSO Overlap with ERMAs, Alternative C

ERMA	Acres Overlapping NSO
Dry Creek	2,120
Kinikin Hills	40
Paradox Valley	2,700
San Miguel River Corridor	430

Source: BLM 2012a

Table 4-43 (Travel Management Area Designations in ERMAs, Alternative C) displays transportation and travel management for ERMAs. The types of impacts from these designations are the same as those described under Alternative B. However, Alternative C includes more acres where motorized travel would be limited to designated routes and fewer acres where motorized travel would be closed, thereby preserving additional opportunities for motorized recreation.

Table 4-43
Travel Management Area Designations in ERMAs, Alternative C

ERMA	Open to Cross-Country Travel (acres)	Closed to Motorized and Mechanized Travel (acres)	Closed to Motorized Travel (acres)	Limited to Designated Routes (acres)	Seasonal Limitations (acres)
Adobe Badlands	0	6,360	0	0	0
Burn Canyon	0	0	0	9,160	0
Dolores River Canyon	0	13,330	0	0	9,770
Dry Creek	0	0	0	41,210	0
Jumbo Mountain	0	0	0	5,020	0
Kinikin Hills	10,810	0	10,810	510	0
North Delta	5,260	0	0	3,270	0
Paradox Valley	0	910	0	44,240	0
Ridgway Trails	0	0	0	1,110	0
Roubideau	0	10,690	0	10,970	0
San Miguel River Corridor	0	0	0	35,570	9,540
Spring Creek	0	0	0	13,500	0

Source: BLM 2012a

Adobe Badlands ERMA

The Adobe Badlands ERMA would focus recreation and visitor services on protecting backcountry nonmotorized and nonmechanized recreation (e.g., hiking, horseback riding, hunting, and dispersed camping). Restrictions stemming from managing 6,360 acres of the ERMA as the Adobe Badlands ACEC would be unlikely to reduce recreation because hiking, horseback riding, hunting, and dispersed camping are largely compatible with protected landscapes. An ERMA designation would likely increase use; the potential for user conflict would be mitigated through professional trail design and by restricting motorized activities where conflict occurs.

Burn Canyon ERMA

The Burn Canyon ERMA would offer motorized and nonmotorized opportunities (e.g., ATV and motorcycle riding, mountain biking, and hiking). However, the likely increase in use resulting from an ERMA designation could lead to a higher risk of user conflicts. Over the long term, conflicts could

displace visitors, and opportunities in the area could be lost. Management as VRM Class III would provide moderate protection for recreation to continue throughout the ERMA.

Dolores River Canyon ERMA

The Dolores River Canyon ERMA would offer nonmotorized and nonmechanized trail and water-based activities (e.g., hiking, rafting, kayaking, and fishing). Over the long term, increased use and user conflict could displace visitors, and opportunities in the area could be lost.

Dry Creek ERMA

The Dry Creek ERMA would offer a variety of established recreation activities (e.g., OHV riding, mountain biking, hiking, hunting, and scenic driving). Over the long term, increased use and user conflict could displace visitors, and opportunities in the area could be lost.

Jumbo Mountain ERMA

The Jumbo Mountain ERMA would offer a variety of established recreation activities (e.g., OHV riding, mountain biking, hiking, and hunting). Over the long term, increased use and user conflict could displace visitors, and opportunities in the area could be lost. Management as VRM Class III would provide moderate protection for recreation to continue throughout the ERMA.

Kinikin Hills ERMA

The Kinikin Hills ERMA would offer unique open cross-country motorized and nonmotorized trail activities (e.g., OHV riding, mountain biking, and hiking). However, designating the ERMA as open to cross-country motorized and nonmotorized travel would further increase the likelihood of user conflicts and the potential for displacing certain activities.

North Delta ERMA

The Delta ERMA would offer unique open cross-country motorized and nonmotorized trail activities (e.g., OHV riding, mountain biking, and hiking). However, designating the ERMA as open to cross-country motorized and nonmotorized travel would further increase the likelihood of user conflicts and the potential for displacing certain activities.

Paradox Valley ERMA

The Paradox Valley ERMA would offer a variety of established recreation activities (e.g., OHV riding, mountain biking, hiking, rock climbing and bouldering, rafting, scenic touring, and hunting). Management as VRM Class III would provide moderate protection for recreation to continue throughout the ERMA.

Ridgway Trails ERMA

The Ridgway Trails ERMA would offer a variety of established recreation activities (e.g., OHV riding, mountain biking, hiking, and hunting). Management as VRM Class III would provide moderate protection for recreation to continue throughout the ERMA.

Roubideau ERMA

The Roubideau ERMA would offer of backcountry recreation activities (e.g., hiking, horseback riding, hunting, and camping). Management as VRM Class III would provide moderate protection for recreation to continue throughout the ERMA.

San Miguel River Corridor ERMA

The San Miguel River ERMA would offer a variety of established recreation activities (e.g., mountain biking, hiking, rafting, and scenic touring). Restrictions stemming from managing 22,410 acres of the

ERMA as the San Miguel River ACEC could reduce recreation opportunities where developed or intensive activities are incompatible with protected landscapes.

Spring Creek ERMA

The Spring Creek ERMA would offer a variety of established recreation activities (e.g., OHV riding, mountain biking, hiking, hunting, and camping). Over the long term, increased use and user conflict could displace visitors, and opportunities in the area could be lost.

