

Uncompahgre Field Office

Draft Resource Management Plan and Environmental Impact Statement

Volume II:
Chapters 4-5, References, Glossary, Index

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BLM



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BLM/CO/PL-16/006

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- ES-1 Uncompahgre RMP Planning Area

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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 land ownership, except the Gunnison Gorge NCA Planning Area and the 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

Chapter 4

Environmental Consequences

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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 (63,390 acres of BLM-administered surface estate and 159,820 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 land ownership, except the Gunnison Gorge NCA Planning Area and the 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

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 topic, similar to **Chapter 3** (Affected Environment). Each topic area includes a method of analysis section that identifies indicators, methods, and assumptions; a discussion of the nature and type of effects; a summary of effects common to all alternatives; an analysis of impacts for each of the four alternatives; and a description of cumulative impacts. A separate section describing irretrievable or irreversible commitment of resources is presented at the end of the chapter. Indicators 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. The section on methods and assumptions describes methodologies and assumptions for assessing impacts specific to the resource or resource use. 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). The nature and type of effects section describes in general terms the types of impacts on resources or resource uses from allowable uses or restrictions on allowable uses. Impacts for each alternative describe how the indicators would change the magnitude of the nature and type of effect (context and intensity).

Nearly all management actions proposed in **Chapter 2** are planning-level decisions rather than implementation decisions and do not result in direct, on-the-ground changes. However, over the long-term (estimated to be 20 years), decisions could result in on-the-ground changes. Impacts for some resources or resource uses, such as recreation and off-highway vehicle (OHV) use, could be confined to the BLM-administered surface estate. Other impacts, such as energy and minerals and requirements to protect special status species and cultural resources from such activity, could apply to all BLM-administered federal mineral estate (including split-estate). Some BLM management actions may affect only certain resources under certain alternatives. This impact analysis 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.

The BLM manages public lands for multiple uses in accordance with the Federal Land Policy and Management Act (FLPMA) of 1976. Land use decisions are made to protect the resources while allowing for different uses of those resources, such as energy and mineral development, OHV use, recreation, and livestock grazing. When there are conflicts among resource uses or when a land use activity could result in unacceptable or irreversible impacts on the environment, the BLM may restrict or prohibit some land uses in specific areas. To ensure that the BLM meets its mandate of multiple use in land management actions, the impacts of the alternatives on resource uses are identified and assessed as part of the planning process. The projected impacts on land use activities and the environmental impacts of land uses are characterized and evaluated for each of the alternatives.

Impact analysis is a cause-and-effect process. The detailed impact analyses and conclusions are based on the BLM planning team's knowledge of resources and the project area; reviews of existing literature; and information provided by experts in the BLM, other agencies, and interest groups, as well as by concerned citizens. The baseline used for the impact analysis is the current condition or situation, as described in **Chapter 3**. Impacts on resources and resource uses are analyzed and discussed in detail commensurate with resources issues and concerns identified throughout the process. Occasionally, impacts are described using ranges of potential impacts or in qualitative terms.

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 Uncompahgre resource management plan (RMP) 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 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 Geographic Information Systems (GIS) technology, and there may be slight variations in total acres between resources.

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 five years after the action is implemented. Long term is defined as lasting beyond five 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).

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 Area of Critical Environmental Concern (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 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.

Overlapping Management

Where varying levels of management from different resource programs overlap, the stricter management prescriptions would apply.

In most cases, data presented for surface use restrictions (i.e., NSO, CSU, TL, NGD, SSR, ROW avoidance, and ROW exclusion) overlap one another. In other words, both NSO and CSU stipulations could be applied to a given acreage to protect different resources. Throughout this chapter, these acreages were calculated independently of one another. If the NSO stipulation were to be excepted, modified, or waived, the area would still be protected by a CSU stipulation. Because of this, acres presented for surface use restrictions cannot be added together to get a total acreage.

Overlapping Restrictions (NSO, CSU, TL, NGD, SSR, ROW avoidance, ROW exclusion)

In most cases, restrictions overlap one another. Acreages were calculated independently. As such, acres cannot be added together to get a total acreage of restrictions.

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.

Alternative B.I proposes decisions for oil and gas leasing specific to the North Fork Valley and also identifies some polygons in the region for protection according to VRM Class II objectives.

Stipulations for and closures to oil and gas leasing and geophysical exploration proposed under Alternative B.I would supersede those proposed under Alternative B. The stipulations or closures proposed under Alternative B.I would apply in the North Fork area instead of those proposed under Alternative B. For visual resources, the VRM classifications in Alternative B also apply in Alternative B.I, except where Alternative B.I identifies additional areas for management according to VRM Class II objectives. In all other cases aside from decisions for fluid mineral leasing stipulations and some limited VRM classifications, management under Alternative B would also apply under Alternative B.I.

For the analysis of Alternatives B and B.I 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.I, then the analysis for Alternative B also applies to Alternative B.I, even if not specifically stated. Where analysis for Alternative B.I 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.

4.1.3 Incomplete or Unavailable Information

The Council on Environmental Quality established implementing regulations for NEPA, requiring that a federal agency identify relevant information that may be incomplete or unavailable for an evaluation of reasonably foreseeable significant adverse effects in an environmental impact statement (EIS) (40 CFR 1502.22). If the information is essential to a reasoned choice among alternatives, it must be included or addressed in an EIS. Knowledge and information is, and would always be, incomplete, particularly with infinitely complex ecosystems considered at various scales.

The best available information pertinent to the decisions to be made was used in developing the RMP. Considerable effort has been taken to acquire and convert resource data from the BLM and outside sources into digital format for use in the RMP.

Certain information was unavailable for use in developing this RMP because inventories have either not been conducted or are incomplete. Some of the major types of data that are incomplete or unavailable include:

- Field inventory of soils and water conditions
- Field inventory of vegetation composition
- Field inventory of wildlife and special status species occurrence and condition
- Field inventories for cultural and paleontological resources

For these resources, estimates were made concerning the number, type, and significance of these resources based on previous surveys and existing knowledge. In addition, some impacts cannot be quantified given the proposed management actions. Where this gap occurs, impacts are projected in qualitative terms or, in some instances, are described as unknown. Subsequent

project-level analysis will provide the opportunity to collect and examine site-specific inventory data required to determine appropriate application of RMP-level guidance. In addition, ongoing inventory efforts by the BLM and other agencies in the planning area continue to update and refine information used to implement this RMP.

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. Cumulative impact analysis is required by Council on Environmental Quality regulations because environmental conditions result from many different factors that act together. The total effect of any single action cannot be determined by considering it in isolation, but must be determined by considering the likely result of that action in conjunction with many others. Evaluation of potential impacts considers incremental impacts that could occur from the proposed project, as well as impacts from past, present, and reasonably foreseeable future actions. Management actions could be influenced by activities and conditions on adjacent BLM-administered and non-BLM-administered lands beyond the planning area boundary; therefore, assessment data and information could span multiple scales, land ownerships, and jurisdictions. These assessments involve determinations that often are complex and, to some degree, subjective.

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.

4.2.1 Cumulative Analysis Methodology

The cumulative impacts discussion that follows considers the alternatives in the context of the broader human environment—specifically, actions that occur outside the scope and geographic area covered by the RMP. Cumulative impact analysis is limited to important issues of national, regional, or local significance; therefore, not all resources identified for the direct and indirect impact analysis in this EIS are analyzed for cumulative impacts.

Because of the programmatic nature of an RMP and cumulative assessment, the analysis tends to be broad and generalized to address potential effects that could occur from a reasonably foreseeable management scenario combined with other reasonably foreseeable activities or projects. Consequently, this assessment is primarily qualitative for most resources because of lack of detailed information that would result from project-level decisions and other activities or projects. Quantitative information is used whenever available and as appropriate to portray the magnitude of an impact. The analysis assesses the magnitude of cumulative impacts by comparing the environment in its baseline condition with the expected impacts of the alternatives and other actions in the same geographic area. The magnitude of an impact is determined through a comparison of anticipated conditions against the naturally occurring baseline as depicted in the affected environment (see **Chapter 3**) or the long-term sustainability of a resource or social system.

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

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.

4.2.2 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 considered in the cumulative analysis were identified through meetings held with cooperating agencies, the Resource Advisory Council Subgroup, and BLM employees with local knowledge of the area. Each was asked to provide information on the most influential past, present, or reasonably foreseeable future actions. Additional information was obtained through discussions with agency officials and review of publicly available materials and Web sites.

Effects of past actions and activities are manifested in the current condition of the resources, as described in the affected environment (see **Chapter 3**). Reasonably foreseeable future actions are actions that have been committed to or known proposals that could take place within the 20-year planning period.

Reasonably foreseeable action scenarios are projections made to predict future impacts—they are not actual planning decisions or resource commitments. Projections, which have been developed for analytical purposes only, are based on current conditions and trends and represent a best professional estimate. Unforeseen changes in factors such as economics, demand, and federal, state, and local laws and policies could result in different outcomes than those projected in this analysis.

Other potential future actions have been considered and eliminated from further analysis because there is a small likelihood these actions would be pursued and implemented within the life of the RMP, or because so little is known about the potential action that formulating an analysis of impacts is premature. In addition, potential future actions protective of the

environment (such as new potential threatened or endangered species listings or regulations related to fugitive dust emissions) have less likelihood of creating major environmental consequences alone, or in combination with this planning effort. Federal actions, such as species listing under the Endangered Species Act of 1973, would require the BLM to reconsider decisions created from this RMP because the consultations and relative impacts might no longer be appropriate. These potential future actions may have greater capacity to affect resource uses within the planning area; however, until more information is developed, no reasonable estimation of impacts could be developed.

Data on the precise locations and overall extent of resources within the planning area are considerable, although the information varies according to resource type and locale. Furthermore, understanding of the impacts on and the interplay among these resources is evolving. As knowledge improves, management measures (adaptive or otherwise) would be considered to reduce potential cumulative impacts in accordance with law, regulations, and the approved RMP.

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 1987b), as amended. This plan sets management, protection, and use goals and guidelines for the BLM Grand Junction Field Office, Colorado, and is currently being revised in a new RMP planning effort. Decision expected 2014.
	BLM Glenwood Springs RMP (now Colorado River Valley Field Office) (BLM 1988b), as amended. This plan sets management, protection, and use goals and guidelines for the BLM Colorado River Valley Field Office, Colorado, and is being revised in a new RMP planning effort. Decision expected 2013.
	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

**Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the
Cumulative Impact Scenario**

	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.
	Interim Management Policy for the Dominguez-Escalante National Conservation Area and Dominguez Canyon Wilderness (BLM 2010n). This plan sets management, protection, and use goals and guidelines for the Dominguez-Escalante National Conservation Area. A new RMP, which will replace the interim management, is being prepared, and a decision is expected in 2016.
	BLM Gunnison Gorge National Conservation Area (NCA) and Wilderness RMP (BLM 2004e). 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 July 2006, but to date, the plan has not been approved.
Energy and minerals development	<p>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 and current 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 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. As such, additional mining and oil and gas development is expected.</p> <p>Energy Fuels has plans to construct the Piñon Ridge Mill (in Paradox Valley, between Naturita and Bedrock in Montrose County, Colorado), pending the outcome of litigation (Energy Fuels Resources Corporation 2012). The Colorado Radiation Control Division issued a final radioactive materials license to Energy Fuels Resources Corporation in March 2011, following the performance of an environmental impact assessment (Colorado Department of Public Health and Environment 2011a, 2011b). The license application included an Environmental Report that outlines the proposed action alternatives, affected environment, environmental impacts, and cumulative impacts (Energy Fuels Resources Corporation 2009). The uranium mill is expected to process ore from 5 to 9 mines at any one time. A surge in uranium exploration, mining, and permitting is possible.</p> <p>The Uruan 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, all originating from four Cotter Corporation mines in the Uruan mineral belt near Nucla and Naturita, Colorado. All four mines ceased production in November 2005, partly due to high energy costs and</p>

**Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the
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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 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). In 2012, Denison Mines' US operations were acquired by Energy Fuels Resources (USA) Inc.

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. The mine remains in maintenance status, and no production is anticipated in the immediate future. The Prince Albert (Rimrock), Last Chance (Nuvemco), and Return (Beck) Mines may have had limited production for testing within the last four years (DOE 2012).

There are 33 actively permitted uranium mine projects in Colorado, and one new permit under review. No uranium production was reported from 2009 to 2011, and none of the actively permitted mine projects are producing as of 2012; 24 are in maintenance status, 7 are being (or 3 have been) reclaimed, and 2 are conducting development activities. There are 12 permitted uranium mines in Utah (DOE 2012).

Coal. There are two active underground coal mines on federal mineral estate in the Uncompahgre RMP planning area (Bowie No. 2 and West Elk) and one that is idle with an unknown resumption date of production (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 on¹	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	1,891,665	Idle	6,116,849	8,008,514

¹ 5-Year Period ends June 30, 2014. 1-Year period is July 1, 2014, through June 30, 2015.

Note: Each of these mining operations control coal reserves with a mix of federal and fee coal; however, 90 percent or more of local production is federal. As mining progresses, only federal coal will be available in the reserve base.

- Bowie No. 2 Mine was opened in 1997 as a room-and-pillar mine but converted to a longwall system in late 1999. It is located northeast of Paonia, Colorado, and is operated by Bowie Resources, LLC with a loadout northeast of Paonia. There are 14,540 acres permitted in the combined permits of the Bowie No. 1 and No. 2 Mines accessed by the Bowie No. 2 Mine.
- The Elk Creek Mine recently was a longwall operation north of Somerset, Colorado, operated by Oxbow Mining, LLC, with a loadout immediately north of Somerset. There are 13,430 acres permitted. The mine is idle.

**Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the
Cumulative Impact Scenario**

- 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 one mile east of Somerset. There are 17,160 acres permitted. The mine is approximately the seventh largest underground longwall coal mine in the US.

The UFO issued a Coal Exploration License on Oak Mesa (in Delta County north of Hotchkiss, Colorado) 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, 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 is the exclusive coal supplier to the Nucla Station power plant (five miles north), producing approximately 350,000 to 400,000 tons of coal per year.

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) 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 12 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

Source: BLM 2012a

*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.

**As of August 2012.

Potash. There is no potash exploration or mining in the Uncompahgre RMP planning area, and no future activity is known.

**Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the
Cumulative Impact Scenario**

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 2010o).

The BLM Tres Rios Field Office received six 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 one year (BLM 2012p). No leasing or development of potash resources has been proposed.

The South Canal Hydropower Project (Bureau of Reclamation 2012). The two power houses that comprise the South Canal Hydropower Project generate an estimated 26,900 megawatt-hours of electricity per year, roughly equivalent to the power used by 3,000 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 US Bureau of Reclamation 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 Uncompahgre Field Office (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 Uncompahgre RMP 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 Uncompahgre RMP 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 Uncompahgre RMP planning area and gives a 20-year prediction of development potential.

**Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the
Cumulative Impact Scenario**

	BLM Uncompahgre Field Office Renewable Energy Potential Report (BLM 2010g). This document looks at renewable energy resources, including geothermal, in the Uncompahgre RMP 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 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 Temporary Regulations for Oil and Gas Operations (Gunnison County 2004).
	Bull Mountain Unit Master Development Plan. This project is in the planning phase; an EIS is being prepared, and a decision is expected in 2016. If approved, it would authorize development of up to 146 natural gas wells on multiple well pads north of Paonia Reservoir.
	Whitewater Master Development Plan. This project is in the planning phase; an environmental assessment was prepared, and the project was approved in June 2014. It authorized development of up to 108 oil/gas wells on 12 well pads in the vicinity of Whitewater, Colorado.
	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 RMP 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 (except chaining). 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.
	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

Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario

	<p>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).</p>
	<p>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 Uncompahgre RMP planning area and gives a 20-year prediction of development potential.</p>
Livestock grazing	<p>Livestock grazing has a long history in the region. Generally, livestock use has decreased over the past 100 years. Grazing in portions of the RMP 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 658,540 acres (97 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 38,364 animal unit months (AUMs), with an additional 5,291 AUMs in suspension. 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 RMP planning area is expected to remain stable or slightly decrease as residential development increases.</p>
Recreation and visitor use	<p>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 lands.</p> <p>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 (which is conducting travel planning) and to trails on BLM-administered lands adjacent to the east side of Ridgway State Park.</p> <p>Recreation trail travel management planning: Ridgway State Park in Colorado is conducting recreation trail travel management planning.</p> <p>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.</p>

Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario

	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 Uncompahgre RMP 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 desalinization plant is located on the Dolores River, seven miles south of Bedrock, Colorado. Operated by the US Bureau of Reclamation, 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 Bureau of Reclamation is starting an alternatives study for the continued operation of the Paradox Valley Unit. Alternatives that may be considered include, but are not necessarily limited to, evaporative ponds, another deep injection well, a commercial operation, and various combinations of alternatives. Facilities on BLM-administered lands are typically authorized under ROWs, but could comprise a Withdrawal to the US Bureau of Reclamation. A decision and implementation of that decision will likely occur within the lifespan of the Uncompahgre RMP.
	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 is beginning 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 2006).
	Mesa County Master Plan (Mesa County 2000). Countywide land use and growth plan for Mesa County.
	Montrose County Master Plan (Montrose County 2010). Countywide land use and growth plan for Montrose County; it has 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.

**Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the
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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.
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	<p>The Natural Resources Conservation Service and US Bureau of Reclamation have been replacing irrigation ditches with buried pipe to conserve water and reduce salinity and selenium within the Colorado River system.</p> <p>In 2016, the Town of Paonia replaced its current two-million-gallon water treatment plant, added an additional two million gallons of treated water storage, and incorporated hydropower components on the water lines in an effort to reduce plant costs with sustainable energy.</p>
Spread of noxious/invasive weeds	<p>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 EA 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.</p> <p>Delta County Noxious Weed Management Plan (Delta County 2010).</p> <p>Dolores River Riparian Action Plan: Recommendations for Implementing Tamarisk Control and Restoration Efforts (Tamarisk Coalition 2010).</p> <p>Gunnison River Watershed Integrated Weed Management Plan (Gunnison County 2012).</p> <p>Mesa County Noxious Weed Management Plan (Mesa County 2009).</p> <p>Montrose County Weed Management Plan (Montrose County 2011).</p> <p>Ouray County Weed Management Plan (Ouray County 2011).</p>

**Table 4-1
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the
Cumulative Impact Scenario**

	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 Area Plan (Uncompahgre Plateau Project 2007a)
	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 <i>Federal Register</i> 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 Uncompahgre 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 Resources Protection Protocol (**Appendix H**) provides details of the processes and the approach to protecting air quality and permitting/authorizing activities. It also includes a description of the comprehensive Colorado Air Resources Management Modeling Study (CARMMS) (BLM 2014b) that the BLM will use to better understand regional air quality for future permitting at the time of project proposal. Currently, CARMMS modeling has been completed for a projected year 2021 oil and gas reasonably foreseeable development scenario. The CARMMS future year 2021 results for the Uncompahgre RMP planning area source emissions and for cumulative (regional) source emissions are presented at the end of this section; these results are used to estimate potential impacts on air quality and air quality related values from RMP alternatives and cumulative sources.

The following information provides analysis of air quality impacts that could occur if all projected resource growth and development under each RMP alternative occurs and is based on existing conditions (**Chapter 3**). Air quality modeling and analysis tools will be continually updated with

new information to reassess current state of the atmosphere and potential impacts from many proposed projects.

Summary of 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** (Summary of 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 2011 was used to estimate actual (existing) emissions. Potential emissions were also estimated for reasonably foreseeable activities within the planning area out to year 2021 (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 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 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, and D 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, and D 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, and D 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

In general, Alternative B.I emission estimates result in the lowest total air pollutant emissions in future planning years and decreases 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, C, and D. Alternative B.I 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 emissions estimated for Alternative A result in the third-lowest emissions. The Preferred Alternative (Alternative D) results in the second-highest estimated emission levels. **Table 4-2** (Estimated Annual Emissions Summary BLM Actions in the Uncompahgre Planning Area) summarizes the estimated annual emissions for each alternative by pollutant.

Methods of Analysis

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,

Table 4-2
Estimated Annual Emissions Summary BLM Actions
in the Uncompahgre Planning Area

Total Estimated Emissions by Alternative (tons per year)							
Scenario	VOC	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	HAPs
Base Year	243	894	438	771	283	9	25
Alternative A - Planning Year 10	742	1,896	1,430	1,444	533	19	70
Alternative B - Planning Year 10	727	1,870	1,430	1,339	527	19	68
Alternative B.I - Planning Year 10	686	1,801	1,381	1,330	524	19	64
Alternative C - Planning Year 10	863	2,176	1,575	1,487	544	19	82
Alternative D - Planning Year 10	800	2,054	1,511	1,400	538	20	75

Source: Appendix Q (Summary of Air Emission Inventory Technical Support Document), Table 3-1

¹ CO = carbon monoxide; NO_x = nitrogen oxides; PM_{2.5} = particulate matter smaller than 2.5 microns in effective diameter; PM₁₀ = particulate matter smaller than 10 microns in effective diameter; SO₂ = sulfur dioxide; VOC = volatile organic compounds

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 (2021, 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**, Summary of 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

The following list of emission-generating activities were identified as those management actions and activities authorized, permitted, allowed, or performed under this RMP that could potentially emit regulated air pollutants and could potentially cause impacts on air quality within the planning area:

- Fluid Leasable Minerals – Conventional Oil and Gas
- Fluid Leasable Minerals – Coal Bed Natural Gas
- Solid Leasable Minerals – Coal
- Locatable Minerals – Uranium and Vanadium
- Mineral Materials (Salable Minerals) – Sand and Gravel
- Lands and Realty – Rights-of-Way
- Livestock Grazing
- Comprehensive Travel and Transportation Management
- Vegetation – Prescribed Fire and Mechanical Treatment

The following air pollutants were identified as being pollutants that could potentially be emitted by management actions and activities authorized, permitted, allowed, or performed under this RMP. Emissions of each of these pollutants were estimated for each identified activity and addressed for each alternative in this analysis.

- Carbon monoxide
- Nitrogen oxides
- Particulate matter less than or equal to 10 microns in diameter (PM₁₀)
- Particulate matter less than or equal to 2.5 microns in diameter (PM_{2.5})
- Sulfur dioxide
- Volatile organic compounds
- Hazardous air pollutants

The analysis focused on estimating emissions associated with peak construction, production, and operation activities associated with the identified emission-generating management actions for the pollutants listed above. Year 2011 was chosen as the base year for estimating actual emissions because this was the most recent year that reliable production and emissions data were available for existing sources within the planning area. Future estimated emissions were calculated for 10 years after the base year. Year 10 was selected for future year scenarios because this is consistent with the current iteration of the CARMMS analysis that analyzed UFO and cumulative regional air quality impacts. 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 inventory, including a more detailed description of the methodologies and assumptions used in this analysis, refer to the Uncompahgre Field Office, Emission Inventory Technical Support Document (ENVIRON International Corporation 2015) (summary provided in **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 Uncompahgre 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 PM₁₀ 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 Uncompahgre 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, PM₁₀ 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.)

Table 4-3 (Estimated Annual Emissions by Activity – Base Year (tons/year)) shows the estimated emissions for each pollutant from each emissions-generating activity analyzed for the base year. The estimated emissions for each of the alternatives are compared to these base year emissions and are included in the discussion of each alternative.

Table 4-3
Estimated Annual Emissions by Activity – Base Year (tons/year)

Emissions Generating Activity	VOC	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	HAPs
Oil and Gas - CBNG	2	7	4	0	0	0	0
Oil and Gas - Conventional	53	90	57	5	2	0	6
Fluid Minerals Total	55	97	61	6	2	0	7
Coal	54	210	286	254	196	4	5
Uranium	-	-	-	-	-	-	-
Sand and Gravel	0	0	0	3	1	0	0
Solid Minerals Total	54	210	286	258	197	4	5
Livestock Grazing	0	0	0	1	0	0	0
Vegetation	83	481	88	156	47	5	8
Lands and Realty	0	1	1	21	3	0	0
Comprehensive Travel and Transportation Management	51	106	1	330	34	0	5
Other Activities Total	134	587	91	507	84	5	13
TOTAL BASELINE	243	894	438	771	283	9	25

Source: Uncompahgre Field Office, Emission Inventory Technical Support Document (ENVIRON International Corporation 2015), Appendix E, Tables E-34 to E-40

¹ CBNG = coalbed natural gas; CO = carbon monoxide; HAPs = hazardous air pollutants; NO_x = nitrogen oxides; PM_{2.5} = particulate matter smaller than 2.5 microns in effective diameter; PM₁₀ = particulate matter smaller than 10 microns in effective diameter; SO₂ = sulfur dioxide; VOC = volatile organic compounds

Alternative A

Total estimated emissions for Alternative A are the third lowest of the alternatives. This is due primarily to the reasonably foreseeable development rate predicted for oil and gas activities, which is higher than Alternatives B and B.I but lower than Alternatives C and D. Estimated emissions for Alternative A increase compared to the base year for all pollutants. Nitrogen oxide and carbon monoxide increases can be attributed to engine combustion emissions at both oil and gas development and uranium mining operations. PM₁₀ and PM_{2.5} increases are due primarily to fugitive dust and fuel combustion emissions from increased uranium mining operations. Volatile organic compound, sulfur dioxide, and hazardous air pollutant emission increases can be attributed to increased oil and gas activities. **Table 4-4** (Estimated Annual Emissions by Activity, Alternative A – Planning Year 10) shows the estimated emissions for each pollutant from each emission-generating activity analyzed for Alternative A. Tables of the estimated emissions calculations by source category and the key assumptions used in the calculations are provided in the Uncompahgre Field Office, Emission Inventory Technical Support Document (BLM 2015).

Table 4-4
Estimated Annual Emissions by Activity, Alternative A – Planning Year 10

Estimated Emissions (tons/yr) - Alternative A - Planning Year 10							
Emissions Generating Activity	VOC	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	HAPs
Oil and Gas - CBNG	279	616	383	53	15	1	31
Oil and Gas - Conventional	223	189	198	63	14	0	15
Fluid Minerals Total	502	805	580	117	29	1	46
Coal	54	210	286	254	196	4	5
Uranium	38	264	473	470	214	9	4
Sand and Gravel	0	0	0	3	1	0	0
Solid Minerals Total	92	474	759	727	410	13	9
Livestock Grazing	0	0	0	1	0	0	0
Vegetation	83	481	88	156	47	5	8
Lands and Realty	0	1	1	21	3	0	0
Comprehensive Travel and Transportation Management	66	136	1	422	44	0	7
Other Activities Total	148	617	91	600	94	5	15
TOTAL	742	1,896	1,430	1,444	533	19	70
<i>Change over Base Year</i>	206%	112%	227%	88%	89%	108%	175%

Source: Uncompahgre Field Office, Emission Inventory Technical Support Document (ENVIRON International Corporation 2015), Appendix E, Tables E-34 to E-40

¹ CBNG = coalbed natural gas; CO = carbon monoxide; HAPs = hazardous air pollutants; NO_x = nitrogen oxides; PM_{2.5} = particulate matter smaller than 2.5 microns in effective diameter; PM₁₀ = particulate matter smaller than 10 microns in effective diameter; SO₂ = sulfur dioxide; VOC = volatile organic compounds

Fluid Leasable Minerals – Oil and Gas

Estimated emissions from oil and gas development for Alternative A were calculated using a reasonably foreseeable development rate based on a development level equivalent to 297 new federal wells added between the base year and Year 10, and associated drilling, completion, gas treatment, and compression activities over the life of the RMP. Estimated emissions from a small number of existing base year federal wells and associated decline over a 10-year period were also included in the estimated emissions calculations. The Uncompahgre Field Office, Emission

Inventory Technical Support Document (ENVIRON International Corporation 2015) (summary provided in **Appendix Q**) includes additional details on the assumptions used in calculating emissions from oil and gas activities for this alternative.

While the levels of oil and gas development differ by alternative, emissions controls were assumed to be the same for all alternatives, as follows:

- Drill rig and completion engines that meet or exceed Tier II engine emission standards as defined in 40 CFR Part 89
- Fugitive dust control from pad, road, and pipeline construction using frequent watering and speed control with an assumed control efficiency of 50 percent
- Control of waste gas from well stimulation and completion assuming 90 percent capture of all vented emissions, then 50 percent sent to flare and 50 percent sent to “green completion”
- 100 percent of drilling/completion fluids are delivered and disposed of by truck
- 88 percent well pad tank emissions are captured and flared at conventional gas wells; no well pad tank control is assumed for coalbed natural gas wells
- 100 percent disposal of produced water and condensate is by truck

Estimated emissions from oil and gas development would increase for all pollutants over the base year for this alternative due to increased development. The emissions of carbon monoxide, nitrogen oxide, sulfur dioxide, volatile organic compounds, and particulate matter have the potential to impact air quality and air quality-related values. Nitrogen oxide and volatile organic compound emissions have the potential to contribute to regional ozone formation. The CARMMS analysis presented below estimates these emission sources’ impacts on air quality (including potential ozone formation) and air quality-related values (visibility and atmospheric deposition) in planning Year 10.

Hazardous air pollutants emissions could increase the risk of localized human health impacts.

Solid Minerals – Coal, Uranium, Sand, and Gravel

Estimated emissions for solid mineral development activities for Alternative A include underground coal mining, uranium and vanadium surface mining, and sand and gravel sales. Development and production rates for this alternative are based on the Mineral Potential Report (BLM 2011b), historical production data for the planning area, and surface use restrictions included in this alternative. Solid mineral development and emissions estimates over the life of the RMP for this alternative include the following assumptions:

- Coal mine production remains unchanged from base year rates with any drop off in existing mine production replaced by production from future mine development in the area
- Development of up to 13 small uranium/vanadium mines from the base year to Year 10
- Continuous sales of sand and gravel equivalent to the base year

- Fugitive dust control from construction activities using frequent watering and speed control with an assumed control efficiency of 50 percent

Emissions from solid mineral mining are expected to increase for all pollutants over the base year in Year 10 due to expected increases in mining activities. Fugitive dust (PM₁₀/PM_{2.5}) emissions from surface disturbing activities associated with uranium/vanadium mining are the most notable increase. These emissions have the potential to contribute to localized increases in particulate matter concentrations and impacts on visibility. Nitrogen oxide emissions from mining equipment associated with uranium mining are also expected to increase substantially. This increase has the potential to contribute to increased ozone formation and impacts on visibility and atmospheric deposition. The CARMMS analysis presented below estimates mining activities' impacts on air quality (including potential ozone formation) and air quality-related values (visibility and atmospheric deposition) in planning Year 10.

The magnitude and rate of increased mining operations over the life of the RMP is dependent on economics and the demand for the materials as well as the construction of product transportation facilities and mineral processing facilities. The rate of mineral development predicted for the emissions inventory is based on mineral potential and may result in overestimating of emissions for this category. For example, the rate of uranium mining development predicted for the emissions calculations is independent of the availability of local processing facilities. The actual permitting and construction of a local uranium processing facility could have a significant effect on actual uranium mineral development over the life of the RMP.

Lands and Realty – Rights-of-Way

Emissions-generating activities associated with this category include construction activities for communication sites, transmission lines, and non-oil and gas pipelines. The UFO predicts very little activity over the life of the RMP for these activities. A total of 28 projects with an average of four acres of disturbance per project were assumed as the level of development for this category. This level of development is not expected to vary by alternative or increase over the life of the RMP. Estimated emissions would be very low for all alternatives and are not expected to contribute to significant air quality impacts. During normal operations, BMPs will be observed to minimize air quality impacts associated with applying or storing pesticides and herbicides, during lawn servicing, and during other routine activities associated with this activity.

Livestock Grazing

Emissions-generating activities associated with this category include primarily construction activities in support of grazing operations. Construction and maintenance of reservoirs, springs, wells, pipelines, and fences generate fugitive dust emissions and combustion emissions from construction equipment. Estimated emissions are based on AUMs from cattle grazing permits. Grazing activities are expected to stay the same as the base year over the life of the RMP for this alternative. Livestock grazing activities would decrease slightly for Alternatives B, B.I, C, and D. Estimated emissions from this category would be very low for all alternatives and are not expected to contribute to significant air quality impacts.

Comprehensive Travel and Transportation Management

Emissions-generating activities associated with this category include fugitive dust from recreational road construction and maintenance, fugitive dust from OHV use, and combustion

emissions from OHV use. Estimated emissions from these activities were calculated based on vehicle miles traveled and associated miles of road for recreational vehicles including all-terrain vehicles, dirt motorcycles, and snowmobiles. The UFO has estimated the counts of visitors using each type of OHV. Projected growth in OHV use was assumed to be similar to estimates for the Grand Junction Field Office. Projected growth in OHV use over the life of the RMP was estimated to be 3 percent annually, based on Grand Junction Field Office data compiled for the period from 2003 to 2010 (BLM 2012n). The magnitude of estimated volatile organic compound emissions predicted for this category has the potential to contribute to ozone formation. Estimated fugitive dust emissions could result in increased ambient concentrations of particulate matter and impacts on visibility.

Vegetation – Prescribed Fire and Mechanical Treatment

Emissions-generating activities associated with the category included smoke from prescribed fires and combustion emissions from mechanical equipment used to manage vegetation and wildlife habitat. Estimated emissions were calculated based on historical acres burned and treated in the planning area. Moderate growth was assumed for each alternative in accordance with the management goals for that alternative. Emissions of all pollutants from this category were predicted to remain equivalent to the base year over the life of the RMP due to the assumption of equivalent activity in future years under Alternative A vegetation management actions. However, the magnitude of emissions from prescribed fire has the potential to result in impacts on visibility, ozone formation, and human and wildlife health.

Alternative B

Total estimated emissions for Alternative B would be the second lowest of the alternatives. This is due primarily to the lower reasonably foreseeable development rate for oil and gas development compared to Alternatives C and D. Estimated emissions for Alternative B increase compared to the base year for all pollutants. Nitrogen oxide and carbon monoxide increases can be attributed to engine combustion emissions at both increased oil and gas developments and increased uranium mining operations. PM₁₀ and PM_{2.5} increases are due primarily to fugitive dust and fuel combustion emissions from increased uranium mining operations. Volatile organic compound, sulfur dioxide, and hazardous air pollutant emission increases can be attributed to increased oil and gas activities. **Table 4-5** (Estimated Annual Emissions by Activity, Alternative B – Planning Year 10) shows the estimated emissions for each pollutant from each emission-generating activity analyzed for Alternative B.

Fluid Leasable Minerals – Oil and Gas

Oil and gas development predicted for Alternative B is based on a development level equivalent to 303 new federal wells added between the base year and Year 10, and associated drilling, completion, gas treatment, and compression activities. Estimated emissions from a small number of existing base-year federal wells and associated decline over a 10-year period were also included in the estimated emissions calculations. The Uncompahgre Field Office, Emission Inventory Technical Support Document (ENVIRON International Corporation 2015) (summary provided in **Appendix Q**) includes additional details on the assumptions used in calculating emissions from oil and gas activities for this alternative. Assumptions for developing Alternative B emissions are the same as those used for Alternative A.

**Table 4-5
Estimated Annual Emissions by Activity, Alternative B – Planning Year 10**

Estimated Emissions (tons/yr) - Alternative B - Planning Year 10							
Emissions Generating Activity	VOC	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	HAPs
Oil and Gas - CBNG	277	612	379	53	15	1	30
Oil and Gas - Conventional	239	205	213	68	15	0	16
Fluid Minerals Total	516	817	593	121	30	1	47
Coal	54	210	286	254	196	4	5
Uranium	38	264	473	470	214	9	4
Sand and Gravel	0	0	0	3	1	0	0
Solid Minerals Total	92	474	759	727	410	13	9
Livestock Grazing	0	0	0	1	0	0	0
Vegetation	73	483	76	172	53	5	7
Lands and Realty	0	1	1	21	3	0	0
Comprehensive Travel and Transportation Management	46	95	1	297	31	0	5
Other Activities Total	119	579	79	491	86	5	12
TOTAL	727	1,870	1,430	1,339	527	19	68
<i>Change over Base Year</i>	199%	109%	227%	74%	87%	115%	167%

Source: Uncompahgre Field Office, Emission Inventory Technical Support Document (ENVIRON International Corporation 2015), Appendix E, Tables E-34 to E-40

¹ CBNG = coalbed natural gas; CO = carbon monoxide; HAPs = hazardous air pollutants; NO_x = nitrogen oxides; PM_{2.5} = particulate matter smaller than 2.5 microns in effective diameter; PM₁₀ = particulate matter smaller than 10 microns in effective diameter; SO₂ = sulfur dioxide; VOC = volatile organic compounds

Estimated emissions from oil and gas development would increase for all pollutants over the base year for this alternative due to increased development.

Similar to Alternative A, estimated emissions from oil and gas development would increase for all pollutants over the base year due to increased development. The emissions of carbon monoxide, nitrogen oxide, sulfur dioxide, volatile organic compounds, and particulate matter could impact air quality and air quality-related values. Nitrogen oxide and volatile organic compound emissions have the potential to contribute to regional ozone formation. The CARMMS analysis presented below estimates these emissions sources' impacts on air quality (including potential ozone formation) and air quality-related values (visibility and atmospheric deposition) in planning Year 10.

Hazardous air pollutants emissions could increase the risk of localized human health impacts.

Solid Minerals – Coal, Uranium, Sand, and Gravel

Estimated emissions and impacts on air quality would be the same as Alternative A for this category. The CARMMS analysis presented below estimates mining activities' impacts on air quality (including potential ozone formation) and air quality-related values (visibility and atmospheric deposition) in planning Year 10.

Lands and Realty – Rights-of-Way

Estimated emissions and impacts on air quality would be the same as Alternative A for this category.

Livestock Grazing

Estimated emissions and the potential for associated impacts on air quality are expected to decrease from the base year and be lower for this alternative than for Alternative A due to lower permitted AUMs and other livestock grazing management actions included for this alternative.

Comprehensive Travel and Transportation Management

Estimated emissions and impacts on air quality would be lower for this alternative than for Alternative A due to road closures and other travel management actions included for this alternative.

Vegetation – Prescribed Fire and Mechanical Treatment

Estimated emissions and impacts on air quality from this category are expected to be similar to the base year and Alternative A due to decreased use of mechanical treatments and increased use of prescribed fire under the management actions for this alternative.

Alternative B.1

Total estimated emissions for Alternative B.1 would be the lowest of the alternatives. This is due primarily to the lower reasonably foreseeable development rate of oil and gas development compared to Alternatives A, B, C, and D. All pollutants' estimated emissions for Alternative B.1 would increase compared to the base year. Nitrogen oxide and carbon monoxide increases can be attributed to engine combustion emissions at both increased oil and gas developments and increased uranium mining operations. PM₁₀ and PM_{2.5} increases would be due primarily to fugitive dust and fuel combustion emissions from increased uranium mining operations. Volatile organic compound, sulfur dioxide, and hazardous air pollutant emission increases can be attributed to increased oil and gas activities. **Table 4-6** (Estimated Annual Emissions by Activity, Alternative B.1 – Planning Year 10) shows the estimated emissions for each pollutant from each emission-generating activity analyzed for Alternative B.1.

Fluid Leasable Minerals – Oil and Gas

Oil and gas development predicted for Alternative B.1 is based on a development level equivalent to 275 new federal wells added between the base year and Year 10, and associated drilling, completion, gas treatment, and compression activities. Estimated emissions from a small number of existing base year federal wells and associated decline over a 10-year period were also included in the estimated emissions calculations. The Uncompahgre Field Office, Emission Inventory Technical Support Document (ENVIRON International Corporation 2015) (summary provided in **Appendix Q**) details the assumptions used in calculating emissions from oil and gas activities for this alternative. Assumptions for developing Alternative B.1 emissions are the same as those used for Alternative A.

Similar to Alternative A, estimated emissions from oil and gas development would increase for all pollutants over the base year due to increased development. Emissions of carbon monoxide, nitrogen oxide, sulfur dioxide, volatile organic compounds, and particulate matter could impact air quality and air quality-related values. Nitrogen oxide and volatile organic compound emissions could contribute to regional ozone formation. The CARMMS analysis presented below estimates these emissions sources' impacts on air quality (including potential ozone

**Table 4-6
Estimated Annual Emissions by Activity, Alternative B.I – Planning Year 10**

Estimated Emissions (tons/yr) - Alternative B.I - Planning Year 10							
Emissions Generating Activity	VOC	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	HAPs
Oil and Gas - CBNG	251	555	344	48	13	1	28
Oil and Gas - Conventional	224	192	200	63	14	0	15
Fluid Minerals Total	475	748	544	111	28	1	43
Coal	54	210	286	254	196	4	5
Uranium	38	264	473	470	214	9	4
Sand and Gravel	0	0	0	3	1	0	0
Solid Minerals Total	92	474	759	727	410	13	9
Livestock Grazing	0	0	0	1	0	0	0
Vegetation	73	483	76	172	53	5	7
Lands and Realty	0	1	1	21	3	0	0
Comprehensive Travel and Transportation Management	46	95	1	297	31	0	5
Other Activities Total	119	579	79	491	86	5	12
TOTAL	686	1,801	1,381	1,330	524	19	64
<i>Change over Base Year</i>	183%	101%	215%	73%	86%	114%	152%

Source: Uncompahgre Field Office, Emission Inventory Technical Support Document (ENVIRON International Corporation 2015), Appendix E, Tables E-34 to E-40

¹ CBNG = coalbed natural gas; CO = carbon monoxide; HAPs = hazardous air pollutants; NO_x = nitrogen oxides; PM_{2.5} = particulate matter smaller than 2.5 microns in effective diameter; PM₁₀ = particulate matter smaller than 10 microns in effective diameter; SO₂ = sulfur dioxide; VOC = volatile organic compounds

formation) and air quality-related values (visibility and atmospheric deposition) in planning Year 10.

Hazardous air pollutants emissions could increase the risk of localized human health impacts.

Solid Minerals – Coal, Uranium, Sand, and Gravel

Estimated emissions and air quality impacts would be the same as Alternative A. The CARMMS analysis presented below estimates mining activities' impacts on air quality (including potential ozone formation) and air quality-related values (visibility and atmospheric deposition) in planning Year 10.

Lands and Realty – Rights-of-Way

Estimated emissions and air quality impacts would be the same as Alternative A.

Livestock Grazing

Estimated emissions and associated air quality impacts would decrease from the base year and be lower for Alternative B than Alternative A due to lower permitted AUMs and other livestock grazing management actions included in Alternative B.

Comprehensive Travel and Transportation Management

Estimated emissions and air quality impacts would be lower for Alternative B than Alternative A due to road closures and other travel management actions included in Alternative B.

Vegetation – Prescribed Fire and Mechanical Treatments

Estimated emissions and air quality impacts would be similar to the base year and Alternative A due to decreased use of mechanical treatments and increased use of prescribed fire in Alternative B.

Alternative C

Total estimated emissions for Alternative C would be the highest of the alternatives. This is due primarily to the highest reasonably foreseeable development rate predicted for oil and gas activities of any of the alternatives. Estimated emissions for Alternative C increase significantly from the base year for all analyzed pollutants. Increases in emissions are similar to those for Alternative A for all source categories except oil and gas development. **Table 4-7** (Estimated Annual Emissions by Activity, Alternative C – Planning Year 10) shows the estimated emissions for each pollutant from each emission-generating activity.

Table 4-7
Estimated Annual Emissions by Activity, Alternative C – Planning Year 10

Estimated Emissions (tons/yr) - Alternative C - Planning Year 10							
Emissions Generating Activity	VOC	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	HAPs
Oil and Gas - CBNG	336	742	460	64	18	1	37
Oil and Gas - Conventional	255	217	227	72	16	0	18
Fluid Minerals Total	590	959	687	137	34	1	54
Coal	54	210	286	254	196	4	5
Uranium	38	264	473	470	214	9	4
Sand and Gravel	0	0	0	3	1	0	0
Solid Minerals Total	92	474	759	727	410	13	9
Livestock Grazing	0	0	0	1	0	0	0
Vegetation	116	606	126	179	53	5	12
Lands and Realty	0	1	1	21	3	0	0
Comprehensive Travel and Transportation Management	66	136	1	422	44	0	7
Other Activities Total	181	743	128	623	100	5	18
TOTAL	863	2,176	1,575	1,487	544	19	82
<i>Change over Base Year</i>	256%	143%	260%	94%	93%	116%	221%

Source: Uncompahgre Field Office, Emission Inventory Technical Support Document (ENVIRON International Corporation 2015), Appendix E, Tables E-34 to E-40

¹ CBNG = coalbed natural gas; CO = carbon monoxide; HAPs = hazardous air pollutants; NO_x = nitrogen oxides; PM_{2.5} = particulate matter smaller than 2.5 microns in effective diameter; PM₁₀ = particulate matter smaller than 10 microns in effective diameter; SO₂ = sulfur dioxide; VOC = volatile organic compounds

Fluid Leasable Minerals – Oil and Gas

Estimated emissions from oil and gas development for Alternative C were calculated using a reasonably foreseeable development rate based on a development level equivalent to 351 new federal wells added between the base year and Year 10, and associated drilling, completion, gas treatment and compression activities. Estimated emissions from a small number of existing base-year federal wells and associated decline over a 10-year period were also included in the estimated emissions calculations. The Uncompahgre Field Office, Emission Inventory Technical Support Document (ENVIRON International Corporation 2015) (summary provided in **Appendix Q**) includes additional details on the assumptions used in calculating emissions from

oil and gas activities for this alternative. Assumptions for developing Alternative C emissions are the same as those used for Alternative A.

Estimated emissions from oil and gas development would increase for all pollutants over the base year for this alternative due to increased development.

Similar to Alternative A, estimated emissions from oil and gas development would increase for all pollutants over the base year due to increased development. The emissions of carbon monoxide, nitrogen oxide, sulfur dioxide, volatile organic compounds, and particulate matter could impact air quality and air quality-related values. Nitrogen oxide and volatile organic compound emissions could contribute to regional ozone formation. The CARMMS analysis presented below estimates these emissions sources' impacts on air quality (including potential ozone formation) and air quality-related values (visibility and atmospheric deposition) in planning Year 10.

Hazardous air pollutants emissions could increase the risk of localized human health impacts.

Solid Minerals – Coal, Uranium, Sand, and Gravel

Estimated emissions and impacts on air quality would be the same as Alternative A for this category. The CARMMS analysis presented below estimates mining activities' impacts on air quality (including potential ozone formation) and air quality-related values (visibility and atmospheric deposition) in planning Year 10.

Lands and Realty – Rights-of-Way

Estimated emissions and air quality impacts would be the same as Alternative A for this category.

Livestock Grazing

Estimated emissions and the potential for associated impacts on air quality are expected to decrease from the base year and be slightly lower for this alternative than for Alternative A due to lower permitted AUMs and other livestock grazing management actions included for this alternative.

Comprehensive Travel and Transportation Management

Estimated emissions and associated impacts on air quality are expected to be the same as Alternative A due to the assumption of equivalent activity for Alternatives A and C.

Vegetation – Prescribed Fire and Mechanical Treatment

Estimated emissions and impacts on air quality from this category are expected to increase slightly from the base year and be similar to but slightly lower than Alternative A due to decreased use of prescribed fire and increased use of mechanical treatments under the management actions for this alternative.

Alternative D

Total emissions for Alternative D are estimated to be greater than Alternative A and B and lower than Alternative C. This is due primarily to the higher reasonably foreseeable development rate predicted for oil and gas activities than for Alternatives A or B but lower rate

than Alternative C. Similar to Alternatives A, B, and C, estimated emissions for Alternative D increase over the base year for all pollutants. **Table 4-8** (Estimated Annual Emissions by Activity, Alternative D – Planning Year 10) shows the estimated emissions for each pollutant from each emission-generating activity analyzed for Alternative D.

Table 4-8
Estimated Annual Emissions by Activity, Alternative D – Planning Year 10

Estimated Emissions (tons/yr) - Alternative D - Planning Year 10							
Emissions Generating Activity	VOC	CO	NOx	PM10	PM2.5	SO2	HAPs
Oil and Gas - CBNG	303	671	416	58	16	1	33
Oil and Gas - Conventional	255	217	227	72	16	0	18
Fluid Minerals Total	558	888	643	130	32	1	51
Coal	54	210	286	254	196	4	5
Uranium	38	264	473	470	214	9	4
Sand and Gravel	0	0	0	3	1	0	0
Solid Minerals Total	92	474	759	727	410	13	9
Livestock Grazing	0	0	0	1	0	0	0
Vegetation	100	585	106	191	58	6	10
Lands and Realty	0	1	1	21	3	0	0
Comprehensive Travel and Transportation Management	51	106	1	330	34	0	5
Other Activities Total	151	692	109	543	95	6	15
TOTAL	800	2,054	1,511	1,400	538	20	75
<i>Change over Base Year</i>	230%	130%	245%	82%	91%	121%	195%

Source: Uncompahgre Field Office, Emission Inventory Technical Support Document (ENVIRON International Corporation 2015), Appendix E, Tables E-34 to E-40

¹ CBNG = coalbed natural gas; CO = carbon monoxide; HAPs = hazardous air pollutants; NO_x = nitrogen oxides; PM_{2.5} = particulate matter smaller than 2.5 microns in effective diameter; PM₁₀ = particulate matter smaller than 10 microns in effective diameter; SO₂ = sulfur dioxide; VOC = volatile organic compounds

Fluid Leasable Minerals – Oil and Gas

Estimated emissions from oil and gas development for Alternative D were calculated using a reasonably foreseeable development rate based on a development level equivalent to 330 new federal wells added between the base year and Year 10, and associated drilling, completion, gas treatment and compression activities. Estimated emissions from a small number of existing base-year federal wells and associated decline over a 10-year period were also included in the estimated emissions calculations. The Uncompahgre Field Office, Emission Inventory Technical Support Document includes additional details on the assumptions used in calculating emissions from oil and gas activities for this alternative. Assumptions for developing Alternative D emissions are the same as those used for Alternative A.

Estimated emissions from oil and gas development would increase for all pollutants over the base year for this alternative due to increased development.

Similar to Alternative A, estimated emissions from oil and gas development would increase for all pollutants over the base year due to increased development. The emissions of carbon monoxide, nitrogen oxide, sulfur dioxide, volatile organic compounds, and particulate matter could impact air quality and air quality-related values. Nitrogen oxide and volatile organic

compound emissions could contribute to regional ozone formation. The CARMMS analysis presented below estimates these emissions sources' impacts on air quality (including potential ozone formation) and air quality-related values (visibility and atmospheric deposition) in planning Year 10.

Hazardous air pollutants emissions could increase the risk of localized human health impacts.

Solid Minerals – Coal, Uranium, Sand, and Gravel

Estimated emissions and impacts on air quality would be the same as Alternative A for this category. The CARMMS analysis presented below estimates mining activities' impacts on air quality (including potential ozone formation) and air quality-related values (visibility and atmospheric deposition) in planning Year 10.

Lands and Realty – Rights-of-Way

Estimated emissions and impacts on air quality would be the same as Alternative A for this category.

Livestock Grazing

Estimated emissions and impacts on air quality would be similar to Alternative C for this category.

Comprehensive Travel and Transportation Management

Estimated emissions and impacts on air quality would be slightly lower for this alternative than for Alternative A due to road closures and other travel management actions included for this alternative.

Vegetation – Prescribed Fire and Mechanical Treatment

Estimated emissions from this category would increase slightly from the base year due to management actions that increase the use of mechanical treatments and prescribed fire. Potential impacts on air quality are the same as for Alternative A.

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 (GWP) 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 GWP 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. GWPs used for greenhouse gas emission calculations and reporting are carbon dioxide = 1, methane = 21, and nitrous oxide = 310. Carbon dioxide equivalents were then converted to million metric tonnes, the typical reporting unit for greenhouse gas emissions. **Table 4-9** (Estimated Annual Greenhouse Gas Emissions Summary for BLM Actions in the Uncompahgre Planning Area) shows the estimated annual emissions of the greenhouse gases for each alternative.

Table 4-9
Estimated Annual Greenhouse Gas Emissions Summary for BLM Actions in the Uncompahgre Planning Area

Total Estimated Emissions by Alternative (tonnes per year)					
Scenario	CO ₂	CH ₄	N ₂ O	CO ₂ e	CO ₂ eq (million metric tonnes)
Base Year	81,978	128,840	6	2,789,616	2.79
Alternative A - Planning Year 10	256,212	134,569	9	3,084,843	3.08
Alternative B - Planning Year 10	258,174	134,475	11	3,085,455	3.09
Alternative B.I - Planning Year 10	247,280	133,955	11	3,063,603	3.06
Alternative C - Planning Year 10	283,901	135,609	8	3,134,190	3.13
Alternative D - Planning Year 10	273,027	135,082	10	3,112,888	3.11

Source: Appendix Q (Summary of Air Emission Inventory Technical Support Document), Table 3-1

¹ CH₄ = methane; CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CO₂eq = carbon dioxide equivalent; N₂O = nitrous oxide

Greenhouse gas emissions are estimated to increase for all alternatives over estimated base year emissions. Alternatives A, B, and B.I show increases of greenhouse gas emissions from the base year of approximately 10 percent. Alternative C shows an increase over the base year of

approximately 12 percent. Alternative D shows an increase over the base year of approximately 11 percent. Coal mining activities would be the largest contributor to greenhouse gas emissions for all alternatives followed by oil and gas development. Coal mining greenhouse gas emissions are primarily from fugitive methane emissions. The largest sources of greenhouse gas emissions within the oil and gas sector include carbon dioxide emissions from heaters and fugitive methane emissions from wellhead equipment.

Table 4-10 (Greenhouse Gas Emissions from BLM Actions as a Percentage of Colorado Statewide Greenhouse Gas Emissions) shows a comparison of greenhouse gas emissions from BLM actions for each of the alternatives to a statewide inventory of greenhouse gas emissions that was completed in 2007. The inventory was compiled for the Colorado Department of Public Health and Environment by the Center for Climate Strategies and was based on actual emissions for 2005 and projected emissions for 2010 and 2020.

Table 4-10
Greenhouse Gas Emissions from BLM Actions as a Percentage of Colorado Statewide Greenhouse Gas Emissions

Uncompahgre Planning Area		Colorado Statewide Inventory ^a		% Contribution
Scenario	Estimated GHG Emissions	Year	Estimated GHG Emissions	BLM GHGs to Colorado GHGs
	(MMt CO _{2eq})		(MMt CO _{2eq})	
Base Year	2.79	Projected 2010	129	2.16%
Alternative A - Planning Year 10	3.08	Projected 2020	148	2.09%
Alternative B - Planning Year 10	3.09	Projected 2020	148	2.09%
Alternative B.1 - Planning Year 10	3.06	Projected 2020	148	2.08%
Alternative C - Planning Year 10	3.13	Projected 2020	148	2.12%
Alternative D - Planning Year 10	3.11	Projected 2020	148	2.11%

^a Source: Center for Climate Strategies 2007

¹ GHG = greenhouse gas; MMtCO_{2eq} = million metric tons of carbon dioxide equivalents

Greenhouse gas emissions estimated for each of the alternatives comprise approximately 2 percent of statewide greenhouse gas emissions. As another means of comparison, the total estimated greenhouse gas emissions estimated for Alternative D (the preferred alternative) are approximately equivalent to 3.6 times the reported carbon dioxide emissions from the Nucla Power Plant located in Montrose County for 2008 (EPA 2012d). The total estimated greenhouse gas emissions for Alternative D (the preferred alternative) of 3.11 million metric tonnes are approximately equal to 0.04 percent of the total US 2008 greenhouse gas emissions of 7,048 million metric tonnes (EPA 2012e).

Several activities contribute to the phenomena of climate change, including emissions of greenhouse gas (especially carbon dioxide and methane) from fossil fuel development, large wildland fires and activities using combustion engines; changes to the natural carbon cycle; and changes to radiative forces and reflectivity (albedo). It is important to note that greenhouse gas will have a sustained climatic impact over different temporal scales. For example, recent emissions of carbon dioxide can influence climate for 100 years.

It may be difficult to discern whether global climate change is already affecting resources in the analysis area of the RMP. It is important to note that projected changes are likely to occur over several decades to a century. Many of the projected changes associated with climate change may not be measurably discernible within the reasonably foreseeable future. Existing climate prediction models are global or continental in scale; therefore, they are not appropriate to estimate potential impacts of climate change on the planning area. The current state of the science involves calculating potential quantities of greenhouse gases that may be added to the atmosphere from a particular activity. However, tools to analyze or predict how global or regional climate systems may be affected by a particular activity or activities within the planning area are not currently available. Assessing the impacts of greenhouse gas emissions on global climate change requires modeling on a global scale which is beyond the scope of this analysis. Potential impacts on climate change are influenced by greenhouse gas emission sources from around the globe and it is not possible to distinguish the impacts on global climate change from greenhouse gas emissions originating from the planning area.

To provide additional context, the EPA has recently modeled global climate change impacts from a model source emitting 20 percent more GHGs than a 1,500 megawatt coal-fired steam electric generating plant (approximately 14,132,586 metric tons per year of carbon dioxide, 273.6 metric tons per year of nitrous oxide, and 136.8 metric tons per year of methane). It estimated a hypothetical maximum mean global temperature value increase resulting from such a project. The results ranged from 0.00022 and 0.00035 degrees Celsius occurring approximately 50 years after the facility begins operation. The modeled changes are extremely small, and any downsizing of these results from the global scale would produce greater uncertainty in the predictions. The EPA concluded that even assuming such an increase in temperature could be downscaled to a particular location, it “would be too small to physically measure or detect,” (see letter from Robert J. Meyers, Principal Deputy Assistant Administrator, Office of Air and Radiation regarding “Endangered Species Act and GHG Emitting Activities; October 3, 2008). The projected UFO planning area emissions are a fraction of the EPA’s modeled source and are shorter in duration, and therefore it is reasonable to conclude that these activities would have no measurable impact on the climate, although the emissions would add incrementally to the global GHG loading burden.

With respect to global GHG emissions, the following predictions were identified by the EPA for the Mountain West and Great Plains region:

- The region will experience warmer temperatures with less snowfall.
- Temperatures are expected to increase more in winter than in summer, more at night than in the day, and more in the mountains than at lower elevations.
- Earlier snowmelt means that peak stream flow will be earlier, weeks before the peak needs of ranchers, farmers, recreationalist, and others. In late summer, rivers, lakes, and reservoirs will be drier.
- More frequent, more severe, and possibly longer-lasting droughts will occur.
- Crop and livestock production patters could shift northward; less soil moisture due to increased evaporation may increase irrigation needs.

- Drier conditions will reduce the range and health of ponderosa and lodge pole pine forests, and increase the susceptibility to fire.
- Grasslands and rangelands could expand into previously forested areas.
- Ecosystems will be stressed and wildlife, such as the mountain lion, black bear, long-nose sucker, marten, and bald eagle, could be further stressed.

If these predictions are realized as mounting evidence suggests is already occurring, there could be impacts to other resources within the region. For example, if global climate change results in a warmer and drier climate, increased particulate matter impacts could occur due to increased windblown dust from drier and less stable soils. Warmer temperatures with decreased snowfall could have an impact on a particular plants ability to sustain itself within its current range. An increased length of growing season in higher elevations could lead to a corresponding variation in vegetation and change in species composition. These types of changes would be most significant for special status plants that typically occupy a very specific ecological niche. Cool season plant species' spatial ranges are predicted to move north and to higher elevations, and extinction of endemic threatened or endangered plants may be accelerated. Invasive plant species would be more likely to out-compete native species.

Increases in winter temperatures in the mountains could have impacts on traditional big game migration patterns. Due to loss of habitat, or due to competition from other species whose ranges may shift northward, the population of some animal species may be reduced. Warmer winters with less snow would impact the Canada lynx by removing a competitive advantage they have over other mountain predators. Earlier snowmelt could also have impacts on cold water fish species that occupy streams throughout the planning area. Climate change could affect seasonal frequency of flooding and alteration of floodplains, which could impact riparian conditions. More frequent and severe droughts would have impacts on many wildlife species throughout the region, as well as vegetative composition and availability of livestock forage in some areas. Climate change could increase the growing season within the region, which could result in more forage production provided there is sufficient precipitation. Drier conditions could have severe impacts on forests and woodlands and could leave these areas more susceptible to insect damage and at higher risk of catastrophic wildfires. Increased fire activity and intensity would increase greenhouse gas emissions, providing for a negative feedback loop. In fact, most of the predicted changes on a global scale have some level of a predicted negative feedback loop, making the problem particularly vexing.

Indirect Greenhouse Gas Emissions from BLM Actions

All of the alternatives outlined above provide for continued coal, oil, and gas exploration and development within the UFO. As such, the BLM understands that the majority, if not all, of any developed resources will eventually be consumed to produce energy. The most common form of energy production/utilization via fossil fuels is from their combustion, regardless of whether or not the end product is used directly for mechanical purposes or to heat air, make hot water, or produce steam. The combustion processes for each of the resources can vary greatly, even for the same resource, and while this can have considerable effects for criteria and hazardous air pollutant generation rates, in general this is not the case for carbon dioxide. While criteria and hazardous air pollutants are very commonly controlled across different sources, source classes,

and industries using varying technologies and specific combustion methods, carbon dioxide is not. Its generation is more directly a function of the feed stock's carbon content and the combustion efficiency of the device using the fuel.

To estimate potential carbon dioxide emissions resulting from coal combustion the BLM used the current maximum expected production rate of approximately 11 million metric tons per year, versus the current permitted rates used for the direct emissions analysis (above). The major factor in deciding to use the current maximum production rate and not the permitted rate was the abrupt and unexpected recent closure of the one of the North Fork Valley mines (Elk Creek). The direct emissions estimates made for mining activities was completed well in advance of the Elk Creek mine closure. The direct emissions analysis and the subsequent impacts are now considered to be very conservative. The decision to include indirect combustion analysis within the Uncompahgre RMP was only made more recently, and thus the BLM will utilize the most recent data available to describe these emissions. The decision to use the current maximum expected production is also a reflection of the fact that the BLM does not reasonably foresee production in the North Fork Valley returning to previously permitted levels. To estimate the potential carbon dioxide emissions resulting from oil and gas combustion, the BLM utilized the production estimates made for the Colorado Air Resources Management Modeling Study (see CARMMS, below). The maximum production year (2021) from the CARMMS high scenario is presented to represent the maximum annual carbon dioxide combustion emissions expected from UFO oil and gas production (new federal portion only). The annual production rates for the fuels were multiplied by the carbon dioxide emission coefficients as provided by the US Energy Information Administration (February 14, 2013). For coal, the BLM used the bituminous emissions coefficient; for gas, the BLM used the industrial flared gas factor to account for the expected higher British thermal unit values normally seen in unprocessed gas (prior to the removal of more valuable components); and for oil, the BLM selected the residual heating fuel factor to conservatively account for the heavier hydrocarbons found in crude prior to processing. Additionally, the calculations assume combustion of 100 percent of the produced product without refinement/processing, or accounting for potential losses and uses as something other than a fuel stock (i.e., petroleum-based products). The results shown in **Table 4-11** (Maximum Annual Indirect Greenhouse Gas Emissions from BLM Actions) provide for the maximum expected annual carbon dioxide emissions from UFO extracted resource combustion for the foreseeable future.

Table 4-11
Maximum Annual Indirect Greenhouse Gas Emissions from BLM Actions

Resource (Production Units)	Maximum Production Rate	Carbon Dioxide Coefficients¹ (Pounds/Unit)	Carbon Dioxide Emissions (Tons)
Coal (tons)	11,000,000	4,931.3	27,122,150
Oil (barrel)	7,504	1,040	3,902
Gas (thousand cubic feet)	3,746,266	128.4	240,510

¹ US Energy Information Administration 2016

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 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 five 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 2013d) and Black Hills DeBeque Exploratory Proposal Environmental Assessment (BLM 2013e) are for multiple oil and gas well development projects in the Grand Junction Field Office. Near-field modeling analyses were conducted for both projects and indicated that pollutant impacts from the proposed development plans would be below acceptable threshold values and in compliance with National Ambient Air Quality Standards, Colorado Ambient Air Quality Standards, and that hazardous air pollutant concentrations of 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.

Colorado Air Resources Management Modeling Study (CARMMS)

As part of the adaptive management strategy for protecting air resources within various BLM RMP planning areas, the BLM is conducting a regional air modeling study to evaluate potential impacts on air quality from future mineral development in Colorado. The modeling study, CARMMS (BLM 2014b), assesses impacts on air quality and air quality-related values from projected increases in oil and gas development. The CARMMS includes potential impacts using reasonably foreseeable development projections for oil and gas up to a maximum of 10 years in the future to reflect realistic estimations of development projections and technology improvements.

The CARMMS includes air quality and air quality-related values impact assessments from future year (year 2021) oil and gas development on federal and nonfederal lands within 13 separate

Colorado BLM planning areas and 1 New Mexico BLM planning area (the Farmington District), as well as mining within the 13 Colorado BLM planning areas (BLM 2014b). As part of CARMMS, future year 2021 emissions estimates were developed for 3 oil and gas development scenarios for the 14 planning areas. These include year 2021 high, medium, and low oil and gas development scenarios. Projections of oil and gas development are based on either the most recent Field Office's reasonably foreseeable development scenario (high) or by projecting the current 5-year average development paces forward to year 2021 (low). The medium scenario includes the same well count projections as the high scenario but assumes restricted emissions (beyond current federal and state regulations), whereas the high scenario assumes current development practices and "on the books" emissions controls and regulations (as of 2012). Each BLM Colorado Field Office's was modeled with the source apportionment option, meaning that incremental impacts on regional ozone, air pollutants, and air quality-related values from federal oil and gas development in these areas are essentially tracked to better understand the significance of such projected development on impacted resources and populations. The CARMMS project leverages the work completed by the West-wide Jump Start Air Quality Modeling Study, and the base model platform and model performance metrics are based on those 2008 modeling products. In addition, CARMMS includes emissions from other regional sources, including oil and gas emissions throughout the modeling domain, which encompasses all of Colorado, western Arizona, western Utah, and north-central New Mexico, and extends into southern Wyoming, western Nebraska, western Kansas, and northwest Texas (**Figure 4-1** [Modeling Domain Used in the Colorado Air Resource Management Modeling Study (CARMMS)]). Most oil and gas emissions inventories for non-Colorado states in the region (i.e., Utah and Wyoming) were obtained from new modeling studies (i.e., Utah Air Resource Management Strategy and Wyoming Continental Divide – Creston Natural Gas Project) for those areas. Oil and gas emissions for the remainder of the region were based on recent year 2020 emissions projections developed by the Three State Air Quality Study. Future year anthropogenic emissions for the remainder of the source categories were based on a year 2020 emissions inventory developed by the EPA for the PM_{2.5} National Ambient Air Quality Standards rulemaking and updated by the Three State Air Quality Study. Biogenic¹ sources, fires, and non-US emissions were held at year 2008 baseline levels for the CARMMS future year 2021 modeling.

The CARMMS utilized the Comprehensive Air Quality Model with Extensions photochemical grid model to estimate air quality and air quality-related values impacts for both a base case year (2008) and future year 2021. Emissions from all source types (anthropogenic and natural) are included in the Comprehensive Air Quality Model with Extensions modeling. The CARMMS includes impact assessments at 55 Class I and sensitive Class II areas and at 58 lakes throughout the CARMMS modeling domain.

Table 4-12 (Total Emissions (tons per year) for the CARMMS 2021 High Development Scenario) lists the total nitrogen oxides, sulfur dioxide, volatile organic compounds, PM₁₀, and PM_{2.5} emissions included in the year 2021 CARMMS high development scenario for the BLM

¹ Produced or brought about by living organisms

Table 4-12
Total Emissions (tons per year) for the CARMMS 2021 High Development Scenario

Source Category	CARMMS 2021 High Scenario Emissions (tons per year) ¹				
	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}
Natural emissions (biogenics, fires, lightning)	113,165	1,132	992,560	574,255	79,453
New oil and gas from nonfederal lands within BLM planning areas	65,713	297	228,655	30,790	4,548
New oil and gas from federal lands within BLM planning areas	32,566	950	76,676	7,409	1,744
Existing oil and gas from BLM planning areas	81,169	252	228,749	2,838	1,558
Mining from BLM planning areas	686	8	46	6,977	6,957
All oil and gas outside BLM planning areas	61,220	4,572	301,705	2,822	2,680
Remaining anthropogenic emissions	459,907	95,720	312,498	1,400,504	242,828
BLM planning areas total oil and gas	179,447	1,499	534,080	41,038	7,849
Total oil and gas	240,667	6,071	835,785	43,859	10,530
Total anthropogenic	701,260	101,799	1,148,329	1,451,340	260,315
Total All Emissions	814,425	102,931	2,140,889	2,025,594	339,768

Source: CARMMS (BLM 2014b), Table 3-4

¹ NO_x = nitrogen oxides; PM_{2.5} = particulate matter smaller than 2.5 microns in effective diameter; PM₁₀ = particulate matter smaller than 10 microns in effective diameter; SO₂ = sulfur dioxide; VOC = volatile organic compounds

planning areas plus 3 combined oil and gas source groups, as well as total anthropogenic and all emissions within the 2.5-mile (4.0-kilometer) modeling domain (**Figure 4-1 [Modeling Domain Used in the Colorado Air Resource Management Modeling Study (CARMMS)]**).

Table 4-13 (Colorado Emissions (tons per year) Included in CARMMS) provides the total CO, NO_x, sulfur dioxide, volatile organic compounds, PM₁₀, and PM_{2.5} emissions in Colorado included in the base year 2008 scenario, the year 2021 CARMMS high development scenario, and the difference in emissions between the two modeling years. Emissions are provided for source categories including electric generating units, industrial sources not including electric generating units, and nonpoint (e.g., area sources), off-road, oil and gas, and on-road sources.

Based on the CARMMS projections, the BLM continually tracks air pollutant emission changes and air quality conditions to determine which projection path (low, medium, or high) would be most appropriate to estimate air quality impact correlations based on the cumulative development (i.e., net emissions changes) that has occurred since the base emissions inventory year (2008). Although the predicted impacts will be based on future modeling results (2021), the relative changes in the impacts between the modeled scenarios will provide insight to understanding how mass emissions impact or change atmospheric composition on a relative basis.

Table 4-13
Colorado Emissions (tons per year) Included in CARMMS

Source Category	CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}
CARMMS 2008 Base Year Scenario Emissions						
(tons per year)¹						
Electric generating units	5,177	61,857	56,685	508	1,628	527
Non-electric generating units	28,380	25,218	7,685	27,018	18,006	7,475
Nonpoint	95,828	7,798	338	66,388	270,299	55,914
Off-road	201,943	35,241	554	35,689	2,873	2,712
Oil and Gas	32,389	48,300	673	150,585	2,602	2,542
On-road	523,260	135,257	1,032	52,094	5,520	4,321
Total	886,977	313,670	66,965	332,282	300,928	73,491
CARMMS 2021 High Scenario Emissions						
(tons per year)						
Electric generating units	9,149	43,965	18,372	596	3,874	3,197
Non-electric generating units	33,508	33,006	4,155	24,171	22,415	14,100
Non-point	105,692	8,265	405	60,150	274,181	57,942
Off-road	480,676	42,770	96	43,330	3,992	3,764
Oil and Gas	122,998	131,649	1,356	313,464	37,842	6,888
On-road	410,544	36,254	537	24,037	3,794	2,293
Total	1,162,567	295,909	24,921	465,747	346,097	88,184
Difference between 2021 High Scenario Emissions and 2008 Base Year Emissions)						
(tons per year)						
Electric generating units	3,971	-17,892	-38,312	88	2,246	2,670
Non-electric generating units	5,128	7,788	-3,529	-2,847	4,409	6,625
Non-point	9,864	467	67	-6,238	3,881	2,028
Off-road	278,733	7,528	-458	7,641	1,119	1,052
Oil and Gas	90,609	83,349	683	162,879	35,240	4,345
On-road	-112,716	-99,002	-495	-28,058	-1,726	-2,027
Total	275,590	-17,762	-42,044	133,466	45,169	14,693

Source: ENVIRON International Corporation 2014

¹ CO = carbon monoxide; NO_x = nitrogen oxides; PM_{2.5} = particulate matter smaller than 2.5 microns in effective diameter; PM₁₀ = particulate matter smaller than 10 microns in effective diameter; SO₂ = sulfur dioxide; VOC = volatile organic compounds

Table 4-14 (CARMMS Future Oil and Gas Development / Projections Modeled – Uncompahgre Planning Area) shows the Uncompahgre planning area oil and gas development and projected production rates modeled for the CARMMS reasonably foreseeable development (high) and five-year average (low) modeling scenarios. As previously described, the low scenario is developed by projecting the current 5-year average oil and gas development paces forward to year 2021. The high (reasonably foreseeable development) scenario for the UFO is based on information from oil and gas operators in the Uncompahgre planning area for multiple projects and development that is forecasted to likely occur by year 2021.

**Table 4-14
 CARMMS Future Oil and Gas Development / Projections Modeled – Uncompahgre
 Planning Area**

Parameter	Reasonably Foreseeable Development (High) Scenario¹	5-year Average (Low) Scenario²
Federal Wells Per Year	36 (364 in 10 years)	10 (105 in 10 years)
Cumulative (federal and nonfederal) Wells Per Year	104	17
Wells Per Pad (assumed for analysis)	3	3
2021 Cumulative Active Well Counts	1,069	201
Percent 2021 Cumulative Wells that are Federal	36%	60%
Cumulative 2021 Gas Production (million standard cubic feet per year)	13,421	1,971
Cumulative 2021 Oil / Condensate Production (thousand barrels per year)	43	8

Source: BLM 2014b

¹ Reasonably foreseeable development scenario is based on oil and gas industry and BLM resource specialists' 10-year projections for the Uncompahgre planning area

² Future oil and gas development projections based on recent 5 years (2008-2012) of oil and gas development data for the Uncompahgre planning area

The CARMMS 2021 high oil and gas development scenario modeling analysis included the Uncompahgre planning area new (post-year 2011) oil and gas emissions on federal lands of 612 tons per year nitrogen oxides, 620 tons per year volatile organic compounds, 788 tons per year CO, 1 tons per year sulfur dioxide, 144 tons per year PM₁₀, and 37 tons per year PM_{2.5} (based on rates shown in **Table 4-13**). The analysis also includes emissions from the Bowie No. 2, West Elk, and Elk Creek coal mines and from 13 new uranium mines in the Uncompahgre planning area. Emissions from the Uncompahgre planning area coal mines are expected to remain constant through 2021 from base year levels. The emissions included in CARMMS for the Uncompahgre planning area coal mines are 55 tons per year nitrogen oxides, 13 tons per year volatile organic compounds, 41 tons per year CO, 1 tons per year sulfur dioxide, 513 tons per year PM₁₀, and 190 tons per year PM_{2.5}. The emissions included in CARMMS for the Uncompahgre planning area new uranium mines are 160 tons per year nitrogen oxides, 13 tons per year volatile organic compounds, 57 tons per year CO, 3 tons per year sulfur dioxide, 181 tons per year PM₁₀, and 171 tons per year PM_{2.5}. Note that the mining emissions summarized above include the portion of mining emissions from stationary sources at the mines. Emissions from mobile sources at the mines, although not specifically itemized in CARMMS, are included in regional emissions as part of the off-road source emissions in **Table 4-12**.

The CARMMS incremental modeled changes and results for each source group (i.e., Uncompahgre planning area) are applicable to the amount of additional air pollutant emissions that were modeled in CARMMS for that area (refer to the emissions levels described above). Annual oil and gas completions and development inventories (post-year 2011) are routinely compiled by BLM Colorado air resource specialists to ensure that current and future oil and gas development does not exceed the acceptable budgets (i.e., oil and gas development and emissions rates) as modeled in the CARMMS. From 2012 to 2014, there have been

approximately three new federal wells completed in the Uncompahgre planning area at a maximum rate of approximately two new federal oil and gas wells completed per year (year 2012). This development rate is much lower than the approximately 364 new federal wells (approximately 36 new federal wells per year) for the Uncompahgre planning area modeled for the CARMMS year 2021 high scenario (new development for years 2012 through 2021), and is tracking lower than the approximately 10 new federal wells per year for the Uncompahgre planning area modeled for the CARMMS low scenario.

Based on the oil and gas development level analysis as described above and the information provided in **Table 4-13**, it is reasonable to conclude that current levels of Uncompahgre planning area federal oil and gas development are tracking below CARMMS low levels, and that the modeling results for the CARMMS low modeling scenario would be adequate to assess future potential regional/cumulative air quality impacts. However, CARMMS high modeling results are being provided for this EIS to provide a hypothetical upper-bounds analysis. The CARMMS modeling results were processed to summarize the estimated future year 2021 air quality and air quality-related values impacts from new oil and gas development on federal lands within each BLM planning area, from existing and new mining activity occurring within the 13 Colorado BLM planning areas, and for cumulative source scenarios that included all future year emissions throughout the CARMMS modeling domain. Modeling results for the CARMMS 2021 high oil and gas development scenario are summarized here to describe the future year impacts from Uncompahgre planning area new oil and gas source emissions and mining activities and from regional source emissions. The following CARMMS impacts summary begins with cumulative impacts describing the overall net changes in atmospheric air quality from base year 2008 to future year 2021 for the high scenario for all cumulative emissions inventories. It then discusses the Uncompahgre planning area new federal oil and gas (post-year 2011) and BLM Colorado mining air quality contributions to the overall CARMMS high scenario year 2021 cumulative air quality. Note that some quasi-cumulative (aggregated planning areas / source groups) contributions to the overall cumulative year 2021 modeling impacts are provided in the cumulative discussion.

Cumulative Air Quality and Air Quality-Related Values Analyses

Air Quality Impacts—Regional Ozone Formation

The CARMMS includes estimates of future year regional ozone impacts using two analysis methods. One method uses the change in the photochemical grid model modeled concentrations between base case or current year design value (DVC) (year 2008) and future year design value (DVF) (year 2021) simulations to scale observed ozone concentrations from monitoring sites to obtain projected future year ozone concentrations. This method utilized the EPA's Modeled Attainment Test Software (Abt 2012) projection tool with the Comprehensive Air Quality Model with Extensions 2008 base case and 2021 high development scenario ozone concentrations to estimate ozone impacts. The second method uses the absolute modeling results from the Comprehensive Air Quality Model with Extensions model to estimate ozone impacts.

The ozone analyses included in the CARMMS study completed during 2014 (BLM 2014b) presented CAMx modeled ozone concentrations compared to the 8-hour ozone NAAQS of 75 ppb that has been in effect since 2008. The EPA has since revised the level of the 8-hour ozone

NAAQS to 70 ppb on October 1, 2015 (EPA 2015b). The CAMx modeled ozone concentration data prepared for the CARMMS 2014 study will subsequently be re-processed and a revised CARMMS report that presents predicted future year ozone concentrations relative to the new ozone NAAQS will be completed during 2016. However the information presented herein, from the 2014 CARMMS study, is applicable for estimating future year ozone impacts from Uncompahgre planning area oil and gas and mining emissions and from regional emissions and for comparing estimated ozone concentrations within the planning area to the level of the revised ozone NAAQS.

Figure 4-2 (2008 Ozone Current Year Design Value (top left), 2021 Ozone Future Year Design Value (top left), and 2021 – 2008 Ozone Future Year Design Value Differences (bottom) Calculated Using Modeled Attainment Test Software for the CARMMS 2021 High Development Scenario) presents the Comprehensive Air Quality Model with Extensions predicted ozone concentrations using the EPA’s Modeled Attainment Test Software. The current year DVCs (2008) indicate areas of ozone exceedances of the National Ambient Air Quality Standards (70 parts per billion) in Colorado, eastern Utah, southern Wyoming, northeast Arizona, and northern New Mexico with the maximum concentrations near Denver and Salt Lake City. The maximum DVC of 81.5 parts per billion is estimated just northwest of Denver (**Figure 4-2**, top left [2008 Ozone Current Year Design Value (top left), 2021 Ozone Future Year Design Value (top left), and 2021 – 2008 Ozone Future Year Design Value Differences (bottom) Calculated Using Modeled Attainment Test Software for the CARMMS 2021 High Development Scenario]). The current year DVCs also indicate that there are areas within the Uncompahgre planning area that are above the 70 ppb NAAQS, with the maximum ozone concentrations occurring in southeast Mesa County and central Montrose County in the range of 73-76 parts per billion.

For the 2021 high development scenario, the area of ozone DVF exceedances is slightly reduced from the base year with a peak DVF of 79.3 parts per billion still northwest of Denver (**Figure 4-2**, top right [2008 Ozone Current Year Design Value (top left), 2021 Ozone Future Year Design Value (top left), and 2021 – 2008 Ozone Future Year Design Value Differences (bottom) Calculated Using Modeled Attainment Test Software for the CARMMS 2021 High Development Scenario]). The High Development Scenario indicates that the range of future year concentrations within the Uncompahgre planning area are approximately the same as the base year, with a slightly reduced area of maximum concentrations in the range of 73-76 parts per billion. The difference plot between 2021 DVF and 2008 DVC (**Figure 4-2**, bottom [2008 Ozone Current Year Design Value (top left), 2021 Ozone Future Year Design Value (top left), and 2021 – 2008 Ozone Future Year Design Value Differences (bottom) Calculated Using Modeled Attainment Test Software for the CARMMS 2021 High Development Scenario]) shows mainly ozone reductions, with the largest reduction in the Denver and Salt Lake City areas; however, ozone increases in the Piceance Basin in Garfield County, Colorado. In the planning area there are increases and decreases in ozone concentrations primarily in the 0.5 parts per billion range with small areas in Gunnison County with ozone concentration reductions up to 1.0 parts per billion and ozone concentration increases up to 1.0 parts per billion.

The Comprehensive Air Quality Model with Extensions absolute modeling results are presented in **Figure 4-3** (Fourth-highest Daily Maximum 8-hour Ozone Concentrations for the 2008 Base Case [top left], CARMMS 2021 High Development Scenario [top right], and 2021 Minus 2008

Differences [bottom]). The ozone National Ambient Air Quality Standard is defined as the three-year average of the fourth-highest daily maximum 8-hour ozone concentrations. Because CARMMS only has one year of modeling results, the 2021 fourth-highest daily maximum eight-hour ozone concentrations are used for the National Ambient Air Quality Standards comparison metric. **Figure 4-3** (Fourth-highest Daily Maximum 8-hour Ozone Concentrations for the 2008 Base Case [top left], CARMMS 2021 High Development Scenario [top right], and 2021 Minus 2008 Differences [bottom]) displays the fourth-highest ozone concentrations for the 2008 base case and the 2021 high development scenario and their differences. For the 2008 base case there are ozone exceedance areas in Colorado, eastern Utah, southern Wyoming, northeast Arizona, and northern New Mexico. The maximum ozone concentrations are estimated near Denver, Salt Lake City, northern New Mexico, and on the Utah-Arizona border (**Figure 4-3**, top left [Fourth-highest Daily Maximum 8-hour Ozone Concentrations for the 2008 Base Case [top left], CARMMS 2021 High Development Scenario [top right], and 2021 Minus 2008 Differences [bottom]). The 2008 Base Case also indicates that there are areas within the Uncompahgre planning area that are above the 70 parts per billion NAAQS, with the maximum ozone concentrations in the range of 73-76 parts per billion estimated in southeast Mesa County, central Montrose County, northeast Delta County and along the Delta and Gunnison County border. In the 2021 high development scenario, the area of ozone exceedances is slightly reduced, although there are increases in ozone concentrations estimated in the Uinta Basin, Utah (**Figure 4-3**, top right [Fourth-highest Daily Maximum 8-hour Ozone Concentrations for the 2008 Base Case [top left], CARMMS 2021 High Development Scenario [top right], and 2021 Minus 2008 Differences [bottom]). The 2021 High Development Scenario also indicates a slight increase in the areas within the planning area that are above the 70 parts per billion NAAQS in the range of 70-76 parts per billion. The 2021 to 2008 ozone differences (**Figure 4-3**, bottom [Fourth-highest Daily Maximum 8-hour Ozone Concentrations for the 2008 Base Case [top left], CARMMS 2021 High Development Scenario [top right], and 2021 Minus 2008 Differences [bottom]) show more decreases than increases, and the ozone increase areas tend to occur in oil and gas development areas, such as the Denver-Julesburg, Piceance, and Uinta Basins. In the Uncompahgre planning area area, there are areas with ozone concentration reductions up to 3.0 parts per billion and ozone concentration increases up to 3.0 parts per billion.

Air Quality Impacts—Regional PM_{2.5} Concentrations Changes

Figure 4-4 (Eighth-Highest Daily Average PM_{2.5} Concentration Changes (2021 High Scenario Minus Base Year 2008 Concentrations) shows changes in eighth-highest daily average PM_{2.5} concentrations (2021 high scenario minus base year 2008 concentrations). With the exception of PM_{2.5} concentrations near large cities, future mining operations and nonfederal oil and gas operations (in northeast Colorado), the CARMMS high scenario full cumulative modeling results show very little change to PM_{2.5} daily average air quality in the region from base year 2008 to year 2021. Very little change in mining emissions is expected in the Uncompahgre planning area from base year to future years modeled.

Air Quality-Related Value Impacts

The CARMMS includes cumulative source impact assessments at 12 Class I and sensitive Class II areas and at 25 lakes within 62 miles (100 kilometers) of the Uncompahgre planning area.

Potential impacts on visibility and atmospheric deposition to these nearby Class I and sensitive Class II are described below.

Air Quality-Related Value Impacts—Visibility

Visibility impacts from future year oil and gas and mining emissions were examined following the procedures provided by USFWS and NPS (2012). These procedures use the EPA's Modeled Attainment Test Software to project current year observed visibility impairment for the best 20 percent and worst 20 percent - days to the future year using the 2008 base case and 2021 high development scenario modeling results, which include contributions from all source categories (anthropogenic and natural), with and without emissions from reasonably foreseeable development sources.

The CARMMS 2021 high oil and gas development modeling analysis provides the contribution to cumulative visibility impacts from future year 2021 projected federal and nonfederal oil and gas emissions throughout the 2.5-mile (4-kilometer) CARMMS domain plus mining on federal lands in Colorado. The modeling results for this scenario, which includes future year oil and gas emissions from the 13 Colorado BLM planning areas plus the Mancos Shale area in Northern New Mexico, as well as emissions from the Piceance Basin (Colorado) and Uinta Basin (Utah), are considered as reasonably foreseeable development emissions in the cumulative visibility analysis.