Alternative D

Similar to Alternative B, recreation decisions to manage seven SRMAs would provide long-term protection of targeted recreation outcomes in those areas. Similar to Alternative C, recreation decisions to manage four ERMAs would support principal recreation activities, and recreation would be managed commensurate with other resources in these areas.

Decision Area

Similar to Alternatives B and C, restrictions on uses or types of uses would be implemented to reduce disturbance in areas with sensitive biological resources. These restrictions would limit some recreation, while providing improved opportunities for other activities, such as wildlife viewing and hiking. As under Alternatives B and C, Alternative D would include more management measures to protect biological resources than would Alternative A (refer to **Table 2-1** for acreages). Effects are described under ***Nature and Type of Effects***.

Alternative D would manage 177,700 acres as ecological emphasis areas with specific measures designed to protect or enhance resource values, resulting in the same type of impacts as those discussed under Alternative B. Alternative D would also protect perennial streams with NSO/SSR measures, prohibiting development that could interfere with recreation. Overall, impacts from applying stipulations are similar to those under Alternative A, although there would be more areas restricted and consequently more areas where recreation would be protected.

Alternative D would apply seasonal disruptive and surface-disturbance restrictions for biological resources management, resulting in the same impacts on recreation as under Alternative B. Applying seasonal travel closures on 81,920 acres to protect wildlife would result in similar impacts as those under Alternative A, but over 28 percent more acres. This would result in fewer opportunities to participate in year-round motorized and mechanized recreation.

Limitations on the location, timing, and type of recreational mining would result in fewer opportunities to engage in this activity.

Effects of temporary or permanent restrictions associated with cultural resource areas are the same as those described for Alternative B.

The types of short- and long-term impacts from managing 158,980 acres (2 times more than under Alternative A) as VRM Classes I and II are the same as those described under ***Nature and Type of Effects***, but they would occur over a larger area. Alternative D would manage the remaining 516,820 acres as VRM Classes III and IV (no areas would be undesignated like under Alternative A), resulting in impacts similar to those under ***Nature and Type of Effects*** but occurring over a larger area.

Managing to protect 18,320 acres of lands with wilderness characteristics units would result in the same type of impacts as under Alternative B. However, allowing target shooting and motorized and mechanized travel on designated routes would increase the recreation opportunities in these areas at the expense of users who prefer quiet areas and those open only to foot and horse travel.

Impacts on recreation on areas available to livestock grazing are described under ***Nature and Type of Effects***. The impacts would occur over a slightly smaller area than under Alternative A because there would be 2,580 fewer acres available for livestock grazing under Alternative D. As a result, conflicts with unsocialized sheep guard dogs, as well as trampling and manure impacts at popular recreation sites (e.g., campsites and trails) could be slightly reduced under Alternative D.

Under Alternative D, 627,290 acres of BLM-administered lands would be managed as open to fluid mineral leasing and geophysical exploration (less than 1 percent fewer acres than under Alternative A). Of the 196,580 acres managed as SRMAs and ERMAs, 4,000 acres are in areas with negligible potential, 84,110 acres are in areas of very low to low oil and gas potential, and 85,280 acres are in moderate potential areas. Impacts are described under ***Nature and Type of Effects***. Impacts on recreation are similar to those under Alternative A; however, having fewer acres available to fluid minerals leasing would result in fewer areas impacted. Applying NSO stipulations on 187,560 acres would preserve the natural character of the landscape and would maintain existing recreation opportunities. Impacts on recreation from applying CSU stipulations on 265,140 acres are the same as those under Alternative A; however, 154,960 additional acres would be impacted.

Impacts from mineral development are similar to those under Alternative A, but they would occur over a smaller area. Impacts are described under ***Nature and Type of Effects***. Because more areas are available for disposal, short- and long-term impacts on recreation would be greater than under Alternative A.

Under Alternative D, closing certain areas to overnight use (e.g., day-use areas, developed recreation sites along the San Miguel River, and specific SRMAs, ERMAs, and ACECs) would result in impacts similar to those under Alternatives B and C. Under Alternative D, there would be more long-term loss of recreation opportunities than under Alternative A by prohibiting recreational mining and target shooting within and near developed recreation sites, near residences, and in specific ACECs and SRMAs. However, this could also result in the potential for maintaining naturalness in localized areas where these activities would no longer occur and could increase the quality of other recreation opportunities.

Issuing SRPs as discretionary actions would continue to provide opportunities for visitors to experience competitive and noncompetitive events and to patronize commercial outfitting services.

There would be long-term changes to travel management area designations, including the elimination of areas managed as open and the conversion of all areas would be managed as limited to designated routes. Compared with Alternative A, areas managed as limited would be increased by 6,150 acres (1 percent), closed areas would increase by 2,410 acres (less than 1 percent), and areas closed to mechanized use would increase by 13,200 acres. This would result in fewer cross-country and trail-based motorized and mechanized opportunities than under Alternative A. The prohibition on open cross-country motorized and mechanized use would directly affect popular areas like the North Delta OHV area, as described under Alternative B. Management of a large portion of the Planning Area (91 percent) as limited to designated routes would provide travel-based recreation opportunities similar to those under Alternatives A, B, and C. Like Alternative B, the reduction in OHV opportunities in some areas could increase motorized recreation levels in other areas.

Managing 53,700 acres as ROW exclusion areas (37 percent fewer acres than under Alternative A) would result in the same type of impacts as those described under ***Nature and Type of Effects*** and would occur over 31,380 fewer acres than under Alternative A. Managing 276,500 acres as ROW avoidance areas (there are none under Alternative A) would limit development that could reduce recreation opportunities. Impacts from communication sites and utility corridors are similar to those

under Alternative B, but more-restrictive management would also enhance recreation opportunities in these areas.

The types of impacts from managing 51,320 acres as ACECs are similar to those under Alternative A, but they would occur over a larger area.

In addition to the impacts from WSAs and the Tabeguache Area described under ***Effects Common to All Alternatives***, Alternative D would also prohibit competitive events in WSAs; impacts would be negligible because current and forecasted demand is very low.

Under Alternative D, the following stream segments with an identified recreation ORV would be determined suitable for inclusion in the NWSRS: Roubideau Creek Segment 1; San Miguel River Segments 1, 2, 3, 5, and 6; Lower Dolores River; Dolores River Segments 1a and 2; and La Sal Creek Segment 3. Effects of are as described under ***Nature and Type of Effects***. In addition, managing Beaver Creek and La Sal Creek Segment 2 with a recreational tentative classification would allow for development needed for recreation, so long as ORVs are protected.

Impacts on recreation from managing National Trails are the same as those under Alternative B.

All SRMAs and ERMAs

Three SRMAs partially or wholly overlap WSAs, where recreation setting characteristics would be managed for consistency with WSA management, providing nonmotorized, nonmechanized experiences. **Table 4-44** (WSA Overlap with SRMAs, Alternative D) displays the acreages of SRMA and WSA overlap.

Table 4-44
WSA Overlap with SRMAs, Alternative D

SRMA	Acres Overlapping WSAs
Dolores River Canyon SRMA	13,230
Roubideau SRMA	10,690

Source: BLM 2012a

Portions or all of three SRMAs would overlap ACECs, where recreation setting characteristics would be managed for consistency with ACEC management, thus largely providing quiet recreation. A small portion of the Paradox Valley ERMA would also overlap the Biological Soil Crust ACEC and Paradox Rock Art ACEC, protecting quiet recreation in those areas. **Table 4-45** (ACEC Overlap with SRMAs and ERMAs, Alternative D) provides the acreages of ACECs overlapping SRMAs and ERMAs.

Table 4-45
ACEC Overlap with SRMAs and ERMAs, Alternative D

SRMA or ERMA	Acres Overlapping ACECs
Dolores River Canyon SRMA	9,710
Paradox Valley ERMA	1,080
Roubideau SRMA	25,360
San Miguel River SRMA	34,230

Source: BLM 2012a

Table 4-46 (NSO Overlap with SRMAs and ERMAs, Alternative D) displays the number of acres of overlapping RMAs and NSO management. Generally, NSO stipulations would protect recreation by prohibiting surface-disturbing activities from fluid mineral development.

Table 4-46
NSO Overlap with SRMAs and ERMAs, Alternative D

SRMA or ERMA	Acres Overlapping NSO
Burn Canyon ERMA	1,810
Dolores River Canyon SRMA	13,380
Dry Creek SRMA	13,440
Jumbo Mountain SRMA	1,360
Kinikin Hills ERMA	1,850
North Delta ERMA	1,600
Paradox Valley ERMA	12,420
Ridgway Trails SRMA	1,130
Roubideau SRMA	25,360
San Miguel River SRMA	34,230
Spring Creek SRMA	4,980

Source: BLM 2012a, 2018a

Table 4-47 (Travel Management Area Designations in SRMAs and ERMAs, Alternative D) displays travel area management for SRMAs and ERMAs. No SRMAs or ERMAs would be managed as open to cross-country travel.

Table 4-47
Travel Management Area Designations in SRMAs and ERMAs, Alternative D

SRMA or ERMA	Closed to Motorized and Mechanized Vehicles (acres)	Closed to Motorized Vehicles (acres)	Limited to Designated Routes (acres)	Seasonal Limitations (acres)[1]
Burn Canyon ERMA	0	0	9,160	0
Dolores River Canyon SRMA	13,370	0	0	9,800
Dry Creek SRMA	0	0	42,180	11,010
Jumbo Mountain SRMA	0	290	1,070	0
Kinikin Hills ERMA	0	0	10,810	0
North Delta ERMA	0	0	8,510	2
Paradox Valley ERMA	0	0	45,160	0
Ridgway Trails SRMA	0	20	1,100	1,100
Roubideau SRMA	17,670	0	7,680	14,250
San Miguel River SRMA	5,530	0	30,060	0
Spring Creek SRMA	0	860	4,130	3,290

Source: BLM 2012a, 2018a

[1] Seasonal limitations would result from management of other sensitive resources (e.g., wintering big game); seasonal limitations may also be in the form of route limitations; not area wide (e.g., Burn Canyon ERMA has seasonal restrictions on the designated routes not area wide).

Dolores River Canyon SRMA

The Dolores River Canyon SRMA would be managed to protect the same outcomes and provide the same recreation opportunities as Alternative B. Impacts on recreation are similar to those described under Alternative B. However, managing the SRMA as ROW avoidance and with an NSO stipulation (as opposed to ROW exclusion and closed to fluid minerals leasing under Alternative B) would help the BLM attain a Middle Country recreation setting characteristic for naturalness. Alternative D would also allow dispersed camping in both RMZs, which would facilitate additional unrestricted camping.

Dry Creek SRMA

The Dry Creek SRMA would be managed for Front Country social and operational recreation setting characteristics, as opposed to Middle Country recreation setting characteristics under Alternative B. These recreation setting characteristics would likely be realized by allowing competitive events and overnight camping in designated sites and areas (RMZs 1 and 2) and undeveloped camping (RMZ 3). Less-restrictive management actions, including a CSU stipulation (RMZs 1 and 3), NSO stipulation (RMZs 2 and 4), open to utility construction (all RMZs), and VRM Class III (all RMZs) would be consistent with desired physical recreation setting characteristics in all RMZs.