Table 4-15 (Cumulative Visibility Results (delta-deciviews) for Worst 20% Visibility Days at Class I Areas for Current Year (2008) and 2021 High Development Scenario (All Emissions and Contributions from Reasonably Foreseeable Development Sources)) and **Table 4-16** (Cumulative Visibility Results (delta-deciviews) for Best 20% Visibility Days at Class I Areas for Current Year (2008) and 2021 High Development Scenario (All Emissions and Contributions from Reasonably Foreseeable Development Sources)) display the cumulative visibility results for the 2021 high development scenario and reasonably foreseeable development sources for worst 20 percent and best 20 percent days, respectively. Note that because the EPA's Modeled Attainment Test Software was used and it only includes observed data for Class I areas, cumulative visibility results are presented for only the Class I areas.

As is indicated in **Table 4-15**, from the 2008 current year to the 2021 high development scenario future year, the worst 20 percent visibility metric is estimated to improve at each of the nearby Class I areas. The biggest improvement is a reduction of 0.81 deciviews at the Eagle Nest Wilderness (from 8.68 deciviews in 2008 to 7.87 deciviews in 2021). Reasonably foreseeable development emissions are estimated to contribute a maximum of 0.26 deciviews to the 2021 worst 20 percent days visibility at Black Canyon of the Gunnison National Park.

Cumulative visibility results at Class I areas for the best 20 percent days are provided in **Table 4-15**. From the 2008 current to 2021 future year, the best 20 percent days visibility is estimated to degrade in four and improve in six Class I areas. The largest best 20 percent visibility degradation is a 0.18 deciviews increase at Canyonlands National Park and the Weminuche Wilderness, whereas the largest best 20 percent visibility improvement is a 0.16 deciviews decrease at the Maroon Bells-Snowmass Wilderness. The maximum contribution from reasonably foreseeable development sources to 2021 best 20 percent visibility metrics is 0.17 deciviews at the Flat Tops Wilderness.

Table 4-15
Cumulative Visibility Results (delta-deciviews) for Worst 20% Visibility Days at Class I
Areas for Current Year (2008) and 2021 High Development Scenario (All Emissions and
Contributions from Reasonably Foreseeable Development Sources)

Class I Area	State	IMPROVE Site	2008 Base	2021 High	2021 High Improvement from 2008	Contribution from Reasonably Foreseeable Development Sources
Arches National Park	UT	CANYI	11.02	10.37	0.65	0.18
Black Canyon of the Gunnison National Park	CO	WEMII	9.95	9.31	0.64	0.26
Canyonlands National Park	UT	CANYI	12.49	11.98	0.51	0.12
Eagles Nest Wilderness	CO	WHRII	8.68	7.87	0.81	0.17
Flat Tops Wilderness	CO	WHRII	8.68	8.07	0.61	0.22
La Garita Wilderness	CO	WEMII	9.95	9.36	0.59	0.05
Maroon Bells-Snowmass Wilderness	CO	WHRII	8.68	7.91	0.77	0.11
Mesa Verde National Park	CO	MEVEI	11.20	10.82	0.38	0.11
Weminuche Wilderness	CO	WEMII	9.95	9.49	0.46	0.07
West Elk Wilderness	CO	WHRII	8.68	8.08	0.60	0.11

Source: CARMMS, Attachment C-1 (BLM 2014b)

Table 4-16
Cumulative Visibility Results (delta-deciviews) for Best 20% Visibility Days at Class I Areas
for Current Year (2008) and 2021 High Development Scenario (All Emissions and
Contributions from Reasonably Foreseeable Development Sources)

Class I Area	State	IMPROVE Site	2008 Base	2021 High	2021 High Improvement from 2008	Contribution from Reasonably Foreseeable Development Sources
Arches National Park	UT	CANYI	2.86	2.86	0.00	0.08
Black Canyon of the Gunnison National Park	CO	WEMII	2.25	2.18	0.07	0.14
Canyonlands National Park	UT	CANYI	4.54	4.72	-0.18	0.15
Eagles Nest Wilderness	CO	WHRII	0.69	0.55	0.14	0.07
Flat Tops Wilderness	CO	WHRII	0.69	0.55	0.14	0.17
La Garita Wilderness	CO	WEMII	2.25	2.29	-0.04	0.07
Maroon Bells-Snowmass Wilderness	CO	WHRII	0.69	0.53	0.16	0.06
Mesa Verde National Park	CO	MEVEI	3.12	3.28	-0.16	0.14
Weminuche Wilderness	CO	WEMII	2.25	2.43	-0.18	0.08
West Elk Wilderness	CO	WHRII	0.69	0.57	0.12	0.05

Source: CARMMS, Attachment C-1 (BLM 2014b)

Air Quality-Related Value Impacts—Deposition

Potential atmospheric deposition impacts within the nearby Class I and sensitive Class II areas were calculated for cumulative sources and are shown in **Table 4-17** (CARMMS High Scenario – Cumulative Nitrogen and Sulfur Deposition Impacts at Class I and Sensitive Class II Areas). These cumulative impacts include contributions from all source categories. Predicted deposition impacts are shown for the base year (2008) scenario, the high scenario (year 2021), and the difference (2021 to 2008). The maximum direct total (wet and dry) nitrogen and sulfur deposition are compared with the critical load values, which, for nitrogen is 2.3 kilogram per hectare per year (with the exception of Dinosaur National Monument, which has a 3.0 kilograms per hectare per year threshold), and is 5.0 kilograms per hectare per year everywhere.

As shown in **Table 4-17**, with the exception of Arches National Park, predicted nitrogen deposition impacts are above the critical load values at all Class I and sensitive Class II areas in 2008, with a maximum impact of 3.81 kilograms per hectare per year occurring at the Maroon Bells-Snowmass Wilderness. Future year 2021 nitrogen deposition impacts are estimated to decrease at all areas, with the impacts above the critical load values at Black Canyon of the Gunnison and Mesa Verde National Parks, and at the Eagles Nest, Flat Tops, Maroon Bells-Snowmass, Raggeds, Weminuche, and West Elk Wilderness Areas. At all Class I and sensitive Class II areas, the estimated 2008 and 2021 sulfur deposition impacts are well below the 5.0 kilograms per hectare per year critical load value, with impacts decreasing at all areas in year 2021. Nitrogen and sulfur deposition impacts future year reductions are primarily the result of estimated nitrogen oxides and sulfur dioxide emissions reductions for electric generating units and non-road sources throughout the modeling domain.

Table 4-17
CARMMS High Scenario – Cumulative Nitrogen and Sulfur Deposition Impacts at Class I and Sensitive Class II Areas

Class I/II Area	Nitrogen Deposition (kilograms per hectare per year)			Sulfur Deposition (kilograms per hectare per year)		
	2008	2021	Difference (2021-2008)	2008	2021	Difference (2021-2008)
Arches National Park	2.20	1.67	-0.53	0.36	0.22	-0.14
Black Canyon of the Gunnison National Park	2.99	2.85	-0.14	0.62	0.36	-0.26
Canyonlands National Park	2.31	1.89	-0.42	0.60	0.35	-0.25
Colorado National Monument	3.44	2.87	-0.57	0.69	0.38	-0.32
Eagles Nest Wilderness	3.59	2.79	-0.79	1.56	0.92	-0.64
Flat Tops Wilderness	3.71	3.00	-0.71	1.72	1.04	-0.69
La Garita Wilderness	2.75	1.97	-0.78	1.25	0.67	-0.58
Maroon Bells-Snowmass Wilderness	3.81	3.01	-0.80	1.86	1.14	-0.71
Mesa Verde National Park	3.14	2.92	-0.21	0.91	0.58	-0.33
Raggeds Wilderness	3.42	2.70	-0.72	1.75	1.10	-0.65
Weminuche Wilderness	3.80	3.03	-0.78	2.06	1.50	-0.56
West Elk Wilderness	3.34	2.58	-0.76	1.48	0.90	-0.58

Source: CARMMS, Attachment D-1 (BLM 2014b)

Air Quality-Related Value Impacts—Sensitive Lake Acid-Neutralizing Capacity

The traditional approach to calculating potential changes in acid-neutralizing capacity associated with a project (new projected emissions post baseline date) uses baseline lake measured data and the predicted incremental increases in nitrogen and sulfur deposition in a lake's watershed associated with the new projected changes in emissions. Using baseline lake monitored data and cumulative nitrogen and sulfur deposition rates is not advised because monitored baseline lake data would already account for existing emissions sources that would be also included in the cumulative modeled impacts. Because acid-neutralizing capacity for any particular lake is directly related to (i.e., calculated using) the natural lake conditions and the modeled amount of nitrogen and sulfur deposition in the watershed for the lake, it is reasonable to conclude that any lake located in the Class I and Class II areas shown in **Table 4-17** would experience improved (higher) acid-neutralizing capacity from baseline year 2008 conditions, because nitrogen and sulfur deposition is predicted to decrease to year 2021 for these areas for the CARMMS year 2021 high modeling scenario. (This assumes that natural lake conditions remain the same from base year 2008 to future year 2021.)

Uncompahgre Planning Area Air Quality and Air Quality-Related Values Impacts from Oil and Gas and Mining Sources

The CARMMS modeling results were processed to provide a summary of the estimated future year 2021 air quality and air quality-related values impacts from new oil and gas development on federal lands in the Uncompahgre planning area, and from existing and new mining activity occurring within the 13 Colorado BLM planning areas. These modeling results are summarized below to describe the future year impacts from new oil and gas source emissions and mining activities in the Uncompahgre planning area.

The CARMMS includes impact assessments at 55 Class I and sensitive Class II areas, and at 58 lakes throughout the CARMMS modeling domain, which included 12 Class I and sensitive Class II areas and 25 lakes within 62 miles (100 kilometers) of the Uncompahgre planning area. Potential impacts on air quality and air quality-related values (visibility and atmospheric deposition) to these nearby Class I and sensitive Class II areas were estimated. The nearby Class I and sensitive Class II areas include:

- Arches National Park, Utah (Class I)
- Black Canyon of the Gunnison National Park, Colorado (Class I)
- Canyonlands National Park, Utah (Class I)
- Colorado National Monument, Colorado (Class II)
- Eagles Nest Wilderness Area, Colorado (Class I)
- Flat Tops Wilderness Area, Colorado (Class I)
- La Garita Wilderness Area, Colorado (Class I)
- Maroon Bells–Snowmass Wilderness Area, Colorado (Class I)
- Mesa Verde National Park, Colorado (Class I)
- Raggeds Wilderness Area, Colorado (Class II)

- Weminuche Wilderness Area, Colorado (Class I)
- West Elk Wilderness Area, Colorado (Class I)

The sensitive lakes within 62 miles (100 kilometers) of the Uncompahgre planning area include:

- Booth Lake and Upper Willow Lake, Eagles Nest Wilderness Area, Colorado
- Ned Wilson Lake, Upper Ned Wilson Lake, Lower Ned Wilson Lake Packtrail Pothole, and Upper Ned Wilson Lake Packtrail Pothole, Flat Tops Wilderness Area, Colorado
- Small Lake Above U-Shaped Lake and U-Shaped Lake, La Garita Wilderness Area, Colorado
- Avalanche Lake, Capitol Lake, and Moon Lake (Upper), Maroon Bells–Snowmass Wilderness Area, Colorado
- Deep Creek Lake, Raggeds Wilderness Area, Colorado
- Big Eldorado Lake, Four Mile Pothole, Lake Due South of Ute Lake, Little Eldorado Lake, Little Granite Lake, Lower Sunlight Lake, Middle Ute Lake, Small Pond Above Trout Lake, Upper Grizzly Lake, Upper Sunlight Lake, West Snowdon Lake, and White Dome Lake, Weminuche Wilderness Area, Colorado
- South Golden Lake, West Elk Wilderness Area, Colorado

Air Quality Impacts

Federal air quality regulations adopted and enforced by states limit incremental emission increases to specific levels defined by the classification of air quality in an area. The Prevention of Significant Deterioration program is designed to limit the incremental increase of specific air pollutant concentrations above a legally defined baseline level. Incremental increases in Prevention of Significant Deterioration program Class I areas are strictly limited, while increases allowed in Class II areas are less strict. Prevention of Significant Deterioration program Class I and Class II increments are defined for nitrogen dioxide, PM₁₀, PM_{2.5}, and sulfur dioxide and are shown in **Table 4-18** (Prevention of Significant Deterioration Program Increments).

The CARMMS 2021 modeling results for Uncompahgre planning area high scenario oil and gas sources and for mining sources within 13 Colorado BLM Field Office planning areas indicated concentration impacts that are well below the applicable Prevention of Significant Deterioration program increments. The maximum impacts from Uncompahgre planning area oil and gas sources are from nitrogen oxides emissions. The maximum annual nitrogen dioxide impacts at the nearby Class I and sensitive Class II areas occur at the Maroon Bells-Snowmass Wilderness Area and are 0.105 micrograms per cubic meter air (4.2 percent of the Prevention of Significant Deterioration program Class I increment for nitrogen dioxide). The maximum impacts from mining sources are short-term (24-hour) particulate (PM₁₀/PM_{2.5}) concentrations, which occur at the Flat Tops Wilderness Area. The maximum 24-hour PM₁₀ concentration is 0.79 micrograms per cubic meter air (9.8 percent of the Prevention of Significant Deterioration program Class I increment for PM₁₀), and the maximum 24-hour PM_{2.5} concentration is 0.79 micrograms per

Table 4-18
Prevention of Significant Deterioration Program Increments

Pollutant ¹	Averaging Time	Prevention of Significant Deterioration Program Class I Increment	Prevention of Significant Deterioration Program Class II Increment
NO ₂	Annual	2.5	25
PM ₁₀	24-hour	8	30
	Annual	4	17
PM _{2.5}	24-hour	2	9
	Annual	1	4
SO ₂	3-hour	25	512
	24-hour	5	91
	Annual	2	20

Source: EPA 2011

¹ NO₂ = nitrogen dioxide; PM_{2.5} = particulate matter smaller than 2.5 microns in effective diameter; PM₁₀ = particulate matter smaller than 10 microns in effective diameter; SO₂ = sulfur dioxide

cubic meter air (39.3 percent of the Prevention of Significant Deterioration program Class I increment for PM_{2.5}). Note that the Prevention of Significant Deterioration program demonstrations serve information purposes only and do not constitute a regulatory Prevention of Significant Deterioration program increment consumption analysis.

Air Quality Impacts—Source Group Specific Ozone and PM_{2.5} Contributions

Figure 4-5 (Contribution to Fourth-Highest Daily Maximum Ozone Concentrations due to Federal Oil and Gas Emissions within the Uncompahgre Planning Area for the CARMMS 2021 High Development Scenario) presents the maximum ozone contributions due to federal oil and gas emissions in the Uncompahgre planning area. **Figure 4-6** (Contribution to Fourth-Highest Daily Maximum Ozone Concentrations due to Mining Emissions in 13 BLM Field Office Planning Areas for the CARMMS 2021 High Development Scenario) presents the maximum ozone concentrations from mining sources within 13 Colorado BLM field office planning areas for the Comprehensive Air Quality Model with Extensions absolute modeling results. The maximum ozone contribution from the Uncompahgre planning area oil and gas sources is 0.8 parts per billion; for mining sources within the 13 Colorado BLM Field Office planning areas, the maximum contribution is 0.9 parts per billion.

Figure 4-7 (Contribution to Eighth-Highest Daily Average PM_{2.5} Concentrations due to Mining Emissions in 13 BLM Field Office Planning Areas for the CARMMS 2021 High Development Scenario) presents the maximum PM_{2.5} concentrations from mining sources within 13 Colorado BLM field office planning areas for the Comprehensive Air Quality Model with Extensions absolute modeling results. As shown, the overall maximum mining source group contribution (39.8 micrograms per cubic meter air) occurs in the BLM White River and Little Snake Field Offices of northwest Colorado, north of the Uncompahgre planning area, and is associated with a large surface mine that borders the White River and Little Snake Field Offices. The maximum

modeled mining source contribution to areas within the Uncompahgre planning area ranges from 2 to 3 micrograms per cubic meter air. This contribution (within the Uncompahgre planning area) is primarily associated with Uncompahgre planning area-based mines.

Air Quality-Related Values Impacts—Visibility

Analysis thresholds for visibility impairment are set forth in the Federal Land Managers' Air Quality Related Values Work Group Report (Forest Service et al. 2010), with the results reported in percent change in light extinction and change in deciviews. A five-percent change in light extinction (approximately equal to 0.5 delta-deciviews) is the threshold recommended in the 2010 Federal Land Managers' Air Quality Related Values Work Group Report and is considered to contribute to regional haze visibility impairment. A ten-percent change in light extinction (approximately equal to 1.0 delta-deciviews) is considered to represent a noticeable change in visibility when compared with background conditions.

Visibility impacts were calculated following Federal Land Managers' Air Quality Related Values Work Group Report (Forest Service et al. 2010) at the nearby Class I and sensitive Class II areas. Estimated visibility degradation at the Class I areas and sensitive Class II areas are presented in terms of the number of days that exceed a threshold percent change in extinction, or deciview relative to background conditions. The results for the Uncompahgre planning area high scenario oil and gas sources and for mining sources within 13 Colorado BLM field office planning areas are shown in **Table 4-19** (CARMMS Reasonably Foreseeable Development/High Scenario – Maximum Delta-Deciviews and Number of Days the Delta-Deciviews Exceed 0.5 and 1.0 for UFO Oil and Gas and Mining Sources from 13 Colorado BLM Planning Areas). The visibility analysis indicated that, for Uncompahgre planning area oil and gas sources, there are zero days predicted above the 1.0 and 0.5 delta-deciviews thresholds at any of the Class I and sensitive Class II areas. For mining sources within the 13 Colorado BLM field office planning areas, there are six days above the 1.0 delta-deciviews threshold and 39 days above the 0.5 delta-deciviews threshold at the Raggeds Wilderness Area, 5 days above the 1.0 delta-deciviews threshold and 23 days above the delta-deciviews threshold at the Flat Tops Wilderness Area, 19 days above the 0.5 delta-deciviews threshold at the West Elk Wilderness Area, and below the threshold values at all other areas.

Air Quality Impacts—Deposition

The effects of atmospheric deposition of nitrogen and sulfur compounds on terrestrial and aquatic ecosystems are well documented and have been shown to cause soil nutrient leaching, surface water acidification, high-elevation vegetation injury, and nutrient cycling and species composition changes (BLM, 2011). The 2010 Federal Land Managers' Air Quality Related Values Work Group Report (Forest Service et al. 2010) recommends that applicable sources assess impacts of nitrogen and sulfur deposition at Class I areas. This guidance recognizes the importance of establishing critical deposition loading values ("critical loads") for each specific Class I area, as these critical loads are entirely dependent on local atmospheric, aquatic, and terrestrial conditions and chemistry. Critical load thresholds are essentially a level of atmospheric pollutant deposition below which negative ecosystem effects are not likely to occur. The 2010 Federal Land Managers' Air Quality Related Values Work Group Report (Forest Service et al. 2010) does not include any critical load levels for specific Class I areas and

Table 4-19
CARMMS Reasonably Foreseeable Development/High Scenario – Maximum Delta-Deciviews and Number of Days the Delta-Deciviews Exceed 0.5 and 1.0 for UFO Oil and Gas and Mining Sources from 13 Colorado BLM Planning Areas

Class I/II Area	UFO Oil and Gas Sources			Mining from 13 Colorado BLM Planning Areas		
	Number of Days		Maximum delta-deciviews	Number of Days		Maximum delta-deciviews
	> 1.0 delta-deciviews	> 0.5 delta-deciviews		> 1.0 delta-deciviews	> 0.5 delta-deciviews	
Arches National Park	0	0	0.01	0	0	0.16
Black Canyon of the Gunnison National Park	0	0	0.05	0	0	0.25
Canyonlands National Park	0	0	0.00	0	0	0.13
Colorado National Monument	0	0	0.03	0	0	0.44
Eagles Nest Wilderness	0	0	0.04	0	0	0.26
Flat Tops Wilderness	0	0	0.04	5	23	1.27
La Garita Wilderness	0	0	0.03	0	0	0.19
Maroon Bells-Snowmass Wilderness	0	0	0.22	0	0	0.48
Mesa Verde National Park	0	0	0.02	0	0	0.16
Raggeds Wilderness	0	0	0.26	6	39	1.40
Weminuche Wilderness	0	0	0.02	0	0	0.17
West Elk Wilderness	0	0	0.12	0	19	0.89

Source: CARMMS, Attachment B-1 (BLM 2014b)

refers to site-specific critical load information on federal land management Web sites for each area of concern. This guidance does, however, recommend the use of deposition analysis thresholds developed by the NPS and USFWS. The deposition analysis thresholds represent screening-level values for nitrogen and sulfur deposition from project emission sources below which estimated impacts are considered negligible. The deposition analysis threshold established for both nitrogen and sulfur in western Class I areas is 0.005 kilogram per hectare per year.

For cumulative, or total, deposition threshold values, the NPS has provided recent information on nitrogen critical load values applicable for Wyoming and Colorado Class I and sensitive Class II areas (NPS 2014). For Class I and sensitive Class II areas in Wyoming, a critical load value of 2.2 kilograms per hectare per year for nitrogen deposition (estimated from a wet deposition critical load value of 1.4 kilograms nitrogen per hectare per year) is applicable, based on research conducted by Saros et. al. (2010) in the eastern Sierra Nevada and Greater Yellowstone ecosystems. This is a critical load value that is protective of high-elevation surface waters. For Colorado Class I and sensitive Class II areas (with the exception of Dinosaur National Monument), a critical load value 2.3 kilograms nitrogen per hectare per year is applicable for total (wet and dry) nitrogen deposition, based on research by Baron (2006) that estimated 1.5 kilograms per hectare per year as a critical loading value for wet nitrogen deposition for high-elevation lakes in Rocky Mountain National Park, Colorado. For Dinosaur National Monument, which is an arid region, a nitrogen deposition critical load value is based on research by Pardo et al. (2011), which concluded that the cumulative critical load necessary to protect shrublands and lichen communities in Dinosaur National Monument is 3 kilograms nitrogen per hectare per year.

For sulfur deposition, the critical load threshold published by Fox et al. (1989) for total (wet and dry) sulfur deposition of 5 kilograms per hectare per year for the Bob Marshall Wilderness Area in Montana and Bridger Wilderness Area in Wyoming is considered applicable for a total sulfur deposition analysis threshold.

The deposition results for the Uncompahgre planning area high scenario oil and gas sources and for mining sources within 13 Colorado BLM field office planning areas are shown in **Table 4-20** (CARMMS Reasonably Foreseeable Development/High Scenario – Nitrogen and Sulfur Deposition Impacts for UFO Oil and Gas and Mining Sources from 13 Colorado BLM Planning Areas). The analysis indicated that for Uncompahgre planning area oil and gas sources, there are nitrogen impacts above the deposition analysis threshold at the Maroon Bells – Snowmass, Raggeds, and West Elk Wildernesses and below the deposition analysis threshold at all other areas. The maximum nitrogen deposition impact of 0.0347 kilogram per hectare per year occurs at the Raggeds Wilderness. Sulfur deposition impacts are below the deposition analysis threshold at all areas. For mining sources within the 13 Colorado BLM field office planning areas, nitrogen deposition impacts are below the deposition analysis threshold at all Class I and sensitive Class II areas, with the exception of the Raggeds and West Elk Wildernesses, where the impacts are slightly above the deposition analysis threshold (maximum of 0.006 kilogram per hectare per year at Raggeds Wilderness). Sulfur deposition impacts are above the deposition analysis threshold at the Flat Tops, Maroon Bells – Snowmass, and Raggeds Wildernesses, with a maximum impact of 0.0145 kilogram per hectare per year occurring at the Flat Tops Wilderness, and are below the deposition analysis threshold at all other areas.

Sulfur and deposition impacts are well below the cumulative threshold values at all Class I and sensitive Class II areas.

In addition, potential changes in acid-neutralizing capacity resulting from potential nitrogen and sulfur deposition from Uncompahgre planning area high scenario oil and gas sources and for mining sources within 13 Colorado BLM field office planning areas, were calculated for 25 sensitive lakes within the nearby Class I and sensitive Class II Wildernesses. For both the oil and gas and mining scenarios, the estimated changes in acid-neutralizing capacity are all predicted to be below the applicable significance thresholds (less than a 10 percent change in acid-neutralizing capacity for lakes with acid-neutralizing capacity values greater than 25 microequivalents per liter, and a 1.0 microequivalents per liter change in acid-neutralizing capacity for lakes with background acid-neutralizing capacity values equal to or less than 25 microequivalents per liter).

Modeling results from the CARMMS 2021 high development scenario indicate that there would be minimal impacts on regional ambient air concentrations of carbon monoxide, nitrogen dioxide, sulfur dioxide, PM₁₀, and PM_{2.5} from federal oil and gas sources and mining activities within the Uncompahgre planning area. Source emissions within the Uncompahgre planning area would not cause or significantly contribute to any exceedances of any of the ambient air quality standards (Chapter 3, **Table 3-2**) anywhere within the modeling domain. A complete summary of the air quality impacts analysis is provide in Section 5.0 of the CARMMS report (BLM 2014b).

Table 4-20
CARMMS Reasonably Foreseeable Development/High Scenario – Nitrogen and Sulfur Deposition Impacts for UFO Oil and Gas and Mining Sources from 13 Colorado BLM Planning Areas

Class I/II Area	UFO Oil and Gas Sources		Mining from 13 Colorado BLM Planning Areas	
	Nitrogen (kilograms per hectare per year)	Sulfur (kilograms per hectare per year)	Nitrogen (kilograms per hectare per year)	Sulfur (kilograms per hectare per year)
Arches National Park	0.0003	0.000001	0.0035	0.0002
Black Canyon of the Gunnison National Park	0.0034	0.000023	0.0026	0.0008
Canyonlands National Park	0.0001	0.000001	0.0011	0.0001
Colorado National Monument	0.0014	0.000006	0.0060	0.0006
Eagles Nest Wilderness	0.0039	0.000059	0.0027	0.0048
Flat Tops Wilderness	0.0026	0.000043	0.0045	0.0145
La Garita Wilderness	0.0019	0.000031	0.0015	0.0012
Maroon Bells-Snowmass Wilderness	0.0240	0.000365	0.0036	0.0064
Mesa Verde National Park	0.0006	0.000002	0.0014	0.0003
Raggeds Wilderness	0.0347	0.000816	0.0062	0.0078
Weminuche Wilderness	0.0008	0.000010	0.0011	0.0008
West Elk Wilderness	0.0132	0.000144	0.0051	0.0047

Source: CARMMS, Attachment D-1 (BLM 2014b)

BLM Planning Efforts

As described earlier, the CARMMS includes two other future modeling scenarios (other than the 2021 high oil and gas scenario): a low scenario, which was developed by projecting the current 5-year average development paces forward to year 2021, 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.

As part of an accounting process to validate the applicability of CARMMS (and other modeling studies) during the authorization of future emission-generating activities, the BLM Colorado will add project-specific emissions to actual total regional air pollutant emissions estimates 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 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.

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
- Number of spills of hazardous substances
- 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 I 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 I.

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 I 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

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, gulying, 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.

Compaction decreases infiltration and gas-exchange rates. Decreased gas-exchange rates can cause aeration problems, induce nitrogen and potassium deficiency, and negatively impact root metabolism. All of this stresses vegetation, which is a key component of soil stabilization. Mixing soil horizons with surface-disturbing actions is another adverse impact on soils, as is loss of topsoil via wind and water. Mixing topsoil and subsoil and loss of the A horizon remove surface cover for erosion control and organic matter for nutrient recycling. The result is decreasing soil productivity in the long term, inhibiting revegetation, decreasing soil reclamation potential, and increasing suitability for noxious and invasive species.

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.

Actions that restrict or limit surface disturbance would reduce soil impacts of erosion and compaction. In areas with NGD restrictions applied, ground disturbance would be prohibited, and soil erosion limited to natural processes. Similar impacts would result in ROW exclusion areas because new ROWs would not be authorized. In areas with SSR restrictions or in ROW avoidance areas, ground disturbance would often be limited. ROW avoidance areas would generally result in lower impacts on soils, compared with areas not managed as ROW avoidance. In areas with TL stipulations, ground disturbance would be limited to certain times of year, which also would protect soils during those time frames.

The primary impacts on soil resources in the planning area are grazing activities that are 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 soils, particularly during high-intensity low-duration grazing systems in small pastures. 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 protect soils and help provide 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 five 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.

Effects Common to All Alternatives

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***.

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 4-21** (Travel Area Management on All Soil Types), **Table 4-22** (Travel Area Management on Slopes Greater than 30 Percent), and **Table 4-23** (Travel Area Management on Saline and Selenium Soils).

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.

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 I 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 I is being achieved when:

- Expression of rills and soil pedestals is minimal
- Evidence of actively eroding gullies (incised channels) is minimal

Table 4-21
Travel Area Management on All Soil Types

Travel Area Management	Alternative (acres)			
	A	B	C	D
Open to all modes of travel	8,560	0	16,070	0
Closed to motorized; mechanized vehicles limited to designated routes	11,950	12,180	0	1,160
Closed to motorized and mechanized vehicles	44,200	102,080	45,170	57,400
Limited to existing routes	465,790	0	0	0
Limited to designated routes	145,300	561,540	614,460	617,240
Seasonal restrictions	59,070	218,230	19,580	104,940

Source: BLM 2012a

Table 4-22
Travel Area Management on Slopes Greater than 30 Percent

Travel Area Management	Alternative (acres)			
	A	B	C	D
Closed to motorized and mechanized vehicles	18,830	40,950	19,310	26,640
Closed to motorized use	8,310	2,440	0	40
Open to all modes of travel	610	0	2,960	0
Limited to existing routes	104,450	0	0	0
Limited to designated routes	31,850	131,150	152,260	147,850
Seasonal restrictions	10,480	72,700	17,760	30,730

Source: BLM 2012a

Table 4-23
Travel Area Management on Saline and Selenium Soils

Travel Area Management	Alternative (acres)			
	A	B	C	D
Closed to motorized and mechanized vehicles	7,740	13,000	7,710	8,320
Closed to motorized use	740	7,190	0	270
Open to all modes of travel	7,000	0	11,640	0
Limited to existing routes	67,270	0	0	0
Limited to designated routes	13,850	86,980	87,820	98,580
Seasonal restrictions	10,570	36,750	630	14,760

Source: BLM 2012a

- 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 I 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 17,260 acres closed and 658,540 acres open 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 closed 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 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.

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.

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. 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 4-21**. 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 zero 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 155.5 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 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 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.I 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 41,780 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, 165,730 acres would be closed to livestock grazing (nearly 10 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 three 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 444,430 acres, SSR restrictions would be applied on 231,310 acres, and TL restrictions would be applied throughout the entire decision area. 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 169,940 acres of BLM surface/federal mineral estate closed to fluid minerals leasing (4 times more acres than under Alternative A), and 505,860 acres of BLM surface/federal mineral estate open to fluid minerals leasing (20 percent fewer acres than under Alternative A). Under Alternative B.I there would be 213,860 acres of BLM surface/federal minerals closed to oil and gas leasing (5 times more acres than under Alternative A) and 461,940 acres of BLM surface/federal minerals open to fluid minerals leasing (27 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 364,890 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.

Under Alternative B.I, NSO stipulations would be applied on 325,940 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.

Under Alternative B, CSU stipulations would be applied to 140,910 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 135,950 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 505,860 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 coal production are the same as those described under Alternative A. 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 impact on soils is expected to be the same under Alternative B.

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 499,340 acres of BLM surface/federal mineral estate to mineral materials disposal (nearly 5 times more than under Alternative A). There would also be 176,460 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 (631,480 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 4-21**. Alternative B would have nearly double the acreage closed to motorized and mechanized travel than under Alternative A, and over four times more acres where motorized and mechanized travel is limited to designated routes than under Alternative A, although five percent fewer 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 561,540 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, 428,060 acres would be managed as ROW exclusion areas (5 times more acreage than under Alternative A), and 197,370 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 215,840 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 or “meeting with problems” and showing a downward trend. 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, 27,900 acres would be closed to livestock grazing (62 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 smaller 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.

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 smaller 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 would be applied on 503,410 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 coal production are the same as those described under Alternative A. 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 impact on soils is expected to be the same as 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 620,230 acres, Alternative C would have about 2 percent fewer acres of BLM surface/federal mineral estate than Alternative A (631,480 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 4-21**. 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 zero 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 zero 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, 64,240 acres would be closed to livestock grazing (nearly 4 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 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 closed to fluid minerals leasing (10 percent more acres than under Alternative A) and 627,290 acres of BLM surface/federal mineral estate 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.

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 (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 smaller 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 would be applied on 675,800 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 coal production are the same as those described under Alternative A. 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 impact on soils is expected to be the same under Alternative D.

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 (631,400 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 4-21**. 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, although one percent more acres where motorized and mechanized travel is limited to existing or designated routes.

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 (74 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 106 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 NGD, SSR, and TL 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 soils along 106 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 106 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.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on soils includes the entire 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 and wildland fires, 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 I (BLM 1997) under Alternatives A and C. Impacts on soil resources would not be as substantial under Alternatives B or D, 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 and D 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 Alternative D.

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
- Ability to maintain sustainable yield of groundwater resources
- Number of state and federal water quality standard exceedances for surface and groundwater
- 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.

Nature and Type of Effects

The mandate to manage BLM-administered land for multiple uses requires the BLM to consider land uses that could degrade water quality, destabilize natural stream morphologic conditions, impair sustainability of water resources (water quantity), alter groundwater aquifer properties, and modify natural stream hydrographs. Minimizing such impacts is a theme common to all of the alternatives.

Surface water quality is influenced by both natural and human factors. Surface water quality concerns created by natural conditions are hard to control. In general, surface water quality in the planning area is typically good in reaches of streams where riparian vegetation is good and streams are fed directly by snowmelt, precipitation, and shallow groundwater. 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 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.

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 (e.g., “fragile soils,” slopes greater than 40 percent, and soils derived from Mancos shale), or fragile areas, such as stream channels, floodplains, and riparian habitats, are at higher risk for erosion. Within the planning area, the adobe badlands are the most notable soils that are highly erodible. Having been formed from an ancient sea bed, the adobe badlands are rich in salts and selenium. Disturbance in the adobe badlands and other such areas creates greater potential for erosion and sediment delivery to surface waters, thereby degrading water quality.

The North Delta OHV Area has particularly fragile soils, including steep slopes and saline/selenium soils that are highly erodible and, with disturbance, can degrade and contaminate downslope waterways during and after precipitation.

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 three to four weeks (Painter et al. 2007). Furthermore, results of studies conducted by Painter and others (2007) indicate that annual runoff is reduced by five 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.

The US Environmental Protection Agency (EPA) is studying the potential for hydraulic fracturing to contaminate shallow groundwater sources, but no scientific consensus has been reached to date (EPA 2012c). Hydraulic fracturing occurs in the gas-producing formations at depths greater than 5,000 feet. 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 as many as 24 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 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 to date (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.

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 4-21**.

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.

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 macroinvertebrates, 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 2-2** [Description of Alternatives A, B, C, and D]) 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 17,260 acres closed to livestock grazing and 658,540 acres open 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 open 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 as closed to fluid minerals leasing and 631,580 acres of BLM surface/federal minerals open to fluid minerals leasing. 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.

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.

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 to 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 zero 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 4-21**. 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/xeroriparian 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 155.5 miles of river segments crossing BLM-administered land identified as eligible for inclusion in the NWSRS. 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 five 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.I, 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.I for public water supplies from a classified surface water-supply stream segment.

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.I, 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.I 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.I, 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.I would prohibit surface occupancy beyond 1,320 feet and up to 2,640 feet. Alternative B.I 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 41,780 acres for wilderness characteristics (compared with zero 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 396,800 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, 165,730 acres would be closed to livestock grazing (nearly 10 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 three 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 169,940 acres of BLM surface/federal minerals closed to fluid minerals leasing (4 times more acres than under Alternative A) and 505,860 acres of BLM surface/federal minerals open to fluid minerals leasing (20 percent fewer acres than under Alternative A). Under Alternative B.I there would be 213,860 acres of BLM surface/federal minerals closed to oil and gas leasing (5 times more acres than under Alternative A) and 461,940 acres of BLM surface/federal minerals open to oil and gas leasing (27 percent fewer acres than under Alternative A). Under Alternative B.I, 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 364,890 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 325,940 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 140,910 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 135,950 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 coal development are the same as those described under Alternative A. 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 impact on water quality is expected to be the same as 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 B would close 499,340 acres of BLM surface/federal minerals to mineral materials disposal (nearly 5 times more than under Alternative A). There would also be far fewer (176,460) 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 (631,400 acres) open for consideration of nonenergy solid leasable mineral exploration or development.

Under Alternative B, NGD restrictions would be applied on 444,430 acres and SSR restrictions would be applied on 231,310 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 10 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 4-21**. Alternative B would have more than double the acreage closed to motorized and mechanized travel than under Alternative A, 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 561,540 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 428,060 acres of ROW exclusion areas (5 times more acreage than under Alternative A) and 197,370 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 215,840 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) or “meeting with problems” and showing a downward trend. 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.

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, 27,900 acres would be closed to livestock grazing (almost 2 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 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 coal development are the same as those described under Alternative A. 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 impact on water quality is expected to be the same as 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 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 (631,480 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 4-21**. Alternative C would manage 5,760 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 zero 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 B, 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.

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 zero 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, 64,240 acres would be closed to livestock grazing (nearly 4 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 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 because 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 closed to fluid minerals leasing (10 percent more acres than under Alternative A) and 627,290 acres of BLM surface/federal minerals 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 coal development are the same as those described under Alternative A. 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 impact on water quality is expected to be the same as 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 132,520 acres of BLM surface/federal minerals to mineral materials disposal (30 percent more than under Alternative A). There would also be fewer acres (543,280) 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 minerals as Alternative A (631,400 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 4-21**. 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 streams. 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 106 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.

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 4-24 (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 4-24
Vegetation Indicators and Desired Trends**

Consolidated Indicator	Desired Trend¹
Upland Vegetation Communities	
Condition of native vegetation communities and individual native plant species	<p>Native plant communities are distributed across the landscape with a density, composition, and frequency of species suitable to ensure reproductive capability and sustainability.</p> <p>Photosynthetic activity is evident throughout the growing season.</p> <p>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.</p> <p>Appropriate plant litter accumulates and is evenly distributed across the landscape.</p>
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	<p>Vegetation is dominated by an appropriate mix of native or desirable introduced species.</p> <p>Vigorous desirable plants are present.</p> <p>There is vegetation with diverse age class structure, appropriate vertical structure, and adequate composition, cover, and density.</p> <p>Plant species indicate maintenance of riparian moisture characteristics.</p> <p>Vegetation colonizes point bars with a range of age classes and successional stages.</p> <p>Vigorous desirable plants are present.</p> <p>Stream bank vegetation is composed of species and communities that have root systems capable of withstanding high stream flows.</p>
Hydrologic functionality	<p>Stream is in balance with the water and sediment being supplied by the watershed.</p> <p>Vegetation and free water indicate high water tables.</p> <p>An active floodplain is present.</p> <p>Residual floodplain vegetation is available to capture and retain sediment and dissipate flood energies.</p> <p>Stream channels have size and meander pattern appropriate for the streams' position in the landscape and parent materials.</p> <p>Woody debris contributes to the character of the stream channel morphology.</p>
Weeds	
Invasive species	<p>Noxious weeds and undesirable species are minimal in the overall plant community.</p> <p>Appropriate plant litter accumulates and is evenly distributed across the landscape.</p>

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 4-25** (Impacts on Vegetation from BLM Management Programs). The discussion that follows describes how each type of action affects the indicators listed above.

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 4-25** 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

Table 4-25
Impacts on Vegetation from BLM Management Programs

Management Program	Types of Action
Land Health	Vegetation manipulation
Air	Direct protections
Soil and water	Incidental protections
Vegetation	Incidental protections
Fish and wildlife	Natural processes
Special status species	Vegetation manipulation
Fire and fuels	Incidental protections
Livestock grazing	Natural processes
Recreation	Vegetation manipulation
Travel and transportation	Incidental protections
Mineral resources	Natural processes
Forestry	Surface disturbance
Visual resources	Vegetation manipulation
Lands and realty	Surface disturbance related to range projects
Special designations	Resource use
	Surface disturbance
	Resource use
	Incidental protections
	Surface disturbance
	Incidental protections
	Incidental protections
	Direct protections

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 VSAs. 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. Livestock grazing during times of drought stress can be particularly damaging to vegetation. 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 seedlings 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 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 recreation management area (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 2-2.**
- *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 open 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, 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.

Weeds

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. Wildland fire use would also be allowed according to the Fire Management Plan. 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 66,250 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 658,540 acres as open and 17,260 acres as closed 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); 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, 297,930 acres would be open to development of major utility corridors, and impacts on vegetation would be concentrated within any

corridors that are designated, including the designated West-wide Energy Corridor (26,880 acres).

Under Alternative A, 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 stipulations on open lands would reduce vegetation impacts from coal mining and surface disturbance on these lands.

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 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.I 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.I 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 or meeting with problems 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 designating 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, 229,440 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 (41,780 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 396,800 acres (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 510,070 acres as open (23 percent fewer acres than under Alternative A), and 165,730 acres as closed to grazing (nearly 10 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 three 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 11 SRMAs on 244,050 acres (5 times more acres than under Alternative A) and no ERMAs. The remaining 432,880 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 backcountry 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 or motorized and mechanized use on 114,260 acres (twice as many acres as under Alternative A) and limited to designated routes on 561,540 acres (4 times more acres than under Alternative A) would reduce the potential for these impacts.

Management of 197,370 acres of ROW avoidance and 428,060 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 37,420 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 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. The impact on vegetation is expected to be the same as under Alternative A.

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, 505,860 acres of BLM surface/federal minerals would be open to fluid minerals leasing (20 percent fewer acres than under Alternative A). Areas closed to fluid minerals leasing on 169,940 acres of BLM surface/federal minerals (almost 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 364,890 acres (15 times more acres than under Alternative A), and CSU stipulations would be applied on 140,910 acres (28 percent more acres than under Alternative A).

Under Alternative B.1, the BLM would manage 461,940 acres of BLM surface/federal minerals as open to oil and gas leasing (27 percent fewer acres than under Alternative A) and 213,860 acres of BLM surface/federal minerals as closed (almost 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 325,940 acres (13 times more acres than under Alternative A), and CSU stipulations would be applied on 135,950 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, 366,730 acres of BLM surface/federal minerals would be recommended for withdrawal from locatable mineral entry (13 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 215,840 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; 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. 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.I 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 wildland fire 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. To achieve this, the BLM would limit or modify activities in areas meeting with problems with a downward trend to improve land health and would not close areas. In these areas, the BLM would require measures to ensure that the project does not reduce the opportunity to improve land health. By doing so, the BLM would reduce impacts from surface disturbance on vegetation.

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 647,900 acres as open (2 percent fewer acres than under Alternative A) and 27,900 acres as closed to grazing (nearly 2 times more 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 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 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 are the same as those described for Alternative A.

Under Alternative C, the types of impacts from coal leasing are the same as those described under **Nature and Type of Effects** (surface disturbance). 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 impact on vegetation is expected to be the same as 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**. 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 would be open to fluid minerals leasing. Areas closed to fluid minerals leasing (44,220 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 and within 325 feet of perennial streams; 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. 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 ERMA's could be impacted by increased visitation. Because the BLM would manage these areas less intensively than SRMA's, 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, WSA's, 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 or meeting with problems. 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 designating 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, 3 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 611,560 acres as open (7 percent fewer acres than under Alternative A) and 64,240 acres as closed to grazing (nearly 4 times 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 7 SRMAs on 124,400 acres (2.5 times more acres than under Alternative A) and 4 ERMAs on 73,310 acres. The emphasis within many SRMAs would be largely on nonmotorized, nonmechanized trail and backcountry 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 are the same as those described for Alternative B.

Under Alternative D, the types of impacts from coal leasing are the same as those described under **Nature and Type of Effects** (surface disturbance). 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 impact on vegetation is expected to be the same as under Alternative A.

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 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 (10 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 of 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 and within 325 feet of perennial and intermittent streams and naturally occurring wetlands, springs, and seeps; 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 special recreation permits. 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.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on vegetation follows fourth-order watershed boundaries that completely or partially overlap the 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 and wildland fires, 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 and wildland fire use, 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 and D 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.

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 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 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 two years or less, and long-term effects would occur over longer than two years. (This supersedes the definitions of short-term and long-term effects in **Section 4.1.2.**)
- 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 4.1.1** 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, and to a lesser extent ERMAs, limits recreational uses through such management tools as designated campsites, permits, area closures, and duration of use limits. Managing SRMAs is generally likely to cause fewer impacts on fish and wildlife compared to ERMAs because SRMA management focuses recreation into more specific recreation types and more specific areas, allowing for impacts on fish and wildlife to be more precisely identified and more adequately mitigated. Seasonal route closure would prevent impacts on species during sensitive or critical times of the year, such as during winter or birthing. Impacts on fish and wildlife habitats can be concentrated in designated use areas to minimize impacts on other more sensitive habitats. However, SRMAs also tend to attract more recreational use by drawing public attention to specific areas and recreation types, and for that reason, SRMAs may have equal adverse impacts as ERMAs unless fish and wildlife needs are carefully considered and taken into account in SRMA designation and management.

Permitted surface-disturbing activities, such as 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. 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.

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. Direct impacts on animals 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 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.

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.

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 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. Ecological emphasis areas identify the most important remaining examples of native vegetation and wildlife habitat, and provide the basis for establishing protections for these areas. Ecological emphasis 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

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 other 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. 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 (215,840 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, 114,260 acres would be closed to motorized or motorized and mechanized use (twice as many acres as under

Alternative A), and 561,540 acres would be limited to designated routes (4 times more acres than under Alternative A). The BLM would manage 197,370 acres as ROW avoidance and 428,060 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 (11 SRMAs on 244,050 acres, 5 times more acres than under Alternative A), which would generally provide more protection for fish and wildlife from impacts of recreational use. 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 the best big game winter habitat remaining on BLM-administered lands in the Uncompahgre Valley. 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 (described in **Section 4.1.1**). 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 five 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 2 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.

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, 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 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.

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 two 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. 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 two 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. Despite these limitations, this alternative would have reduced impacts on most fish and wildlife species, compared with Alternative A.

ACECs would be increased to 8, 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, cross-country motorized use would not be allowed, 58,560 acres would be closed to motorized or motorized and mechanized use (4 percent fewer 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 five 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 the best big game winter habitat remaining on BLM-administered lands in the Uncompahgre Valley. 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 Assessment 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 summer 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.

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 and D 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. 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.

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, 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 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 two years or less, and long-term effects would occur over longer than two years. (This supersedes the definitions of short-term and long-term effects in **Section 4.1.2**.)

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.

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 construction, 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.

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 4.1.1 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 to 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 4.1.1 and 4.3.5**).

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 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 could affect habitat for and populations of Colorado hookless cactus. 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.

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.

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 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.

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 66,250 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 658,540 acres as open and 17,260 acres as closed 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.

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, 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.

Under Alternative A, 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.

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 as open to fluid minerals leasing. Areas closed to fluid minerals leasing on 44,220 acres of BLM surface/federal minerals 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 designation 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 two 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 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.

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-4/NGD-12, NL-1/NGD-3, NSO-13/NGD-8, NSO-14/NGD-9, NSO-17/NGD-10, CSU-20/SSR-23, and CSU-25/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 215,840 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 units (41,780 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, 229,440 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 396,800 acres (4 times more than under Alternative A) closed to wood product sales and/or harvest.

The BLM would manage 510,070 acres (23 percent fewer acres than under Alternative A) as open and 165,730 acres (nearly 10 times more acres than under Alternative A) as closed to livestock grazing. Emphasis would be placed on decreasing grazing preference. The requirement for at least three 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 concentrates recreation facilities and visitor use and generally allows more opportunities to manage impacts on special status species and their habitats. The BLM would manage 11 SRMAs on 244,050 acres (5 times more acres than under Alternative A) and no ERMA's. 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.

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 on 114,260 acres (twice as many acres as under Alternative A) and limited to designated routes on 561,540 acres (4 times more acres than under Alternative A) would also reduce impacts.

Management of 197,370 acres as ROW avoidance (compared with none under Alternative A) and 428,060 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 37,420 additional acres would concentrate impacts and reduce habitat fragmentation.

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 impact on special status species is expected to be the same as under Alternative A.

Under Alternative B, the BLM would manage 505,860 acres of BLM surface/federal minerals as open to fluid minerals leasing (20 percent fewer acres than under Alternative A) and 169,940 acres of BLM surface/federal minerals as closed (almost 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 364,890 acres (15 times more acres than under Alternative A), and CSU stipulations would be applied on 140,910 acres (28 percent more acres than under Alternative A), including many stipulations specifically protecting special status species (e.g., NL-4/NGD-12, NL-1/NGD-3, NSO-13/NGD-8, NSO-14/NGD-9, NSO-17/NGD-10, NSO-18/SSR-28, CSU-20/SSR-23, and CSU-25/SSR-30). These actions would reduce the potential for impacts on special status species.

Under Alternative B.1, the BLM would manage 461,940 acres of BLM surface/federal minerals as open to oil and gas leasing (27 percent fewer acres than under Alternative A) and 213,860 acres of BLM surface/federal minerals as closed (almost 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 325,940 acres (13 times more acres than under Alternative A), and CSU stipulations would be applied on 135,950 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, 366,730 acres of BLM surface/federal minerals would be recommended for withdrawal from locatable mineral entry (13 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 designation 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-13/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, 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 (155.5 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.I 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.I 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.I 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-14/NGD-9) and 0.25-mile for native cutthroat trout, reducing impacts from land uses in these areas (CSU-20/SSR-23). In addition, Alternative B.I 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-19/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-25/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, 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-4/NGD-12, TL-17). Other stipulations would provide general protection from disturbance/disruption within four miles of leks and in mapped breeding and early brood-rearing habitats (NSO-21/NGD-13). Alternative B.I 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 proposed 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 proposed 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-35/SSR-43) and sensitive bat species roosts (NSO-30/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-1/NGD-3).

For desert 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 desert 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 nine 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 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.

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-29/NGD-18, CSU-21/SSR-24, CSU-23/SSR-27, and CSU-27/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 647,900 acres (2 percent fewer acres than under Alternative A) as open and 27,900 acres (14 percent more 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. Alternative C would place the greatest emphasis on recreation and visitation within the planning area. As use continues to increase, the BLM would have a reduced capacity to concentrate use in areas managed for recreation, and the potential for impacts on special status species and their habitats would increase.

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 are the same as those described for Alternative A.

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 impact on special status species is expected to be the same as under Alternative A.

Under Alternative C, the BLM would manage 631,580 acres of BLM surface/federal minerals 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-9/SSR-10) and within 325 feet of perennial streams (CSU-10/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-14/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-23/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-20/SSR-32). A CSU/SSR stipulation would limit some disturbance/disruption within four miles of active leks, but it would not completely exclude surface occupancy (CSU-27/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 ERMA, which has proposed critical habitat for Gunnison sage-grouse, and would be open to cross-country OHV use. Impacts are greater than those described for Alternative B, since the areas would be managed as 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 or Dry Creek ERMA. As a result, proposed critical habitat for Gunnison sage-grouse could be damaged in the Kinikin Hills and Dry Creek ERMA. (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-29/NGD-18). Stipulations would protect kit fox active dens (TL-26) and sensitive bat species roosts (CSU-37/SSR-45). Stipulations to protect waterfowl and shorebirds would be extended to all major rivers in the planning area, with appropriate buffers (CSU-9/SSR-10).

For desert bighorn sheep, Alternative C provides a livestock grazing objective to minimize contact and mitigate effects of domestic sheep grazing on desert and 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 five miles of occupied wild sheep habitat.

It provides other actions to reduce contact between domestic sheep/goats and wild sheep within three 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.

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-4/SSR-11, NSO-15/SSR-22, NSO-18/SSR-28, NSO-23/SSR-36, CSU-18/SSR-20, CSU-19/SSR-21, and CSU-26/SSR-31).

Eight ACECs would be managed on 51,320 acres (74 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 611,560 acres (7 percent fewer acres than under Alternative A) as open and 64,240 acres as closed (nearly 4 times 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 are less than those under Alternative A due to the increased concentration and management of recreation in SRMAs.

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 on 58,560 acres (four 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 are the same as those for Alternative B.

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 impact on special status species is expected to be the same as under Alternative A.

Under Alternative D, the BLM would manage 627,290 acres of BLM surface/federal minerals 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, 10 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-18/SSR-20 and CSU-19/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.

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—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 special recreation permits. 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 NVSRS, 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-15/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 (NSO-18/SSR-28, CSU-24/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-26/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-20/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 four miles of active leks (CSU-28/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 breeding habitat would be designated as ROW avoidance. 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 proposed critical habitat from recreation in the Kinikin Hills ERMA are similar to those described for Alternative C. Impacts on Gunnison sage-grouse 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-27/SSR-41 and CSU-33/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-31/SSR-46). Stipulations to protect waterfowl and shorebirds would be extended to all major rivers in the planning area, with appropriate buffers (NSO-4/SSR-11). These measures would reduce impacts on special status species.

For desert 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 desert 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 a Domestic/Bighorn Sheep Probability of Interaction Assessment that the BLM developed in collaboration with CPW and livestock permittees, using current science summarized by the Wild Sheep Working Group (2012). Management of current grazing permits would follow the assessment developed for the RMP. At permit renewal, the assessment will be reviewed with current data specific to the allotment, and permit renewal decisions will be guided by the assessment. Conversion of cattle allotments to domestic sheep/goat allotments would be prohibited where the assessment depicts high probability of

disease transmission. 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 the assessment depicts high or moderate risk of disease transmission would be managed to mitigate risk of disease transmission, and it would be limited to one to two days. These actions would reduce impacts of livestock grazing on desert 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 4.1.1**). 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.

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 in 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. There are now 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 likewise 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 migratory birds, 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.

BLM Fire Planning Handbook H-921 I-1 requires analysis of anticipated relative wildland fire suppression costs. Suppression costs include but are not limited to wages for firefighters, transportation, equipment, services and supplies, as well as indirect costs of communications interruption and emergency evacuations. Fire suppression costs can increase when fuels treatments are restricted resulting in larger or more intense fires or when access is restricted for suppression activities (Liang et al. 2008, Forest Service 2000b).

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 grass banks 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 wildfires 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.

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 wildland 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 wildland fires.

The extent of planned ignitions 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 and could inhibit response to wildland fire through the need to protect firefighter and public safety.

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.

The types of impacts from coal management are the same as those described under **Effects Common to All Alternatives**. 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.

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 I.

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.

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.I, 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 229,440 acres (3 times more acres than under Alternative A). Under Alternative B.I, 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.I 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 41,780 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 244,050 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 and could inhibit response to wildland fire through the need to protect firefighter and public safety.

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 428,060 acres as ROW exclusion (5 times more than Alternative A) and 197,370 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 coal management are the same as those described under **Effects Common to All Alternatives**. 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 impact on wildland fire ecology and management is expected to be the same as under Alternative A.

The types of impacts from ACEC management are the same as those described under Alternative A but would occur over 215,840 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.

The types of impacts from coal management are the same as those described under **Effects Common to All Alternatives**. 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 impact on wildland fire ecology and management is expected to be the same as under Alternative A.

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, the increased use of planned and unplanned fires to meet resource objectives under Alternative D 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 grass banks, 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 grass banks.

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 and could inhibit response to wildland fire through the need to protect firefighter and public safety.

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 coal management are the same as those described under **Effects Common to All Alternatives**. 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 impact on wildland fire ecology and management is expected to be the same as under Alternative A.

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).

Cumulative

The cumulative impact analysis area for wildland fire management is delineated by the fourth-order watersheds that partially overlap the 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 wildland fires 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 wildland fires.

4.3.9 Cultural Resources

This section discusses impacts on cultural resource 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

Cultural resources are past and present expressions of human culture and history in the physical environment. 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. Cultural resources are traditionally described as discreet sites, localities, or districts. More recently, however, cultural resource specialists have talked about and viewed cultural resources within their broader landscape context and moved beyond the “site.” Considering this perspective, cultural resources do not lend themselves to quantitative analysis. For example, when a property’s eligibility criteria could extend to encompass an entire watershed or be determined by the integrity of its setting within the landscape, there are no numbers to quantify the magnitude or severity of the impact that would cause resources to no longer be eligible. Instead, a qualitative approach is used that can describe the qualities that are diminished or elements of the landscape that benefit or detract from a property’s eligibility.

Indicators

The use of indicators in NEPA analysis should provide information on determining whether the action would have a significant adverse impact on the resource (43 CFR 1508.27). For cultural resources, for example, 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:

- Impacts on cultural resources are assessed by applying the criteria of adverse effect, as defined in 36 CFR Part 800.5a: “An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association....Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative.”
- 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.
- The BLM will follow 36 CFR 800, Section 106 (including Native American consultation), and the Colorado Protocol when addressing federal undertakings. Following 36 CFR Part 800.8a(3)(c)(5), the BLM will develop alternatives and measures to avoid, minimize, or mitigate adverse effects on historic properties.
- 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.

Potential impacts on cultural resources and their settings from subsequent undertakings would be addressed at the project design and implementation phase. Required separate compliance with Section 106 of the NHPA would result in the continued identification, evaluation, and mitigation of historic properties eligible for listing on the National Register of Historic Places. Effects on cultural resources eligible for listing on the National Register of Historic Places would be avoided, minimized, or mitigated. If previously undiscovered resources are identified during an undertaking, work would be suspended while the resource is evaluated and mitigated in order to avoid any further impact. Consultation would continue with Native American groups to identify any traditional cultural properties or resource uses and to address impacts. Through this process, impacts on cultural resources would be minimized or eliminated.

Cultural Resource Units

For ease of discussion in this RMP, the BLM cultural resources staff has divided the planning area into four cultural resource units, as detailed below. The specific impacts on each unit are outlined under ***Effects Common to All Alternatives***.

Uncompahgre Unit

This unit encompasses BLM-administered lands along the northeastern flank of the Uncompahgre Plateau in Ouray, Montrose, Delta, and Mesa Counties. It includes the Dry Creek Basin, Roubideau Canyon, Escalante Canyon, Little Dominguez, and the adobe badland flanks of Grand Mesa, north of Delta. While many types of impacts can occur in the Uncompahgre Unit, development impacts often come from the establishment of linear ROWs (e.g., transmission and communication lines and pipelines), transportation management, livestock grazing, and mineral exploration and development.

North Fork Unit

This unit includes all BLM-administered lands north and east of the Gunnison Gorge National Conservation Area. Many impacts in the North Fork Unit are caused by livestock grazing, fluid minerals exploration, and recreational use in the area.

Ouray Unit

This unit is generally characterized by higher elevations and less-intensive use. It encompasses BLM-administered lands along the eastern margin of the UFO, from Ouray on the south to the Black Canyon of the Gunnison on the north. While not exclusive, expected impacts in the

Ouray Unit are from reclamation (e.g., vegetation and soil management), mineral exploration and development, livestock grazing, and recreational use.

West End Unit

This unit encompasses all BLM-administered lands in the western half of the planning area, 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. Expected impacts in the West End Unit can be caused by linear ROW development (e.g., transmission and communication lines), transportation management, recreational use, livestock grazing, mineral exploration and development, and watershed protection.

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, and D 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 compliance actions would continue under all alternatives. New protective measures based on cultural resource use categories would be expanded under Alternatives B, C, and D. Additional measures addressing protection of Native American resources and traditional uses would be expanded under the three 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 directives contained in BLM Manual 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). The BLM would continue to identify, protect, and preserve traditional cultural properties, sacred/religious sites, or special use areas through site- and project-specific modification or mitigation on a case-by-case or project-by-project consultation basis.

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 wildland fire, 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 closed 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.

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.

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

Current management of cultural resources under Alternative A does not include proactive measures 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 C 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.

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, wildland fire, mineral development, and energy development. Increased frequency of wildland fire 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 is provided in **Table 4-26** (Summary of Impacts on Paleontological Resources (PFYC 4 and 5)).

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 vegetation), 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.

Table 4-26
Summary of Impacts on Paleontological Resources (PFYC 4 and 5)

Management Action or Allocation	Acres of PFYC 4 and 5 Overlap with Management Action or Allocation				
	Alternative A	Alternative B	Alternative C	Alternative D	
Total acres of PFYC 4 and 5 in the decision area: 493,320 acres (BLM surface/federal minerals)					
ACECs	19,810	157,960	19,250	38,860	
SRMA allocation	41,670	197,890	0	173,940	
ERMA allocation	0	0	166,410	50,280	
Closed to motorized and mechanized travel	34,000	84,140	35,000	46,260	
Closed to motorized travel	11,200	3,560	0	860	
Motorized and mechanized travel limited to designated routes	448,150 ¹	405,620	458,330	446,210	
Open to cross-country motorized and mechanized travel	0	N/A	0	N/A	
Available for fluid mineral leasing with standard stipulations ²	309,240	Alt. B: 1,950	Alt. B.I: 1,950	234,660	86,820
Fluid mineral leasing with NSO ²	23,360	Alt. B: 409,590	Alt. B.I: 425,370	12,060	165,230
Fluid mineral leasing with CSU ²	111,960	Alt. B: 583,540	Alt. B.I: 583,540	246,010	375,420
Utility corridors	18,400		41,560	18,400	41,560
VRM Class III and IV ²	440,770 ³	Alt. B: 370,580	Alt. B.I: 366,020	438,180	370,520
Available for coal leasing ²	29,570		270,160	236,250	201,080
Available for locatable mineral exploration and development ²	474,310		304,060	467,920	428,610
Available for mineral materials disposal ²	415,290		142,260	453,360	388,870
No ground disturbance restriction	0		286,160	26,440	25,930
Site-specific relocation restriction	0		488,370	150,060	493,320

Source: BLM 2012a

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.

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 outstandingly remarkable values, 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. 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 446,360 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 440,280 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.

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 under **Nature and Type of Effects**, there are instances when human actions can inadvertently damage or destroy these resources. 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.

Travel management actions are similar in that closed areas would provide protection against the types of impacts resulting from vehicles or increased number of people in or near sensitive resources (surface disturbance of exposed localities or plundering and vandalism). 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 64,300 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.

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 under **Nature and Type of Effects**, there are instances when human actions can inadvertently damage or destroy these resources. 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 zero acres of PFYC 4 and 5 within allocated SRMAs, so there would be neither protection from the restrictions nor possible impacts from recreation.

Alternative C also considers allocations for ERMAs, which, like SRMAs, can be somewhat protective but also damaging. There could be increases in visitation, which would have the same types of impacts as SRMAs. Some of the ERMAs have areas known to be of scientific interest: the Adobe Badlands, Burn Canyon, Dolores River Canyon, Dry Creek, Jumbo Mountain, Kinikin Hills, North Delta OHV area, Paradox Valley, Ridgway Trails, Roubideau, San Miguel River Corridor, and Spring Creek. There are approximately 166,410 acres of PFYC 4 and 5 that overlap with ERMAs.

Travel management actions are similar in that closed areas would provide protection against the 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 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.

Only the San Miguel River ACEC would be designated, which 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.

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 under **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 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.

Alternative D also considers allocations for ERMA's, which, like SRMA's, can be somewhat protective but also damaging. There may be increases in visitation, which would have the same types of impacts as SRMA's. Some of the ERMA's have known areas of scientific interest: the Adobe Badlands, Burn Canyon, Dolores River Canyon, Dry Creek, Jumbo Mountain, Kinikin Hills, North Delta OHV area, Paradox Valley, Ridgway Trails, Roubideau, San Miguel River Corridor, and Spring Creek. There are approximately 50,280 acres of PFYC 4 and 5 that overlap with ERMA's.

Travel management actions are similar in that closed areas would protect against the types of 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 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 64,300 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.

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 and wildland fires, 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, and D 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

The visual resource inventory (VRI) classes form the basis for analysis in this section. Although VRI classes use the same numerical scale (i.e., Class I through IV) as VRM classes, they are defined differently. Visual resource inventory classes are the categories the BLM uses to classify the current visual character of the landscape and are a way to communicate the degree of visual quality in the area. Generally, VRI Class I indicates high visual quality, and VRI Class IV indicates

lower visual quality. For more information on the VRI process, refer to BLM Handbook H-8410-I, Visual Resource Inventory (BLM 1986a). The VRI is on file at the UFO.

This section identifies impacts on visual resources on 675,800 acres of BLM-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. It is developed through public participation and collaboration. Visual values are considered throughout the RMP process, and the area's visual resources are then designated as the management classes with established objectives. The VRI classes do not establish management direction and are not used as a basis for constraining or limiting surface-disturbing activities, but they are considered a baseline for existing conditions.

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. During the process, inventory class boundaries can be adjusted as necessary to reflect these resource allocation decisions. The goal of VRM is to minimize the visual impacts of all surface-disturbing activities, regardless of the class to which an area is assigned. 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 the 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 mines vegetation treatment in areas. 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.

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 and benefits). 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 lands 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 and 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 4-27** (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. 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.

Table 4-27
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	319,770	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	175,570	0	0%	79,120	48%	47,550	15%	48,900	27%	0	0%
VRM Class III	427,370	0	0%	53,490	32%	253,460	81%	112,570	62%	7,860	100%
VRM Class IV	18,990	0	0%	0	0%	0	0%	18,990	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	18,990	0	0%	0	0%	0	0%	18,990	11%	0	0%
Alternative C											
VRM Class I	44,220	8,060	100%	25,30	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%

Table 4-28
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 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%

Source: BLM 2012a

¹ These lands are part of the Curecanti National Recreation Area and are managed by the National Park Service.

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 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.

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.

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.

Under Alternative B, all of the lands lacking a VRI class would be managed as VRM Class III. Without a VRI, it is difficult to identify if VRM Class III management objectives would be appropriate for these lands.

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 protect seven units with wilderness characteristics, totaling 41,780 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 60 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 140,910 acres under Alternative B and 135,950 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.

Alternative B.I would assign VRM Class II to several vistas and travel corridors. Within the North Fork area, Alternatives B and B.I would both have 80 acres of VRM Class I. Alternative B.I 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.I 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.I would provide more protection for the West Elk Scenic Byway. Under Alternative B, the BLM would manage all National Trails and BLM byways as VRM Class II within a half-mile of either side of centerline. Under Alternative B.I, VRM Class II management would extend to 1 mile of either side of centerline for 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 11 SRMAs, totaling 244,050 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.

Under Alternative C, all of the lands lacking a VRI class would be managed as VRM Class III. Without a VRI, it is difficult to identify if VRM Class III management objectives would be appropriate for these lands.

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.

The BLM would manage 12 ERMA, 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 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.

Under Alternative D, all of the lands lacking a VRI class would be managed as VRM Class III. Without a VRI, it is difficult to identify if VRM Class III management objectives would be appropriate for these lands.

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 protect only three units with wilderness characteristics, totaling 18,330 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.

The BLM would manage seven SRMAs and four ERMAs, totaling 196,580 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 trails and travel 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 12 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.

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). The BLM is required to maintain updated inventories of all resources, including lands with wilderness characteristics, and to consider those resources during the land use planning process. Wilderness characteristics considered in this analysis are roadless areas of sufficient size, naturalness, and outstanding opportunities for solitude or a primitive and unconfined type of recreation, and supplemental values. In the planning area, seven areas outside of existing WSAs

and the Tabeguache Area, with a total of 41,780 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: 2011 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 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 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 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.

Two other wilderness characteristics—outstanding opportunities for solitude or primitive unconfined types of recreation—are related to the human experience in an area. Visitors can have outstanding opportunities for solitude or for primitive, unconfined recreation when the sights, sounds, and evidence of other people are rare or infrequent; where visitors can be isolated, alone, or secluded from others; where the use of the area is through nonmotorized nonmechanized means; and where there are no or only minimal developed recreation facilities.

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, solitude experienced by recreational users 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 wilderness characteristics. 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.

Visitors have outstanding opportunities for solitude or primitive and unconfined recreation when the sights, sounds, and evidence of other people are rare or infrequent and where visitors can be isolated and alone or secluded from others. High concentrations of recreation users

(large group sizes or frequent group encounters) would decrease outstanding opportunities for solitude. Limiting visitor use only as necessary to prevent substantial degradation to wilderness characteristics (i.e., naturalness and opportunities for solitude) would protect opportunities for unconfined recreation.

Allowing 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. Motorized and mechanized access would also reduce opportunities for primitive recreation. The existence of 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 detractor from the natural character of the areas. These impacts would be uncommon and short duration if they were to occur. On a more regular basis, motorized and mechanized use by established livestock grazing permittees would impact opportunities for solitude and naturalness of appearance.

Allowing any type of 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 natural 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 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 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 4-29** (Acreage Impacts on Lands with Wilderness Characteristics).

Table 4-29 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 Alternative D protects only some of the areas identified as possessing

Table 4-29
Acreage Impacts on Lands with Wilderness Characteristics¹

Management Action	Alt. A <i>(Not Managed to Protect Wilderness Characteristics)</i>	Alt. B <i>(Managed to Protect Wilderness Characteristics)</i>	Alt. C <i>(Not Managed to Protect Wilderness Characteristics)</i>	Alt. D <i>(Not Managed to Protect Wilderness Characteristics)</i>	Alt. D <i>(Managed to Protect Wilderness Characteristics)</i>
Total	41,780	41,780	41,780	23,460	18,320
Ecological Emphasis Areas	0	34,650	3,370	1,780	13,420
Open to Livestock Grazing	41,780	38,020	41,780	23,450	18,310
VRM Class I	20	4,050	20	10	990
VRM Class II	0	37,730	1,360	6,690	17,330
VRM Class III	19,730	0	34,090	10,460	0
VRM Class IV	0	0	6,310	6,310	0
VRM Unclassified	22,030	N/A	N/A	N/A	N/A
SRMA	0	19,460	0	0	13,980
ERMA	0	0	13,980	0	0
Closed to motorized travel (<i>mechanized travel limited to designated routes</i>)	170	0	0	0	0
Closed to motorized and mechanized travel	20	41,780	20	10	6,290
ROW Avoidance	0	0	13,680	17,320	14,270
ROW Exclusion	20	41,780	20	10	4,060
Closed to fluid mineral leasing	20	41,780	20	10	10
NSO	14,770	N/A	1,240	1,490	18,320
CSU	1,750	N/A	23,320	16,950	N/A
TL	28,490	12,680	33,840	23,450	18,320
Closed to coal leasing	0	12,680	230	230	1,110
Recommend for withdrawal from locatable mineral entry	14,730	41,780	350	80	4,100
Closed to mineral material disposal	6,780	41,780	660	750	18,320
NGD	10	41,780	150	0	10
SSR	0	41,780	8,890	5,710	18,320
ACECs	0	24,360	0	0	3,370
Eligible/Suitable Wild and Scenic River Segments	5,800	5,800	0	0	4,060

Source: BLM 2012a

¹ Acres refer to impacts on lands in the BLM's current inventory of lands with wilderness characteristics.

wilderness characteristics, the table has two different columns for Alternative D, one for areas managed for the protection of wilderness characteristics, and one for those not managed for protection of wilderness characteristics. The allocations overlapping lands with wilderness characteristics are discussed by alternative in the alternative-specific discussions below.

Wilderness characteristics could be enhanced in the Dolores River Canyon WSA, Camel Back WSA, and Adobe Badlands WSA, which are next to lands with wilderness characteristics (Dolores River Canyon WSA Adjacent and Camel Back WSA Adjacent, and Adobe Badlands WSA Adjacent, respectively). This is because the management of WSAs would include protective measures. A wider expanse of contiguous land containing the special management area and lands with wilderness characteristics could therefore heighten protection within the lands with wilderness characteristics and further ensure the integrity of wilderness characteristics.

Where lands managed to protect wilderness characteristics overlap or are next to eligible or suitable WSR segments or ACECs, management of these other areas could also indirectly protect wilderness characteristics due to the protective measures proposed for the other areas. These protective measures would include complementary management objectives, where lands with wilderness characteristics units would be managed to protect their wilderness characteristics, and could offer some indirect protection of wilderness characteristics for units managed primarily for other resource considerations.

Effects Common to All Alternatives

Table 4-29 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 Alternative D protects only some of the areas identified as possessing wilderness characteristics, the table below has two different columns for Alternative D, 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, WSAs, 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 that were found to have wilderness characteristics would leave these lands vulnerable to surface-disturbing activities, which would 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 4-29**). 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 open to livestock grazing (**Table 4-29**). 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 4-29**). 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 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 one percent of lands with wilderness characteristics are closed to motorized or mechanized travel or both (**Table 4-29**). 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 three-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 two-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 five 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 one 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 4-29**). Any new roads authorized for access to the lease 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.

Approximately 35 percent of lands with wilderness characteristics would be recommended for withdrawal from locatable mineral entry (**Table 4-29**). 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 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 one percent) of lands with wilderness characteristics would be managed as ROW exclusion areas (**Table 4-29**). 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 access roads that bisect the unit so that they are no longer considered to be a roadless area of adequate size would eliminate wilderness characteristics of the entire unit.

Managing 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. 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 4-29**).

Alternative B

Under Alternative B, the BLM would manage 7 units totaling 41,780 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 4-29**). 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 4-29**). 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 4-29**). 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 closed 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 backcountry 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 special recreation permits 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 one 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 4-29**).

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 4-29**).

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 eliminate wilderness characteristics from an area.

Recreation use in Alternative C resulting from 13,980 acres of ERMA's 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 SRMA's, ERMA's 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 SRMA's, 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 4-29**). 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 (three 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 4-29**). 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 (five 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. An additional 10,460 acres (45 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.

The remaining 6,310 acres (27 percent) would be managed according to VRM Class IV objectives. This 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. Landscape modifications noticeable to the casual observer would eliminate wilderness characteristics from part or all of a unit.

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, special recreation permits 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 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).

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on lands with wilderness characteristics is the 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. Due to the isolated, roadless nature of the units and their surrounding areas, present and reasonably foreseeable future actions are not expected to degrade the wilderness characteristics of these areas.

The final Colorado Roadless Rule identified the Roc Creek Colorado Roadless Area, next 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
- 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 4.1.1.**

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 4.1.1.**

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.

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.

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.

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 lands with wilderness characteristics, 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, paleontological resources, livestock grazing, 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 I; 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 not any 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 VSR segments to impact forest product harvest.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on forest resources is the 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 ippis 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 and National Forest. This Forest has historically been one 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 through the Forest (Forest Service 2007). Management actions for the Forest would focus on maintaining and improving forest health and should help to return forest to historic conditions in the planning area in the long term.

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).

Consistent with BLM Washington Office Instruction Memorandum No. 2012-169, 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 30 percent, and variation in areas open to livestock grazing is 23 percent. Note that this includes 28,870 acres and 1,242 AUMs that are currently unallotted. Therefore, the actual variation in AUMs from high to low is 20 percent and the actual variation in areas open to livestock grazing is 19 percent.

Methods and Assumptions

Indicators

Indicators of impacts on livestock grazing are the following:

- A change in permitted AUMs in areas open 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)
- Closure of areas 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 be in accordance with the Omnibus Public Land Management Act of 2009, Subtitle E; 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 five 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 open 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 forage by wildlife and could necessitate 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 high numbers of bighorn sheep fatalities (Foreyt and Jessup 1982; Jessup 1985). As a result, limitations on domestic sheep and goat grazing could be recommended in occupied bighorn sheep habitat to protect the native species. 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, even to the extent that 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 may be excluded from certain sensitive areas, or management activities may be otherwise limited, 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 one 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 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 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 conduction 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, noise, and livestock shooting.

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 open 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 two 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 two 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 closed 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 30 percent, and variation in areas open to livestock grazing is 23 percent. Additional differences are seen in the total acres closed 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 opened to livestock grazing that are potentially affected by various described impacts are displayed in **Table 4-30** (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.

Alternative A

This alternative includes the largest area open to livestock grazing and the highest level of permitted AUMs. As a result, limitations on livestock grazing management would be minimized. Detailed acreage impacts are included in **Table 4-30**.

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;

Table 4-30
Acres Impacts on Grazing Allotments

Management Action	Alternative A	Alternative B	Alternative C	Alternative D
Open to all classes of livestock grazing	658,540	510,070	647,900	611,560
Closed to livestock grazing ¹	17,260	165,730	27,900	64,240
Unallotted ²	28,870	0	22,750	0
Available AUMs	38,364	29,862	37,926	36,424
Open for sheep grazing	658,540	115,530	647,900	611,560
Closed to sheep grazing ¹	0	394,540	0	0
Open to grazing with NGD restrictions ³	33,340	287,940	42,580	30,220
Open to grazing with SSR restrictions ³	N/A	507,720	251,150	489,290
Open to grazing with TL ⁴	411,620	510,070	484,230	611,570
Open to grazing within SRMAs	22,570	171,580	N/A	89,290
Open to grazing within ERMAs	N/A	N/A	199,250	70,310
Open to grazing within ACECs	13,650	137,840	13,110	29,570
Open to grazing within WSAs	33,130	20,510	36,080	30,200
Open to grazing within Tabeguache Area	7,930	7,370	8,060	7,930
Open to grazing within lands managed for wilderness characteristics	N/A	38,020	N/A	18,310
Open to grazing within ROW avoidance areas	N/A	192,600	190,460	232,270
Open to grazing within eligible or suitable WSR corridors	38,250	28,250	N/A	18,520
Open to grazing and have lands for disposal	7,890	1,030	9,030	1,020
Open to grazing within ROW exclusion areas	N/A	269,890	44,470	45,350
Open to grazing in special status species areas	11,430	6,310	11,620	10,580
Closed to grazing in special status species areas ¹	0	5,320	0	1,050
Open to grazing in areas defined as fragile soils	N/A	30,410	105,690	100,140
Open to grazing in VRM Class I	41,060	33,980	44,140	40,170
Closed to grazing in VRM Class I ¹	80	19,880	80	6,270

Table 4-30
Acres Impacts on Grazing Allotments

Management Action	Alternative A	Alternative B	Alternative C	Alternative D
Open to grazing in VRM Class II	6,000	<i>Alt. B:</i> 132,000	<i>Alt. B. I:</i> 133,740	30,440 97,600
Closed to grazing in VRM Class II ¹	15,920	<i>Alt. B:</i> 43,580	<i>Alt. B. I:</i> 47,910	820 14,940
Acceptable for coal leasing (in potential coal resource area)	32,080		163,400	249,230 212,150
Open to fluid minerals leasing	588,660	<i>Alt. B:</i> 418,620	<i>Alt. B. I:</i> 395,130	603,820 569,810
Open to nonenergy solid leasable mineral development	588,660		240,330	596,470 482,040
Open for mineral material disposal	556,260		137,710	591,130 508,390

Source: BLM 2012a

¹ Acres closed to livestock grazing may be closed for the purpose of protecting other resources.

² Unallotted acres are also shown in the acres for "Open to all classes of livestock grazing"

³ Grazing is not considered a ground-disturbing activity. Restrictions would apply to management facilities only.

⁴ Timing limitations on travel management do not apply to livestock management. Timing limitations would apply only to surface restriction on management facilities.

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 open 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 grass banks on abandoned or relinquished allotments. Grass banks, 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 open and closed to grazing are shown in **Table 4-30**.

Acres of allotments open 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 open 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 open 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 open 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 open to livestock grazing and trailing; no additional acres would be closed 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 open to livestock grazing, and no additional acres are closed.

In addition, 38,250 acres next to river segments eligible for inclusion in the NWSRS would be open 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 open to grazing, 510,070 acres (approximately 23 percent fewer acres than under Alternative A). In addition, permitted AUMs would be reduced to 29,862 (an approximately 30-percent reduction in AUMs from Alternative A). A total of 165,730 acres (nearly 10 times that under Alternative A) would be closed 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.

Grass banks 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 closing sensitive areas. A total of 74,510 acres in ecological emphasis areas are closed to grazing due to overlapping restrictions for protection of other resources. The 168,060 acres open to grazing may have some restrictions on management activities.

Impacts from riparian area management are as described for Alternative A but at an increased intensity due to a larger area closed for riparian resource protection. In total, 23,930 acres would be closed 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 open to grazing) and fragile soils susceptible to erosion (30,410 acres open 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 open to grazing, and an additional 5,320 acres of mapped special status species habitat are closed 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 nine 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 closed 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 open and closed to grazing are shown in **Table 4-30**. VRM Class I areas closed to livestock grazing would cover 19,880 acres. Additional limitations could occur in areas managed according to VRM Class II objectives that are open 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 closed to grazing, with an additional reduction in AUMs. Additional impacts may occur in the 38,020 additional acres open to grazing due to potential restrictions on grazing management options.

The types of impacts from managing livestock grazing open to fluid mineral leasing on 418,620 acres under Alternative B and 395,130 acres under Alternative B.1, 240,330 acres open to nonenergy mineral leasing, and 137,710 acres open to mineral material disposal 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 open 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 open to grazing would be within SRMAs (nearly eight 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 open 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 open 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 (215,840 acres) that would be designated under Alternative B, 137,840 acres are open to livestock grazing, and 77,990 acres are closed to grazing. The types of impacts from management of the ACECs open 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 closed 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 open to grazing and trailing. In these areas, impacts are as described for Alternative A. An additional 21,000 acres would be closed to grazing, with potential reductions in AUMs.

Alternative C

Alternative C would slightly reduce areas open to grazing, compared with Alternative A; approximately 647,900 acres of allotments would be open to grazing (approximately two percent fewer acres than under Alternative A). Similarly, permitted AUMs would be slightly reduced to 36,833 (a one percent reduction in AUMs). A total of 27,900 acres would be closed

to all classes of livestock grazing due to lack of suitability for grazing and to reduce private land conflict (nearly twice as many acres as 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 be 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 five miles of occupied bighorn sheep habitat, and cattle allotments would be prohibited from being converted to domestic sheep or goat grazing within three 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 open and closed to grazing are shown in **Table 4-30**. As in Alternative A, 80 acres of VRM Class I areas are closed to grazing. Additional restrictions could occur in the 30,440 acres open 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 open 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 open 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 open to grazing would be managed as ROW avoidance areas, and 44,470 acres open 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 closed 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 reduce areas open to grazing, as compared with Alternative A; approximately 611,560 acres would be open to grazing (approximately seven percent fewer acres than under Alternative A). Similarly, permitted AUMs would be slightly reduced to 36,424 (approximately five percent fewer than under Alternative A). A total of 32,560 acres would be closed 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 health 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.

Grass banks 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 open 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 closed to grazing to protect special status species. In total, 10,580 acres of mapped special status species habitat would be open to grazing.

Ecological emphasis areas would be established as described under Alternative B; impacts could occur on 153,600 acres open 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 [Domestic/Bighorn Sheep Probability of Interaction Assessment]**), 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 open and closed to grazing are shown in **Table 4-30**. A total of 6,270 acres of VRM Class I areas would be closed to grazing. Additional restrictions could occur in the 97,600 acres open 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 open to livestock grazing could impose some restrictions on grazing management.

The types of impacts from managing 569,810 acres open 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 open 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 (four 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 open 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 open to livestock grazing. The types of impacts from management of the ACECs open 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 closed to livestock grazing.

In addition, 18,520 acres next to river segments determined suitable for inclusion in the NWSRS would be open to grazing. In these areas, impacts are as described for Alternative A. An additional 12,920 acres would be closed to grazing, with potential reductions in AUMs.

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 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 has 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.

The cumulative impacts under each alternative would parallel the impacts of the alternatives in the general impact analysis, above. Cumulative impacts from each resource or resource use would be greater on livestock grazing if the cumulative projects were to occur simultaneously. However, standard mitigation identified in the BLM Colorado Public Land Health Standards (BLM 1997) would be implemented across all alternatives and any other cumulative projects on BLM-administered lands. This would reduce or minimize cumulative impacts on decision area lands.

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. Fluid leasable minerals are oil (including oil shale), gas (including shale gas), and geothermal resources; solid leasable minerals are coal, sodium, potash, and potassium; locatable minerals are gold, silver, platinum, copper, lead, zinc, gypsum, magnesium, nickel, tungsten, bentonite, uranium, vanadium, and uncommon varieties of sand, gravel, and dimension stone. Mineral materials, also referred to as salable minerals, are common varieties of construction materials and aggregates, such as, sand, gravel, riprap, cinders, roadbed, and ballast material.

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 affects could increase the cost of mineral resource extraction.

Wildland fire could adversely affect fluid mineral operations by threatening and burning infrastructure, requiring evacuations, and interrupting production.

There are not any 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, 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.

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.

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.

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 strip mining operation on private coal that supplies coal to the Nucla power plant (which can burn no more than 420,000 tons of coal per year) by truck because no rail line is available. 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.

The Somerset coal field has the greatest potential for continuing to produce the largest amount of coal in the planning area (BLM 2010h). There are two active mines in this coal field that are mining coal from the Paonia Shale member of the Mesaverde and one idle mine whose resumption date of production is unknown. 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, and Sodium

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 valid existing rights reviews for 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 trails and travel 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 4-31** (Quantitative Impacts on Fluid Mineral Resources) and are discussed below in the analysis of each alternative.

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 4-31**, 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 4-32** (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.

Solid Leasable Minerals—Nonenergy Leasables, Potassium, and Sodium

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.

Table 4-31
Quantitative Impacts on Fluid Mineral Resources

Leasable Minerals (Fluid)	Alternative A	Alternative B	Alternative B.1	Alternative C	Alternative D
Closed to fluid mineral leasing and geophysical exploration	44,220	186,700	280,840	44,220	50,060
<i>BLM surface/federal minerals</i>	44,220	169,940	213,860	44,220	48,510
<i>Private or state surface/federal minerals</i>	–	16,760	66,980	–	1,550
Open to fluid mineral leasing and geophysical exploration	871,810	729,330	635,190	871,810	865,970
<i>BLM surface/federal minerals</i>	631,580	505,860	461,940	631,580	627,290
<i>Private or state surface/federal minerals</i>	240,230	223,470	173,250	240,230	238,680
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	5,660	5,660	392,390	294,500
<i>BLM surface/federal minerals¹</i>	496,510	60	60	251,090	174,590
<i>Private or state surface/federal minerals</i>	229,830	5,600	5,600	141,300	119,910
Open to leasing with NSO stipulation	25,610	479,540	427,070	22,300	238,140
<i>BLM surface/federal minerals</i>	24,890	364,890	325,940	14,680	187,560

Table 4-31
Quantitative Impacts on Fluid Mineral Resources

Leasable Minerals (Fluid)	Alternative A	Alternative B	Alternative B.1	Alternative C	Alternative D
<i>Private or state surface/federal minerals</i>	720	114,650	101,130	7,620	50,580
Open to leasing with CSU stipulation	119,860	244,130	202,470	457,120	333,330
<i>BLM surface/federal minerals</i>	110,180	140,910	135,950	365,810	265,140
<i>Private or State surface/federal minerals</i>	9,680	103,220	66,520	91,310	68,190
Open to leasing with TL stipulation	501,100	729,320	635,180	582,390	865,970
<i>BLM surface/federal minerals</i>	423,900	505,860	461,940	475,220	627,290
<i>Private or state surface/federal minerals</i>	77,200	223,460	173,240	107,170	238,680

Source: BLM 2012a

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.

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 4-33** (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.

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 five or fewer acres and a plan of operations for exploration and development greater than five 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

Table 4-32
Quantitative Impacts on Coal Leasing

	Alternative A	Alternative B	Alternative C	Alternative D
Coal Fields				
Grand Mesa				
Area of potential	25,580	27,740	27,740	27,740
Area closed	0	3,460	1,270	660
Nucla-Naturita				
Area of potential	2,080	148,440	148,440	148,440
Area closed	490	49,820	5,430	8,810
<i>Screen 2—Specific to surface-mining and surface mining operations</i>				
Area of potential for surface mining only	1,090	21,950	21,950	21,950
Area closed, per Screen 2	490	2,500	2,500	2,500
Area with SSR restrictions	n/d	21,950	3,680	13,790
Area with TL stipulation	990	21,950	19,740	21,950
Somerset				
Area of potential	44,920	46,220	46,220	46,220
Area closed	0	5,610	2,660	1,110
Tongue Mesa				
Area of potential	15,920	16,570	16,570	16,570
Area closed	580	1,390	850	700
Coal Resource Areas¹				
Piceance Deep				
Area of potential	57,350	57,360	57,360	57,360
Area closed	0	1,480	610	140
Uncompahgre Plateau				
Area of potential	No data	117,260	117,260	117,260
Area closed	0	39,080	5,240	38,460
Unnamed Areas				
Area of potential	No data	7,910	7,910	7,910
Area closed	0	210	210	210

Source: BLM 2012a

¹The 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.

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 five 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

Table 4-33
Quantitative Impacts on Locatable Minerals

Locatable Minerals	Alternative A	Alternative B	Alternative C	Alternative D
Total federal mineral estate for locatable minerals	896,190	896,190	896,190	896,190
<i>BLM surface/federal minerals</i>	675,800	675,800	675,800	675,800
<i>Private, state, or Bureau of Reclamation project lands surfac/federal minerals</i>	220,390	220,390	220,390	220,390
Total acreage withdrawn from locatable mineral entry ¹	28,060	28,060	28,060	28,060
Total acreage recommended for withdrawal from locatable mineral entry	27,690	371,090	11,250	55,880
<i>BLM surface/federal minerals</i>	27,690	366,730	9,550	54,090
<i>Private, state, or Bureau of Reclamation project lands surfac/federal minerals</i>	0	4,360	1,700	1,790
<i>Increase from Alternative A</i>	N/A	13x	59%	2x
Total acreage of open active mining claims within areas recommended for withdrawal from locatable mineral entry	140	37,090	460	2,180
<i>BLM Surface/Federal Minerals</i>	140	37,010	460	2,180
<i>Private, state, or Bureau of Reclamation project lands surfac/federal minerals</i>	0	80	0	0
Total acreage open to locatable mineral exploration or development	840,440	495,870	856,880	812,250
<i>BLM surface/federal minerals</i>	620,050	281,120	638,190	593,650
<i>Private, state, or Bureau of Reclamation project lands surfac/federal minerals</i>	220,390	215,980	218,690	218,600

Source: BLM 2012a

¹ All lands withdrawn from locatable mineral entry are on BLM surface with federal minerals.

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 4-31**, 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 4-34** (Acres of Conventional Oil and Gas Leasing Decisions by Potential, Alternative A).

Table 4-34
Acres of Conventional Oil and Gas Leasing Decisions by Potential,
Alternative A

Conventional Oil and Gas	Higher Development Potential	Lower Development Potential
<i>Federal Mineral Estate Potential</i>	482,790	433,230
Closed to Leasing	23,140	21,080
Open to Leasing	459,650	412,150
<i>Open with No Stipulations¹</i>	319,050	407,270
<i>Open with NSO Stipulations²</i>	25,390	220
<i>Open with CSU Stipulations²</i>	126,650	4,650
<i>Open with TL Stipulations²</i>	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.

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 potential areas would be available for fluid mineral leasing and development with standard lease stipulations; 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 4-35** (Acres of Coalbed Natural Gas Leasing Decisions by Potential, Alternative A).

Table 4-35
Acres of Coalbed Natural Gas Leasing Decisions by Potential,
Alternative A

Coalbed Natural Gas	Development	
	Potential	No Potential
<i>Federal Mineral Estate Potential</i>	466,700	449,330
Closed to leasing	10,510	33,730
Open to Leasing	456,190	415,600
<i>Open with No Stipulations¹</i>	437,750	288,570
<i>Open with NSO Stipulations²</i>	5,460	20,140
<i>Open with CSU Stipulations²</i>	15,010	116,300
<i>Open with TL Stipulations²</i>	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 with standard lease stipulations; 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 4-36** (Acres of Geothermal Leasing Decisions by Potential, Alternative A).

Table 4-36
Acres of Geothermal Leasing Decisions by Potential,
Alternative A

	Acres of Geothermal Potential Area
<i>Federal Mineral Estate Potential</i>	832,980
Closed to Leasing	29,900
Open to Leasing	803,080
<i>Open with No Stipulations¹</i>	598,120
<i>Open with NSO Stipulations²</i>	31,180
<i>Open with CSU Stipulations²</i>	109,460
<i>Open with TL Stipulations²</i>	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 with standard lease stipulations; 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 (seven 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 (three 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 (one 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 directional 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, and Sodium

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 (three 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 (three 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, and notification forms for recreational mining would still be required. 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 is 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 six 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 4-31**, under Alternative B, approximately 186,700 acres would be unavailable for fluid mineral leasing, exploration, development, or production, 4 times the acreage under Alternative A. About 729,330 acres would be open to leasing, 16 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 4-37** (Acres of Conventional Oil and Gas Leasing Decisions by Potential, Alternative B).

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 729,330 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

Table 4-37
Acres of Conventional Oil and Gas Leasing Decisions by Potential,
Alternative B

Conventional Oil and Gas	Higher Development Potential	Lower Development Potential
<i>Federal mineral estate potential</i>	482,790	433,230
Closed to Leasing	106,890	79,810
Open to Leasing	375,900	353,420
<i>Open with No Stipulations¹</i>	480	5,150
<i>Open with NSO Stipulations²</i>	235,220	274,010
<i>Open with CSU Stipulations²</i>	372,860	345,860
<i>Open with TL Stipulations²</i>	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.

estate in high development potential areas and 5,150 acres in low development potential areas would be available for fluid mineral leasing and development with standard lease stipulations; 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 4-38** (Acres of Coalbed Natural Gas Leasing Decisions by Potential, Alternative B).

Table 4-38
Acres of Coalbed Natural Gas Leasing Decisions by Potential,
Alternative B

Coalbed Natural Gas	Development Potential	No Potential
<i>Federal Mineral Estate Potential</i>	466,700	449,330
Closed to Leasing	47,240	139,430
Open to Leasing	419,460	309,900
<i>Open with No Stipulations¹</i>	4,430	0
<i>Open with NSO Stipulations²</i>	273,190	206,350
<i>Open with CSU Stipulations²</i>	412,490	306,200
<i>Open with TL Stipulations²</i>	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 with standard lease stipulations; 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 4-39** (Acres of Geothermal Leasing Decisions by Potential, Alternative B/B.1).

Table 4-39
Acres of Geothermal Leasing Decisions by Potential,
Alternative B/B.1

	Acres of Geothermal Potential Area
<i>Federal Mineral Estate Potential</i>	832,980
Closed to Leasing	164,040
Open to Leasing	668,940
<i>Open with No Stipulations¹</i>	5,640
<i>Open with NSO Stipulations²</i>	442,000
<i>Open with CSU Stipulations²</i>	658,340
<i>Open with TL Stipulations²</i>	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 five 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 with standard lease stipulations; these lands are not subject to additional NSO or CSU stipulations and provide the most flexibility for geothermal development. These acres with standard lease stipulations 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 percent of BLM-administered surface acres would be categorized as VRM Class III (430,580 acres) and VRM Class IV (23,210 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, and Sodium

Approximately 395,900 acres (44 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, 371,090 acres (including 4,360 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 399,150 acres, or 45 percent of the federal mineral estate (7 times the acreage under Alternative A and the most restrictive for locatable minerals). About 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 zero 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 567,590 acres (64 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 4-31**, under Alternative B.1, approximately 280,840 acres would be unavailable for oil and gas leasing, exploration, development, or production, 6 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 635,190 acres would be open to leasing, 27 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 4-40** (Acres of Conventional Oil and Gas Leasing Decisions by Potential, Alternative B.1).

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

Table 4-40
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
<i>Federal mineral estate potential</i>	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
<i>Open with No Stipulations¹</i>	480	5,150	0	120
<i>Open with NSO Stipulations²</i>	214,850	212,230	11,460	15,820
<i>Open with CSU Stipulations²</i>	343,480	281,110	15,700	18,740
<i>Open with TL Stipulations²</i>	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.

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 with standard lease stipulations; 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 4-41** (Acres of Coalbed Natural Gas Leasing Decisions by Potential, Alternative B.1).

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

Table 4-41
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 Area: Development Potential	North Fork Area: No Potential
<i>Federal Mineral Estate Potential</i>	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
<i>Open with No Stipulations¹</i>	4,430	1,210	120	0
<i>Open with NSO Stipulations²</i>	222,880	204,200	25,990	1,290
<i>Open with CSU Stipulations²</i>	322,320	302,240	33,150	1,290
<i>Open with TL Stipulations²</i>	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.

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 with standard lease stipulations; 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 4-42** (Acres of Conventional Oil and Gas Leasing Decisions by Potential, Alternative C).

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

Table 4-42
Acres of Conventional Oil and Gas Leasing Decisions by Potential,
Alternative C

Conventional Oil and Gas	Higher Development Potential	Lower Development Potential
<i>Federal Mineral Estate Potential</i>	482,790	433,230
Closed to Leasing	23,140	21,080
Open to Leasing	459,650	412,150
<i>Open with No Stipulations¹</i>	257,420	134,950
<i>Open with NSO Stipulations²</i>	11,210	11,090
<i>Open with CSU Stipulations²</i>	182,140	289,850
<i>Open with TL Stipulations²</i>	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.

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 with standard lease stipulations; 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 4-43** (Acres of Coalbed Natural Gas Leasing Decisions by Potential, Alternative C).

Table 4-43
Acres of Coalbed Natural Gas Leasing Decisions by Potential,
Alternative C

Coalbed Natural Gas	Development Potential	No Potential
<i>Federal Mineral Estate Potential</i>	466,700	449,330
Closed to Leasing	10,510	33,730
Open to Leasing	456,220	415,560
<i>Open with No Stipulations¹</i>	81,880	43,630
<i>Open with NSO Stipulations²</i>	12,810	9,480
<i>Open with CSU Stipulations²</i>	253,470	218,500
<i>Open with TL Stipulations²</i>	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 with standard lease stipulations; 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 4-44** (Acres of Geothermal Leasing Decisions by Potential, Alternative C).

Table 4-44
Acres of Geothermal Leasing Decisions by Potential,
Alternative C

	Acres of Geothermal Potential Area
<i>Federal Mineral Estate Potential</i>	832,980
Closed to Leasing	29,900
Open to Leasing	803,080
<i>Open with No Stipulations¹</i>	342,480
<i>Open with NSO Stipulations²</i>	27,910
<i>Open with CSU Stipulations²</i>	452,550
<i>Open with TL Stipulations²</i>	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 with standard lease stipulations; these lands are not subject to additional NSO or CSU stipulations and provide the most flexibility for geothermal development. These acres with standard lease stipulations 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 classification 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, five percent of the Grand Mesa coal field, six percent of the Somerset coal field (including 1,140 acres of active lease areas), and five 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, and Sodium

Approximately 57,390 acres (six 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 (two 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 zero 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 one half 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 (seven 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 4-45** (Acres of Conventional Oil and Gas Leasing Decisions by Potential, Alternative D).

Table 4-45
Acres of Conventional Oil and Gas Leasing Decisions by Potential,
Alternative D

Conventional Oil and Gas	Higher Development Potential	Lower Development Potential
<i>Federal Mineral Estate Potential</i>	482,790	433,230
Closed to Leasing	27,420	22,630
Open to Leasing	455,370	410,600
<i>Open with No Stipulations¹</i>	198,360	96,130
<i>Open with NSO Stipulations²</i>	110,830	127,310
<i>Open with CSU Stipulations²</i>	202,180	298,860
<i>Open with TL Stipulations²</i>	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 with standard lease stipulations; 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 4-46** (Acres of Coalbed Natural Gas Leasing Decisions by Potential, Alternative D).

Table 4-46
Acres of Coalbed Natural Gas Leasing Decisions by Potential,
Alternative D

Coalbed Natural Gas	Development Potential	No Potential
<i>Federal Mineral Estate Potential</i>	466,700	449,330
Closed to Leasing	14,410	35,650
Open to Leasing	452,330	413,650
<i>Open with No Stipulations¹</i>	0	0
<i>Open with NSO Stipulations²</i>	87,420	150,730
<i>Open with CSU Stipulations²</i>	271,820	229,210
<i>Open with TL Stipulations²</i>	452,330	413,650

Source: BLM 2012a

¹TLs overlap some of this area but were not included in this calculation due to the temporal nature of the TL stipulation.

²Total acreage for stipulations is greater than the total acreage within the planning area because stipulations could overlap.

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 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 with standard lease stipulations. 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 4-47** (Acres of Geothermal Leasing Decisions by Potential, Alternative D).

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

Table 4-47
Acres of Geothermal Leasing Decisions by Potential,
Alternative D

	Acres of Geothermal Potential Area
<i>Federal Mineral Estate Potential</i>	832,980
Closed to Leasing	35,720
Open to Leasing	797,260
<i>Open with No Stipulations¹</i>	193,130
<i>Open with NSO Stipulations²</i>	221,960
<i>Open with CSU Stipulations²</i>	549,060
<i>Open with TL Stipulations²</i>	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.

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 with standard lease stipulations; these lands are not subject to additional NSO or CSU stipulations and provide the most flexibility for geothermal development. These acres with standard lease stipulations 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, two percent of the Grand Mesa coal field, two percent of the Somerset coal field (zero acres of active lease areas), and four 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, and Sodium

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 zero acres under Alternative A. The types of impacts are the same as those described under ***Nature and Type of Effects***.

Approximately 5,200 acres (three 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***.

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 wildland fires, 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 12 years, federal oil and gas leases have ranged from zero leases in 2010 to 71 leases in 2001. 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 4-31**). 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 and D 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 two alternatives); however, Alternative C has considerably fewer acres with NSO stipulations (22,300 acres, compared with Alternative D with 238,140 acres). As a result, a greater number of wells would be developed under Alternative C than under Alternative D.

Solid Leasable Minerals—Coal

The UFO manages several active federal coal leases related to three underground coal mines in the North Fork Valley near Paonia (the Bowie #2, West Elk, and Elk Creek). The Elk Creek Mine lease is currently managed in suspension and the resumption date of production is unknown. The Coal Resource and Development Potential Report (BLM 2010h) projects the three mines will continue to collectively produce 12 to 16 million tons of coal per year. Over the last six years, total yearly production for these underground coal mines has been between 8 and 11 million tons, and is expected to remain about the same. The mines in the Somerset field are permitted for up to 20.5 million tons per year, but production is expected to remain the same as current. 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. This mine is the exclusive coal supplier to the Nucla Station power plant (5 miles north), producing approximately 350,000 to 400,000 tons of coal per year. These coal projections indicate continued industry emphasis on coal development on existing producing fields in the planning area.

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 ten percent of the Grand Mesa coal field, 12 percent of the Somerset coal field (including 3,490 acres of active lease areas), and eight percent of the Tongue Mesa coal field would be unacceptable for further consideration of leasing and development. Additionally, nine 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 zero). 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 and D fall between the two alternatives, with Alternative C having slightly more restrictions, particularly in the Somerset coal field.

Solid Leasable Minerals—Nonenergy Leasables, Potassium, and Sodium

Mineral exploration and development of nonenergy leasable minerals, specifically potassium and sodium, 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. Alternative A would be the least restrictive to mineral development (five percent of the planning area would be closed to nonenergy leasable minerals) and could result in the fewest cumulative impacts. 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/vanadium, and gypsum. 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, with subsequent valid existing rights reviews for existing claims. 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.

Energy Fuels plans to construct the Piñon Ridge Mill in Paradox Valley to process uranium ore; the planned mill is currently being litigated. 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. The BLM Tres Rios Field Office is currently preparing an EA for reopening of the Sunday Mines Complex, a Denison Mines' US operation recently acquired by Energy Fuels. 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 Uncompahgre 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 (six and three percent, respectively). Alternative C would be the least restrictive, recommending for withdrawal less than one-half percent of the uranium/vanadium potential area.

Placer mining in the planning area is expected to remain strong as long as the price of gold remains high. Any increase in lands withdrawn from mineral entry in the high gold potential area would reduce the acreage available for placer gold mining. 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 C (two percent) and Alternative A (three-tenths of one 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). Alternative A would be the least restrictive on gypsum since no acres within the high potential area would be recommended for withdrawal.

Mineral Materials

As 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. Alternative D proposes closing 15 percent of the federal mineral estate, followed closely by Alternative A at 12 percent. Alternative C proposes closing seven 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 ERMA 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, and D 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, as follows:

- First, management actions for each SRMA are analyzed to determine if they 1) sustain or enhance recreation objectives, 2) protect the desired recreation setting characteristics, and 3) constrain uses, including incompatible recreation activities that are detrimental to meeting recreation or other critical resource objectives (e.g., cultural or threatened and endangered species).
- Second, management actions for individual ERMAs are analyzed to determine whether they facilitate the visitor's ability to participate in outdoor recreation and protect the associated qualities and conditions.
- Finally, the decision area discussion provides a broader analysis of impacts on recreation arising from implementing management for other resource programs that could occur over the entire decision area, including those areas managed as SRMAs or ERMAs.

Proposed recreation management under each alternative would also impact regional recreation conditions. For example, opportunities provided, or not provided, in the Uncompahgre RMP decision area would affect recreation use on surrounding federal, state, and local lands.

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; and Alternative D, 479,220 acres), because recreation opportunities, activities, and experiences would not purposefully be protected, 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. 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 if the adjustment considers recreational values. 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 backcountry 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. 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 non-consumptive 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 66,250 acres as VRM Class I and II areas; effects are as those described under **Nature and Type of Effects**. The 319,770 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 658,540 acres open 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, 647,740 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 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 benefits 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 benefits.

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 4-48** (Travel Management Area Designations in SRMAs, Alternative A) provides travel area acreages for SRMAs.

Table 4-48
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

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 five 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.

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 identify 297,930 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. 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.

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 444,430 acres and SSR restrictions over 231,310 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 229,440 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.I as VRM Classes I and II are the same as described under **Nature and Type of Effects**. The remaining 446,360 acres under Alternative B and 440,280 acres under Alternative B.I 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 41,780 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 open 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 closed to livestock grazing based on the results of monitoring.

Under Alternative B, 505,860 acres of BLM-administered lands would be open to fluid mineral leasing and geophysical exploration (20 percent less than under Alternative A), and 169,940 acres would be closed to leasing (4 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 364,890 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 140,910 acres of BLM-administered lands are the same as under Alternative A but would occur over 30,730 more acres.

Under Alternative B.1, 461,940 acres of BLM-administered lands would be open to fluid mineral leasing and geophysical exploration (27 percent less than under Alternative A), and 213,860 acres would be closed to leasing (5 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 325,940 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 135,950 acres of BLM-administered lands are the same as under Alternative A but would occur over 25,770 more acres.

Coal leasing would result in impacts similar to those under Alternative A (and described under **Nature and Type of Effects**); however, 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 impact on recreation is expected to be the same as under Alternative A.

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 428,060 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 215,840 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 4-49** (WSA Overlap with SRMAs, Alternative B) displays the acreages of SRMA and WSA overlap.

Table 4-49
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

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 4-50 (ACEC Overlap with SRMAs, Alternative B) provides the acreages of ACECs overlapping SRMAs.

Table 4-50
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 4-51 (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 fluid mineral development.

Table 4-51
NSO Overlap with SRMAs, Alternative B

SRMA	Acres Overlapping NSO	
Burn Canyon		9,160
Dolores River Canyon		0*
Dry Creek		31,590*
Jumbo Mountain	<i>Alt. B:</i>	<i>Alt. B.1:</i>
	4,710*	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

Source: BLM 2012a

*SRMA or portion of SRMA is closed to leasing.

Table 4-52 (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 backcountry recreation setting characteristics, as discussed in the analysis for individual SRMAs, below.

Table 4-52
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
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

Source: BLM 2012a

Of the 244,050 acres managed as SRMAs, 88,270 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 backcountry 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 backcountry. 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 backcountry. 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 backcountry 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 backcountry 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 backcountry 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 benefits 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 backcountry 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 seven 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.

Alternative C

Under Alternative C, 12 ERMA's would be managed to support principal recreation activities. Recreation would be managed commensurate with other resources within ERMA's. 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 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 over 9,230 fewer acres.

Impacts on recreation on areas open to livestock grazing are described under **Nature and Type of Effects**. The impacts would occur over a smaller area than under Alternative A because there would be 10,640 fewer 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 reduced 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.

Impacts of coal leasing are 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. The impact on recreation is expected to be the same as under Alternative A.

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. 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 one percent, and areas managed as closed would decrease by one percent. Areas closed to motorized and mechanized use, and where such use is limited to designated routes, would increase by less than one percent. Expanding open area designations would have a long-term direct effect on OHV use by increasing the area available for 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 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 4-53 (WSA Overlap with ERMAs, Alternative C) provides the acreages of WSAs overlapping WSAs. WSA management would generally facilitate nonmotorized, nonmechanized activities.

Table 4-53
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 4-54 (ACEC Overlap with ERMAs, Alternative C) provides the acreages of ACECs overlapping ERMAs. ACEC management would generally facilitate quiet recreation.

Table 4-54
ACEC Overlap with ERMAs, Alternative C

ERMA	Acres Overlapping ACECs
Adobe Badlands	6,360
San Miguel River Corridor	22,410

Source: BLM 2012a

Table 4-55 (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 fluid mineral development.

Table 4-55
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 4-56 (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

Table 4-56
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

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.

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 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 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 458,980 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 open to livestock grazing are described under **Nature and Type of Effects**. The impacts would occur over a smaller area than under Alternative A because there would be 46,980 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 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 ERMA, 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 of coal leasing are 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. The impact on recreation is expected to be the same as under Alternative A.

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, ERMA, 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. Designated target shooting areas

and ranges would be allowed, which could increase recreational opportunities by providing managed, accessible, and designated areas for shooting.

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 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 4-57** (WSA Overlap with SRMAs, Alternative D) displays the acreages of SRMA and WSA overlap.

Table 4-57
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 4-58** (ACEC Overlap with SRMAs and ERMAs, Alternative D) provides the acreages of ACECs overlapping SRMAs and ERMAs.

Table 4-58
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 4-59 (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 fluid mineral development.

Table 4-60 (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.

Dolores River Canyon SRMA

The Dolores River Canyon SRMA would be managed to protect the same outcomes and to provide the same recreation opportunities as would 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

Table 4-59
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	1,170
Roubideau SRMA	25,360
San Miguel River SRMA	34,230
Spring Creek SRMA	4,980

Source: BLM 2012a

Table 4-60
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	19,950
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	1,150	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

¹ Seasonal limitations would result from management of other values (e.g., Ecological Emphasis Areas); SRMAs themselves (except for Ridgway) would not have seasonal closures.

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 backcountry 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 backcountry 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 backcountry 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 backcountry. 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 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 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.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on recreation includes the 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 backcountry 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.

4.4.5 Comprehensive Travel and Transportation Management

Travel designations support resource programs and are designed to help achieve their objectives. The land use emphasis for each area guides travel designations. Consequently, the travel designations would adhere to the management prescriptions included under each alternative, while following the theme of each alternative. Impacts result from resource allocations, management actions, and allowable use decisions. For example, a decision to close routes to protect wildlife habitat could have impacts on recreation opportunities and wildlife habitat. In this case, the impacts of improved wildlife habitat and loss of recreation opportunity flows from the wildlife decision, not a travel decision. These types of impacts are discussed in those particular resource sections of this chapter. Existing conditions are described in **Section 3.2.5** (Comprehensive Travel and Transportation Management).

As required by Executive Order and regulation, this RMP makes area allocation travel management decisions only. The RMP classifies all BLM-administered lands as open, limited, or closed to motorized travel, as discussed in **Chapter 2**. Travel management implementation decisions for the RMP are being deferred to an implementation plan due to the complexity of the area, controversy, and incomplete data (e.g., complete inventory of routes) within most of the decision area (refer to **Appendix M** [Travel Management] for further information). During future implementation-level planning, for areas classified as limited, the implementation plan would designate the types or modes of travel, such as pedestrian, equestrian, bicycle, and motorized; limitations on time or season of use; limitations on certain types of vehicles (e.g., OHVs, motorcycles, all-terrain vehicles, and mechanized vehicles [mountain bikes]); limitations on licensed or permitted vehicles or users; limitations on BLM administrative use only; or other types of limitations.

Methods and Assumptions

The following discussion of the impacts on travel and transportation focuses on management actions and allowable uses that restrict or facilitate travel opportunities based on area designations. The analysis describes the changes based on the number of acres open, closed, or limited. Analysis of impacts from future implementation-level route designations will be analyzed as part of developing the implementation-level plan.

This section does not address the impacts on travel and transportation management from other resources and resource uses. While impacts on travel and transportation management from other program areas do occur and are considered as part of travel management planning, in this RMP, these types of impacts are described under the resource or resource use directing this management.

Indicators

Indicators to measure trends in travel management include the size of designated areas for motorized and mechanized use (e.g., open, limited, or closed; see **Table 4-61** [Travel Management Area Designations by Alternative]).

Table 4-61
Travel Management Area Designations by Alternative

	Alternative A	Alternative B	Alternative C	Alternative D
Open to cross-country motorized travel	8,560	0	16,070	0
Closed to motorized travel (mechanized travel limited to designated routes)	11,950	12,180	0	1,160
Closed to motorized and mechanized travel	44,200	102,080	45,170	57,400
Limited to existing routes for motorized and mechanized travel	465,790	0	0	0
Limited to designated routes for motorized and mechanized travel	145,300	561,540	614,560	617,240
Seasonal travel limitations	59,070	218,230	19,580	104,940

Source: BLM 2012a

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- The demand to increase travel routes on BLM-administered lands would continue to increase over the life of the RMP, especially near communities.
- Recreation visits would continue to increase.
- All types and modes of travel, designations, and limitations associated with public access are analyzed.
- Routes within Congressionally designated areas and WSAs can be designated for horse and foot travel, as well as administrative use.
- The travel designations would not affect ROW holders, permitted uses, county or state roads, or other valid existing rights. Travel closures/limitations apply only to public access.
- The BLM has no authority over state or county roads on BLM-administered lands, so those routes are not included in the analysis.

- The incidence of resource damage and conflicts among mechanized, motorized, and nonmotorized activities would increase with increasing use of BLM-administered lands.
- Impacts on travel management occur from limitations, such as wildlife stipulations, special designations, and cultural resources, as well as permitted uses, such as gas development, livestock grazing, and mining.
- Administrative use authorizations are granted on a case-by-case basis with approval from the BLM.
- Implementation of the travel management plan would include increased public education, signing, enforcement, and resource monitoring in regard to travel management, as well as partnerships with a variety of special interest groups, local communities, and agencies.
- Technology will continue to advance the ability of all travel in previously inaccessible terrain.

Nature and Type of Effects

For the purposes of this analysis, impacts on travel and transportation management are those that restrict travel (e.g., managing areas as closed or limited to motorized travel and seasonal travel limitations). In general, impacts on travel management are greater when areas are closed to motorized or mechanized travel than when travel is limited. Management limiting motorized or mechanized travel to designated roads and trails is more restrictive than limiting travel to existing roads and trails and would therefore result in greater impacts on travel management. Limiting travel to designated roads and trails only allows motorized or mechanized use in areas defined with specific signage or areas identified in travel management plans. Seasonal travel restrictions allow motorized and mechanized travel in defined areas only at specific times of the year to protect other resources in that area, such as wildlife. Impacts also result from management that increases the number or quality of roads and trails or that provides opportunities for access on- or off-road using motorized, mechanized, equestrian, or pedestrian travel. Additionally, impacts include improvements to travel that reduce potential health and safety concerns associated with travel and transportation use in the planning area.

Effects Common to All Alternatives

All BLM-administered lands within the planning area would be managed as open, closed, or limited, as shown in **Table 4-6 I**. Travel in these areas would be allowed as follows:

- In open areas, all types of motorized vehicle use would be permitted anywhere at all times (on roads or cross country).
- Limited designations would restrict motorized and mechanized travel to either existing routes under Alternative A (until a designated routes system is implemented within five years of completing the RMP) or designated routes under Alternatives B, C, and D.
- Closed areas would prohibit motorized or mechanized vehicle travel year-round, and would allow motorized and mechanized vehicle travel on previously established existing routes to private inholdings or mining claims, where those routes are

identified in the BLM-designated route system. In general, most route restrictions allow motorized vehicle travel only when authorized by the BLM.

- Seasonal travel limitations would prohibit motorized and mechanized travel seasonally in identified areas. Effects vary depending on how much a route is used and the level of restriction placed on the route.

By providing public information, such as maps, signs, and kiosks, as part of implementing the travel management plan, potential user conflicts could be minimized.

Alternative A

Travel within the decision area would be limited to current travel management area designations (refer to **Table 4-61**). 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. Additionally, 59,070 acres (9 percent) are seasonally closed to motorized and mechanized travel. The North Delta OHV Area (8,560 acres) is open to cross-country motorized travel, thereby providing an opportunity to those who wish to travel by motorized vehicle cross country.

Under Alternative A, areas managed as limited would be limited to existing and designated routes until a comprehensive designated routes system is implemented within five years of completing the RMP. Areas without designated routes would be managed as limited to the existing routes shown in the OHV Area Designations (BLM 2010b) and this RMP (**Figure 2-48** [Alternative A: Comprehensive Travel and Transportation Management]). Closing motorized travel (56,150 acres) and mechanized travel (44,200 acres), and placing seasonal restrictions on motorized and mechanized travel (59,070 acres), would prohibit these types of travel in these areas permanently or seasonally. Equestrian or foot travel would be allowed year-round on existing/designated routes and cross-country travel on decision area lands. This would provide for access into remote areas by equestrian users and hikers, but that could result in the establishment of additional trails from continued use.

Alternative B

There would be long-term changes to existing travel management area designations, including the elimination of open areas and the conversion of all areas limited to existing routes to areas limited to designated routes (refer to **Table 4-61**). Travel and transportation management would manage no areas as open, 561,540 acres (83 percent) as limited, and 114,260 acres (17 percent) as closed to either motorized or motorized and mechanized travel. Additionally, 218,230 acres (32 percent) would be seasonally closed to motorized and mechanized travel. Limited areas would decrease by 49,550 acres (8 percent fewer acres than under Alternative A), closed areas would increase by 58,110 acres (twice as many acres as under Alternative A), and seasonal restrictions on motorized and mechanized travel would increase by 159,160 acres (24 percent of the decision area), compared with Alternative A. Areas closed to motorized use would increase by 58,110 acres, and areas closed to mechanized use would increase by 57,880 acres. Eliminating open area designations would have a long-term direct effect on motorized and mechanized travel by eliminating the North Delta OHV area of cross-country travel. Motorized and mechanized users in that area would be limited to existing routes until future route designation is completed, and cross-country travel would not be allowed.

Management of 83 percent of the decision area as limited to designated routes would provide similar travel-based opportunities as Alternative A, which limits travel in 90 percent of the decision area. Like Alternative A, equestrian and foot travel would be allowed year-round on existing/designated routes and cross-country on decision area lands, resulting in the same impacts as Alternative A. Seasonal restrictions on motorized and mechanized travel would result in the same type of impacts as Alternative A but over a larger area. The reduction in motorized and mechanized travel opportunities in some areas could increase route densities in other areas.

Alternative C

Like Alternative B, there would be long-term changes to existing travel management area designations, including the conversion of all areas limited to existing routes to areas limited to designated routes (refer to **Table 4-61**). Under Alternative C, the BLM would manage 16,070 acres (2 percent) as open, 614,560 acres (91 percent) as limited, and 45,170 acres (7 percent) as closed. Additionally, 19,580 acres (3 percent) would be seasonally closed to motorized and mechanized travel. Open areas would increase by 7,510 acres (1 percent of the decision area), closed areas would decrease by 11,980 acres (2 percent of the decision area), and seasonal restrictions on motorized and mechanized travel would decrease by 39,490 acres (6 percent of the decision area), compared with Alternative A. Areas closed to mechanized travel would increase by 970 acres. Limited areas would be increased by only 3,470 acres (less than 1 percent) compared with Alternative A. Expanding open area designations overall to include the Kinikin Hills area in addition to the North Delta OHV area would have a long-term direct effect on motorized and mechanized use by increasing the area of cross-country travel allowed on BLM-administered lands.

Management of 91 percent of the planning area as limited to designated routes would provide similar travel-based opportunities as Alternatives A and B. Like Alternative A, equestrian or foot travel would be allowed year-round on existing/designated routes and cross-country on decision area lands, resulting in the same impacts as Alternative A. Seasonal restrictions on motorized and mechanized travel would result in the same type of impacts as Alternative A but over a smaller area. The increase in motorized and mechanized opportunities in some areas could decrease route densities in other areas.

Alternative D

Like Alternatives B and C, there would be long-term changes to current travel management area designations. Alternative C would eliminate open areas and convert all areas limited to existing routes to areas limited to designated routes (refer to **Table 4-61**). The BLM would manage no areas as open, 617,240 acres (91 percent) as limited, and 58,560 acres (9 percent) as closed. Additionally, 104,940 acres (15 percent) would be seasonally closed to motorized and mechanized travel. Limited areas would be increased by 6,150 acres (1 percent of the decision area), closed areas would increase by 2,410 acres (less than 1 percent of the decision area), and seasonal restrictions on motorized and mechanized travel would increase by 45,870 acres (7 percent of the decision area), compared with Alternative A. Areas closed to motorized use would increase by 2,410 acres, and areas closed to mechanized use would increase by 13,200 acres. Impacts of eliminating open areas are the same as those described for Alternative B.

Management of 91 percent of the decision area as limited to designated routes would have the same impacts as those described under Alternative C. Seasonal restrictions on motorized and mechanized travel would result in the same type of impacts as Alternative A but over a larger area. The reduction in motorized and mechanized opportunities in some areas could increase route densities in other areas.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on comprehensive trails and travel management is the Uncompahgre RMP planning area. Cumulative impacts on trails and travel management would occur primarily from actions that facilitate, restrict, or preclude motorized access. Management actions that restrict OHV use would limit the degree of travel opportunities and the ability to access certain portions of the planning area for the public. The continued maintenance of federal and state highways would provide arterial connections to BLM system roads. County-maintained routes that connect federal and state highways to BLM system routes would maintain and improve access to the decision area's resources. Past, present, and reasonably foreseeable future nonfederal actions have affected and will continue to affect travel management within the planning area. These actions, which include community development patterns, the continuing growth of vehicle-based recreation, planned road and highway projects, and population growth, are expected to increase demand and construction of transportation routes near the planning area. Actions that would limit or restrict transportation project design (e.g., VRM class, land use closures, and NGD restrictions) would impact transportation and access.

The actions and activities considered in this analysis, including land use restrictions for the preservation of sensitive resources, would not result in the inability of the BLM to provide public access. The degree of impact would be lowest under Alternative A because of fewer land use restrictions for the protection of sensitive resources. Conversely, increasing the restrictions to protect sensitive resources under Alternative B would result in the greatest level of impact on transportation and access. Alternatives C and D would have more restriction, and therefore more impact, than Alternative A.

4.4.6 Lands and Realty

This section discusses impacts on land tenure and land use authorizations from proposed management actions of other resources and resource uses. Existing conditions are described in **Section 3.2.6** (Lands and Realty).

Methods and Assumptions

Indicators

An indicator used to assess realty actions in the planning area is the number of land use authorizations and acres. An indicator used to assess land tenure in the planning area is reflected in the number of land tenure adjustments and changes in acres of ownership.

Indicators of impacts on land tenure and land use authorizations are the ability to accommodate the following:

- Proposed routes or locations for ROWs, including transportation systems, pipelines, transmission lines, and renewable energy projects, based on available locations
- Demand for proposed ROWs based on the number and scope of ROWs
- Proposed ROWs and routes for ROW corridors based on the acres and location of ROW exclusion areas
- Proposed locations for communication sites based on available locations
- Land tenure adjustments based on meeting resource objectives

The mandate to manage land for multiple uses requires the BLM to consider the potential impacts of management actions on land tenure and land use authorizations, including ROWs. Because land tenure adjustments and land use authorizations are a resource use rather than an environmental component, impacts on land tenure and land use authorizations are a direct result of actions from other resource programs and resource uses. The discussion of the effects on land tenure and land use authorizations under each alternative includes the effects on existing authorized uses, as well as potential future uses and land tenure, including restrictions, costs, and issuance or modification of proposals. Management actions of other resources were assessed to determine restrictions or limitations on land use authorizations (including ROWs) and land tenure.

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- Existing ROWs, designated utility corridors, and communication sites would be managed to protect valid existing rights.
- On renewal, assignment, or amendment of existing ROWs, additional stipulations could be included in the land use authorization.
- ROW holders may continue their authorized use as long as they are in compliance with the terms and conditions of their grant.
- The BLM would continue to process land tenure adjustments and land use authorizations as workforce and workload allow.
- The demand for all types of ROWs (including communication sites, utilities, and renewable energy projects) would increase over the life of this RMP.
- Maintaining and upgrading utilities, communication sites, and other ROWs is preferred before the construction of new facilities in the decision area.
- Demand for small distribution facilities to extend and upgrade services, such as communication sites and utilities, would increase as rural development occurs on the dispersed private parcels within the planning area.
- Demand for both regional and interstate transmission lines would increase as population and urban areas grow.

- Retention areas include all decision area lands (the BLM-administered lands within the planning area), with the exception of lands identified for disposal.
- The BLM would continue to manage all previously withdrawn BLM-administered lands as withdrawn from entry, appropriation, or disposal under the public land laws; location, entry, and patent under the mining laws; and operation of the mineral leasing, mineral materials, and geothermal leasing laws.
- Withdrawals would be reviewed, as needed, and recommended for extensions, modifications, revocations, or terminations. All existing withdrawals initiated by other agencies, such as the US Bureau of Reclamation or the Department of Energy, would be continued unless the initiating agency requests that the withdrawal be revoked.

Nature and Type of Effects

BLM-administered lands are used for a variety of purposes. Major focus areas for the lands and realty program include land tenure adjustments, ROWs, other land use authorizations (leases or permits), utility corridors, and communication sites.

Resources and resource uses affect the lands and realty program by prescribing ROW exclusion and avoidance areas and stipulations in order to protect resources. A ROW exclusion area is one that is not available for ROW location under any conditions. A ROW avoidance area may be available for ROW location but may require special stipulations. ROW applications could be submitted in ROW avoidance areas; however, a project proposed in these areas may be subject to additional requirements, such as resource surveys and reports, construction and reclamation engineering, long-term monitoring, special design features, special siting requirements, timing limitations, and rerouting. Such requirements could restrict project location or they could delay availability of energy supply (by delaying or restricting pipelines, transmission lines or renewable energy projects) or they could delay or restrict communications service availability. As a result of special surveys and reports, alternative routes may need to be identified and selected to protect sensitive resources. Designating ROW exclusion and avoidance areas and applying special stipulations would result in increased application processing time and costs due to the potential need to relocate facilities or due to greater design, mitigation, and siting requirements. The following BLM resource programs contain ROW avoidance and exclusion areas to protect resources: land health, soils, water resources, vegetation, special status species, lands with wilderness characteristics, ACECs, wild and scenic rivers, and national trails and byways.

Visual resource management classes influence the level of disturbance allowed to the natural landscape for a given area (see **Chapter 3, Section 3.1.12** [Visual Resources]). A VRM Class I designation allows for fewer modifications to the natural landscape than a VRM Class IV designation. Land uses are authorized so long as structures and activities associated with the land use comply with the VRM class management objectives for the area. For example, fewer land use authorizations are capable of meeting VRM Class II management objectives than VRM Class IV management objectives. Therefore, VRM class management objectives limit locations and types of ROWs and land use authorizations. Higher VRM classifications (VRM Class I is the highest, and VRM Class IV is the lowest) would likely increase application processing time and

increase project costs due to the need to relocate facilities or due to greater design, mitigation measures, and siting requirements.

Recreation management actions involve managing the locations and types of recreation through the designation of SRMAs and ERMAs. Within these areas, appropriate recreation activity levels, such as camping, motorized and mechanized travel, and horseback riding, are established. Land uses are authorized so long as they comply with the management goals and objectives of the SRMAs and ERMAs and do not conflict with recreation in the SRMAs and ERMAs. Therefore, SRMAs and ERMAs could limit locations and types of land use authorizations. Some land use authorizations would not occur in order to avoid conflicting uses.

Travel management actions can involve closing areas to motorized or mechanized travel. This creates areas that can only be accessed for administrative use, thereby creating areas that are off limits to some types of new land uses, such as ROWs, unless the route is authorized for administrative use under the ROW permit. Conversely, closing areas to motorized or mechanized travel allows other types of land uses to occur that conflict with these forms of travel.

Land tenure adjustments are intended to improve natural resources, recreation opportunities or management of BLM-administered lands. Land disposals would result in more contiguous decision area lands and accommodate resource management. Land disposals near cities or towns could accommodate community expansion needs by enabling lands to be used for public purposes, such as conveyance to local government under the provisions of the Recreation and Public Purposes Act. Disposal would also reduce isolated tracts, thus increasing BLM-administered lands management efficiency.

Effects Common to All Alternatives

BLM-administered lands are identified for retention and disposal under all alternatives. Also, land exchanges would be considered in retention areas on a case-by-case basis in order to meet resource objectives if the exchange is in the public interest. Lands or interests in acquired lands would be managed in a manner consistent with other BLM-administered lands in the surrounding area. Impacts are as described under ***Nature and Type of Effects***.

The UFO would continue to be managed as an exclusion area for utility-scale solar (greater than 20 megawatts); detailed impact analysis and design features for utility-scale solar can be found in the Solar Programmatic EIS (BLM 2012c).

Collocating utilities within designated corridors would reduce land use conflicts in other decision area 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 plans and selection of more-preferable locations.

All of the alternatives would continue to manage five WSAs according to BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012b), until such time as Congress either designates them as wilderness or releases them for other uses. These guidelines influence land use authorizations in these areas. The WSAs and the Tabeguache Area total 44,220 acres.

Because limited activities and surface disturbances are allowed in these areas in order to prevent altering or degrading their resources, WSAs and the Tabeguache Area are identified as ROW exclusion areas under all alternatives.

Several resources and special designation programs identify ROW avoidance and ROW exclusion areas. The following BLM resource programs contain ROW avoidance and exclusion areas to protect resources: land health, soils, water resources, vegetation, special status species, lands with wilderness characteristics, ACECs, WSRs, and national trails and byways.

Surveys for special status plant and animal species and cultural and paleontological resources could identify resources that would, through subsequent project-level NEPA analysis, force the relocation or mitigation of a project in areas not identified as ROW avoidance or exclusion areas.

Except for management that identifies areas as ROW avoidance or ROW exclusion to protect resources, implementing management actions for the following resources or resource uses would have negligible or no impact on land tenure and land use authorizations and are, therefore, not discussed in detail: air quality, climate change, land health, soils and water, vegetation, fish and wildlife, special status species, wild horses, wildland fire ecology and management, cultural resources, paleontological resources, lands with wilderness characteristics, forestry and woodland products, livestock grazing, energy and minerals, ACECs, wilderness and WSAs, WSRs, national trails and BLM byways, watchable wildlife viewing sites, Native American tribal uses, and public health and safety.

Alternative A

Under Alternative A, 9,850 acres would remain available for land disposal. Most lands identified for disposal are south and west of Paonia, south of Montrose, and northwest and southeast of Norwood. Impacts are the same as those identified under **Nature and Type of Effects**.

ROW avoidance and exclusion areas are established for a multitude of resources and resources uses. Continuing to manage 85,080 acres as ROW exclusion areas would prohibit ROW development in these areas. Continuing to restrict ROW authorizations to only those with an overriding public need in the San Miguel River ACEC outside of relic riparian communities could limit ROW development. Impacts are the same as identified under **Nature and Type of Effects**.

Utility corridors totaling 297,930 acres would continue to be managed under Alternative A. Impacts are the same as those identified under **Effects Common to All Alternatives**.

Alternative A would continue to manage BLM-administered lands according to specified VRM class management objectives in **Table 2-1**. There would continue to be a significant area containing no VRM class management objectives, as well as VRM Class III and IV management objectives (totaling 609,550 acres). These areas would continue to allow for most lands and realty program actions. Lands and realty program management actions would be more difficult to implement in VRM Class I and II areas (totaling 66,250 acres) due to the VRM management objectives for these areas. Impacts are as described under **Nature and Type of Effects**.

Alternative A would continue to manage 49,320 acres of SRMAs. The SRMAs would be around the Dolores River Canyon and San Miguel River. There would be no change to the management of these areas and, therefore, how they limit locations and types of land use authorizations in order to avoid conflicting uses. Types of impacts are the same as those described under **Nature and Type of Effects**.

Alternative A would continue to manage 56,150 acres as closed to motorized or mechanized travel. There would be no change in travel management and, therefore, how such access affects land use. Impacts are the same as identified under **Nature and Type of Effects**.

Alternative B

Alternative B identifies 2,650 acres for land disposal (7,200 acres fewer than under Alternative A). Impacts are 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.

ROW exclusion and avoidance areas would have impacts similar to those under Alternative A, except that there would be 428,060 acres of ROW exclusion areas (5 times more than under Alternative A) and 197,370 acres of ROW avoidance areas (compared to none under Alternative A).

Corridors totaling 64,180 acres for utilities would be designated and managed under Alternative B. Impacts are the same as identified under Alternative A, but over a smaller area. This would provide fewer options and locations in designated corridors for future planning and development, though development could still occur outside of the designated corridors.

Alternative B would manage BLM-administered lands according to specified VRM class management objectives in **Table 2-1**. Impacts are similar to those identified under Alternative A, but there would be 229,440 acres of VRM Class I and II BLM-administered lands under Alternative B and 235,510 acres under Alternative B.I (163,290 acres and 169,360 acres more than Alternative A, respectively). This would result in more areas with restrictions, challenges, and increased costs for development by lands and realty program management actions. In the North Fork area, Alternative B.I would have 36,360 acres of VRM Classes I and II on BLM-administered lands, which is 6,080 acres more than Alternative B.

Alternative B would manage 244,050 acres as SRMAs. The SRMAs would be around the Dolores River Canyon, around the San Miguel River, in Paradox Valley, around Norwood, north of Ridgway, northeast of Paonia, and around the Gunnison Gorge NCA. Impacts are similar to those identified under Alternative A, but there would be five times more acres of SRMAs. SRMAs would have a greater influence on restraining locations and types of land use authorizations in order to avoid conflicting uses and user experiences.

Alternative B would manage 114,260 acres as closed to motorized or mechanized travel. Impacts are similar to those identified under Alternative A, but twice as many acres would be closed to motorized or mechanized travel. Therefore, Alternative B would create fewer areas where land uses involving motorized or mechanized travel would be allowed. Also, it would

create more areas where land uses that conflict with motorized or mechanized travel would be allowed.

Alternative C

Alternative C identifies 9,850 acres for land disposals, which is the same as under Alternative A. Impacts are the same as Alternative A.

ROW exclusion and avoidance areas would have impacts similar to those described under Alternative A, except that the BLM would manage 44,550 acres as ROW exclusion areas (48 percent fewer acres than under Alternative A) and 210,390 acres as ROW avoidance areas (compared to none under Alternative A).

Impacts from utility corridors are similar to those identified under Alternative B but still fewer, 26,880 acres, of designated utility corridors would be identified.

Alternative C would manage BLM-administered lands according to specified VRM class management objectives in **Table 2-1**. Impacts are similar to those identified under Alternative A, but there would be 75,480 acres of VRM Class I and II BLM-administered lands, 9,230 more acres than under Alternative A. This would provide more areas with restrictions, challenges, and increased costs for development by lands and realty program management actions.

Alternative C would manage 215,880 acres of ERMA. The ERMA would be approximately the same areas as the SRMA under Alternative B. Impacts are similar to those identified under Alternative A for SRMA, but there would be over four times more acres of recreation areas. ERMA would have a greater influence on restraining locations and types of land use authorizations in order to avoid conflicting uses.

Alternative C would manage 45,170 acres as closed to motorized and mechanized 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. Therefore, Alternative C would create more areas where land uses involving motorized or mechanized travel would be allowed. Also, it would create fewer areas where land uses that conflict with motorized or mechanized travel would be allowed.

Alternative D

Alternative D identifies 1,930 acres for land disposals (7,920 fewer acres than under Alternative A). Impacts are 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.

ROW exclusion and avoidance areas would have impacts similar to Alternative A, except that there would be 53,700 acres of ROW exclusion areas (37 percent fewer than Alternative A) and 276,500 acres of ROW avoidance areas (compared to none under Alternative A) (the greatest acreage of all the alternatives). Increased ROW avoidance areas would increase the application processing time and project costs.

Impacts from utility corridors are the same as those identified under Alternative B.

Alternative D would manage BLM-administered lands according to specified VRM class management objectives in **Table 2-1**. Impacts are similar to those identified under Alternative A, but there would be 158,980 acres of VRM Class I and II BLM-administered lands, 92,730 more acres than under Alternative A. This would provide more areas with restrictions, challenges, and increased costs for development by lands and realty program management actions.

Alternative D would manage 124,400 acres as SRMAs and 73,310 acres as ERMAs. The SRMAs and ERMAs would be approximately the same areas as the SRMAs in Alternative B. Impacts are similar to those identified under Alternative A, but there would be four times more acres of recreation areas (SRMAs and ERMAs combined). Recreation areas would have a greater influence on restraining locations and types of land use authorizations in order to avoid conflicting uses.

Alternative D would manage 58,560 acres as closed to motorized or mechanized travel. Impacts are similar to those identified under Alternative A, but there would be a four-percent increase in the areas closed to motorized or mechanized travel. Therefore, Alternative D would create fewer areas where land uses involving motorized or mechanized travel would be allowed. Also, it would create more areas where land uses that conflict with motorized or mechanized travel would be allowed.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on the uses administered by the lands and realty program 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 lands and realty are climate change, energy and minerals development, vegetation management, recreation and visitor use, lands and realty, roadway development, and water diversions.

Increasing demand for lands for community development and increasing interest in utility, mineral, and renewable energy development in the planning area places a greater demand on lands and realty actions. These demands create the need for land tenure adjustments and additional ROWs for access utilities and other facilities supporting development.

Roadway development activities, the Designation of Energy Corridors on Federal Lands in the 11 Western States PEIS, and ongoing climate changes and anticipated associated changes in the regulation of greenhouse gases would contribute direct and indirect long-term impacts on lands and realty management involving renewable energy development in the cumulative impact analysis area. The drought that has been experienced across the western US for multiple years prior to this RMP revision, if it continues, could indirectly impact the ability for water-consuming energy generation or mineral development sites to be implemented in the planning area.

4.4.7 Renewable Energy

This section discusses impacts on renewable energy from proposed management actions of other resources and resource uses. Existing conditions are described in **Section 3.2.7** (Renewable Energy).

Solar, wind, hydropower, and biomass facilities require a ROW authorization. Such authorizations may be obtained on BLM-administered lands, except in ROW exclusion areas. Proposed projects within ROW avoidance areas may be subject to increased application processing time and costs due to the need to relocate facilities or due to greater design, mitigation, and siting requirements. Projects are sited based on resource potential and proximity to transmission lines or end users.

Methods and Assumptions

Indicators

Indicators of impacts on renewable energy ROWs are as follows:

- Increase in acreages identified as ROW exclusion and avoidance areas
- Ability to permit new transmission ROWs, if required for the project
- Restrictions on harvesting biomass from woodlands

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- Existing ROWs may be modified on their renewal, assignment, or amendment if the requested actions meet the objectives of the RMP.
- ROW holders may continue their authorized use as long as they are in compliance with the terms and conditions of their grant.
- The demand for ROWs would increase over the life of this RMP.
- Areas that are closer to existing transmission lines and access routes would more likely be developed first since proximity to transmission and access would reduce project costs.
- Renewable energy resources include solar, wind, hydropower, and biomass facilities. (Biomass projects are authorized under the timber regulations, unless a new facility is being authorized for biomass production. Geothermal resources are part of the fluid minerals program and are discussed in **Section 4.4.3**.)

Nature and Type of Effects

Impacts on renewable energy projects are generally related to where ROW authorizations are allowed to occur, the mitigation measures required for specific project siting, and special stipulations required for resource protection.

Renewable energy ROWs can only occur on lands that are not ROW exclusion areas. Alternatives with greater ROW exclusion acreages would have long-term direct impacts on the ability for renewable energy resources to be developed.

As discussed in **Section 4.4.6** (Lands and Realty), ROW applications may be filed within ROW avoidance areas; however, projects proposed in such areas may be subject to restrictions that would add application processing time and increased project costs. Alternatives with greater

ROW avoidance areas are considered to have short-term direct impacts (e.g., special surveys, reports, and construction and reclamation BMPs) and long-term direct impacts (e.g., potential operation and maintenance requirements) on the economic feasibility of the development of renewable energy resources.

Visual resource management classes influence the level of disturbance allowed to the natural landscape for a given area. A VRM Class I designation allows for fewer modifications to the natural landscape than a VRM Class IV designation. Renewable energy ROW applications are authorized so long as structures and activities associated with the land use comply with the VRM class management objectives for the area (see **Chapter 3, Section 3.1.12** [Visual Resources]). Therefore, VRM class management objectives can limit locations and types of renewable energy ROWs.

Recreation management actions involve managing the locations and types of recreation through the designation of SRMAs and ERMAs. Within these areas, appropriate recreation activity levels, such as camping, motorized and mechanized travel, and horseback riding, are established. Renewable energy ROWs can be authorized so long they comply with the management goals and objectives of the SRMAs and ERMAs and do not conflict with recreation in the SRMAs and ERMAs. Therefore, SRMAs and ERMAs have the potential to limit locations and types of renewable energy ROWs. Some renewable energy projects would not be authorized in order to avoid conflicting uses.

Biomass facilities would also be restricted to areas not managed as ROW exclusion areas; however, it is unlikely that developers would propose the construction of any biomass facilities on BLM-administered lands due to the lack of infrastructure present on BLM-administered lands that would be needed to support such facilities. BLM management actions that relate to the production of biomass-derived energy are primarily related to how lands yield feedstock for biomass facilities. Feedstock for biomass facilities typically comes in the form of waste wood products. Active forest management practices would provide more reliable feed stock sources to support a biomass facility, compared with passive forest management practices, which would produce much less feedstock. Additionally, RMP measures that specifically direct the BLM to make by-products from forest management activities available for biomass use would be beneficial to any biomass facility.

Effects Common to All Alternatives

The acreages of lands with ROW exclusions vary across alternatives. The acreages under each alternative that are within exclusion and avoidance areas for renewable energy are provided in **Table 4-62** (Lands Managed as ROW Exclusion and Avoidance Areas for Renewable Energy).

The UFO would continue to be managed as an exclusion area for utility-scale solar (greater than 20 megawatts); detailed impact analysis and design features for utility-scale solar can be found in the Solar Programmatic EIS (BLM 2012c).

Collocating utilities within designated corridors would reduce land use conflicts 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 on BLM-administered lands,

Table 4-62
Lands Managed as ROW Exclusion and Avoidance Areas for Renewable Energy

	Alternative A	Alternative B	Alternative B.1	Alternative C	Alternative D
ROW Exclusion¹					
<i>Wind</i>	85,140	517,800	518,140	44,550	126,160
<i>Solar</i>	85,140	513,000	513,420	44,550	166,620
<i>Hydropower</i>	85,140	513,000	513,420	44,550	147,720
ROW Avoidance²					
<i>Wind</i>	29,460	123,780	123,720	261,280	320,350
<i>Solar³</i>	29,460	128,580	128,440	261,280	279,890
<i>Hydropower</i>	29,460	128,580	128,440	261,280	298,790

Source: BLM 2012a

¹ An area restricted by “Exclusion” is closed to the type of renewable energy project.

² 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.

³ Solar energy projects are allowed for fewer than 20 megawatts only.

Note: Geothermal development would follow stipulations shown under Fluid Minerals.

would make construction and maintenance of the facilities easier, and would simplify the application processing for new facilities. However, designation of corridors could limit options for ROW and facility design and selection of more-preferable locations.

All of the alternatives would continue to manage five WSAs totaling 36,160 acres according to BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012b), until such time as Congress either designates them as wilderness or releases them for other uses. These guidelines influence the types of land uses authorized in these areas and direct that they be managed as ROW exclusion areas. In addition, the Tabeguache Area would also be managed as a ROW exclusion area under all alternatives, eliminating the potential for new ROW development on 8,060 acres.

Implementing management for the following resources would have negligible or no impact on renewable energy and are therefore not discussed in detail: air quality, climate, soils and water, vegetation, fish and wildlife, special status species, wild horses, wildland fire ecology and management, cultural resources, paleontological resources, lands with wilderness characteristics, forestry and woodland products, livestock grazing, energy and minerals, comprehensive trails and travel management, lands and realty, renewable energy, ACECs, wild and scenic rivers, national trails and byways, watchable wildlife viewing sites, Native American tribal uses, and public health and safety.

Alternative A

Under Alternative A, 85,080 acres are ROW exclusion areas for wind, solar, and hydropower and are not open for renewable energy development. There are 29,460 acres of ROW

avoidance areas for wind, solar, and hydropower. Alternative A has no actions related to biomass.

Corridors totaling 26,880 acres designated under the West-wide Energy Corridor EIS would continue to be managed under Alternative A. Impacts of collocating corridors are the same as those identified under ***Effects Common to All Alternatives***.

Alternative A would continue to manage BLM-administered lands according to specified VRM class management objectives in **Table 2-1**. There would continue to be a significant area containing no VRM class objectives, as well as VRM Class III and IV management objectives (totaling 609,550 acres). These areas would continue to allow for renewable energy ROW authorizations. Renewable energy projects would be more difficult to implement in VRM Class I and II areas (totaling 66,250 acres) due to the VRM management objectives for these areas. Impacts are the same as identified under ***Nature and Type of Effects***.

Alternative A would continue to manage 49,320 acres as SRMAs. There would be no change to the management of recreation areas and, therefore, how recreation areas limit locations and types of renewable energy ROW authorizations in order to avoid conflicting uses. Impacts are the same as those identified under ***Nature and Type of Effects***.

Alternative B

Renewable energy could be developed on 34,220 acres without restrictions (526,980 acres fewer than under Alternative A) under Alternative B and on 33,940 acres without restrictions (527,260 acres fewer than under Alternative A) under Alternative B.1.

Under Alternative B, 517,800 acres would be managed as exclusion areas for wind, and 513,000 acres would be managed as exclusion areas for solar and hydropower and would not be open for renewable energy development. Under Alternative B.1, 340 additional acres would be managed as exclusion areas for wind, and an additional 420 acres would be managed as exclusion areas for solar and hydropower and would not be open for renewable energy development. The additional acres are associated with VRM Class II in the North Fork area. Alternatives B and B.1 would have fewer acres open to renewable energy development than Alternative A.

Under Alternative B, 123,780 acres would be managed as avoidance areas for wind, and 128,580 acres would be managed as avoidance areas for solar and hydropower. Under Alternative B.1, 60 fewer acres in the North Fork area would be managed as avoidance areas for wind, and 140 fewer acres would be managed as avoidance areas for solar and hydropower. The reduction in avoidance acres in the North Fork area is due to additional exclusion areas. While renewable energy development could occur in these areas, they would likely operate under more restrictions than under Alternative A.

An additional 14 corridors totaling 64,180 acres would be designated and managed for utilities under Alternative B. Impacts are the same as identified under Alternative A, but would occur over a smaller area. This would provide fewer options and locations in designated corridors for future planning and development, though development could still occur outside of the designated corridors.

Under Alternative B the BLM would manage lands according to specified VRM class management objectives in **Table 2-1**. Impacts would be similar to those identified under Alternative A, but there would be 229,440 acres of VRM Class I and II lands under Alternative B and 235,510 acres under Alternative B.I (163,290 acres and 169,360 acres more than under Alternative A, respectively). This would result in more areas with restrictions, challenges, and increased costs to develop renewable energy projects. In the North Fork area, Alternative B.I would have 36,360 acres of VRM Class I and II on BLM-administered lands, which is 6,080 acres more than Alternative B.

Alternative B would manage 243,920 acres of SRMAs. Impacts are similar to those identified under Alternative A, but there would be five times more acres of SRMAs. Recreation areas would have a greater influence on limiting locations and types of renewable energy projects to avoid conflicting uses.

Alternative B would make by-products from forest management actions available for biomass use, providing a benefit to renewable energy, when compared with Alternative A.

Alternative C

Under Alternative C, 44,550 acres would be managed as exclusion areas for wind, solar, and hydropower and would not be open for renewable energy applications. More acres would be available for renewable energy development under Alternative C than under Alternative A.

Under Alternative C, 261,280 acres would be managed as avoidance areas for wind, solar, and hydropower. While renewable energy development could occur in these areas, they would likely operate under more restrictions than under Alternative A. Renewable energy could be developed on 369,970 acres without restrictions (191,230 acres fewer than under Alternative A).

Impacts from utility corridors are similar to those identified under Alternative B but still fewer, 26,880 acres, of designated utility corridors would be identified.

Under Alternative C the BLM would manage lands according to specified VRM class management objectives in **Table 2-1**. Impacts would be similar to those identified under Alternative A, but there would be 75,480 acres of VRM Class I and II lands, 9,230 additional acres than under Alternative A. This would result in more areas with restrictions, challenges, and increased costs to develop renewable energy projects.

Alternative C would manage 215,880 acres as ERMAs. Impacts would be similar to those identified under Alternative A for SRMAs, but there would be over four times more acres of recreation areas (ERMAs). Recreation areas would have a greater influence on limiting locations and types of renewable energy projects to avoid conflicting uses.

Alternative C would allow biomass production in appropriate forest cover types where compatible with other uses, providing a benefit to renewable energy, when compared with Alternative A.

Alternative D

Under Alternative D, 126,160 acres would be managed as exclusion areas for wind, 166,620 acres would be exclusion areas for solar, and 147,720 acres would be exclusion areas for hydropower. These areas would not be open for ROW applications. More acres would be open to renewable energy development under Alternative D than under Alternative A.

Under Alternative D, 320,350 acres would be managed as avoidance areas for wind, 279,890 acres would be avoidance areas for solar, and 298,790 acres would be avoidance areas for hydropower. While renewable energy development could occur in these areas, they would likely operate under more restrictions than under Alternative A. Renewable energy could be developed on 229,290 acres without restrictions (331,910 acres fewer than under Alternative A).

Impacts from utility corridors are the same as those identified under Alternative B.

Under Alternative D the BLM would manage lands according to specified VRM class management objectives in **Table 2-1**. Impacts would be similar to those identified under Alternative A, but there would be 158,980 acres of VRM Class I and II lands, 92,730 additional acres than under Alternative A. This would result in more areas with restrictions, challenges, and increased costs to develop renewable energy projects.

Alternative D would manage 124,400 acres as SRMAs and 73,310 acres as ERMAs. Impacts are similar to those identified under Alternative A for SRMAs, but there would be four times more acres of recreation areas (SRMAs and ERMAs combined). Recreation areas would have a greater influence on limiting locations and types of renewable energy projects to avoid conflicting uses.

Alternative D would allow biomass production and use in appropriate forest cover types, where compatible with vegetation mosaics and other resource uses. Alternative D would also make by-products from forest management activities available for biomass use or for insect and disease control. In terms of biomass, Alternative D would be more supportive of renewable energy than Alternative A.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on the uses of lands for renewable energy projects is the 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 renewable energy are energy and minerals development, recreation and visitor use, lands and realty, roadway development, biomass, designation of Energy Corridors on Federal Lands in the 11 Western States Programmatic EIS (DOE and BLM 2009), decisions in the Solar Programmatic EIS (BLM 2012c), water diversions, drought, and climate change.

Roadway development activities, the Solar Programmatic EIS, the Designation of Energy Corridors on Federal Lands in the 11 Western States PEIS, and ongoing climate changes and anticipated associated changes in the regulation of greenhouse gases would contribute direct and indirect long-term impacts on the use of solar and wind resources in the planning area. The drought that has been experienced across the western US for the seven or eight years prior to

this RMP revision, if it continues, could indirectly impact the ability for certain water-consuming solar technologies to be implemented in the planning area.

Vegetation treatments, hazardous fuels reduction, and biomass harvesting could all influence the degree to which biomass could be collected in the planning area for conversion to renewable bioenergy. Drought and climate change also increase the likelihood of wildfires, which reduce the amount of natural biomass available for bioenergy production.

4.5 SPECIAL DESIGNATIONS

This section is a description of the special designation areas in the Uncompahgre RMP planning area and follows the order of topics addressed in **Chapter 3**:

- Areas of critical environmental concern
- Wilderness and wilderness study areas
- Wild and scenic rivers
- National trails and byways
- Watchable wildlife viewing sites

4.5.1 Areas of Critical Environmental Concern

ACECs are BLM-administered lands where special management attention is needed to protect the relevant and important values (i.e., historic, cultural, or scenic values, fish and wildlife resources, or other natural processes or systems) of the area from irreparable damage. This section discusses impacts on potential ACECs and the BLM's ability to protect relevant and important values from proposed management of other resources and resource uses. Existing conditions are described in **Section 3.3.1** (Areas of Critical Environmental Concern).

Interdisciplinary team meetings were held to discuss 18 new ACEC nominations and the effectiveness of five existing ACECs. The results of those meetings were used in this analysis and are described in **Appendix O** (Summary of Areas of Critical Environmental Concern Report).

Methods and Assumptions

Direct impacts on ACECs are considered to be those that either impair or enhance the values for which the ACEC was proposed for designation. As such, this analysis focuses on relevance and importance criteria for each potential ACEC and impacts on these values from either the special management derived from ACEC designation or, under alternatives where an ACEC is not proposed for designation, the management actions for other resources. All impacts discussed are direct impacts, though some may not occur immediately after implementation of management actions.

Indicators

Impacts on ACECs would occur from management actions that would protect or impair relevant and important ACEC values, including "important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes" (BLM Manual 1613, Areas of Critical Environmental Concern [BLM 1988a]). The relevant and important values for each proposed ACEC are identified in **Appendix O**.

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- Although management actions for most resources and resource uses have field office-wide application, ACEC management prescriptions apply only to those lands within each specific ACEC.
- Permitted activities would not be allowed to impair the relevant and important values for which the ACECs are designated. The exception is locatable minerals; until withdrawn from mineral entry, a mining claim can be filed, and subsequent mining could have an impact.
- ACEC designation provides protection and focused management for relevant values beyond that provided through general management of the parent resource (e.g., the biological soil crust ACEC would receive greater recognition and protection than the general management action regarding biological soil crusts; the Endangered Species Act protects threatened and endangered plants, whereas an ACEC for special status plants would offer greater protection of ecosystem processes for plants and focused management).
- Special management prescribed within ACECs is included in other resource and resource use management decisions (e.g., travel restrictions within ACECs are brought forward in travel management and would be recognized during future travel management planning).
- Any designated ACEC that falls within a WSA would be managed according to BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012b), unless the ACEC management is more restrictive. Because activities within WSAs must meet the nonimpairment criterion, which generally restricts new surface-disturbance, it is assumed that a WSA would generally protect relevant and important values and would have a beneficial effect on overlapping designated and undesignated ACECs. If Congress were to release a WSA from further consideration, the special management in designated ACECs would be designed to protect and enhance the relevant and important values.
- Any ACEC that falls within the Congressionally-designated Tabeguache Area would be managed according to the 1993 Colorado Wilderness Act (PL 103-77, August 13, 1993). Because most surface-disturbing activities in the Tabeguache Area are constrained by the legislation, it is assumed that the Tabeguache Area would protect relevant and important values and would have a beneficial effect on potential ACECs within the Tabeguache Area.

Nature and Type of Effects

This section provides a qualitative description of the impacts on potential ACECs that could occur from both special management for designated ACECs and management actions in other resource programs. The magnitude of such impacts is discussed in the comparison of alternatives. Under alternatives where ACECs are proposed for designation, proposed ACEC management provides a more focused approach to protecting the relevant and important values; therefore, ACEC designation would be the most protective of relevant and important values.

Under alternatives where ACECs are not proposed for designation, protection of relevant and important values relies on the management under other resources or resource uses. Incidental protections would usually be in a more generalized manner.

In general, management actions that protect resources—such as improvements in water quality and quantity, surface disturbance restrictions, management for desired plant communities and habitats, travel restrictions and closures, and recreation restrictions—would help maintain and improve the important and relevant values within ACECs. In the same fashion, management actions that create the potential for resource degradation—such as mineral development, livestock grazing, and infrastructure development—could lead to impacts on the relevant and important values within ACECs.

Soil and water management could help protect ACEC values due to complementary management objectives, such as minimizing erosion, maintaining and improving water quality, ensuring adequate quantities of water to support healthy riparian and aquatic ecosystems, and protecting soil, water, and vegetation resources during periods of drought. Protection or enlargement of instream flows would help protect the aquatic ACEC values of special status fish species and riparian habitats through habitat improvement and improved water quality. Instream flows could increase aquatic habitat area by continuously connecting stream segments that could become disconnected during dry seasons. Implementing drought management guidelines would also protect soil, water, riparian and vegetation resources, and aquatic habitat within potential ACECs by ensuring adequate year-round water availability for those ecosystems and resources.

Vegetation management objectives would be complementary to biological ACEC objectives and could protect ACEC values by maintaining and improving terrestrial and riparian habitat and ecosystems and protecting special status vegetation species. Revegetation of degraded areas with native species and enhancement and restoration of riparian areas would protect or enhance riparian ecosystems within potential ACECs and could protect aquatic or riparian special status species and habitats from flood or erosional damage or weed invasion. These actions could also protect or enhance habitat for terrestrial special status wildlife.

Vegetation and weed treatments within potential ACECs through physical, mechanical, biological, herbicidal, or fire methods could cause short-term degradation of certain resources due to increased potential for soil erosion and sedimentation and removal of stream-shading vegetation and habitat. Over the long term, these treatments would improve the relevant and important biological values within ACECs by creating healthier functioning ecosystems and habitat in cases where they are successful, but could cause prolonged degradation in cases where they do not succeed as planned. Conversely, where vegetation and weed treatments are limited in favor of natural processes, the BLM would have fewer management options to deal with undesired vegetation mosaics and weed infestations could alter riparian habitat as well as habitat of special status plants and wildlife but would not risk the impacts of unsuccessful treatment.

Special status and non-special status species protections would prevent degradation of, and possibly improve, biological ACEC values due to complementary species protection management objectives. These objectives would be achieved through augmentation and reintroduction of native species; designation of ecological emphasis areas to manage and

preserve the continuity of habitats, vegetation communities, and native wildlife; and habitat protection, restoration, and improvement. Specific impacts of these actions on ACEC values include increases in species populations and habitat improvements.

Depending on their extent, location, and severity, wildfires could cause short- and long-term damage to ACEC values through habitat removal, changes to the visual landscape, sedimentation of waterways, increased likelihood of weed invasion, and conversion to cheatgrass. Emergency stabilization and restoration techniques would be applied to minimize impacts where special values are at risk. If these techniques are successful, wildfires could also cause long-term improvement in ACEC values by maintaining natural vegetative ecosystem cycles.

Cultural resources protections would complement management within potential ACECs by preserving the resources and educating the public about cultural resource ethics.

Managing potential ACECs according to VRM Class I objectives would require that any activities within the area preserve the existing character of the landscape and managing according to VRM Class II objectives would require that any activities within the area maintain the existing character of the landscape. While VRM class management does not preclude any development, it guides the design objectives for activities and development. Therefore, while directly protecting scenic ACEC values, managing potential ACECs as VRM Class I or II would also protect ACEC values from most impacts associated with large scale ground-disturbing activities that would modify the existing landscape.

Managing potential ACECs according to VRM Class III or IV objectives would allow more modifications to the landscape than VRM Class I or II management and modifications could be more visible than in VRM Class I or II areas. While the BLM would require that all landscape modifications repeat the form, line, color, and texture of the landscape, thereby minimizing impacts on relevant and important scenic values, these modifications could be allowed to dominate the view of the casual observer. Changes in the scenic landscape could also degrade cultural resources where the sacred or historic setting of those resources is important.

Wood product sales and harvest could impact ACEC values by flattening, destroying, or removing vegetation, desired plant communities, and special status plant species; making changes to the visual landscape, degrading and fragmenting habitat; causing erosion that could degrade aquatic habitats; providing opportunity for weeds to spread into harvested areas; or damaging cultural or geologic resources during harvest or road construction. Restrictions on this activity would reduce the degradation impacts mentioned above. Closure to this activity would eliminate impacts from this activity. On the other hand, wood product sale and harvest can also be used as a tool to improve vegetation conditions. The BLM would have fewer tools to improve vegetation conditions where this activity is restricted or closed.

Domestic cattle, goat, and sheep grazing would be allowed on all or portions of most potential ACECs, depending on the location and alternative. Livestock grazing and grazing infrastructure could damage the relevant and important values of a potential ACEC through damaging vegetation and weed spread. This would also degrade habitats and scenic values. Livestock grazing could also damage special status plants by consuming or damaging them. Relevant and important values associated with desert bighorn sheep could be threatened by disease

transmission from domestic goats and sheep where domestic goat or sheep grazing occurs within or near potential ACECs with a desert bighorn sheep value. Intensive management would be used to adjust grazing to reduce impacts. Prohibiting or restricting domestic goat and sheep trailing close to desert bighorn sheep habitat would reduce the risk of disease transmission within potential ACECs with a desert bighorn sheep value.

Energy and minerals development could impact ACEC values by flattening, destroying, or removing vegetation, desired plant communities, and special status plant species; changing the visual landscape; degrading and fragmenting habitat; disturbing wildlife; causing erosion that could degrade aquatic habitats; spreading weeds; damaging cultural or geologic resources during road and facility construction; and contaminating surface water from wastewater spills and runoff containing drilling fluids. An NSO stipulation within an ACEC would eliminate these impacts by prohibiting surface occupancy or surface-disturbing activities associated with fluid mineral development. A CSU stipulation would allow mineral leasing with certain operational or locational constraints imposed by the BLM to protect an identified resource or value. This stipulation would reduce impacts on ACEC values associated with fluid mineral leasing. Closures to leasing of fluid minerals, coal, and nonenergy solid minerals, and closure to mineral materials disposal within potential ACECs would help protect ACEC values by eliminating surface-disturbance associated with energy and minerals development.

Recommending withdrawal of areas from locatable mineral entry within potential ACECs could help protect ACEC values if they are formally withdrawn. Withdrawal would eliminate the impacts of locatable minerals development on ACEC values within the portions of ACECs that were withdrawn. Specific impacts of locatable minerals development on ACEC values are of the same nature and type as impacts of general energy and minerals development.

Closing an area to recreational mining would protect stream bottoms, stream banks, riparian areas and floodplains from degradation impacts, including dredging, undercutting banks, and removing excess material.

A TL stipulation would close an area to fluid mineral development, as well as all surface-disturbing activities for a specific period, which could exceed 60 days. It does not generally apply to operation and basic maintenance, including associated vehicle travel. Intensive operations and maintenance would not be allowed. This stipulation would reduce impacts of the same nature and type as those described for mineral leasing when the period specified overlaps with a time when a biological ACEC value is particularly sensitive (e.g., when desert bighorn sheep are concentrating in their winter habitat).

An NGD restriction would prohibit other surface-disturbing activities, as defined in **Appendix B** and the glossary. This stipulation would greatly reduce impacts from surface disturbance on ACEC values. Specific impacts that could be reduced are flattening, destroying, or removing vegetation, desired plant communities, and special status plant species; degrading and fragmenting habitat; causing erosion that could degrade aquatic habitats; spreading weeds; and damaging cultural resources.

An SSR restriction would allow some surface-disturbing activities subject to special operational or locational constraints that could be applied by the BLM to protect a specified resource or

value. This stipulation would apply to the same types of activities as an NGD restriction and would also reduce impacts from those activities of the same nature and type described in the paragraph above. This restriction relies on project design, siting, and implementation of appropriate mitigation measures and monitoring protocols to ensure that the resource for which the restriction was designed to protect is adequately safeguarded.

Recreation, including travel, within potential ACECs could impact ACEC values by flattening, destroying, or removing vegetation, desired plant communities, and special status plant species; changing the visual landscape from construction of facilities; degrading and fragmenting habitat; disturbing wildlife; spreading weeds; and damaging cultural or geologic resources. Impacts would be reduced where camping and target shooting are restricted or prohibited and where travel is permanently or seasonally closed. Damage to geologic features or rock art would be reduced where rock climbing on those features is prohibited. Closure to rock climbing during bird breeding seasons would reduce degradation impacts on those birds from human disturbance and nest damage.

Recreation impacts are more likely to occur in ERMA areas because ERMA areas would attract more concentrated recreation focused on targeted recreation activities without focusing on recreational outcomes or experiences. Therefore, fewer restrictions on other resource uses would be implemented solely to protect recreational outcomes or experiences. Where they overlap, SRMA areas could attract concentrated recreation to potential ACECs but would also allow the BLM to restrict land uses to enhance recreation opportunities and protect the resources supporting them. Impacts would be reduced where recreation was restricted to meet cultural and biological resource objectives or where educational facilities are constructed in a way that minimizes impacts on resources. Additionally, concentrating recreation in ERMA areas and SRMA areas could reduce recreation levels outside of the RMA areas and diminish impacts across an entire ACEC from dispersed recreation.

Identifying ACECs as ROW exclusion or avoidance areas would protect relevant and important values by reducing (for avoidance areas) or eliminating (for exclusion areas) impacts from development requiring a ROW permit including utilities, access roads, and renewable energy excluding geothermal. Designating utility corridors within potential ACECs could increase and concentrate impacts of utility development on those areas.

Acquisition of lands within designated ACECs could help protect relevant and important values by bringing additional acres under BLM control and managing those acres according to special protections for the resources they contain.

Stream segments eligible (Alternative A) or suitable (Alternatives B and D) for inclusion in the National Wild and Scenic Rivers System or lands managed to protect wilderness characteristics that overlap potential ACECs could also protect ACEC values due to complementary management objectives. Managing these areas would limit surface-disturbing activities and changes to the visual landscape and would protect existing resources.

Effects Common to All Alternatives

Under all alternatives, management to protect and enhance riparian vegetation would protectively impact riparian ACEC values in the Roubideau-Potter-Monitor, Roubideau

Corridors, San Miguel River, and San Miguel River Extension potential ACECs in the manner described above under **Nature and Type of Effects**.

Under all alternatives, emergency stabilization and response techniques would be applied to minimize impacts of wildfires. These techniques would protectively impact potential ACECs in the manner described under **Nature and Type of Effects**.

Under all alternatives, impacts from motorized and mechanized travel would be maintained or reduced because motorized and mechanized travel would be limited to existing (Alternative A) or designated (Alternatives B, C, and D) routes, at a minimum.

Under all alternatives, the Tabeguache Area would be managed as VRM Class I and ROW exclusion and would be withdrawn from locatable mineral entry. It would be closed to motorized and mechanized travel, wood cutting, coal leasing, fluid mineral leasing and geophysical exploration, nonenergy solid mineral leasing, and mineral materials disposal, in accordance with the Colorado Wilderness Act of 1993 (PL 103-77, August 13, 1993). Cultural values in the 5,290 acres of the Tabeguache Pueblo and Tabeguache Caves ACEC overlapping this area would be protected from surface disturbing activities that could damage the resources or the historical setting. Cultural and riparian values in the Tabeguache Creek ACEC within the Tabeguache Area would be protected from surface-disturbing activities that could damage the resources or historical setting.

All of the Adobe Badlands, Coyote Wash, Dolores River Slickrock Canyon, and Needle Rock potential ACECs overlap with WSAs, as do portions of the Dolores Slickrock Canyon (9,820 acres), La Sal Creek (3,420 acres), Lower Uncompahgre Plateau Cultural (1,300 acres), Roubideau Corridors (4,480 acres), Roubideau-Potter-Monitor (10,670 acres), and Salt Desert Shrub Ecosystem (3,940 acres) potential ACECs. Managing the WSAs to maintain their eligibility for consideration for wilderness would protect the relevant and important values by requiring new activities within WSAs meet the nonimpairment criteria which require that new facilities or uses must be temporary and not create new surface disturbance (BLM 2012b). In addition, WSAs are closed to fluid mineral leasing, coal leasing, mineral material disposal, and ROWs. While not explicitly closed to nonenergy solid mineral leasing, development would likely create a new surface disturbance and thus not meet the nonimpairment criteria. These actions would protect ACEC values within overlapping portions of ACECs by prohibiting new surface-disturbing activities and the subsequent impacts of those activities in the manner described under **Nature and Type of Effects**.

The area of development potential for locatable minerals is generally considered to be the portion of the planning area west of the Uncompahgre Plateau. As such, impacts from locatable mineral exploration and development in potential ACECs east of the Uncompahgre Plateau is considered negligible. Acres currently withdrawn and recommended for withdrawal are still reported in the tables in this section but impacts in these areas will not be discussed further.

Implementing management for the following resources and resource uses would have negligible or no impact on ACECs' relevant and important values and are therefore not discussed in detail: air quality, climate change, wild horses, national trails and byways, and public health and safety.

Alternatives

This section is structured by ACEC, then by alternative within the ACEC. The ACECs are organized in the order they appear in **Chapter 2**. Summary tables show overlapping land use allocations that could impact the relevant and important values for the ACEC proposed for designation under each alternative. For potential ACECs or portions of potential ACECs not proposed for designation under Alternatives A, C, and D, a summary of overlapping land use allocations that could impact the relevant and important values are shown in **Table 4-78** (Summary of Protections for ACECs or Portions of ACECs Not Proposed for Designation, Alternative A), **Table 4-79** (Summary of Protections for ACECs or Portions of ACECs Not Proposed for Designation, Alternative C), and **Table 4-80** (Summary of Protections for ACECs or Portions of ACECs Not Proposed for Designation, Alternative D) at the end of this section. Because Alternative B proposes for designation all but 770 acres within the potential Biological Soil Crust and Roubideau Corridors ACECs, there is no summary table for ACECs not proposed for designation under Alternative B. Instead, those impacts are discussed in text under the sections **East Paradox ACEC and Biological Soil Crust ACEC** and **Roubideau Corridors ACEC and Roubideau-Potter-Monitor ACEC** below.

Adobe Badlands ACEC and Salt Desert Shrub ACEC

The potential for impacts on the relevant and important values for the ACEC proposed for designation under each alternative is summarized in **Table 4-63** (Summary of Protections for Designated Adobe Badlands ACEC (Alternatives A, C, and D) and Salt Desert Shrub ACEC (Alternative B)).

Alternative A

The Adobe Badlands ACEC is designated. The ACEC overlaps with the Adobe Badlands WSA and would continue to receive the same protective management described under **Effects Common to All Alternatives**. Special status plant and animal species, scenic values and highly erodible soils would be protected.

The potential Salt Desert Shrub ACEC is not designated. A portion of the potential ACEC is within the Adobe Badlands WSA (30 percent). Relevant and important values overlapping the WSA would continue to receive the same protective management described under **Effects Common to All Alternatives**. Outside of the WSA, surface use restrictions would be applied minimally in the area and, as a result, the relevant and important values could be degraded as described above under **Nature and Type of Effects** where surface-disturbing activities occur. Application of TL stipulations on portions of the potential ACEC could mitigate these impacts to some extent, but the stipulations would not be targeted to protect ACEC values.