Jumbo Mountain SRMA

The Jumbo Mountain SRMA would be managed for the same activities, experiences, and benefits as under Alternative B, but proposed recreation setting characteristics are largely Front Country under Alternative D, as opposed to primarily Middle Country under Alternative B. For example, proposed social recreation setting characteristics would be realized by managing to accommodate more contacts and larger groups, and physical recreation setting characteristics would be realized through NSO stipulations (RMZ 1), VRM Class III (RMZs 1 and 2), and ROW exclusion or avoidance (RMZs 1 and 2). Additionally, Alternative D would allow dispersed camping (RMZ 2), which would provide additional camping experiences. Competitive events would also be allowed in RMZ 2, which would provide opportunities for this type of experience but would alter the social recreation setting characteristic during events.

Ridgway Trails SRMA

The Ridgway Trails SRMA would be managed for the same activities, experiences, and benefits as under Alternative B, but proposed recreation setting characteristics would fall under a mix of Front Country and Rural settings, as opposed to being primarily Front Country in Alternative B. The social recreation setting characteristics would be realized by accommodating more contacts and larger groups, and proposed physical recreation setting characteristics could be realized through opening the SRMA to fluid mineral leasing (with an NSO stipulation) and not managing any acres as ROW exclusion or avoidance. Additionally, motorized travel on designated routes would be allowed (RMZ 2), and nonmotorized events (RMZ 1) and competitive events (RMZ 2) would also be allowed in a portion of the SRMA. These actions would be consistent with desired recreation setting characteristics, although competitive events could alter the social recreation setting characteristics during events.

Roubideau SRMA

The Roubideau SRMA would be managed for the same activities, experiences, and benefits as under Alternative B. Proposed recreation setting characteristics in RMZ 1 would be largely identical to those under Alternative B, with only a few differences. Allowing nonmotorized competitive events would help attain Back Country social recreation setting characteristics for contacts if the events were small or confined to a portion of the SRMA. The impacts on social recreation setting characteristics from allowing target shooting are similar and would help the BLM attain a Back Country setting for contacts.

Proposed recreation setting characteristics in RMZs 2, 3, and 4 are shifted one level from their proposed levels under Alternative B (e.g., from Back Country to Middle Country, or from Front Country to Urban). Management actions largely support this shift, as evidenced through management as VRM Class III (RMZs 2, 3, and 4), ROW avoidance (RMZs 2 and 3), allowing dispersed camping (RMZs 2 and 3), and allowing nonmotorized competitive events (RMZs 2 and 3, and an annual limit of two events in RMZ 4).

San Miguel River SRMA

The San Miguel SRMA would be managed for the same activities, experiences, and benefits as under Alternative B. Proposed recreation setting characteristics would also be the same as under Alternative B, except for managing the naturalness setting in RMZ 2 as Middle Country instead of Back Country. Whereas proposed management actions under Alternative B could have caused some recreation setting characteristics to drift toward a less-developed setting, Alternative D proposes actions that are complementary to desired recreation setting characteristics. Examples include opening the area to fluid mineral leasing with a CSU stipulation (RMZ 4) or NSO stipulation (RMZs 1, 2, and 3), not managing the area as ROW exclusion or avoidance (RMZs 1 and 4), and allowing nonmotorized competitive events (RMZs 1 and 4).

Spring Creek SRMA

The Spring Creek SRMA would be managed for the same activities, experiences, and benefits as under Alternative B, except that motorcycle riding would be targeted in RMZ 2 in addition to nonmotorized activities. In general, desired recreation setting characteristics would trend toward more-developed settings than under Alternative B. Many management actions support the desired recreation setting characteristics, including assigning VRM Class III (RMZ 1), opening the area to fluid mineral leasing with an NSO stipulation (RMZs 1 and 2), and allowing competitive events (nonmotorized events in RMZ 1, nonmotorized and nonmechanized events in RMZ 2, and competitive events in RMZ 3). However, group size restrictions would likely not allow desired Front Country and Rural (RMZ 1) and Front Country (RMZ 3) social recreation setting characteristics for group sizes, except during competitive events.

Burn Canyon ERMA

The Burn Canyon ERMA would offer the same recreation activities as under Alternative C. Applying a CSU stipulation on the entire ERMA and an NSO stipulation on 1,810 acres would provide moderate protection for recreation to continue throughout the ERMA.

Kinikin Hills ERMA

The Kinikin Hills ERMA would offer the same recreation activities as under Alternative C, but Alternative D would limit motorized and mechanized travel to designated routes, thus limiting opportunities for open cross-country travel. Applying a CSU stipulation on the entire ERMA, applying an NSO stipulation on 1,850 acres, and managing the ERMA as VRM Class III would provide moderate protection for recreation to continue throughout the ERMA.

North Delta ERMA

The North Delta ERMA would offer the same recreation activities as Alternative C, but Alternative D would limit motorized and mechanized travel to designated routes, thus eliminating opportunities for open cross-country travel. Management as VRM Class IV could result in development incompatible with the desired recreational activities. However, applying an NSO stipulation on 1,600 acres would protect recreation in that area.

Paradox Valley ERMA

The Paradox Valley ERMA would offer the same recreation activities as under Alternative C, so impacts on recreation are the same. Applying an NSO stipulation on 12,420 acres would provide moderate protection for recreation to continue throughout the ERMA.