Alternative B

The Salt Desert Shrub ACEC would be designated; the entire Adobe Badlands ACEC is within the Salt Desert Shrub ACEC. The portion of the ACEC in the Adobe Badlands WSA (30 percent) would receive the same protective management described under **Effects Common to All Alternatives**. An additional 1,580 acres overlap the Adobe Badlands WSA Adjacent lands with wilderness characteristics unit, which also provides strict protections such as closed to fluid mineral leasing, closed to coal leasing, management according to VRM Class II objectives, and closed to motorized and mechanized travel. Outside of these areas, management

Table 4-63
Summary of Protections for Designated Adobe Badlands ACEC (Alternatives A, C, and D) and Salt Desert Shrub ACEC (Alternative B)

Stipulation, Restriction, or Protection	A	B	C	D
Acres Designated as an ACEC:	6,380	34,510	6,380	6,380
NL	6,380	11,900	6,380	6,380
NSO ¹		22,610		
CSU ¹		22,610		
TL ¹	1,360	22,610		6,380
Closed to mineral materials disposal	6,380	34,510	6,380	6,380
Within coal potential area		660		
Closed to coal leasing		660		
Within locatable mineral potential area				
Withdrawn from locatable mineral entry				
Recommend for withdrawal from locatable mineral entry	6,380	34,510		
NGD ¹	6,380	34,510	6,380	6,380
SSR ¹		34,510	6,380	6,380
VRM Class I	6,380	10,320	6,380	6,380
VRM Class II		1,580		
VRM Class III		22,600		
VRM Class IV		10		
Closed to livestock grazing		18,920		
ROW avoidance		3,940		
ROW exclusion	6,380	30,540	6,380	6,380
SRMA				
ERMA			6,360	
Closed to motorized travel				
Closed to motorized and mechanized travel	6,380	11,900	6,380	6,380

Source: BLM 2012a

¹ Total acreage for stipulations may be greater than the total acreage of an ACEC because stipulations could overlap. If a stipulation were excepted, modified, or waived by the BLM Authorized Officer, underlying stipulations could still be in effect.

Hatching indicates zero acres or not applicable under this alternative.

protections would be greater than under Alternative A. For example, the entire area outside of the WSA and lands with wilderness characteristics unit would have an NSO stipulation for fluid mineral leasing, most of the ACEC would be managed as ROW exclusion and the remainder would be managed as ROW avoidance, and the entire ACEC would be closed to mineral material disposal. Management prescriptions are adequate to protect special status plant and animal species, as well as scenic values and highly erodible soils in the Adobe Badlands portion.

Alternative C

The Adobe Badlands ACEC would be designated. The ACEC overlaps with the Adobe Badlands WSA and would continue to receive the same protective management described under **Effects Common to All Alternatives**. Special status plant and animal species, scenic values and highly erodible soils would be protected in a similar manner as Alternative A.

The potential Salt Desert Shrub ACEC would not be designated. The portion of the potential ACEC that is within the Adobe Badlands WSA (30 percent) would continue to receive the same protective management described under **Effects Common to All Alternatives**.

Overall, the management prescriptions identified in **Table 2-2** would provide some protection for the special status plant and animal species within the potential Salt Desert Shrub ACEC. Outside of the WSA, nearly all of the area would be subject to CSU, or TL stipulations for fluid mineral development, and would be ROW avoidance. Because the stipulations would not be targeted at protecting the relevant and important values, impacts could be experienced if the stipulations were excepted, modified, or waived by the BLM Authorized Officer.

Other than the stipulations for fluid minerals and an SSR restriction for other surface-disturbing activities that would protect the relevant and important values on approximately 16,590 acres of the potential Salt Desert Shrub ACEC, few surface use restrictions would be in place. Where surface-disturbing activities occur, the special status plant and animal species could be impacted as described under **Nature and Type of Effects**.

Alternative D

The Adobe Badlands ACEC would be designated. The ACEC overlaps with the Adobe Badlands WSA and would continue to receive the same protective management described under **Effects Common to All Alternatives**. Special status plant and animal species, scenic values and highly erodible soils would be protected in a similar manner as Alternative A.

The potential Salt Desert Shrub ACEC would not be designated. Of the 34,540 acres comprising the potential ACEC, 6,380 acres are within the Adobe Badlands ACEC and would receive the same protections described above. Of the remaining 28,130 acres, 3,940 acres are within the Adobe Badlands WSA and would continue to receive the same protective management described under **Effects Common to All Alternatives**. Management prescriptions identified in **Table 2-2** would help protect the special status species values within the potential Salt Desert Shrub ACEC. Outside of the WSA, nearly all of the area would be subject to CSU and TL stipulations for fluid mineral development, and about one-half would be ROW avoidance. Most of the area would also have an SSR restriction. Because the stipulations would not be targeted at protecting the relevant and important values, impacts could be experienced if the stipulations were excepted, modified, or waived by the BLM Authorized Officer.

About one-half of the potential Salt Desert Shrub ACEC would overlap the Adobe Ecological Emphasis Area which would be managed to preserve the continuity of habitats, vegetation communities, and native wildlife within, which would also provide protection to the special status species identified as relevant and important values. Surface use restrictions (same as those identified above) associated with the ecological emphasis area would apply throughout the potential ACEC providing some protection to the relevant and important values from surface-disturbing activities as described under **Nature and Type of Effects**.

Fairview South ACEC, Fairview South (CNHP Expansion) ACEC and Fairview South (BLM Expansion) ACEC

The potential for impacts on the relevant and important values for the ACEC proposed for designation under each alternative is summarized in **Table 4-64** (Summary of Protections for Designated Fairview South ACEC (Alternatives A and C) Fairview South (CNHP Expansion) ACEC (Alternative B), and Fairview South (BLM Expansion) ACEC (Alternative D)).

Table 4-64
Summary of Protections for
Designated Fairview South ACEC (Alternatives A and C)
Fairview South (CNHP Expansion) ACEC (Alternative B), and
Fairview South (BLM Expansion) ACEC (Alternative D)

Stipulation, Restriction, or Protection	A	B	C	D
Acres Designated as an ACEC:	210	4,250	210	610
NL				
NSO ¹	210	4,250		610
CSU ¹		4,250	210	610
TL ¹	170	4,250	110	610
Closed to mineral materials disposal	210	4,250	210	610
Within coal potential area				
Closed to coal leasing				
Within locatable mineral potential area				
Withdrawn from locatable mineral entry	50	1,480	50	220
Recommend for withdrawal from locatable mineral entry	210	4,250		
NGD ¹	210	4,250		
SSR ¹		4,160	210	610
VRM Class I				
VRM Class II		510		
VRM Class III	210	3,740	210	610
VRM Class IV				
Closed to livestock grazing		4,250		610
ROW avoidance		110	210	
ROW exclusion	210	4,140		610
SRMA		1,630		
ERMA				
Closed to motorized travel	210	980		
Closed to motorized and mechanized travel		500		610

Source: BLM 2012a

¹ Total acreage for stipulations may be greater than the total acreage of an ACEC because stipulations could overlap. If a stipulation were excepted, modified, or waived by the BLM Authorized Officer, underlying stipulations could still be in effect.

Hatching indicates zero acres or not applicable under this alternative.

Alternative A

The Fairview South ACEC is designated. Management prescriptions which include NGD, NSO, closed to OHV use and closed to mineral material disposal provide protection for the special status plants within this ACEC. Impacts from livestock grazing can occur from trampling or grazing of the plants, and from alteration of the plant community, as described under Nature and Type of Effects. Because a larger portion of clay-loving wild buckwheat are located within the potential Fairview South (BLM Expansion) area outside of the existing ACEC, not designating this area as an ACEC results in a loss of focused protection for the plant species afforded by ACEC designation. However, the area receives some incidental protection from managing other resources as further described.

The potential Fairview South (BLM Expansion) and the Fairview South (CNHP Expansion) ACECs are not designated. Of the 610 acres comprising the potential Fairview South (BLM Expansion) ACEC and the 4,250 acres comprising the potential Fairview South (CNHP Expansion) ACEC, 210 acres of each are within the existing Fairview South ACEC and receive the same protections described above. Outside of the overlap, the management prescriptions identified in **Table 2-2** provide minimal protection for the special status plant and animal species and botanical values within the potential ACECs.

Fluid mineral development could cause surface disturbance that could damage or destroy plants and habitat as described under **Nature and Type of Effects**. Application of TL stipulations would provide some incidental protections across the potential ACEC and would provide incidental protection to the values during the timeframe specified in the stipulation. Because the potential ACECs would be available for mineral materials disposal and ROW location, the relevant and important values could be degraded as described above under **Nature and Type of Effects** if these activities were to occur in the area. Both motorized and mechanized travel would be limited to existing routes in the potential ACECs, which would prevent damage of plants and disruption of wildlife in most cases. Finally, impacts from livestock grazing can occur, as described for the Fairview South ACEC and under **Nature and Type of Effects**

Alternative B

The Fairview South (CNHP Expansion) ACEC would be designated. This ACEC includes the entire area of the potential Fairview South and Fairview South (BLM Expansion) ACECs. Management prescriptions summarized in **Table 2-2** would provide protection for the special status plants and wildlife within this ACEC. This ACEC would provide similar management protections for the values as Alternative A, but over a larger area (20 times larger). The largest density of clay-loving wild buckwheat individuals would be within a designated ACEC under this alternative providing the most protection in the form of focused management of any of the alternatives.

Alternative C

The Fairview South ACEC would be designated. This is the same boundary as the existing ACEC. Management prescriptions would provide more protection for the special status plants within this ACEC than under Alternative A. A CSU stipulation would be applied to fluid mineral leasing and an SSR restriction placed on other surface-disturbing activities. These stipulations and restriction rely on project design, siting, and implementation of appropriate mitigation measures and monitoring protocols to ensure that the special status plants are adequately safeguarded. Similarly, the ACEC would be managed as a ROW avoidance area under Alternative C instead of as a ROW exclusion area as under Alternative A. This could allow land use authorizations in the ACEC but they would be required to be mitigated so as not to impair the special status plants.

The potential Fairview South (BLM Expansion) and the potential Fairview South (CNHP Expansion) would not be designated. Of the 610 acres comprising the potential Fairview South BLM Expansion ACEC and the 4,250 acres comprising the potential Fairview South (CNHP Expansion) ACEC, 210 acres would be within the Fairview South ACEC and would receive the same protections describe above. Outside of the overlap, the management prescriptions

identified in **Table 2-2** would help protect the special status plant and animal species and botanical values within the potential ACECs. Because a larger portion of clay-loving wild buckwheat are located within the potential Fairview South (BLM Expansion) area outside of the existing ACEC, not designating this area as an ACEC would result in a loss of focused protection for the plant species afforded by ACEC designation. However, the area may receive some incidental protection from managing other resources as further described.

Overall, protection would increase over Alternative A. Application of CSU and SSR stipulations across the potential Fairview South (BLM and CNHP Expansion) ACECs would mitigate impacts from fluid mineral development and other surface-disturbing activities, but these stipulations would not be targeted to protect ACEC values. If the restrictions were excepted, modified, or waived by the BLM Authorized Officer, impacts on these values could occur as described under **Nature and Type of Effects**.

While more of the potential Fairview South (BLM and CNHP Expansion) ACECs would be closed to mineral materials disposal compared with Alternative A, this activity could still impact ACEC values on the remainder of the ACEC as described under **Nature and Type of Effects**.

Managing all of the potential Fairview South (BLM and CNHP Expansion) ACECs as ROW avoidance would decrease the risk of land use authorizations within the areas compared with Alternative A. Impacts of the ACEC being open for livestock grazing would be the same as under Alternative A.

Overlap of portions of the potential Fairview South (CNHP Expansion) ACEC with the Kinikin Hills ERMA (1,630 acres), a portion of which would be open to cross-country motorized and mechanized travel (1,120 acres), could increase impacts from recreation compared with Alternative A. Impacts of recreation on special status plants and wildlife are described under **Nature and Type of Effects**.

Alternative D

The Fairview South (BLM Expansion) ACEC would be designated. This ACEC includes the entire area of the existing Fairview South ACEC. Surface uses would be heavily restricted in the area as summarized in **Table 2-2** providing protection for the special status plants and wildlife within this ACEC. This ACEC would provide similar management protections for the values as Alternative A, but over a larger area (about three times larger). The ACEC would be closed to livestock grazing, which would provide greater protection for the special status plants than would Alternative A. The ACEC would have an SSR restriction, which would be less protective than Alternative A, which is NGD. The SSR restriction would rely on project design, siting, and implementation of appropriate mitigation measures to ensure that the special status plants are adequately safeguarded.

The potential Fairview South (CNHP Expansion) would not be designated. Of the 4,250 acres comprising the potential ACEC, 610 acres are within the Fairview South (BLM Expansion) ACEC and would receive the same protections described above. Outside of the overlap, management prescriptions identified in **Table 2-2** would help protect the special status plant and animal species and botanical values within the potential ACEC.

While portions of the potential Fairview South (CNHP Expansion) ACEC would be protected from the impacts of fluid mineral development by an NSO stipulation, fluid mineral activity could impact ACEC values on the remainder of the area. In the remaining area, impacts would be mitigated through application of CSU stipulations targeted at protecting the potential biological soil crusts and BLM sensitive plant species. Impacts of fluid mineral leasing would be increased compared with Alternative A and are described under **Nature and Type of Effects**. The potential ACEC would also be protected by an SSR restriction for surface-disturbing activities aimed directly at protecting the BLM sensitive plant species.

A portion of the potential Fairview South (CNHP Expansion) ACEC would be closed to livestock grazing, which would reduce the risk of impacts from grazing on vegetation as described under **Nature and Type of Effects**. Overlap of a portion of the potential ACEC with the Kinikin Hills ERMA could increase recreation impacts compared with Alternative A. Impacts of recreation are described under **Nature and Type of Effects**. Allowing motorized and mechanized travel within the area would have the same impacts as under Alternative A.

Needle Rock ACEC

The potential for impacts on the relevant and important values for the ACEC proposed for designation under each alternative is summarized in **Table 4-65** (Summary of Protections for Designated Needle Rock ACEC).

Alternatives A, B, C and D

The Needle Rock ACEC would be designated in all alternatives. The ACEC overlaps the Needle Rock Instant Study Area (ISA) and would continue to receive the same protective management described under **Effects Common to All Alternatives**.

While Alternative B.I proposes the area for management according to VRM Class II objectives, because it is an ISA, it is automatically managed according to VRM Class I objectives per BLM policy. Alternative B.I also would close the area to fluid mineral leasing, which is the same as Alternative B.

San Miguel River ACEC and San Miguel River Expansion ACEC

The potential for impacts on the relevant and important values for the ACEC proposed for designation under each alternative is summarized in **Table 4-66** (Summary of Protections for Designated San Miguel River ACEC (Alternatives A, C and D) and San Miguel River Expansion ACEC (Alternative B)).

Alternative A

The San Miguel River ACEC is designated. Management prescriptions summarized in **Table 4-66** provide protection for the scenic and riparian values and special status species within this ACEC but they are vulnerable to damage caused by continued recreational mining and locatable mineral entry. Impacts would be as described above under **Nature and Type of Effects**.

The potential San Miguel River Expansion ACEC is not designated. Of the 35,420 acres comprising the potential ACEC, 22,710 acres are within the San Miguel River ACEC and would receive the same protections summarized in **Table 4-66**. Outside of the overlap, the

Table 4-65
Summary of Protections for Designated Needle Rock ACEC

Stipulation, Restriction, or Protection	A	B	C	D
<i>Acres Designated as an ACEC:</i>	80	80	80	80
NL	80	80	80	80
NSO ¹				
CSU ¹				
TL ¹	80	80	80	80
Closed to mineral materials disposal	80	80	80	80
Within coal potential area				
Closed to coal leasing				
Within locatable mineral potential area				
Withdrawn from locatable mineral entry				
Recommend for withdrawal from locatable mineral entry	80	80		80
NGD ¹	80	80	80	80
SSR ¹		40	70	80
VRM Class I	80	80	80	80
VRM Class II				
VRM Class III				
VRM Class IV				
Closed to livestock grazing	80	80	80	80
ROW avoidance				
ROW exclusion	80	80	80	80
SRMA				
ERMA				
Closed to motorized travel				
Closed to motorized and mechanized travel				

Source: BLM 2012a

¹ Total acreage for stipulations may be greater than the total acreage of an ACEC because stipulations could overlap. If a stipulation were excepted, modified, or waived by the BLM Authorized Officer, underlying stipulations could still be in effect.

Hatching indicates zero acres or not applicable under this alternative.

management prescriptions identified in **Table 2-2** would help protect the scenic and riparian values and special status species values within the potential ACEC.

While over half of the potential San Miguel River Expansion ACEC would continue to be protected from fluid mineral development by application of CSU stipulations, development in the remainder of the area could cause surface disturbance that could degrade relevant and important values as described under **Nature and Type of Effects**. Because all of the potential ACEC would be available for locatable mineral entry and ROW location, the relevant and important values could be degraded as described above under **Nature and Type of Effects** if these activities were to occur in the area.

Livestock grazing in the potential ACEC could damage riparian areas as described under **Nature and Type of Effects**. It should be noted that the area open to livestock grazing is currently ungrazed.

Table 4-66
Summary of Protections for Designated San Miguel River ACEC (Alternatives A, C and D) and San Miguel River Expansion ACEC (Alternative B)

Stipulation, Restriction, or Protection	A	B	C	D
<i>Acres Designated as an ACEC:</i>	22,780	35,480	22,780	22,780
NL		35,480		
NSO ¹	160		380	22,780
CSU ¹	15,460		22,780	21,310
TL ¹	19,890	35,480	18,890	22,780
Closed to mineral materials disposal	22,780	35,480		22,780
Within coal potential area		4,210	3,720	3,710
Closed to coal leasing		4,210		3,710
Within locatable mineral potential area	22,780	35,480	22,780	22,780
Withdrawn from locatable mineral entry				
Recommend for withdrawal from locatable mineral entry		35,480		
NGD ¹		32,830		
SSR ¹		35,430	17,750	21,580
VRM Class I		2,560		1,100
VRM Class II	21,890	10,170	30	7,160
VRM Class III		22,750	22,750	14,520
VRM Class IV	850			
Closed to livestock grazing	16,250	35,480	16,250	18,670
ROW avoidance		340	18,650	19,300
ROW exclusion	22,780	35,140		2,430
SRMA	22,780	35,090		22,780
ERMA			22,780	
Closed to motorized travel	11,530			
Closed to motorized and mechanized travel		11,180		5,400

Source: BLM 2012a

¹ Total acreage for stipulations may be greater than the total acreage of an ACEC because stipulations could overlap. If a stipulation were excepted, modified, or waived by the BLM Authorized Officer, underlying stipulations could still be in effect.

Hatching indicates zero acres or not applicable under this alternative.

There is no VRM class objective in the area so development could be allowed that would diminish the scenic value.

Portions of Beaver Creek, Saltado Creek, and the San Miguel River have been determined eligible for inclusion in the NWSRS and flow through the potential San Miguel River Expansion ACEC. Management of the segments to protect their free-flowing condition, tentative classification, and ORVs (including vegetation, scenic, and wildlife) would provide protection to the riparian vegetation, scenic values, and wildlife species within the potential ACEC where they overlap the WSR study corridors. Maintenance of instream flow rights to ensure sufficient instream flow would help protect riparian ecosystems by ensuring sufficient flows to maintain the habitat.

Alternative B

The San Miguel River Expansion ACEC would be designated. This ACEC would offer management protections for the scenic and riparian values and special status species over a greater area than would Alternative A. Management prescriptions summarized in **Table 4-66** would provide more management protections than Alternative A: rather than NSO, the ACEC would not be open to leasing fluid minerals; it would have an NGD restriction; it would be closed to livestock grazing; and would be recommended for withdrawal for locatable mineral entry. Impacts of each would be as described above under **Nature and Type of Effects**. Approximately 36 percent of the ACEC would be managed according to VRM Class I or II objectives, in contrast with 62 percent that would be managed according to VRM Class II objectives under Alternative A. However, the remainder of the ACEC under Alternative B would be managed according to VRM Class III objectives while 36 percent of the ACEC would not have a VRM Class under Alternative A. Overall, Alternative B provides less protection for the scenic value than Alternative A.

Alternative C

The San Miguel River ACEC would be designated. The management prescriptions summarized in **Table 4-66** would provide protection for the scenic and riparian values and special status species within this ACEC. However, the types of restrictions would be less protective than under Alternative A and would rely on project design, siting, and implementation of appropriate mitigation measures and monitoring protocols to ensure that the values for which the restrictions were designed to protect are adequately safeguarded. The most notable difference between Alternative A and Alternative C is that the San Miguel River RMA under Alternative A would be managed as an ERMA under this alternative. As a result, use restrictions could decrease because the BLM would not be managing the area to maintain user experiences. Therefore, ACEC values would not receive the same level of incidental protections from recreation management as under Alternative A.

The potential San Miguel River Expansion ACEC would not be designated. Of the 35,420 acres comprising the potential ACEC, 22,710 acres are within the San Miguel River ACEC and would receive the same protections summarized in **Table 4-66**. Outside of the overlap, the management prescriptions identified in **Table 2-2** would help protect the scenic and riparian values and special status species values within the ACEC.

The potential for impacts from fluid mineral development would decrease compared with Alternative A because most of the area would be subject to CSU stipulations in addition to TL stipulations. Because the stipulations would not be targeted at protecting the relevant and important values, impacts could be experienced if the stipulations were excepted, modified, or waived by the BLM Authorized Officer.

Just over half of the potential San Miguel River Expansion ACEC would be managed as VRM Class II, which would help protect the scenic relevant and important values and provide incidental protection to the special status wildlife in the area by requiring that development be constructed in a manner that maintains the existing character of the landscape.

Other surface use restrictions over most of the potential San Miguel River Expansion ACEC including an SSR restriction for other surface-disturbing activities and ROW avoidance would help protect the relevant and important values as described under **Nature and Type of Effects**.

Unlike under Alternative A, a portion of the potential San Miguel River Expansion ACEC is within the coal potential area under Alternative C. Coal exploration and development within this area would impact ACEC values as described under **Nature and Type of Effects**.

The entire potential San Miguel River Expansion ACEC would be available for locatable mineral entry and development; impacts would be the same as described under Alternative A.

The potential San Miguel River Expansion ACEC would be within the San Miguel River ERMA; impacts would be similar to those described for the San Miguel River ACEC designated under this alternative.

Maintenance of instream flow rights to ensure sufficient instream flow would help protect riparian ecosystems to maintain habitat.

Alternative D

The San Miguel River ACEC would be designated. The management prescriptions summarized in **Table 4-66** would provide protection for the scenic and riparian values and special status species within this ACEC and the type of restrictions would afford similar protections as under Alternative A. The most notable differences between Alternative A and Alternative D are that more acres would be managed as VRM Class III and IV and fewer acres would be managed as ROW exclusion under Alternative D.

The potential San Miguel River Expansion ACEC would not be designated. Of the 35,420 acres comprising the potential ACEC, 22,780 acres are within the San Miguel River ACEC and would receive the same protections summarized in **Table 4-66**. Outside of the overlap, the management prescriptions identified in **Table 2-2** would help protect the scenic and riparian values and special status species within the ACEC.

Most of the potential San Miguel River Expansion ACEC would be managed according to VRM Class III objectives which would allow modifications to the landscape that attract the attention of the casual observer. This could impair the scenic value and allow surface-disturbing activities that could impair the other relevant and important values in the potential ACEC.

Management would be more protective than that under Alternative A. An increase in acres subject to CSU and TL stipulations compared with Alternative A would add some protections to complement NSO stipulations. In some cases, these stipulations would be targeted to protect ACEC values.

An SSR restriction for other surface-disturbing activities on nearly 90 percent of the potential San Miguel River Expansion ACEC would provide some incidental protection for the relevant and important values. This restriction would rely on project design, proper siting, and

implementation of appropriate mitigation to ensure that the resource for which the restriction was designed to protect is adequately safeguarded.

While some of the potential San Miguel River Expansion ACEC would be closed to mineral material disposal, mineral material development, locatable mineral entry, and coal development could all impact relevant and important values as described under ***Nature and Type of Effects***.

Approximately 84 percent of the potential San Miguel River Expansion ACEC would be managed as ROW avoidance, which would reduce the risk of impacts from land use authorizations on relevant and important values.

The overlap of most of the potential San Miguel River Expansion ACEC with the San Miguel River SRMA could increase concentration of recreation in the area but would also give the BLM additional tools to manage that recreation to protect the activities and the setting.

Portions of San Miguel River Segments 1 and 3 would be determined suitable for inclusion in the NWSRS and flow through the potential San Miguel River Expansion ACEC outside of the existing San Miguel River ACEC. Management of the segments to protect their free-flowing condition, tentative classification, and ORVs (including vegetation, scenic, and wildlife) would provide protection to the riparian vegetation, scenic values, and wildlife species within the potential ACEC where they overlap the WSR study corridors. Maintenance of instream flow rights to ensure sufficient instream flow would help protect riparian ecosystems by ensuring sufficient flows to maintain the habitat. Maintenance of instream flow rights to ensure sufficient instream flow would help protect riparian ecosystems to maintain habitat.

Tabeguache Creek ACEC

The potential for impacts on the relevant and important values of the ACEC proposed for designation is summarized in **Table 4-67** (Summary of Protections for Designated Tabeguache Creek ACEC). The Dolores River Slickrock Canyon and Coyote Wash ACECs are entirely within the Dolores River Canyon WSA and would continue to receive the same protective management described under Effects Common to All Alternatives.

Alternative A

The Tabeguache Creek ACEC would be designated. The ACEC is within the Tabeguache Area and would continue to receive the same protective management described under ***Effects Common to All Alternatives*** and ***Assumptions***. Cultural and aquatic/riparian values would be protected.

Alternatives B, C, and D

The Tabeguache Creek ACEC would be designated. However, because the ACEC is within the Tabeguache Area, it would continue to receive the same protective management described under ***Effects Common to All Alternatives*** and ***Assumptions***. Cultural and aquatic/riparian values would be protected in the same manner as under Alternative A.

Table 4-67
Summary of Protections for Designated Tabeguache Creek ACEC

Stipulation, Restriction, or Protection	A	B	C	D
Acres Designated as an ACEC:	560	0	0	0
NL	560	Not Designated	Not Designated	Not Designated
NSO ¹				
CSU ¹				
TL ¹				
Closed to mineral materials disposal	560			
Within coal potential area				
Closed to coal leasing				
Within locatable mineral potential area	560			
Withdrawn from locatable mineral entry	560			
Recommend for withdrawal from locatable mineral entry				
NGD ¹				
SSR ¹				
VRM Class I	560			
VRM Class II				
VRM Class III				
VRM Class IV				
Closed to livestock grazing				
ROW avoidance				
ROW exclusion	560			
SRMA				
ERMA				
Closed to motorized travel				
Closed to motorized and mechanized travel	560			

Source: BLM 2012a

¹ Total acreage for stipulations may be greater than the total acreage of an ACEC because stipulations could overlap. If a stipulation were excepted, modified, or waived by the authorized officer, underlying stipulations could still be in effect.

Hatching indicates zero acres or stipulation, restriction, or protection is not applicable under this alternative.

Dolores Slickrock Canyon ACEC, Dolores River Slickrock Canyon ACEC, Coyote Wash ACEC

The potential for impacts on the relevant and important values for the ACEC proposed for designation under each alternative is summarized in **Table 4-68** (Summary of Protections for Designated Dolores Slickrock Canyon ACEC and Coyote Wash ACEC (Alternative B) and Dolores River Slickrock Canyon ACEC (Alternative D)).

Alternative A

The Dolores Slickrock Canyon, Dolores River Slickrock Canyon and Coyote Wash ACECs would not be designated.

Table 4-68
Summary of Protections for Designated Dolores Slickrock Canyon ACEC and Coyote Wash ACEC (Alternative B)¹ and Dolores River Slickrock Canyon ACEC (Alternative D)

Stipulation, Restriction, or Protection	A	B	C	D
Acres Designated as an ACEC:	0	10,670	0	9,780
NL	Not Designated	10,670	Not Designated	9,780
NSO ²				
CSU ²				
TL ²		10,670		9,780
Closed to mineral materials disposal		10,670		9,780
Within coal potential area				
Closed to coal leasing				
Within locatable mineral potential area		10,670		9,780
Withdrawn from locatable mineral entry				
Recommend for withdrawal from locatable mineral entry		10,670		9,780
NGD ²		10,670		9,780
SSR ²		10,670		9,780
VRM Class I		9,830		9,780
VRM Class II		840		
VRM Class III				
VRM Class IV				
Closed to livestock grazing		4,380		2,380
ROW avoidance				
ROW exclusion		10,670		9,780
SRMA		9,790		9,780
ERMA				
Closed to motorized travel				
Closed to motorized and mechanized travel	9,880	9,780		

Source: BLM 2012a

¹ Coyote Wash is within Dolores Slickrock Canyon, so acres are not shown separately

² Total acreage for stipulations may be greater than the total acreage of an ACEC because stipulations could overlap. If a stipulation were excepted, modified, or waived by the BLM Authorized Officer, underlying stipulations could still be in effect.

Hatching indicates zero acres or not applicable under this alternative.

The Dolores River Slickrock Canyon and Coyote Wash ACECs are entirely within the Dolores River Canyon WSA and would continue to receive the same protective management described under **Effects Common to All Alternatives**.

The potential ACECs are available for domestic goat and sheep grazing which increases the risk of disease transmission from domestic goats and sheep to desert bighorn sheep, one of the relevant and important values. It should be noted that there is currently no sheep grazing in Dolores Canyon, so risks are low. However, if any cattle allotments were converted to goat or sheep allotments, the risk of disease transmission would increase.

Portions of the Dolores River and La Sal Creek have been determined eligible for inclusion in the NWSRS and flow through the three potential ACECs. Management of the segments to

protect the free-flowing condition, tentative classification, and ORVs (including scenic, fish, wildlife, ecologic, and vegetation) would provide protection to the scenic, special status fish species, rare plants, and wildlife within the ACECs where they overlap the WSR study corridor.

Most of the potential Dolores Slickrock Canyon ACEC (92 percent) is within the Dolores River Canyon WSA. Relevant and important values overlapping the WSA would continue to receive the same protective management described under **Effects Common to All Alternatives**. A TL stipulation for fluid minerals would also apply on part of the area to protect peregrine falcon nests and crucial big game (desert bighorn sheep) winter habitat. Other surface-disturbing activities would not be restricted resulting in the potential for impacts described under **Nature and Type of Effects**. There is no VRM class objective in the potential Dolores Slickrock Canyon ACEC outside of the WSA so development could be allowed that would diminish the scenic value.

Alternative B

The Dolores Slickrock Canyon and Coyote Wash ACECs would be designated. The potential Dolores River Slickrock Canyon ACEC (which would not be designated under this alternative) and the Coyote Wash ACEC are entirely within the Dolores River Canyon WSA and would continue to receive the same protective management described under **Effects Common to All Alternatives**. The management prescriptions summarized in **Table 4-68** would provide the most protection of all alternatives for the riparian communities, BLM sensitive species, and scenic values within the ACECs.

Over half of the Dolores Slickrock Canyon ACEC would be closed to domestic goat and sheep grazing which would reduce the risk of disease transmission from domestic goats and sheep to desert bighorn sheep, one of the relevant and important values in the Dolores Slickrock Canyon ACEC and potential Dolores River Slickrock Canyon ACEC. However the risk would persist in the remaining area, although it is currently not grazed by domestic goats or sheep.

Portions of the Dolores River and La Sal Creek have been determined suitable for inclusion in the NWSRS and flow through the Dolores Slickrock Canyon ACEC. Management of the segments to protect the free-flowing condition, tentative classification, and ORVs would provide protection to the values within the ACEC where they overlap the WSR study corridor.

Outside of the Dolores River Canyon WSA, the Dolores Slickrock Canyon ACEC would be managed as VRM Class II which would provide protection to the scenic value as described under Nature and Type of Effects.

Alternative C

The potential Dolores Slickrock Canyon, Dolores River Slickrock Canyon and Coyote Wash ACECs would not be designated.

The potential Dolores River Slickrock Canyon and Coyote Wash ACECs are entirely within the Dolores River Canyon WSA and would continue to receive the same protective management described under **Effects Common to All Alternatives**. Most of the potential Dolores Slickrock Canyon ACEC (92 percent) is within the Dolores River Canyon WSA. Relevant and important

values overlapping the WSA would continue to receive the same protective management described under **Effects Common to All Alternatives**.

The three potential ACECs would be closed to domestic goat grazing, while domestic sheep grazing would be managed to minimize contact with desert bighorn sheep. Compared with Alternative A, this would minimize the risk of disease transmission between domestic sheep and desert bighorn sheep, one of the relevant and important values, from disease transmission.

Outside of the Dolores River Canyon WSA, there would be surface use restrictions (CSU and SSR on most of the area) to protect the rare vegetation communities and special status wildlife. Managing nearly all of the area as VRM Class II would provide protection to the scenic value by minimizing landscape modifications. In addition, nearly all of the potential ACECs would overlap the La Sal Ecological Emphasis Area which would provide some incidental protection to the special status species identified as relevant and important values as described under **Nature and Type of Effects**.

Alternative D

The Dolores River Slickrock Canyon ACEC would be designated. The Dolores River Slickrock Canyon ACEC overlaps the Dolores River Canyon WSA and would continue to receive the same protective management described under **Effects Common to All Alternatives**. Surface uses would be as summarized in **Table 4-68**. Because the potential Coyote Wash ACEC is completely within the Dolores River Slickrock Canyon ACEC, its values would be protected.

The potential Dolores Slickrock Canyon ACEC would not be designated; however, about 92 percent (9,780 acres) is within the Dolores River Slickrock Canyon ACEC and would receive the same protections. Of the remaining 890 acres not proposed for designation under this alternative, 80 acres are within the Dolores River Canyon WSA and would continue to receive the same protective management described under **Effects Common to All Alternatives**. Outside of the overlap, the management prescriptions identified in **Table 2-2** would help protect the special status species and scenic values within the potential ACECs.

While there is no sheep grazing in the potential ACECs currently, under Alternative D cattle allotments could not be converted to sheep allotments in high probability for interaction areas unless it was determined that sheep grazing could be accomplished below high probability levels. Domestic goat grazing would be excluded on 4,190 acres of the potential Dolores Slickrock Canyon ACEC (39 percent), also accounting for 43 percent of the Dolores River Slickrock Canyon ACEC. This would help protect desert bighorn sheep, one of the relevant and important values, from disease transmission.

Portions of the Dolores River and La Sal Creek would be determined suitable for inclusion in the NWSRS and flow through the Dolores River Slickrock Canyon ACEC and potential Dolores Slickrock Canyon ACEC. Management of the segments to protect the free-flowing condition, tentative classification, and ORVs (including scenic, fish, wildlife, ecologic, and vegetation) would provide protection to the scenic, special status fish species, rare plants, and wildlife within the ACEC or potential ACEC where they overlap the WSR study corridor.

The potential Dolores Slickrock Canyon ACEC would overlap the La Sal Ecological Emphasis Area which would be managed to preserve the continuity of habitats, vegetation communities, and native wildlife within, which would also provide some protection to the special status species identified as relevant and important values.

Because the majority of the potential Dolores Slickrock Canyon ACEC would be managed as VRM Class I (within the WSA) or II (880 acres, 99 percent), impacts of which are described under **Nature and Type of Effects**, the scenic values would be protected. In addition, managing to meet VRM Class I or II objectives could preclude surface-disturbing activities such as mineral development, ROW location, and recreation facilities if they are not able to meet the visual resource objectives. Where these types of activities are able to be mitigated in order to meet VRM objectives, it is likely that the associated mitigation, such as surface reclamation, revegetation techniques, and minimizing cuts and fills, would also minimize impacts on the riparian and special status plant and wildlife species over the long-term.

East Paradox ACEC and Biological Soil Crust ACEC

The potential for impacts on the relevant and important values for the ACEC proposed for designation under each alternative is summarized in **Table 4-69** (Summary of Protections for Designated East Paradox ACEC (Alternative B) and Biological Soil Crust ACEC (Alternative D)).

Alternative A

The potential East Paradox and Biological Soil Crust ACECs would not be designated. Minimal surface use restrictions would be applied.

The potential Biological Soil Crust ACEC is partially protected by a CSU stipulation for fluid minerals on 1,120 acres, but the stipulation is not targeted at protecting rare biological soil crusts, the relevant and important value identified for this area. If the CSU were to be excepted, modified, or waived by the BLM Authorized Officer, surface disturbance associated with fluid mineral development could damage the biological soil crust. Other types of mineral development or uses of the land would not be restricted and could damage the soils. While livestock and recreational use of the area has impacted biological soil crust, the level of impact and season of use has allowed for moderate annual recovery. These activities have the potential to impair the biological soil crust if use deviates from current levels or season of use changes.

The potential East Paradox ACEC would be partially protected from fluid mineral development by NSO (1,130 acres) and CSU (3,960 acres) stipulations which would help protect the relevant and important values where there is overlap. There are not any NGD or SSR restrictions; development in the remainder of the area could cause surface disturbance that could damage or destroy plants or their habitat, fish habitat, or the unique soils as described under **Nature and Type of Effects**. Motorized and mechanized travel would be limited to existing routes in the ACECs which would prevent the trampling of plants and biological soils in most cases. However, erosion and runoff caused by vehicle travel on routes near streams containing special status fish could degrade the species' habitat and thus impact the relevant and important fish value. While livestock grazing within the ACEC has not yet damaged the soil crusts beyond repair, continued grazing risks damage to these crusts.

Table 4-69
Summary of Protections for Designated East Paradox ACEC (Alternative B) and
Biological Soil Crust ACEC (Alternative D)

Stipulation, Restriction, or Protection	A	B	C	D
Acres Designated as an ACEC:	0	7,360	0	1,900
NL	Not Designated	1,220	Not Designated	
NSO ¹		6,140		1,900
CSU ¹		6,960		1,880
TL ¹		7,360		1,900
Closed to mineral materials disposal		7,360		1,900
Within coal potential area				
Closed to coal leasing				
Within locatable mineral potential area		7,360		1,900
Withdrawn from locatable mineral entry				
Recommend for withdrawal from locatable mineral entry		7,360		1,900
NGD ¹		7,360		1,900
SSR ¹		6,960		1,900
VRM Class I				
VRM Class II		640		1,900
VRM Class III		6,720		
VRM Class IV				
Closed to livestock grazing		1,390		
ROW avoidance		70		40
ROW exclusion		7,290		1,860
SRMA		7,360		
ERMA				
Closed to motorized travel				
Closed to motorized and mechanized travel				

Source: BLM 2012a

¹ Total acreage for stipulations may be greater than the total acreage of an ACEC because stipulations could overlap. If a stipulation were excepted, modified, or waived by the BLM Authorized Officer, underlying stipulations could still be in effect.

Hatching indicates zero acres or not applicable under this alternative.

A TL stipulation would be applied to fluid mineral leases throughout both potential ACECs and would provide incidental protection to the values during the timeframe specified in the stipulation.

Most of both potential ACECs would be available for mineral materials disposal, locatable mineral entry, and ROW location. The potential ACECs are also within the area of locatable mineral development potential. The relevant and important values could be degraded as described under **Nature and Type of Effects** if these activities were to occur.

A portion of the Dolores River has been determined eligible for inclusion in the NWSRS and flows through the potential East Paradox ACEC. Management of the segment to protect the free-flowing condition, tentative classification, and ORVs (including vegetation) would provide protection to the special status plants and rare biological soil crusts where they overlap the WSR study corridor.

Alternative B

The East Paradox ACEC would be designated. The potential Biological Soil Crust ACEC would not be designated; however, 1,800 acres are within the East Paradox ACEC and would receive management protections.

The management prescriptions summarized in **Table 4-69** would provide the most protection of all alternatives for the unique vegetation communities, rare species of biological soil crusts, and BLM sensitive plant and wildlife species in the East Paradox ACEC. The ACEC would be closed to oil and gas leasing over 17 percent of the area and would have an NSO stipulation across the remainder. There would also be an NGD restriction and ROW exclusion or avoidance across the entire ACEC.

On the 100 acres of the potential Biological Soil Crust ACEC outside of the East Paradox ACEC, surface use restrictions would be in place throughout the entire area, including NSO stipulations for fluid mineral leasing, closure to mineral material disposal, recommend for withdrawal from locatable mineral entry, NGD or SSR restrictions for other surface-disturbing activities, and management as ROW avoidance or exclusion areas.

Livestock grazing would continue on 560 of the 1,900 acres within the potential Biological Soil Crust ACEC. While livestock and recreational use of the area is not currently damaging the soils, these activities have the potential to impair the soils if use deviates from current levels or nature of use.

Alternative C

Neither the potential Biological Soil Crust nor the East Paradox ACECs would be designated. Minimal surface use restrictions would be applied.

Within the potential Biological Soil Crust ACEC, CSU and SSR restrictions targeted at protecting biological soil crusts, which is the relevant and important value identified, would be applied on 82 percent of the area, providing some level of protection from these activities. While livestock and recreational use of the area has impacted biological soil crust, the level of impact and season of use has allowed for moderate annual recovery. These activities have the potential to impair the biological soil crust if use deviates from current levels or season of use changes.

Within the potential East Paradox ACEC, protections would be similar to those described under Alternative A but would occur over more of the potential ACEC. Nearly all of the potential ACEC would be subject to either an NSO or CSU stipulation and a TL on all of the potential ACEC would protect the relevant and important values from surface disturbance associated with fluid mineral development and other surface-disturbing activities during the timeframe specified.

Closure of portions of the potential East Paradox ACEC to mineral materials disposal would prevent that activity from impacting ACEC values, but mineral materials disposal could still occur across the remainder of both areas. Furthermore, the potential ACECs would be open for locatable mineral entry. Impacts would be the same as described under Alternative A.

An SSR restriction for other surface-disturbing activities on over half of the potential East Paradox ACEC would provide protection to the relevant and important values as described under **Nature and Type of Effects**. Less than half of the potential ACEC would be managed as either ROW exclusion or avoidance. Where permitted, the relevant and important values could be impaired by surface disturbances associated with land use authorizations as described under **Nature and Type of Effects**.

Overlap of most of the potential East Paradox ACEC with the Paradox Valley ERMA could increase recreation impacts on special status plants within the potential ACEC as described under **Nature and Type of Effects**.

Impacts of livestock grazing, locatable mineral development, and motorized and mechanized travel within the potential East Paradox ACEC would be the same as under Alternative A.

Alternative D

The Biological Soil Crust ACEC would be designated; the potential East Paradox ACEC would not be designated. Within the Biological Soil Crust ACEC, surface uses would be heavily restricted as summarized in **Table 4-69**. Additionally, all forms of travel, including equestrian and foot travel, would be limited to designated routes, providing the most protection to the biological soil crust of any of the alternatives. The ACEC would be open to livestock grazing. While livestock and recreational use of the area has impacted biological soil crust, the level of impact and season of use has allowed for moderate annual recovery. These activities have the potential to impair the biological soil crust if use deviates from current levels or season of use changes.

Of the 7,360 acres comprising the potential East Paradox ACEC, 1,800 acres are within the Biological Soil Crust ACEC and would receive the same protections. Outside of the overlap, management prescriptions from other resources would help protect the special status plant and fish species and biological soils within the potential ACEC.

Approximately half of the potential East Paradox ACEC would be subject to an NSO stipulation for fluid minerals, protecting the relevant and important values from associated impacts as described under **Nature and Type of Effects**. The remaining portion of the ACEC would be protected by CSU stipulations for fluid minerals and SSR restrictions for other surface-disturbing activities, though they would not be specifically targeted at all ACEC values. Because of these stipulations, potential impacts from surface-disturbing activities would be reduced compared with Alternative A.

Managing 99 percent of the potential East Paradox ACEC according to VRM Class II objectives could reduce surface-disturbing activities such as mineral material development, ROW location, and recreation facilities that would not be able to meet the visual resource objectives. Where these types of activities are able to be mitigated in order to meet VRM objectives, it is likely that the associated mitigation, such as surface reclamation, revegetation techniques, and minimizing cuts and fills, would also minimize impacts on the special status plant and fish species and potential biological soils over the long-term.

Impacts of livestock grazing, locatable mineral development, and motorized and mechanized would be the same as under Alternative A.

Additionally, almost all of the potential East Paradox ACEC would overlap with the Paradox Valley ERMA, which could increase impacts from recreation compared with Alternative A. Impacts from recreation are described under ***Nature and Type of Effects***.

La Sal Creek ACEC

The potential for impacts on the relevant and important values for the ACEC proposed for designation under each alternative is summarized in **Table 4-70** (Summary of Protections for Designated La Sal Creek ACEC).

Table 4-70
Summary of Protections for Designated La Sal Creek ACEC

Stipulation, Restriction, or Protection	A	B	C	D
Acres Designated as an ACEC:	0	10,490	0	0
NL	Not Designated	4,210	Not Designated	Not Designated
NSO ¹		6,280		
CSU ¹		6,900		
TL ¹		10,490		
Closed to mineral materials disposal		10,490		
Within coal potential area				
Closed to coal leasing				
Within locatable mineral potential area		10,490		
Withdrawn from locatable mineral entry				
Recommend for withdrawal from locatable mineral entry		10,490		
NGD ¹		10,490		
SSR ¹		10,380		
VRM Class I		3,430		
VRM Class II		6,660		
VRM Class III		400		
VRM Class IV				
Closed to livestock grazing		6,690		
ROW avoidance				
ROW exclusion		10,490		
SRMA		3,420		
ERMA				
Closed to motorized travel				
Closed to motorized and mechanized travel	3,460			

Source: BLM 2012a

¹ Total acreage for stipulations may be greater than the total acreage of an ACEC because stipulations could overlap. If a stipulation were excepted, modified, or waived by the BLM Authorized Officer, underlying stipulations could still be in effect.

Hatching indicates zero acres or not applicable under this alternative.

Alternative A

The La Sal Creek ACEC would not be designated. One-third of the potential ACEC is entirely within the Dolores River Canyon WSA. Relevant and important values overlapping the WSA would continue to receive the same protective management described under **Effects Common to All Alternatives**. A TL stipulation for fluid minerals would also apply on part of the area to protect peregrine falcon nests and crucial big game (desert bighorn sheep) winter habitat. Other surface-disturbing activities would not generally be restricted resulting in the potential for impacts described under **Nature and Type of Effects**.

The potential ACEC is available for domestic goat and sheep grazing which increases the risk of disease transmission from domestic goats and sheep to desert bighorn sheep, one of the relevant and important values.

Portions of the Dolores River, La Sal Creek, and Spring Creek have been determined eligible for inclusion in the NWSRS and flow through the potential ACEC. Management of the segment to protect the free-flowing condition, tentative classification, and ORVs (including fish, ecologic, and vegetation) would provide protection to the special status plants and fish and unique vegetation communities within the potential ACEC where they overlap the WSR study corridors.

Alternative B

The La Sal Creek ACEC would be designated. This ACEC would offer management protections for the unique vegetation communities and BLM sensitive plant and wildlife species. One-third of the ACEC is entirely within the Dolores River Canyon WSA. Relevant and important values overlapping the WSA would continue to receive the same protective management described under **Effects Common to All Alternatives**.

Management prescriptions summarized in **Table 4-70** would provide more management protections than Alternative A: 11 percent of the ACEC would be closed to fluid mineral leasing, and the remainder would have an NSO stipulation, there would be an NGD restriction and ROW exclusion over the entire area. Impacts would be as described under **Nature and Type of Effects**. Also, about two-thirds the ACEC would be closed to all livestock grazing, and the remainder would be closed to domestic sheep and goats, which would help protect the unique vegetation communities.

Alternative C

The La Sal Creek ACEC would not be designated. One-third of the potential ACEC is entirely within the Dolores River Canyon WSA. Relevant and important values overlapping the WSA would continue to receive the same protective management described under **Effects Common to All Alternatives**. Outside of the WSA, a portion of the potential ACEC would overlap the La Sal Ecological Emphasis Area which would provide some incidental protection to the special status species identified as relevant and important values as described under **Nature and Type of Effects**. Surface use restrictions, including CSU stipulations for fluid minerals, SSR restrictions for other surface-disturbing activities would offer some protection to the relevant and important values.

The potential ACEC is within the area of locatable mineral development potential, but would not be recommended for withdrawal from locatable mineral entry. As such, the impacts described under **Nature and Type of Effects** would be experienced if locatable mineral development were to occur. Just over half of the potential ACEC outside of the Dolores River Canyon WSA would be managed as ROW avoidance. Land use authorizations, if not properly mitigated, have the potential to impact the relevant and important values as described under **Nature and Type of Effects**.

Alternative D

The La Sal Creek ACEC would not be designated. Of the 10,490 acres comprising the La Sal Creek ACEC, 3,290 acres are within the Dolores River Slickrock Canyon ACEC and would receive the same protections summarized in **Table 4-68**. Of the remaining 7,200 acres not proposed for designation under this alternative, 120 acres are within the Dolores River Canyon WSA and would continue to receive the same protective management described under **Effects Common to All Alternatives**.

Outside of the overlap, there would be a CSU stipulation, SSR restriction and ROW avoidance over 95 percent of the potential ACEC. Impacts would be as described under **Nature and Type of Effects**.

The area would overlap the La Sal Ecological Emphasis Area which would be managed to preserve the continuity of habitats, vegetation communities, and native wildlife within, which would also provide protection to the special status species identified as relevant and important values. Surface use restrictions associated with the ecological emphasis area would apply throughout most of the potential ACEC providing some protection to the relevant and important values from surface-disturbing activities as described under **Nature and Type of Effects**.

The potential ACEC is within the area of locatable mineral development potential and would not be recommended for withdrawal from locatable mineral entry. If locatable mineral development were to occur, impacts could impair the relevant and important plant associations, rare plants, and special status fish species as described under **Nature and Type of Effects**

Under Alternative D cattle allotments could not be converted to sheep allotments in high probability for interaction areas unless it was determined that sheep grazing could be accomplished below high probability levels. Domestic goat grazing would be excluded on 2,400 acres of the potential La Sal Creek ACEC. This would help protect desert bighorn sheep, one of the relevant and important values, from disease transmission.

Portions of the Dolores River and La Sal Creek determined suitable for inclusion in the NWSRS also flow through the potential ACEC. Management of the segments to protect the free-flowing condition, tentative classification, and ORVs (including scenic, fish, wildlife, ecologic, and vegetation) would provide protection to the special status fish species and rare plants within the potential ACEC where they overlap the WSR study corridor.

Lower Uncompahgre Plateau ACEC

The potential for impacts on the relevant and important values for the ACEC proposed for designation under each alternative is summarized in **Table 4-71** (Summary of Protections for Designated Lower Uncompahgre Plateau ACEC).

Table 4-71
Summary of Protections for Designated Lower Uncompahgre Plateau ACEC

Stipulation, Restriction, or Protection	A	B	C	D
Acres Designated as an ACEC:	0	31,810	0	0
NL	Not Designated	4,480	Not Designated	Not Designated
NSO ¹		27,330		
CSU ¹		30,620		
TL ¹		31,810		
Closed to mineral materials disposal		31,810		
Within coal potential area		22,660		
Closed to coal leasing		9,050		
Within locatable mineral potential area				
Withdrawn from locatable mineral entry				
Recommend for withdrawal from locatable mineral entry		31,810		
NGD ¹		31,810		
SSR ¹		31,030		
VRM Class I		1,300		
VRM Class II		2,140		
VRM Class III		28,370		
VRM Class IV				
Closed to livestock grazing		390		
ROW avoidance		3,080		
ROW exclusion		27,570		
SRMA		16,060		
ERMA				
Closed to motorized travel				
Closed to motorized and mechanized travel	2,410			

Source: BLM 2012a

¹ Total acreage for stipulations may be greater than the total acreage of an ACEC because stipulations could overlap. If a stipulation were excepted, modified, or waived by the BLM Authorized Officer, underlying stipulations could still be in effect.

Hatching indicates zero acres or not applicable under this alternative.

Alternative A

The Lower Uncompahgre Plateau ACEC is not designated. A portion of the potential Lower Uncompahgre Plateau ACEC overlaps the Camel Back WSA and would continue to receive the same protective management described under **Effects Common to All Alternatives**. Outside of the WSA, application of TL stipulations would provide some incidental protections across the ACEC, but they would not be specifically targeted to protect the cultural values. Though standard protections would apply to cultural resources uncovered during permitted activities, the lack of restrictions on surface-disturbing activities could result in damage to rock art and other cultural resources as described above under **Nature and Type of Effects** if these activities were to occur in the area.

Managing most of the potential ACEC as VRM Class III, in addition to the lack of restrictions on surface-disturbing activities, could lead to impacts on the sacred or historic setting of the cultural resources within the potential ACEC. Impacts are described above under **Nature and Type of Effects**.

A portion of Roubideau Creek has been determined eligible for inclusion in the NWSRS and flows through the potential ACEC. Management of the segment to protect the free-flowing condition, tentative classification, and ORVs (including cultural) would provide protection to the cultural resources within the potential ACEC where they overlap the WSR study corridors.

Alternative B

The Lower Uncompahgre Plateau ACEC would be designated. A portion of the Lower Uncompahgre Plateau ACEC overlaps the Camel Back WSA and would continue to receive the same protective management described under **Effects Common to All Alternatives**. Approximately 1,040 acres of the ACEC overlap the Roubideau-Potter-Monitor ACEC, also proposed for designation under this alternative. Where overlap occurs, the stricter of the management prescriptions would be applied.

Outside of the WSA, the relevant and important values would be protected from surface-disturbing activities associated with fluid mineral leasing by an NSO stipulation. An NGD restriction would also apply throughout the ACEC for other surface-disturbing activities, and the area would be predominately managed as a ROW exclusion area, thereby protecting the cultural resource values from most surface-disturbing activities.

Of the 22,660 acres within the area of coal potential, only 9,050 acres (40 percent) would be closed to coal leasing. In the remainder of the area open to coal leasing, the relevant and important values could be impaired where coal development occurs. The greatest threat would be from surface-mining, but localized effects from underground mining could be experienced where surface vents are needed.

Alternative C

The Lower Uncompahgre Plateau ACEC would not be designated. A portion of the potential Lower Uncompahgre Plateau ACEC overlaps the Camel Back WSA and would continue to receive the same protective management described under **Effects Common to All Alternatives**. Surface use restrictions would be applied minimally in the area outside of the WSA. Where the potential ACEC would not be subject to surface use restrictions, cultural resources would be at risk of accidental damage.

Management of the entire Lower Uncompahgre Plateau ACEC as an area of archaeological significance, including emphasis on alternative mitigation for development, would increase protection for cultural resources over Alternative A in the manner described under **Nature and Type of Effects**.

Alternative D

The Lower Uncompahgre Plateau ACEC would not be designated. Of the 31,870 acres comprising the potential Lower Uncompahgre Plateau ACEC, 1,040 acres are within the Roubideau Corridors ACEC and would receive the same protections summarized in

Table 4-73. Of the remaining 30,770 acres not proposed for designation under this alternative, 260 acres are within the Camel Back WSA and would continue to receive the same protective management described under **Effects Common to All Alternatives**. Outside of the overlap, the management prescriptions identified in **Table 2-2** would help protect the cultural values within the potential ACEC.

Managing the Lower Uncompahgre Plateau as an area of archaeological significance would specifically target protection of cultural values in the potential Lower Uncompahgre Plateau ACEC. Surface use restrictions, including a CSU and SSR restriction, would be in place to provide direct protection to the archaeological resources in the area. Other surface use restrictions would apply on portions of the potential ACEC but would not be targeted at protecting the relevant and important values. Where surface-disturbing activities occurred, cultural resources could be damaged as described under **Nature and Type of Effects**.

A portion of the potential ACEC would overlap the Dry Creek Basin Lands with Wilderness Characteristics unit, which would be managed to maintain those characteristics. Managing to maintain the size, naturalness, and opportunities for primitive or unconfined recreation would provide incidental protection to the portion of the potential ACEC where there is overlap by precluding activities that would impair the wilderness characteristics.

Paradox Rock Art ACEC

The potential for impacts on the relevant and important values for the ACEC proposed for designation under each alternative is summarized in **Table 4-72** (Summary of Protections for Designated Paradox Rock Art ACEC).

Alternative A

The Paradox Rock Art ACEC is not designated. The ACEC would remain open to rock climbing resulting in the potential for impacts described above under **Nature and Type of Effects**.

Application of CSU and TL stipulations would provide some incidental protections across most of the areas, but they would not be specifically targeted to protect the cultural values. Though standard protections would apply to cultural resources uncovered during permitted activities, the lack of restrictions on surface-disturbing activities could result in damage to rock art and other cultural resources as described under **Nature and Type of Effects** if these activities were to occur in the areas. Locatable mineral exploration and development within the ACEC could also impact these resources as described under **Nature and Type of Effects**.

Alternative B

The Paradox Rock Art ACEC would be designated. Stringent surface use restrictions would be applied throughout the entire ACEC, protecting cultural resource values as described under **Nature and Type of Effects**. In addition, the ACEC is within the area of locatable mineral potential and, unlike Alternative A, would be proposed for withdrawal from locatable mineral entry. If withdrawn, cultural resources would be protected from damage associated with locatable mineral development.

Table 4-72
Summary of Protections for Designated Paradox Rock Art ACEC

Stipulation, Restriction, or Protection	A	B	C	D	
Acres Designated as an ACEC:	0	1,080	0	1,080	
NL	Not Designated		Not Designated		
NSO ¹		1,080		1,080	
CSU ¹		550		1,080	
TL ¹		1,080		1,080	
Closed to mineral materials disposal		1,080		1,080	
Within coal potential area					
Closed to coal leasing					
Within locatable mineral potential area		1,080		1,080	
Withdrawn from locatable mineral entry					
Recommend for withdrawal from locatable mineral entry		1,080			
NGD ¹		1,080			
SSR ¹		550		1,080	
VRM Class I					
VRM Class II		1,080		1,080	
VRM Class III					
VRM Class IV					
Closed to livestock grazing					
ROW avoidance				20	1,080
ROW exclusion				1,080	
SRMA				1,080	
ERMA			1,080		
Closed to motorized travel					
Closed to motorized and mechanized travel					

Source: BLM 2012a

¹ Total acreage for stipulations may be greater than the total acreage of an ACEC because stipulations could overlap. If a stipulation were excepted, modified, or waived by the BLM Authorized Officer, underlying stipulations could still be in effect.

Hatching indicates zero acres or not applicable under this alternative.

Alternative C

The Paradox Rock Art ACEC would not be designated. The potential ACEC would be managed as a National Register District to focus protection on the cultural ACEC values. Because the entire area would be subject to an NSO stipulation for the protection of this area, the cultural resources there would be protected from damage during fluid mineral development as described above under **Nature and Type of Effects**. If it is determined that the rock art values need additional protection, individual sites could be nominated for National or State Registers of Historic Places. If sites are listed on a National or State Register, they would experience additional protection over Alternative A, as described under **Nature and Type of Effects**.

Except for NSO stipulation, few surface use restrictions would be in place and cultural resources without surface use restrictions could be damaged. Most of the potential ACEC (84 percent) would be closed to motorized and mechanized travel. This would protect the archaeological sites from damage caused by motorized and mechanized travel.

Alternative D

The Paradox Rock Art ACEC would be designated. Surface uses would be heavily restricted in the area as summarized in **Table 4-72**, providing protection for the cultural resources within this ACEC. The ACEC is within the area of locatable mineral potential but would not be recommended for withdrawal from locatable mineral entry. If locatable mineral development occurred, there could be incidental damage to cultural resources; however, a mine plan would be required prior to commencing operations and would identify mitigation measures.

Roubideau Corridors ACEC and Roubideau-Potter-Monitor ACEC

The potential for impacts on the relevant and important values for the ACEC proposed for designation under each alternative is summarized in **Table 4-73** (Summary of Protections for Designated Roubideau-Potter-Monitor ACEC (Alternative B) and Roubideau Corridors ACEC (Alternative D)).

Table 4-73
Summary of Protections for Designated Roubideau-Potter-Monitor ACEC (Alternative B) and Roubideau Corridors ACEC (Alternative D)

Stipulation, Restriction, or Protection	A	B	C	D
Acres Designated as an ACEC:	0	20,430	0	8,720
NL		20,430		4,480
NSO ¹				4,240
CSU ¹				4,240
TL ¹		20,430		8,720
Closed to mineral materials disposal		20,430		8,720
Within coal potential area		5,930		210
Closed to coal leasing		5,930		190
Within locatable mineral potential area				
Withdrawn from locatable mineral entry				
Recommend for withdrawal from locatable mineral entry		20,430		8,720
NGD ¹		20,430		4,480
SSR ¹		20,430		8,720
VRM Class I		14,930		5,220
VRM Class II		5,490		2,860
VRM Class III		10		640
VRM Class IV				
Closed to livestock grazing		1,100		
ROW avoidance				930
ROW exclusion		20,430		7,790
SRMA		20,430		8,440
ERMA				
Closed to motorized travel				
Closed to motorized and mechanized travel		18,090		7,850

Source: BLM 2012a

¹ Total acreage for stipulations may be greater than the total acreage of an ACEC because stipulations could overlap. If a stipulation were excepted, modified, or waived by the BLM Authorized Officer, underlying stipulations could still be in effect.

Hatching indicates zero acres or not applicable under this alternative.

Alternative A

Neither the Roubideau Corridors ACEC nor the Roubideau-Potter-Monitor ACEC is designated. Just over half of each potential ACEC is within the Camel Back WSA. Relevant and important values overlapping the WSA would continue to receive the same protective management described under **Effects Common to All Alternatives**. Outside of the WSA, surface use restrictions would be applied minimally in the areas and, as a result, the relevant and important values could be degraded as described above under **Nature and Type of Effects** where surface-disturbing activities occur. These impacts would be mitigated to some extent by closure to mineral materials disposal in riparian zones and application of TL stipulations to protect big game (desert bighorn) crucial winter habitat and lambing areas.

The potential Roubideau Corridors and Roubideau-Potter-Monitor ACECs are available for domestic goat and sheep grazing and some sheep grazing currently occurs in the area. This increases the risk of disease transmission from domestic goats and sheep to desert bighorn sheep, one of the relevant and important values.

Portions of Monitor, Potter, and Roubideau Creeks have been determined eligible for inclusion in the NWSRS and flow through the potential ACECs. Management of the segments to protect their free-flowing condition, tentative classification, and ORVs (including wildlife, vegetation, and cultural) would provide protection to the special status plants and fish, riparian vegetation, and cultural resources within the potential ACECs where they overlap the WSR study corridors. Maintenance of instream flow rights to ensure sufficient instream flow would help protect riparian vegetation and special status fish by ensuring sufficient flows to maintain their habitat.

Alternative B

The Roubideau-Potter-Monitor ACEC would be designated. Just over half of the ACEC is within the Camel Back WSA. Relevant and important values overlapping the WSA would continue to receive the same protective management described under **Effects Common to All Alternatives**. Outside of the WSA, stringent surface use restrictions would be applied throughout the entire ACEC, protecting cultural resource values as described under **Nature and Type of Effects**.

The potential Roubideau Corridors ACEC would not be designated. Of the 8,720 acres comprising the potential Roubideau Corridors ACEC, 8,050 acres are within the Roubideau-Potter-Monitor ACEC proposed for designation under this alternative and would receive the same protections summarized in **Table 4-73**. Outside of the overlap, the management prescriptions identified in **Table 2-2** would help protect the riparian vegetation, special status species, and historical relevant and important values within the potential ACEC.

The portion of the potential Roubideau Corridors ACEC that lies outside the Roubideau-Potter-Monitor ACEC would be protected by application of NSO stipulations, management as ROW exclusion, and closure to mineral materials disposal. Nearly all of the undesignated portion of the potential ACEC would also be subject to NGD restrictions. Any areas not subject to NGD restrictions would be subject to SSR restrictions. These management prescriptions would greatly reduce impacts of surface-disturbing activities on the cultural, special status species, riparian, and hydrologic values within the potential ACEC.

Domestic goat and sheep grazing and trailing would be prohibited within nine miles of occupied desert bighorn sheep habitat, providing increased protection to the desert bighorn sheep value in the potential ACEC compared with Alternative A.

Alternative C

Neither the Roubideau Corridors ACEC nor the Roubideau-Potter-Monitor ACEC would be designated. The management prescriptions identified in **Table 2-2** would help protect the cultural, riparian, hydrologic, and special status species ACEC values within these areas. Just over half of each potential ACEC is within the Camel Back WSA. Relevant and important values overlapping the WSA would continue to receive the same protective management described under **Effects Common to All Alternatives**. Outside of the WSA, surface use restrictions would be similar to Alternative A, though more acres would be protected with CSU and TL stipulations for fluid minerals, SSR restrictions for other surface-disturbing activities, and ROW avoidance areas.

Nearly all of the potential Roubideau Corridors ACEC would overlap the Monitor-Potter-Roubideau Ecological Emphasis Area, as would almost 40 percent of the potential Roubideau-Potter-Monitor ACEC, which would be managed to preserve the continuity of habitats, vegetation communities, and native wildlife within, which would also provide some protection to the riparian vegetation and special status species identified as relevant and important values. The overlapping protections can be attributed to management of the Monitor-Potter-Roubideau Ecological Emphasis Area and would also provide some incidental protection to the historical resource value.

Maintenance of instream flow rights to ensure sufficient instream flow would help protect riparian vegetation and special status fish by ensuring sufficient flows to maintain their habitat in both potential ACECs.

Portions of the potential Roubideau Corridors and Roubideau-Potter-Monitor ACECs are within the coal potential area under Alternative C (210 acres and 6,000 acres, respectively). While about half of each area would be closed to coal leasing, coal exploration and development could impact the remainder of the areas with coal potential as described under **Nature and Type of Effects**.

All of both potential ACECs would be closed to domestic goat grazing and domestic sheep grazing would be managed to minimize contact with desert bighorn sheep. This would help protect desert bighorn sheep, one of the relevant and important values, from disease transmission.

The potential Roubideau Corridors and Roubideau-Potter-Monitor ACECs would overlap the Roubideau ERMA. Increased recreation in the area without restrictions on surface-disturbing activities could lead to impacts on the relevant and important values as described under **Nature and Type of Effects**.

Alternative D

The Roubideau Corridors ACEC would be designated. Just over half of the ACEC is within the Camel Back WSA; relevant and important values overlapping the WSA would continue to

receive the same protective management described under **Effects Common to All Alternatives**. The entire ACEC would overlap the Monitor-Potter-Roubideau Ecological Emphasis Area which would be managed to preserve the continuity of habitats, vegetation communities, and native wildlife within, which would also provide some protection to the riparian vegetation and special status species identified as relevant and important values. The management of these areas would be complementary and provide reinforced protection to the relevant and important values.

The potential Roubideau-Potter-Monitor ACEC would not be designated. Of the 20,470 acres comprising the potential ACEC, 8,090 acres are within the Roubideau Corridors ACEC and would receive the same protections summarized in **Table 4-73**. Of the remaining 12,380 acres not proposed for designation under this alternative, 5,940 acres are within the Camel Back WSA and would continue to receive the same protective management described under **Effects Common to All Alternatives**. Outside of the WSA overlap, the management prescriptions identified in **Table 2-2** would help protect the cultural, riparian, hydrologic, and special status species values within the ACEC.

Under Alternative D cattle allotments could not be converted to sheep allotments in high probability for interaction areas unless it was determined that sheep grazing could be accomplished below high probability levels. Domestic goat grazing would be excluded on 8,120 acres of the Roubideau Corridors ACEC (93 percent) and 19,360 acres of the potential Roubideau-Potter-Monitor ACEC (95 percent). This would help protect desert bighorn sheep, one of the relevant and important values, from disease transmission.

The potential Roubideau-Potter-Monitor ACEC would overlap the Monitor-Potter-Roubideau Ecological Emphasis Area which would be managed to preserve the continuity of habitats, vegetation communities, and native wildlife within, which would also provide some protection to the special status species identified as relevant and important values, though not as much as ACEC designation. Surface use restrictions associated with the ecological emphasis area would apply throughout most of the potential ACEC providing some protection to the relevant and important values from surface-disturbing activities as described under **Nature and Type of Effects**.

A portion of the potential Roubideau-Potter-Monitor ACEC would overlap the Camel Back WSA Adjacent lands with wilderness characteristics unit, which would be managed to maintain those characteristics. Managing to maintain the size, naturalness, and opportunities for primitive or unconfined recreation would provide incidental protection to the portion of the potential ACEC where there is overlap by precluding activities that would impair the wilderness characteristics.

Because of the surface use restrictions in place for the Camel Back WSA Adjacent and Monitor-Potter-Roubideau Ecological Emphasis Area, as well as restrictions to preserve the recreational activities and associated settings within the Roubideau SRMA, which also overlaps the potential Roubideau-Potter-Monitor ACEC, the relevant and important values would be protected.

Maintenance of instream flow rights to ensure sufficient instream flow would help protect riparian vegetation and special status fish by ensuring sufficient flows to maintain their habitat.

San Miguel Gunnison Sage-grouse ACEC

The potential for impacts on the relevant and important values for the ACEC proposed for designation under each alternative is summarized in **Table 4-74** (Summary of Protections for Designated San Miguel Gunnison Sage-grouse ACEC).

Table 4-74
Summary of Protections for Designated San Miguel Gunnison Sage-grouse ACEC

Stipulation, Restriction, or Protection	A	B	C	D
Acres Designated as an ACEC:	0	470	0	0
NL	Not Designated	160	Not Designated	Not Designated
NSO ¹		310		
CSU ¹				
TL ¹		470		
Closed to mineral materials disposal		470		
Within coal potential area		120		
Closed to coal leasing		110		
Within locatable mineral potential area		470		
Withdrawn from locatable mineral entry				
Recommend for withdrawal from locatable mineral entry		470		
NGD ¹		470		
SSR ¹		260		
VRM Class I				
VRM Class II		160		
VRM Class III		310		
VRM Class IV				
Closed to livestock grazing		230		
ROW avoidance				
ROW exclusion		470		
SRMA		160		
ERMA				
Closed to motorized travel				
Closed to motorized and mechanized travel	160			

Source: BLM 2012a

¹ Total acreage for stipulations may be greater than the total acreage of an ACEC because stipulations could overlap. If a stipulation were excepted, modified, or waived by the BLM Authorized Officer, underlying stipulations could still be in effect.

Hatching indicates zero acres or not applicable under this alternative.

Alternative A

The San Miguel Gunnison Sage-grouse ACEC is not designated. Of the 470 acres comprising the San Miguel Gunnison Sage-grouse ACEC, 160 acres are within the San Miguel River ACEC and would receive the same protections summarized in **Table 4-66**. Outside of the overlap, surface use restrictions would be applied minimally in the area and, as a result, the relevant and important values could be degraded as described above under **Nature and Type of Effects** where surface-disturbing activities occur. The potential ACEC is open to livestock grazing and could experience the impacts described under **Nature and Type of Effects**.

Alternative B

The San Miguel Gunnison Sage-grouse ACEC would be designated. Of the 470 acres comprising the San Miguel Gunnison Sage-grouse ACEC, 160 acres are within the San Miguel River Expansion ACEC, also proposed for designation under this alternative and would receive the same protections summarized in **Table 4-66**. Where there is overlap, the stricter management would apply, including closing the area of overlap to fluid mineral leasing and motorized and mechanized travel. Outside of the area of overlap, stringent surface use restrictions would be in place that would protect the sage-grouse and their habitats, as described under **Nature and Type of Effects**. About half of the ACEC would be closed to livestock grazing, protecting the species' habitat from damage by livestock, preventing impacts described under **Nature and Type of Effects**. These impacts could be experienced on the remaining 240 acres.

Alternative C

The San Miguel Gunnison Sage-grouse ACEC would not be designated. Of the 470 acres comprising the potential ACEC, 160 acres are within the San Miguel River ACEC and would receive the same protections summarized in **Table 4-66**. Outside of the overlap, the management prescriptions identified in **Table 2-2** would help protect the Gunnison sage-grouse individuals and habitat within the potential ACEC.

Surface use restrictions would be applied on approximately half of the area that overlaps the San Miguel Ecological Emphasis Area. The ecological emphasis area would be managed to preserve the continuity of habitats, vegetation communities, and native wildlife within, which would provide some protection to the riparian vegetation and special status species identified as relevant and important values. In areas without surface use restrictions, Gunnison sage-grouse individuals and habitat would be subject to impacts associated with surface-disturbing activities described under **Nature and Type of Effects**. Potential impacts from livestock grazing would be the same as under Alternative A.

Alternative D

The San Miguel Gunnison Sage-grouse ACEC would not be designated. Of the 470 acres comprising the potential ACEC, 160 acres (34 percent) are within the San Miguel River ACEC and would receive the same protections summarized in **Table 4-66**. It should be noted that the San Miguel River ACEC would not manage for Gunnison sage-grouse as a relevant and important value, so all protections provided by the San Miguel River ACEC would be incidental and not directed towards Gunnison sage-grouse. Outside of the overlap, the management prescriptions identified in **Table 2-2** would help protect the Gunnison sage-grouse populations and habitat within the potential ACEC. Impacts would be similar to those described under Alternative C except that the entire potential ACEC would be protected by a TL for fluid mineral leasing and other surface-disturbing activities aimed directly at protecting Gunnison sage-grouse winter and breeding habitats which would provide incidental protection to the relevant and important value. Approximately 70 acres of the potential ACEC would be closed to livestock grazing, preventing impacts described under **Nature and Type of Effects**. The potential for impacts would persist in the remaining area open for livestock grazing.

Sims-Cerro Gunnison Sage-grouse ACEC

The potential for impacts on the relevant and important values for the ACEC proposed for designation under each alternative is summarized in **Table 4-75** (Summary of Protections for Designated Sims-Cerro Gunnison Sage-grouse ACEC).

Table 4-75
Summary of Protections for Designated Sims-Cerro Gunnison Sage-grouse ACEC

Stipulation, Restriction, or Protection	A	B	C	D
Acres Designated as an ACEC:	0	25,620	0	0
NL	Not Designated	3,120	Not Designated	Not Designated
NSO ¹		22,500		
CSU ¹		20,010		
TL ¹		25,620		
Closed to mineral materials disposal		25,620		
Within coal potential area		21,260		
Closed to coal leasing		2,340		
Within locatable mineral potential area				
Withdrawn from locatable mineral entry				
Recommend for withdrawal from locatable mineral entry		25,620		
NGD ¹		25,620		
SSR ¹		24,280		
VRM Class I				
VRM Class II		910		
VRM Class III		24,710		
VRM Class IV				
Closed to livestock grazing		1,630		
ROW avoidance		1,660		
ROW exclusion		23,490		
SRMA		3,120		
ERMA				
Closed to motorized travel	1,770			
Closed to motorized and mechanized travel				

Source: BLM 2012a

¹ Total acreage for stipulations may be greater than the total acreage of an ACEC because stipulations could overlap. If a stipulation were excepted, modified, or waived by the BLM Authorized Officer, underlying stipulations could still be in effect.

Hatching indicates zero acres or not applicable under this alternative.

Alternative A

This Sims-Cerro Gunnison Sage-grouse ACEC is not designated. Surface use restrictions would be applied minimally in the area and, as a result, the relevant and important values could be impaired as described above under **Nature and Type of Effects** where surface-disturbing activities occur. Application of TL stipulations would mitigate impacts of surface-disturbing activities associated with fluid mineral development during the time specified by the stipulation, but these stipulations would not be specifically targeted to protect Gunnison sage-grouse. All of the potential ACEC would remain open to livestock grazing, potential impacts of which are described under **Nature and Type of Effects**.

Alternative B

This Sims-Cerro Gunnison Sage-grouse ACEC would be designated. Stringent surface use restrictions would be applied throughout the entire ACEC, providing protection to sage-grouse and their habitat from most surface-disturbing activities. Of the 21,260 acres within the area of coal potential, only 2,340 acres (11 percent) would be closed to coal leasing. In the remainder of the area open to coal leasing, the relevant and important values could be impaired where coal development occurs. The greatest threat would be from surface-mining, but localized effects from underground mining could be experienced where surface vents are needed. Potential impacts from livestock grazing would be similar to Alternative A, though 1,630 acres (6 percent) would be closed to grazing.

Alternative C

This Sims-Cerro Gunnison Sage-grouse ACEC would not be designated. The management prescriptions identified in **Table 2-2** would provide some protection for the Gunnison sage-grouse populations and habitat within the potential ACEC. While application of an NSO stipulation to a small portion of the Sims-Cerro Gunnison Sage-grouse ACEC (920 acres) would increase protection compared with Alternative A, other areas open to fluid mineral leasing could still be impacted as described under **Nature and Type of Effects**. Over 60 percent of the potential ACEC would have CSU or TL stipulations attached to fluid mineral leases.

Except for an SSR restriction on less than half of the potential ACEC and the stipulations for fluid minerals previously mentioned, few other surface use restrictions would be applied. Surface-disturbing activities have the potential to damage sage-grouse habitat and disrupt individuals in a manner described under **Nature and Type of Effects**.

While some acres would be closed to livestock grazing, grazing could impact sage-grouse throughout most of the potential ACECs as described under **Nature and Type of Effects**.

Overlap of a portion of the potential Sims-Cerro Gunnison Sage-grouse ACEC with the Spring Creek ERMA could increase impacts from recreation on sage-grouse compared with Alternative A. Impacts of recreation are described under **Nature and Type of Effects**.

Alternative D

This Sims-Cerro Gunnison Sage-grouse ACEC would not be designated. The management prescriptions identified in **Table 2-2** would help protect the Gunnison sage-grouse populations and habitat within the potential ACEC. Land use restrictions would be in place throughout most of the potential ACEC, including a TL stipulation for fluid minerals and other surface-disturbing activities aimed directly at protecting Gunnison sage-grouse winter and breeding habitats which would provide incidental protection to the relevant and important value. A small portion of the potential ACEC (six percent) would be closed to livestock grazing. Impacts would be similar to those described under Alternative B.

Tabeguache Pueblo and Tabeguache Caves ACEC

The potential for impacts on the relevant and important values for the ACEC proposed for designation under each alternative is summarized in **Table 4-76** (Summary of Protections for Designated Tabeguache Pueblo and Tabeguache Caves ACEC).

Table 4-76
Summary of Protections for Designated Tabeguache Pueblo and Tabeguache Caves
ACEC

Stipulation, Restriction, or Protection	A	B	C	D
Acres Designated as an ACEC:	0	26,300	0	0
NL	Not Designated	20,150	Not Designated	Not Designated
NSO ¹		6,150		
CSU ¹		6,150		
TL ¹		6,150		
Closed to mineral materials disposal		26,300		
Within coal potential area		15,930		
Closed to coal leasing		11,600		
Within locatable mineral potential area		26,300		
Withdrawn from locatable mineral entry		5,290		
Recommend for withdrawal from locatable mineral entry		21,010		
NGD ¹		26,300		
SSR ¹		26,300		
VRM Class I		5,290		
VRM Class II		20,000		
VRM Class III		1,010		
VRM Class IV		760		
Closed to livestock grazing		26,300		
ROW avoidance		26,300		
ROW exclusion		26,300		
SRMA		20,030		
ERMA				
Closed to motorized travel				
Closed to motorized and mechanized travel				

Source: BLM 2012a

¹ Total acreage for stipulations may be greater than the total acreage of an ACEC because stipulations could overlap. If a stipulation were excepted, modified, or waived by the BLM Authorized Officer, underlying stipulations could still be in effect.

Hatching indicates zero acres or not applicable under this alternative.

Alternative A

Of the 26,300 acres comprising the Tabeguache Pueblo and Tabeguache Caves ACEC, 5,290 acres are within the Tabeguache Area and would continue to receive the same protective management under all alternatives described under **Effects Common to All Alternatives**.

Outside of the Tabeguache Area, surface use restrictions are applied minimally, standard protections apply to cultural resources uncovered during permitted activities though development could cause surface disturbance that could damage or destroy rock art as described under **Nature and Type of Effects**. All of the of the Tabeguache Pueblo and Tabeguache Caves ACEC outside the Tabeguache Area are covered by an NSO stipulation (21,030 acres), and TL restrictions also overlap approximately 60 percent of the area (12,470 acres) Application of NSO and TL stipulations would provide some incidental protections across most of the areas, but they would not be specifically targeted to protect the potential ACEC

values. Because most of the ACECs would be available for mineral materials disposal and ROW location, the rock art could be degraded as described above under **Nature and Type of Effects** if these activities were to occur in the areas. Locatable mineral exploration and development within the ACEC could also impact these resources as described under **Nature and Type of Effects**.

A portion of Tabeguache Creek, which is within the Tabeguache Area, has been determined eligible for inclusion in the NWSRS and flows through the ACEC. Management of the segments to protect their free-flowing condition, tentative classification, and ORVs (including cultural) would provide protection to the cultural values within the potential ACEC where they overlap the WSR study corridors.

Alternative B

The Tabeguache Pueblo and Tabeguache Caves ACEC would be designated. Of the 26,300 acres comprising the Tabeguache Pueblo and Tabeguache Caves ACEC, 5,290 acres are within the Tabeguache Area and would continue to receive the same protective management under all alternatives described under **Effects Common to All Alternatives**. An additional 10,150 acres overlap the Lower Tabeguache/Campbell Creek lands with wilderness characteristics unit, which also provides strict protections such as closed to fluid mineral leasing, closed to coal leasing, management according to VRM Class II objectives, and closed to motorized and mechanized travel. Outside of these areas, stringent surface use restrictions would be applied throughout the ACEC providing protection to cultural resources from damage due to surface-disturbing activities. Of the 15,930 acres within the area of coal potential, 11,600 acres (73 percent) would be closed to coal leasing. In the remainder of the area open to coal leasing, the relevant and important values could be impaired where coal development occurs. The greatest threat would be from surface-mining, but localized effects from underground mining could be experienced where surface vents are needed.

Alternative C

The Tabeguache Pueblo and Tabeguache Caves ACEC would not be designated. Of the 26,300 acres comprising the potential ACEC, 5,290 acres are within the Tabeguache Area and would continue to receive the same protective management under all alternatives described under **Effects Common to All Alternatives**. Outside of the Tabeguache Area, surface use restrictions would be applied minimally. Where surface uses are not restricted, there is potential for surface-disturbing activities to damage the cultural resources as described under **Nature and Type of Effects**.

Alternative D

The Tabeguache Pueblo and Tabeguache Caves ACEC would not be designated. Of the 26,300 acres comprising the potential ACEC, 5,290 acres are within the Tabeguache Area and would continue to receive the same protective management under all alternatives described under **Effects Common to All Alternatives**. Outside of the Tabeguache Area, the management prescriptions identified in **Table 2-2** would help protect the cultural resources within the potential ACEC. An NSO stipulation for known eligible cultural resources, traditional cultural properties, sites/districts listed on the National Register of Historic Places, outstanding cultural resources to be nominated to the National Register of Historic Places, interpreted and/or public

use sites, and experimental-use sites would be in place to directly protect the cultural resources from surface disturbance associated with fluid mineral development. In addition, an SSR restriction throughout the whole potential ACEC would protect the area from other surface-disturbing activities.

The ACEC is within the area of locatable mineral development potential and, aside from the Tabeguache Area which is withdrawn from locatable mineral entry, the area could experience impacts as described under **Nature and Type of Effects** if locatable mineral development were to occur in the area.

West Paradox ACEC

The potential for impacts on the relevant and important values for the ACEC proposed for designation under each alternative is summarized in **Table 4-77** (Summary of Protections for Designated West Paradox ACEC).

Table 4-77
Summary of Protections for Designated West Paradox ACEC

Stipulation, Restriction, or Protection	A	B	C	D
Acres Designated as an ACEC:	0	5,190	0	0
NL	Not Designated	20	Not Designated	Not Designated
NSO ¹		5,170		
CSU ¹		4,260		
TL ¹				
Closed to mineral materials disposal		5,190		
Within coal potential area				
Closed to coal leasing				
Within locatable mineral potential area		5,190		
Withdrawn from locatable mineral entry				
Recommend for withdrawal from locatable mineral entry		5,190		
NGD ¹		5,190		
SSR ¹		4,250		
VRM Class I				
VRM Class II		270		
VRM Class III		4,920		
VRM Class IV				
Closed to livestock grazing		2,310		
ROW avoidance		80		
ROW exclusion		5,110		
SRMA		5,190		
ERMA				
Closed to motorized travel				
Closed to motorized and mechanized travel				

Source: BLM 2012a

¹ Total acreage for stipulations may be greater than the total acreage of an ACEC because stipulations could overlap. If a stipulation were excepted, modified, or waived by the BLM Authorized Officer, underlying stipulations could still be in effect.

Hatching indicates zero acres or not applicable under this alternative.

Alternative A

The West Paradox ACEC is not designated. While portions of the ACEC would continue to be protected from surface-disturbance related to fluid mineral development by application of NSO, CSU, and TL stipulations, these stipulations are not targeted at protecting the relevant and important ACEC values. If they are excepted, modified, or waived by the BLM Authorized Officer, impacts described under **Nature and Type of Effects** could be experienced if development occurs. Because all of the potential ACEC would be available for mineral materials disposal, locatable mineral entry, and ROW location, the relevant and important values could be impaired as described under **Nature and Type of Effects** if these activities were to occur in the area. Continued livestock grazing could damage vegetation communities and special status plants as described under **Nature and Type of Effects**.

Alternative B

The West Paradox ACEC would be designated. Stringent surface use restrictions would be applied throughout the ACEC, as summarized in **Table 4-77**, providing the most protection to cultural resources of any alternative from most surface-disturbing activities.

Alternative C

The West Paradox ACEC would not be designated. The management prescriptions identified in **Table 2-2** would provide some protection for the special status plant and bird species and vegetation communities within this potential ACEC. Impacts on ACEC values from fluid mineral development could increase compared with Alternative A due to a decrease in the number of acres subject to NSO and TL stipulations.

While more acres would be closed to mineral materials disposal and managed as ROW avoidance than under Alternative A, these activities could still impact ACEC values across the remainder of the area as described under **Nature and Type of Effects**. Application of SSR restrictions on portions of the potential ACEC would mitigate impacts of mineral materials disposal and ROW location, but these stipulations would not be targeted to protect all ACEC values.

A small portion of the potential ACEC would overlap with the Paradox Valley ERMA, which could increase recreation impacts over Alternative A as described under **Nature and Type of Effects**.

Impacts of livestock grazing would be the same as under Alternative A.

Alternative D

The West Paradox ACEC would not be designated. The management prescriptions identified in **Table 2-2** would help protect the special status plant and animal species and unique vegetation communities within the potential ACEC. While application of NSO stipulations would increase protection of ACEC values from impacts of fluid mineral development, this development would be allowed on the remainder of the area. Application of CSU and TL stipulations would mitigate impacts of this development.

Managing more of the area as closed to mineral materials disposal and ROW avoidance would reduce impacts of mineral materials disposal and ROW location compared with Alternative A, but these activities could still impact ACEC values on the remainder of the potential ACEC. Impacts of these activities are described under **Nature and Type of Effects**. Application of SSR restrictions across most of the potential ACEC would mitigate these impacts.

Management of most of the area as VRM Class II would also help mitigate impacts of surface-disturbing activities that would not satisfy the criteria of that VRM Class.

Impacts of livestock grazing, locatable mineral entry, and motorized and mechanized travel on the special status plants and unique vegetation within the potential ACEC would be the same as those under Alternative A.

The overlap of a portion of the potential ACEC with the Paradox Valley ERMA could increase impacts of recreation on ACEC values compared with Alternative A as described under **Nature and Type of Effects**.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on ACECs 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 ACECs are mineral exploration and development, unauthorized travel, forestry, livestock grazing, recreation, road construction, ROWs, water diversions, weed invasion and spread, weed control, prescribed and wildland fires, land planning efforts, vegetation treatments, habitat improvement projects, insects and disease, and drought.

Cumulative impacts on potential ACECs under the proposed plan and alternatives could result from non-BLM actions and decisions on lands next to ACECs. While protections exist within potential ACECs, population growth, development, and recreation throughout the planning area could, over time, encroach on these areas, causing potential degradation of the ACEC values, such as unauthorized off-route travel and trash dumping and increased noise, air pollution, and light pollution. Other impacts include displacement of species, habitat fragmentation, and changes to the visual landscape that could affect resources within ACECs. Impacts would be greater where recreation areas, such as SRMAs or ERMAs, or development were next to an ACEC. The BLM would adaptively manage to protect ACEC values and minimize impacts where applicable and feasible.

4.5.2 Wilderness and Wilderness Study Areas

Within the decision area there are two types of congressionally established wilderness resources: WSAs, including the Adobe Badlands, Camel Back, Dolores River Canyon, and Sewemup Mesa WSAs and the Needle Rock ISA; and the Tabeguache Area, a special congressional designation managed similarly to wilderness. This chapter discusses the impacts from proposed management actions of other resources and resource uses on these two wilderness categories. Existing conditions are described in **Section 3.3.2** (Wilderness and Wilderness Study Areas). The size of the Tabeguache Area and each of the five WSAs is the same under all alternatives and is described in **Table 2-2**. Since the authority to establish or

Table 4-78
Summary of Protections for ACECs or Portions of ACECs Not Proposed for Designation, Alternative A

Stipulation, Restriction, or Protection	Biological Soil Crust ¹	Coyote Wash ²	Dolores River Slickrock Canyon ²	Dolores Slickrock Canyon ³	East Paradox ⁴	Fairview South (BLM Expansion) ⁵	Fairview South (CNHP Expansion) ⁶	La Sal Creek ⁷	Lower Uncompahgre Plateau ⁸	Paradox Rock Art	Roubideau Corridors ⁹	Roubideau-Potter-Monitor ⁹	Salt Desert Shrub Ecosystem ¹⁰	San Miguel Gunnison Sage-grouse ¹¹	San Miguel River Expansion ¹²	Sims-Cerro Gunnison Sage-grouse	Tabeguache Pueblo and Tabeguache Caves	West Paradox
Acres Not Designated as an ACEC:	1,900	2,100	9,780	10,670	7,360	400	4,040	10,490	31,810	1,080	8,720	20,430	28,110	310	12,700	25,620	26,300	5,190
NL ¹³	0	✓	✓	9,820	0	0	0	3,420	1,300	0	4,480	10,670	3,950	0	0	0	5,310	0
NSO ¹³	150	2,090	9,710	9,800	1,130	0	0	3,430	0	0	0	0	0	0	0	0	21,030	590
CSU ¹³	1,120	0	0	720	3,960	0	0	2,760	0	450	0	0	0	0	7,420	0	9,690	2,400
TL ¹³	✓	330	3,300	3,370	✓	✓	3,760	2,880	31,420	✓	5,960	15,730	16,780	0	10,180	15,770	14,080	4,840
Closed to Mineral Materials Disposal	0	560	1,910	2,460	780	0	270	1,400	1,980	0	5,340	5,080	330	0	12,430	2,980	8,190	0
Within Coal Potential Area																		
Closed to Coal Leasing																		
Within Locatable Mineral Potential Area	✓	✓	✓	✓	✓			✓		✓				✓	✓		✓	✓
Withdrawn from Locatable Mineral Entry	0	0	0	0	0	170	1,430	0		0				0	0		5,290	0
Recommend for Withdrawal from Locatable Mineral Entry	0	0	0	0	0			0		0				0	0		0	0
NGD ¹³	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSR ¹³																		
VRM Class I	0	✓	9,780	9,830	0	0	0	3,410	1,300	0	4,480	10,670	3,940	0	0	0	5,290	0
VRM Class II	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VRM Class III	0	0	0	0	0	✓	✓	0	30,510	0	4,230	9,740	24,140	0	0	✓	0	0
VRM Class IV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VRM Undesignated	✓	0	0	840	✓	0	0	7,080	0	✓	10	20	50	✓	✓	0	21,010	✓
Closed to Livestock Grazing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 4-78
Summary of Protections for ACECs or Portions of ACECs Not Proposed for Designation, Alternative A

Stipulation, Restriction, or Protection	Biological Soil Crust ¹	Coyote Wash ²	Dolores River Slickrock Canyon ²	Dolores Slickrock Canyon ³	East Paradox ⁴	Fairview South (BLM Expansion) ⁵	Fairview South (CNHP Expansion) ⁶	La Sal Creek ⁷	Lower Uncompahgre Plateau ⁸	Paradox Rock Art	Roubideau Corridors ⁹	Roubideau-Potter-Monitor ⁹	Salt Desert Shrub Ecosystem ¹⁰	San Miguel Gunnison Sage-grouse ¹¹	San Miguel River Expansion ¹²	Sims-Cerro Gunnison Sage-grouse	Tabeguache Pueblo and Tabeguache Caves	West Paradox
Acres Not Designated as an ACEC:	1,900	2,100	9,780	10,670	7,360	400	4,040	10,490	31,810	1,080	8,720	20,430	28,110	310	12,700	25,620	26,300	5,190
ROW Avoidance																		
ROW Exclusion	0	✓	✓	9,820	0	0	0	3,420	1,300	0	4,480	10,670	3,940	0	0	0	5,410	0
SRMA	0	✓	9,710	9,800	0	0	0	3,420	0	0	0	0	0	0	12,240	0	0	0
ERMA																		
Closed to Motorized Travel	0	0	0	0	0	0	0	0	0	0	160	170	0	0	0	0	0	0
Closed to Motorized and Mechanized Travel	0	✓	✓	9,820	0	0	0	3,420	1,300	0	4,480	10,680	3,940	0	0	0	5,290	0

Source: BLM 2012a

¹ Biological Soil Crust ACEC is almost entirely within the East Paradox ACEC.² Coyote Wash and Dolores River Slickrock Canyon ACECs are entirely within the Dolores Slickrock Canyon ACEC.³ Includes all of the Coyote Wash and Dolores River Slickrock Canyon ACECs, and approximately one-third of the La Sal Creek ACEC.⁴ Includes almost all of the Biological Soil Crust ACEC.⁵ Fairview South (BLM Expansion) ACEC is entirely with the Fairview South (CNHP Expansion) ACEC. Fairview South (BLM Expansion) ACEC contains the entire Fairview South ACEC, which is proposed for designation under Alternative A.⁶ Includes Fairview South (BLM Expansion) ACEC and the Fairview South ACEC (proposed for designation under Alternative A).⁷ Approximately one-third of the La Sal Creek ACEC overlaps with the Dolores River Slickrock Canyon and Dolores Slickrock Canyon ACECs.⁸ A total of 1,040 acres of the Lower Uncompahgre Plateau ACEC overlaps with the Roubideau Corridors and Roubideau-Potter-Monitor ACECs.⁹ A portion of the Roubideau Corridors ACEC overlaps with the Roubideau-Potter-Monitor ACEC.¹⁰ Includes the Adobe Badlands ACEC, which is proposed for designation under Alternative A.¹¹ Approximately one-third of the San Miguel Gunnison Sage-grouse ACEC overlaps with the San Miguel River ACEC, which is designated under this Alternative. This portion also overlaps the San Miguel River Expansion ACEC.¹² Includes the San Miguel River ACEC, which is proposed for designation under Alternative A.¹³ Total acreage for stipulations may be greater than the total acreage of an ACEC because stipulations could overlap. If a stipulation were excepted, modified, or waived by the BLM Authorized Officer, underlying stipulations could still be in effect.

✓- Indicates stipulation, restriction, or protection covers the entire ACEC.

Hatching indicates not applicable under this alternative.

Table 4-79
Summary of Protections for ACECs or Portions of ACECs Not Proposed for Designation, Alternative C

Stipulation, Restriction, or Protection	Biological Soil Crust ¹	Coyote Wash ²	Dolores River Slickrock Canyon ²	Dolores Slickrock Canyon ³	East Paradox ⁴	Fairview South (BLM Expansion) ⁵	Fairview South (CNHP Expansion) ⁶	La Sal Creek ⁷	Lower Uncompahgre Plateau ⁸	Paradox Rock Art	Roubideau Corridors ⁹	Roubideau-Potter-Monitor ⁸	Salt Desert Shrub Ecosystem ¹⁰	San Miguel Gunnison Sage-grouse ¹¹	San Miguel River Expansion ¹²	Sims-Cerro Gunnison Sage-grouse	Tabeguache Pueblo and Tabeguache Caves	West Paradox
Acres Not Designated as an ACEC:	1,900	2,100	9,780	10,670	7,360	400	4,040	10,490	31,810	1,080	8,720	20,430	28,120	310	12,710	25,620	26,300	5,190
NL ¹³	0	✓	✓	9,820	0	0	0	3,420	1,300	0	4,480	10,670	3,940	0	0	0	5,290	0
NSO ¹³	0	0	0	0	840	0	70	0	1,080	✓	0	0	2,990	0	50	920	1,330	360
CSU ¹³	1,550	✓	9,760	10,640	7,040	✓	✓	7,300	18,440	✓	✓	✓	27,490	150	12,670	16,290	4,260	2,020
TL ¹³	✓	✓	7,500	7,900	✓	350	3,450	2,350	✓	✓	8,660	20,350	1,220	100	11,600	16,080	23,030	4,450
Closed to Mineral Materials Disposal	0	✓	✓	9,820	1,290	320	1,020	3,420	1,550	0	4,870	10,990	6,710	0	50	1,330	5,680	310
Within Coal Potential Area									22,660		210	6,000	660	10	490	21,260	15,920	
Closed to Coal Leasing									280		130	3,110	660	0	0	0	680	
Within Locatable Mineral Potential Area	✓	✓	✓	✓	✓			✓		✓				✓	✓		✓	✓
Withdrawn from Locatable Mineral Entry	0	0	0	0	0	170	1,430	0		0				0	0		5,290	0
Recommend for Withdrawal from Locatable Mineral Entry	0	0	0	0	0			0		0				0	50		0	0
NGD ¹³	0	✓	✓	9,820	0	0	0	3,420	1,500	0	3,440	9,380	0	0	0	0	0	0
SSR ¹³	1,540	✓	9,750	10,620	4,040	✓	4,010	7,250	4,260	340	8,380	10,720	16,590	150	9,590	12,070	8,430	1,690
Class I	0	✓	9,750	9,820	0	0	0	3,420	1,300	0	4,480	10,680	3,940	0	0	0	5,290	0
Class II	0	0	30	770	0	0	0	1,430	10	0	410	0	0	0	6,620	1,430	1,140	800
Class III	✓	0	0	80	✓	✓	1,820	5,140	22,110	✓	3,570	9,750	4,010	140	5,820	24,190	18,630	✓
Class IV	0	0	0	0	0	0	2,220	500	8,400	0	260	0	20,170	170	270	0	1,580	0
Closed to Livestock Grazing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	680	0	0
ROW Avoidance	1,050	0	10	770	3,230	✓	4,010	3,840	4,010	340	4,240	4,940	13,750	110	8,060	2,680	2,630	1,740

Table 4-79
Summary of Protections for ACECs or Portions of ACECs Not Proposed for Designation, Alternative C

Stipulation, Restriction, or Protection	Biological Soil Crust ¹	Coyote Wash ²	Dolores River Slickrock Canyon ²	Dolores Slickrock Canyon ³	East Paradox ⁴	Fairview South (BLM Expansion) ⁵	Fairview South (CNHP Expansion) ⁶	La Sal Creek ⁷	Lower Uncompahgre Plateau ⁸	Paradox Rock Art	Roubideau Corridors ⁹	Roubideau-Potter-Monitor ⁸	Salt Desert Shrub Ecosystem ¹⁰	San Miguel Gunnison Sage-grouse ¹¹	San Miguel River Expansion ¹²	Sims-Cerro Gunnison Sage-grouse	Tabeguache Pueblo and Tabeguache Caves	West Paradox
Acres Not Designated as an ACEC:	1,900	2,100	9,780	10,670	7,360	400	4,040	10,490	31,810	1,080	8,720	20,430	28,120	310	12,710	25,620	26,300	5,190
ROW Exclusion	330	✓	9,770	9,820	310	0	0	3,420	1,300	0	4,480	10,680	3,940	0	0	0	5,290	0
SRMA																		
ERMA	0	✓	9,720	9,800	5,550	0	1,630	3,420	16,060	✓	8,440	✓	0	0	12,310	3,130	0	290
Closed to Motorized Travel																		
Closed to Motorized and Mechanized Travel	0	✓	✓	9,830	0	0	0	3,450	1,300	910	4,470	10,680	3,940	0	0	0	5,290	0

Source: BLM 2012a

¹ Biological Soil Crust ACEC is almost entirely within the East Paradox ACEC.

² Coyote Wash and Dolores River Slickrock Canyon ACECs are entirely within the Dolores Slickrock Canyon ACEC.

³ Includes all of the Coyote Wash and Dolores River Slickrock Canyon ACECs, and approximately one-third of the La Sal Creek ACEC.

⁴ Includes almost all of the Biological Soil Crust ACEC.

⁵ Fairview South (BLM Expansion) ACEC is entirely with the Fairview South (CNHP Expansion) ACEC. Fairview South (BLM Expansion) ACEC contains the entire Fairview South ACEC, which is proposed for designation under Alternative A.

⁶ Includes Fairview South (BLM Expansion) ACEC and the Fairview South ACEC (proposed for designation under Alternative A).

⁷ Approximately one-third of the La Sal Creek ACEC is partially within the Dolores River Slickrock Canyon and Dolores Slickrock Canyon ACECs.

⁸ A total of 1,040 acres of the Lower Uncompahgre Plateau ACEC overlaps with the Roubideau Corridors and Roubideau-Potter-Monitor ACECs.

⁹ A portion of the Roubideau Corridors ACEC overlaps with the Roubideau-Potter-Monitor ACEC.

¹⁰ Includes the Adobe Badlands ACEC, which is proposed for designation under Alternative A.

¹¹ Approximately one-third of the San Miguel Gunnison Sage-grouse ACEC overlaps with the San Miguel River ACEC, which is proposed for designation under Alternative C. This portion also overlaps with the San Miguel River Expansion ACEC.

¹² Includes the San Miguel River ACEC, which is proposed for designation under Alternative A.

¹³ Total acreage for stipulations may be greater than the total acreage of an ACEC because stipulations could overlap. If a stipulation were excepted, modified, or waived by the BLM Authorized Officer, underlying stipulations could still be in effect.

✓- Indicates stipulation, restriction, or protection covers the entire ACEC.

Hatching indicates stipulation, restriction, or protection is not applicable under this alternative.

Table 4-80
Summary of Protections for ACECs or Portions of ACECs Not Proposed for Designation, Alternative D

Stipulation, Restriction, or Protection	Coyote Wash ¹	Dolores Slickrock Canyon ²	East Paradox ³	Fairview South (CNHP Expansion) ⁴	Fairview South ⁵	La Sal Creek ⁶	Lower Uncompahgre Plateau ⁷	Roubideau-Potter-Monitor ⁸	Salt Desert Shrub Ecosystem ⁹	San Miguel Gunnison Sage-grouse ¹⁰	San Miguel River Expansion ¹¹	Sims-Cerro Gunnison Sage-grouse	Tabeguache Pueblo and Tabeguache Caves	West Paradox
Acres Not Designated as an ACEC:	0	890	5,560	3,640	0	7,200	30,770	12,380	28,130	310	12,710	25,620	26,300	5,190
NL ¹²		80	0	0		120	260	5,940	3,940	0	50	0	5,290	0
NSO ¹²		640	2,870	1,430		2,370	5,710	✓	7,510	0	11,510	6,870	5,800	2,530
CSU ¹²		870	✓	✓		6,880	✓	✓	28,100	150	10,170	24,810	✓	4,040
TL ¹²		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Closed to Mineral Material Disposal Within Coal Potential Area		670	1,190	720		980	3,370	✓	6,730	0	5,700	2,300	6,250	340
Closed to Coal Leasing Within Locatable Mineral Potential Area							22,630	5,560	660	10	490	21,260	15,920	
Withdrawn from Locatable Mineral Entry		0	0	1,260		0				0	0		5,290	0
Recommend for Withdrawal from Locatable Mineral Entry		0	0			0				0	70		0	0
NGD ¹²		80	0	0		120	0	5,940	3,940	0	0	0	0	0
SSR ¹²		✓	✓	✓		6,960	✓	12,360	27,490	150	11,290	24,580	✓	4,730
Class I		80	0	0		120	260	6,470	3,940	0	0	0	5,290	0
Class II		800	5,500	0		4,040	1,110	3,750	0	0	2,530	3,170	7,670	4,510
Class III		10	60	2,100		3,040	25,780	2,160	290	140	10,180	22,450	11,770	680
Class IV		0	0	1,540		0	3,620	0	23,900	170	0	0	1,570	0
Closed to Livestock Grazing		210	0	350		2,920	10	0	40	70	10,010	1,440	150	0
ROW Avoidance		790	2,550	1,080		6,750	7,730	5,190	13,830	150	10,650	22,540	21,010	2,120
ROW Exclusion		80	0	0		150	260	7,190	3,940	0	0	0	5,290	0
SRMA		80	0	0		150	15,020	12,120	0	0	12,310	3,120	0	0
ERMA		0	5,550	1,120		0	0	0	0	0	0	0	0	290

Table 4-80
Summary of Protections for ACECs or Portions of ACECs Not Proposed for Designation, Alternative D

Stipulation, Restriction, or Protection	Coyote Wash ¹	Dolores Slickrock Canyon ²	East Paradox ³	Fairview South (CNHP Expansion) ⁴	Fairview South ⁵	La Sal Creek ⁶	Lower Uncompahgre Plateau ⁷	Roubideau-Potter-Monitor ⁸	Salt Desert Shrub Ecosystem ⁹	San Miguel Gunnison Sage-grouse ¹⁰	San Miguel River Expansion ¹¹	Sims-Cerro Gunnison Sage-grouse	Tabeguache Pueblo and Tabeguache Caves	West Paradox
Acres Not Designated as an ACEC:	0	890	5,560	3,640	0	7,200	30,770	12,380	28,130	310	12,710	25,620	26,300	5,190
Closed to Motorized Travel		0	0	0		0	0	0	0	0	0	850	0	0
Closed to Motorized and Mechanized Travel		80	0	0		150	260	9,410	3,940	0	0	0	5,290	0

Source: BLM 2012a

¹ The Coyote Wash ACEC is entirely within the Dolores River Slickrock Canyon ACEC, which is proposed for designation under Alternative D. Coyote Wash would therefore be protected by the special management applicable to that ACEC.

² Contains the entire Dolores River Slickrock Canyon ACEC, which is proposed for designation under Alternative D.

³ Contains all but 100 acres of the Biological Soil Crust ACEC, which is proposed for designation under Alternative D.

⁴ Includes the Fairview South ACEC. Also contains the entire Fairview South (BLM Expansion) ACEC, which is proposed for designation under Alternative D.

⁵ Fairview South ACEC is entirely within the Fairview South (BLM Expansion) ACEC, which is proposed for designation under Alternative D. Fairview South would therefore be protected by the special management applicable to that ACEC.

⁶ Approximately one third of the La Sal Creek ACEC overlaps with the Dolores River Slickrock Canyon ACEC, which is proposed for designation under Alternative D. This portion of La Sal Creek also overlaps with the Dolores Slickrock Canyon ACEC.

⁷ A total of 1,040 acres of the Lower Uncompahgre Plateau ACEC overlaps with the Roubideau Corridors ACEC, which is proposed for designation under Alternative D. This portion also overlaps with the Roubideau-Potter-Monitor ACEC.

⁸ A portion of the Roubideau-Potter-Monitor ACEC overlaps with the Roubideau Corridors ACEC, which is proposed for designation under Alternative D.

⁹ Contains the entire Adobe Badlands ACEC, which is proposed for designation under Alternative D.

¹⁰ Approximately one-third of the San Miguel Gunnison Sage-grouse ACEC overlaps the San Miguel River ACEC, which is proposed for designation under Alternative D. This portion also overlaps the San Miguel River Expansion ACEC.

¹¹ Contains the entire San Miguel River ACEC, which is proposed for designation under Alternative D.

¹² Total acreage for stipulations may be greater than the total acreage of an ACEC because stipulations could overlap. If a stipulation were excepted, modified, or waived by the BLM Authorized Officer, underlying stipulations could still be in effect.

✓- Indicates stipulation, restriction, or protection covers the entire ACEC.

Hatching indicates not applicable under this alternative.

release WSAs lies solely with Congress, no new WSAs will be established under any alternative; nor will any WSA be released under any alternative.

The two types of wilderness resources have different definitions, and the management decisions governing each are distinct. The Tabeguache Area is defined by wilderness character. Section 2(c) of the 1964 Wilderness Act identifies wilderness as having four qualities—untrammelled, natural, undeveloped, and a place for solitude or a primitive and unconfined type of recreation. All wilderness areas exhibit these four characteristics. Wilderness character is also likely to include less-tangible elements, such as scenic beauty and qualities that promote self-discovery and self-reliance for those who experience it.

WSAs are areas where, in accordance with Section 603 of FLMPA and the BLM's wilderness review process, wilderness characteristics exist. WSAs are established following a lengthy inventory of all BLM-administered lands. WSAs (with the exception of some ISAs) meet the minimum criteria for wilderness characteristics including size, naturalness, and either an outstanding opportunity for solitude or primitive and unconfined recreation. At 80 acres, Needle Rock ISA does not possess wilderness characteristics, but it is managed to the same standard as any other WSA. Like designated wilderness areas, WSAs often exhibit unique characteristics that are in addition to the minimum criteria.

Wilderness character and WSA wilderness characteristics are primarily subject to impacts from recreational use, livestock grazing and management, fire suppression, and wildlife management projects.

Wilderness Study Areas

Methods and Assumptions

Indicators

Indicators of impacts on WSAs are impacts on their wilderness characteristics of natural appearance, outstanding opportunities for solitude or primitive and unconfined recreation, and unique or supplemental values.

All of the alternatives would continue to manage five WSAs according to BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012b), until such time as Congress either designates them as wilderness or releases them for other uses.

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- The five WSAs in the planning area, Adobe Badlands, Camel Back, Dolores River Canyon, Sewemup, and Needle Rock ISA, would continue to be managed according to BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012b), until Congress either designates or releases all or portions of the WSAs from further consideration.
- Managing the WSAs according to BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012b), will protect their wilderness characteristics in a manner

that will not “impair the suitability of WSAs for preservation as wilderness” (FLPMA Section 603[c]). This is the “nonimpairment standard.”

- Management of the WSAs is subject to valid existing rights and grandfathered uses under all alternatives, consistent with BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012b).
- Established grazing in the WSAs is determined by the active AUMs permitted at the time of designation for any allotment that is wholly or partly within the WSAs. Maintenance of existing facilities and construction of new facilities necessary to manage and use permitted AUMs would be conducted in accordance with the nonimpairment standard of BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012b).
- Livestock grazing managed in accordance with BLM regulations does not impact naturalness in the WSAs. The assumption is that grazing is part of wilderness, and the WSAs exist in the context of grazing, although livestock developments could impact the natural appearance of the WSAs.
- Actions that would “impair the suitability of WSAs for preservation as wilderness” would not be permitted unless they were to meet one of the following exception criteria described in BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012b):
 - Emergencies such as suppression activities associated with wildfire or search and rescue operations
 - Reclamation activities designed to minimize impacts on wilderness values created by violations of and emergencies to BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012b)
 - Uses and facilities that are considered grandfathered or valid existing rights under BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012b),
 - Uses and facilities that clearly protect or enhance the land’s wilderness values or that are the minimum necessary for public health and safety in the use and enjoyment of the wilderness values
 - Reclamation of pre-FLPMA impacts
- All activities approved in the WSAs would be closely managed to ensure that they would not impair the areas’ wilderness characteristics. Preservation of wilderness characteristics within the WSAs is paramount and is the primary consideration when evaluating any proposed action or use.
- Impacts on the WSAs from implementing management actions for other resources, resource uses, and special designations would be considered negligible. Allowable uses in the WSAs are permitted if they meet the nonimpairment standard.
- The WSAs, if released by Congress, could still possess wilderness characteristics (with the exception of Needle Rock ISA, due to size and existing road), and BLM management could impact those characteristics. As a result, preservation of

wilderness characteristics within the released areas (former WSAs) should be considered during the evaluation of proposed actions or uses, should Congress release any of the WSAs from further wilderness review.

Nature and Type of Effects

In the WSAs, impacts normally come from recreational use, vegetation treatments, and the installation, maintenance, and use of range/wildlife improvements allowed under BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012b). There could be indirect impacts from management of other resources that would enhance wilderness characteristics in the WSAs; however, such effects are generally negligible, as protections are not as strict as those afforded to WSAs in accordance with BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012b).

Managing the WSAs to protect their wilderness characteristics would protect wilderness values through application of the minimum requirements analysis for all surface-disturbing activities. Because the BLM cannot and would not permit any actions that would impair the WSAs' wilderness characteristics, such impacts would occur only from activities associated with valid existing rights or grandfathered uses. Grazing is the only grandfathered use allowed in the WSAs, which may be managed in a manner and to the degree it was when the areas were designated.

BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012b), states that mining and mineral leasing uses can continue in the manner and to the degree that they were being conducted at the time the FLPMA was passed, as long as they do not cause unnecessary or undue degradation of the lands. While this clause allows for a natural progression of development, new impacts cannot be of a significantly different type than the impacts involved with the pre-FLPMA activity. There are no existing mineral leases within the WSAs. If mineral development occurred next to the WSAs, associated activities could impact visitors' perceptions if they were visible from within the WSA, particularly opportunities for solitude, as well as air quality and scenic and ecological values.

Livestock grazing is considered a valid existing right in the WSAs. Impacts are possible from livestock grazing, particularly from fencing and water developments, which could impact naturalness and opportunities for unconfined recreation. Cattle grazing could impact recreation by the presence of livestock in a wilderness setting. Impacts on areas frequented by livestock, such as springs or water developments, could diminish the naturalness in the vicinity of the developments. Existing range improvements used for grazing, such as fences, stock trails, springs, and stock ponds, constitute a valid existing right and would continue to be maintained. Structures and maintenance of range improvements could result in short-term impacts on solitude and naturalness. Changes in grazing could be allowed in number, kind, or season of use following the preparation of an environmental assessment (if not adequately addressed in an existing NEPA document).

Stipulations associated with cultural resources, water, soils, and special status species could indirectly improve the naturalness of the WSAs. If any of the WSAs were released by Congress from further wilderness review, these measures would help protect wilderness characteristics.

Lands managed to protect wilderness characteristics, where they are next to WSAs, could create additional protection for the WSAs, as the management for the areas would be similar. A wider expanse of contiguous land containing the WSAs and lands managed to protect wilderness characteristics could therefore heighten protection of wilderness characteristics found within the WSAs.

Where WSAs overlap or are next to stream segments eligible or suitable for inclusion in the NWSRS or other special management areas, such as ACECs or SRMAs, management of these other areas could also indirectly protect wilderness characteristics of the WSAs due to their protective measures, as they often include complementary management objectives.

Similarly, management for ecological emphasis areas could afford some protection for wilderness characteristics by management direction to preserve the continuity of habitats, vegetation communities, and native wildlife within, thus offering indirect protection of the naturalness wilderness characteristic.

Effects of Management if Congress Releases WSAs from Wilderness Consideration

In the event that one or more WSA is released by Congress from wilderness consideration, management of an area in accordance with WSR, SRMA, ecological emphasis area, or ACEC principles could offer some indirect protection of wilderness characteristics. Conversely, if congressionally released WSAs were managed as open to leasing, mineral entry and development, or mineral material sales, wilderness characteristics could be diminished or eliminated from surface disturbance caused by well pads and roads created for mineral exploration and development. The degree of impact would depend on the size of surface disturbance and related activity required for development.

Effects Common to All Alternatives

Because the BLM would not permit any new actions that would impair WSAs, such impacts would occur only from activities associated with valid existing rights or grandfathered uses. There could be indirect impacts from management of other resources that would enhance wilderness characteristics; however, such impacts are generally negligible, as protections are not as strict as those afforded to WSAs by BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012b). Additional impacts on wilderness characteristics of affected WSAs could occur if Congress were to release one or more from further wilderness consideration.

Under all alternatives, WSAs are closed to coal leasing and nonenergy solid mineral leasing. In addition, all would have an NGD restriction, be closed to fluid mineral leasing and exploration, and prohibit associated surface-disturbing activities. These restrictions would protect all wilderness characteristics from development, but there is potential for impacts should the WSAs be released from wilderness consideration by Congress, as well as potential for impacts from leasing or development in adjacent areas. Although active coal leasing does not occur near any of the WSAs, coal potential has been identified in and around the Camel Back WSA and, to a lesser extent, the Adobe Badlands WSA; therefore, there is some potential for coal development in some adjacent areas. Leasable mineral development potential is low in and around existing WSAs and is not likely to impact WSA management. Potential impacts on wilderness characteristics from mineral development are discussed under ***Nature and Type of Effects***.

Managing all WSAs as VRM Class I contributes to the protection of the wilderness characteristics of natural appearance. All WSAs would be managed as ROW exclusion areas, which would help preserve wilderness characteristics. The BLM would consider the acquisition of lands in or next to WSAs in order to enhance wilderness characteristics.

All WSAs would also be closed to wood cutting and wood product sales and harvest to preserve all wilderness characteristics, in particular, naturalness.

Implementing management for the following resources would have negligible or no impact on WSAs and are therefore not discussed in detail: air quality, lands and realty, national trails and byways, and watchable wildlife viewing sites.

Effects of Management if Congress Releases WSAs from Wilderness Consideration

As discussed under **Nature and Type of Effects**, wilderness characteristics could be protected if areas are released from study by Congress in cases where other special designations overlap the WSA. The Needle Rock ISA, though managed to the same standards as WSAs, is only 80 acres and is bisected by a county road. It does not meet any of the size criteria for wilderness characteristics, and therefore would not possess wilderness characteristics if released by Congress. Under all alternatives, the entirety of the Needle Rock ISA would continue to be designated as the Needle Rock ACEC/Outstanding Natural Area if released by Congress from wilderness consideration (see **Section 4.5.1**). Limiting travel to designated routes would provide some protection similar to WSA management. Management as VRM Class I would limit surface-disturbing activities and related impacts on wilderness characteristics. However, the former WSA lands would be open to fluid minerals leasing, mineral entry and development, and mineral material sales; impacts would be as those described under **Nature and Type of Effects**.

Alternative A

Alternative A allows resource uses in the WSAs that maintain each area's suitability for preservation as wilderness and protects the viability of current wilderness characteristics. In addition to the management prescriptions discussed under **Effects Common to All Alternatives**, additional protection for wilderness characteristics under Alternative A is provided by closing Needle Rock ISA and a portion of the Adobe Badlands WSA to mineral materials disposal. This limits surface disturbance and vehicular access to mineral material sites, preserving naturalness of setting.

Under Alternative A, impacts from travel management on WSAs are minimal, because all WSAs, with the exception of Needle Rock ISA, are closed to motorized and mechanized travel, except for administrative use, including routes associated with grandfathered uses and valid existing rights. Motorized and mechanized travel in Needle Rock ISA is limited to the one existing way (BLM 2010b). Ways are closed in Dolores River Canyon WSA and in Sewemup Mesa WSA; special permits are required for vehicle use for administration of livestock grazing allotments. Closing WSAs to motorized travel continues to protect the wilderness characteristics in these areas by restricting activities that could impact roadlessness, natural appearance, and opportunities for solitude and primitive/unconfined recreation. Prohibition of motorized river activities in Dolores River Canyon further protects opportunities for solitude and primitive and unconfined recreation.

In addition, under Alternative A, segments eligible for inclusion in the NWSRS overlap with portions of the Dolores River Canyon WSA (La Sal Creek Segment 3 and Dolores River Canyon Segment 1a) and Camel Back WSA (Roubideau Creek Segment 1). Management of eligible segments must preserve the tentative classification and ORVs, including protection of the level of development in the river study corridors, their free-flowing condition, and adequate water quality to support the ORVs. This would result in limitations on surface-disturbing activities that would indirectly preserve or enhance wilderness characteristics (refer to **Section 4.5.3** [Wild and Scenic Rivers]).

Effects of Management if Congress Releases WSAs from Wilderness Consideration

If Congress were to release WSAs from wilderness consideration, some protection would be afforded for wilderness characteristics due to overlapping special designations, as described under **Nature and Type of Effects**. Under Alternative A, a portion of the Abode Badlands WSA (6,370 acres) would be encompassed in the Adobe Badlands ACEC. Management of the Adobe Badlands ACEC as VRM Class I would protect wilderness characteristics, as described in **Nature and Type of Effects**, should the Adobe Badlands WSA be released from further wilderness consideration.

Alternative B

Alternative B would provide the maximum level of protection for wilderness characteristics of all WSAs. Under this alternative, protective management of ACECs, SRMAs, ecological emphasis areas, suitable WSR segments, and lands with wilderness characteristics would provide both adjacent and overlapping designations. Adjacent protection of wilderness characteristics would provide complementary management for many characteristics, and a wider expanse of contiguous land could therefore heighten protection within WSAs and further ensure the integrity of wilderness characteristics.

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, as described under Alternative A. Management of suitable segments tentatively classified as wild requires limitation on surface disturbance similar to a WSA including VRM Class I, ROW exclusion, and closure to mineral leasing and development, thereby preserving wilderness characteristics of naturalness and opportunities for solitude or primitive and unconfined recreation.

Under Alternative B, the Camel Back WSA would be contiguous with the Camel Back WSA Adjacent lands with wilderness characteristics unit. Similarly, Dolores River Canyon WSA would be adjacent to the Dolores River Canyon WSA Adjacent lands with wilderness characteristics unit. Impacts are as described under **Nature and Type of Effects**.

All WSAs under Alternative B would be closed to mineral material disposal, providing protection from surface disturbance of all wilderness characteristics.

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. Travel management impacts are the same as those described for Alternative A.

Effects of Management if Congress Releases WSAs from Wilderness Consideration

Alternative B would provide additional protection for wilderness characteristics should any WSAs be released by Congress from further wilderness consideration. It would do this by requiring an update to the wilderness characteristics inventory for lands that were formerly WSAs (FLPMA Section 201) and by specifying that, on release, those lands would be managed consistent with underlying land use designations. Overlapping designations would provide indirect protection for wilderness characteristics if the WSA were released by Congress, as discussed in further detail for each WSA, as follows.

Sewemup Mesa WSA. Management for Sewemup Mesa WSA, if released, would be similar in prescription to management for WSAs under Alternative B in that the area would remain closed to nonenergy solid mineral leasing, mineral materials disposal, and fluid minerals leasing; retain the NGD restriction; and be closed to motorized travel, competitive SRP permits, and wood cutting. The area would remain a ROW exclusion area. Significant differences that could impact wilderness characteristics include the allowance of mechanized travel, which could impact naturalness of setting and opportunities for solitude and primitive/unconfined recreation. Because the former WSA would be managed as VRM Class II, the naturalness characteristic would largely be protected.

Dolores River Canyon WSA. Management consistent with Dolores Slickrock Canyon ACEC and Dolores River SRMA would provide some indirect protection of wilderness characteristics, but management prescriptions would not be as protective as WSA management. Limiting travel to designated routes would provide some protection similar to WSA management. Management as VRM Class II, closure to fluid minerals leasing, and an NGD restriction would limit surface-disturbing activities and related impacts on wilderness characteristics. However, the former WSA lands would be open to mineral entry and development and mineral material sales; impacts would be as those described under **Nature and Type of Effects**.

Camel Back WSA. If released, lands would be managed consistent with Roubideau-Potter-Monitor ACEC and Roubideau SRMA, providing direct protection of wilderness characteristics. Impacts from recreation on opportunities for solitude and primitive and unconfined recreation would be limited due to restrictions on SRP permits and prohibition of target shooting. However, the former WSA lands would be open to fluid minerals leasing, mineral entry and development, and mineral material sales; impacts would be as those described under **Nature and Type of Effects**. Management of the adjacent Roubideau Area on National Forest System lands would continue to provide a protective buffer on the southern border of the unit.

Adobe Badlands WSA. If released, these lands would be managed consistent with Salt Desert Shrub Ecosystem ACEC, which would provide direct protection of wilderness characteristics, particularly through management that would limit surface disturbance, including the NSO/NGD stipulation and ROW exclusion. Because there are no designated vehicle routes in the WSA, and because the Salt Desert Shrub Ecosystem ACEC prohibits OHVs and surface disturbance, the limited to designated routes travel management designation for the area would provide adequate protection of wilderness characteristics. However, the former WSA lands would be open to fluid minerals leasing, mineral entry and development, and mineral material sales; impacts would be as those described under **Nature and Type of Effects**.

Alternative C

Alternative C would provide the fewest adjacent or overlapping special designation areas, so the indirect impacts of special designation areas on WSAs would be minimized. Under Alternative C, there are no lands managed to protect wilderness characteristics contiguous or overlapping with WSAs.

All WSAs would be closed to mineral materials disposal; impacts are described under Alternative B.

Effects of Management if Congress Releases WSAs from Wilderness Consideration

Alternative C would provide the fewest adjacent or overlapping special designation areas, and surface disturbance could be more likely to occur in areas released by Congress from wilderness consideration.

If any WSAs were released by Congress from wilderness consideration, the lands could still receive indirect protection by being managed according to management prescriptions in the RMP. However, a focus on multiple use management under this alternative is not likely to be consistent with management for wilderness characteristics. Management of Sewemup Mesa WSA (if released) would be consistent with Grand Junction RMP prescriptions for Sewemup Mesa WSA, most of which is in the BLM's Grand Junction Field Office. Likewise, Dolores River Canyon WSA lands (if released) would be managed consistent with the San Juan Public Lands RMP, most of which is under the San Juan Public Lands Planning Area. Similarly, management of the Camel Back WSA lands (if released) would be consistent with management goals and objectives in this RMP, which would not specifically provide protection of wilderness characteristics. Prescriptions of adjacent BLM-administered lands would provide limited protection of wilderness characteristics and could lead to a loss in those characteristics. If released from wilderness consideration, management of Adobe Badlands consistent with the Adobe Badlands ACEC would provide some indirect protection for the area, as described under Alternative A.

Impacts from mineral development, if areas were released from consideration, could occur as described under **Nature and Type of Effects** and Alternative B.

Alternative D

Under Alternative D, WSAs would be closed to motorized and mechanized use, and the same management prescriptions and impacts from comprehensive travel and transportation management would apply, as described under Alternative B. Wilderness characteristics of 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 to the Camel Back WSA Adjacent (6,950 acres) under Alternative D.

All WSAs under Alternative D would be closed to mineral material disposal; impacts are described under Alternative B.

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, as described under Alternative A. Impacts of interim management of these segments would be the same as those described under Alternative B.

Effects of Management if Congress Releases WSAs from Wilderness Consideration

Sewemup Mesa WSA. Management and impacts are as described for Alternative B, with the exception that the area would be managed as a ROW avoidance area. If ROWs were located on these lands, there would be impacts on roadlessness, naturalness, and primitive and unconfined recreation. Depending on the extent of the ROWs, wilderness characteristics could be eliminated.

Dolores River Canyon WSA. Management consistent with the Dolores River Slickrock Canyon ACEC would provide some indirect protection of wilderness characteristics, similar to that describe under Alternative B. Under Alternative D, additional protection would be provided by the closure to mineral material disposal, nonenergy solid mineral leasing, and NSO/SSR restrictions. These would limit the potential for surface disturbance and related impacts on naturalness from mineral development.

Camel Back WSA. Management consistent with Roubideau SRMA and Roubideau Corridors ACEC would provide some indirect protection of wilderness characteristics if released by Congress. Because it allows for projects that create visual impacts that attract the attention of a casual observer, management as VRM Class III could diminish the naturalness characteristic. While there are designated routes in the area, the overlapping SRMA management allows only nonmotorized/nonmechanized use; therefore, no new impacts on wilderness characteristics would occur. Management as a ROW avoidance area, as well as NSO/NGD stipulations, closure to mineral materials disposal, and closure to nonenergy solid mineral leasing, would limit the potential for surface disturbance and related impacts on naturalness. If ROWs were located on these lands, there would be impacts on roadlessness, naturalness, and primitive and unconfined recreation. Depending on the extent of the ROWs, wilderness characteristics could be eliminated.

Adobe Badlands WSA. Management and impacts would be the same as those described for Alternative C.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on WSAs encompasses the Uncompahgre RMP planning area. Continued management of all WSAs to the nonimpairment standard prescribed by BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012b), will maintain the areas' suitability for preservation as wilderness. Trends described in **Chapter 3**, including increasing visitation and recreation in the area, continue to have potential to impact wilderness characteristics of all WSAs. Management of the Sewemup Mesa WSA in the Grand Junction Field Office would enhance protection of wilderness characteristics of the WSA in both planning areas, as would management of the Dolores River Canyon WSA in the Tres Rios Field Office. In addition, the Colorado Roadless Rule (77 Federal Register 39576-39612, 3 July 2012) provides management direction for conserving and managing Roadless Areas on National Forest System lands. One of the Upper Tier areas, Roc Creek, is

next to the west of Sewemup Mesa WSA. The management under the Roadless Rule would protect additional lands in a compatible manner to WSAs and would enhance wilderness characteristics of the Sewemup Mesa WSA over a larger area.

Tabeguache Area

Methods and Assumptions

Indicators

Indicators of impacts on the Tabeguache Area are the following:

- Potential changes in wilderness character (untrammled, natural, and undeveloped; opportunities for solitude or primitive and unconfined recreation; and unique or supplemental values) within the area. Definitions of each quality of wilderness character are detailed in the Keeping It Wild Interagency Wilderness Monitoring Protocol (Landres et al. 2008):
 - Untrammled—Number of authorized actions and persistent structures designed to manipulate plants, animals, pathogens, soil, water, or fire; percent of natural fire starts that are manipulated within the boundaries of the area; number of unauthorized actions by agencies, citizen groups, or individuals that manipulate plants, animals, pathogens, soil, water, or fire
 - Natural—Abundance, distribution, or number of indigenous species and special status species; abundance and distribution of nonindigenous species; AUMs of livestock use inside the area; extent and magnitude of changes to water, air quality, and human-caused stream bank erosion; departure from natural fire regimes; area and magnitude of loss of connectivity with the surrounding landscape
 - Undeveloped—Index of physical development for authorized or predesignation structures and developments (e.g., buildings, fences, and livestock water developments); existing or potential impact of inholdings; type and amount of administrative use of motor vehicles
 - Opportunities for solitude or primitive and unconfined recreation—Amount of visitor use; area of wilderness affected from travel routes; type and number of agency provided and user-created recreation facilities; type and extent of management restrictions
 - Unique and Supplemental Values—Severity of disturbances to cultural resources, and status of indigenous species that are listed, or are candidates for listing, as threatened or endangered

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- The Tabeguache Area was designated by the Colorado Wilderness Act (HR 631), passed by Congress in 1993, as a special area, the management for which is similar

to that of a wilderness area. The Tabeguache Area must be managed to maintain the area's "presently existing wilderness character and potential for inclusion in the National Wilderness Preservation System."

- Management of the Tabeguache Area is subject to valid existing rights and special provisions under all alternatives, as consistent with the Colorado Wilderness Act (HR 631).
- Established grazing in the Tabeguache Area is determined by the active AUMs permitted at the time of designation for any allotment that is wholly or partly within the area. Maintenance of existing facilities and construction of new facilities necessary to manage and use permitted AUMs would be conducted to maintain "presently existing wilderness character and potential for inclusion in the National Wilderness Preservation System."
- Because livestock grazing levels at the time of wilderness designation were in accordance with BLM grazing regulations, and future grazing would conform to BLM grazing regulations, existing permitted AUM levels would not impact naturalness. However, livestock developments and authorized motorized use by permittees impact the undeveloped nature of the wilderness; livestock grazing operations can impact outstanding opportunities for primitive recreation, as visitors may have to camp in the presence of livestock or in areas with evidence of livestock (e.g., manure); and livestock grazing operations can impact solitude by increasing the potential of encounters between Tabeguache Area visitors and grazing permittees during authorized grazing dates.
- All activities approved in the Tabeguache Area would be closely managed to ensure that they would not impair the area's wilderness character.

Nature and Type of Effects

In the Tabeguache Area, protection of wilderness character (the combination of all the wilderness qualities) can involve trade-offs between different qualities of its wilderness character. For example, protecting or enhancing a biological community could require a vegetation treatment. In this case, the "natural" (ecological naturalness) quality of its wilderness character would be enhanced in the long term, but the treatment would negatively impact its untrammeled quality.

Stipulations associated with cultural resources, water, soils, and special status species could indirectly improve the untrammeled and undeveloped qualities of the Tabeguache Area.

There could be impacts on the wilderness character of the Tabeguache Area from fire management. Impacts could result from fire suppression, prescribed fire (intentionally ignited for resource or management objectives), and fire use (naturally ignited fires that are not suppressed in order to achieve management objectives).

Because it would constrain natural processes, fire suppression in itself would reduce the untrammeled quality of the Tabeguache Area. However, if the fuels in the area were unnaturally dense as a result of past fire suppression, this condition could lead to unnaturally hot wildfires that could essentially sterilize the area, reducing its natural quality. Wildfire suppression is

considered an emergency action and is not subject to a “minimum requirements analysis.” Agency (e.g., BLM and Forest Service) resource advisors would normally be assigned to help mitigate impacts on wilderness character from fire-suppression activities.

Prescribed fire is used as a tool to restore natural fire ecology to an area. As such, it would act to enhance the natural quality of the area’s wilderness character, while reducing the untrammeled quality. Fire use would enhance the natural quality of the Tabeguache Area without impairing any other qualities of wilderness character.

The designation of the Tabeguache Area as VRM Class I would contribute to the protection of its undeveloped character. Closing the Tabeguache Area to wood cutting and wood product sales and harvest also would preserve wilderness character.

Livestock grazing is considered a valid existing right in the Tabeguache Area. Livestock grazing could impact the untrammeled and natural qualities of its character. Existing range improvements used for grazing, such as fences, stock trails, springs, and stock ponds, constitute a valid existing right under the Colorado Wilderness Act (HR 631) and would continue to be maintained. Structures could diminish the undeveloped quality of the Tabeguache Area. Maintenance of range improvements could result in short-term impacts on the area’s undeveloped quality and opportunities for solitude. Changes in grazing could be allowed in number, kind, or season of use following the preparation of an environmental assessment (if not adequately addressed in an existing NEPA document).

There are no existing mineral leases in the Tabeguache Area, and Congress has closed it to mineral development. If mineral development were to occur next to the Tabeguache Area, associated activities could impact visitors’ perceptions. If they were visible from within the Tabeguache Area, impacts could occur on perceived opportunities for solitude, as well as untrammeled and undeveloped qualities.

Managing the Tabeguache Area as ROW exclusion would help preserve its wilderness character.

Continuing to prohibit motorized and mechanized use in the Tabeguache Area would protect its wilderness character by restricting activities that could impact opportunities for solitude and primitive/unconfined recreation. Motorized and mechanized use on authorized routes would be allowed for administrative and permitted access (i.e., livestock grazing) and could impact opportunities for solitude and the untrammeled character of the area. However, this use was present at the time of designation and should therefore not significantly alter wilderness character.

Special designation areas, such as protected lands with wilderness characteristics, ACECs, and managing stream segments as eligible or suitable for inclusion in the NWSRS, where next to the Tabeguache Area, would complement management for wilderness character and could therefore heighten protection within the Tabeguache Area, further ensuring the integrity of wilderness character. In addition, special management lands near, but not immediately adjacent to, the Tabeguache Area could also provide some additional protection, in particular by reducing development and related impacts on noise, light, and air pollution.

Similarly, management of ecological emphasis areas to preserve continuity of habitats, vegetation communities, and native wildlife would offer indirect protection of the Tabeguache Area's wilderness character.

Effects Common to All Alternatives

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.

Under all alternatives the BLM would manage the Tabeguache Area as VRM Class I, contributing to the protection of its undeveloped quality, as described under **Nature and Type of Effects**.

Under all alternatives the Tabeguache Area would be closed to wood cutting and wood product sales and harvest; impacts are as described under **Nature and Type of Effects**.

Under all alternatives, 7,930 acres (98 percent) of the Tabeguache Area would remain open to livestock grazing. Impacts are described under **Nature and Type of Effects**

Under all alternatives, impacts from energy and mineral development would be minimal. The Tabeguache Area would continue to be withdrawn from mineral entry, and would be closed to fluid minerals leasing, coal leasing, nonenergy solid mineral leasing, and mineral material disposal. Active coal leasing does not occur near the Tabeguache Area, but coal potential has been identified in and around the area and could have impacts should adjacent areas be developed. Impacts are described under **Nature and Type of Effects**

All alternatives would close the Tabeguache Area to motorized and mechanized travel; impacts are as described under **Nature and Type of Effects**.

All alternatives would manage the Tabeguache Area as ROW exclusion; impacts are as described under **Nature and Type of Effects**.

Implementing management for the following resources would have negligible or no impact on the Tabeguache Area and are therefore not discussed in detail: air quality, lands and realty, national trails and byways, and watchable wildlife viewing sites.

Alternative A

Under Alternative A, there are no ecological emphasis areas or protected lands with wilderness characteristics units, and there are no ACECs adjacent to or near the Tabeguache Area, so no indirect protections of the Tabeguache Area would occur. Approximately 1,240 acres of stream segments managed as eligible for inclusion in the NWSRS are contiguous to or overlapping with the Tabeguache Area. Impacts are as described under **Nature and Type of Effects**.

Alternative B

Alternative B would provide the most protection of wilderness character in the Tabeguache Area. Management to protect lands with wilderness characteristics units, ACECs (5,310 acres, or 66 percent of the Tabeguache Area), and ecological emphasis areas (8,060 acres, the entire Tabeguache Area), as well as managing stream segments as suitable for inclusion in the NWSRS

(1,240 acres, the same as under Alternative A), would provide adjacent and overlapping protective management. Management of the Shavano Creek lands with wilderness characteristics unit, near the Tabeguache Area, could provide additional protection for such resources as air and noise due to limitation on development in this unit. Additional impacts are as described under **Nature and Type of Effects**.

In addition to the restrictions on development described under **Effects Common to All Alternatives**, under Alternative B, an SSR restriction would limit surface disturbance from all activities, thereby preserving 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, naturalness, and undeveloped character.

Alternative C

Alternative C would provide the fewest special designation areas, so the indirect impacts from special designation areas next to or near the Tabeguache Area would be minimized. Under Alternative C, there are no protected lands with wilderness characteristics units. No stream segments would be managed as eligible or suitable for inclusion in the NWSRS. Impacts are as described under **Nature and Type of Effects**.

Alternative D

Under Alternative D, there are no protected lands with wilderness characteristics units near or overlapping with the Tabeguache Area, so no indirect protections would occur. Management to protect ecological emphasis areas (8,060 acres, the entire Tabeguache Area), as well as managing stream segments as suitable for inclusion in the NWSRS (1,010 acres, less than under Alternative A), would provide adjacent and overlapping protective management. Impacts are as described under **Nature and Type of Effects**. Under Alternative D, SSR restrictions would be applied, with impacts as described under Alternative B.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on the Tabeguache Area is the Uncompahgre RMP planning area. Trends described in **Chapter 3**, including increasing visitation and recreation in the area, continue to have potential to impact wilderness character if visitation to the Tabeguache Area or adjacent lands were to increase. In addition, development of coal or other energy and mineral resources next to the Tabeguache Area could impact perceived wilderness character. Of note is potential for coal development on private lands in the Nucla-Naturita coal field.

4.5.3 Wild and Scenic Rivers

This section discusses the impacts on Wild and Scenic Rivers (WSRs) from the proposed management actions of other resources and resource uses. Existing conditions are described in **Section 3.3.3** (Wild and Scenic Rivers).

Methods and Assumptions

Indicators

The indicator of impacts on WSRs is any potential change to the ORVs, tentative classification (i.e., wild, scenic, or recreational), or free-flowing condition of the river segment or corridor area from its current state, or a reduction in water quality to the extent that it would no longer support the ORVs, as described in **Section 3.3.3** and Appendix B of the draft Wild and Scenic River Suitability report. The preliminary classification and identified ORVs for each segment are summarized below in **Table 4-81** (Summary of Wild and Scenic River Study Segments). The length and acreage of the study corridor for each segment can be found in **Table 2-4** (Summary of Wild and Scenic River Study Segments (Alternatives A and B)) and **Table 2-5** (Summary of Wild and Scenic River Study Segments (Alternative D)) in **Chapter 2**.

Documentation of the process used to determine suitability can be found in Appendix B of the draft Wild and Scenic River Suitability report.

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- All suitable stream segments under consideration for WSR designation will be managed under interim protective measures required by the WSR Act and BLM Manual 6400, Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, Planning, and Management (BLM 2012h) until the Record of Decision for this RMP is adopted. At that time, any stream segment not found suitable for inclusion in the National Wild and Scenic Rivers System (NWSRS) would lose its interim protection. This procedure and the interim protective measures would ensure that the values for which these river segments were found eligible and suitable are not compromised until Congress makes a decision regarding WSR designation.
- If WSR designation is not provided (i.e., if segments are found not suitable and released from further study under the WSR Act), provisions could still remain to protect these river corridors under a combination of existing plans and policies and actions proposed under the action alternatives of this RMP. These provisions protect streamside and riparian habitats, riparian and aquatic wildlife, water quality, and cultural and visual resources. The major difference between designation and nondesignation is the legislative and, thus, lasting protection afforded designated streams. Decisions in this RMP, however, affect suitability only. Once a segment is determined suitable, only Congress can formally designate it as part of the NWSRS.
- The BLM would not permit any actions that would adversely affect the free-flowing condition, ORVs and adequate water quality to support those ORVs, or tentative classification of any of the segments, or would result in the reduction of water quality to the extent that it would no longer support the ORVs. As such, implementing management actions in this RMP would not adversely impact eligible or suitable segments. As a result, there would not be impacts from other resources

**Table 4-81
Summary of Wild and Scenic River Study Segments**

River or Creek	Preliminary Classification	Outstandingly Remarkable Values
Gunnison River Segment 2 ^{AB}	Recreational	Fish
Monitor Creek	Wild	Vegetation
Potter Creek	Wild	Vegetation
Roubideau Creek Segment 1	Wild	Recreational, Wildlife, Cultural, Vegetation
Roubideau Creek Segment 2 ^{AB}	Scenic	Wildlife, Vegetation
Deep Creek ^{AB}	Scenic	Fish
West Fork Terror Creek ^{AB}	Scenic	Fish
Beaver Creek	<i>Alternatives A and B: Scenic Alternative D: Recreational</i>	Vegetation
Dry Creek ^{AB}	Wild	Scenic, Geologic
Naturita Creek ^{AB}	Scenic	Fish
Saltado Creek	Wild	Vegetation
San Miguel River Segment 1	Recreational	Scenic, Recreational, Wildlife, Historic, Vegetation, Paleontology
San Miguel River Segment 2	Wild	Scenic, Recreational, Wildlife, Vegetation
San Miguel River Segment 3	<i>Alternatives A and B: Scenic Alternative D: Recreational</i>	Recreational, Fish, Wildlife, Vegetation
San Miguel River Segment 5	Recreational	Recreational, Fish, Historic, Vegetation
San Miguel River Segment 6	Recreational	Recreational, Fish, Historic, Vegetation
Tabeguache Creek Segment 1	Wild	Vegetation
Tabeguache Creek Segment 2 ^{AB}	Recreational	Cultural, Vegetation
Lower Dolores River	Scenic	Scenic, Recreational, Geologic, Fish, Wildlife
North Fork Mesa Creek ^{AB}	Scenic	Vegetation
Dolores River Segment 1a (<i>portion within the Dolores River Canyon WSA</i>)	Wild	Recreational, Scenic, Fish, Wildlife, Geology, Ecologic, Archaeology
Dolores River Segment 1b ^{AB} (<i>portion from the Dolores River Canyon WSA to Bedrock</i>)	Recreational	Recreational, Scenic, Fish, Wildlife, Geology, Ecologic, Archaeology
Dolores River Segment 2	Recreational	Scenic, Recreational, Geologic, Fish, Wildlife, Vegetation

Table 4-81
Summary of Wild and Scenic River Study Segments

River or Creek	Preliminary Classification	Outstandingly Remarkable Values
Ice Lake Creek Segment 2 ^{AB}	Scenic	Scenic
La Sal Creek Segment 1 ^{AB}	Recreational	Fish, Vegetation
La Sal Creek Segment 2	<i>Alternatives A and B: Scenic Alternative D: Recreational</i>	Fish, Vegetation
La Sal Creek Segment 3	Wild	Scenic, Recreational, Fish, Cultural, Vegetation
Lion Creek Segment 2 ^{AB}	Scenic	Vegetation
Spring Creek ^{AB}	Recreational	Vegetation

^{AB} This segment is identified as eligible or suitable only under Alternatives A and B, respectively.

under alternatives with either eligible or suitable segments. Recognizing that, the analysis of impacts on eligible and suitable WSR stream segments includes an evaluation of where management actions might be inconsistent with the tentative classification given to each suitable segment, as well as potential impacts on its ORVs or free-flowing condition. For Alternatives C and D, in which some segments are found not suitable and, thus, lose their interim protection, the impacts from other management prescriptions on the ORVs are analyzed because the values for which the segments were found eligible would still be present.

- A withdrawal is an administrative designation made by the BLM that prohibits certain activities on the identified federal lands to protect the identified value. The BLM's determination of whether a stream segment is suitable or not suitable could affect some of these withdrawals, especially withdrawals that are designed to protect potential water storage and potential hydropower generation sites. If the BLM determines that a stream segment is suitable, the final management plan could recommend revocation of water storage or hydropower related withdrawals. In addition, Congress could require revocation of certain withdrawals if it were to designate a river segment. A WSR management plan created in accordance with designation could also include a recommendation for revocation of withdrawals.

Nature and Type of Effects

The potential impact on each stream segment depends on the ORVs identified for the segment and the tentative classification of the segment. Segments classified as recreational would allow for the greatest level of development in the study corridor, while segments classified as wild must remain relatively undeveloped. Segments classified as scenic fall in between recreational and wild segments, allowing a moderate amount of development within the study corridor. Because segments classified as recreational would allow development to the extent it is compatible with the protection of the identified ORVs, impacts on segments classified as wild or scenic are the focus of the analysis of impacts on the segments' classification. In the planning area, impacts on the tentative classification would come mostly from trail and road

development, developed campsites, mineral and energy development, timber harvest, and, along segments classified as wild, heavy use by livestock.

Management actions that prohibit surface-disturbing activities, including ROW exclusion areas, in the WSR study corridor would provide some amount of protection for a number of ORVs, including cultural, vegetation, fish, scenic, wildlife, and geological, by keeping the ORVs intact from human disturbance. This would also ensure that the tentative classification of the area remains intact.

Properly functioning riparian/wetland vegetation communities provide soil stabilization, soil filtration, and diverse vegetation species. In turn, properly functioning riparian/wetland vegetation communities can provide protection for vegetation, fish, and wildlife ORVs. Uses in riparian/wetland vegetation that could degrade the riparian/wetland vegetation ORV, thereby potentially indirectly diminishing the wildlife ORV associated with canyon tree frog breeding pools, include camping, livestock grazing, livestock trailing, and trail development. These activities can also cause soil erosion and degrade water quality, potentially impacting the fish ORV.

Managing the segments according to VRM Class I or II objectives would provide direct protection to segments with a scenic ORV by requiring that alterations to the landscape be done so as not to dominate the viewshed. If alterations cannot be mitigated to reach the VRM class objective, they would not be permitted. Because most large-scale developments cannot meet VRM Class I or II objectives, managing to protect the scenic values of the planning area would generally preclude most large-scale developments. In turn, this would provide indirect protection to segments with a cultural or historical ORV where a relatively unmodified landscape is part of the setting, vegetation ORVs, and wildlife and geological ORVs.

Effects Common to All Alternatives

Under all alternatives, Roubideau Creek Segment 1 is within the Camel Back WSA, and Dolores River Segment 1a and La Sal Creek Segment 3 are within the Dolores River Canyon WSA. Typically, management of WSAs to meet the nonimpairment standard (described in BLM Manual 6330, Management of Wilderness Study Areas [BLM 2012b]) and specific management prescriptions provide protection for both the tentative classification of segments within WSAs by prohibiting or otherwise precluding the type of development that would change the free-flowing condition or result in a change in classification of wild segments to a scenic classification. Management of WSAs includes management as VRM Class I, minimal allowances for surface-disturbing activities, closure to fluid, coal, and nonenergy solid mineral leasing, ROW exclusion, and closure to wood cutting and wood product sales and harvest; impacts would be as discussed under **Nature and Type of Effects**. Management of WSAs also provides protection to ORVs, except for those that depend on a specific water flow, such as vegetation (Roubideau Creek Segment 1, La Sal Creek Segment 3), fish (La Sal Creek Segment 3), and ecology (Dolores River Segment 1a). This is because WSAs do not carry an instream flow water right, so water appropriated upstream could impact the vegetation and fish ORVs.

Similarly to WSAs, the segment within the Tabeguache Area, Tabeguache Creek Segment 1, would receive indirect protection for the free-flowing condition and tentative classification, as discussed for WSAs, from management of the Tabeguache Area. This includes management as

VRM Class I, closure to motorized and mechanized travel, minimal allowances for surface-disturbing activities, ROW exclusion, closure to wood cutting and wood product sales and harvest, withdrawal from locatable mineral entry, closure to fluid, coal, nonenergy solid mineral leasing, and closure to mineral material disposal. While the Tabeguache Area does not have an instream flow water right provided in the congressional designation of the area, a state-based flow water right provides protection for the vegetation ORV.

A portion of Roubideau Creek Segment I is not allotted for livestock grazing, including sheep, under Alternative A. While the remaining portion of the segment isn't closed to domestic sheep grazing, domestic sheep grazing does not currently occur in the study corridor. Under Alternatives B, C, and D, the study corridor would be closed to domestic sheep grazing. The absence of domestic sheep in this portion of the study corridor would ensure the protection of desert bighorn sheep by minimizing the risk of disease transmission from domestic sheep to desert bighorn sheep in the surrounding area.

Impacts from implementing management for water resources, fish and wildlife, vegetation, special status species, and cultural resources would provide protection to segments that have those ORVs. As such, impacts from the management of these resources are not discussed further. In addition, implementing management for the following resources would not impact wild and scenic rivers and are therefore not discussed in detail: air quality, climate, soils, wild horses, wildland fire ecology and management, paleontological resources, lands with wilderness characteristics, national trails and byways, watchable wildlife viewing sites, Native American tribal uses, and public health and safety.

Alternative A

Because segments were found eligible based on current management and existing conditions, and because the BLM must manage all eligible segments to protect the tentative classification, free-flowing condition, ORVs, and adequate water quality to support those ORVs, continuation of current management would not diminish the aforementioned qualities. ORVs could be indirectly enhanced by management for other resources.

Under this alternative, there are few restrictions on surface-disturbing activities or stipulations in place for fluid mineral leasing. For example, only 29.2 miles (19 percent) of eligible segments are closed to fluid mineral leasing. Approximately 22.6 miles (15 percent) of eligible segments are open to fluid mineral leasing with no stipulations (i.e., NSO, CSU, and TL), including 20.4 miles (32 percent) of segments classified as wild. Without specific restrictions in the RMP, the BLM must implement or require design features, mitigation measures, and monitoring systems to ensure the continued eligibility of the segments. Regarding locatable minerals, where activity presently exists within the quarter-mile study corridor, the current levels of activity are compatible with protection of the segment. Future developments would require a mine plan that includes measures to mitigate impacts on the segment for its continued eligibility for inclusion in the NWSRS.

All or portions of San Miguel River Segments 1, 2, and 3 are within the San Miguel River SRMA. Management of the SRMA, which targets floatboating and camping, would enhance the recreational ORV along these segments. At the same time, a portion of this area, which includes San Miguel River Segment 2, a portion of San Miguel River Segment 1, Beaver Creek, and Saltado

Creek, is also managed as an ACEC for the protection of riparian resources, bird habitat, and scenic values. These values overlap the ORVs of the segments, providing complementary management to enhance the ORVs.

Alternative B

Under Alternative B, all eligible segments would be determined suitable for inclusion in the NWSRS. Because segments were found eligible based on current management and existing conditions, and because the BLM would manage all suitable segments to protect the tentative classification, free-flowing condition, ORVs, and adequate water quality to support those ORVs, management proposed under Alternative B would not diminish the aforementioned qualities.

The BLM would implement specific measures that would help ensure protection to the free-flowing condition, tentative classification, and ORVs of the segments. Restrictions for wild segments, including management as VRM Class I and ROW exclusion; closure to mineral material disposal, nonenergy solid mineral leasing, and coal leasing; recommendation to the Secretary of the Interior for withdrawal from locatable mineral entry, and prohibition of other surface-disturbing activities would ensure that the wild classification of the segments and ORVs are maintained. In addition, an NSO stipulation would be attached to fluid mineral leases within the quarter-mile study corridor, so any fluid mineral development would occur outside of the corridor.

While scenic and recreational segments would not have the same level of restrictions as wild segments, management prescriptions would allow more activities consistent with the scenic and recreational classification. In these areas, the BLM might need to implement or require design features, mitigation measures, and monitoring systems to ensure the continued eligibility of the segments.

ORVs could be indirectly enhanced by management for other resources.

Monitor and Potter Creeks are within the Camel Back WSA Adjacent, managed to protect wilderness characteristics under this alternative. Managing for wilderness characteristics, including naturalness, could enhance the vegetation ORV by managing these lands and surrounding areas to maintain the natural qualities of the unit.

All or portions of San Miguel River Segments 1, 2, and 3 are within the San Miguel River SRMA. Management of the SRMA, which targets floatboating and camping, would enhance the recreational ORV along these segments. At the same time, a portion of this area, which includes San Miguel River Segment 2, a portion of San Miguel River Segment 1, Beaver Creek, and Saltado Creek, is also managed as an ACEC for the protection of riparian resources, bird habitat, and scenic values. These values overlap the ORVs of the segments, providing complementary management to enhance the ORVs.

Alternative C

Under Alternative C, no segments would be determined suitable for inclusion in the NWSRS, and all segments would be released from interim management protection afforded to eligible segments (described under Alternative A). However, management prescriptions for other

resources could overlap the study area and provide indirect protection to the ORVs and free-flowing condition.

During the suitability review of the eligible segments, new information became available for the ORVs along Roubideau Creek Segment 2 and North Fork Mesa Creek. It was determined that the ORVs for these two segments no longer rise to the level of outstandingly remarkable. Because these segments no longer contain ORVs, there would be no impacts from a WSR perspective.

Under Alternative C, the BLM would not pursue recommendations to the Colorado Water Conservation Board for protection or enlargements of in-stream flows on appropriate stream segments. Some segments, particularly those with water-based ORVs, such as fish, wildlife, vegetation, recreation, and scenic, rely on certain water levels for their existence. Should water levels drop, these ORVs could be diminished.

Managing the segments according to visual resource management (VRM) Class I or II objectives would provide direct protection to segments with a scenic ORV (i.e., Dry Creek; San Miguel River Segments 1 and 2; Lower Dolores River; Dolores River Segments 1a, 1b, and 2; Ice Lake Creek Segment 2; and La Sal Creek Segment 3) by requiring that alterations to the landscape be done in such a way so as not to dominate the viewshed. If alterations cannot be mitigated to reach the VRM class objective, they would not be permitted. In turn, this would provide incidental protection to vegetation, wildlife, and geological ORVs that could be threatened by surface-disturbing activities. Of the segments with a scenic ORV, 13.0 miles (23 percent), would be managed as either VRM Class I or II, providing direct protection to the scenic ORV and incidental protection to other ORVs. The remaining segments or portions of segments would be managed as VRM Class III which allows modifications to the landscape that could diminish the scenic ORV.

Under Alternative C, approximately 29.1 miles (19 percent) of segments would be closed to wood product sales and harvest, providing some protection to the ORVs, including fish, wildlife, vegetation, and ecological, within the corridor that might be impacted by habitat destruction, erosion, and runoff caused by wood clearing. Scenic values would also be protected by prohibiting this type of landscape modification. The remaining 126.4 miles (81 percent) of segments would be open to wood product sales and harvest, and the ORVs mentioned could experience impacts.

Approximately 29.1 miles (19 percent) of segments would be managed as ROW exclusion, which would protect all ORVs by precluding activities associated with utility and access road development that might cause habitat degradation, erosion, runoff, and modifications to the landscape affecting scenic quality and settings for cultural and historical ORVs. An additional 82.7 miles (53 percent) of segments would be managed as ROW avoidance. If the areas could be avoided, the same protections as under ROW exclusion would be experienced. If the areas could not be avoided, activities would minimize impacts through design features or mitigation measures. Finally, 31.8 miles (21 percent) of segments are within designated energy corridors. Where these corridors overlap ROW avoidance areas within the segment corridor, impacts would be minimized. Elsewhere, the location of ROWs could cause surface-disturbance that could impact any of the ORVs.

Approximately 29.1 miles (19 percent) of segments would be closed to fluid mineral leasing, which would protect all ORVs by precluding activities associated with mineral development that might cause habitat degradation, erosion, runoff, and modifications to the landscape affecting scenic quality and settings for cultural and historical ORVs. Approximately 8.8 miles (six percent) of segments would be protected by an NSO stipulation for fluid minerals, which would generally provide the same level of protection as closing the area to leasing because, while the mineral would still be available for extraction beneath the surface, facilities would be located outside of the study corridor. If NSO stipulations are excepted or waived, 125.1 miles (81 percent) would be protected by a CSU stipulation. While surface occupancy could still occur, mitigation measures would be implemented to minimize impacts on the resource for which the stipulation was designed to protect.

In addition to the current withdrawal from locatable mineral entry for Tabeguache Creek Segment 1, 0.1 miles (less than one percent) of segments would be recommended for withdrawal from locatable mineral entry. The remaining segments would be available for locatable mineral entry. Along segments east of the Uncompahgre Plateau, there has been no exploration or development for these minerals, and resource potential is thought to be low. For all other segments, facilities and surface-disturbance associated with locatable mineral exploration and development could impact any of the ORVs.

Approximately 29.3 miles (19 percent) of segments would be closed to mineral material disposal, and the remaining areas would be open. If development of these minerals occurred within the study corridor, it is possible the fish could be impacted by erosion or runoff caused by associated surface-disturbing activities.

Approximately 37.5 miles (24 percent) would be closed to nonenergy solid mineral leasing, and the remaining areas would be open. Along segments outside of the Paradox Valley, the potential is thought to be low, so impacts from nonenergy solid mineral development would not be expected. Within the Paradox Valley, resource occurrence potential is high, so potential impacts could be possible. However, because development potential is low, the likelihood of potential impacts is limited.

Approximately 10 miles of seven study segments determined not suitable for inclusion in the NWSRS are within the area of coal potential (Beaver Creek, West Fork Terror Creek, Deep Creek, North Fork Mesa Creek, Dry Creek, Naturita Creek, and Tabeguache Creek Segment 2). Under Alternative C, only 0.2 miles of Tabeguache Creek Segment 2 would be closed to coal leasing. If coal development were to occur within the study corridor of the segments available for coal leasing, it could impair riparian vegetation impacting riparian ORVs and fish habitat, as well as impair scenic values.

Where segments with a recreational ORV are within ERMA, managing for targeted recreation would enhance the recreational ORV of the segments. This includes Roubideau Creek Segment 1, San Miguel River Segment 5 and 6, Dolores River Segment 2, Dolores River Segment 1a, San Miguel River Segments 1, 2, and 3, Saltado Creek, and a portion of Beaver Creek. On the other hand, an increased number of users could impact the biological ORVs by trampling or contaminating the area. This includes Naturita Creek, Monitor Creek, and Potter Creek.

San Miguel River Segments 1, 2, and 3, Saltado Creek, and a portion of Beaver Creek are within the San Miguel River ACEC for the protection of riparian resources, bird habitat, and scenic values, which overlap the ORVs of the segments, providing complementary management to enhance the ORVs.

Alternative D

Under Alternative D, all or portions of 16 segments would be determined suitable for inclusion in the NWSRS. Because segments were found eligible based on current management and existing conditions, and because the BLM would manage all suitable segments to protect the tentative classification, free-flowing condition, ORVs, and adequate water quality to support those ORVs, management proposed under Alternative D would not diminish the aforementioned qualities of suitable segments. Specific measures could be implemented to ensure the continued suitability, described in **Chapter 2**. Qualities could be indirectly enhanced by management for other resources.

Under Alternative D, 13 stream segments would be determined not suitable for inclusion in the NWSRS. In addition, portions of eight segments in which only a portion of the eligible stream was determined suitable for inclusion in the NWSRS would be determined not suitable and released from further study under the WSR Act. During the suitability review of the eligible segments, new information became available for the ORVs along Roubideau Creek Segment 2 and North Fork Mesa Creek. It was determined that the ORVs for these two segments no longer rise to the level of outstandingly remarkable. Because these segments no longer contain ORVs, there would be no impacts from a WSR perspective. Impacts on the remaining segments determined not suitable are discussed below.

The BLM would continue to make recommendations to the Colorado Water Conservation Board for protection or enlargements of in-stream flows on appropriate stream segments. If granted along any of the segments determined not suitable for inclusion in the NWSRS, water-based ORVs, including fish, wildlife, vegetation, recreation, and scenic, would be protected.

Site-specific relocation restrictions for other surface-disturbing activities would be applied to all segments determined not suitable for inclusion in the NWSRS. This would provide some protection to all ORVs by relocating activities or designing or siting them in a manner to minimize impacts.

Managing the segments according to visual resource management (VRM) Class I or II objectives would provide direct protection to segments with a scenic ORV (i.e., Dry Creek; San Miguel River Segments 1 and 2; Lower Dolores River; Dolores River Segments 1a, 1b, and 2; Ice Lake Creek Segment 2; and La Sal Creek Segment 3) by requiring that alterations to the landscape be done in such a way so as not to dominate the viewshed. If alterations cannot be mitigated to reach the VRM class objective, they would not be permitted. In turn, this would provide incidental protection to vegetation, wildlife, and geological ORVs that could be threatened by surface-disturbing activities. Of the 14.1 miles of segments determined not suitable for inclusion in the NWSRS with a scenic ORV, 1.3 miles (9 percent), would be managed as either VRM Class I or II, providing direct protection to the scenic ORV and incidental protection to other ORVs. The remaining segments or portions of segments would be managed as VRM Class III which allows modifications to the landscape that could diminish the scenic ORV.

Under Alternative D, all segments determined not suitable for inclusion in the NWSRS would be closed to wood product sales and harvest, providing some protection to the ORVs, including fish, wildlife, vegetation, and ecological, within the corridor that might be impacted by habitat destruction, erosion, and runoff caused by wood clearing. Scenic values would also be protected by prohibiting this type of landscape modification.

Fewer than two percent of segments would be managed as ROW exclusion, which would protect all ORVs by precluding activities associated with utility and access road development that might cause habitat degradation, erosion, runoff, and modifications to the landscape affecting scenic quality and settings for cultural and historical ORVs. The remaining segments (98 percent) would be managed as ROW avoidance. If the areas could be avoided, the same protections as under ROW exclusion would be experienced. If the areas could not be avoided, activities would minimize impacts through design features or mitigation measures. Finally, six miles of segments are within designated energy corridors. However, because these corridors overlap either ROW avoidance areas within the segment corridor, impacts would be minimized.

About one percent of segments would be closed to fluid mineral leasing, which would protect all ORVs by precluding activities associated with mineral development that might cause habitat degradation, erosion, runoff, and modifications to the landscape affecting scenic quality and degradation for cultural and historical ORVs. All of the segments not closed to fluid mineral leasing would be protected by an NSO stipulation for fluid minerals, which would generally provide the same level of protection as closing the area to leasing because, while the mineral would still be available for extraction beneath the surface, facilities would be located outside of the study corridor. If an NSO stipulation were excepted, modified, or waived, 37.4 miles (81 percent of segments not closed) would still be protected by a CSU stipulation for fluid minerals. While surface occupancy could still occur, mitigation measures would be implemented to minimize impacts on the resource for which the stipulation was designed to protect.

In addition to the current withdrawal from locatable mineral entry for Tabeguache Creek Segment 1, 77.1 miles (51 percent) of segments would be recommended for withdrawal from locatable mineral entry. The remaining segments would be available for locatable mineral entry. Along segments east of the Uncompahgre Plateau, there has been no exploration or development for these minerals, and resource potential is thought to be low. For all other segments, facilities and surface-disturbance associated with locatable mineral exploration and development could impact any of the ORVs.

All segments would be closed to mineral material disposal, so the ORVs would be protected from disturbances associated with mineral material development.

Approximately 4.6 miles (10 percent) would be closed to nonenergy solid mineral leasing, and the remaining areas would be open. Along segments outside of the Paradox Valley, the potential is thought to be low, so impacts from nonenergy solid mineral development are not expected. Within the Paradox Valley, resource occurrence potential is high, so potential impacts could be possible. However, because development potential is low, the likelihood of potential impacts is limited.

Approximately 9.5 miles of six study segments determined not suitable for inclusion in the NWSRS are within the area of coal potential (West Fork Terror Creek, Deep Creek, North Fork Mesa Creek, Dry Creek, Naturita Creek, and Tabeguache Creek Segment 2). Under Alternative D, only 0.2 miles of Tabeguache Creek Segment 2 would be closed to coal leasing. Impacts would be the same as described for Alternative C.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on WSRs includes all land, regardless of ownership, within the Uncompahgre RMP planning area and surrounding BLM field offices. Under Alternatives A, B, and D, where stream segments would be found eligible or suitable, management of the segments would be consistent with neighboring BLM field offices, whose staff also found that portions of those rivers are suitable for inclusion in the NWSRS.

There are no reasonably foreseeable future projects at this time that would impact the segments. However, if major projects were proposed and there were no systematic analysis of impacts on river-related values, in accordance with to the WSR Act, there could be significant cumulative impacts on river-related values.

Other federal agencies considering permit applications (not under BLM authority) that could affect the free-flowing condition, ORVs, or tentative classification of any of the eligible or suitable segments would need to seek formal comments from the BLM, and the BLM would discourage projects with such impacts or suggest terms and conditions to eliminate, avoid, or mitigate impacts. Other agencies would not be required to act on the BLM's comments, so the effect on eligible and suitable segments would depend on the decisions outside of BLM authority. For stream segments determined not suitable under Alternatives C and D, the BLM would not make recommendations based solely on the need to protect WSR values when it is asked for comments on projects authorized by other agencies. Rather, if asked to comment, the BLM would focus on impacts on documented multiple use values, rather than focusing on compliance with the WSR Act standards for protection of ORVs, free flowing condition, and classification.

4.5.4 National Trails and Byways

This section discusses impacts on national trails and byways from proposed management actions of other resources, resource uses, and special designations. Existing conditions are described in **Section 3.3.4** (National Trails and Byways).

Methods and Assumptions

Indicators

National Trails

Indicators of impacts on national trails are as follows:

- Alterations to the level of public recreation or changes to the scenic, natural, and cultural resources of the Old Spanish National Historic Trail
- Alterations to the level of public recreation or changes to the scenic, natural, and cultural resources of the Tabeguache Trail and Paradox Trail

For all agency undertakings that could impact national historic trails, the BLM complies with Section 106 of the NHPA before the undertaking. Section 106 compliance typically includes inventory, evaluation, and consultation with the Colorado State Historic Preservation Office. The BLM would manage National Scenic and Historic Trails according to policy provided in BLM Manual 6250, National Scenic and Historic Trail Administration (BLM 2012i); BLM Manual 8353, Trail Management Areas – Secretarially Designated National Recreation, Water, and Connecting and Side Trails (BLM 2012j); and BLM Manual 6280, Management of National Scenic and Historic Trails and Trails Under Study or Recommended as Suitable for Congressional Designation (BLM 2012k).

Byways

Indicators of impacts on byways and skyways are as follows:

- Alterations to the level of public access
- Alterations to the archaeological, cultural, historic, natural, recreational, and scenic qualities the byways and skyways are managed for

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- National trails and related sites are protected in accordance with federal laws and BLM regulations and agreements.
- The BLM looks favorably at opportunities to cooperate with private landowners to minimize or eliminate disturbance to national trails.
- Recognizing that national trails often comprise numerous routes rather than a single trace, all protective zones begin at the outer edges of trails rather than at a centerline, which is difficult to define.
- Certain projects, due to their size or topography of the land, could require consideration of visual intrusions into the setting beyond the foreground or middle ground zones to comply with Section 106 of the NHPA.
- The BLM would work with local, state, and federal partners to manage state and federal byways.
- Management prescribed for national and state byways and skyways would provide opportunities for motor touring, while enhancing the understanding of the multiple uses of BLM-administered lands.

Nature and Type of Effects

National Trails

Direct impacts on national trails typically result from actions that disturb the soil or alter the surrounding environment's characteristics that contribute to trail significance and introduce visual elements out of character with the property or that alter its setting, or result in neglect of the resource to the extent that it is impaired or destroyed. For example, surface-disturbing

activities that destroy or alter trail ruts for historic trails are considered a direct impact. Direct impacts also include proactive trail management, such as the preservation of buffer zones.

Indirect impacts on national trails result from project-induced increases or decreases in activity in the planning area. The construction of a recreation facility could increase visitor use, which could result in indirect impacts on previously undisturbed trail segments, particularly along national historic trails. Construction in an area some distance from a trail also can result in erosion or deposition at a trail location.

Management for other resources (vegetation, wildlife, cultural and paleontological resources, and special designations) along the lands next to national trails could impact features of trails and the visitor experience. Wildlife habitat improvement projects could indirectly provide some enhancement or preservation of national trail qualities. Timing limitations for wildlife and special status species could impact national trails indirectly by closing these trails seasonally to protect wildlife or special status species. Closure of these national trails would make them unavailable for public use or recreation. Protection of cultural and paleontological resources could indirectly impact national trails by preserving the cultural and paleontological resource values in the area.

Management of soils and water quality could limit surface-disturbing activities on steep slopes, sensitive soils, or critical watersheds, making them unavailable for public use or recreation. Stipulations on surface-disturbing activities (e.g., NSO, CSU, and TL for fluid minerals development, or NGD, SSR, and TL for other surface-disturbing activities) could locally impact national trails indirectly by restricting or minimizing surface disturbance, thus preserving the scenic, natural, and cultural resource values in the area.

Impacts on national trails from livestock grazing include trampling, conflicts with unsocialized sheep guard dogs, as well as manure impacts. The intensity of the impact would vary with the visitor's experience of recreating in areas where livestock graze. In addition, development of livestock grazing facilities impacts the naturalness attribute of the physical setting. Stock ponds and catchments contrast with the natural landscape.

Future comprehensive travel and transportation management implementation decisions for the Old Spanish, Tabeguache, and Paradox Trails could directly impact trail usage. Travel restrictions would impact the types of experiences available along these trails. Opening the trails to more types of uses would likely increase use levels but could increase conflicts.

Development of pipelines and electricity transmission and distribution facilities next to trails could directly impact the trail during construction. 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. The West-wide Energy Corridor is exempt from ROW exclusion areas.

Management actions (VRM Class I; ROW exclusion; closed to wood cutting and wood product sales and harvest; closed to fluid minerals, coal, and nonenergy solid mineral leasing; and NGD restrictions) for the Adobe Badlands WSA could indirectly impact the Old Spanish Trail by

restricting or minimizing surface disturbance, thus preserving the historic, natural, and scenic qualities of lands next to the trail.

Byways

Byways and skyways are used frequently and are susceptible to direct and indirect impacts. Direct impacts on byways and skyways are any action that substantially limits or prevents the use of the byway or skyway. Indirect impacts are actions that alter the scenic or historic values associated with the byway or skyway.

Management for other resources (e.g., vegetation, wildlife, and cultural resources) along the lands next to byways could impact the visitor experience of traveling the byway. Wildlife habitat improvement projects could indirectly provide some enhancement or preservation of qualities of byways over the long term. Restoring unhealthy vegetation communities and reducing infestations of noxious weeds could indirectly affect byways by enhancing the natural diversity of the native landscape in areas next to the byways over the long term. Short-term disturbance could occur due to the use of machinery for vegetation manipulation, but these effects would be temporary. Weed treatments would provide localized benefit where applied. Protection of cultural resources could indirectly impact byways by preserving the cultural resource values in the area of the byway.

Management of soils and water quality could limit surface-disturbing activities in specific areas (e.g., steep slopes, sensitive soils, and critical watersheds) along byways. Stipulations on surface-disturbing activities (e.g., NSO, CSU, and TL for fluid minerals development or NGD and SSR for other surface-disturbing activities) could locally impact byways indirectly by restricting or minimizing surface disturbance, thus preserving the scenic, natural, and cultural resource values in the area of the byway.

Development of pipelines and electricity transmission and distribution facilities in utility corridors that cross the byway or are next to the byway could directly impact byways during construction. Indirect impacts from development in these corridors could include changes to scenic resources.