Alternative E

Decision Area

Similar to the other action alternatives, restrictions on uses or types of uses would be implemented to reduce disturbance in areas with sensitive biological resources. These restrictions would limit some recreation, while providing improved opportunities for other activities, such as hunting, wildlife viewing, and hiking. As under Alternatives B, C, and D, Alternative E would include more management measures to protect biological resources than would Alternative A (refer to **Table 2-1** for acreages). Effects are described under ***Nature and Type of Effects***.

Limitations on the location, timing, and type of casual use mining would result in fewer opportunities to engage in this activity than under Alternative A.

Water Resources

Alternative E would protect perennial, intermittent, and ephemeral streams; riparian areas, fens, and/or wetlands; and water impoundments with CSU/SSR measures. While this could limit development that could interfere with recreation activities or the desired recreation setting for some recreational users, protections along these areas would help maintain the areas' naturalness and preserve the desired recreational setting sought by other recreational users. Overall, impacts from applying more stipulations than Alternative A means there would be more areas restricted and, consequently, more areas where recreation would be protected.

Fish and Wildlife

Alternative E would apply seasonal disruptive and surface-disturbance restrictions for biological resources management, resulting in the same types of impacts on recreation as under Alternative B. Compared with Alternative A, 270 fewer acres would be subject to NGD restrictions, 307,450 more acres would be subject to SSR restrictions, and 70,440 more acres would be subject to TL restrictions for surface-disturbing activities.

Comprehensive Travel and Transportation Management

Alternative E would also apply seasonal travel closures on 3,020 acres to protect wildlife, which would result in similar impacts as those under Alternative A, but over 95 percent fewer acres. This would result in fewer limitations on the ability to participate in year-round motorized and mechanized recreation.

Cultural Resources

Effects of temporary or permanent restrictions associated with cultural resource areas are the same as those described for Alternatives B and D.

Visual Resources

The types of short- and long-term impacts from VRM decisions would be similar to those described under Alternative D. Impacts from managing 151,930 acres (2 times more than under Alternative A) as VRM Classes I and II are the same as those described under ***Nature and Type of Effects***, but they would occur over a larger area than under Alternative A. However, Alternative E would manage the remaining 523,860 acres as VRM Classes III and IV (no areas would be undesignated like under Alternative A), resulting in impacts similar to those under ***Nature and Type of Effects***, but occurring over a larger area.

Lands with Wilderness Characteristics

The BLM would not manage any lands to protect wilderness characteristics under Alternative E, which would result in the same types of impacts as under Alternative A. Under Alternative E, three units identified as possessing wilderness characteristics (18,320 acres) would be managed to minimize impacts

on wilderness characteristics, when possible, while allowing for competing resource uses. This would provide greater opportunities for quiet recreation in these areas than under Alternative A, but not to the magnitude described under Alternative B. Allowing target shooting and motorized and mechanized travel on designated routes would increase the recreation opportunities in these areas at the expense of users who prefer quiet areas and those open only to foot and horse travel. The remaining 23,830 acres of units identified as possessing wilderness characteristics would be managed to prioritize other multiple uses. This would leave these lands vulnerable to surface-disturbing activities, which would likely diminish wilderness characteristics over time.

Livestock Grazing

Impacts of livestock grazing on recreation are described under ***Nature and Type of Effects***. Alternative E shows 2,860 fewer acres available for livestock grazing than Alternative A. This apparent reduction in both available and unavailable acres from Alternative A actually reflects corrections to the existing grazing inventory and associated GIS; in reality, acres open and unavailable under Alternative E are similar to Alternative A and would have a similar potential for grazing impacts on recreation.

Fluid Leasable Minerals—Oil and Gas and Geothermal Resources

Under Alternative E, 631,580 acres of BLM surface/federal minerals and 240,230 acres of split-estate lands (totaling 871,810 acres) would be managed as open to fluid mineral leasing and geophysical exploration, the same as Alternative A. Of the 186,920 acres managed as SRMAs and ERMAs, 3,970 acres are in areas with negligible oil and gas potential, 79,850 acres are in areas of very low to low potential, and 79,420 acres are in moderate potential areas. Impacts are as described under ***Nature and Type of Effects***. Although the same number of acres are available as under Alternative A, impacts on recreation would be less intense under Alternative E due to the application of NSO stipulations on 49,690 more acres (74,580 acres in total), which would preserve the natural character of the landscape and would maintain existing recreation opportunities. Impacts on recreation from applying CSU stipulations on 290,880 acres are the same as those under Alternative A; however, 180,700 additional acres would be impacted.

Locatable Minerals, Mineral Materials, and Nonenergy Leasable Minerals

Impacts from locatable mineral development are similar to those under Alternative D because they would occur over similar areas. Impacts are described under ***Nature and Type of Effects***. Because more areas are available for disposal, short- and long-term impacts on recreation would be greater than under Alternative A.

Recreation and Visitor Services

Under Alternative E, closing certain areas to overnight use (e.g., certain developed recreation sites along the San Miguel River and specific SRMAs and ACECs) would result in impacts similar to those described under Alternatives B, C, and D. Closure of certain zones in some SRMAs and in one ACEC would further reduce opportunities for engaging in camping, compared with Alternative A.

Similar to Alternative A, recreational target shooting would be generally permitted; however, in addition to the existing closure to target shooting around developed recreation sites, Alternative E would specify additional limitations intended to promote public safety and protect facilities. Overall, 9 percent more acres would be open to target shooting under Alternative E than under Alternative A. Alternative E would also continue to allow for noncommercial mineral material collection. However, allowing these recreational opportunities to continue could also result in the potential for reducing naturalness in localized areas where these activities would occur and could decrease the quality of other recreation opportunities.

Issuing SRPs as discretionary actions would continue to provide opportunities for visitors to experience competitive and noncompetitive events and to patronize commercial outfitting services.

Comprehensive Travel and Transportation Management

There would be long-term changes to travel management area designations under Alternative E. Alternative E would continue to recognize 3,950 acres (1 percent of the Decision Area) in the North Delta SRMA as open to cross-country motorized travel, thereby providing an opportunity to those who wish to travel by motorized vehicle cross country, although across a smaller area. Management of a large portion of the Decision Area (91 percent) as limited to designated routes would provide travel-based recreation opportunities similar to those under Alternatives A, B, C, and D. Like Alternative D, the reduction in OHV opportunities in some areas could increase motorized recreation levels in other areas.

Lands and Realty—Rights-of-Way

Managing 53,040 acres as ROW exclusion areas (38 percent fewer acres than under Alternative A) would result in the same type of impacts as those described under ***Nature and Type of Effects***. Managing 66,030 acres as ROW avoidance areas (compared with 0 acres under Alternative A) would limit development that could reduce recreation opportunities. Impacts from communication sites and utility corridors are similar to those under Alternative B, but more-restrictive management would also enhance recreation opportunities in these areas.

Areas of Critical Environmental Concern

The types of impacts from managing 30,190 acres as ACECs are similar to those under Alternative A and would occur over a similar area.

Wild and Scenic Rivers

Under Alternative E, the impacts on recreation from wild and scenic rivers suitability determinations would be the same as those described under Alternative D.

Watchable Wildlife Viewing Sites

Under Alternative E, the impacts on recreation from the designation of 25,790 acres of Watchable Wildlife Viewing Sites would be the same as under Alternative B.

National Trails and Byways

Impacts on recreation from managing National Trails and Byways are the same as those under Alternatives B and D.

All SRMAs and ERMAs

Wilderness and Wilderness Study Areas

Two SRMAs partially or wholly overlap WSAs (**Table 4-48** [WSA Overlap with SRMAs, Alternative E]), where recreation setting characteristics would be managed for consistency with WSA management, providing nonmotorized, nonmechanized experiences.

Table 4-48
WSA Overlap with SRMAs, Alternative E

SRMA	Acres Overlapping WSAs
Dolores River Canyon SRMA	13,230
Roubideau SRMA	10,690

Source: BLM 2018a

Areas of Critical Environmental Concern

Portions or all of two SRMAs or ERMAs would overlap ACECs (**Table 4-49** ([ACEC Overlap with SRMAs and ERMAs, Alternative E]), where recreation setting characteristics would be managed for consistency with ACEC management, thus largely providing quiet recreation. A small portion of the Paradox Valley ERMA would overlap the Biological Soil Crust ACEC and Paradox Rock Art ACEC, protecting quiet recreation in those areas.

Table 4-49
ACEC Overlap with SRMAs and ERMAs, Alternative E

SRMA or ERMA	Acres Overlapping ACECs
Paradox Valley ERMA	1,080
San Miguel River SRMA	18,340

Source: BLM 2019

Fluid Leasable Minerals—Oil and Gas

Table 4-50 (NSO Overlap with SRMAs and ERMAs, Alternative E) displays the number of acres of overlapping RMAs and NSO management. Generally, NSO stipulations would protect recreation by prohibiting surface-disturbing activities from fluid mineral development.

Table 4-50
NSO Overlap with SRMAs and ERMAs, Alternative E

SRMA or ERMA	Acres Overlapping NSO
Burn Canyon ERMA	120
Dry Creek SRMA	60
North Delta SRMA	430
Paradox Valley ERMA	3,120
Ridgway Trails SRMA	50
Roubideau SRMA	8,070
San Miguel River SRMA	29,740

Source: BLM 2019

Comprehensive Travel and Transportation Management

Table 4-51 (Travel Management Area Designations in SRMAs and ERMAs, Alternative E) displays travel area management for SRMAs and ERMAs.

Table 4-51
Travel Management Area Designations in SRMAs and ERMAs, Alternative E

SRMA or ERMA	Open to Cross-country Travel (acres)	Closed to Motorized and Mechanized Vehicles (acres)	Closed to Motorized Vehicles (acres)	Limited to Designated Routes (acres)	Seasonal Limitations (acres)[1]
Burn Canyon ERMA	0	0	0	9,160	0
Dolores River Canyon SRMA	0	13,390	0	20	0
Dry Creek SRMA	0	0	0	42,180	11,010
Jumbo Mountain SRMA	0	0	0	1,600	1,600
Kinikin Hills ERMA	0	0	0	10,810	0
North Delta SRMA	3,950	0	0	0	0
Paradox Valley ERMA	0	0	0	44,820	0
Ridgway Trails SRMA	0	0	20	1,110	1,100

SRMA or ERMA	Open to Cross-country Travel (acres)	Closed to Motorized and Mechanized Vehicles (acres)	Closed to Motorized Vehicles (acres)	Limited to Designated Routes (acres)	Seasonal Limitations (acres)[1]
Roubideau SRMA	0	17,670	0	7,680	0
San Miguel River SRMA	0	3,890	0	25,850	0
Spring Creek SRMA	0	0	860	4,130	0

Source: BLM 2019

[1]Seasonal limitations would result from management of other values; SRMAs themselves (except for Ridgway) would not have seasonal closures.