Effects Common to All Alternatives

National Trails

The 50 miles of the Old Spanish National Historic Trail on BLM-administered lands in the decision area is minimal; approximately 9 miles of the trail are under BLM jurisdiction. Once the Old Spanish Trail Comprehensive Management Plan is completed by the National Park Service and BLM, in cooperation with the Old Spanish Trail Association, the portion of the trail on BLM-administered lands would be managed accordingly to minimize impacts on the trail. In the interim, BLM management actions would have minimal impact on the congressionally-designated Old Spanish Trail corridor under any alternative. However, impacts on the surrounding environment's characteristics that contribute to trail significance and introduce visual elements out of character with designated corridor, or that alter its setting could occur. These types of impacts are discussed below by alternative.

Under all alternatives, portions of the West-wide Energy Corridor are next to the Old Spanish Trail. Impacts are described under ***Nature and Type of Effects***.

Implementing management for the following resources would have negligible or no impact on national trails and are therefore not discussed in detail: air quality, climate change, land health, wild horses, wildland fire management, lands with wilderness characteristics, forestry and woodland products, wilderness, wild and scenic rivers, byways, and watchable wildlife viewing sites.

Byways

For all alternatives, the BLM would support the management of designated national and Colorado byways within the planning area consistent with other resources. Designated All-American Roads include the San Juan Skyway; National byways include the Grand Mesa Scenic and Historic Byway, and any additional byways or All-American Roads designated by the US Secretary of Transportation during the life of the RMP. Designated Colorado byways include the Unaweep/Tabeguache Scenic Byway and the West Elk Loop.

All of the byways have sections of utility corridors (designated or proposed corridors) that cross the byway or are next to the byway. Impacts are described under ***Nature and Type of Effects***.

Implementing management for the following resources would have negligible or no impact on byways and are therefore not discussed in detail: air quality, climate change, land health, wild horses, wildland fire ecology and management, paleontological resources, lands with wilderness characteristics, forestry and woodland products, livestock grazing, comprehensive trails and travel management, wilderness and WSAs, and national trails.

Alternative A

National Trails

Under Alternative A, the BLM would continue to work with the National Park Service and local nonfederal partners to manage the Old Spanish Trail. The Tabeguache and Paradox Trails would not be proposed for listing as national recreational trails.

Because the area around the Paradox Trail is an undesignated VRM area, indirect impacts on national trails could result in long-term changes to the scenic quality from major modifications to the landscape. The Old Spanish and Tabeguache Trails are in or next to areas managed as VRM Class III. These areas would be managed to partially retain the existing character of the landscape. Management activities in these areas could attract the attention of the observers, which could indirectly alter the scenic quality or setting of these trails.

The Old Spanish, Tabeguache, and Paradox Trails are all within areas not managed as RMAs (based on current BLM recreation guidance). Under Alternative A, the BLM would not make a commitment to the quality or quantity of recreation opportunities. Since recreation would be managed consistently with other resources and uses, recreation settings and opportunities would be impacted by those other uses, and current opportunities and recreation settings could change over the long term as a result of those impacts.

Under Alternative A, the Old Spanish Trail, Tabeguache, and Paradox Trails are not in areas managed as ROW avoidance or exclusion areas. This could result in surface disturbance and development related to ROW activities that could indirectly alter the scenic, natural, and cultural values associated with these trails during construction and in the long term during operation of facilities.

All congressionally designated trails would be closed to coal leasing, so there would be no impacts on the Old Spanish Trail from mining coal. Portions of the Paradox Trail near Nucla are in areas acceptable to coal leasing. Because this trail is not congressionally designated under Alternative A, sections of the trail in areas potentially leased for coal would 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.

Under Alternative A, most of the Old Spanish, Tabeguache, and Paradox Trails on BLM-administered lands are in areas open to fluid mineral leasing with no stipulations (NSO or CSU). Because these restrictions would not be in place, potential fluid mineral development would not be compatible with preservation of trail values and could alter trail users' expected outcomes. A small section of the Old Spanish Trail east of Montrose is in an area withdrawn from mineral entry, eliminating impacts from mineral development in that area. Portions of the Paradox Trail are in an area recommended for withdrawal from locatable mineral entry, thereby reducing the potential for direct and indirect impacts on this trail from mineral development (e.g., surface disturbance and visual intrusions) in the short and long term. Most of the Old Spanish, Tabeguache, and Paradox Trails are in areas open to mineral material disposal. Indirect long-term impacts from potential mineral disposal include changes to the scenic quality of these trails.

Under Alternative A, the Old Spanish, Tabeguache, and Paradox Trails would not be in any ACECs and would not be impacted by management actions related to ACEC management.

Byways

By not establishing any BLM byways, resources along BLM roads would not receive the level of public recognition, and traffic would not increase at levels commensurate with an official byway.

Because the BLM-administered lands around the San Juan Skyway are an undesignated VRM area, indirect impacts on this byway could include changes to scenic quality from major modifications to the landscape. Sections of the Unaweep-Tabeguache Byway are in or next to areas managed as VRM Class II. These areas would be managed to retain the existing character of the landscape. Management activities in these areas should not attract the attention of the observers; however, indirect impacts could result if an observer were to focus on the management activity. Sections of the West Elk Loop Byway are in or next to areas managed as VRM Class III. These areas would be managed to partially retain the existing character of the landscape. Management activities in these areas could attract the attention of the observers, which could indirectly alter the scenic quality of the byway.

A portion of the Unaweep-Tabeguache Byway and San Juan Skyway runs through the San Miguel SRMA, and driving for pleasure combined with SRMA visitation could lead to increased use. Increased recreation management in these SRMAs could provide additional opportunities for activities and experiences for byway users in the long term. Enhanced awareness and

appreciation can result in increased protective actions but may also strain resources. In addition, noticeable increases in traffic may be perceived as a negative impact by local residents who value remote settings or depend on the byways for transportation.

Under Alternative A, portions of the UnawEEP-Tabeguache Byway and West Elk Loop are in ROW exclusion areas. This would reduce surface disturbance and development related to ROW activities that could indirectly alter the scenic, natural, and cultural values associated with these trails.

A small area east of Naturita near the UnawEEP-Tabeguache Byway is acceptable to coal leasing. Indirect impacts could alter the scenic values of the byway if coal mining were to occur in areas visible to travelers. Sections of the West Elk Loop Byway east of Paonia travel through the active Somerset Coal Field. Any future coal mining in this area could contribute to visual impacts for travelers on this section of the byway already occurring from coal mining.

Under Alternative A, the Grand Mesa Byway and West Elk Loop on BLM-administered lands are in areas open to fluid mineral leasing with no stipulations (e.g., NSO or CSU). Portions (east of Norwood) of the UnawEEP-Tabeguache Byway are in areas with NSO stipulations. Most of the UnawEEP-Tabeguache Byway (west of Norwood), and sections of the San Juan Skyway are in areas open to fluid mineral leasing with CSU stipulations. Because these restrictions would not be in place, potential fluid mineral development would not be compatible with preservation of scenic values. Under Alternative A, none of the byways are in areas withdrawn from mineral entry. Similar to fluid mineral development, potential mineral exploration and development next to the byways could alter the scenic character of the byways. Portions of the UnawEEP-Tabeguache Byway and San Juan Skyway are in areas open to mineral material disposal. Disposal of material in these areas could also impact the scenic resources of the byway indirectly if visible from the roadway.

A portion of the UnawEEP-Tabeguache Byway passes through the San Miguel River ACEC. Under Alternative A, efforts to protect scenic and recreational ORVs along eligible WSR segments along the UnawEEP-Tabeguache Byway would benefit scenic values of the byways by prohibiting or limiting most surface-disturbing activities and would promote recreation along the byways.

Under Alternative A, no byways would be within any watchable wildlife viewing sites. No formal opportunities would be provided to view wildlife along the byways.

Alternative B

National Trails

Under Alternative B, management of the Old Spanish Trail would continue as described under Alternative A. However, the Tabeguache and Paradox Trails would be proposed for listing as national recreational trails. Should the proposal succeed, recreational use of these trails is likely to increase, thus providing the potential for greater opportunities for interpretation and education regarding the natural, cultural, and historical resources associated with these trails. This would also increase pressure on trail resources, including cultural and historic resources within the trail corridor and next to the trail.

An NSO stipulation for fluid minerals would prohibit surface occupancy within a half-mile buffer around the Old Spanish Trail. In addition, a CSU stipulation for fluid minerals restricting surface use within one-half to five miles on either side if the Old Spanish Trail would be in place. These stipulations would provide more protection from surface-disturbing activities than under Alternative A, reducing the potential for direct impacts on the trails from development and indirect impacts on scenic qualities and trail experience over the long term. In areas of NGD and SSR, national trails would also be less impacted in the short and long term by controlling surface-disturbing activities. If the Tabeguache and Paradox Trails were designated, an NSO stipulation would be in place that prohibits surface occupancy within a half-mile of the trail. Potential protections of the scenic qualities of these trails are similar to the Old Spanish Trail from this stipulation.

Similar to Alternative A, the Tabeguache Trail is in or next to areas managed as VRM Class III. Indirect impacts on this trail from visual resource management are the same as Alternative A. The Old Spanish Trail would be managed as VRM Class II within 0.5 mile of either side of the center line, providing additional protection from visual intrusions as compared to Alternative A. The Paradox Trail would be in areas managed as VRM Class II, III, and IV. Users of this trail could experience varying levels of surface disturbance or alterations to the landscape in the short and long term based on the VRM classification. VRM Class II areas would be managed to retain the existing character of the landscape, while areas of VRM Class III and IV would partially retain the landscape character or be changed dramatically due to development. Impacts would vary based on the restrictions and type of development. However, since VRM Class II objectives also limit the type and visibility of development that can occur, this management could preclude some development necessary to support recreation along the trail.

The portion of the Old Spanish Trail (1.0 mile) located within Kinikin SRMA, the portion of the Tabeguache Trail (13.3 miles) located in the Dry Creek SRMA, and the portion of the Paradox Trail (16.3 miles) located in the Paradox Valley SRMA would be managed according to the management actions of those SRMAs. Increased recreation management in these SRMAs could provide additional opportunities for activities and experiences for national trail users in the long term. Evidence of a management presence would provide a safe setting for users and fosters appropriate behavior that protects natural and cultural resources and the recreation setting. Where facilities are minimized, undeveloped settings would be maintained. However, developing new facilities would diminish undeveloped settings and opportunities for experiences, such as adventure, exploration, solitude, and escape from noise and crowds. Increased recreation management could also result in greater use of the trails, which could degrade the quality of the trail if overused and additional use of the trail could alter the number of encounters visitors would have with other trail users.

Unlike Alternative A, most of the Old Spanish, Tabeguache, and Paradox Trails would be in ROW exclusion and avoidance areas. This would limit the impacts from new development related to ROW activities in the short and long term, including transmission and roadway development.

Similar to Alternative A, all congressionally designated trails would be closed to coal leasing, so there would be no impacts on the Old Spanish Trail from mining coal. In addition, all

congressionally designated trails would be closed to mineral materials disposal and nonenergy solid mineral leasing within a half-mile buffer; therefore, the Old Spanish Trail would not be impacted by these activities under Alternative B. 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. Like Alternative A, because this trail is not congressionally designated under Alternative B, sections of the trail in areas potentially leased for coal would 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.

Under Alternative B, most of the Old Spanish, Tabeguache, and Paradox Trails on BLM-administered lands are in areas closed to fluid mineral leasing. Closing these areas would provide more protection of trail values than would Alternative A by limiting surface-disturbing activities and development. Under Alternative B, most of the Old Spanish Trail, Tabeguache, and Paradox Trails are in areas recommended for withdrawal from locatable mineral entry, eliminating impacts (e.g., surface disturbance and visual intrusions) in the short and long term from this type of mineral development in these areas. Portions of the Paradox Trail are in an area recommended for withdrawal from locatable mineral entry; therefore reducing the potential for impacts on this trail from mineral development. Unlike Alternative A, most of the Old Spanish, Tabeguache, and Paradox Trails would be in areas closed to mineral material disposal. This would eliminate potential indirect impacts on visual resources and recreation settings from material disposal in the long term.

Portions of the Old Spanish Trail pass through the proposed Fairview South (CNHP Expansion) ACEC (1.8 miles) and Salt Desert Shrub Ecosystem ACEC (8.0 miles); portions of the Tabeguache Trail pass through the Lower Uncompahgre ACEC (6.3 miles); and portions of the Paradox Trail pass through the East Paradox ACEC (5.8 miles), Tabeguache Pueblo and Tabeguache Caves ACEC (7.4 miles), and West Paradox ACEC (3.0 miles). Management activities tailored for what these ACECs were designated could indirectly preserve the scenic (habitat enhancements) and cultural values along these trails in the long term.

Byways

As under Alternative A, no BLM byways would be established under this alternative. The number of visitors traveling on BLM roads would not increase as a result of byway designations.

Under Alternative B, all national and BLM byways would be managed as VRM Class II within a half-mile of either side of the centerline. Alternative B.I would extend that buffer to 1 mile of either side of centerline for the West Elk Scenic Byway. Maintaining the existing character of the landscape within this area would indirectly protect the scenic qualities associated with the byway. Management activities in these areas should not attract the attention of the observers; however, indirect impacts could result if an observer were to focus on the management activity. By designating the area around byways as VRM Class II, opportunities to protect viewsheds would be greater than under Alternative A. In addition, an NSO stipulation would apply to fluid mineral leasing within a half-mile of scenic byways. Alternative B.I would extend that buffer to 1 mile of either side of centerline for the West Elk Scenic Byway. Restricting surface use within this area would indirectly protect the scenic qualities associated with the byway. Finally, a CSU

stipulation would be applied under Alternative B.1 beyond 1 mile of either side of centerline of the West Elk Scenic Byway to lands visible from the byway. This would further ensure that the scenic driving experience is protected from visual intrusions associated with fluid mineral development. Potential impacts from these uses would be less than under Alternative A because of the stipulations.

A portion of the Unaweep-Tabeguache Byway and San Juan Skyway would run through the San Miguel SRMA, and a portion of the Unaweep-Tabeguache Byway would run through the Paradox Valley SRMA. Scenic touring would be a targeted activity in these SRMAs. Potential impacts are the same as Alternative A.

Under Alternative B, most of the Unaweep-Tabeguache Byway, San Juan Skyway, and West Elk Loop are in areas managed as ROW exclusion and avoidance areas. These designations could provide more opportunities to preserve the historic, natural, and scenic qualities of lands next to these byways than under Alternative A by reducing ROW activities.

Under Alternative B, most of the lands surrounding the Unaweep-Tabeguache Byway, east of Highway 90, and the San Juan Skyway are in areas acceptable to coal leasing. Indirect visual resource impacts could occur in more areas along this byway than under Alternative A if coal mining was to occur in areas visible to travelers on the byway. Impacts on the West Elk Loop Byway east of Paonia are similar to those under Alternative A. Any future coal mining in this area could contribute to visual impacts for travelers on this section of the byway.

Like Alternative A, no byways are in areas withdrawn from mineral entry. Under Alternative B, most of the Unaweep-Tabeguache Byway, San Juan Skyway, and West Elk Loop Byway would be in areas recommended for withdrawal from locatable mineral entry, thereby reducing the potential for impacts on these byways from mineral development. In addition, most of the Unaweep-Tabeguache Byway, San Juan Skyway, and West Elk Loop Byway are in areas closed to mineral material disposal.

Portions of the Unaweep-Tabeguache Byway and San Juan Skyway would pass through the San Miguel River Expansion ACEC. Management activities tailored to values for which the ACEC was designated could indirectly preserve the scenic values along these byways. The effects could be perceived over a larger area than under Alternative A due to the expanded ACEC. Under Alternative B, efforts to protect ORVs along suitable WSR segments along the Unaweep-Tabeguache Byway would benefit scenic values of the byways by prohibiting or limiting most surface-disturbing activities, and it would promote recreation along the byways. 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 than under Alternative A.

Portions of the Unaweep-Tabeguache Byway would pass through the San Miguel Watchable Wildlife Viewing Site. Management activities associated with this area could provide travelers with more opportunities to view wildlife in this area.

Alternative C*National Trails*

Under Alternative C, management of the Old Spanish Trail would continue as described under Alternative A. The Tabeguache and Paradox Trails would also be proposed for listing as national recreational trails as under Alternative B. Potential impacts from listing are the same as under Alternative B.

Under Alternative C, an NSO stipulation prohibiting fluid minerals surface occupancy within a 164-foot buffer around the Old Spanish Trail would be in place. In addition, a CSU stipulation restricting surface use from 164 feet to 5 miles on either side if the Old Spanish Trail would be in place. These stipulations would provide more protection to the trail from surface-disturbing activities than under Alternative A. Impacts are similar to those under Alternative B; however, the reduced buffer areas for these stipulations may not provide adequate protection of the values giving the Old Spanish Trail its significance. Potential impacts from fluid minerals development could be closer to the trail. Under Alternative C, if the Tabeguache and Paradox Trails are designated, an NSO stipulation would be in place for these trails that prohibits fluid mineral surface occupancy within 656 feet of the trail. Potential impacts on scenic qualities of these trails from development are similar to those under Alternative B; however, the reduced buffer area under Alternative C would result in these impacts being closer to the trails.

Under Alternative C, portions of the Tabeguache Trails are in or next to areas managed as VRM Class IV; however, most of the Tabeguache Trail would be in VRM Class III areas. Impacts in the VRM Class III and IV areas are similar to the types of impacts described under Alternative B. The Old Spanish Trail would be managed as VRM Class III, resulting in the same impacts as described under Alternative A. Under Alternative C, the Paradox Trail would be in areas managed as VRM Class II, III, and IV. However, there are fewer areas of VRM Class II, so most of the trail is in areas that could partially retain the landscape character or be changed dramatically due to development.

The portion of the Old Spanish Trail (1.0 mile) located within Kinikin ERMA, the portion of the Tabeguache Trail (13.3 miles) located in the Dry Creek ERMA, and portion of Paradox Trail (10.4 miles) located in the Paradox Valley ERMA would be managed according to the management actions of those ERMAs. Impacts on these trails from recreation management are similar to those under Alternative A.

Like Alternative A, most of the Tabeguache and Paradox Trails would not be in ROW exclusion or avoidance areas. Impacts on these trails from new development related to ROW activities in the short and long term, including transmission and roadway development, are the same as under Alternative A. The Old Spanish Trail would be in a ROW avoidance area. Indirect impacts on trail values from development would be reduced due to this avoidance area.

Similar to Alternative A, all congressionally designated trails would be closed to coal leasing; therefore, there would be no impacts on the Old Spanish Trail from mining coal. In addition, all congressionally designated trails would be closed to mineral materials disposal and nonenergy solid mineral leasing within a 164-foot buffer. Potential impacts on scenic qualities of these trails from mineral activities are similar to those under Alternative B; however, the reduced buffer

area under Alternative C would result in these impacts being closer to the trails. Under Alternative C, the Tabeguache and Paradox Trails are in areas acceptable to coal leasing. Because these trails are not congressionally designated under Alternative C, sections of these trails located in areas potentially leased for coal 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.

Under Alternative C, most of the Tabeguache and Paradox Trails on BLM-administered lands are in areas open to fluid mineral leasing. Impacts on these trails from fluid minerals development are similar to Alternative A. Like Alternative B, the Old Spanish Trail would be near areas closed to fluid minerals leasing. Closing areas to fluid minerals development would result in the same impacts as under Alternative B. Under Alternative C, most of the Old Spanish, Tabeguache, and Paradox Trails are in areas not recommended for withdrawal from locatable mineral entry, resulting in greater opportunities for direct and indirect impacts from mineral development (e.g., surface disturbance and visual intrusions) in the short and long term. Impacts from mineral material disposal are the same as under Alternative A because the Old Spanish, Tabeguache, and Paradox Trails would be in areas open to mineral material disposal.

Like Alternative A, the Old Spanish, Tabeguache, and Paradox Trails would not be within any ACECs. These trails would not be impacted by management actions related to ACEC management.

Byways

As under Alternative A, no BLM byways would be established under this alternative. As a result, the number of visitors traveling on BLM roads would not increase as a result of byway designations.

Under Alternative C, all national and BLM byways would be managed as VRM Class III within a quarter-mile of either side of centerline. This designation would partially retain the landscape character around the byways. Indirect impacts on byway travelers could result in greater changes to the landscape, and the changes would be closer to the byways due to the smaller buffer area. In addition, a CSU stipulation would apply to fluid minerals within a quarter-mile of scenic byways. Like Alternative B, potential impacts from these uses would be less than under Alternative A because of the stipulations; however, the less restrictive stipulation and smaller buffer area would not provide as much protection to viewsheds.

A portion of the Unaweep-Tabeguache Byway and San Juan Skyway would run through the San Miguel ERMA, and a portion of the Unaweep-Tabeguache Byway would run through the Paradox Valley ERMA. Scenic touring would be a protected activity in these ERMAs. Potential impacts are the same as impacts on SRMAs under Alternative A.

Under Alternative C, most of the Unaweep-Tabeguache Byway, San Juan Skyway, and West Elk Loop are in areas managed as ROW avoidance areas. Like Alternative B, these designations could provide more opportunities to preserve the historic, natural, and scenic qualities of lands next to these byways than under Alternative A; however, the less restrictive designation would not provide as much protection from impacts related to ROW activities.

Under Alternative C, most of the lands surrounding the Unaweep-Tabeguache Byway and San Juan Skyway are in areas acceptable to coal leasing. Like Alternative B, indirect visual resource impacts could occur in more areas along this byway than under Alternative A if coal mining activities were to occur in areas visible to travelers on the byway. However, Alternative C has more areas along the Unaweep-Tabeguache Byway west of Highway 90 acceptable to coal leasing. Impacts on the West Elk Loop Byway east of Paonia are similar to those under Alternative A.

Like Alternative A, no byways are in areas withdrawn from mineral entry. Under Alternative C, most of the Unaweep-Tabeguache Byway, San Juan Skyway, and West Elk Loop Byway would not be in areas recommended for withdrawal from locatable mineral entry, resulting in greater opportunities for direct and indirect impacts from mineral development (e.g., surface disturbance and visual intrusions) in the short and long term. Impacts from mineral material disposal would be similar to those under Alternative A. In addition, most of the Unaweep-Tabeguache Byway, San Juan Skyway, and West Elk Loop Byway are in areas open to mineral material disposal, resulting in greater impacts on scenic values if any byways are near these activities.

Portions of the Unaweep-Tabeguache Byway would pass through the San Miguel River ACEC. Management activities tailored to what the ACEC was designated for could indirectly preserve the scenic values along these byways. The impacts on travelers on this byway are the same as Alternative B. Under Alternative C, all eligible stream segments would be found not suitable for inclusion in the NWSRS, and the BLM would release them from interim management protection. Therefore, opportunities to protect scenic values associated with the eligible segments along this byway would be less than under Alternative A.

Alternative D

National Trails

Under Alternative D, management of the Old Spanish Trail would continue as described under Alternative A. The Tabeguache and Paradox Trails would also be proposed for listing as national recreational trails, as under Alternative B. Potential impacts from listing are the same as Alternative B.

Under Alternative D, an NSO stipulation prohibiting fluid minerals surface occupancy within a half-mile buffer around the Old Spanish Trail would be in place. In addition, a CSU stipulation restricting surface use within one-half to five miles on either side if the Old Spanish Trail would be in place. Impacts related to these stipulations are the same as under Alternative B. Like Alternative C, if the Tabeguache and Paradox Trails are designated, an NSO stipulation would be in place for these trails that prohibits surface occupancy within 656 feet of the trail. Potential impacts on scenic qualities of these trails are the same as under Alternative C.

Under Alternative D, 0.5 mile from the centerline of the Old Spanish Trail would be managed as VRM Class III and impacts would be similar to those described under Alternative A. Similarly, the Tabeguache Trail would be in VRM Class III areas. Impacts on the Tabeguache Trail would be similar to the types of impacts described under Alternative B. Like Alternative C, the

Paradox Trail would be in areas managed as VRM Class II, III, and IV. Impacts are similar to Alternative C.

Like Alternative C, the portion of the Old Spanish Trail located within Kinikin ERMA (1.0 mile) and Paradox Trail located within the Paradox Valley ERMA (10.4 miles) would be managed according to the management actions of the ERMA. Impacts on these trails from managing these ERMA are the same as Alternative C. Like Alternative B, the portion of the Tabeguache Trail located in the Dry Creek SRMA (13.3 miles) would be managed according to the management actions of that SRMA. Impacts on this trail from recreation management are the same as under Alternative B.

Under Alternative D, portions of the Tabeguache and Paradox Trails would be in ROW avoidance areas. Impacts on these trails from new development in the short and long term, including transmission and roadway development, are similar to Alternative B. Like Alternative C, the Old Spanish Trail would be in a ROW avoidance area, resulting in reduced indirect impacts on trail values from development.

Similar to Alternative A, all congressionally designated trails would be closed to coal leasing; therefore, there would be no impacts on the Old Spanish Trail from mining coal. In addition, all congressionally designated trails would be closed to mineral materials disposal and nonenergy solid mineral leasing within a 164-foot buffer. Potential impacts on scenic qualities of these trails from mineral activities are the same as under Alternative C. Like Alternative B, the Tabeguache Trail is in an area unacceptable to coal leasing. Portions of the Paradox Trail are within areas acceptable to coal leasing. Like Alternative A, because this trail is not congressionally designated under Alternative D, sections of the trail located in areas potentially leased for coal would 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.

Under Alternative D, most of the Old Spanish, Tabeguache, and Paradox Trails on BLM-administered lands are in areas open to fluid mineral leasing with a CSU stipulation, resulting in fewer impacts on trail values from fluid minerals development than under Alternative A. Impacts from mineral materials development under Alternative D are similar to Alternative C because most of the Old Spanish, Tabeguache, and Paradox Trails are in areas not recommended for withdrawal from locatable mineral entry. Impacts from mineral material disposal are the same as under Alternative A because the Old Spanish, Tabeguache, and Paradox Trails would be in areas open to mineral material disposal.

Like Alternative A, the Old Spanish, Tabeguache, and Paradox Trails would not be within any ACECs. These trails would not be impacted by management actions related to ACEC management.

Byways

As under Alternative A, no BLM byways would be established under this alternative. As a result, the number of visitors traveling on BLM roads would not increase as a result of byway designations.

Under Alternative D, the Grand Mesa Scenic Byway and the West Elk Byway from the northeast Uncompahgre RMP planning area boundary to Gunnison County Road 12 would be managed as VRM Class II. Impacts on scenic resources along these sections of byways are the same as under Alternative B. The remaining portion of the West Elk Byway, San Juan Skyway, and Unaweeptabeguache Byway would be managed as VRM Class III. Impacts on scenic resources along these byways are the same as under Alternative C. These designations would provide more opportunities to protect scenic resources than Alternative A; however, the varying levels of protection under this alternative would result in scenic resource impacts similar to Alternative A in some areas of byways managed as VRM Class III. In addition, a CSU stipulation would apply to fluid minerals within a half-mile of scenic byways. Like Alternative C, potential impacts from these uses would be less than under Alternative A because of the stipulations; however, the larger buffer area would provide protection to viewsheds in more areas along byways.

A portion of the Unaweeptabeguache Byway and San Juan Skyway would run through the San Miguel SRMA, and a portion of the Unaweeptabeguache Byway would run through the Paradox Valley ERMA. Scenic touring would be a targeted activity in the SRMA and would be a protected activity in the ERMA. Potential impacts are the same as impacts on SRMAs under Alternative A.

Like Alternative C, most of the Unaweeptabeguache Byway, San Juan Skyway, and West Elk Loop are in areas managed as ROW avoidance areas. Potential impacts on byways related to ROW activities are similar to Alternative C; however, expanded areas of avoidance could provide more opportunities to preserve the historic, natural, and scenic qualities of lands next to these byways.

Like Alternative C, most of the lands surrounding the Unaweeptabeguache Byway and San Juan Skyway are in areas acceptable to coal leasing. Impacts on scenic resources along these byways from potential coal development are similar to Alternative C. Impacts on the West Elk Loop Byway east of Paonia are similar to Alternative A.

Like Alternative A, no byways are in areas withdrawn from mineral entry. Under Alternative D, most of the Unaweeptabeguache Byway east of Norwood and near the northwest UFO boundary would be in areas recommended for withdrawal from locatable mineral entry, thereby reducing the potential for impacts on scenic resources from mineral development along this section of the byway. In addition, most of the Unaweeptabeguache Byway, San Juan Skyway, and West Elk Loop Byway are in areas closed to mineral material disposal.

Under Alternative D, most of the byways are in areas not recommended for withdrawal from locatable mineral entry, resulting in greater opportunities for direct and indirect impacts from mineral development (e.g., surface disturbance and visual intrusions) in the short and long term. Most of the byways are in areas open to mineral material disposal; however, a portion of the Unaweeptabeguache Byway east of Norwood is in areas closed to disposal. Impacts on scenic resources from mineral material disposal are similar to those under Alternative C in those areas open to disposal.

Under Alternative D, portions of the Unaweeptabeguache Byway would pass through the San Miguel River ACEC. The impacts on travelers on the byway through this ACEC are the same as Alternative B. In addition, the Unaweeptabeguache Byway would also be next to the Biological

Soil Crust ACEC. Management related to this ACEC could provide additional opportunities to protect the scenic values along this section of the byway.

Under Alternative D, efforts to protect ORVs along suitable WSR segments along the Unaweeptabeguache 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 to this segment along the byway. Like Alternative B, additional stipulations (NSO and CSU for fluid minerals and NGD and SSR for other surface-disturbing activities) would provide greater protection of ORVs than under Alternative A.

Cumulative

National Trails

The cumulative impact analysis area used to analyze cumulative impacts on national trails includes the entire planning area, as well as adjacent BLM field offices in which the Old Spanish National Historic Trail, Tabeguache Trail, or Paradox Trail occurs. The Old Spanish Trail is the only national historic trail next to or within the planning area boundary. It also occurs within the Grand Junction Field Office to the north and the Moab Field Office to the west. Management of the Old Spanish Trail in those field offices is similar to the management prescribed in this RMP. Under the agency-preferred alternative in the Grand Junction RMP revision, being revised at this time, the BLM would propose the designation of the Tabeguache Trail as a National Recreation Trail, which would enhance the values and manageability of the trail.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect national trails include continued oil and gas development, ROW location, and, most important, increasing recreation and visitor use in the region putting additional pressure on trails. As discussed, management of the Old Spanish Trail is coordinated with the National Park Service and local nonfederal partners. Management plan development for this trail, as well as management direction provided for the Tabeguache Trail and Paradox Trail from adjacent BLM field offices or federal land managers, could decrease the potential for degradation and assist in the preservation of natural, cultural, and historic trail resources.

The actions and activities considered in this analysis would not result in the inability of the BLM to provide public access to national trails. However, these actions and activities would alter scenic, natural, and cultural features of the national trails. The degree of alteration would be greatest under Alternative A because of fewer land use restrictions for the protection of sensitive resources next to national trails. Conversely, the implementation of increased restrictions to protect sensitive resources under Alternative B would result in the fewest impacts on national trails. Alternatives C and D would have slightly less restriction and therefore slightly greater impact than Alternative B.

Byways

The cumulative impact analysis area used to analyze cumulative impacts on byways includes the planning area and the San Juan Skyway, Grand Mesa Scenic and Historic Byway, Unaweeptabeguache Scenic Byway, and West Elk Loop, the byways on lands in and next to the planning area boundary.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect byways in the planning area are activities associated with energy and minerals development, land use, visitor use, and vegetation management. Energy and minerals development could impact byways by altering visual landscapes through the addition of pipelines or transmission lines, scarring of surrounding landscapes, and increased truck traffic on roadways. Certain land uses that surround BLM-administered lands, such as continued growth and development, also could affect byways by leading to increased visitor use of byways and increased demand for such resources as housing, energy, and utilities. Developing these resources could impact naturalness of lands surrounding byways by converting lands from their natural setting. Restoring unhealthy vegetation communities and reducing infestations of noxious weeds along the byway corridors would enhance the natural diversity of the native landscape.

The actions and activities considered in this analysis would not result in the inability of the BLM to provide public access to byways. However, these actions and activities would alter scenic, natural, and cultural features of the byways. The degree of alteration would be greatest under Alternative A because of fewer land use restrictions for the protection of sensitive resources next to byways. Conversely, the implementation of increased restrictions to protect sensitive resources under Alternative B would result in the least impact on byways. Alternatives C and D would have slightly less restriction and therefore slightly greater impact than Alternative B.

4.5.5 Watchable Wildlife Viewing Sites

This section discusses impacts on watchable wildlife viewing sites that would occur from actions associated with the management of other resources. Existing conditions are described in **Section 3.3.5** (Watchable Wildlife Viewing Sites).

Methods and Assumptions

This analysis focuses on management actions with disturbance potential to reduce the success of potential watchable wildlife viewing sites or the potential to increase opportunities for wildlife viewing within the potential watchable wildlife viewing sites. Impacts on the potential watchable wildlife viewing sites are discussed for alternatives that would not designate watchable wildlife viewing sites (Alternatives A, C, and D) in the same manner as alternatives that do designate the areas (Alternative B).

Indicators

Indicators of impacts on watchable wildlife viewing sites are the following:

- The ability to identify and create opportunities for interpretation and education related to wildlife
- The ability to complete wildlife habitat improvements to enhance fish/wildlife viewing opportunities, while maintaining protection of fish/wildlife species and their habitats

Assumptions

Assumptions are described in **Section 4.1.1**.

Nature and Type of Effects

Actions that would impact watchable wildlife viewing sites are those that enhance wildlife viewing opportunities by improving habitat and wildlife health, actions that enhance wildlife viewing opportunities by restricting disturbance, and actions that reduce opportunities to view wildlife by creating disturbances.

Actions that enhance wildlife viewing opportunities through habitat improvement include management to promote and conserve native species as well as ecosystem diversity and the use of vegetation treatments (e.g., mechanical treatments, chemical treatments, prescribed fire, and reseeded) to improve plant composition and structure and overall wildlife habitat. Additionally, the designation of ecological emphasis areas, if they were to overlap with the watchable wildlife viewing sites, would preserve the continuity of habitats and encourage native wildlife persistence, also enhancing wildlife viewing opportunities.

Management of scenic values would create opportunities to view wildlife by protecting open spaces, including scenic vistas. Increased opportunities to view wildlife would also exist in areas where ACECs overlap watchable wildlife viewing sites due to restrictions on disturbances. Restrictions on camping, firewood harvest, and travel routes would minimize disturbances within the watchable wildlife viewing site, thereby enhancing wildlife viewing opportunities. Similarly, seasonally prohibiting disruptive activities in mapped big game crucial winter range would protect those animals and improve opportunities to view wildlife.

Actions that enhance educational values, opportunities, and awareness of wildlife viewing opportunities would complement the watchable wildlife viewing site through increased visitor awareness and understanding of wildlife, their habitats, and their importance. This would lead to increased stewardship of the wildlife and their habitat. Actions that develop recreation facilities and promote recreation could attract more visitors and encourage more people to view wildlife. However, increased visitation could also result in greater disturbance to wildlife, reducing viewing opportunities.

Designating roads and trails for public access would improve access within the watchable wildlife viewing site, but resulting habitat fragmentation could encourage wildlife to move elsewhere and degrade the watchable wildlife viewing experience.

Reducing human induced stressors if big game herds were determined by CPW to be highly stressed during crucial winter periods would temporarily reduce opportunities for wildlife viewing. However, this would protect herd populations over the long term and provide long-term benefits to wildlife viewing opportunities.

Mineral exploration and development on or next to watchable wildlife viewing sites would cause disturbance and reduce opportunities for wildlife viewing.

Effects Common to All Alternatives

Under all alternatives, management actions that tended to restrict disturbance and focus on improving habitat and wildlife health would increase opportunities to view wildlife, while actions that tended to allow disturbances would decrease opportunities to view wildlife. The largest

impacts under all alternatives would come from management actions related to recreation, mineral exploration and development, and travel management.

All alternatives manage a portion of the land within the San Miguel Watchable Wildlife Viewing Site boundary as the San Miguel River ACEC. This provides for protections that would restrict disturbances and promote opportunities for wildlife viewing.

While implementing management for some of the following resources could have impacts on the quality of the watchable wildlife experience, they would be negligible overall and are therefore not discussed in detail: air quality, climate change, soils and water, wildland fire ecology and management, cultural resources, paleontological resources, lands with wilderness characteristics, forestry and woodland products, livestock grazing, lands and realty, wilderness and WSAs, WSRs, national trails and byways, Native American tribal uses, and public health and safety.

Alternative A

There would be no watchable wildlife viewing sites under Alternative A. Visitors would have to create their own opportunities to view wildlife but the associated interpretation and education would be lacking. Visitors would also not be directed to these areas for the purpose of viewing wildlife, so visitors may not know that they are good locations. Wildlife viewing would take place across the decision area as opportunities arise, but would be lower quality.

Some of the land within the potential San Miguel Watchable Wildlife Viewing Site boundary would be managed as VRM Class II, limiting the types of development detrimental to wildlife habitat, but potentially restricting the construction of infrastructure to facilitate wildlife viewing.

The potential San Miguel Watchable Wildlife Viewing Site is entirely within the San Miguel River SRMA and ACEC. While the SRMA status attracts visitors to experience specific recreation not directly associated with wildlife viewing, the San Miguel River ACEC, also in this area, provides protection for the riparian resources and bird habitat needed to support wildlife viewing. Managing recreation in the SRMA in a manner that also protects the ACEC values provides an opportunity to encourage wildlife viewing and a sense of stewardship in visitors. There is no overlap between SRMAs and the other two potential watchable wildlife viewing sites (Billy Creek and Uncompahgre Riverway); dispersed recreation in the areas would not likely rise to a level that would disturb the species' habitat.

Under Alternative A, 160 acres within the potential San Miguel Watchable Wildlife Viewing Site has and NSO stipulations attached to fluid mineral leases, 15,500 acres (68 percent) has CSU stipulations attached to fluid mineral leases, and timing limitation stipulations are attached to fluid mineral leases on 19,920 acres (87 percent). Where these stipulations overlap, if one of them is excepted, modified, or waived by the BLM Authorized Officer, the underlying stipulation may still be in place. Portions are also closed to mineral material disposal. Additionally, 2,170 acres of the potential Billy Creek Watchable Wildlife Viewing Site (73 percent) are subject to timing limitations for fluid mineral development. These restrictions reduce disturbances to wildlife and promote wildlife viewing opportunities, but not target opportunities for wildlife interpretation and education that enhance public wildlife viewing experiences.

Alternative B

Under Alternative B, three watchable wildlife viewing sites (Uncompahgre Riverway, the San Miguel River ACEC, and Billy Creek) would provide targeted opportunities for wildlife interpretation and education, enhancing public wildlife viewing experiences as a result. The watchable wildlife viewing sites 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 improvements in the watchable wildlife viewing sites would encourage more wildlife to frequent the area.

Watchable wildlife viewing site management under Alternative B would prohibit many disturbing activities that could cause wildlife to be less visible (i.e., move to areas of greater cover or outside the watchable wildlife viewing sites). For example, surface-disturbing activities would be prohibited within the Uncompahgre Riverway Watchable Wildlife Viewing Site and in most of the Billy Creek and San Miguel Watchable Wildlife Viewing Sites (totaling 23,970 acres, 93 percent). If exceptions were granted for surface-disturbing activities, site-specific relocation restrictions would apply within all of the watchable wildlife viewing sites. In addition, Alternative B proposes more actions aimed at maintaining existing landscapes in order to increase opportunities for viewing wildlife than under Alternative A. Furthermore, promoting the public's ability to view wildlife within the watchable wildlife viewing sites could increase visitors' feelings of stewardship and result in reduced impacts on other resources in the area.

Under Alternative B, the majority of the San Miguel Watchable Wildlife Viewing Site would be managed as VRM Class III (11,620 acres), potentially allowing the types of development detrimental to wildlife habitat but potentially allowing the construction of infrastructure to facilitate wildlife viewing opportunities.

Unlike Alternative A, some recreation under Alternative B would be restricted, such as motorized competitive events, all recreational mining, and some dispersed camping. These restrictions would impact watchable wildlife viewing sites by limiting disturbances that could scare away wildlife. The San Miguel Watchable Wildlife Viewing Site would be within the San Miguel River SRMA and ACEC. Targeted activities of the SRMA include educational programs and nonmotorized trail use and targeted benefits include several outcomes that would instill a sense of stewardship in visitors. This would enhance the watchable wildlife viewing experience in the area, particularly if educational programs were aimed at wildlife and their habitat. Management of the ACEC would provide protection for the riparian resources and bird habitat needed to support the wildlife viewing. Managing recreation in the SRMA in a manner that also protects the ACEC values provides an opportunity to encourage wildlife viewing.

The Uncompahgre Riverway Watchable Wildlife Viewing Site would be within the Ridgway Trails SRMA. Targeted activities in the SRMA include outdoor classroom and targeted experiences and benefits include several outcomes that would instill a sense of stewardship in visitors. This would enhance the watchable wildlife viewing experience in the area, particularly if educational programs were aimed at wildlife and their habitat. The Billy Creek Watchable Wildlife Viewing Site is not within an SRMA; dispersed recreation in the area would not likely rise to a level that would disturb the species' habitat.

Under Alternative B, the San Miguel Watchable Wildlife Viewing Site would be closed to fluid mineral leasing, nonenergy solid mineral leasing, and mineral material disposal. It would also be recommended for withdrawal from locatable mineral entry, as would a portion of the Billy Creek Watchable Wildlife Viewing Site. In addition, the Uncompahgre Riverway and 190 acres of the Billy Creek Watchable Wildlife Viewing Site (6 percent) would be closed to fluid mineral leasing. On the remaining portion of Billy Creek, NSO, CSU, or TL stipulations would be attached to fluid mineral leases. Where these stipulations overlap, if one of them is excepted, modified, or waived by the BLM Authorized Officer, the underlying stipulation may still be in place. These restrictions would reduce disturbances to wildlife and promote wildlife viewing opportunities. The restrictions placed on mineral exploration and development on watchable wildlife viewing sites under this alternative are more stringent than under Alternative A, and as such, would contribute more to wildlife viewing opportunities than the other alternatives.

Alternative C

There would be no watchable wildlife viewing sites under Alternative C, and visitors would have to create their own opportunities to view wildlife. Effects would be similar to Alternative A, except as described below.

Because there are no watchable wildlife viewing sites designated under this alternative, fewer precautions would be taken to encourage wildlife to inhabit lands within the potential watchable wildlife viewing site boundaries. Under Alternative C, only a very small area within potential watchable wildlife viewing sites proposed under Alternative B would be managed as VRM Class I or II (20 acres), resulting in fewer limitations on development that could be detrimental to wildlife habitat than under the other alternatives. Site-specific relocation restrictions would be imposed within all of the potential Uncompahgre Riverway Watchable Wildlife Viewing Site and portions of the potential Billy Creek and San Miguel Watchable Wildlife Viewing Sites (totaling 20,210 acres, 78 percent). While SSR restrictions could provide some level of protection from habitat fragmentation or loss, the restriction relies on site design and mitigation measures, which may or may not be adequate to protect the area for watchable wildlife viewing.

This alternative places the fewest restrictions on recreation of all the action alternatives. As a result, disturbance could be expected to be greater under this alternative, which could lead to decreased opportunities to view wildlife in the land within the potential watchable wildlife viewing site boundaries.

The potential San Miguel and Uncompahgre Riverway Watchable Wildlife Viewing Sites would be within the San Miguel River and Ridgway Trails ERMA, respectively. Because ERMA would not target activities or outcomes associated with wildlife viewing or stewardship, the potential for disturbances to wildlife from visitor use would be present. On the other hand, the potential San Miguel River Watchable Wildlife Viewing Site would overlap the San Miguel River ACEC, which would provide some restrictions to protect riparian resources and bird habitat, maintaining an opportunity for wildlife viewing.

Under Alternative C, CSU stipulations would be attached to fluid mineral leases in all of the potential watchable wildlife viewing sites. Timing limitation restrictions would also apply on all of the potential Uncompahgre Riverway Watchable Wildlife Viewing Site and portions of the potential San Miguel and Billy Creek Watchable Wildlife Viewing Sites. The restrictions placed

on mineral exploration and development within the potential watchable wildlife viewing sites are more than those under Alternative A, and they allow for fewer disturbances which would reduce opportunities for wildlife viewing in the potential watchable wildlife viewing sites' boundaries.

Alternative D

There would be no watchable wildlife viewing sites under Alternative D, and visitors would have to create their own opportunities to view wildlife. Effects would be similar to Alternative A, except as described below.

Under Alternative D, 1,100 acres of the land within the potential San Miguel Watchable Wildlife Viewing Site boundary would be managed as VRM Class I, and 7,160 acres would be managed as VRM Class II, limiting the types of development detrimental to wildlife habitat but potentially restricting the construction of infrastructure to facilitate wildlife viewing. Site-specific relocation restrictions would be imposed within all of the potential Uncompahgre Riverway and Billy Creek Watchable Wildlife Viewing Sites and portions of the potential San Miguel Watchable Wildlife Viewing Site (totaling 20,210 acres, 95 percent). While SSR restrictions could provide some level of protection from habitat fragmentation or loss, the restriction relies on site design and mitigation measures, which may or may not be adequate to protect the area for watchable wildlife viewing.

The potential San Miguel and Uncompahgre Riverway Watchable Wildlife Viewing Sites would be within the San Miguel River and Ridgway Trails SRMAs, respectively; impacts would be the same as described under Alternative B.

Under Alternative D, NSO stipulations would be attached to fluid mineral leases within all of the potential San Miguel and Uncompahgre Riverway Watchable Wildlife Viewing Sites and a portion of the potential Billy Creek Watchable Wildlife Viewing Site (totaling 23,890 acres, 93 percent). In addition, CSU stipulations would be attached to fluid mineral leases within all of the potential Billy Creek and Uncompahgre Riverway Watchable Wildlife Viewing Sites and a portion of the potential San Miguel Watchable Wildlife Viewing Site (totaling 24,320 acres, 94 percent). Finally, all of the potential watchable wildlife viewing sites would be TL restrictions on all surface-disturbing activities. Where these stipulations overlap, if one of them is excepted, modified, or waived by the BLM Authorized Officer, the underlying stipulation may still be in place. Impacts from these restrictions are similar to those described under Alternative B, but the magnitude of protection to the areas for watchable wildlife viewing would be less.

The potential San Miguel and a portion of the potential Billy Creek Watchable Wildlife Viewing Sites would be recommended for withdrawal from locatable mineral entry. The San Miguel and a portion of the potential Uncompahgre Riverway Watchable Wildlife Viewing Sites would be closed to mineral material disposal. Finally, The San Miguel River, Uncompahgre Riverway, and a portion of the potential Billy Creek Watchable Wildlife Viewing Sites would be closed to nonenergy solid mineral leasing. These restrictions would reduce disturbances to wildlife and would promote wildlife viewing opportunities. These restrictions are similar to those in place under Alternative A.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on watchable wildlife viewing sites is the Uncompahgre RMP planning area. Cumulative impacts on watchable wildlife viewing sites are related to those described for fish and wildlife and vegetation, since vegetative communities provide the habitat for wildlife species and can affect habitat for fish species (e.g., riparian vegetation). Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect watchable wildlife viewing sites are energy and minerals development, forestry, livestock grazing, recreation and visitor use, road development, water diversion and withdrawals, weed invasion and spread, prescribed and wildland fires, land planning efforts, vegetation management, habitat improvement projects, insects and disease, and drought. Many of these activities change habitat conditions, which then cause or favor other habitat changes. For example, wildland fire removes habitat, and affected areas are more susceptible to weed invasion, soil erosion, and sedimentation of waterways, all of which degrade habitats. In general, resource use activities have cumulatively caused habitat removal, fragmentation, noise, increased human presence, and weed spread, whereas land planning efforts and vegetation, habitat, and weed treatments have countered these effects by improving habitat connectivity, productivity, diversity, and health.

4.6 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 3**:

- Native American tribal interests
- Public health and safety
- Socioeconomics
- Environmental justice

4.6.1 Native American Tribal Interests

This section addresses potential effects from management actions on Native American tribal interests, specifically Indian Trust Assets, treaty-based rights, and reservation lands. Indian Trust Assets are legal interests in property, physical assets, or intangible property rights held in trust by the US Government for Indian tribes or individual Indians. This includes treaty rights such as those described in the Brunot Agreement of 1878. As described in Chapter 3 in **Section 3.4.1** (Native American Tribal Interests) the Brunot Agreement allowed the Utes to retain the hunting rights on reservation lands relinquished by them; in other words, the tribes retained such rights as part of their status as prior and continuing sovereigns. These hunting rights currently apply only to the Ute Mountain Ute Indian Tribe. Within the planning area, there are approximately 54,060 acres of BLM-administered land that fall under the Brunot Agreement.

Methods and Assumptions

The BLM conducted government-to-government tribal consultations with affected federally recognized Native American tribes to identify tribal interests and treaty rights (including Brunot Agreement issues) in the planning area, and these consultations are continuing. All laws, regulations, and policies pertinent to determining effects on tribal interests were considered and included in impacts criteria. 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 tribal interests, agreements, and trust assets.

Indicators

The use of indicators in NEPA analysis should provide information on determining whether the action would have a significant adverse impact on the resource (43 CFR 1508.27). For tribal interests, treaty-based rights, and trust assets, a significant adverse impact would be the permanent loss of those interests, rights, and/or assets. When assessing whether the actions would have significant impact, the indicators are the same as the qualitative level-of-effect indicators as those described in **Section 4.3.9**, Cultural Resources (magnitude, severity, duration, rate of change, etc.).

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- The BLM will continue to consult with tribes regarding Brunot Agreement issues.
- If other Indian Trust Assets or treaty-based rights are revealed during the RMP process or RMP implementation, the BLM will conduct consultation and fulfill its obligations under applicable treaties, the tribal trust relationship, various federal laws, DOI and BLM regulations, and guidance and executive orders. The BLM, as a federal agency, will continue to maintain government-to-government relationships with federally recognized Native American tribes and will consult with tribes during resource management actions affecting tribal lands and resources.
- Short of the permanent loss of treaty rights and/or trust assets, the types of effects, and an impact's magnitude, severity, and duration upon tribal interests are best determined through tribal consultation. There may also be unidentified conflicts with existing tribal treaty rights or claims of ownership related to traditional use areas or heritage resources that can be determined through ongoing tribal consultation.

Nature and Type of Effects

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. 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 sacred sites in the planning area are unknown, and planning-level alternatives typically do not identify specific areas for surface-disturbing activities.

Types of impacts that could occur from the planning actions include:

- Conflicts with the land uses, management, and economic wellbeing of nearby reservations, trust lands, restricted Indian allotments, and federally dependent Indian communities
- Conflicts with the exercise of off-reservation treaty and reserved rights including Brunot Agreement access and hunting and fishing rights

- Conflicts with federal trust responsibilities to tribes and individual Indians regarding real property, physical assets, or intangible property rights
- Conflict with existing court decisions, laws, policies, executive orders, and agency agreements with tribes regarding land and resource use

Effects Common to All Alternatives

An adverse effect is any action that disturbs the integrity of an Indian Trust Asset or treaty-based right or responsibility of the BLM in the planning area. Those actions can be caused by development (e.g., road construction or logging) or conservation (e.g., habitat improvement or landscape reclamation) alternatives. The BLM will continue to maintain government-to-government consultation with federally recognized Native American tribes and will consult with tribes during future resource management actions to assess case-by-case or project-by-project impacts.

Under all alternatives, the BLM would continue to manage BLM-administered lands in a manner that accommodates Native American access to Brunot Agreement lands. All alternatives allow for the appropriate tribal governments to consult on a case-by-case basis on undertakings on BLM-administered lands that could affect Native American concerns.

Implementing management for the following resources would have negligible or no impacts on Native American tribal interests and are therefore not discussed in detail: air quality, wild horses, paleontological resources, WSRs, national trails and byways, and public health and safety.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on Native American tribal interests is the Uncompahgre RMP planning area. Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that could affect Native American tribal interests include increases in mining, fluid mineral leasing, leasable minerals, renewable energy development, personal and commercial harvesting of forest products, and wildland fire.. There is little likelihood of any one of these actions causing the absolute loss of or restrictions on treaty rights or Indian trust assets due to the requirements within existing agreements to preserve access to the Brunot lands. However, only with information provided by the tribes through consultation is it possible to describe the less-than-total scope and scale of effects these actions may have. Ongoing consultation on a case-by-case basis will further define the impacts these actions may have on tribal interests.

All undertakings that could affect tribal interests on federal land or actions that are funded, licensed, or permitted by the federal government are subject to numerous directives in various federal regulations. Consideration of the future cumulative effects of undertakings would be required, and adverse effects would be resolved on a case-by-case or project-by-project basis. Adhering to appropriate legal measures would reduce cumulative effects to an insignificant level. Implementing the proposed RMP is not anticipated to contribute to cumulative effects on Indian Trust Assets or treaty-based rights.

4.6.2 Public Health and Safety

This section discusses impacts on public health and safety from proposed management actions of other resources and resource uses. Existing conditions are described in **Section 3.4.2** (Public Health and Safety).

Methods and Assumptions

Indicators

The change in exposure to hazards resulting from management actions is used as an indicator of impacts on public health and safety.

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis assumes the following:

- Public health and safety issues would receive priority consideration in the management of BLM-administered lands.
- Potential for risk to visitor safety would increase with increasing numbers of BLM-administered land users.
- Activities and resources available in and around the planning area would continue to be important to the health and safety of current and future residents.
- Most abandoned mine sites in the planning area are identified and characterized.
- The BLM would set as its highest priority for abandoned mines the physical safety action of cleaning up of those abandoned mine sites at locations (a) where a death or injury has occurred and the site has not already been addressed or (b) on or in immediate access to areas with high visitor use (BLM Instruction Memorandum 2000-182).
- All new hazardous materials and waste sites would be identified and characterized.
- Resource development activities would identify any possible generation of hazardous waste.
- No substantial new hazardous materials uses and waste generating would occur within the planning area.
- The BLM's Hazard Management and Resource Restoration Program would respond to all hazardous material releases on BLM-administered surface lands. Emergency cleanup actions would be implemented on sites posing a substantial threat to the public and the environment.

Nature and Type of Effects

Impacts on public health and safety include management actions that reduce or eliminate or reduce exposure to risk.

Health and safety hazards occurring on BLM-administered lands typically include the presence of hazardous materials, including the potential for air or water contamination.

Federally established National Ambient Air Quality Standards have been established to protect public health. Separate emissions standards have also been established for hazardous air pollutants that may cause an increase in fatalities or in serious, irreversible, or incapacitating illness. Management actions that maintain or move towards compliance with standards by limiting emissions from BLM managed or permitted activities would improve public health while those that allow for increased emissions and result in non-compliance with standards could impact public health.

Abandoned mine lands represent a risk to public safety due to the potential for injury by falling in open pits or excavations, encountering unsafe structures, and being exposed to contaminants remaining on site. Potential indirect impacts on public health occur from management actions that permit activities that result in soil or water contamination.

Mass movement poses a potential hazard to public health and safety in areas where there are steep, unstable hillsides and cliffs in which large amounts of soil, rock, and debris may become dislodged. Mass movement is a dynamic process and can be caused by long-term erosion of weaker rock strata, or can be initiated by natural events, such as an earthquake, rainstorm, or wildfire, or by man-made events such as vehicular traffic over unstable surfaces. Management actions that contribute to mass movement may indirectly human injury or death and property damage.

Energy and mineral development in the planning area includes inherent risks for workers and the public related to safety during construction and operation, as well as the potential introduction of hazardous materials that could impact human health should exposure occur. Introduction of hazardous materials could indirectly affect health due local air, soil, or water contamination.

Smoldering or burning coal seams are a risk to public health and safety through effects of exposure to airborne toxic chemicals. Burning coal seams may also trigger wildfire should the smoldering or burning seam come in contact with nearby plant communities.

Surface waters can be indirectly impacted over the long term from development activities in the same watershed and from livestock grazing, which can introduce both chemical and biological (e.g., fecal coliform and nitrogen) contamination into waters. Contaminated surface waters pose health risks to recreational users who may come into contact with those waters. Development activities in the vicinity of drinking water aquifers (groundwater) pose a risk of contaminating those aquifers and causing health impacts on groundwater consumers.

Risks to public health and safety from BLM-administered land use are potential for injury from recreation, including use of motorized and mechanized vehicles and target shooting. In general, risks to public health and safety are elevated with increased use intensity and public accessibility. Risks to BLM-administered land users also include exposure to naturally occurring hazards.

Additional risks to public safety occur from potential for wildland fire to spread to communities next to BLM-administered lands. In addition, BLM-administered land users may become trapped, injured, or killed during a wildfire.

The BLM is responsible for maintaining facilities and infrastructure, for reducing health and safety risks to employees and the public, and for protecting BLM-administered lands from illegal waste dumping, theft, public property destruction, and resource misuse. Where hazards are known and public exposure to these risks can be minimized or prevented, land use planning decisions can help protect public health and safety.

Effects Common to All Alternatives

As discussed in **Section 4.1**, Air Quality, emissions of pollutants from prescribed fire and other vegetation management activities were predicted to remain similar for all alternatives. Emissions from prescribed fire have the potential to result in impacts on visibility, ozone formation, and human and wildlife health under all alternatives. BMPs for prescribed burns would be applied to minimize air quality impacts.

Lands available for use in the North Delta unexploded ordnance area have the potential for future health and safety risks related to exposure to undetonated explosive materials. The potential for long-term direct and indirect impacts is considered to be proportional to the number of acres in the North Delta unexploded ordnance area authorized for project development. Impacts would be minimized under all alternatives, with the requirements to identify and clear affected areas before development.

Hazardous materials threaten public health and safety through potential exposure to a hazardous substance and through potential contamination of water, soil, and air. The reduction in hazardous material sites through response to, and reclamation of, hazardous materials 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 would occur under every alternative. As more acres and sites are reclaimed, the risks of hazardous material exposure to public health and safety are reduced in proportion to the reclaimed acreage amount.

Hazardous fuels treatments, including prescribed fire and mechanical treatment, would improve public safety by reducing fire hazard. Many of these fuels treatments occur in locations to reduce the chance of a wildfire burning from BLM-administered lands onto adjacent private lands. Treatments to reduce hazardous fuels also reduce risk to BLM-administered land users from wildfires. Under all alternatives, protection of public safety would be emphasized by the Wildfire Management Program.

Use of BLM-administered lands for recreation presents a potential risk to public safety under all alternatives. Risks are assumed to increase as recreational use increases. However, within SRMAs, the risk to public health and safety would be reduced by providing recreational separation, signs, and facilities where applicable.

The designation of no shooting areas and areas with shooting restrictions improves public health and safety by limiting the risk of the public being injured by gunfire. The potential for long-term impacts is considered to be inversely proportional to the acreages that are closed or have restrictions for shooting under each alternative, so the level of risk varies by alternative along with these acreages.

Livestock grazing has the potential for human interaction and injury, in particular if conflicts between recreation and grazing land uses were to occur. An associated risk is the potential for injury when public interaction occurs with guard dogs associated with some livestock grazing. The potential for long-term impacts is considered to be in direct proportion to the acreages that are open for livestock grazing under each alternative, with an increased potential for areas that are also emphasized for recreation. Therefore, the level of risk varies by alternative along with these acreages.

Lands that are open for consideration for mineral material sales or fluid minerals leasing have the potential for health and safety risks related to mining activities and oil, gas, or geothermal exploration, development, operation, and decommissioning. Such risk includes potential injury or death from working with large machinery and equipment or in faulty development infrastructure throughout each phase of mine or plant production. It also includes potential exposure to toxic or poisonous substances during exploration and development phases. The number of acres open to mineral material sales or open for leasing is considered to be proportional to the potential for long-term, health and safety risks. Similarly, lands that are acceptable for further coal leasing and development have the potential for future health and safety risks related to coal mining. The acres acceptable for further leasing and development are considered to be proportional to the potential for long-term health and safety impacts. Under all alternatives, lease stipulations and BMPs would limit impacts on human health and safety from development.

Contamination of public water supply is a potential risk associated with development related to mining and oil, gas, and geothermal exploration. All alternatives include leases, notices, or stipulations to protect municipal watersheds and source water protection areas, but the level of protection varies among alternatives.

Under all alternatives, potential for illegal dumping in the planning area remains. Illegal waste may result in soil contamination and damage to surface water and ground water on BLM-administered land, causing harm to public health and the environment.

Under all alternatives, law enforcement demands are projected to increase as area population and public land use increases. Focus of law enforcement and challenges would vary by alternative.

Implementing management for the following resources would have negligible or no impact on public health and safety and are therefore not discussed in detail: soils, vegetation, special status species, fish and wildlife, cultural resources, paleontological resources, visual resources, lands with wilderness characteristics, forestry and woodland products, ACECs, WSAs, and national trails and byways.

Alternative A

Under Alternative A, risks to public health and safety would be as described in **Chapter 3** and all current conditions and trends would continue. As a result, impacts under this alternative are similar to those described under **Effects Common to all Alternatives**.

Under Alternative A there is potential for continued release of some volatile organic compounds and hazardous air pollutant emissions over the life of the RMP, with related potential for impacts on human health.

Target shooting under Alternative A would continue to be prohibited in developed recreational sites (2,070 acres), providing a minimal level of protection for the public from injury by gunfire.

Under Alternative A, 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.

Law enforcement demands would remain similar to current conditions but are anticipated to increase as area population increases.

Alternative B

Alternative B emission estimates result in the lowest total air pollutant emissions in future planning years and decreases in emissions of some pollutants over the base year, having the lowest potential for impacts on public health due to air quality.

Target shooting would be prohibited in 247,760 acres under Alternative B, including all developed recreation areas and other areas with high visitor use, such as SRMAs, and in the direction of roads and other routes. Target shooting would also be prohibited in WSAs, the Tabeguache Area, lands managed to protect wilderness characteristics, and in prairie dog colonies that have burrowing owls. This alternative would provide the maximum level of protection from injury and damage to facilities from gunfire across all alternatives.

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 protected from contamination with an NL (fluid minerals) restriction, as well as an NGD restriction for other activities, providing enhanced protection, as compared 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 an NL (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.

Alternative B prohibits surface occupancy and surface-disturbing activities on a 20-acre site near Uravan under the Uranium Mill Tailings Remedial Action Area DOE stipulation. This would reduce risk to public health and safety from exposure to uranium and vanadium caused by ground-disturbing activities.

Management of new and abandoned mine lands to include road closure and soil stabilization would also occur under Alternative B. Road closure to abandoned mines would reduce the risk to public health and safety by reducing exposure to these areas through inhibiting access, with the number of roads closed proportional to the decrease in risk to public health and safety. Closure of roads near and next to active and abandoned mine sites that are closer to widely used roads, recreational areas, or places of dense human populations would result in a larger

increase in public health and safety from mine sites than the closure of roads around active and abandoned mines in remote or hard-to-access areas. This is due to the difference in the expected frequency of visitors to mines in highly used areas versus remote areas. Also, the rehabilitation of soil around active and abandoned mine sites reduces active erosion, which reduces the risk of contaminated sediment impacting public health and safety. As actively eroding soil is stabilized, the potential introduction of toxic chemicals and sediment particles to municipal water supply decreases, leading to a decrease in water contamination and an increase in water quality. This alternative has a greater capacity to reduce the impact on public health and safety over Alternative A, which does not provide for the management of mine site soil rehabilitation or road closure.

Alternative B provides for the protection of public health and safety in the event of a smoldering or burning coal seam. Impacts are described under ***Nature and Type of Effects***.

Under Alternative B, grazing allotments or portions of grazing allotments would be periodically evaluated to identify grazing issues and their impact on public health and safety. In cases where public health and safety is preferential to grazing on an allotment or portion of an allotment, grazing could be reduced or closed. Public health and safety would be improved.

Under Alternative B, law enforcement demands would likely be concentrated in the 11 SRMAs where recreation is more likely to be concentrated. Elimination of cross-country travel and open designation areas could result in increased law enforcement demands.

Alternative C

Alternative C emission estimates result in the greatest magnitude of and increases in total air pollutant emissions due to the least restrictions on solid mineral development and on oil and gas development. This alternative would have the greatest potential to contribute to volatile organic compounds and local increases in hazardous air pollutants and associated risks to human health.

Under Alternative C, target shooting would be prohibited within developed recreation sites, providing a similar level of protection from injury by gunfire as would Alternative A.

Under Alternative C, 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 during development by a NSO stipulation for the first 1,000 feet from the water supply. Once development is complete, a CSU stipulation and additional protective measures between 1,000 and 2,640 feet from the water would be maintained, providing enhanced protection, when compared with Alternative A.

Alternative C would also prohibit surface occupancy and surface-disturbing activities on a 20-acre site near the Uraivan area, the impacts of which are similar to those described under Alternative B.

Under Alternative C, the management of active and abandoned mine lands to reduce active soil erosion through rehabilitation would occur. The impacts are similar to the results of soil rehabilitation that would occur under Alternative B. Alternative C provides for more management of mine sites than Alternative A through soil rehabilitation.

Alternative C would also provide for the protection of public health and safety in the event of a smoldering or burning coal seam, the impacts of which are described under **Nature and Type of Effects**.

Under Alternative C, law enforcement demands from recreation are likely to occur in the 11 ERMAs, where more recreation could occur. Maintenance of open areas would not increase law enforcement demands.

Alternative D

Alternative D would have the second highest estimated emissions levels, with impacts above Alternative A. Impacts on human health from emission would be present as described under Alternative C, however at a slightly reduced level.

Target shooting would be prohibited on 49,370 acres under Alternative D, including within 150 yards of any developed recreation site and in specific SRMAs and ACECs. Some limitations would be in place, including shooting toward a target located across a designated route, and shooting towards a site or facility if it is within the range of the firearm. This alternative would provide more protection from injury and damage to facilities by gunfire than would Alternative A.

Alternative D would protect municipal water supplies classified by the State of Colorado, as well as groundwater wells and springs used for public water supply, from contamination with an NL restriction for the first 1,000 feet from the water supply, and then a CSU stipulation and additional protective measures between 1,000 and 2,640 feet, providing enhanced protection as compared with Alternative A.

Alternative D would also prohibit 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.

In addition, Alternative D would provide for the management of active and abandoned mine lands to reduce active soil erosion through rehabilitation. The impacts are similar to the results of soil rehabilitation that would occur under Alternative B. In addition to soil rehabilitation, Alternative D provides for possible route closure as a part of a comprehensive travel management plan. The impacts of route closure would depend on the outcome of travel management planning; however, Alternative D would have a greater capacity to reduce the risk of active and abandoned mine sites on public health and safety than Alternative A due to the review and possible closure of routes to those mine sites.

Alternative D would also provide for the protection of public health and safety in the event of a smoldering or burning coal seam, the impacts of which are described under **Nature and Type of Effects**.

Under Alternative D, grazing allotments or portions of grazing allotments would be periodically evaluated to identify grazing issues and their impact on public health and safety, as with Alternative B. The impacts of such are similar to those described under Alternative B.

Under Alternative D, law enforcement demands from recreation are likely to occur in the seven SRMAs and, to some extent, in the four ERMAs where recreation is most likely to occur. As discussed under Alternative B, travel management decisions prohibiting areas open to cross-county travel could result in increased law enforcement demands.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on public health and safety 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 public health and safety are potential exposure to unexploded ordnance in the North Delta unexploded ordnance area, exposure to hazardous materials from contaminated sites, dispersed or unmanaged target shooting, injury from recreational or conflicting land uses, risk from abandoned mine openings, risks associated with sites that are being used or were used for resource extraction, and surface water contamination from development.

Over the life of the RMP, these actions and risks are expected to continue to grow in proportion to the increasing use of BLM-administered lands by a regional and national audience. A larger population of visitors could result in a greater risk for human exposure to hazardous wastes, unexploded ordnance, and abandoned mine openings; a greater risk of injury from recreational or conflicting activities; and a greater strain on law enforcement. If renewable or traditional energy or mineral development increases, risks associated with extractive infrastructure and transmission lines would be expected to rise.

4.6.3 Socioeconomics

Socioeconomic impacts would occur with the implementation of any of the alternatives. Potential impacts include changes in employment and income, in tax revenue for local, state, and federal government entities, and in demand for housing and government services. In addition, management actions could alter the attitudes and opinions concerning use of BLM-administered lands. This section describes potential impacts on socioeconomics from management actions. Existing conditions are described in **Section 3.4.3** (Socioeconomics).

Under all alternatives, the BLM continues to consider socioeconomic impacts of site-specific actions and incorporates socioeconomic issues into analyses of environmental, social, and economic impacts, such as the NEPA-required analyses for site-specific actions.

Methods and Assumptions

The study area is broken down using a tiered approach:

- I. The five-county area of Delta, Gunnison, Montrose, Ouray, and San Miguel. The planning area also includes a portion of Mesa County (11,900 acres). However, the population centers in Mesa County are outside of the planning area, so Mesa County data does not accurately represent the planning area. Qualitative analysis includes Mesa County information as appropriate, but Mesa County data has been excluded from quantitative analysis to avoid misrepresentation of planning area data.

2. The five socioeconomic units, as defined in the Community Assessment of the Uncompahgre Planning Area (BLM 2009e). This is also discussed in **Chapter 3**, as appropriate, to demonstrate differences between social or economic impacts in different portions of the planning area. Community-level data is provided if available and if they add meaning to the analysis.

Economic analysis takes one of two forms depending on the available data. For those activities that generate measurable spending (market values), the analysis estimates economic impact in terms of output (total spending), value added (income), and employment in the regional economy. For example, spending to produce coal, to raise cattle, and to recreate on BLM-administered land fits this type of analysis. Through the use of a regional input-output multiplier (IMPLAN), an assessment of impacts on selected industrial sectors of the economy has been evaluated, including coal production, livestock grazing, and recreation. IMPLAN is a regional economic impact model that provides a mathematical account of the flow of dollars and commodities through a region's economy. This model provides estimates of how a given amount of a particular economic activity translates into jobs and income in the region. These multipliers were applied to changes in final demand resulting from the differing BLM management alternatives in the RMP. The results measure the change in the level of output, employment, and income for those industrial sectors impacted by each action.

For some resources, it was determined that the level of uncertainty for production or use did not allow for meaningful economic modeling output. Oil and gas production falls into this category; although the UFO Reasonably Foreseeable Development Scenario (BLM 2012d) estimates level of wells drilled, production levels would vary based on multiple factors, such as technology employed and resource market value. Site-specific NEPA analysis would be completed prior to any development and would include additional economic impacts analysis of the proposed action. Mineral exploration and locatable mineral deposit development are allowed under the General Mining Law of 1872 on all BLM-administered lands unless withdrawn by Secretarial Public Land Order or an act of Congress. BLM management activities would impact only the acres recommended for withdrawal from mineral entry and permitting requirements. Level of mineral withdrawal would, however, be highly variable based on market conditions and other factors. As such, it was determined that economic modeling would not result in meaningful output. For others, it was determined that the level of economic influence in the region from activities on BLM-administered lands would remain low and therefore be inconsistent with performing economic impact analysis. Specific components of recreation, including recreational use permits, forest and woodland material sales, and ROW rents, are included in this category. For these types of resources, detailed qualitative discussion of impacts by alternative is included.

Economic impacts are described in terms of direct, indirect, and induced impacts. Direct impacts, such as income and employment, are directly affected by activity on BLM-administered land, such as a rancher spending money at a local veterinarian. Indirect impacts occur when related industries gain from purchases by the directly impacted businesses, such as the veterinarian buying supplies from local firms. Induced impacts are the results of spending by employees hired due to the business activity just described. Together, these are reported as the total impact of the different management alternatives.

Employment opportunities related to activities on BLM-administered land and mineral estate include jobs in exploration, development, and production of minerals, including oil and gas, solid leasable minerals, such as coal, and locatable and mineral materials; jobs in livestock production; and jobs in various recreation activities. The economic analysis provides quantitative estimates of employment in the planning area from coal exploration and development, livestock grazing, and recreation on BLM-administered lands and mineral estate.

For all economic modeling presented here, data presented are estimates, based on best available data. However, under all alternatives, the pace of development could differ from the rate assumed in the analysis. The BLM has limited control over the pace of development because it authorizes only economic activities but does not perform these activities. An abrupt shift in the pace of development could result in short-term impacts on the demand for housing and community services. It also could have short-term impacts on the supply of tax revenues from residences or businesses to support community services due to short-term changes in job opportunities and the resulting change in in-migration or out-migration trends. Any such impacts would likely be more severe for smaller communities, which are less likely to be able to absorb a sudden influx of new residents, or to continue to support existing infrastructure if out-migration were to increase suddenly.

Actual impacts would also vary based on site-specific differences and changes in market demand for mineral resources, policy regulating mineral extraction or livestock grazing, population change in the planning area, or various other factors that could alter the economic impact of BLM-administered land use. Narratives included discuss the specific limitations of data and modeling for each specific resource use.

In addition, not all economic values can be measured by market transactions. Open space, access to recreation, and other factors enhance quality of life for residents and could attract individuals or business to an area. This analysis examines values for nonmarket factors based on previous research.

Results from the quantitative and qualitative economic analysis also are applied in measuring the social impacts. A narrative discussion of the impacts on communities and groups that result from a change to baseline conditions measure social change.

In the absence of quantitative data, impacts are described using ranges of potential impacts, or a qualitative analysis was performed, based on the best available data, as appropriate. Expert opinions were solicited from the UFO regarding current conditions for specific resources and anticipated outcomes, and they were incorporated into the evaluation.

Indicators

Key indicators that are used in the socioeconomic impact analysis are as follows:

BLM-Administered Land Contributions

- Recreation use in visitor days
- Livestock grazing AUMs
- Energy development and production:

- Oil production (barrels)
- Gas production (millions of cubic feet)
- Coal production (millions of tons)
- Other minerals (mineral materials, other leasables, and locatables)
- Ecosystem services

Social and Economic Contributions

- Population (growth projections)
- Changing demographics (selected indicators)
- Employment (numbers by sector)
- Income (personal income)
- Tax revenue
- Ethnic and racial characteristics of the region
- Open space (land enhancement value and attracting non-labor income)

Assumptions

In addition to the assumptions in **Section 4.1.1**, the analysis is based on the following assumptions for livestock grazing:

- The actual AUMs used would vary by alternative but is assumed to be the same in each of the 20 years of the planning period
- A change in actual AUMs will represent a corresponding decrease in cattle or sheep grazing

In addition to the assumptions in **Section 4.1.1**, the analysis is based the following assumptions for mineral development:

- The coal resources in the Tongue Mesa coal field are heavily faulted with no rail access to the area, making it economically unviable to mine in the next 20 years (BLM 2010h). Since this is the current status of this resource area, it will have no impact on the socioeconomics of the area, and no further analysis was performed.
- The mining operations in the Somerset coal field produce high-quality coal and use subsurface mining techniques, specifically longwall mining. The output from the two active mines on BLM-administered land within this coal field is estimated to remain the same as current production, between 9 and 11 million tons of coal each year for the next 20 years. This amount will remain fairly constant over this period due to constraints from demand and expressed interest.
- The coal resources in the Grand Mesa coal field have limited potential and are less economically viable than coal resources in Somerset due to low coal quality and transportation constraints. The Grand Mesa area would most likely be mined only when the resources at Somerset are exhausted, which is not forecasted to happen

in the next 20 years. As such, it was assumed that Grand Mesa would not be mined in the next 20 years. Since this represents the current status of this resource area, it would have no impact on the socioeconomics of the area, and no further analysis was performed.

- The surface mining operation in the Nucla-Naturita coal field is on private land extracting private minerals. It produces approximately 350,000 to 400,000 tons of coal annually, and all of the coal mined from this location goes directly to a local power plant. This is a private operation and would only be affected by BLM land management decisions if the mine extended onto adjacent federal lands. Economic impacts of the Nucla-Naturita coal field are not included in the IMPLAN analysis but are discussed in the text.

In addition to the assumptions in **Section 4.1.1**, the analysis includes the following assumptions for recreation:

- Recreation Management Information System data provides an accurate representation of visitor days and uses in the planning area.
- Recreation use will continue to increase over the 20-year planning period. Exact numbers are not available for Uncompahgre RMP planning area visitor increase, so a linear progression was used to predict future increases in visitor days based on state population forecasts and planning area Recreation Management Information System estimates for the past five years. Actual increases in visitation could vary, based on regional and national economics and other factors.
- Spending profiles for motorized and nonmotorized users in the planning area are similar to those determined for other BLM-administered lands in Colorado.
- Percentage of visitors from outside the planning area is similar to that determined for other planning areas and in national use surveys on other federal lands (for example, the Forest Service Visitor Use Monitoring surveys).

Projected annual resource outputs are based on the best available information and professional judgment. The purpose of the economic analysis is to compare the relative impacts of the alternatives and should not be viewed as absolute economic values.

Nature and Type of Effects

Planning Area

The focus of this analysis is the resource activities that land management decisions would most likely impact, including energy development, livestock grazing, and recreation. Actions from resource programs or constraints (as described for each alternative) that impact energy development, livestock grazing, and recreation (e.g., surface-disturbing activities that impact the amount of land available for grazing) are included by implication. Also included are actions that impact social values and sense of place.

Impacts from recreation on BLM-administered land at the state level in 2011 were estimated at \$483.2 million, and total impacts (direct, indirect, and induced) were estimated at \$983 million

(BLM 2011d). Recreation plays an important role in the planning area's economy, contributing 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.

Changes in recreation levels and activity types could occur as a result of planning actions; however, the role of recreation management and the associated direct and indirect impacts would continue to sustain opportunities important to the area economy and wellbeing under all of the alternatives. Different levels of recreation are supported under each alternative, although it is projected that recreation in the local economy will continue to increase as OHV use, boating, biking, and other forms of recreation continue to increase. Permitted outfitters also represent an important economic contribution tied to BLM-administered lands by providing recreation services, such as big-game hunting and float trips, rock-climbing excursions, and mountain biking trips. Guided recreation trips with outfitters on the San Miguel River are of particular importance.

Opportunities provided to residents are important, but their recreation expenditures do not represent new money introduced into the economy. If opportunities on BLM-administered lands were not present, it is likely that residents would participate in other locally based recreation, so this money would still be retained in the local economy. As a result, quantitative analysis by alternative focuses on visitors from outside the area. Additionally, jobs and income associated with recreation management do not capture the entire value of the experience held by recreation users within the planning area. For example, boating or motorized use within the planning area could change as management actions are implemented; therefore, the value of these recreation experiences could change as visitor use changes.

Hunting and fishing attract visitors to area counties, and some of those visitors will hunt and fish on BLM-administered land. No accurate numbers on hunters and anglers visitation in the planning area is available. The CPW collects data on hunting and fishing at the state and county level. Economic impacts from out-of-state visitors on planning area counties are included in

Table 4-82 (Hunting and Fishing Economic Impacts from Nonresidents in Planning Area Counties, 2007). The output in this report does not include visitors from outside of the region but within Colorado, so estimates of economic contribution are undervalued. However, not all of these impacts are related to use of BLM-administered lands and include hunting and fishing on other federal and state lands. Wildlife watching is an activity on BLM-administered lands that also contributes a regional economic impact. According to state-wide estimates, the average nonresident wildlife watcher is estimated to spend \$147 per day, and overall impacts in 2006 were more than \$720 million (CPW 2008b).

In total for the state, direct contributions were \$6,146 million from all energy development of BLM-administered resources (all federal mineral estate) in 2010. For the state, the largest contributions were from oil and gas (\$2,930 million direct impacts) and coal (\$782.7 million direct impacts) (BLM 2011d). For the UFO, receipts from coal are much higher than for oil and gas; as such, these state values do not reflect the UFO. The BLM would continue to provide leasable, locatable, and mineral materials in the planning area. Management under the approved

Table 4-82
Hunting and Fishing Economic Impacts from Nonresidents in
Planning Area Counties, 2007¹

County	Hunting economic impacts	Fishing economic impacts	CPW fees	Total impact (resident and nonresident)
Delta	\$7,990,000	\$1,220,000	\$300,000	\$27,840,000
Gunnison	\$12,270,000	\$7,200,000	\$890,000	\$53,140,000
Montrose	\$3,680,000	\$2,500,000	\$790,000	\$29,180,000
Ouray	\$690,000	\$180,000	\$240,000	\$3,440,000
San Miguel	\$4,280,000	\$730,000	\$250,000	\$17,380,000

¹ Overall impacts on counties from out-of-state visitors based on CPW 2008b.

RMP will play one role in determining the extent of future energy and mineral resource activity in the planning area. For example, withdrawal from mineral entry would be recommended and could occur for portions of ACECs with mineral potential.

Under all alternatives, the change in population that would result from changes in energy and mineral sector employment is not anticipated to result in a significant overall population change. In addition, the housing vacancy rate in the planning area (18.9 percent average) would likely accommodate any changes in housing demand resulting from population changes due to energy development. However, concentrated development could impact community economy or social structure at the local level. These impacts are based on current conditions and available technology in the energy market. Actual activity in oil, gas, or coal markets cannot be projected, so these estimates may not be an accurate portrayal of actual impacts. In addition, changes in population, housing markets, or other community factors could alter impacts on housing availability and affordability at the local level.

Most of the hydrocarbon production in the planning area is natural gas. As such, only natural gas production is discussed in the remainder of this section. Gunnison and San Miguel Counties accounted for the majority of the natural gas produced and sold in the area in recent years (Gunnison with 20 wells and 1,684,191 thousand cubic feet, and San Miguel with 120 wells and 5,865,504 thousand cubic feet sold in 2011; Colorado Oil and Gas Conservation Commission 2012b). At a wellhead price of \$3.95 per thousand cubic feet (US Energy Information Administration 2012), gas sales could represent total sales of more than \$6.6 million and \$22.2 million for Gunnison and San Miguel Counties, respectively, although much of this money would not be retained in the planning area counties. It should be noted that Gunnison and San Miguel Counties is 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.

Based on the reasonably foreseeable development scenario (BLM 2012d), an estimated 1,271 wells could be drilled in the planning area by 2030 using coalbed natural gas and conventional methods, with 418 of those wells falling under BLM management. This is estimated to result in approximately 70 wells drilled per year or 23 wells under BLM management. The number of

wells drilled, both nationally and in the planning area, is projected to increase, while the production per well decreases (BLM 2012d). The regional economic impact of oil and gas production on planning area land results primarily from expenditures to drill wells and to extract gas from completed wells. Changes to economic contributions would occur based on differing levels of drilling or extraction or changes in cost of development or extraction. RMP actions would have no impact on the market price for natural gas or oil, which is the most important factor in the decision to develop. Potential social issues related to gas development are a concern, particularly for nonconventional methods of extraction. Local community residents may be concerned about water quality changes, exposure to hazardous material, and changes to population and area social character as a result of development. Stipulations on oil and gas development, including, but not limited to, surface disturbance limitations, development siting, and development timing would generally increase development costs; however, such stipulations would provide increased protection of the visual landscape, water quality, air quality, and the related quality of life factors for area residents and visitors.

Over the life of the RMP, it is anticipated that the coal industry will remain steady (BLM 2010h). Like natural gas, coal development economic impacts are determined by the tons of coal produced and the cost to mine. In the planning area, costs and contributions differ for the two producing coal fields, Somerset and Nucla-Naturita, due to differences in extractive technique. RMP actions would also impact production differently. This is because surface restrictions would have minimal impacts on production at Somerset where underground mining occurs, but could impact production or increase costs at the Nucla-Naturita strip-mine.

Economic contributions from mineral development, principally uranium mining, could be impacted by RMP actions to withdraw minerals and to establish permitting requirements. The Piñon Ridge uranium mill near Naturita (which is in the permitting process) is likely to increase demand for uranium extraction. Social views of the mill development vary widely across the planning area. There is a high 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.

Crushed stone and sand and gravel removal by county and state governments is authorized under free use permits, such that the BLM receives no revenues or lease fees, so no payments are made to counties. Free use permits economically benefit counties that would otherwise have to pay for a private mineral source. No fees are collected from the removal of salable and locatable minerals; however, royalties from coal and oil and gas production are distributed back to local governments and represent an important BLM-associated payment in planning area counties. Impracticalities exist in predicting actual levels of production, market prices, and the resulting royalties paid, making it difficult to accurately assess the resulting input from these fees into the local economy.

State-wide livestock grazing represents an important economic sector. Direct contributions from BLM-administered lands in 2011 were \$28.3 million, and total contributions (direct, indirect, and induced) were estimated at \$53.5 million (BLM 2011d). Exports of beef from Colorado surged 55 percent in 2008, to \$497 million. Exports of beef from Colorado increased at a rate of 33 percent faster than total US beef exports, which topped \$3 billion in 2008

(Colorado Department of Agriculture 2012). Even though not all beef exported from Colorado started out within the state, almost all local Colorado-grown beef is fed and exported from Colorado feed yards. In turn, this has allowed Colorado ranchers to transport their beef a shorter distance, allowing more money to stay within local communities. In 2011, Colorado was the third-largest sheep and lamb producer in the US, producing approximately 370,000 sheep and lambs (American Sheep Industry Association 2012).

Locally, agriculture represents approximately 3.6 percent of jobs in the planning area counties, based on 2010 numbers. These numbers include all agricultural activity, including farming and ranching on private and BLM-administered lands. 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 (US Department of Agriculture, National Agricultural Statistical Service 2012) and supports the West Elk American Viticulture Area. Additionally, the area supports agritourism, visits to farms and orchards to pick produce or view operations (US 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 (US Department of Agriculture, National Agricultural Statistical Service 2012).

BLM-administered land livestock grazing represents an important component of the grazing for local ranchers. In addition to potential changes in projected employment and income as a result of changes in BLM forage offered, the value of BLM forage to area operators should also be considered. (This value can be estimated as the difference between the competitive market price of an AUM and the BLM lease fee.) As described in detail in **Chapter 3**, the cost of replacing BLM-administered lands with private grazing lands can be estimated. In the planning area, the cost of replacing pasture land per AUM is calculated at around \$5,400. The benefit to operators from the potential permitted BLM grazing varies among the alternatives, as described below. Payments to counties under the Taylor Grazing Act would continue under all of the alternatives and would vary by alternative, as described below.