Dolores River Canyon SRMA

The Dolores River Canyon SRMA would target visitors who seek opportunities to participate in quiet water-based activities and similar activities in a primitive Back Country setting (RMZ 1), and quiet use activities in a Middle to Front Country setting (RMZs 2 and 3), with realization of specific experience and beneficial outcomes identified in each SRMA zone objective. Recreation opportunities would be impacted by allowing dispersed camping in RMZs 1 and 2, but restricting camping to designated sites in RMZ 3, by limiting this recreation opportunity in a small portion of the SRMA. In RMZs 1 and 2, prohibiting competitive events, applying certain travel management allocations (e.g., closed to motorized and mechanized or limited to designated routes), and using NSO stipulations would help maintain the expected social setting in these zones. However, it would limit the opportunity to engage in certain recreation opportunities, which could be displaced to other portions of the Planning Area.

Dry Creek SRMA

The Dry Creek SRMA would be managed for predominately Front Country recreation setting characteristics and would target visitors who seek opportunities to participate in the following:

- Motorized and mechanized technical trail riding (RMZ 1)
- Rock climbing and observing natural landscape activities (RMZ 2)
- Quality multi-use trail riding (RMZ 3)
- Close to town nonmotorized activities, including natural-surfaced, disabled-accessible trails (RMZ 4)
- Hunting and canyon viewing (RMZ 5)

Each management zone would seek to realize the specific experience and beneficial outcomes identified for each SRMA zone objective through supporting management actions, which would either foster certain activities or limit incompatible activities. These management actions include closures to mineral materials sales, closures to coal and nonenergy solid leasable minerals leasing, management as VRM Class II or Class III, allowing motorized and mechanized travel on designated routes, and applying NSO or CSU stipulations to fluid mineral leasing. These would cause recreation setting characteristics to drift towards a Front Country setting from the existing setting, which has more Back Country and Middle Country recreation setting characteristics.

Jumbo Mountain SRMA

The Jumbo Mountain SRMA would target visitors who seek particular recreation opportunities, with the realization of specific experience and beneficial outcomes identified within each SRMA zone objective. In RMZ 1, visitors who seek the ability to participate in day-use, stacked loop, family friendly single-track trail activities would be targeted, while RMZ 2 would target those seeking similar opportunities but at a technical (intermediate to difficult) level. Applying NSO stipulations, managing as VRM Class III, closing to coal and mineral materials leasing or sale, and limiting motorized and mechanized travel to designated

routes would foster achievement of largely Front Country recreation setting characteristics across the SRMA (due to the proximity to the town of Paonia and resulting increased demand over the life of this RMP), while still providing for the identified zone objectives. Recognizing this potential for growing demand, no overnight camping would be allowed in the SRMA, standard group size restrictions would apply, and competitive events would only be allowed at the discretion of the BLM Authorized Officer if determined compatible with the SRMA zone objectives, in order to realize the desired social recreation setting characteristics.

North Delta SRMA

The North Delta SRMA would target visitors who seek opportunities to engage in motorized activities, with the realization of specific experience and beneficial outcomes identified in the SRMA zone objective. Under Alternative E, the SRMA would be managed as open to cross-country travel for motorized and nonmotorized travel, which would provide opportunities for visitors to engage in this type of recreation, which would not be present elsewhere in the Decision Area. Allowances for facilities development, ROW avoidance, CSU stipulations on fluid minerals, and management as VRM Class IV would foster the achievement of the zone objective and drift the physical and social recreation setting characteristics towards Front Country and Rural, and the operational recreation setting characteristics toward Middle Country and Front Country. This recognizes the SRMA's proximity to the town of Delta and potential for increased recreation demand within the SRMA during the life of the RMP. Dispersed camping would provide opportunities to overnight out of doors, while not necessitating a Back Country-type experience. Opportunities for users seeking quiet recreation would be displaced from the SRMA.

Ridgway Trails SRMA

The Ridgway Trails SRMA would target visitors who seek opportunities to participate in specific recreational opportunities, with the realization of specific experience and beneficial outcomes identified within each SRMA zone objective. Within RMZ 1, the zone would be managed for the same activities, experiences, and benefits under Alternative B, except that recreation target shooting would be allowed. Therefore, the impacts on recreation would be the same as Alternative B, except that under Alternative E there would be a greater number of recreational opportunities available. RMZ 2 would target visitors seeking to engage in day-use, stacked loop, single-track trail activities, including challenging, natural surfaced, disabled accessible trails. Day use restrictions would prohibit camping and seasonal travel restrictions would limit access during certain periods of the year, which would both limit the ability of visitors to engage in certain recreation activities during certain periods, However, the zone objectives would be furthered by certain restrictions on minerals actions (such as NSO stipulations on fluid minerals), VRM Class III designation and allowances for facilities development would allow for the desired drift towards a recreation setting characteristics towards a more Middle and Front Country, or even Rural in some instances, setting.

Roubideau SRMA

The Roubideau SRMA would be managed for very similar activities, experiences, and benefits as under Alternative D with a few differences in certain RMZs. The SRMA would target visitors who seek opportunities to participate in specific recreational opportunities, with the realization of specific experience and beneficial outcomes identified within each SRMA zone objective. Management of RMZ 1 would be the same as under Alternative D, except that targeted activities would include hunting. Management of RMZ 2 would be the same as Alternative D, except that the desired visitor services recreation setting characteristics supporting the activities, experiences, and benefits would be a Middle Country setting, while the remoteness recreation setting characteristics would be Middle and Front Country. Management of RMZ 3 is the same Alternative D, except that CSU would be applied to fluid minerals, which would facilitate a drift in the recreation setting characteristics toward Middle Country.