Prior levels of AUMs used in impacts analyses might not be an accurate portrayal of actual impacts. Factors such as drought, financial limitations on operators, market conditions, and the implementation of grazing practices designed to improve range conditions are important to consider. Also, impacts may not be evenly distributed across all portions of the planning area. Should permitted AUMs be reduced in allotments that were not billing at full capacity, then economic impacts for that particular allotment and permittee could be minimal.

With mounting economic pressures on the livestock sector, some ranch owners have raised money for retirement or other purposes by subdividing portions of their land into “ranchettes” and selling them to individuals. The sale of these ranchettes provides financial liquidity to ranchers who frequently have most of their assets in land, but it generally results in increased building of fences, houses, and sometimes other structures (e.g., barns), changing the visual landscape. Under all alternatives, this trend would be likely to continue because it is

fundamentally related to the nature of the ranching business (principally, the facts that most ranchers' assets are in land, and that profit margins are generally low and can turn negative in drought or other adverse conditions). Also, state laws govern property subdivision, under which county zoning laws cannot regulate subdivisions of 35 acres and larger. However, alternatives that could lead to increased costs for area ranchers could serve to increase this trend.

In addition to market values described above, nonmarket values are important to the wellbeing of visitors, residents, and others outside the planning area. These values include natural amenities, quality-of-life factors (such as view and open space), recreation opportunities, and ecosystem services. Nonmarket values relate to things that people value but are not generally bought or sold in a marketplace. Nonmarket values are difficult to quantify, and insufficient data exists in order to assess the impacts of management actions. However, the fact that no monetary value is assigned to these values does not lessen their importance in the decision-making process.

Some of the value associated with open space and other features can be captured in markets. For example, the price of a house that overlooks a pristine mountain range might be higher than the price of a house identical in almost every respect but overlooking a cement factory. However, the ability to see an open landscape while driving along a highway is not likely to be captured in the market.

A related concept is that some changes in management could affect both market and nonmarket values. For example, industrial development that substantially alters the visual characteristics of the landscape might, over time, result in fewer tourists visiting the area from afar and spending money in local hotels, restaurants, and shops. This decline in tourism would result in adverse impacts on employment and income. Such industrial development also could reduce the satisfaction of residents who value open space and, therefore, would result in adverse impacts on nonmarket values. Conversely, new industrial development also would generate jobs and income, and the net effect—if all values were to be expressed in the same metric (dollars)—could be positive or negative.

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 relative to non-wilderness 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 its 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, non-labor income is intimately tied to natural amenities (as discussed in **Chapter 3**).

Rural county population change, the development of rural recreation, and retirement-destination areas are all related to natural amenities (McGranahan 1999).

As discussed in Chapter 3, recent models have been created to assess the economic benefits of ecosystem services so that these economic values can be incorporated into the planning process. A study based in the Pike San Isabel National Forest of Colorado's Front Range determined the total value of ecosystem services to be \$2,208 per acre per year in 2008 dollars (Bacigalupi 2010). If these assumptions were used to assign a value for the Uncompahgre RMP planning area, ecosystem services could provide as much as \$1,492 million. Ecosystem services benefits vary across specific habitats and with site-specific conditions; due to the complexity and cost of implementing site-specific nonmarket valuation methods, quantifying these values is beyond the scope of this analysis. However, the BLM recognizes that changes in nonmarket values would be likely as a result of management actions, and the severity of impacts would depend on the level of resource protection and development under each alternative. In general, alternatives that emphasize resource development over conservation likely would result in more impacts on nonmarket values and how planning area individuals perceive their own quality of life.

Socioeconomic Units

Recreation plays a vital role in all five socioeconomic units (see **Chapter 3** for a complete description and map of these units). Many people in the study area not only value their own proximity to recreation areas but see their towns as gateways to these areas, enabling them to attract tourists. This is particularly pronounced in socioeconomic unit 4, where the resort town of Telluride and major access points to the San Miguel River are located.

Impacts on the economy from leasable, locatable, and salable minerals are the most pronounced in socioeconomic units 1, 2, and 5, where major coal fields and minor oil and gas extraction are located. Unit 5 is the most dependent on mineral extraction from BLM-administered lands, with major coal and uranium mines located near Nucla and Naturita. These towns are also economically dependent on these industries, as witnessed by their sensitivity to the "boom and bust" nature of mineral extraction.

Livestock grazing is an important economic and cultural resource to socioeconomic units 2, 3, 4, and 5. Many communities within these units have a long agricultural history, which not only contributes to the local economies, but also contributes to the area's history and sense of place. Units 3 and 5 contain the most grazing allotment acres and are more likely to be affected by future land use decisions than units 2 and 4. As discussed under Planning Area **Nature and Type of Effects**, agricultural operations are of particular importance to residents of the North Fork Valley communities within socioeconomic unit 1.

All five socioeconomic units cited the scenic beauty of the landscapes and sense of community as strong factors in their decision to live and work in the area. While no monetary value can be placed on these, they do play an important role for both retaining residents and attracting new visitors. These factors could be impacted in all socioeconomic units by future land use decisions and development in the area.

Effects Common to All Alternatives

Implementing management for the following resources would have negligible or no impact on socioeconomics and are therefore not discussed in detail: wild horses, paleontological resources, national trails and byways, watchable wildlife viewing sites, Native American Tribal Uses, and public health and safety.

Across all alternatives, BLM management actions are not likely to change the planning area economic diversity (the number of economic sectors) or to change economic dependency, which occurs when the local economy is dominated by a limited number of industries. Shifts in emphasis could occur but would not likely result as a consequence of planning actions analyzed in this EIS. However, changes could be more important for smaller planning area communities. In addition, impacts could occur on social components of communities and other unquantifiable factors, such as sense of place.

For all alternatives, population in the area is expected to increase over the life of the RMP. As detailed in **Chapter 3**, population projections for 2030 call for a population increase ranging from lows of 18 percent and 22 percent in Ouray and Gunnison Counties, to highs of 46 percent in Delta and San Miguel Counties and 43 percent in Montrose County, with potential impacts on housing, employment, and social values as new people enter communities. While BLM management actions could result in some level of changes to population, as described below, the overall trends would not be impacted.

Across all alternatives, certain factors impacting energy and mineral development would remain consistent. For coal development, 580 acres of areas with congressional mandates would remain closed to coal leasing and WSAs have been identified as unacceptable for further coal exploration and leasing consideration. This could have impacts on the level of extraction and associated economic impacts. In addition, according to the Coal Resource and Development Potential report (BLM 2010h), future levels of extraction in the area will be limited by coal sources that are economically feasible to extract and by limited transportation routes for extracted coal. Specifically, Tongue Mesa, Grand Mesa, and Uncompahgre Plateau coal have been determined to have low potential for development and will not likely be impacted by RMP decisions. The socioeconomic discussion focuses on the Somerset coal field, where underground mining occurs, and the Nucla-Naturita coal field, where surface mining occurs.

Natural gas drilling is on an increasing trend throughout the nation and the planning area. Across all alternatives, for natural gas development, the economic contributions to the planning area represent a small fraction of jobs and income. According to Headwaters Economics data (2010), oil and gas extraction for the total five planning area counties examined, including both drilling and support, accounted for an estimated 34 out of 1,304 jobs in the mining sector in 2009 (0.01 percent of total area private employment). Although the majority of gas production in the planning area has occurred in San Miguel County in recent years, most of these jobs (28) were in Montrose County (Headwaters Economics 2010). While BLM management decisions could result in changes in acres available for exploration, development, and leasing, the relative economic impact of oil and gas leasing on federal mineral estate is expected to remain low, and it was not examined in the IMPLAN analysis. As for all mineral resources, impacts on local communities could be higher if concentrated development occurs. For all alternatives, leasing of

oil, gas, and geothermal fluid minerals, as well as coal solid mineral leasing, would result in federal royalty contributions to the local economies. As discussed in **Chapter 3**, standard distribution of federal royalties includes 50 percent of net funds to states of origin and approximately 50 percent of the state amount to the county of origin. As such, impacts would depend on level of resource extraction and would vary, as discussed below.

Additionally, economic impacts from solid nonenergy leasables, phosphate and sodium, would be limited under all alternatives, due to lack of foreseeable development, and are not examined under the IMPLAN analysis.

RMP actions could have some impacts on mining claims for locatable minerals by recommending areas for congressional withdrawal. Time and costs associated with permitting and related profit and return are likely to represent the larger impact and could differ by alternative. Major commercially mined minerals are uranium, vanadium, and gypsum.

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 end product user for exploring for, developing, and extracting those mineral resources.

Among renewable energy sources, solar has moderate to high potential in the planning area, while wind, geothermal, and biomass energy have low potential, due to the lack of commercial interest and existing infrastructure. The primary drivers of the pace of development will be market forces and policy variables outside the scope of this RMP. BLM decisions regarding management of BLM-administered land would result in some impacts on economic opportunities related to development, but the influence of BLM RMP decisions would be small in relation to the influence of market conditions and policies.

Although management across alternatives varies in terms of acres of forest and woodland available for harvest for commercial or personal use, impacts on local economies are likely to be minimal. Commercial harvest, while permitted under the current RMP, is limited by lack of suitable timber and access. Levels of harvest of woodland product for personal use are not anticipated to be limited by management for any alternatives.

Dependency on BLM forage would not change under any of the alternatives. The permitted use would provide varying degrees of total forage. As described in **Chapter 3**, the percentage of jobs in the overall area associated with farming and ranching are not likely to change as a result of BLM management action; it would continue to account for between two and nine percent of area totals for area counties. The highest levels would be in Delta County (currently 9.3 percent) and Montrose County (currently 5.4 percent), and the lowest levels would be in San Miguel and Gunnison Counties (currently 1.7 and 2.0 percent, respectively). Under all alternatives, forage on BLM-administered land would continue to provide a low-cost and important complement to some livestock producers' grazing, forage, and hay production. For smaller communities, dependency on grazing on BLM-administered lands could be more important, and jobs could be impacted.

If monitoring data indicate livestock grazing is negatively impacting other resources, appropriate adjustments would be made to AUMs, seasons of use, or use levels. Adjusting AUMs could impact the permittee negatively or positively, depending on the situation. Adjusting grazing management could impact livestock permittees by limiting flexibility for season of use and reducing the amount of available forage in the short term. Livestock removal during times of drought and critical growth could limit where permittees can put their livestock. These changes could have a more pronounced effect in smaller communities, which are heavily dependent on BLM-administered land for livestock grazing as their primary income source.

In addition to potential changes in projected employment and income as a result of changes in forage offered on BLM-administered land, the value of this forage to area operators should also be considered. (This value can be estimated as the difference between the competitive market price of an AUM and the BLM lease fee.) This value is experienced above the price ranchers pay for AUM leases and can therefore be considered a benefit. The benefit to operators from the potential permitted BLM grazing varies among the alternatives. Payments to counties under the Taylor Grazing Act would continue under all of the alternatives.

Under all of the alternatives, recreation visits are expected to increase. Employment and income related to recreation, many of which depend on access to BLM-administered lands, would, at a minimum, continue to support communities' quality of life. Localized changes in access could occur, but recreation opportunities would be maintained and enhanced, thereby accommodating existing recreation uses and expected increases in recreation uses. Impacts resulting from increased visitation to the quality of the recreation experience would depend on the type and location of the recreation activity taking place, as well as the behavior of the individual recreationist. Across all of the alternatives, it is important to recognize that the difference in special management area designations (such as SRMAs and areas open, closed, or limited to motorized uses) represents a change in management focus and may not change the public's ability to access or use BLM-administered lands. The current planning effort will not include route designation in areas limited to designated routes, so the exact impacts on motorized and mechanized use levels are difficult to predict and are discussed at a qualitative level. Recreation opportunities would be maintained and enhanced with these designations, thereby accommodating existing recreation uses and expected increases in recreation. Future site-specific travel management planning will consider impacts on level of use and quality of life resulting from changes in access.

Under all alternatives, economic impacts from hunting and fishing are expected to continue as described under ***Nature and Type of Effects***.

Changes in economic activity discussed above would also impact federal, state, and local tax revenues. Under all alternatives, grazing and leasable mineral royalties are likely to represent the major BLM contributions to county payments. In alternatives where billed AUMs or leasable mineral extraction increase, payments to counties would also increase.

In addition to contributions discussed above, livestock production, minerals production, and recreation spending all generate tax revenues. These revenues are collected and disbursed at the federal, state, and local government levels. Taxes represent revenue that is diverted from private to public spending. When the taxes collected are spent locally, they can have the same

multiplier effects as other spending does. Local taxes are the most likely to remain and be spent in the region. State taxes are likely to initially leave the area but might return in some proportion in the form of state spending in the region. Federal taxes also are likely to initially leave the area but might generate regional multiplier effects if they return as federal spending in the area.

Table 4-83 (Sales and Property Tax Impacts from Livestock Grazing by Alternative (2012 Dollars)) shows the tax impact from livestock production on decision area lands for the estimated actual AUMs used and the maximum AUMs. The table below represents the sales and property tax impacts over the expected lifespan of the RMP (20 years).

Table 4-83
Sales and Property Tax Impacts from Livestock Grazing by Alternative (2012 Dollars)

	Alternative A	Alternative B	Alternative C	Alternative D
Actual AUMs				
Federal	\$2,349,600	\$1,600,000	\$2,203,800	\$2,240,930
State and Local	\$1,796,300	\$1,316,100	\$1,793,000	\$1,704,000
Maximum AUMs				
Federal	\$4,030,600	\$2,601,200	\$3,494,650	\$3,868,590
State and Local	\$3,004,200	\$2,155,100	\$2,802,410	\$2,866,600

Source: IMPLAN calculations from BLM data

Similarly, as discussed in **Chapter 3**, for all area counties, payment in lieu of taxes (PILT) would be distributed to area counties in accordance with 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. Impacts would vary by alternative, depending on mineral leasing and grazing receipts, and would follow trends discussed for these resources.

Table 4-84 (Tax Impacts from Coal Development (2012 Dollars)) reports the tax impact from coal extraction in the planning area. These tax revenues are associated with the sales and income earned from extraction and transportation of coal. Oil, natural gas, and uranium extraction also play a role in this sector, but they were not analyzed using the IMPLAN model and are not included in these figures. Note that these figures represent coal production on BLM-administered lands (decision area) only, and do not take into account the private strip-mining operation located in the Nucla-Naturita coal field. These forecasts represent the total sales, income, property, and similar taxes collected over the expected lifespan of the RMP (20 years). These figures do not include severance taxes or royalties. It can be anticipated that assuming current rates of severance and royalty taxes, as presented in **Chapter 3**, increased production of oil and gas on BLM-administered lands would result in a comparable increase in contributions to local counties and communities. Due to lack of certainty of all natural resource extraction in the planning area, exact amounts are not estimated here. It should be noted that severance tax distribution is related to the percentage of county residents employed in the natural resource-extraction industry; therefore, level of distributions can vary dependent on the percentage of local workers employed in development and operations. Operations that rely on non-local employee will result in a lower level of distributions.

Table 4-84
Tax Impacts from Coal Development (2012 Dollars)

Federal	\$1,104,185,500
State and Local	\$1,308,658,950

Source: IMPLAN calculations from BLM data

Note: Represents sales, income, and property tax. Excludes severance taxes and royalties.

The tax impacts from recreation are shown in **Table 4-85** (Sales Tax Impacts from Recreation Activities: 2013, 2022, and 2032 (2012 Dollars)). These impacts would vary in their magnitude, as described under the general economic impacts discussion. While exact spending and tax impacts cannot be predicted, it is likely that sales tax receipts under Alternative B would be reduced, as compared to Alternative A, due to limitations on motorized recreation, and under Alternative C, as compared to Alternative A, due to reduced emphasis on targeted recreation opportunities. Under Alternative D, tax receipts may increase slightly compared to Alternative A due to a variety of recreational opportunities, including targeted recreation experience in SRMAs and opportunities for motorized and nonmotorized recreation.

Table 4-85
Sales Tax Impacts from Recreation Activities: 2013, 2022, and 2032 (2012 Dollars)

	2013 (Year 1)	2022 (Year 10)	2032 (Year 20)	TOTAL
Federal	\$255,610	\$365,740	\$483,880	\$7,417,100
State and Local	\$247,130	\$353,600	\$467,820	\$7,170,990

Source: IMPLAN calculations from BLM data

Alternative A

Planning Area

Under Alternative A, the contribution of livestock grazing to the local economy would remain similar to current conditions. The future number of billed AUMs is difficult to predict, based on factors such as drought, unforeseen financial limitations on operators, market conditions, and the implementation of grazing practices designed to improve range conditions. All of these factors could impact the level of use. As a result, a high and low level of AUM use was examined to determine a range of economic impacts. The high value is represented by maximum permitted AUMs and the low value by the average of billed AUMs for the past five years (see **Table 4-86** [Projected Low and High Livestock Grazing AUMs by Alternative]).

Alternative A grazing use would likely range from 17,824 to 26,581 cattle AUMs and 5,602 to 11,783 domestic sheep AUMs. It would support approximately 889 to 1,579 jobs and \$7.6 million to \$12.8 million in labor income (see **Table 4-87** [Regional Economic Impacts for Livestock Grazing by Alternative]). Should the affected permittees replace federal grazing lands with annual rental of private lands for grazing, as discussed in chapter 3, estimated costs to area permittees for billed AUMs, would be \$308,00 in private grazing fees or over \$126.8 million in pasture land costs. As described under **Nature and Type of Effects**, livestock grazing impacts are broader than those portrayed by the economic impacts, as grazing represents an important historical source of employment and way of life in the planning area.

Table 4-86
Projected Low and High Livestock Grazing AUMs by Alternative

	Alternative A	Alternative B	Alternative C	Alternative D
Average Billed AUMs (Low)				
Cattle	17,824	19,006	22,310	16,523
Sheep	5,602	722	2,213	5,602
<i>Total</i>	<i>23,426</i>	<i>19,728</i>	<i>24,523</i>	<i>22,125</i>
Maximum Permitted AUMs (High)				
Cattle	26,581	28,344	33,271	24,641
Sheep	11,783	1,518	4,655	11,783
<i>Total</i>	<i>38,364</i>	<i>29,862</i>	<i>37,926</i>	<i>36,424</i>

Source: BLM 2012a

Table 4-87
Regional Economic Impacts for Livestock Grazing by Alternative

	Alternative A	Alternative B	Alternative C	Alternative D
Average Billed AUMs (Low)				
Output	\$55,245,500	\$42,529,230	\$56,645,960	\$52,278,780
Labor Income	\$7,558,880	\$5,337,647	\$7,277,180	\$7,193,280
Jobs	889	529	759	854
Maximum Permitted AUMs (High)				
Output	\$91,321,820	\$68,595,600	\$88,005,810	\$86,897,530
Labor Income	\$12,833,130	\$8,656,560	\$11,469,000	\$12,287,930
Jobs	1,579	869	1,232	1,527

Source: IMPLAN calculations from BLM data

In general, recreation use can be assumed to continue to increase between 2.5 and 4.5 percent per year, using the method discussed under **Assumptions**. Given this increase, regional economic impacts were examined for three levels of visitors: 1) current conditions; 2) estimated use in ten years; and 3) estimated visitor levels in 20 years (see **Table 4-88** [Economic Impacts from Recreation Activities: 2013, 2022, and 2032 (2012 Dollars)]). Current average annual recreation visits are estimated at 297,700 general visits, including 118,700 from motorized recreation and 178,000 for nonmotorized activities. Expenditures of these visitors support annually approximately 36 jobs and \$976,000 in labor income in the planning area economy. This is predicted to almost double over the next 20 years. It should also be noted that it is difficult to quantify all sectors of the economy influenced by recreation and tourism. It is likely that additional jobs in the retail and tourism sector would be influenced by changes that affect planning area visitor numbers. For example, BLM management could influence the level, location, and type of visitor use. Lack of adequate facilities and opportunities for specific recreation opportunities can result in visitors choosing to recreate elsewhere in the area. Under Alternative A, facilities would likely be strained if projected visitation levels for 10 or 20 years in the future were realized, and the limited number of SRMAs would provide a minimal level of targeted recreation. If visitors were to use other local lands in lieu of the planning area, due to these constraints, economic impacts could be limited; but if visitors decided to go to a different region, economic impacts on local communities and counties could occur.

Table 4-88
Economic Impacts from Recreation Activities: 2013, 2022, and 2032 (2012 Dollars)

	2013 (Year 1)	2022 (Year 10)	2032 (Year 20)	Total
Output	\$2,992,150	\$4,281,400	\$5,664,290	\$86,824,820
Labor Income	\$976,410	\$1,397,130	\$1,848,400	\$28,333,090
Direct Employment	36	52	69	1057

Source: IMPLAN calculations from BLM data

Impacts specific to hunting and fishing would be as described under **Nature and Type of Effects**. Recreation would continue to represent an important factor in quality of life for residents, with the potential to attract visitors, retirees, and others as non-labor sources of income.

Fluid and solid leasable minerals extraction (coal, oil and gas, and geothermal resources) under Alternative A would continue on current trends, as described in **Chapter 3**. Approximately 13.8 million tons of coal would be mined in the planning area in Delta, Gunnison, and Montrose Counties in 2012, with approximately 13.1 million tons of that being federal coal (see **Table 4-89** [2012 Coal Extraction Levels]). Coal contributions to employment and income from these uses would annually provide approximately 2,018 jobs and over \$175 million in labor income, with these figures increasing to 50,350 jobs and over \$3.5 billion in labor income over the expected 20 year lifespan of the RMP (see **Table 4-90** [Baseline Regional Economic Impacts for Coal (Alternative A)]).

For oil and gas development, less than one percent of employment and labor income in the planning area would continue to be supported by oil and gas extraction under Alternative A. Approximately 459,650 acres (53 percent of federal fluid mineral estate) are open in the higher development potential areas for conventional oil and gas and 412,150 acres (47 percent of federal fluid mineral estate) are open in the lower development potential areas for conventional oil and gas. An additional 456,190 acres with coalbed gas potential are open to drilling under this alternative.

Table 4-89
2012 Coal Extraction Levels

County	Coal Field	Mine name/ mineral status	Extraction (million tons)	Technique
Delta	Somerset	Bowie No. 2 (all federal)	3.2	longwall (subsurface)
Gunnison	Somerset	Elk Creek Mine ¹ and West Elk Mine (primarily federal)	9.9	longwall (subsurface)
Montrose	Nucla-Naturita	New Horizon (all currently nonfederal)	0.3 to 0.4	surface
Ouray	N/A			
San Miguel	N/A			

Source: BLM 2012I

¹ Elk Creek Mine is idle

Table 4-90
Baseline Regional Economic Impacts for Coal
(Alternative A)¹

	Annually	Lifetime of RMP
Output	\$556,738,410	\$11,134,768,270
Labor Income	\$175,750,000	\$3,514,999,880
Employment	2,518	50,350

Source: IMPLAN calculations from BLM data

¹ Somerset coal field only; additional impacts are possible from the Nucla-Naturita coal field, as discussed in the text

Due to minimal restrictions within high-potential areas under this alternative, fluid mineral development is more likely to meet levels predicted in the reasonably foreseeable development scenario (BLM 2012d), and economic impacts would be increased. As under other alternatives, NSO, CSU, and TL stipulations would likely influence the cost of drilling and could influence the number of wells drilled.

Level of renewable energy development would continue to be determined by market conditions, as discussed under **Nature and Type of Effects**, and would represent a small component of energy development in the planning area. Renewable energy development is discussed in the Renewable Energy Potential Report (BLM 2010g).

Likewise, mineral resource management under Alternative A would continue to support current levels of salable, locatable, and leasable mineral resource uses. Local economies where mineral and energy development on federal lands supports jobs and businesses would not be impacted. Changes to visual landscapes would continue to occur as a result of development. The potential for social changes to local area communities would continue to be present, with intensity of development largely dependent on market value of resources.

Nonmarket values would reflect current conditions and trends, as described in **Chapter 3**. Levels of protected lands and resources would remain similar to current conditions, so impacts on those that value resource protection would not be altered. Levels of non-labor income and other indicators would follow recent trends, barring changes in the local landscape of economy outside of BLM management control.

Socioeconomic Units

Impacts under Alternative A are generally as described under **Nature and Type of Effects**. Current conditions would continue, and relative importance of economic sectors and social values in the five units is not expected to change.

Alternative B

Planning Area

Alternative B would continue the BLM's current practice of allowing multiple uses, but it would prioritize resource conservation over resource uses, such as energy development. Under this alternative, surface use restrictions would be increased, additional areas would be set aside as protected areas, and stipulations to protect air and water quality would be increased. As a

result, the magnitude of development and additional structures associated with resource uses are likely to be less than that seen in historic trends and under Alternative A. This might be inconsistent with the culture advocated by some interest groups (e.g., fluid mineral development interests) and could promote the culture advocated by others (e.g., individuals interested in resource conservation or wilderness).

Under Alternative B, the contribution of livestock grazing to the local economy would decrease due to a reduction in permitted AUMs and limitations on management, which could result in additional reductions in billed AUMs. Alternative B grazing use would likely range from 19,006 to 28,344 cattle AUMs and 722 to 1,518 domestic sheep AUMs (see **Table 4-86**). It would support approximately 529 to 869 jobs and \$5.3 million to \$8.7 million in labor income. Total changes in permitted AUMs represent a reduction of 8,502 AUMs from Alternative A. Similarly, total billed AUMs are estimated at 19,728 AUMs, a reduction in 3,698 AUMs from Alternative A. Should the affected permittees replace federal grazing lands with annual rental of private lands for grazing, estimated costs to area permittees, as detailed in **Chapter 3**, would be around \$300,000 in private grazing fees or over \$122 million in pasture costs based on projected level of billed AUMs.

Under Alternative B, subdivision of ranch land and related development and sale of ranchette parcels would continue. This could be more intense than historic trends because Alternative B would likely result in measurable economic impacts for many operations that use federal land for forage, including those who currently graze domestic sheep where allotments would be required to convert to cattle.

Under Alternative B, total number of area visitors would be influenced by population and economic changes, and visitation is expected to increase, as discussed for Alternative A. However, the activities conducted on BLM-administered lands and related area spending could be influenced by BLM management actions.

Under Alternative B, 11 SRMAs would be developed, with an emphasis on targeted recreation experiences. Under Alternative B, travel and transportation management would limit additional areas to motorized and mechanized use (41,240 and 41,010 acres, respectively), reducing the opportunity for this type of recreation but improving the natural and cultural landscape and enhancing recreational outcomes and settings over the long term. Eliminating open area travel designations impacts OHV users, particularly in the North Delta OHV area. There would be impacts on residents who value recreating in this area, as well as potential economic impacts related to reduction in visits from out-of-area motorized users. Management of additional areas to protect lands with wilderness characteristics units could increase nonmotorized and primitive recreation in these areas; because nonmotorized visitor spending is typically lower than that of motorized users, there could be an overall impact on economic contributions.

Management of watchable wildlife viewing sites could provide additional opportunities for visitors interested in general wildlife or bird watching and could increase related economic expenditures in the local economy. Prohibition of SRPs for competitive events in specific SRMAs under Alternative B could result in some reduction of economic contributions, but this could improve the quality of recreation for those not participating in such events.

Fluid and solid leasable minerals (e.g., oil and gas) production under Alternative B would be lower than under the other alternatives, with the exception of Alternative B.I. Approximately 12 percent of the Somerset coal field would be closed to mining under Alternative B. Very little change in coal production and associated economic impact would result from this closure, however, because closure areas have no to low potential for mining for the next 20 years. Economic impacts from this coal field would be similar to those discussed under Alternative A.

For the Nucla-Naturita coal field, SSR and TL restrictions would effectively close all decision area lands in the coal field to mining. Impacts would primarily occur in the later part of the RMP period (i.e., 2020-2030) because it is anticipated that the private land currently mined would be depleted of coal resources in the next decade. Restrictions that would effectively close decision area lands would likely result in closure of the coal mine and power plant. As a result, \$12.2 million in output, \$3.3 million in labor income, 28 jobs, and over \$800,000 in local taxes and fees could be lost (Kramer 2012). The coal mine and power plant are major employers in the area, and the closure of these operations could significantly impact the local economy.

Alternative B would place additional restrictions on coal extraction by protecting lands with wilderness characteristics units that overlap 12,680 acres of areas acceptable for further coal leasing. This protection could limit future production by limiting such activities as methane venting or exploration road building. NGD designations under Alternative B could also complicate coal development on future leases because it would prohibit construction of temporary roads required for exploration.

For oil and gas, closures to extraction would limit the area available for development. Approximately 729,330 acres of federal fluid mineral estate would be open to leasing, 15 percent less than under Alternative A. Approximately 186,700 acres of federal fluid mineral estate would be closed to fluid mineral leasing, 4 times the acreage under Alternative A. Closures and stipulations, including NL and an NGD restriction within 0.50-mile of public water supplies (streams, wells, or springs), NSO near domestic water wells, NSO and NGD within 500 feet of perennial water bodies, and NL within 0.25-mile of major rivers, would be applied. These stipulations could increase development costs, leading to additional contributions to the local economy per well, but overall economic contributions from fluid mineral development are likely to be reduced as compared to Alternative A. Less than one percent of employment and labor income for the planning area would continue to be supported by oil and gas extraction under Alternative B.

Under Alternative B.I, additional restrictions would apply to oil and gas extraction in the North Fork area. Approximately 635,190 acres of federal mineral estate would be open to leasing, 27 percent less than Alternative A. Approximately 280,840 acres would be closed to fluid mineral leasing, 6 times greater than Alternative A. Closures and stipulations would be applied and would include NL within 0.25-mile of public water supplies (streams, wells, or springs) and NSO between 0.25- and 0.50-mile of these supplies; NL within 0.25-mile of domestic water wells, ditches, canals, dams, and other water conveyance; NL within 0.50-mile of major rivers and NSO between 0.50- and 1 mile of these features; and NSO within 0.25-mile of agricultural operations. All additional restrictions under Alternative B.I would occur in the North Fork area only; Alternative B.I would close 104,750 acres (75 percent) of the North Fork area to oil and

gas leasing, which is 94,140 acres more than Alternative B. These closures and stipulations on oil and gas development are intended to protect local water sources for North Fork Valley residents and to maintain water quality for local agricultural operations. Specific limitations on development in this portion of the planning area, including NSO stipulations and NL areas, could result in preferential development on adjacent lands where mineral resources are available. The specific impacts on the regional economy would depend on how much development occurred outside of the socioeconomic planning area and cannot be determined at the land use planning level; however, Alternative B.I would be the most restrictive of fluid mineral development in the North Fork area and is therefore likely to have the greatest impact on economic contributions from the oil and gas industry in the planning area and in the North Fork area in particular.

Similarly, additional closures and permitting requirements would likely impact solid mineral extraction. Future mining of nonenergy solid minerals would be precluded on approximately 395,900 acres (44 percent) of the federal mineral estate, and additional SSR and TL limitations would apply. As a result, special constraints could be applied to the mining activity, or the activity could be shifted to a new location. Due to the lack of potential for exploration or development over the life of the RMP, economic impacts would be limited.

If fully withdrawn, locatable mineral entry would be prohibited on 415,330 acres of the federal mineral estate, or 46 percent of the federal mineral estate (7 times the acreage under Alternative A, and the most restrictive for locatable minerals). Current levels of jobs and income provided by this industry are low, but such closures and restrictions could prevent future increases in development, particularly of uranium mining, which may be in higher demand with the operation of the Piñon Ridge Uranium Mill, which is currently in litigation.

Likewise, salable mineral material extraction would be limited by stipulations and closures, and costs to local communities could increase if they were required to find other sources of materials or to get materials from greater distances, as transportation costs of gravel and other salable minerals is high.

More acreage would be managed under protected areas (ACECs, protected lands with wilderness characteristics units, and VRM Class I and II acres) than under all other alternatives. Therefore, Alternative B would generally provide more protection of nonmarket values and natural amenities. Consequently, well-being associated with nonmarket values, and the potential contributions from new residents and tourists attracted by natural amenities, could be greater than under the other alternatives.

Socioeconomic Units

Under Alternative B, the RMP goals and objectives would emphasize resource protection and ecological preservation. As a result, socioeconomic units that are more dependent on tourism and other non-extractive uses (in particular, unit 4) are likely to benefit from this alternative. This is because management would promote preservation of values important to attracting residents and visitors. Resource use under this alternative would be limited compared with Alternative A due to the addition of special designation areas, withdrawals, and leasing stipulations. As discussed under **Nature and Type of Effects**, leasing restrictions do not always result in decreased economic output, but socioeconomic units more dependent on resource extraction (units 1, 2, and 5) could be impacted under this Alternative if restrictions were to

result in energy developers preferentially developing lands outside of the planning area. In addition, communities dependent on ranching (units 3 and 5), particularly those with domestic sheep ranches, could be impacted due to limitations on management opportunities and requirements to convert allotments to cattle, as discussed under **Alternative B – Planning Area**, above.

Under Alternative B.1, additional restrictions on oil and gas leasing would be placed on development in the North Fork area, primarily in socioeconomic unit I. Impacts would be as discussed for Alternative B, with the potential for decreased economic contributions from resource extraction activities and increased benefit to non-extractive uses in socioeconomic unit I.

Alternative C

Planning Area

Alternative C would continue the BLM practice of allowing multiple uses but would prioritize the use of resources, such as energy development, over the conservation of resources, such as air quality and wildlife. This might be consistent with the culture advocated by some interest groups (e.g., developers) and inconsistent with the culture advocated by others (e.g., wilderness advocates).

Under Alternative C, the contribution of livestock grazing to the local economy could decrease due to a lower level of permitted AUMs compared with Alternative A. Alternative C livestock grazing use would likely range from 22,310 to 33,271 cattle AUMs and 2,213 to 4,655 domestic sheep AUMs (see **Table 4-86**). It would support approximately 759 to 1,232 jobs and \$7.3 million to \$12.3 million in labor income. Total changes in permitted AUMs represent a slight decrease compared with Alternative A, while billed AUM estimates are slightly higher than in Alternative A. Consequently, permittees could have slightly increased costs associated with grazing public versus private lands. Additionally, limitations on domestic sheep grazing could impact permittees on allotments running sheep. In general, fewer restrictions would be applied to grazing management under this alternative; therefore, permittees would be more likely to be able to utilize permitted level of AUMs, weather and other factors notwithstanding. As a result, overall economic contributions could trend towards the higher end of the predicted scale above. Subdivision of ranches and loss of grazing traditional culture would not be promoted under this alternative and would generally be consistent with historic trends.

Under Alternative C, the total number of area visitors would be expected to increase, as discussed for Alternative A. Under Alternative C, targeted recreation would be reduced, as ERMAs would be established in place of SRMAs. Under this classification, other resources could be emphasized in addition to recreation. Specific valued outcomes desired by current visitors, service providers, and affected communities may not be available in the future. If visitors do not receive the desired experience, they are less likely to return to the area or spend money for local support services, thereby reducing potential contributions to the local economy in the long term. By having fewer restrictions on recreation for protection of air, water, and biological resources, there would be more opportunities to participate in activities; however, the

recreational physical setting may be diminished due to affected habitat conditions and fewer opportunities to experience wildlife.

Under Alternative C, impacts on routes closed to motorized and mechanized use are similar to those described for Alternative B. Under Alternative C, however, open area designations would be permitted at approximately one percent above that under Alternative A. Increasing these open areas would have impacts on OHV use in the North Delta OHV area and the Kinikin Hills ERMA, increasing opportunities for local residents who desire this experience and promote spending for motorized vehicle use by area visitors. Similarly, areas closed to motorized use would be reduced, increasing options for those who prefer this form of recreation. No lands with wilderness characteristics units would be managed to protect those characteristics, and no lands would be determined eligible or suitable for inclusion in the NWSRS. Consequently, opportunities for those who desire a primitive recreation experience would be reduced, and economic contributions from this group could be reduced.

Fluid and solid leasable minerals (e.g., oil and gas) production under Alternative C would be higher than under the other alternatives. Approximately eight percent of the Somerset coal field would be closed to mining under Alternative C. As under Alternative B, very little change in coal production and associated economic impact would result from this closure, because closure areas have no to low potential for mining for the next 20 years. Economic impacts from this coal field would be similar to those discussed under Alternative A. For the Nucla-Naturita coal field, SSR and TL restrictions would effectively close 90 percent of decision area lands in the coal field to mining. Impacts would be the same as under Alternative B.

Similarly, fewer stipulations and closures for oil and gas development and extraction, as compared with other action alternatives, could decrease costs for developers and encourage development. The amount of federal fluid mineral estate open and closed to fluid mineral leasing is the same as under Alternative A (871,810 acres and 44,220 acres, respectively). However, fewer acres would be open to leasing without NSO and CSU stipulations (392,390 acres, compared with 644,650 acres under Alternative A). It is likely, however, that less than one percent of employment and labor income would continue to be supported by oil and gas extraction under this alternative.

Also, similarly, fewer closures and permitting requirements would be likely to impact solid mineral extraction, with potential increases in uranium development, where permitted, assuming completion of the Piñon Ridge uranium mill.

Salable mineral material extraction would be similar to that under Alternative A, and local communities should be able to extract resources at low costs.

Alternative C would result in approximately the same economic opportunities in the planning area as Alternative A. However, because of the greater emphasis on resource use under Alternative C, it could result in additional impacts on air quality, wildlife, and other resources that improve quality of life related to natural characteristics. Under Alternative C, continued development of oil and gas wells, ROWs, and other human-made structures on the landscape and fewer VRM Class I and II areas and special protection areas would decrease nonmarket values associated with open space and wilderness. However, because this alternative emphasizes

resource development, the magnitude of these decreases would be greater than historic trends and greater than impacts under Alternative A.

Socioeconomic Units

Under Alternative C, the RMP goals and objectives would emphasize natural resource consumption and commodity production. As a result, community visions for socioeconomic units that are more dependent on mining, oil and gas, and other extractive industries (units 1, 3, and 5) are likely to correspond with the management decisions under this alternative. This is because management would emphasize profitable social activities and economic gains. Resource use would increase, compared with Alternative A, due to the increased acreage allowed for fluid minerals and mineral materials leasing.

Ecological protections and recreation areas would decrease, compared with Alternative A, since management actions would not designate any new ACECs or manage river segments as eligible or suitable for inclusion in the NWSRS. Many of the recreation areas would also be managed as ERMAAs rather than SRMAAs, allowing for other management objectives to take precedence over recreation. This could impact all socioeconomic units because scenic and recreation opportunities could be diminished by increased development, and values important to attracting non-labor income groups and tourists could be decreased. In addition, communities dependent on ranching (socioeconomic units 3 and 5), particularly those with domestic sheep ranches, could be impacted due to limitations on management opportunities and requirements to convert allotments to cattle, as discussed under **Alternative C – Planning Area**.

Alternative D

Planning Area

Alternative D would aim to balance resource uses, such as energy development, with resource conservation, resulting in economic opportunities associated with resource development and preserving scenic and environmental values.

Under Alternative D, the permitted AUMs would be similar to those under Alternative C. Additional measures would impose some limits on livestock grazing operations and allocation of additional forage. Alternative D grazing use would likely range from 16,523 to 24,641 cattle AUMs and 5,602 to 11,783 domestic sheep AUMs (see **Table 4-86**). It would support approximately 854 to 1,527 jobs and \$7.2 million to \$12.3 million in labor income. Total changes in permitted AUMs represent a slight decrease from Alternative A (1,940 AUMs less than Alternative A), as do estimated billed AUMs (1,301 AUMs less than Alternative A). Therefore, permittees could have increased costs associated with grazing on public versus private lands, estimated at approximately \$291,000 in private grazing fees and \$119.7 million in pasture land based on projected level of billed AUMs. Domestic sheep grazing also would be limited in certain allotments that currently allow sheep and cattle, based on the likelihood of conflict with bighorn sheep. This would result in potential impacts on permittees grazing domestic sheep, although no allotments with only sheep grazing would be closed under this alternative. In addition, subdivision of ranches and loss of grazing traditional culture could occur and would generally be consistent with historic trends.

Under Alternative D, the total number of area visitors would increase, as discussed for Alternative A. Under Alternative D, seven SRMAs would provide long-term protection of specific targeted recreation outcomes in those areas, similar to Alternative B but at a reduced level. Similar to Alternative C, recreation decisions to manage four ERMAs would support principal recreation activities in these areas, and recreation would be managed commensurate with other resources. As a result, there would be a variety of recreation opportunities for residents, which would attract visitor spending in the area.

Under Alternative D, areas closed to motorized and mechanized use would be higher than that under Alternative A (30 percent more), and acres limited to designated routes would be similar to those under Alternative C. As under Alternative B, open areas would be limited to designated routes, with potential impacts on visitor experience and economic contributions. Some recreation opportunities would be limited by restrictions for resource protection, but recreation experiences would be preserved in the long term. Lands with wilderness characteristics units managed to protect those characteristics, and stream segments managed as suitable for inclusion in the NWSRS, would present opportunities for those who desire a primitive recreation experience, as discussed under Alternative B; however, due to fewer acres restricted, more-flexible opportunities for recreation could represent potential economic contributions to local communities. Issuing SRPs and competitive events as discretionary actions would continue to provide economic opportunities for commercial outfitting services. Alternative D would prohibit motorized and nonmotorized competitive events in specific SRMAs, limiting impacts on visitors not interested in such events.

Fluid and solid leasable minerals (e.g., oil and gas) production under Alternative D would be lower than under Alternative A due to some restrictions on surface use and closures impacting development. Approximately two percent of the Somerset coal field would be closed to mining under Alternative D. Minimal change in coal production and associated economic impact would result from this closure, because of the area closed and its low potential for mining in the next 20 years. Economic impacts from this coal field would be similar to those described under Alternative A. For the Nucla-Naturita coal field, SSR and TL restrictions would effectively close all decision area lands in the coal field to mining. Impacts would be the same as those described under Alternative B.

Alternative D would place additional restrictions on coal extraction by protecting lands with wilderness characteristics units that overlap 1,110 acres of areas acceptable for further coal leasing, with potential impacts similar to those described for Alternative B.

Alternative D would be more restrictive to oil and gas exploration and development than Alternative A because a larger percentage of the planning area would be unavailable for leasing, and fewer acres would be open to leasing without stipulations. Associated costs for development would be increased above that in Alternative A. Under Alternative D, 50,060 acres of federal fluid mineral estate would be closed to fluid mineral leasing and approximately 865,970 acres of federal fluid mineral estate would be open to fluid mineral leasing, a slight decrease from Alternative A. It is likely, however, that less than one percent of employment and labor income would continue to be supported by oil and gas extraction under Alternative D.

Similarly, closures and permitting requirements would continue to impact solid mineral extraction, with potential increases in uranium development, where permitted. Likewise, salable mineral extraction would have limitations beyond that under Alternative A.

Alternative D would result in a variety of economic opportunities in the planning area, with a balance between resource use and preservation of resources. Under this alternative, continued development of energy and mineral resources would allow for economic contributions from resource extraction, while preserving values that impact quality of life nonmarket values and attract non-labor income, such as that from visitors seeking open space and wilderness.

Socioeconomic Units

Under Alternative D, the RMP goals and objectives would balance resource consumption, human interests, and ecological conservation. Compared with Alternative A, this alternative provides significant lands for coal, fluid minerals, and mineral materials leasing, while creating more ecological emphasis areas and managing lands with wilderness characteristics units to protect those characteristics. As a result, socioeconomic units that depend on mineral extraction from federal lands (units 1, 3, and 5) would be able to use these resources, while preserving their scenic character. This alternative also proposes a mix of SRMAs and ERMAs, allowing all socioeconomic units to continue attracting recreationists. The livestock grazing opportunities would be similar to those under Alternative A, with only small acreages closed to all livestock. This would allow ranchers to remain near or at their current livestock levels, although impacts could still occur in those allotments where permittees would be required to convert to cattle from sheep grazing. Grazing and agriculture represents an important economic sector in socioeconomic units 3 and 5.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on socioeconomics and environmental justice is the Uncompahgre RMP planning area counties. Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect socioeconomics and environmental justice are mineral exploration and development, unauthorized travel, forestry, livestock grazing, recreation, road construction, ROWs, water diversions, weed invasion and spread, weed control, prescribed and wildland fires, land planning efforts, vegetation treatments, habitat improvement projects, insects and disease, and drought.

Trends discussed in **Chapter 3** are likely to continue with similar impacts. In addition, development and land use changes outside of the decision area could result in additional impacts. Energy and mineral development is likely to continue in some portions of the planning area counties, as described below.

Within the planning area, there has been a strong history of uranium mining. While most of the mines are in maintenance status, there are seven mines that have been or will be reclaimed, two mines that are under development, and one new uranium mine in the planning phase. Increased uranium mining could lead to additional area jobs and employment income but is controversial due to associated environmental concerns. Energy Fuels is planning to build its Piñon Ridge Mill in Montrose County, which is expected to result in a surge in uranium exploration, mining, and permitting in the area. Energy Fuels estimates that the Piñon Ridge Mill would directly create

approximately 85 jobs with a salary range of \$40,000 and \$75,000 per year at full capacity. An estimated 80 percent of these jobs would be filled by local residents. An additional 200 jobs are expected to be created through the opening of uranium mines in the area, which can supply ore to the Piñon Ridge Mill (Energy Fuels Resource Corporation 2009). These jobs could provide direct and indirect economic opportunities to local communities. Development could also result in increased truck traffic, emissions, and impacts on local wildlife and scenic values, which could all impact social setting of local communities. Large-scale population changes are not anticipated based on initial estimates. Should population increases occur, local community services could also be impacted. The Radioactive Materials License for the Piñon Ridge Mill was approved by the Colorado Department of Public Health and Environment on April 25, 2013, bringing the project closer to construction.

Coal mining is likely to continue in the North Fork Valley's active mines under BLM jurisdiction, including the Bowie No. 2 and West Elk Mines, as discussed in **Chapter 3**. However, the Elk Creek Mine was closed in late 2013 after an underground fire closed much of the coal-mining operation, resulting in a 257-person reduction in work force in 2013 (Denver Post 2013). Development and production could occur on BLM-administered land at Oak Mesa in Delta County, where the Oxbow Mining, LLC has completed exploration drilling on 13,873 acres north of Hotchkiss, although there has not been an expressed interest in leasing. The level of coal production and associated employment and economic contributions from this economic section will continue to be impacted by coal markets and shutdowns for safety concerns. The only private mining operation within the planning area is the New Horizon Mine Coal Mine in Nucla, Montrose County, which produces between 350,000 and 400,000 tons of coal annually to supply coal to the Nucla Station power plant and has begun planning an expansion for a new coal mine in the area. The coal industry tends to produce high-paying, stable jobs, with employees living in the area. In combination with the existing coal mines, should new mines be developed, they would play an important role in the local economy through direct, indirect, and induced effects. Level of impacts would depend on the size of operations, number of employees from the local area, and timing of development, none of which can be determined at this time.

Oil and gas development, while historically not a major presence within the planning area, does play a role in the cumulative impact analysis area, particularly as new drilling technologies are employed making previously inaccessible/uneconomical reserves available. As shown in **Table 4-1**, 25 percent (224,950 acres) of the federal fluid mineral estate in the UFO is already leased, including 160,510 acres (24 percent) of BLM-administered surface and 64,440 acres (27 percent) of split-estate lands. One area of intensified development on federal mineral estate and private estate is the North Fork Valley. Within the North Fork Valley, currently 116 gas wells have been drilled on federally managed oil and gas leases, including split-estate lands. Of these wells, 15 are presently producing natural gas, 29 are shut-in but capable of production, and 72 have been drilled, abandoned, and plugged. In addition, there are currently 17 applications for permit to drill pending in the area, and a proposed 146 natural gas well Master Development Plan for Bull Mountain. It is unclear how many, if any, wells will be developed due to pending leasing actions.

Contributions to cumulative impacts from oil and gas development in the planning area would vary by alternative. Additional closures to fluid mineral leasing and stipulations applied under

Alternatives B and B.I would reduce contributions to cumulative development levels and related employment and economic contributions. Conversely, Alternative C imposes the lowest level of restrictions on development and, therefore, would likely result in the highest contribution to cumulative development and associated economic contributions, and is the most likely to meet predicted development levels in the UFO Reasonably Foreseeable Development Scenario (BLM 2012d). It should be noted that restrictions on development in the planning area could result in shifting development to adjacent lands with mineral resources outside of the planning area; therefore, exact cumulative impacts are difficult to predict.

Outside of the planning area, oil and gas development continues to play an important role in Mesa County's economy. Development activities in Mesa County, such as the proposed Whitewater Master Development Plan, which authorized development of 108 oil and gas wells on multiple well pads near Whitewater, Colorado, could attract workers and have economic and social impacts on area communities in bordering counties. Because the intensity, timing, and location of development would depend on market demand for resources and other factors, quantitative analysis of development is not possible. Should leases be developed, local economic benefits could occur from the employment of area energy workers and spending of employees in area businesses, as well as the purchase of construction materials from the region. Level of impact would depend on the percentage of local workers employed and percentage of materials purchased in the local area. Lease sales, as well as production from operating wells, would contribute federal royalties and severance taxes to state and federal treasuries with a portion redirected to local communities. In addition, an influx of workers during the drilling phase can increase the impacts of changes in social structure, population, and housing availability in communities near concentrated energy development areas. Development could also add to the changes in the scenic values and other non-market commodities. The level of impacts from development in the oil and gas sector is determined by intensity and timing, which, to a large degree, is determined by public policy and also market forces, including national and international energy demand.

Livestock grazing on private lands is expected to remain stable or to slightly decrease as residential development increases, following the recent trend in the agricultural sector. Many private farmers rely on the relatively inexpensive cost of grazing on BLM-administered land to support their livestock operation. As profit margins get tighter, some private farmers are selling off sections of their property to real estate developers for additional income. In the planning area, most of the inputs for raising livestock are locally sourced, implying that most of the money that goes into raising livestock stays in the local economy. When land is sold to private developers, much the money from livestock grazing may leave the area, having a potential impact on the local economy. Should this land be developed for other uses that promote business development, promote tourism, attract retirees, or otherwise benefit the local economy, these economic impacts may be offset.

Recreation is expected to increase as the Colorado population and the desire to live near or recreate on BLM-administered lands increase. This follows the trend of recent years seen across the state. Impacts would be the same as those discussed for planning area lands.

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. 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. If these die-offs and major forest fires keep occurring at an accelerated rate, this could cause a decrease in available forest products for both private and commercial purposes. While the forest products industry accounts for less than one percent of the employment in the area, a decrease in forest stock due to these effects would have a negative impact on the region.

Renewable energy projects have increased across the state over the past several years. Within the planning area, the major source is from small hydropower plants. The South Canal Hydropower Project in Montrose County produces approximately 27 million kilowatt hours of hydropower, while the operational small hydroplant in Ouray produces approximately 700,000 kilowatt hours. New renewable energy projects bring in new money into an area, although the economic effects tend to be indirect and induced rather than direct. The economic gain from these types of projects comes from workers spending money in the local towns on commodities and services rather than producing direct jobs, since many companies bring in a specialized work force for construction.

4.6.4 Environmental Justice

This section discusses impacts on environmental justice from proposed management actions of other resources and resource uses. Existing conditions are described in **Section 3.4.4** (Environmental Justice).

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires that federal agencies identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. Guidance for evaluating environmental justice issues in land use planning is included in BLM Handbook 1601-1, Land Use Planning, Appendix D (BLM 2005a).

Environmental justice refers to the fair treatment and meaningful involvement of people of all races, cultures, and incomes with respect to the development, implementation, and enforcement of environmental laws, regulations, programs, and policies. It focuses on environmental hazards and human health to avoid disproportionately high and adverse human health or environmental effects on minority and low-income populations. Low-income populations are defined as persons living below the poverty level based on total income of \$11,136 for an individual and \$22,314 for a family household of four for 2010, based on preliminary census data (US Census Bureau 2010a). Black/African American, Hispanic, Asian and Pacific Islander, American Indian, Eskimo, Aleut, and other non-White persons are defined as minority populations.

Methods and Assumptions

Indicators

Counties and key communities within the planning area were examined for minority or low-income populations based on Council on Environmental Quality guidelines of minority or low-income populations, which comprise 50 percent or more of the total population or significantly higher than that of the reference population of the state of Colorado (20 percentage points higher than the state aggregate minority population was utilized as the significant threshold here).

Impacts on environmental justice could occur if anticipated future actions consistent with implementing the alternatives described in **Chapter 2** were to result in actions that could lead to:

- A potential reduced income/employment to these communities
- An impediment to economic development in low-income or minority communities
- Disproportionate potential for human health and safety impacts on low-income or minority communities

Assumptions

Assumptions for the analysis of environmental justice impacts are the same as those provided in **Section 4.6.3** (Socioeconomics).

Effects Common to All Alternatives

No minority or low-income populations were identified per Council on Environmental Quality guidelines in the planning area. In order to reach a wide range of socioeconomic groups and races and ethnicities, public outreach materials were available in multiple formats including, but not limited to, the project Web site, as well as in print and email newsletters. Public meetings were held throughout the planning area, including in locations accessible by public transportation for area communities. As a result, there would be no impacts on low-income or minority populations by actions in the RMP under any of the alternatives. The BLM would continue to consider environmental justice impacts for site-specific actions.

While hunting represents an economically important use in the planning area, it is not likely that populations within the planning principally rely on fish and wildlife for subsistence. Data on subsistence use is not collected or maintained by the UFO and is not further addressed in the environmental justice discussion.

Cumulative

The cumulative impact analysis area used to analyze cumulative impacts on environmental justice, as well as the past, present, and reasonably foreseeable future actions and conditions that have affected and will likely continue to affect environmental justice, are discussed in the **Cumulative** section of **Section 4.6.3**. No significant cumulative impacts on environmental justice would occur under any alternative because there are no environmental justice populations in the planning area.

4.7 UNAVOIDABLE ADVERSE IMPACTS

Section 102(C) of NEPA requires disclosure of any adverse environmental effects that cannot be avoided should the proposal be implemented. Unavoidable adverse impacts are those that remain following the implementation of mitigation measures or impacts for which there are no mitigation measures. Some unavoidable adverse impacts occur as a result of implementing the RMP. Others are a result of public use of the decision area lands. This section summarizes major unavoidable impacts; discussions of the impacts of each management action (in the discussion of alternatives) provide greater information on specific unavoidable impacts.

Surface-disturbing activities would result in unavoidable adverse impacts under current BLM policy to foster multiple uses. Although these impacts would be mitigated to the extent possible, unavoidable damage would be inevitable. Long-term conversion of areas to other uses such as mineral and energy development would increase erosion and change the relative abundance of species within plant communities, the relative distribution of plant communities, and the relative occurrence of seral stages of those communities. Where ecological emphasis areas are not protected by stipulations, oil and gas development would result in unavoidable long-term wildlife habitat loss where developed. These activities would also introduce intrusions that could affect the visual landscape.

Unavoidable damage to cultural and paleontological resources from permitted activities could occur if resources undetected during surveys were identified during ground-disturbing activities. In these instances, standard condition of approvals would require ceasing further activities upon discovery, and the resource would be mitigated to minimize data loss. Unavoidable loss or destruction of cultural and paleontological resources would also occur in areas open to cross-country or intensive motorized use, specifically in areas of high cultural sensitivity or areas containing vertebrate or scientifically significant fossil resources. Unavoidable loss of cultural and paleontological resources due to non-recognition, lack of information and documentation, erosion, casual collection, and inadvertent destruction or use would also occur. Unavoidable damage to buried cultural resources could occur, particularly in construction situations.

Wildlife and livestock would contribute to soil erosion, compaction, and vegetation loss, which could be extensive during drought cycles and dormancy periods. Conversely, unavoidable losses or damage to forage from resource development in the planning area would affect livestock and wildlife. Some level of competition for forage between these species, although mitigated to the extent possible, would be unavoidable. Instances of displacement, harassment, and injury could also occur.

Recreational activities, mineral resource development, and general use of the planning area would introduce additional ignition sources into the planning area, which would increase the probability of wildland fire occurrence and the need for suppression activities. These activities, combined with continued fire suppression, would also affect the overall composition and structure of vegetation communities, which could increase the potential for high-intensity wildland fires.

As recreation demand increases, recreation use would disperse, creating unavoidable conflicts as more users compete for a limited amount of space. In areas where development activities would be greater, the potential for displaced users would increase.

Numerous land use restrictions imposed throughout the planning area to protect sensitive resources and other important values, by their nature, affect the ability of operators, individuals, and groups who use BLM-administered lands to do so freely without limitations. These restrictions could also require closing roads or trails or limiting certain modes or seasons of travel. Although attempts would be made to minimize these impacts by limiting them to the level of protection necessary to accomplish management objectives, and providing alternative use areas for affected activities, unavoidable adverse impacts would occur under all alternatives.

4.8 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Section 102(C) of NEPA requires a discussion of any irreversible or irretrievable commitments of resources that are involved in the proposal should it be implemented. An irretrievable commitment of a resource is one in which the resource or its use is lost for a period of time (e.g., extraction of any locatable mineral ore or oil and gas). An irreversible commitment of a resource is one that cannot be reversed (e.g., the extinction of a species or disturbance to protected cultural resources). The air quality resource in the planning area is not irreversible or irretrievable.

Implementing the RMP management actions would result in surface-disturbing activities, including dispersed recreation, mineral and energy development, and ROW development, which result in a commitment to the loss of irreversible or irretrievable resources. Mineral extraction or sale eliminates a nonrenewable resource, thereby resulting in irreversible and irretrievable commitment of the resource. Surface disturbance associated with energy development is reclaimed after the resource is removed. However, surface disturbances from gas storage, geothermal development, road ROWs, wind and solar development, and recreational development are a long term encumbrance of the land. Although new soil can develop, soil development is a slow process in many parts of the planning area. Soil erosion or the loss of productivity and soil structure may be considered irreversible commitments to resources. Surface-disturbing activities, therefore, would remove vegetation and accelerate erosion that would contribute to irreversible soil loss; however, management actions and BMPs are intended to reduce the magnitude of these impacts and restore some of the soil and vegetation lost. Primarily because of the number of acres available for recreational travel, energy and mineral development, and ROW development, such disturbances would occur to the greatest degree under Alternative A; Alternative C would be similar but with more stipulations for surface-disturbing activities. Alternative D, and to a greater extent Alternative B, contains additional conservation measures, mitigation measures, and stipulations to protect planning area resources.

Laws protecting cultural and paleontological resources would provide for mitigation of irreversible and irretrievable impacts on these resources from permitted activity. Across all alternatives, an irreversible commitment of nonrenewable fossil fuels (e.g., oil, gas, and coal), locatable minerals, and mineral materials would occur from development over the next 20 years.

4.9 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

Section 102(C) of NEPA requires discussion of the relationship between local, short-term uses of the human environment, and the maintenance and enhancement of long-term productivity of resources. As described in the introduction to this chapter, “short term” is defined as

anticipated to occur within one to five years of the activity's implementation. "Long term" is defined as following the first five years of implementation, but within the life of the RMP (projected to be 20 years).

Short-term use of the air quality resource would not affect long-term productivity, except that air quality emissions in high enough concentrations could reduce vegetation and plant vigor. Across all alternatives, management actions would result in various short-term effects, such as increased localized soil erosion, fugitive dust emission, vegetation loss or damage, wildlife disturbance, and decreased visual resource quality. Surface-disturbing activities, including utility construction, mineral resource development, and developed recreation would result in the greatest potential for impacts on long-term productivity. Management prescriptions and BMPs are intended to minimize the effect of short-term commitments and reverse change over the long term. These prescriptions and the associated reduction of impacts would be greatest under Alternative B and are present to a lesser extent under Alternative D for resources such as vegetation and wildlife habitat. However, BLM-administered lands are managed to foster multiple uses, and some impacts on long-term productivity could occur.

Short-term use of an area to foster energy and minerals, ROWs, and cross-country recreational use would result in long-term loss of soil productivity and vegetation diversity. Impacts would persist as long as surface disturbance and vegetation loss continue. In general, the loss of soil productivity would be directly at the point of disturbance, although long-term vegetation diversity and habitat value could be reduced due to fragmentation and the increased potential for invasive species to spread from the developments or disturbances. Alternatives A and C would have the greatest potential for short-term loss of productivity and diversity due to the high development potential and the lack of stringent mitigation and reclamation standards contained under Alternatives B and D. Alternative B would provide the greatest long-term productivity by deferring development in many areas through closures or application of major restrictions on development activities.

The short-term use of big game severe winter range, calving areas, and/or migratory corridors for energy and minerals, ROWs, and cross-country recreational use could impair the long-term productivity of big game populations by displacing animals from primary habitats and removing components of these habitats that might not be restored for more than 20 years. These short-term uses could also affect the long-term sustainability of some special status species. Gunnison sage-grouse, as well as other terrestrial special status species, could be affected by habitat fragmentation associated with short-term resource uses and road construction and use. Likewise, habitat for special status fish species and aquatic wildlife could be degraded by sedimentation and pollution of waterways caused by short-term uses of nearby habitats.

Chapter 5

Consultation and Coordination

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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 (63,390 acres of BLM-administered surface estate and 159,820 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 land ownership, except the Gunnison Gorge NCA Planning Area and the 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

CHAPTER 5

CONSULTATION AND COORDINATION

This chapter describes the public outreach and participation opportunities made available through the development of this resource management plan (RMP)/environmental impact statement (EIS) and consultation and coordination efforts with tribes, government agencies, and other stakeholders. This chapter also lists the tribal and local governments and agencies that received a copy of the draft RMP and associated EIS.

The BLM land use planning activities are conducted in accordance with requirements of the National Environmental Policy Act of 1969, Council on Environmental Quality regulations, United States (US) Department of the Interior NEPA regulations (43 CFR 46), and Bureau of Land Management (BLM) policies and procedures for implementing the NEPA. The NEPA and associated regulations and policies require the BLM to seek public involvement early in, and throughout, the planning process to develop a reasonable range of alternatives to proposed actions and to prepare environmental documents that disclose the potential impacts of proposed actions and alternatives. Public involvement and agency consultation and coordination, which have been at the heart of the planning process leading to this draft RMP/EIS, were achieved through *Federal Register* notices, public and informal meetings, individual contacts, media releases, planning bulletins, and the Uncompahgre RMP revision Web site (http://www.blm.gov/co/st/en/fo/ufo/uncompahgre_rmp.html).

5.1 PUBLIC INVOLVEMENT

Public involvement is a vital and legally required component of both the RMP and EIS processes. Public involvement vests the public in the decision-making process and allows for full environmental disclosure. Guidance for implementing public involvement under NEPA is codified in 40 Code of Federal Regulations (CFR) Section 1506.6. Section 202 of the Federal Land Policy and Management Act of 1976 directs the Secretary of the Interior to establish procedures for public involvement during land use planning actions on BLM-administered lands. These procedures can be found in the BLM's Land Use Planning Handbook (H-1601-1) (BLM 2005a). Public involvement for the Uncompahgre RMP/EIS includes the following four phases:

1. Public scoping before beginning NEPA analysis to determine the scope of issues and alternatives to be addressed in the RMP/EIS
2. Public outreach via newsletters and news releases
3. Collaboration with federal, state, local, and tribal governments, the BLM Colorado Southwest Resource Advisory Council, and cooperating agencies
4. Public review of and comment on the draft RMP/EIS, which analyzes likely environmental effects and identifies the BLM's preferred alternative

The public scoping phase (phase 1) of the process has been completed and is described in **Section 5.1.1** (Scoping Process). The public outreach and collaboration phases (2 and 3) are ongoing throughout the RMP/EIS process and are described in **Section 5.2** (Consultation and Coordination) and **Section 5.3** (Cooperating Agencies). Phase 4 started with the 90-day public comment period on the draft RMP/EIS. This phase is discussed under **Section 5.4** (Distribution and Availability of the Draft RMP/EIS).

5.1.1 Scoping Process

The formal public scoping process for the Uncompahgre RMP/EIS began on February 25, 2010, with the publication of the Notice of Intent in the *Federal Register* (75 *Federal Register* 8739-8740, February 25, 2010). The Notice of Intent notified the public of the BLM's intent to develop an RMP for the Uncompahgre Field Office (UFO); it also initiated the formal public scoping period, which closed on March 29, 2010.

Newsletter and Mailing List

In December 2009, the BLM mailed a newsletter announcing the start of the public scoping period for the Uncompahgre RMP/EIS to more than 350 individuals from the public, agencies, and organizations who had participated in past UFO activities and had been included on past UFO distribution lists. The newsletter provided the dates and venues for the original six scoping open houses (Hotchkiss, Delta, Montrose, Ridgway, Norwood, and Naturita) (see **Scoping Open Houses**, below), included an insert with a comment form for submitting scoping comments, and described the various methods for submitting comments, including dedicated email and postal addresses. The BLM will publish future newsletters at major project milestones and will announce them to individuals and organizations that have requested to remain on or be added to the project mailing list. All newsletters are and will be posted on the project Web site (http://www.blm.gov/co/st/en/fo/ufo/uncompahgre_rmp.html).

Press Release and Newspaper Advertisements

A press release was posted on the Uncompahgre RMP revision Web site on January 5, 2010, announcing the scoping period for the Uncompahgre RMP/EIS process. It also provided information on the original six scoping open houses held in Hotchkiss, Delta, Montrose, Ridgway, Norwood, and Naturita (see **Scoping Open Houses**, below) and described the various methods for submitting comments.

A second press release was posted on the project Web site on March 2, 2010, announcing the extension of the public scoping period to March 29, 2010.

A newspaper advertisement was published in six local newspapers in December 2009 and January 2010 prior to the scoping meetings. **Table 5-1** (Newspaper Advertisement Publication Dates and Location) displays the date each newspaper published the advertisement. This newspaper advertisement announced the original six scoping open houses (see **Scoping Open Houses**, below). The newspaper article and press releases are included in the Uncompahgre RMP Revision and EIS Scoping Summary Report (BLM 2010b), available on the project Web site (http://www.blm.gov/co/st/en/fo/ufo/uncompahgre_rmp.html).

Table 5-1
Newspaper Advertisement Publication Dates and Location

Newspaper	Location (Colorado)	Date(s) Advertisement Appeared
Delta County Independent	Delta	December 23, 2009 January 6, 2010
Montrose Daily Press	Montrose	December 30, 2009 December 31, 2009 January 6, 2010 January 10, 2010
Norwood Post	Norwood	December 30, 2009 January 20, 2010
Ouray Plaindealer	Ouray	January 8, 2010
Ridgway Sun	Ridgway	January 6, 2010 January 13, 2010
Telluride Daily Planet	Telluride	January 20, 2010 February 2, 2010

Newspaper Articles

Six local newspapers are known to have published their own articles covering the RMP revision and scoping period. **Table 5-2** (Newspaper Articles) displays each newspaper's publication date of the articles.

Table 5-2
Newspaper Articles

Newspaper	Date(s) Article(s) Appeared
Delta County Independent	January 20 and 27, 2010
Montrose Daily Press	January 15 and February 3, 2010
Norwood Post	January 23, 2010
Ridgway Sun	January 13, 2010
San Miguel Basin Forum	January 21 and 28, 2010
Telluride Daily Planet	January 17 and February 2, 2010

Flyer

A flyer announcing the dates and locations of the original six scoping open houses (see **Scoping Open Houses**, below) was posted in various public locations in Delta, Hotchkiss, Montrose, Naturita, Norwood, Nucla, Paonia, and Redvale, Colorado, on January 8 and 12, 2010. The flyer is included in the Uncompahgre RMP Revision and EIS Scoping Summary Report (BLM 2010a), available on the project Web site (http://www.blm.gov/co/st/en/fo/ufo/uncompahgre_rmp.html).

Project Web Site

A public Web site was launched when the scoping process began and is regularly updated to provide the public with the latest information about the RMP/EIS process. The Web site, available on the Internet at http://www.blm.gov/co/st/en/fo/ufo/uncompahgre_rmp.html, provides background information about the project, a public involvement timeline and calendar, maps and photos of the planning area, and copies of public information documents such as the newsletter and Notice of Intent. The site also provides a link to the scoping comment form for submitting comments about the RMP process. The dates and locations of all seven scoping open houses were announced on the Web site.

Scoping Open Houses

The BLM hosted seven open houses to provide the public with opportunities to become involved, learn about the project and the planning process, meet the Uncompahgre RMP team members, and offer comments. The six originally scheduled open houses were advertised via press release, newspaper advertisements, the project newsletter, the project Web site, and a flyer posted in various towns throughout the planning area. The seventh open house in Telluride was added in response to a special request from the San Miguel County Commissioners. The locations of the open houses are provided in **Table 5-3** (Scoping Open Houses).

Scoping meetings were held in an open house format to encourage participants to discuss concerns and questions with BLM staff representatives. Copies of the first issue of the project newsletter, as well as blank scoping comment forms and a guide to providing substantive comments, were available at the sign-in station. A Microsoft PowerPoint presentation that provided an overview of the RMP process and presented information about public involvement opportunities was played continuously on a large screen. Eight resource stations displayed resource maps and information to illustrate the current situation and management techniques practiced among different resources and land areas. At those stations, 16 fact sheets for various resources provided an overview of current management practices and issues. At the recreation station, information regarding the recreation public focus group meetings to be held in February 2010, including a sign-up sheet for those meetings, was provided. As shown in **Table 5-3**, 369 people attended the open houses.

Table 5-3
Scoping Open Houses

Location (Colorado)	Venue	Date	Number of Attendees	Number of Completed Comment Forms Received
Hotchkiss	Memorial Hall	January 12, 2010	99	11
Delta	Bill Heddles Recreation Center	January 13, 2010	42	0
Montrose	Montrose Pavilion	January 14, 2010	84	1
Ridgway	Town Hall	January 19, 2010	41	3
Norwood	Town Hall	January 20, 2010	26	0
Naturita	Community Building	January 21, 2010	60	2
Telluride	Miramonte Building	February 3, 2010	17	0
Total			369	17

Note: Meetings were from 4:30 to 7:30 pm, except in Delta and Montrose where meetings were from 4:30 to 8:00 pm, and Telluride where the meeting was from 2:00 to 4:00 pm.

Scoping Comments Received

The BLM received 214 unique written submissions containing 2,496 separate comments during the public scoping period. Detailed information about the comments received and about the public outreach process can be found in the Uncompahgre RMP Revision and EIS Scoping Summary Report, finalized in July 2010 (BLM 2010a). The issues identified during public scoping and outreach helped refine the list of planning issues, included in **Section 1.4.2** (Issue Identification) which guided the development of alternative management strategies for the RMP.

5.2 CONSULTATION AND COORDINATION

Federal laws require the BLM to consult with certain federal and state agencies and entities and Native American tribes (40 CFR 1502.25) during the NEPA decision-making process. The BLM is also directed to integrate NEPA requirements with other environmental review and consultation requirements to reduce paperwork and delays (40 CFR 1500.4-5).

In addition to formal scoping (**Section 5.1.1**), as summarized below, the BLM has implemented an extensive collaborative outreach and public involvement process that has included conducting a community assessment (BLM 2009f), coordinating with cooperating agencies, and working closely with the Colorado Southwest Resource Advisory Council and a specially created and sanctioned subgroup of the resource advisory council. The BLM will continue to meet with interested agencies and organizations throughout the planning process, as appropriate, and will continue coordinating closely with cooperating agencies and the resource advisory council subgroup.

5.2.1 Tribes

The UFO initiated consultation with tribes that are identified as having interests or Traditional Cultural Properties in the Uncompahgre RMP planning area. Consultation is that required by the National Historic Preservation Act and the American Indian Religious Freedom Act. 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.

No written comments were received from tribal agencies during the scoping period; tribal concerns or issues have been typically presented in oral format. Government-to-government consultation will continue throughout the RMP process to ensure that the concerns of tribal groups are considered in development of the RMP.

Uncompahgre Draft RMP/EIS was provided to the four tribes concurrently with its release to the public.

5.2.2 Colorado State Historic Preservation Officer Consultation

The draft RMP/EIS was provided to the State Historic Preservation Officer concurrently with its release to the public.

5.2.3 US Fish and Wildlife Service Consultation

To comply with Section 7(c) of the Endangered Species Act of 1973, the BLM coordinated with the US Fish and Wildlife Service early in the planning process as a cooperating agency. The US Fish and Wildlife Service provided input on planning issues, data collection and review, and alternatives development. The BLM will consult with US Fish and Wildlife Service to develop the draft Biological Assessment, which will be prepared after public comments are received on the draft RMP/EIS.

5.2.4 Resource Advisory Council Collaboration

A resource advisory council is a committee established by the Secretary of the Interior to provide advice or recommendations to BLM management (BLM Land Use Planning Handbook H-1601-1; BLM 2005a). A resource advisory council is generally composed of 15 members of the public representing different areas of expertise. The Colorado Southwest Resource Advisory Council includes members appointed to represent constituent BLM-administered land users and provides input on public management issues to the BLM's Southwest Resource Advisory Council Designated Federal Officers. Recommendations are based on consensus-building and collaboration.

The Colorado Southwest Resource Advisory Council was involved in developing the preliminary planning issues for the Uncompahgre RMP. In addition, a resource advisory council subgroup was established to participate in the planning process, and in particular to assist the BLM with creating a range of reasonable alternatives for the EIS. To date, 11 meetings of the resource advisory council subgroup have been held for the Uncompahgre RMP. On June 22, 2012, the resource advisory council subgroup approved the range of alternatives as a reasonable range. Recommendations developed by the subgroup were presented formally for discussion to the Southwest Resource Advisory Council at the October 26, 2012, public meeting of the full Southwest Resource Advisory Council. A resolution approving the reasonable range of alternatives was passed by the Southwest Resource Advisory Council on October 26, 2013. Meeting minutes from resource advisory council subgroup meetings are available on the project Web site (http://www.blm.gov/co/st/en/fo/ufo/uncompahgre_rmp.html). Future resource advisory council subgroup meeting dates will also be posted on the project Web site.

In addition to these 11 meetings, the resource advisory council subgroup facilitated nine public meetings in late 2010 and early 2011 to discuss wild and scenic river suitability within the Dolores River Basin. These were educational and public input meetings to increase the public understanding of the wild and scenic river process and eligibility, and to solicit comments regarding segments within the Dolores and San Miguel River watersheds; these were held in Norwood, Naturita, Placerville, and Telluride, Colorado, in November 2010, December 2010, and January 2011.

5.2.5 Cooperating Agencies

The BLM invites agency cooperation early in the RMP process using the process outlined in 43 CFR 1501.6. A cooperating agency is any federal, state, or local government agency or Indian tribe that enters into a formal agreement with the lead federal agency to help develop an environmental analysis. More specifically, cooperating agencies "work with the BLM, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks" (BLM Land Use Planning Handbook H-1601-1; BLM 2005a). The primary role of cooperating agencies during the planning process is to provide input on issues for which they have a special expertise or jurisdiction.

On January 23, 2009, the BLM invited 40 local, state, federal, and tribal representatives to participate as cooperating agencies for the Uncompahgre RMP revision. The BLM invited one additional agency in March 2013. Eighteen agencies are participating in the RMP as designated cooperating agencies, all of which have signed memoranda of understanding with the UFO (**Table 5-4** [Cooperating Agency Participation]).

**Table 5-4
Cooperating Agency Participation**

Agencies and Tribes Invited to be Cooperators	Agencies that Signed MOUs
US Department of the Interior, Fish and Wildlife Service	✓
US Department of the Interior, Bureau of Reclamation	✓
US Department of the Interior, National Park Service – Black Canyon National Park	
US Department of Agriculture, Forest Service – Grand Mesa, Uncompahgre, and Gunnison National Forests	✓
US Department of Agriculture, Forest Service – San Juan National Forest	
US Department of Agriculture, National Resource Conservation Service – Colorado State Office	
US Department of Agriculture, Animal and Plant Health Inspection Service	
US Department of Energy	
Western Area Power Administration	
Colorado Department of Natural Resources (Division of Parks and Wildlife, Natural Heritage Program, State Forest Service, Reclamation Division, Mining and Safety)	✓
Colorado Department of Transportation	
Colorado State Historical Preservation Office	
Delta Soil Conservation District	✓
Delta County	✓
Gunnison County	✓
Mesa County	
Montrose County	✓
Ouray County	✓
San Miguel County	✓
City of Delta	
City of Montrose	✓
City of Ouray	
Town of Cedaredge	✓
Town of Crawford	
Town of Hotchkiss*	✓
Town of Mountain Village*	✓
Town of Naturita	
Town of Norwood	✓
Town of Nucla	✓
Town of Olathe	✓
Town of Orchard City	✓
Town of Paonia	✓
Town of Ridgway	✓
Town of Sawpit	
Town of Telluride	
Navajo Nation	
Northern Ute Indian Tribe	
Southern Ute Indian Tribe	
Ute Mountain Ute Indian Tribe	

*Town signed MOU to be a cooperating agency. MOU was subsequently terminated.

Starting on May 27, 2010, the BLM has conducted 11 meetings to date with cooperating agencies. Cooperating agencies were also encouraged to attend the scoping open houses and provide comments during the scoping period (**Section 5.1.1**). These agencies have been engaged throughout the planning process, including during alternatives development.

5.2.6 North Fork Advocacy Group

On February 26, 2013, the BLM received a letter from an advocacy group with preliminary documents depicting the “North Fork Alternative Plan for Oil and Gas Leasing/Development.” The group provided the BLM a more-refined concept on April 2, 2013. The BLM and group representatives met on April 25, 2013, to discuss the proposal in more detail. The group provided the BLM a final concept in December 2013. The concept is Alternative B.1 (see **Chapter 2**, Alternatives).

5.2.7 Shooting Sports Roundtable

The 40 private organizations that are participating in the “Federal Lands Hunting, Fishing, and Shooting Sports Roundtable Memorandum of Understanding” (BLM Instruction Memorandum 2007-041; BLM 2007h) have been notified of the availability of the Draft RMP and the comment opportunity.

Staff from BLM UFO met with representatives of the local Rod and Gun Club and other interested firearm shooters on March 13 and April 10, 2013. The purpose of the meeting was to discuss potential management alternatives in the RMP, including areas with limits on or closure to target shooting. As a result of the meetings, the alternatives were further developed and refined. The attendees of the meetings indicated that they are generally agreeable with the actions that are carried forward in the preferred alternative.

5.3 DISTRIBUTION AND AVAILABILITY OF THE DRAFT RMP/EIS

Members of the public have the opportunity to comment on this draft RMP/EIS during the 90-day public comment period. A newsletter announcing the availability of the draft RMP/EIS was posted on the Uncompahgre RMP Web site; a postcard directing recipients to the Web site’s newsletter was mailed to those on the Uncompahgre RMP mailing list. A press release was posted on the Uncompahgre RMP revision Web site, announcing the availability of the draft RMP/EIS.

The draft RMP/EIS has been made available through the RMP revision Web site and at the BLM State Office (Denver/Lakewood) and the BLM UFO (Montrose). Notification of the draft RMP/EIS has also been provided to cooperating agencies and tribal representatives.

Six public meetings (open houses) will be held during a two-week period during the public comment period on the DEIS. One meeting will be held in each of the following locations: Montrose, Delta, Hotchkiss, Ridgway, Naturita, and Telluride. These public meetings will be structured in an open house format with BLM specialists available to provide information on the draft RMP/EIS, including the range of alternatives, impact analysis, and specific resources of concern, or on the planning process.

The proposed RMP/final EIS will respond to all substantive comments on the draft RMP/EIS received during the 90-day comment period. The record of decision will then be issued by the

BLM after the release of the proposed RMP/final EIS, the Governor's Consistency Review, and any resolution of protests received on the proposed RMP/final EIS.

5.3.1 Distribution of the Draft RMP/EIS

The BLM provided a copy (paper or CD) of the Draft RMP/EIS to tribal and local governments and agencies (**Table 5-5** [Draft RMP/EIS Distribution]). A limited number of copies were printed. Individuals and organizations may download the documents from the RMP Web site, review a paper copy at the BLM State Office or BLM Uncompahgre Field Office, or request a CD.

5.4 LIST OF PREPARERS

This Draft RMP/EIS was prepared by an interdisciplinary team of staff from the BLM and Environmental Management and Planning Solutions, Inc. (EMPSi), with their local supporting subcontractors Alpine Archaeology, Anchorpoint, BIO-Logic, Carter Lake Consulting, DOWL HKM (formerly Buckhorn Geotech), Ramboll-Environ, and Uinta Paleo. **Table 5-6** (RMP/EIS Preparers) is a list of people that prepared or contributed to the development of the Draft RMP and EIS. As discussed in **Section 5.2**, staff from numerous federal, state, and local agencies, industry, and nonprofit organizations also contributed to developing the Draft RMP.

**Table 5-5
Draft RMP/EIS Distribution**

Tribal Governments	
<ul style="list-style-type: none"> • Navajo Nation • Southern Ute Tribe 	<ul style="list-style-type: none"> • Ute Indian Tribe of the Uinta and Ouray Reservation • Ute Mountain Ute Tribe
Local Governments (Counties, Cities, Towns)	
<ul style="list-style-type: none"> • Delta County • Gunnison County • Mesa County • Montrose County • Ouray County • San Miguel County • City of Delta • City of Montrose • City of Ouray • Town of Cedaredge • Town of Crawford 	<ul style="list-style-type: none"> • Town of Hotchkiss • Town of Mountain Village • Town of Naturita • Town of Norwood • Town of Nucla • Town of Olathe • Town of Orchard City • Town of Paonia • Town of Ridgway • Town of Sawpit • Town of Telluride
Colorado State Agencies, Boards, and Commissions	
<ul style="list-style-type: none"> • Department of Natural Resources <ul style="list-style-type: none"> ○ Colorado Parks and Wildlife <ul style="list-style-type: none"> ▫ Headquarters, Denver ▫ Montrose, CO ▫ Crawford State Park ▫ Paonia State Park ▫ Ridgway State Park ○ Division of Reclamation Mining and Safety ○ Oil and Gas Conservation Commission 	<ul style="list-style-type: none"> • Department of Public Health and the Environment <ul style="list-style-type: none"> ○ Air Pollution Control Division ○ Water Quality Control Division • State Historic Preservation Officer
US Department of the Interior	
<ul style="list-style-type: none"> • BLM <ul style="list-style-type: none"> ○ Colorado State Office ○ Southwest District ○ Washington, DC ○ Grand Junction Field Office ○ Gunnison Field Office ○ Moab Field Office ○ Monticello Field Office ○ Tres Rios Field Office • US Bureau of Reclamation <ul style="list-style-type: none"> ○ Western Colorado Area Office 	<ul style="list-style-type: none"> • National Park Service <ul style="list-style-type: none"> ○ Denver, CO ○ Washington, DC ○ Black Canyon National Park ○ Curecanti National Recreation Area • Office of Environmental Policy and Compliance • Office of Surface Mining • USFWS <ul style="list-style-type: none"> ○ Denver, CO ○ Western Colorado Field Office
Other Federal Agencies	
<ul style="list-style-type: none"> • DOE, Western Area Power Administration • EPA, Region VIII • Natural Resources Conservation Service • US Army Corps of Engineers 	<ul style="list-style-type: none"> • Forest Service <ul style="list-style-type: none"> ○ Grand Mesa, Uncompahgre, and Gunnison National Forests ○ San Juan National Forest

**Table 5-6
RMP/EIS Preparers**

Name	Role/Responsibility
BLM UFO	
Bruce Krickbaum (BLM Colorado State Office)	RMP Lead, ACECs, Public Health and Safety
Scott Archer* (BLM Colorado State Office)	Air Quality, Climate
Debbie Burch-Hawkes	Livestock Grazing
Joe Cain*	GIS
Amanda Clements	Vegetation (Uplands, Riparian and Wetlands)
Forrest Cook (BLM Colorado State Office)	Air Quality, Climate
Desty Dyer	Energy and Minerals (Coal)
David Epstein* (BLM Colorado State Office)	Socioeconomics, Environmental Justice
Rob Ernst	Energy and Minerals (Locatable Minerals, Mineral Materials, and Nonenergy Leasables), Renewable Energy
Edd Franz	Lands with Wilderness Characteristics, Wilderness and WSAs
Glade Hadden	Cultural Resources, Native American Tribal Uses
Ken Holsinger	Special Status Species (Plants, Aquatic Wildlife), Forestry and Woodland Products
Melissa Hovey* (BLM Colorado State Office)	Air Quality, Climate
Dan Huisjen	Wildland Fire Ecology and Management
Julie Jackson	Visual Resources, Comprehensive Travel and Transportation Management, Recreation and Visitor Services, National Trails and Byways
Gina Jones (BLM Southwest District)	Planner and NEPA Coordinator
Dave Kauffman*	Associate Field Manager, Wild Horses
Jeff Litteral*	Soils and Geology, Water Resources, Wild and Scenic Rivers
Chad Meister (BLM Colorado State Office)	Air Quality, Climate
Amanda Moore*	GIS
Dennis Murphy*	Wild and Scenic Rivers
Teresa Pfifer	Lands and Minerals Supervisor
Linda Reed*	Lands and Realty
Lynae Rogers	Vegetation (Weeds), Livestock Grazing
Charlie Sharp*	Fish and Wildlife, Special Status Species
Barb Sharrow	Field Manager
Melissa Siders	Biological Resources Supervisor, Fish and Wildlife, Special Status Species (Terrestrial Wildlife), Watchable Wildlife Viewing Sites
David Sinton	GIS
Jedd Sondergard	Soils and Geology, Water Resources, Wild and Scenic Rivers
Thane Stranathan	Energy and Minerals (Fluid Minerals)
Karen Tucker*	Recreation Supervisor
Aaron Worstell* (BLM Colorado State Office)	Air Quality, Climate

**Table 5-6
RMP/EIS Preparers**

Name	Role/Responsibility
Angela Zahniser* (BLM Colorado State Office)	Air Quality, Climate
EMPSi: Environmental Management and Planning Solutions, Inc.	
Angie Adams	Project Manager
Kate Krebs	Deputy Project Manager, Special Designations Lead, Wild Horses, Lands with Wilderness Characteristics, ACECs, Wild and Scenic Rivers, Watchable Wildlife Viewing Sites
Andrew Gentile*	Physical Resources Lead, Soils and Geology, Water Resources, Renewable Energy
Zoe Ghali	Wildland Fire Ecology and Management, Forestry and Woodland Products, Livestock Grazing, Wilderness and WSAs, Public Health and Safety, Socioeconomics, Environmental Justice
Derek Holmgren	Visual Resources, Lands and Realty, Wild and Scenic Rivers
Julia Howe*	Visual Resources, Public Health and Safety
Carol-Anne Murray	Paleontological Resources
Katie Patterson	Energy and Minerals, ACECs
Holly Prohaska	Resource Uses Lead, Wild Horses, Livestock Grazing
Marcia Rickey	GIS
Chad Ricklefs	Recreation and Visitor Services, Comprehensive Travel and Transportation Management, National Trails and Byways
Shine Roshan*	Air Quality, Climate
Jennifer Thies	Lands and Realty, National Trails and Byways, Watchable Wildlife Viewing Sites
Drew Vankat	Recreation and Visitor Services, Comprehensive Travel and Transportation Management
Jennifer Whitaker	Energy and Minerals
Meredith Zaccherio	Vegetation, Special Status Species (Plants)
Lauren Zielinski*	Socioeconomics, Environmental Justice
Alpine Archaeology	
Matt Landt	Cultural Resources, Native American Tribal Uses
Anchorpoint	
Rod Moraga*	Wildland Fire Ecology and Management
BIO-Logic	
Steve Boyle	Biological Resources Lead, Fish and Wildlife, Special Status Species (Terrestrial Wildlife)
Shawn Conner	Vegetation (Forest and Woodlands), Rangelands
Carter Lake Consulting	
Jim Zapert	Air Quality, Climate
DOWL HKM (formerly Buckhorn Geotech)	
Laurie Brandt	Soils and Geology, Energy and Minerals
Ramboll-Environ	
John Grant	Air Quality, Climate
Ralph Morris	Air Quality, Climate
Uinta Paleo	
Kelli C. Trujillo	Paleontological Resources

* Former employee

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Glossary

GLOSSARY

100-year floodplain. The area inundated by a flood event with a one percent chance of occurring in any given year.