Management of RMZ 4 would be very similar to Alternative D, but CSU would be applied to fluid minerals.

San Miguel River SRMA

The San Miguel SRMA would be managed for similar activities, experiences, and benefits as under Alternative D. Proposed recreation setting characteristics would also be similar as under Alternative D, except for small shifts in certain characteristics toward a more developed character in RMZs 2, 3, and 4. Management actions complimentary to these outcomes includes applying NSO stipulations on fluid minerals across the SRMA, limiting certain developed recreation sites in RMZ I to day use, limiting camping to designated campsites (all RMZs), prohibiting motorized competitive events (all RMZs), and limiting motorized and mechanized travel to designated routes (RMZ 1, 2, and 4). While these restrictions would eliminate dispersed recreation activities, the restrictions would help achieve the zone objectives and desired characteristics. Commercial walk-wade fishing would continue to be allowed in RMZ 2.

Spring Creek SRMA

The Spring Creek SRMA would target visitors who seek opportunities to participate in the following:

- Day-use, nonmotorized, single-track, stacked loop trail activities and accessible trails through the use of current and emerging adaptive equipment (RMZ 1)
- Canyon viewing through quality single-track trail activities (RMZ 2)
- Camping and scenic viewing activities (RMZ 3), all with the realization of specific experience and beneficial outcomes identified within each SRMA zone objective

In general, desired recreation setting characteristics would trend toward more developed settings and be supported by management actions such as VRM Class III (RMZs 1 and 3), allowing competitive events (nonmotorized only in RMZ 1), allowing recreational target shooting, and limitations on motorized and mechanized travel (closed to motorized and mechanized limited to designated in RMZ 1; motorized and mechanized limited to designated in RMZs 2 and 3). However, group size restrictions would likely not allow desired Front Country and Rural (RMZ 1) and Front County (RMZ 3) social recreation setting characteristics for group sizes, except during competitive events.

Burn Canyon ERMA

The Burn Canyon ERMA would offer the same recreation activities as under Alternative D making impacts similar.

Kinikin Hills ERMA

The Kinikin Hills ERMA would offer the same recreation activities as under Alternative D making impacts similar.

Paradox Valley ERMA

The Paradox Valley ERMA would offer the same recreation activities as under Alternative D, except that VRM Class III would apply. This allows for greater alterations to the landscape, which could reduce the ability to achieve a visual setting that is commensurate with other uses that retain a natural-appearing landscape.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on recreation includes the Uncompaghre RMP Planning Area and all big game herd units that intersect the Planning Area. Any activities that affect game populations would in turn impact the potential for recreation benefits (e.g., wildlife viewing and hunting) because of the loss or gain of the number of animals. The cumulative impact

analysis area also extends along major roads, trails, and rivers, where management inside the Planning Area could impact use outside the Planning Area boundary.

At the broadest level, the physical, social, and operational recreation character of BLM-administered lands is quickly changing from natural to more developed, from less crowded to more crowded, and from less restrictive rules to more rules and regulations. These changes will impact the activity opportunities that can be offered and the recreation experience and benefit opportunities that can be produced by land managers and partners.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect recreation include surrounding BLM and Forest Service management plans, increased visitation (especially from residents in the Planning Area and those from the surrounding region), increased urbanization of towns and cities in the region, advances in outdoor recreation equipment, management in existing SRMAs, and energy development.

Forest plans for adjacent National Forest System lands and RMPs for adjacent BLM-administered lands have closed areas and routes to motorized recreation, causing users to move to Decision Area lands.

Increasing urban and suburban populations near the Planning Area have greatly increased the level of recreation use on BLM-administered lands. There is a strong correlation between population growth, visitation, and recreation in large part because many new residents have moved to the area specifically because of easy access to recreation on BLM-administered lands. The expanding suburban development footprint has also placed many new neighborhoods directly next to BLM-administered land boundaries, resulting in increased trespass onto private property and resource impacts from private property owners accessing BLM-administered lands from adjoining private land (e.g., social trailing).

The combination of the region's growing population and the bounty of desirable recreation settings have combined to greatly increase use in the Planning Area.

Advances in technology are at least partly responsible for increased recreation across the Planning Area. Motorized vehicles are more capable of accessing previously remote areas of the Uncompahgre RMP Planning Area, improvements in mountain biking have made that activity increasingly popular, and enhancements in equipment and clothing have made day hiking and camping more accessible to more people.

Increased oil, gas, and locatable and mineral materials exploration and development have altered physical recreation setting characteristics through the construction of energy and communication facilities, roads, and related infrastructure. As a result, many areas have trended away from a more natural setting, and users seeking a Back Country or Primitive experience have been displaced.

Past and present management of SRMAs focused primarily on providing activity opportunities. For example, management of the Dolores River Canyon and San Miguel River SRMAs focused on water-based activities, such as boating and fishing. These areas have not been managed for a long-term commitment to specific settings or outcome opportunities. As a result, settings have changed and opportunities have been lost.

Reasonably foreseeable trends that would result in cumulative impacts on recreation are continued growth patterns in demand for all recreation experiences, increased demand for close to home recreation opportunities for residents, continued and increased visitation from a growing regional population, and increased popularity of adjacent BLM-administered and other public lands and private resorts.