2920 permits. Land use authorizations processed under 43 CFR 2920 that can include agricultural, industrial, commercial, or residential uses, such as commercial filming, advertising displays, apiaries, commercial or noncommercial croplands, or temporary or permanent facilities for commercial purposes. Section 302 of the Federal Land Policy and Management Act provides BLM's authority to issue these types of leases and permits.

Abandoned nest. A nest that was occupied by breeding birds earlier in the breeding season but was abandoned at some point during breeding (e.g., failed eggs, death of young).

Acquisition. Acquisition of lands can be pursued to facilitate various resource management objectives. Acquisitions, including easements, can be completed through exchange, purchase, or donation.

Active nest site. A raptor nest site that is currently occupied by a pair of breeding raptors.

Activity plan. A type of implementation plan (see *Implementation plan*); an activity plan usually describes multiple projects and applies best management practices to meet land use plan objectives. Examples of activity plans include interdisciplinary management plans, habitat management plans, recreation area management plans, and grazing plans.

Actual use. The amount of animal unit months consumed by livestock based on the numbers of livestock and grazing dates submitted by the livestock operator and confirmed by periodic field checks by the BLM.

Adaptive management. A type of natural resource management in which decisions are made as part of an ongoing science-based process. Adaptive management involves testing, monitoring, and evaluating applied strategies, and incorporating new knowledge into management

approaches that are based on scientific findings and the needs of society. Results are used to modify management policy, strategies, and practices.

Administrative access. Administrative access pertains to travel on routes that are limited to authorized users (typically motorized access). These are existing routes that lead to developments that have an administrative purpose, where the BLM or a permitted user must have access for regular maintenance or operation.

Air basin. A land area with generally similar meteorological and geographic conditions throughout. To the extent possible, air basin boundaries are defined along political boundary lines and include both the source and receptor areas.

Air pollution. Degradation of air quality resulting from unwanted chemicals or other materials occurring in the air.

Air quality classes. Classifications established under the Prevention of Significant Deterioration portion of the Clean Air Act, which limits the amount of air pollution considered significant within an area. Class I applies to areas where almost any change in air quality would be significant; Class II applies to areas where the deterioration normally accompanying moderate well-controlled growth would be insignificant; and Class III applies to areas where industrial deterioration would generally be insignificant.

Airshed. A subset of air basin, the term denotes a geographical area that shares the same air because of topography, meteorology and climate.

Allotment. An area of land in which one or more livestock operators graze their livestock. Allotments generally consist of BLM lands but may include other federally managed, state-owned, and private lands. An allotment may include one or more separate pastures. Livestock numbers and periods of use are specified for each allotment.

Allotment management plan. A concisely written program of livestock grazing management, including supportive measures if required, designed to attain specific, multiple-use management goals in a grazing allotment. An AMP is prepared in consultation with the permittee(s), lessee(s), and other affected interests. Livestock grazing is considered in relation to other uses of the range and to renewable resources, such as watershed, vegetation, and wildlife. An AMP establishes seasons of use, the number of livestock to be permitted, the range improvements needed, and the grazing system.

Allowable cut. The amount of timber, which can be harvested on an annual or decadal basis consistent with the principle of sustained yield. The allowable cut includes all planned timber harvest volumes exclusive of such products as Christmas trees, branches, and cones.

Allowable sale quantity. The quantity of timber that may be sold from an area covered by a land management plan during a period specified by the plan, usually expressed as the average annual allowable sale quantity.

All-terrain vehicle. A motorized vehicle that is less than 50 inches in width and is capable of operating on roads, trails, or designed areas that are not maintained. A wheeled vehicle, other than a snowmobile, that has a wheelbase and chassis of 50 inches in width or less, generally has a dry weight of 800 to 1200 pounds or less, and travels on three or more low-pressure tires.

Alluvial soil. A soil developing from recently deposited alluvium and exhibiting essentially no horizon development or modification of the recently deposited materials.

Alluvium. Clay, silt, sand, gravel, or other rock materials transported by moving water. Deposited in comparatively recent geologic time as sorted or semi-sorted sediment in rivers, floodplains, lakes, and shores, and in fans at the base of mountain slopes.

Alternate nest (inactive nest) site. A raptor nest site that has been used in the past by and within the territory of a breeding pair of raptors. The nest site still maintains the characteristics of a nest structure and habitat features of a nest site but is not currently in use.

Ambient air quality. The state of the atmosphere at ground level as defined by the range of measured and/or predicted ambient concentrations of all significant pollutants for all averaging periods of interest.

Ambient noise. The all-encompassing noise level associated with a given environment, being a composite of sounds from all sources.

Amendment. The process for considering or making changes in the terms, conditions, and decisions of approved Resource Management Plans or management framework plans. Usually only one or two issues are considered that involve only a portion of the planning area.

Analysis of the Management Situation. Assessment of the current management direction. It includes a consolidation of existing data needed to analyze and resolve identified issues, a description of current BLM management guidance, and a discussion of existing problems and opportunities for solving them.

Ancient (vegetation). Very old woodlands or forests (450 years or more) with old growth stand structure that has persisted through multiple droughts.

Animal unit month (AUM). The amount of forage necessary to sustain one cow, five sheep, or five goats for a period of one month.

Aquatic. Living or growing in or on the water.

Area of Critical Environmental Concern (ACEC). Special Area designation established through the BLM's land use planning process (43 CFR 1610.7-2) where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards. The level of allowable use within an ACEC is established through

the collaborative planning process. Designation of an ACEC allows for resource use limitations in order to protect identified resources or values.

Assets. Term utilized to describe roads, primitive roads, and trails that comprise the transportation system. Also the general term utilized to describe all BLM constructed “Assets” contained within the Facility Asset Management System.

Associated settings. The geographic extent of the resources, qualities, and values or landscape elements within the surrounding environment that influence the trail experience and contribute to resource protection. Settings associated with a National Scenic or Historic Trail include scenic, historic, cultural, recreation, natural (including biological, geological, and scientific), and other landscape elements (see *resources, qualities, and values*).

Atmospheric deposition. Air pollution produced when acid chemicals are incorporated into rain, snow, fog, or mist and fall to the earth. Sometimes referred to as “acid rain” and comes from sulfur oxides and nitrogen oxides, products of burning coal and other fuels and from certain industrial processes. If the acid chemicals in the air are blown into the area where the weather is wet, the acids can fall to earth in the rain, snow, fog, or mist. In areas where the weather is dry, the acid chemicals may become incorporated into dust or smoke.

Attainment area. A geographic area in which levels of a criteria air pollutant meet the health-based National Ambient Air Quality Standard for that specific pollutant.

Attenuation. The reduction of sound intensity and energy as a function of distance traveled.

Avoidance area. See “*right-of-way avoidance area*” definition.

Backcountry. Lands which are remote from development and typically difficult to access.

Backcountry byway. Vehicle routes that traverse scenic corridors using secondary or backcountry road systems. National backcountry byways are designated by the type of road and vehicle needed to travel the byway.

Badland. A type of dry terrain where softer sedimentary rocks and clay-rich soils have been extensively eroded by wind and water. An example of badland terrain in the UFO is the Adobe Badlands Wilderness Study Area.

Bank-full stage. The water surface elevation that just fills the active channel to the top of its banks and at a point where the water begins to overflow onto a floodplain.

Beneficial outcomes. Also referenced as “recreation benefits;” improved conditions, maintenance of desired conditions, prevention of worse conditions, and realization of desired experiences.

Best management practice (BMP). A method, process, or activity, or usually a combination of these, that are determined by a State or a designated planning agency to be the most effective and practicable means (including technological, economic, and institutional considerations) of

managing or controlling particular conditions or circumstances. BMPs are a suite of voluntary, accepted measures that may or may not be applied to or enforced for any given project.

Big game. Indigenous, ungulate (hoofed) wildlife species that are hunted, such as elk, deer, bison, bighorn sheep, and pronghorn antelope.

Biodiversity (biological diversity). The variety of life and its processes, and the interrelationships within and among various levels of ecological organization. Conservation, protection, and restoration of biological species and genetic diversity are needed to sustain the health of existing biological systems. Federal resource management agencies must examine the implications of management actions and development decisions on regional and local biodiversity.

Biological Opinion. A document prepared by USFWS stating their opinion as to whether or not a federal action will likely jeopardize the continued existence or adversely modify the habitat of a listed threatened or endangered species.

Biological soil crust. A complex association between soil particles and cyanobacteria, algae, microfungi, lichens, and bryophytes that live within or atop the uppermost millimeters of soil.

BLM Sensitive Species. Those species that are not federally listed as endangered, threatened, or proposed under the ESA, but that are designated by the BLM State Director under 16 USC 1536(a)(2) for special management consideration. By national policy, federally listed candidate species are automatically included as sensitive species. Sensitive species are managed so they will not need to be listed as proposed, threatened, or endangered under the ESA.

Breccia. A coarse-grained clastic composed of angular fragments of other rocks held together by cement or other fine-grained matrix. Can have a sedimentary breccia, fault breccia, collapse breccia, or volcanic breccia.

Burned area rehabilitation. Efforts undertaken within three years of containment of a wildfire to repair or improve fire-damaged lands unlikely to recover naturally to management approved conditions, or to repair or replace minor facilities damaged by fire.

Candidate species. Taxa for which the USFWS has sufficient information on their status and threats to propose the species for listing as endangered or threatened under the ESA, but for which issuance of a proposed rule is currently precluded by higher priority listing actions. Separate lists for plants, vertebrate animals, and invertebrate animals are published periodically in the Federal Register (BLM Manual 6840, Special Status Species Manual).

Categorical Exclusion. A category of actions (identified in agency guidance) that do not individually or cumulatively have a significant effect on the human environment, and for which neither an environmental assessment nor an environmental impact statement is required (40 CFR 1508.4), but a limited form of NEPA analysis is performed.

Chemical vegetation treatment. Application of herbicides to control invasive species/noxious weeds and/or unwanted vegetation. To meet resource objectives the

preponderance of chemical treatments would be used in areas where cheatgrass or noxious weeds have invaded sagebrush steppe.

Chert. A hard, dense microcrystalline sedimentary rock formed of microscopic, interlocking crystals of quartz. Can form concretions, nodules, or be bedded.

Citizen Wilderness Proposal. Areas that have been inventoried and proposed for Wilderness designation by citizens.

Classified surface water supply segment. A “public water system,” as defined by the State of Colorado, beginning at the surface water point of intake and extending 5 miles upstream.

Clastic. A sedimentary rock composed of fragments of other rocks that are transported mechanically to their place of deposition. Shale, siltstone, sandstone, conglomerate are all classic rocks.

Clean Air Act of 1963 (as amended). Federal legislation governing air pollution control.

Climate change. Any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from:

- natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- natural processes within the climate system (e.g., changes in ocean circulation); and
- human activities that change the atmosphere's composition (e.g., driving automobiles) and the land surface (e.g., deforestation, reforestation, urbanization, desertification, etc.).

Climax vegetative community. The final vegetation community and highest ecological development of a plant community that emerges after a series of successive vegetational stages. The climax community perpetuates itself indefinitely unless disturbed by outside forces.

Closed area. An area where one or more uses are prohibited either temporarily or over the long term. Areas may be closed to uses such as, but not limited to, off-road vehicles, mineral leasing, mineral or vegetative material collection, or target shooting. In off-road vehicle use closed areas, motorized and mechanized off-road vehicle use is prohibited. Use of motorized and mechanized off-road vehicles in closed areas may be allowed for certain reasons; however, such use shall be made only with the approval of the authorized officer (43 CFR 8340.0-5).

Collaboration. A cooperative process in which interested parties, often with widely varied interests, work together to seek solutions with broad support for managing public and other lands. Collaboration may take place with any interested parties, whether or not they are a cooperating agency.

Collaborative partnerships. Refers to people working together, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks.

Common use area. Areas designated to sell various mineral materials (gravel, moss rock, etc.) to the public through purchase of a permit from the BLM Field Office.

Comprehensive trails and travel management. The proactive interdisciplinary planning; on-the-ground management and administration of travel networks (both motorized and non-motorized) to ensure public access, natural resources, and regulatory needs are considered. It consists of inventory, planning, designation, implementation, education, enforcement, monitoring, easement acquisition, mapping and signing, and other measures necessary to provide access to public lands for a wide variety of uses (including uses for recreational, traditional, casual, agricultural, commercial, educational, landing strips, and other purposes).

Concession leases. Authorize the operation of recreation-oriented services and facilities by the private sector, on BLM-administered lands, in support of BLM recreation programs. The concessionaire is authorized through a concession lease administered on a regular basis. The lease requires the concessionaire to pay fees to the BLM in exchange for the opportunity to carry out business activity. BLM Handbook H-2930-1, Recreation Permit Administration, provides consistent and explicit direction to supplement the Recreation Permit Administration Manual 2930 and regulations set forth in 43 CFR 2930.

Condition class (fire regimes). Fire regime condition classes are a measure describing the degree of departure from historical fire regimes, possibly resulting in alterations of key ecosystem components, such as species composition, structural stage, stand age, canopy closure, and fuel loadings. One or more of the following activities may have caused this departure: fire suppression, timber harvesting, livestock grazing, introduction and establishment of exotic plant species, introduced insects or disease, or other management activities.

Condition of approval. Condition or provision (requirement) under which an application for a permit to drill or sundry notice is approved.

Conformance. A proposed action shall be specifically provided for in the land use plan or, if not specifically mentioned, shall be clearly consistent with the goals, objectives, or standards of the approved land use plan.

Conservation agreement. A formal signed agreement between the USFWS or National Oceanographic and Atmospheric Administration-Fisheries and other parties that implement specific actions, activities, or programs designed to eliminate or reduce threats to, or otherwise improve the status of, a species. Conservation agreements can be developed at a state, regional, or national level and generally include multiple agencies at both the state and federal level, as well as tribes. Depending on the types of commitments the BLM makes in a conservation agreement and the level of signatory authority, plan revisions or amendments may be required before the conservation agreement is signed or subsequently in order to implement the conservation agreement.

Conservation strategy. A strategy outlining current activities or threats that are contributing to the decline of a species, along with the actions or strategies needed to reverse or eliminate such a decline or threats. Conservation strategies are generally developed for species of plants and animals that are designated as BLM sensitive species or that have been determined by the USFWS or National Oceanographic and Atmospheric Administration-Fisheries to be federal candidates under the ESA.

Controlled surface use (CSU). CSU is a category of moderate constraint stipulations that allows some use and occupancy of public land while protecting identified resources or values and is applicable to fluid mineral leasing and all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, construction of wells and/or pads). CSU areas are open to fluid mineral leasing but the stipulation allows the BLM to require special operational constraints, or the activity can be shifted more than 200 meters (656 feet) to protect the specified resource or value.

Cooperating Agency. Assists the lead federal agency in developing an environmental assessment or environmental impact statement. These can be any agency with jurisdiction by law or special expertise for proposals covered by NEPA (40 CFR 1501.6). Any tribe or Federal, State, or local government jurisdiction with such qualifications may become a cooperating agency by agreement with the lead agency.

Corridor. A strip of land that aids in the movement of species between disconnected core areas of their natural habitat.

Council on Environmental Quality. An advisory council to the President of the US established by the National Environmental Policy Act of 1969. It reviews federal programs to analyze and interpret environmental trends and information.

Criteria pollutant. The US EPA uses six “criteria pollutants” as indicators of air quality, and has established for each of them a maximum concentration above which adverse effects on human health may occur. These threshold concentrations are called National Ambient Air Quality Standards. The criteria pollutants are ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter and lead.

Critical habitat. An area: A) designated by the USFWS that is occupied by a threatened or endangered species “on which are found those physical and biological features (1) essential to the conservation of the species, and (2) which may require special management considerations or protection;” or B) on which are found those physical and biological features essential to the conservation of a species that may require special management consideration or protection.

Crucial habitat types. The environment essential to plant or animal biodiversity and conservation at the landscape level. Crucial habitats include, but are not limited to, ecological emphasis areas, severe winter range, winter concentration areas, reproduction areas, and movement corridors.

Crucial winter range. That part of the overall range where 90 percent of the individuals are located during the average five winters out of 10 from the first heavy snowfall to spring green-

up, or during a site-specific period of winter as defined for each Colorado Parks and Wildlife Data Analysis Unit.

Cultural resource high priority sites. Those sites which have been identified as being in some danger of modification (e.g., vandalism, erosion, heavy visitation, etc.) which would alter the site's eligibility for listing on the National Register of Historic Places.

Cultural resources. Locations of human activity, occupation, or use. Cultural resources include archaeological, historic, or architectural sites, structures, or places with important public and scientific uses, and locations of traditional cultural or religious importance to specified social and/or cultural groups.

Cultural resources inventory. An inventory to assess the potential presence of cultural resources. There are three classes of surveys:

- **Class I.** An existing data survey. This is an inventory of a study area to (1) provide a narrative overview of cultural resources by using existing information, and (2) compile existing cultural resources site record data on which to base the development of the BLM's site record system.
- **Class II.** A sampling field inventory designed to locate, from surface and exposed profile indications, all cultural resource sites within a portion of an area so that an estimate can be made of the cultural resources for the entire area.
- **Class III.** An intensive field inventory designed to locate, from surface and exposed profile indications, all cultural resource sites in an area. Upon its completion, no further cultural resources inventory work is normally needed.

Cumulative effects. 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.

Cyanobacteria. A blue-green algae or bacteria that obtain its energy through photosynthesis.

Decision Area. Lands and federal mineral estate within the planning area that are administered by the BLM.

Deferred rotation. Rotation grazing with regard to deferring pastures beyond the growing season, if they were used early the prior year, or that have been identified as needing deferment for resource reasons.

Degraded vegetation. Areas where the plant community is not complete or is under threat. Examples include missing components such as perennial forbs or cool season grasses, weed infestations, or lack of regeneration of key species such as sagebrush or cottonwoods trees.

Designated roads and trails. Specific roads and trails identified by the BLM (or other agency) where some type of motorized/nonmotorized use is appropriate and allowed, either seasonally or year-long (H-1601-1, BLM Land Use Planning Handbook).

Desired future condition. For rangeland vegetation, the condition of rangeland resources on a landscape scale that meet management objectives. It is based on ecological, social, and economic considerations during the land planning process. It is usually expressed as ecological status or management status of vegetation (species composition, habitat diversity, and age and size class of species) and desired soil qualities (soil cover, erosion, and compaction). In a general context, desired future condition is a portrayal of the land or resource conditions that are expected to result if goals and objectives are fully achieved.

Desired outcomes. A type of land use plan decision expressed as a goal or objective.

Direct impacts. Direct impacts are caused by an action or implementation of an alternative and occur at the same time and place.

Directional drilling. A drilling technique whereby a well is deliberately deviated from the vertical in order to reach a particular part of the oil- or gas-bearing reservoir. Directional drilling technology enables the driller to steer the drill stem and bit to a desired bottom hole location. Directional wells initially are drilled straight down to a predetermined depth and then gradually curved at one or more different points to penetrate one or more given target reservoirs. This specialized drilling usually is accomplished with the use of a fluid-driven downhole motor, which turns the drill bit. Directional drilling also allows multiple production and injection wells to be drilled from a single surface location such as a gravel pad, thus minimizing cost and the surface impact of oil and gas drilling, production, and transportation facilities. It can be used to reach a target located beneath an environmentally sensitive area (Alaska Department of Natural Resources, Division of Oil and Gas 2009).

Disposal lands. Transfer of public land out of federal ownership to another party through sale, exchange, Recreation and Public Purposes Act of 1926, Desert Land Entry or other land law statutes.

Disruptive activities. Human-caused disturbances that induce stress on a population, community, or ecosystem and cause potential loss of species fitness (survival, reproduction, and recruitment) within crucial habitats or other sensitive areas during specified time periods; may or may not entail surface disturbance. This does not include regular background levels of activity, such as hiking, cross country skiing or livestock grazing, that individuals would be accustomed to. Examples of disruptive activities include:

- Commercial recreation activities, especially large groups;
- Abnormally loud or sustained noise; and
- Road maintenance.

Diversity. The relative abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area.

Domestic well. A well serving up to three single-family dwellings, irrigating one acre or less of lawn and garden, and providing water for the individual's domestic animals and livestock.

Early detection. As applied to invasive species, is a comprehensive, integrated system of active or passive surveillance to find and verify the identity of new invasive species as early after entry as possible, when eradication and control are still feasible and less costly. It may be targeted at areas where introductions are likely (such as near to pathways of introduction) and in sensitive ecosystems where impacts are likely to be great or invasion is likely to be rapid.

Easement. A right afforded a person or agency to make limited use of another's real property for access or other purposes.

Ecologic functionality. These levels include successional processes that are in place, energy and nutrients that are being cycled effectively, and soil that is being appropriately stabilized. An area can be functioning at a basic level of ecologic functionality without meeting land health standards.

Ecological emphasis area. The central and primary area of habitat for a population of a given species or group of species. These areas include corridors, which are strips of land that aid in the movement of species between disconnected emphasis areas of their natural habitat. Emphasis areas may be divided into smaller geographical zones.

Ecosystem diversity. The variety of habitats, living communities, and ecological processes in the living world. Ecosystem diversity refers to the diversity of a place at the level of ecosystem. Inherent in ecosystem diversity are both biotic (living) and abiotic (non-living) components. The term differs from biodiversity, which refers to variation in species rather than ecosystems.

Element Occurrence Record. A record of an individual plant or plant population present at a specific geographic location at a specific time.

Eligible river. A river or river segment found to meet criteria found in Sections 1(b) and 2(b) of the Wild and Scenic Rivers Act of being free flowing and possessing one or more outstandingly remarkable value (BLM Manual 6400, Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, Planning, and Management).

Emergency stabilization. Planned actions to stabilize and prevent unacceptable degradation to natural and cultural resources, to minimize threats to life or property resulting from the effects of a fire, or to repair/replace/construct physical improvements necessary to prevent degradation of land or resources. Emergency stabilization actions must be taken within one year following containment of a wildfire.

Endangered species. Any species that is in danger of extinction throughout all or a significant portion of its range (BLM Manual 6840, Special Status Species Manual). Under the ESA in the US, "endangered" is the more-protected of the two categories. Designation as endangered (or threatened) is determined by USFWS as directed by the ESA.

Endangered Species Act of 1973 (ESA) (as amended). Designed to protect critically imperiled species from extinction as a consequence of economic growth and development untempered by adequate concern and conservation. The Act is administered by two federal agencies, USFWS and the National Oceanic and Atmospheric Administration. The purpose of

the Act is to protect species and also the ecosystems upon which they depend (16 US Code 1531-1544).

Enhance. Increase or improve in value, quality or desirability.

Environmental assessment. A concise public document prepared to provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact. It includes a brief discussion of the need for the proposal, alternatives considered, environmental impact of the proposed action and alternatives, and a list of agencies and individuals consulted.

Environmental impact statement (EIS). A detailed statement prepared by the responsible official in which a major federal action that significantly affects the quality of the human environment is described, alternatives to the proposed action are provided, and effects are analyzed (BLM National Management Strategy for OHV Use on Public Lands).

Evaluation (plan evaluation). The process of reviewing the land use plan and the periodic plan monitoring reports to determine whether the land use plan decisions and National Environmental Policy Act of 1969 analysis are still valid and whether the plan is being implemented.

Exchange. A transaction whereby the federal government receives land or interests in land in exchange for other land or interests in land.

Exclusion area. See “right-of-way exclusion area” definition.

Exemplary (vegetation). An area of vegetation that does not show signs of degradation and which may serve as a comparison to illustrate what the vegetation potential is for a given type of environment. Exemplary vegetation meets A-ranked viability criteria as described by the Colorado Natural Heritage Program.

Existing routes. The roads, trails, or ways that are used by motorized vehicles (jeeps, all-terrain vehicles, motorized dirt bikes, etc.), mechanized uses (mountain bikes, wheelbarrows, game carts), pedestrians (hikers), and/or equestrians (horseback riders) and are, to the best of BLM’s knowledge, in existence at the time of RMP/EIS publication.

Extensive recreation management area (ERMA). Administrative units that require specific management consideration in order to address recreation use, demand, or Recreation and Visitor Services program investments. ERMAs are managed to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. ERMA management is commensurate and considered in context with the management of other resources and resource uses.

Extremely rare vegetation communities. Unique combinations of plant species as identified by terminology and a classification system from the Colorado Natural Heritage Program. These are identified as Potential Conservation Areas with moderate or better Biodiversity Significance and fair or better Viability.

Federal Land Policy and Management Act of 1976 (FLPMA). Public Law 94-579, October 21, 1976, often referred to as the BLM's "Organic Act," which provides most of the BLM's legislated authority, direction policy, and basic management guidance.

Federal mineral estate. Subsurface mineral estate owned by the US and administered by the BLM.

Fire frequency. A general term referring to the recurrence of fire in a given area over time.

Fire management plan (FMP). A plan that identifies and integrates all wildland fire management and related activities within the context of approved land/resource management plans. It defines a program to manage wildland fires (wildfire, prescribed fire, and wildland fire use). The plan is supplemented by operational plans including, but not limited to, preparedness plans, preplanned dispatch plans, and prevention plans. Fire Management Plans assure that wildland fire management goals and components are coordinated.

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.

Fire severity. Degree to which a site has been altered or disrupted by fire; loosely, a product of fire intensity and residence time.

Fire suppression. All work and activities connected with control and fire-extinguishing operations, beginning with discovery and continuing until the fire is completely extinguished.

Fluid minerals. Oil, gas, coal bed natural gas, and geothermal resources.

Fluvial. Of or pertaining to rivers or produced by the action of rivers or streams.

Forage. All browse and herbaceous foods that are available to grazing animals.

Forage base. The amount of vegetation available for wildlife and livestock use.

Forage reserve. A parcel of land for which a term livestock grazing permit has not been issued but is available for livestock grazing authorization under special circumstances. Those circumstances may include but are not limited to instances where livestock grazing on permitted allotments is not available in a given year due to drought conditions or post fire rehabilitation and/or vegetation treatment grazing deferrals.

Forest health. The condition in which forest ecosystems sustain sufficient complexity, diversity, resiliency, and productivity to provide for specified human needs and values (BLM and US Forest Service 1997).

Forest product disposal. A term used in old BLM RMPs for the permitted or contractual sale of forest products.

Four-wheel drive vehicle. A passenger vehicle or truck having power available to all wheels. Any motorized vehicle that has generally higher clearance than a passenger car and has traction on all four wheels.

Fragile soils. Soils having a shallow depth to bedrock, minimal surface layer of organic material, textures that are more easily detached and eroded, or are on slopes over 35 percent.

Fugitive dust. Significant atmospheric dust arises from the mechanical disturbance of granular material exposed to the air. Dust generated from these open sources is termed "fugitive" because it is not discharged to the atmosphere in a confined flow stream. Common sources of fugitive dust include unpaved roads, agricultural tilling operations, aggregate storage piles, and heavy construction operations.

Functional/structural group. A group of species that because of similar shoot or root structure, rooting depth, woody or non-woody stems, plant height, photosynthetic pathways, nitrogen fixing ability, or life cycle perform similar roles or functions in the ecosystem and are grouped together on an ecological site basis.

Functioning at risk. Riparian-wetland areas that are in functional condition, but that have an existing soil, water, or vegetation attribute that makes them susceptible to degradation.

Game fish. Fish species such as trout, bass, pike, sunfish, and perch species that are pursued for sport by recreational anglers.

Geographic Information System (GIS). A system of computer hardware, software, data, people, and applications that capture, store, edit, analyze, and display a potentially wide array of geospatial information.

Geologic hazard, high. Active mudflows, earthflows, and landslides, and areas prone to avalanche.

Geologic hazard, moderate. Failed slopes that are no longer active (stabilized earthflows, mudflows, and landslides); those slopes adjacent to failed slopes or active earthflows, mudflows or landslides and avalanche chutes; areas of rockfall; flash flood zones; and areas with potential mining-related problems (e.g., subsidence and acid drainage).

Geomorphic balance. Stream channel size, sinuosity, slope, and substrate are appropriate for its landscape setting and geology.

Geophysical exploration. Efforts to locate deposits of oil and gas resources and to better define the subsurface.

Geothermal energy. Natural heat from within the Earth captured for production of electric power, space heating, or industrial steam.

Goal. A broad statement of a desired outcome; usually not quantifiable and may not have established timeframes for achievement.

Grandfathered right. The right to use in a non-conforming manner due to existence prior to the establishment of conforming terms and conditions.

Grazing district. The specific area within which public lands are administered under Taylor Grazing Act Section 3. All Taylor Grazing Act Section 3 permits are contained in grazing districts.

Grazing lease. A document that authorizes grazing use of public lands under Taylor Grazing Act Section 15; it specifies grazing preference and the terms and conditions under which lessees make grazing use during the lease term. Public lands outside grazing district boundaries are administered under Taylor Grazing Act Section 15.

Grazing permit. A document that authorizes grazing use of public lands under Taylor Grazing Act Section 3; it specifies grazing preference and the terms and conditions under which permittees make grazing use during the term of the permit.

Grazing permitted use. Grazing permitted use or preference means the total number of animal unit months on public lands apportioned and attached to base property owned or controlled by a permittee, lessee, or an applicant for a permit or lease. Grazing permitted use includes active use and use held in suspension. Grazing permitted use holders have a superior or priority position against others for the purpose of receiving a grazing permit or lease (43 CFR 4100.0-5).

Grazing system. Scheduled grazing use and non-use of an allotment to reach identified goals or objectives by improving the quality and quantity of vegetation. Include, but are not limited to, developing pastures, utilization levels, grazing rotations, timing and duration of use periods, and necessary range improvements.

Green completion. Methods that minimize the amount of natural gas and oil vapors that are released to the environment when a well is being flowed during the completion phase of a well.

Groundwater. Water held underground in soil or permeable rock, often feeding springs and wells.

Guidelines. Actions or management practices that may be used to achieve desired outcomes, sometimes expressed as BMPs. Guidelines may be identified during the land use planning process, but they are not considered a land use plan decision unless the plan specifies that they are mandatory. Guidelines for grazing administration must conform to 43 CFR 4180.2.

Guzzler. General term covering guzzler, wildlife drinker, or tenaja. A natural or artificially constructed structure or device to capture and hold rain water, and make it accessible to small and/or large animals. Most guzzlers involve above or below ground piping, storage tanks, and valves. Tenajas are natural depressions in rock, which trap and hold water. To some guzzlers, steps or ladders are sometimes added to improve access and reduce mortality from drowning.

Habitat. An environment that meets a specific set of physical, biological, temporal, or spatial characteristics that satisfy the requirements of a plant or animal species or group of species for part or all of their life cycle.

Habitat management plan. A written and approved activity plan for a geographical area which identifies habitat management activities to be implemented in achieving specific objectives of planning decisions.

Hazardous material. A substance, pollutant, or contaminant that, due to its quantity, concentration, or physical or chemical characteristics, poses a potential hazard to human health and safety or to the environment if released into the workplace or the environment.

Healthy aquatic community. Varies by species and numbers of target species present, and channel type, and is characterized by: proper amounts of sediment/silt; a diversity of instream habitat complexity; the development/maintenance of undercut bank habitats; adequate canopy cover; appropriate holding habitat (pools/minimum pools depth) commensurate with the identified Rosgen channel type; reduced diurnal water temperature fluctuations; appropriate width to depth ratios; and represented by a healthy biological community (fish and macroinvertebrate diversity and abundance reflect water quality attaining a biological minimum).

Herd management area. Public land under the jurisdiction of the BLM that has been designated for special management emphasizing the maintenance of an established wild horse or burro herd.

High-power communication site. Sites that include broadcast types of uses (e.g., television, AM/FM radio, cable television, broadcast translator).

High wind event. The period of time and location covered by National Weather Service high wind warning; or when there are sustained surface winds greater than 40 miles per hour lasting more than an hour or winds over 58 miles per hour that are occurring for an unspecified period of time.

Historic range of variability. The range of conditions that are likely to have occurred prior to settlement of the project area by Euro-Americans (approximately the mid-1800's) which would have varied within certain limits over time (BLM and US Forest Service 1997).

Historic resources. Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places.

Horizontal drilling. A more-specialized type of directional drilling that allows a single well bore at the surface to penetrate oil- or gas-bearing reservoir strata at angles that parallel or nearly parallel the dip of the strata. The well bore is then open and in communication with the reservoir over much longer distances. In development wells, this can greatly increase production rates of oil and gas or volumes of injected fluids. Horizontal drilling may involve underbalanced drilling, coiled tubing, bit steering, continuous logging, multilateral horizontals, and horizontal completions. Lateral step-outs are directional wells that branch off a main borehole to access more of the subsurface. Conditions for successful horizontal wells include adequate pre-spud

planning, reservoir descriptions, drillable strata that will not collapse, and careful cost control (Alaska Department of Natural Resources, Division of Oil and Gas 2009).

Impact. The effect, influence, alteration, or imprint caused by an action.

Impairment. The degree to which a distance of clear visibility is degraded by man-made pollutants.

Implementation decisions. Decisions that take action to implement land use planning; generally appealable to Interior Board of Land Appeals under 43 CFR 4.410.

Implementation plan. An area or site-specific plan written to implement decisions made in a land use plan. Implementation plans include both activity plans and project plans.

Inactive nest site. See “*alternate nest (inactive nest) site*” definition.

Incompatible use. An activity that affects (hinders or obstructs) the nature and purposes of a designated National Trail (see *substantial interference*).

Indian Trust Assets. Legal interests in property, physical assets, or intangible property rights held in trust by the United States for Indian tribes or individual Indians.

Indicators. Factors that describe resource condition and change and can help the BLM determine trends over time.

Indirect impacts. 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.

Intermittent stream. An intermittent stream is a stream that flows only at certain times of the year when it receives water from springs or from some surface sources such as melting snow in mountainous areas. During the dry season and throughout minor drought periods, these streams will not exhibit flow. Geomorphological characteristics are not well defined and are often inconspicuous. In the absence of external limiting factors, such as pollution and thermal modifications, species are scarce and adapted to the wet and dry conditions of the fluctuating water level.

Introduced fish. See “*nonnative fish*” definition.

Invertebrate. An animal lacking a backbone or spinal column, such as insects, snails, and worms. The group includes 97 percent of all animal species.

K factor. A soil erodibility factor used in the universal soil loss equation that is a measure of the susceptibility of soil particles to detachment and transport by rainfall and runoff. Estimation of the factor takes several soil parameters into account, including soil texture, percent of sand greater than 0.10 millimeter, soil organic matter content, soil structure, soil permeability, clay mineralogy, and coarse fragments. K factor values range from .02 to .64, the greater values indicating the highest susceptibilities to erosion.

Key wildlife habitat. Specific areas within the geographic area occupied by a species in which are found those physical and biological features 1) essential to the conservation of the species, and 2) which may require special management considerations or protection.

Lacustrine. Pertaining to, produced by, or inhabiting a lake environment.

Land classification. When, under criteria of 43 CFR 2400, a tract of land has the potential for retention for multiple use management or for some form of disposal or for more than one form of disposal. The relative scarcity of the values involved and the availability of alternative means and sites for realization of those values will be considered. Long-term public benefits will be weighed against more immediate or local benefits. The tract will then be classified in a manner that will best promote the public interest.

Land health condition. BLM Regulation and policy direct lands to be classified in terms of Land Health (BLM Manual Section 4180). The UFO has subdivided the basic classifications of “Meeting Land Health Standard(s)” and “Not Meeting Land Health Standard(s)” into the following subcategories:

- Meeting Land Health Standard(s): Lands for which health indicators are currently in acceptable condition such that basic levels of ecological processes and functions are in place. This rating includes the following subcategories:
 - Fully Meeting Standard(s): Lands for which there are no substantive concerns with health indicators
 - Exceeding Standard(s): Lands for which health indicators are in substantially better conditions than acceptable levels.
 - Meeting Standard(s) with Problems: Lands which have one or more concerns with health indicators to the degree that they are categorized as meeting the Land Health Standards, but have some issues which make them at risk of becoming “not meeting.”
- Not Meeting Land Health Standard(s): Lands for which one or more health indicators are in unacceptable conditions such that basic levels of ecological processes and functions are no longer in place.

Land health trend is used to describe these classes further. It includes these categories: upward, static, and downward.

- Upward Trend: lands which have shown improving indicator conditions over time.
- Static Trend: lands which have shown no clear improvement or decline in indicator conditions over time.
- Downward Trend: lands which have shown declining indicator conditions over time.

Land health improvement projects. Activities which are directed at increasing the levels and/or vigor of desirable species within the plant community so that it reaches a higher level of functioning. Activities include restoration or revegetation of areas of degraded vegetation;

removal of weeds, and repair or retirement and rehabilitation of developments which are contributing to vegetation degradation.

Landscape scale. An approach that examines or considers issues at an extensive scale rather than the individual site scale. The term landscape refers to the scale of the approach (landscape as an area), rather than as a topic of interest.

Land tenure adjustments. Land ownership or jurisdictional changes. To improve the manageability of the BLM lands and their usefulness to the public, the BLM has numerous authorities for repositioning lands into a more consolidated pattern, disposing of lands, and entering into cooperative management agreements. These land pattern improvements are completed primarily through the use of land exchanges but also through land sales, through jurisdictional transfers to other agencies, and through the use of cooperative management agreements and leases.

Land treatment. All methods of artificial range improvement arid soil stabilization such as reseeding, brush control (chemical and mechanical), pitting, furrowing, water spreading, etc.

Land use allocation. The identification in a land use plan of the activities and foreseeable development that are allowed, restricted, or excluded for all or part of the planning area, based on desired future conditions (H-1601-I, BLM Land Use Planning Handbook).

Land use plan. A set of decisions that establish management direction for land within an administrative area, as prescribed under the planning provisions of FLPMA; an assimilation of land use plan level decisions developed through the planning process outlined in 43 CFR 1600, regardless of the scale at which the decisions were developed. The term includes both RMPs and management framework plans (H-1601-I, BLM Land Use Planning Handbook).

Land use plan boundary. The geographic extent of a resource management plan or management framework plans.

Land use plan decision. Establishes desired outcomes and actions needed to achieve them. Decisions are reached using the planning process in 43 CFR 1600. When they are presented to the public as proposed decisions, they can be protested to the BLM Director. They are not appealable to Interior Board of Land Appeals.

Land utilization project lands. Privately owned submarginal farmlands incapable of producing sufficient income to support the family of a farm owner and purchased under Title III of the Bankhead-Jones Farm Tenant Act of July 22, 1937. These acquired lands became known as land utilization projects and were subsequently transferred from jurisdiction of the US Department of Agriculture to the US Department of the Interior. They are now administered by the BLM.

Late season. Late summer or fall grazing.

Leasable minerals. Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. These include energy-related mineral resources such as oil, natural

gas, coal, and geothermal, and some nonenergy minerals, such as phosphate, sodium, potassium, and sulfur. Geothermal resources are also leasable under the Geothermal Steam Act of 1970.

Lease. Section 302 of the Federal Land Policy and Management Act of 1976 provides the BLM's authority to issue leases for the use, occupancy, and development of public lands. Leases are issued for purposes such as a commercial filming, advertising displays, commercial or noncommercial croplands, apiaries, livestock holding or feeding areas not related to grazing permits and leases, native or introduced species harvesting, temporary or permanent facilities for commercial purposes (does not include mining claims), residential occupancy, ski resorts, construction equipment storage sites, assembly yards, oil rig stacking sites, mining claim occupancy if the residential structures are not incidental to the mining operation, and water pipelines and well pumps related to irrigation and nonirrigation facilities. The regulations establishing procedures for processing these leases and permits are found in 43 CFR 2920.

Lease notice. Provides more-detailed information concerning limitations that already exist in law, lease terms, regulations, or operational orders. A lease notice also addresses special items that lessees should consider when planning operations but does not impose additional restrictions. Lease notices are not an RMP-level decision, and new lease notices may be added to fluid mineral leases at the time of sale. Lease notices apply only to leasable minerals (e.g., oil, gas, geothermal) and not to other types of leases, such as livestock grazing.

Lease stipulation. A modification of the terms and conditions on a standard lease form at the time of the lease sale.

Lek. An assembly area where birds, especially sage-grouse, carry on display and courtship behavior.

Lentic. Pertaining to standing water such as lakes and ponds.

Limited area. An area restricted at certain times, in certain areas, and/or to certain vehicular use. These restrictions may be of any type, but can generally be accommodated within the following type of categories: Numbers of vehicles; types of vehicles; time or season of vehicle use; permitted or licensed use only; use on existing roads and trails; use on designated roads and trails; and other restrictions (43 CFR 8340.0-5).

Lithic site. An archaeological site containing debris left from the manufacture, use, or maintenance of flaked stone tools.

Livestock trailing. Temporary herding of livestock from one location to another using a designated route.

Locally derived. Seeds or cuttings from native species that are collected close to the area in which they will be used for planting. For example, from the same ecoregion, or major watershed, and from similar elevational zones and soil textures as the planting site. This increases the chance that genetic characteristics will be best suited for the planting area and will not disrupt the genetic structure of nearby populations.

Locatable minerals. Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

Long-term effect. The effect could occur for an extended period after implementation of the alternative. The effect could last several years or more.

Low-power communication site. Sites that include to non-broadcast uses (e.g., commercial or private mobile radio service, cellular telephone, microwave, local exchange network, passive reflector).

Low productivity forest lands. Woodlands and forest stands producing less than 20 cubic feet per acre per year.

Ma. Millions of years ago.

Managed fire. Management of a wildfire (unplanned ignition) to meet the objectives of the RMP. Objectives could include protection of high-value resources such as subdivisions or cultural resources through suppression, enhancement of resources such as wildlife habitat by utilizing the fire, or managing the fire as a natural process on the landscape. Multiple objectives could apply to any single wildfire.

Management decision. A decision made by the BLM to manage public lands. Management decisions include both land use plan decisions and implementation decisions.

Master development plan. Information common to multiple planned wells, including drilling plans, Surface Use Plans of Operations, and plans for future production.

Mechanical transport. Any vehicle, device, or contrivance for moving people or material in or over land, water, snow, or air that has moving parts.

Mechanical vegetation treatment. Includes mowing, chaining, chopping, drill seeding, and cutting vegetation to meet resource objective. Mechanical treatments generally occur in areas where fuel loads or invasive species need to be reduced prior to prescribed fire application; when fire risk to resources is too great to use naturally started wildland fires or prescribed fires; or where opportunities exist for biomass utilization or timber harvest. Mechanical treatments may also be utilized to improve wildlife habitat conditions.

Mechanized uses. Equipment that is mechanized, including but not limited to mountain bikes, wheelbarrows, and game carts.

Mexican spotted owl suitable breeding habitat. Vegetation characteristics described in the current Mexican spotted owl recovery plan in areas where Mexican spotted owl breeding has been confirmed.

Mineral. Any naturally formed inorganic material, solid or fluid inorganic substance that can be extracted from the earth, any of various naturally occurring homogeneous substances (as stone, coal, salt, sulfur, sand, petroleum, water, or natural gas) obtained usually from the ground.

Under federal laws, considered as locatable (subject to the general mining laws), leasable (subject to the Mineral Leasing Act of 1920), and salable (subject to the Materials Act of 1947).

Mineral entry. The filing of a claim on public land to obtain the right to any locatable minerals it may contain.

Mineral estate. The ownership of minerals, including rights necessary for access, exploration, development, mining, ore dressing, and transportation operations.

Mineralize. The process where a substance is converted from an organic substance to an inorganic substance.

Mineral materials (salable minerals, salable mineral materials). Common varieties of mineral materials such as soil, sand and gravel, stone, pumice, pumicite, and clay that are not obtainable under the mining or leasing laws but that can be acquired under the Materials Act of 1947, as amended.

Mineral patent. A claim on which title has passed from the federal government to the mining claimant under the Mining Law of 1872.

Minimum impact suppression tactics. The use of fire management tactics commensurate with the fire's potential or existing behavior while producing the least impact on the resource being protected.

Mining claim. A parcel of land that a miner takes and holds for mining purposes, having acquired the right of possession by complying with the Mining Law and local laws and rules. A mining claim may contain as many adjoining locations as the locator may make or buy. There are four categories of mining claims: lode, placer, millsite, and tunnel site.

Mining Law of 1872. Provides for claiming and gaining title to locatable minerals on public lands. Also referred to as the "General Mining Laws" or "Mining Laws."

Mitigation. Alleviation or lessening of possible adverse effects on a resource by applying appropriate protective measures or adequate scientific study. Mitigation may be achieved by avoidance, minimization, rectification, reduction, and compensation.

Modification. A change to the provisions of a lease stipulation, either temporarily or for the term of the lease. Depending on the specific modification, the stipulation may or may not apply to all sites within the leasehold to which the restrictive criteria are applied.

Monitoring (plan monitoring). The process of tracking the implementation of land use plan decisions and collecting and assessing data necessary to evaluate the effectiveness of land use planning decisions.

Motorcycle. A motorized vehicle with two tires and with a seat designed to be straddled by the operator.

Motorized vehicles or uses. Vehicles that are motorized, including but not limited to jeeps, all-terrain vehicles (all-terrain vehicles, such as four-wheelers and three-wheelers), trail motorcycles or dirt bikes, and aircrafts.

Multiple-use. The management of the public lands and their various resource values so that they are used in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output (FLPMA) (BLM Manual 6840, Special Status Species Manual).

Municipal watershed. A watershed area that provides water for use by a municipality as defined by the community and accepted by the State.

National Environmental Policy Act of 1969 (NEPA). Public Law 91-190. Establishes environmental policy for the nation. Among other items, NEPA requires federal agencies to consider environmental values in decision-making processes.

National Historic Trail. 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.

National Register District. A geographically definable area, urban or rural, possessing a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united by past events or aesthetically by plan or physical development. Consists of contributing and non-contributing properties.

National Register of Historic Places. A listing of architectural, historical, archaeological, and cultural sites of local, state, or national significance, established by the Historic Preservation Act of, 1966 and maintained by the National Park Service.

National Wild and Scenic Rivers System (NWSRS). A system of nationally designated rivers and their immediate environments that have outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, and other similar values and are preserved in a free-flowing condition. The system consists of three types of streams: (1) recreation—rivers or sections of rivers that are readily accessible by road or railroad and that may have some development along

their shorelines and may have undergone some impoundments or diversion in the past; (2) scenic—rivers or sections of rivers free of impoundments with shorelines or watersheds still largely undeveloped but accessible in places by roads; and (3) wild—rivers or sections of rivers free of impoundments and generally inaccessible except by trails, with watersheds or shorelines essentially primitive and waters unpolluted.

Native cutthroat trout. Native populations include what current science and genetics tell us are Colorado River cutthroat or greenback cutthroat trout.

Native fish. Any species of fresh water fish that is found naturally among the waterways of the UFO, such as cutthroat trout (*Oncorhynchus clarki*), mottled sculpin (*Cottus bairdii*), bluehead sucker (*Catostomus discobolus*), roundtail chub (*Gila robusta*), and flannelmouth sucker (*Catostomus latipinnis*).

Native nongame species. Any species of freshwater fish that is found naturally among the waterways of the UFO that is not pursued for sport by recreational anglers.

Native vegetation. Plant species which were found here prior to European settlement, and consequently are in balance with these ecosystems because they have well developed parasites, predators, and pollinators.

Naturalness. Consistent with what would occur without human intervention. For vegetation structure, naturalness implies a pattern similar to what fire and climate would produce across the landscape.

Natural processes. Fire, drought, insect and disease outbreaks, flooding, and other events which existed prior to European settlement, and shaped vegetation composition and structure.

Nature and purposes. The term used to describe the character, characteristics, and congressional intent for a designated National Trail, including the resources, qualities, values, and associated settings of the areas through which such trails may pass; the primary use or uses of a National Trail; and activities promoting the preservation of, public access to, travel within, and enjoyment and appreciation of National Trail.

No ground disturbance (NGD). Areas restricted by NGD are closed to all surface-disturbing activities. Activities that are not considered surface disturbing include, but are not limited to, livestock grazing, cross-country hiking or equestrian use, installing signs, minimum impact filming, vehicular travel on designated routes, and use of the land by wildlife. An NGD stipulation cannot be applied to operations conducted under the 1872 Mining Law without a withdrawal. A withdrawal is not considered a land use planning decision because it must be approved by the Secretary of Interior. Therefore, unless withdrawn, areas identified as NGD are open to operations conducted under the mining laws subject only to TL and CSU stipulations that are consistent with the rights granted under the mining laws. In addition, the following actions or activities are not subject to the NGD stipulation because specific laws and program terminology constrain them. However, these actions or activities may be subject to SSR or TL stipulations: right-of-way location; coal leasing; nonenergy solid mineral leasing; and mineral material disposal.

Nonenergy leasable minerals. Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. Nonenergy minerals include resources such as phosphate, sodium, potassium, and sulfur.

Nonfunctional condition. Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or woody debris to dissipate energies associated with flow events, and thus are not reducing erosion, improving water quality, etc.

Nonnative fish. Fish species that are introduced, alien, exotic, or nonindigenous to the UFO, such as brown trout (*Salmo trutta*), northern pike (*Esox lucius*), smallmouth bass (*Micropterus dolomieu*), and channel catfish (*Ictalurus punctatus*).

North Fork area. North Fork Alternative Plan area (63,390 acres of BLM-administered surface estate and 159,820 acres of federal mineral estate).

No surface occupancy (NSO). A major constraint where use or occupancy of the land surface for fluid mineral exploration or development and all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, construction of wells and/or pads) are prohibited to protect identified resource values. Areas identified as NSO are open to fluid mineral leasing, but surface occupancy or surface-disturbing activities associated with fluid mineral leasing cannot be conducted on the surface of the land. Access to fluid mineral deposits would require horizontal drilling from outside the boundaries of the NSO area.

Noxious weeds. A plant species designated by federal or state law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or nonnative, new, or not common to the US.

Objective. A description of a desired outcome for a resource. Objectives can be quantified and measured and, where possible, have established timeframes for achievement.

Off-highway vehicle (OHV) (off-road vehicle). Any motorized vehicle capable of, or designated for travel on or immediately over land, water or other natural terrain, excluding: (1) any non-amphibious registered motorboat; (2) any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes; (3) any vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved; (4) vehicles in official use; and (5) any combat or combat support vehicle when used for national defense emergencies (43 CFR 8340.0-5).

Off-highway vehicle area designations. BLM-administered lands in the CFO are designated as Open, Limited, or Closed for OHV use.

- **Open.** An area where all types of vehicle use is permitted at all times, anywhere in the area subject to the operating regulations and vehicle standards set forth in 43 CFR subparts 8341 and 8342 (43 CFR 8340.0-5).
- **Limited.** An area restricted at certain times, in certain areas, and/or to certain vehicular use. These restrictions may be of any type, but can generally be

accommodated within the following type of categories: Numbers of vehicles; types of vehicles; time or season of vehicle use; permitted or licensed use only; use on existing roads and trails; use on designated roads and trails; and other restrictions (43 CFR 8340.0-5).

- **Closed.** An area where off-road vehicle use is prohibited. Use of off-road vehicles in closed areas may be allowed for certain reasons; however, such use shall be made only with the approval of the authorized officer (43 CFR 8340.0-5).

Old-growth forest stands. Stands composed of trees that are generally in the late successional stages of development. The desired attributes of old-growth stands are older, large trees for the species and site; signs of decadence (broken or deformed tops or boles and some root decay); multiple layers of canopy; standing and down dead trees; a variation in tree age, size, and spacing; and gaps or patchiness in the canopy and understory (Mehl 1992).

Open. Generally denotes that an area is available for a particular use or uses. Refer to specific program definitions found in law, regulations, or policy guidance for application to individual programs. For example, 43 CFR 8340.0-5 defines the specific meaning of “open” as it relates to OHV use.

Open area. See “*Off-highway vehicle area designations – Open*” definition.

Ordinary high water mark. That line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

Organizer. Any person who advertises for an activity on public lands whether via Internet or any other technology, flyers, club meetings, or other means.

Outstandingly remarkable value (ORV). Values among those listed in Section I(b) of the Wild and Scenic Rivers Act of 1968: “scenic, recreational, geological, fish and wildlife, historical, cultural, or other similar values...” Other similar values that may be considered include ecological, biological, or botanical.

Overstory. That portion of a plant community consisting of the taller plants on the site; the forest or woodland canopy.

Ozone. A faint blue gas produced in the atmosphere from chemical reactions of burning coal, gasoline, and other fuels and chemicals found in products such as solvents, paints, and hairsprays.

Paleontological resources. The physical remains or other physical evidence of plants and animals preserved in soils and sedimentary rock formations. Paleontological resources are important for correlating and dating rock strata and for understanding past environments, environmental change, and the evolution of life.

Particulate matter (PM). One of the six “criteria” pollutants for which the US EPA established National Ambient Air Quality Standards. Particulate matter is defined as two categories, fine particulates, with an aerodynamic diameter of 10 micrometers (PM₁₀) or less, and fine particulates with an aerodynamic diameter of 2.5 micrometers or less (PM_{2.5}).

Passenger vehicle. Two-wheel-drive, low-clearance vehicles.

Patent. Instrument that conveys title to lands from federal ownership to another entity.

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

Permitted access. See “*administrative access*” definition.

Permitted use. The forage allocated by, or under the guidance of, an applicable land use plan for livestock grazing in an allotment under a permit or lease and expressed in AUMs (43 CFR 4100.0-5) (from H-4180-1, BLM Rangeland Health Standards Manual).

Permittee. A person or company permitted to graze livestock on public land.

Petroglyph. A form of rock art created by incising, scratching or pecking designs into rock surfaces.

Physiography. The study and classification of the surface features of the earth.

Pictograph. A form of rock art created by applying mineral based or organic paint to rock surfaces.

Planning Area. The geographical area for which resource management plans are developed and maintained. The Uncompahgre planning area boundary defines the area assessed in this RMP. The planning area encompasses 3.1 million acres in Delta, Gunnison, Mesa, Montrose, Ouray, and San Miguel counties in southwestern Colorado. The BLM administers about 675,760 acres (less than one-percent) of the planning area, and 2.1 million acres of federal mineral estate.

Planning criteria. The standards, rules, and other factors developed by managers and interdisciplinary teams for their use in forming judgments about decision making, analysis, and data collection during planning. Planning criteria streamlines and simplifies the resource management planning actions.

Planning issues. Concerns, conflicts, and problems with the existing management of public lands. Frequently, issues are based on how land uses affect resources. Some issues are concerned with how land uses can affect other land uses, or how the protection of resources affects land uses.

Point bar. A depositional feature of streams, point bars are found in abundance in mature or meandering streams. They are crescent-shaped and located on the inside of a stream bend, being very similar to, though often smaller than, towheads (river islands).

Potential Fossil Yield Classification (PFYC) system. A system used by the BLM to classify geologic units based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher potential.

Potential vegetation group. Potential vegetation types grouped on the basis of a similar general moisture or temperature environment.

Prehistoric resources. Any material remains, structures, and items used or modified by people before Euro-Americans established a presence in the region.

Prescribed fire. A wildland fire originating from a planned ignition to meet specific objectives identified in a written, approved, prescribed fire plan for which NEPA requirements (where applicable) have been met prior to ignition.

Prevention of significant deterioration. An air pollution permitting program intended to ensure that air quality does not diminish in attainment areas.

Primary use(s). Authorized mode or modes of travel, and/or activities identified in the National Trails System Act of 1968 (Public Law 90-543), enabling legislation, or legislative history, through the trailwide Comprehensive Plan or approved Resource Management Plan.

Primitive and unconfined recreation. Nonmotorized, nonmechanized (except as provided by law), and undeveloped types of recreational activities. Bicycles are considered mechanical transport, so their use is not considered primitive and unconfined recreation.

Primitive route. Any transportation linear feature located within areas that have been identified as having wilderness characteristics and not meeting the wilderness inventory road definition (BLM Manual 6310 – Conducting Wilderness Characteristics Inventory on BLM Lands).

Probable sale quantity. The probable sale quantity is the amount of timber, measured in thousand board feet, that could be produced on BLM lands where commercial forest uses are considered appropriate. Calculations are based on species, growth, mortality, land base, and sustainability. The probable sale quantity does not include volume removed for other purposes from other areas (such as recreation sites where hazard trees are removed). The probable sale quantity also is not a commitment to offer for sale a specific level of timber volume.

Proper functioning condition. A term describing stream health that is based on the presence of adequate vegetation, landform and debris to dissipate energy, reduce erosion and improve water quality.

Proper functioning condition for lentic areas. A riparian-wetland areas are functioning properly when adequate vegetation, landform, or debris is present to: dissipate energies associated with wind action, wave action, and overland flow from adjacent sites, thereby reducing erosion and improving water quality; filter sediment and aid floodplain development; improve flood-water retention and ground-water recharge; develop root masses that stabilize

islands and shoreline features against cutting action; restrict water percolation; develop diverse ponding characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterbird breeding, and other uses; and support greater biodiversity.

Proper functioning condition for lotic areas. A riparian-wetland area is considered to be in proper functioning condition when adequate vegetation, landform, or large woody debris is present to:

- dissipate stream energy associated with high waterflow, thereby reducing erosion and improving water quality;
- filter sediment, capture bedload, and aid floodplain development;
- improve flood-water retention and ground-water recharge;
- develop root masses that stabilize streambanks against cutting action;
- develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses;
- support greater biodiversity.

Proposed critical habitat. Those areas officially proposed for designations as critical habitat by the Secretary of Interior or Commerce.

Proposed species. A species for which a proposed rule to add the species to the federal list of threatened and endangered species has been published in the Federal Register.

Public land. Land or interest in land owned by the US and administered by the Secretary of the Interior through the BLM without regard to how the US acquired ownership, except lands located on the Outer Continental Shelf and land held for the benefit of Indians, Aleuts, and Eskimos (H-1601-1, BLM Land Use Planning Handbook).

Public water supply. As defined by the state of Colorado, a “public water system” is a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has a least fifteen service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year.

Pyroclastic. Fragments of rocks formed during volcanic eruptions or aerial expulsion from a volcanic vent.

Range improvement project. An authorized physical modification or treatment which is designed to improve production of forage; change vegetation composition; control patterns of use; provide water; stabilize soil and water conditions; restore, protect and improve the condition of rangeland ecosystems to benefit livestock, wild horses and burros, and fish and wildlife. This definition includes, but is not limited to: structures, treatment projects and use of mechanical devices, or modifications achieved through mechanical means.

Rapid response. A systematic effort to eradicate, contain or control invasive species while the infestation is still localized. It may be implemented in response to new introductions or to isolated infestations of a previously established, nonnative organism. Preliminary assessment and subsequent monitoring may be part of the response. It is based on a system and infrastructure, organized in advance so that the response is rapid and efficient.

Raptor. Bird of prey with sharp talons and strongly curved beaks, such as hawks, owls, falcons, and eagles.

Rare vegetation. Unique combinations of plant species as identified by terminology and a classification system from the Colorado Natural Heritage Program (CNHP). These are defined using CNHP's Global Rarity Ranks denoting scarcity on a global level and include the rankings of G1 and G2.

Reasonable foreseeable development scenario. The prediction of the type and amount of oil and gas activity that would occur in a given area. The prediction is based on geologic factors, past history of drilling, projected demand for oil and gas, and industry interest.

Recharge areas. Headwaters of perennial streams, contributing watersheds to springs and/or seeps, floodplains, all stream channels, municipal watersheds, and source water protection areas.

Reclamation. Returning disturbed lands to a form and productivity that will be ecologically balanced and in conformity with a predetermined land management plan.

Recreation management area. Includes special recreation management areas (SRMAs) and extensive recreation management areas (ERMAs); see SRMA and ERMA definitions.

Recreational river. Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

Recreational mining. Engaging in mining activities for hobby, sport, or recreation. Recreational activities undertaken using different types of mining equipment. Also referred to as "casual mining," "recreational panning," "recreational gold panning," and "recreational mineral prospecting."

Recreation and Public Purposes Act of 1926. Provides for the lease and sale of public lands determined valuable for public purposes. The objective of the R&PP Act is to meet the needs of state and local government agencies and nonprofit organizations by leasing or conveying public land required for recreation and public purpose uses. Examples of uses made of R&PP lands are parks and greenbelts, sanitary landfills, schools, religious facilities, and camps for youth groups. The act provides substantial cost-benefits for land acquisition and provides for recreation facilities or historical monuments at no cost.

Recreation experiences. Psychological outcomes realized either by recreation-tourism participants as a direct result of their on-site leisure engagements and recreation-tourism activity participation or by nonparticipating community residents as a result of their interaction

with visitors and guests within their community or interaction with the BLM and other public and private recreation-tourism providers and their actions.

Recreation management zones. Subunits within an SRMA managed for distinctly different recreation products. Recreation products are composed of recreation opportunities, the natural resource and community settings within which they occur, and the administrative and service environment created by all affecting recreation-tourism providers, within which recreation participation occurs.

Recreation niche. The place or position within the strategically targeted recreation-tourism market for each SRMA that is most suitable (i.e., capable of producing certain specific kinds of recreation opportunities) and appropriate (i.e., most responsive to identified visitor or resident customers), given available supply and current demand, for the production of specific recreation opportunities and the sustainable maintenance of accompanying natural resource or community setting character.

Recreation opportunities. Favorable circumstances enabling visitors' engagement in a leisure activity to realize immediate psychological experiences and attain more lasting, value-added beneficial outcomes.

Recreation opportunity spectrum. One of the existing tools for classifying recreation environments (existing and desired) along a continuum, ranging from primitive, low-use, and inconspicuous administration to urban, high-use, and a highly visible administrative presence. This continuum recognizes variation among various components of any landscape's physical, social, and administrative attributes. Resulting descriptions of existing conditions and prescriptions of desired future conditions define recreation setting character.

Recreation setting character conditions. The distinguishing recreational qualities of any landscape, objectively defined along a continuum, ranging from primitive to urban landscapes, expressed in terms of the nature of the component parts of its physical, social, and administrative attributes. These recreational qualities can be both classified and mapped. This classification and mapping process should be based on variation that either exists (for example, setting descriptions) or is desired (for example, setting prescriptions) among component parts of the various physical, social, and administrative attributes of any landscape. The recreation opportunity spectrum is one of the tools for doing this.

Recreation settings. The collective distinguishing attributes of landscapes that influence and sometimes actually determine what kinds of recreation opportunities are produced.

Recreation use permits. Authorizations for use of developed facilities that meet the fee criteria established by the Land and Water Conservation Fund Act of 1964, as amended or subsequent authority (such as the pilot fee demonstration program). Recreation Use Permits are issued to ensure that US residents receive a fair and equitable return for the use of those facilities to help recover the cost of construction, operation, maintenance, and management of the permits.

Rehabilitate. Returning disturbed lands as near to its predisturbed condition as is reasonably practical or as specified in approved permits.

Renewable Energy. Energy resources that constantly renew themselves or that are regarded as practically inexhaustible. These include solar, wind, geothermal, hydro, and biomass. Although particular geothermal formations can be depleted, the natural heat in the Earth is a virtually inexhaustible reserve of potential energy.

Research Natural Area. A land management status which reserves the area for uses that are compatible with the resource of interest and research for which the area was designated.

Resource Advisory Council. A council established by the Secretary of the Interior to provide advice or recommendations to BLM management. The Southwest Colorado RAC covers issues within the UFO.

Resource management plan (RMP). A land use plan as prescribed by the Federal Land Policy and Management Act that establishes, for a given area of land, land-use allocations, coordination guidelines for multiple-use, objectives, and actions to be achieved.

Resources, qualities, and values. 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 of 1968 (Public Law 90-543) (see *associated settings*).

Restore/restoration. The process of returning disturbed areas to a natural array of native plant and animal associations.

Rest rotation. A grazing rotation strategy that normally involves a multi-pasture system, where one pasture is given 12 months of nonuse each year, while the remaining pastures absorb all the grazing use. This grazing strategy can provide periodic rest for all pastures in the rotation system, or for pastures that have been identified as needing rest for resource reasons.

Retard. Measurably slow attainment of any identified objective level that is worse than the objective standard. Degradation of the physical/biological process or conditions that determine objective standards would be considered to retard attainment of specific objective standard.

Revegetate/revegetation. The process of putting vegetation back in an area where vegetation previously existed, which may or may not simulate natural conditions.

Revision. The process of completely rewriting the land use plan due to changes in the planning area affecting major portions of the plan or the entire plan.

Right-of-way (ROW). Public lands authorized to be used or occupied for specific purposes pursuant to a right-of-way grant, which are in the public interest and which require ROWs over, on, under, or through such lands.

Right-of-way avoidance area. An area identified through resource management planning to be avoided but may be available for ROW location with special stipulations. A ROW avoidance area is comparable to the SSR restriction applied to other resources.

Right-of-way exclusion area. An area identified through resource management planning that is not available for ROW location under any conditions. A ROW exclusion area is comparable to the NGD stipulation applied to other resources.

Riparian/aquatic system. Interacting system between aquatic and terrestrial situations. Identified by a stream channel and distinctive vegetation that requires or tolerates free or unbound water.

Riparian area. A form of wetland transition between permanently saturated wetlands and upland areas. Riparian areas exhibit vegetation or physical characteristics that reflect the influence of permanent surface or subsurface water. Typical riparian areas include lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels. Excluded are ephemeral streams or washes that lack vegetation and depend on free water in the soil.

Riparian zone. An area one-quarter mile wide encompassing riparian and adjacent vegetation.

Road. A linear route declared a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use.

Roadless. The absence of roads that have been constructed and maintained by mechanical means to ensure regular and continuous use.

Rock art. Petroglyphs (carvings) or pictographs (painting) used by native persons to depict their history and culture.

Rotation. Grazing rotation between pastures in the allotment for the permitted time.

Routes. Multiple roads, trails and primitive roads; a group or set of roads, trails, and primitive roads that represents less than 100 percent of the BLM transportation system. Generically, components of the transportation system are described as “routes.”

Sale (public land). A method of land disposal pursuant to Section 203 of FLPMA, whereby the US receives a fair-market payment for the transfer of land from federal ownership. Public lands determined suitable for sale are offered on the initiative of the BLM. Lands suitable for sale must be identified in the RMP. Any lands to be disposed of by sale that are not identified in the current RMP, or that meet the disposal criteria identified in the RMP, require a plan amendment before a sale can occur.

Salinity. Refers to the solids such as sodium chloride (table salt) and alkali metals that are dissolved in water.

Saturated soils. Occur when the infiltration capacity of the soil is exceeded from above due to rainfall or snowmelt runoff. Soils can also become saturated from groundwater inputs.

Scenic byways. Highway routes that have roadsides or corridors of special aesthetic, cultural, or historical value. An essential part of the highway is its scenic corridor. The corridor may contain outstanding scenic vistas, unusual geologic features, or other natural elements.

Scenic river. A river or section of a river that is free of impoundments and whose shorelines are largely undeveloped but accessible in places by roads.

Scoping process. An early and open public participation process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action.

Season of use. The time during which livestock grazing is permitted on a given range area, as specified in the grazing lease.

Seeding. Seeding is a vegetation treatment that includes the application of grass, forb, or shrub seed, either aerially or from the ground. In areas of gentle terrain, ground applications of seed are often accomplished with a rangeland drill. Seeding allows the establishment of native species or placeholder species and restoration of disturbed areas to a perennial-dominated cover type, thereby decreasing the risk of subsequent invasion by exotic plant species. Seeding would be used primarily as a follow-up treatment in areas where disturbance or the previously described treatments have removed exotic plant species and their residue.

Setting character. The condition of any recreation system, objectively defined along a continuum, ranging from primitive to urban in terms of variation of its component physical, social, and administrative attributes.

Severe winter range. That part of the overall range where 90 percent of the individuals are located when the annual snowpack is at its maximum and/or temperatures are at a minimum in the two worst winters out of ten. Severe winter range is defined for each Colorado Division of Wildlife Data Analysis Unit.

Short-term effect. The effect occurs only during or immediately after implementation of the alternative.

Significant fossils. Any vertebrate fossil remains or site with fossils of exceptional preservation or context.

Site-specific relocation (SSR). An SSR restriction is similar to a CSU restriction in that it allows some use and occupancy of public land while protecting identified resources or values. SSR areas are potentially open to surface-disturbing activities but the restriction allows the BLM to require special constraints, or the activity can be shifted to protect the specified resource or value. Activities that are not considered surface disturbing include, but are not limited to, livestock grazing, cross-country hiking or equestrian use, installing signs, minimum impact filming, vehicular travel on designated routes, and general use of the and by wildlife. Right-of-way location authorizations are not subject to the SSR restriction because it is constrained in other ways. The action may be subject to TL stipulations.

Slash. Downed vegetation.

Sole-source aquifer. Defined by the US EPA as an aquifer supplying at least 50 percent of the drinking water consumed in the area overlying the aquifer, where the surrounding area has no alternative drinking water source(s) that could physically, legally, and economically supply all those who depend upon the aquifer for drinking water.

Solitude. The state of being alone or remote from habitations; isolation. A lonely or secluded place. Factors contributing to opportunities for solitude may include size, natural screening, topographic relief, vistas, physiographic variety, and the ability of the user to find a secluded spot.

Source water protection area. The area delineated by a state for a public water supply or including numerous suppliers, whether the source is ground water or surface water or both.

Special recreation management area (SRMA). An administrative public lands unit identified in land use plans 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.

Special recreation permit (SRP). Authorization that allows for recreational uses of public lands and related waters. Issued as a means to control visitor use, protect recreational and natural resources, and provide for the health and safety of visitors. Commercial SRPs are also issued as a mechanism to provide a fair return for the commercial use of public lands.

Special status species. BLM special status species are: (1) species listed, candidate, or proposed for listing under the ESA; and (2) species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA that are designated as BLM sensitive by the BLM State Director(s). All federally listed candidate species, proposed species, and delisted species in the five years following delisting are conserved as BLM sensitive species.

Split estate. Lands on which the mineral estate is owned by someone other than the surface estate owner. For example, the surface is in private ownership and the mineral resources are publicly held and managed by the federal government.

Split season. Removing livestock from the allotment and returning them later in the year within the permitted time.

Sport fish. See “game fish” definition.

Stabilize. The process of stopping further damage from occurring.

Standard. A description of the physical and biological conditions or degree of function required for healthy, sustainable lands (e.g., land health standards). To be expressed as a desired outcome (goal).

Standard lease terms and conditions. Areas may be open to leasing with no specific management decisions defined in a Resource Management Plan; however, these areas are

subject to lease terms and conditions as defined on the lease form (Form 3100-11, Offer to Lease and Lease for Oil and Gas; and Form 3200-24, Offer to Lease and Lease for Geothermal Resources).

State-listed noxious weed species. Noxious weed species listed by the State of Colorado:

- List A species are designated by the Commissioner for eradication.
- List B weed species are species for which the Commissioner, in consultation with the state noxious weed advisory committee, local governments, and other interested parties, develops and implements state noxious weed management plans designed to stop the continued spread of these species.
- List C weed species are species for which the Commissioner, in consultation with the state noxious weed advisory committee, local governments, and other interested parties, will develop and implement state noxious weed management plans designed to support the efforts of local governing bodies to facilitate more effective integrated weed management on private and public lands. The goal of such plans will not be to stop the continued spread of these species but to provide additional education, research, and biological control resources to jurisdictions that choose to require management of List C species.

State implementation plan. A detailed description of the programs a state will use to carry out its responsibilities under the Clean Air Act. State implementation plans are collections of the regulations used by a state to reduce air pollution.

Stationary source. Refers to a stationary source of emissions. Prevention of Significant Deterioration permits are required for major new stationary sources of emissions that emit 100 tons or more per year of carbon monoxide, sulphur dioxide, nitrogen dioxide, ozone, or particulate matter.

Stipulation (general). A term or condition in an agreement or contract.

Stipulation (oil and gas). A provision that modifies standard oil and gas lease terms and conditions in order to protect other resource values or land uses and is attached to and made a part of the lease. Typical lease stipulations include No Surface Occupancy (NSO), Timing Limitations (TL), and Controlled Surface Use (CSU). Lease stipulations are developed through the land use planning (RMP) process.

Streamside management zone. Land adjacent to a waterbody where activities on land are likely to affect water quality.

Substantial interference. Determination that an activity or use affects (hinders or obstructs) the nature and purposes of a designated National Trail (see nature and purposes).

Suitable river. An eligible river segment found through administrative study to meet the criteria for designation as a component of the National System, as specified in Section 4(a) of

the Wild and Scenic Rivers Act (BLM Manual 6400, Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, Planning, and Management).

Surface-disturbing activities. Surface-disturbing activities are those that normally result in more than negligible (immeasurable, not readily noticeable) disturbance to vegetation and soils on public lands and accelerate the natural erosive process. Surface disturbances could require reclamation and normally involve use and/or occupancy of the surface, causing disturbance to soils and vegetation. They include, but are not limited to: the use of mechanized earth-moving equipment; truck-mounted drilling, stationary drill rigs in unison, and geophysical exploration equipment off designated routes; off-road vehicle travel in areas designated as limited or closed to off-road vehicle use; construction of facilities such as range facilities and/or improvements, power lines, pipelines, oil and gas wells and/or pads; recreation sites; new road and trail construction; and use of pyrotechnics and explosives. Surface disturbance is not normally caused by casual-use activities. Activities that are not considered surface-disturbing include, but are not limited to, livestock grazing, cross-country hiking or equestrian use, dispersed camping, installing signs, minimum impact filming, vehicular travel on designated routes, and general use of the land by wildlife.

Sustained yield. The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the public lands consistent with multiple uses.

Terrestrial. Living or growing in or on the land.

Threatened species. Any species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range (BLM Manual 6840, Special Status Species Management). Under the ESA in the US, “threatened” is the lesser-protected of the two categories. Designation as threatened (or endangered) is determined by USFWS as directed by the ESA.

Timber. Standing trees, downed trees, or logs which are capable of being measured in board feet.

Timing Limitation (TL). The TL stipulation, a moderate constraint, is applicable to fluid mineral leasing, all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, construction of wells and/or pads), and other surface-disturbing activities (i.e., those not related to fluid mineral leasing). Areas identified for TL are closed to fluid mineral exploration and development, surface-disturbing activities, and intensive human activity during identified time frames. This stipulation does not apply to operation and basic maintenance activities, including associated vehicle travel, unless otherwise specified. Construction, drilling, completions, and other operations considered to be intensive in nature are not allowed. Intensive maintenance, such as workovers on wells, is not permitted. TLs can overlap spatially with NSO, NGD, CSU, SSR, as well as with areas that have no other restrictions. Administrative activities are allowed at the discretion of the Authorized Officer.

Total dissolved solids. Salt, or an aggregate of carbonates, bicarbonates, chlorides, sulfates, phosphates, and nitrates of calcium, magnesium, manganese, sodium, potassium, and other cations that form salts.

Total maximum daily load. An estimate of the total quantity of pollutants (from all sources: point, nonpoint, and natural) that may be allowed into waters without exceeding applicable water quality criteria.

Traditional cultural properties. A property that derives significance from traditional values associated with it by a social or cultural group, such as an Indian tribe or local community. A traditional cultural property may qualify for the National Register of Historic Places if it meets the criteria and criteria exceptions at 36 CFR 60.4 (see National Register Bulletin 38).

Traditional use. Longstanding, socially conveyed, customary patterns of thought, cultural expression, and behavior, such as religious beliefs and practices, social customs, and land or resource uses. Traditions are shared generally within a social and/or cultural group and span generations. Usually traditional uses are reserved rights resulting from treaty and/or agreements with Native American groups.

Trail. A linear route managed for human-power (e.g., hiking or bicycling), stock (e.g., equestrian), or off-highway vehicle forms of transportation or for historical or heritage values. Trails are not generally managed for use by four-wheel drive or high-clearance vehicles.

Transmission. The movement or transfer of electric energy over an interconnected group of lines and associated equipment between points of supply and points at which it is transformed for delivery to consumers, or is delivered to other electric systems. Transmission is considered to end when the energy is transformed for distribution to the consumer.

Transportation linear features. “Linear features” represents the broadest category of physical disturbance (planned and unplanned) on BLM land. Transportation related linear features include engineered roads and trails, as well as user-defined, non-engineered roads and trails created as a result of the public use of BLM land. Linear features may include roads and trails identified for closure or removal as well as those that make up the BLM’s defined transportation system.

Transportation system. The sum of the BLM’s recognized inventory of linear features (roads, primitive roads, and trails) formally recognized, designated, and approved as part of the BLM’s transportation system.

Travel management areas. Polygons or delineated areas where a rational approach has been taken to classify areas open, closed or limited, and have identified and/or designated a network of roads, trails, ways, landing strips, and other routes that provide for public access and travel across the planning area. All designated travel routes within travel management areas should have a clearly identified need and purpose as well as clearly defined activity types, modes of travel, and seasons or timeframes for allowable access or other limitations (BLM Handbook H-1601-I Land Use Planning Handbook).

Trespass. Any unauthorized use of public land.

Tribal interests. Native American or Native Alaskan economic rights such as Indian trust assets, resource uses and access guaranteed by treaty rights, and subsistence uses.

Tuff. A pyroclastic volcanic rock composed of ash-sized fragments.

Unallotted. Lands that currently are not committed to livestock grazing use.

Understory. That portion of a plant community growing underneath the taller plants on the site.

Upland game birds. Non-waterfowl game birds usually hunted with pointing breed, flushing spaniels, and retrievers. Upland game birds include grouse, chukar, quail, snipe, doves, pigeons, ptarmigan, and wild turkey.

Utility corridor. Tract of land varying in width forming passageway through which various commodities such as oil, gas, and electricity are transported.

Valid existing rights. Documented, legal rights or interests in the land that allow a person or entity to use said land for a specific purpose and that are still in effect. Such rights include but are not limited to fee title ownership, mineral rights, rights-of-way, easements, permits, and licenses. Such rights may have been reserved, acquired, leased, granted, permitted, or otherwise authorized over time.

Vegetation manipulation. Planned alteration of vegetation communities through use of mechanical, chemical, seeding, and/or prescribed fire or managed fire to achieve desired resource objectives.

Vegetation structure. The stage of plant community development, encompassing age of stand, height of vegetation, and spatial distribution of plants.

Vegetation treatments. Management practices which change the vegetation structure to a different stage of development. Vegetation treatment methods include managed fire, prescribed fire, chemical, mechanical, and seeding.

Vegetation type. A plant community with immediately distinguishable characteristics based upon and named after the apparent dominant plant species.

Vertebrate. An animal having a backbone or spinal column. Includes jawless fishes, bony fishes, sharks and rays, amphibians, reptiles, mammals, and birds.

Viewshed. The panorama from a given viewpoint that encompasses the visual landscape, including everything visible within a 360-degree radius.

Visibility (air quality). A measure of the ability to see and identify objects at different distances.

Visitor day. Twelve visitor hours that may be aggregated by one or more persons in single or multiple visits.

Visitor use. Visitor use of a resource for inspiration, stimulation, solitude, relaxation, education, pleasure, or satisfaction.

Visual resource management (VRM). The inventory and planning actions taken to identify visual resource values and to establish objectives for managing those values, and the management actions taken to achieve the visual resource management objectives.

Visual resource management classes. Define the degree of acceptable visual change within a characteristic landscape. A class is based on the physical and sociological characteristics of any given homogeneous area and serves as a management objective. Categories assigned to public lands are based on scenic quality, sensitivity level, and distance zones. Each class has an objective that prescribes the amount of change allowed in the characteristic landscape (from H-1601-1, BLM Land Use Planning Handbook).

The four classes are described below:

- **Class I** provides for natural ecological changes only. This class includes primitive areas, some natural areas, some wild and scenic rivers, and other similar areas where landscape modification activities should be restricted.
- **Class II** areas are those areas where changes in any of the basic elements (form, line, color, or texture) caused by management activity should not be evident in the characteristic landscape.
- **Class III** includes areas where changes in the basic elements (form, line, color, or texture) caused by a management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.
- **Class IV** applies to areas where changes may subordinate the original composition and character; however, they should reflect what could be a natural occurrence within the characteristic landscape.

Visual resources. The visible physical features on a landscape, (topography, water, vegetation, animals, structures, and other features) that comprise the scenery of the area.

Visual sensitivity. Visual sensitivity levels are a measure of public concern for scenic quality and existing or proposed visual change.

Volatile organic compounds. Chemicals that produce vapors readily at room temperature and at normal atmospheric pressure. Volatile organic compounds include gasoline, industrial chemicals such as benzene, solvents such as toluene and xylene, and tetrachloroethylene (perchloroethylene, the principal dry cleaning solvent).

Waiver. A permanent exemption from a lease stipulation. The stipulation no longer applies anywhere within the leasehold.

Water body. An area of open, standing water. Includes ponds and lakes.

Watershed. Topographical region or area delineated by water draining to a particular watercourse or body of water.

Watershed condition indicators. An integrated suite of aquatic, riparian, and hydrologic condition measures that are intended to be used at the watershed scale.

Way. Roadlike feature used by vehicles having four or more wheels but not declared a road by the owner and which receives no maintenance to guarantee regular and continuous use.

Wild and scenic study river. Rivers identified in Section 5 of the Wild and Scenic Rivers Act of 1968 for study as potential additions to the National Wild and Scenic Rivers System. The rivers will be studied under the provisions of Section 4 of the act (BLM Manual 6400, Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, Planning, and Management).

Wilderness. A congressionally designated area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, that is protected and managed to preserve its natural conditions and that (1) generally appears to have been affected mainly by the forces of nature, with human imprints substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres or is large enough to make practical its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historic value. The definition is contained in Section 2(c) of the Wilderness Act of 1964 (78 Stat. 891).

Wilderness characteristics. Wilderness characteristics attributes include the area's size, its apparent naturalness, and outstanding opportunities for solitude or a primitive and unconfined type of recreation. They may also include supplemental values. Lands with wilderness characteristics are those lands that have been inventoried and determined by the BLM to contain wilderness characteristics as defined in section 2(c) of the Wilderness Act.

Wilderness inventory road. Any route outside of WSAs, designated wilderness and the Tabeguache Area that has been improved and maintained by mechanical means to insure relatively regular and continuous use (BLM Manual 6310 – Conducting Wilderness Characteristics Inventory on BLM Lands).

Wilderness Study Area (WSA). A designation made through the land use planning process of a roadless area found to have wilderness characteristics, as described in Section 2(c) of the Wilderness Act of 1964.

Wilderness Study Area (WSA) Ways. Existing vehicle routes identified during the BLM's original wilderness inventory; does not include illegal routes created in the interim. The miles of motorized routes in WSAs are only conditionally open to vehicle use. If use and/or non-compliance are found through monitoring efforts to impair the area's suitability for wilderness designation, the BLM would take further action to limit use of the routes or would close them.

The continued use of these routes, therefore, is based on user compliance and non-impairment of wilderness values.

Wildland fire. Wildland fire is a general term describing any non-structure fire that occurs in the wildland. Wildland fires are categorized into two distinct types:

- Wildfires: Unplanned ignitions or prescribed fires that are declared wildfires.
- Prescribed fires: Planned ignitions.

Wildland fire use. *A term no longer used; the new terminology is “managed fire” (see “managed fire” definition).* A vegetation treatment that involves taking advantage of a naturally-ignited wildland fire in an area where fire would benefit resources. Wildland fire use would be conducted in specific areas needing treatment after a site-specific plan and NEPA analysis are completed and only if predetermined prescriptive parameters (e.g., weather/fire behavior) can be met. Until this planning and NEPA analysis are accomplished, wildland fires would be suppressed using an appropriate management response.

Wildland-urban interface (WUI): The line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

Wild river. Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and unpolluted. These represent vestiges of primitive America.

Winter concentration area: That part of winter range where densities are at least 200 percent greater than the surrounding winter range density during the same period used to define winter range in the average five winters out of ten. Winter concentration areas are defined for each Colorado Division of Wildlife Data Analysis Unit.

Withdrawal. An action that restricts the use of public land and segregates the land from the operation of some or all of the public land and mineral laws. Withdrawals are also used to transfer jurisdiction of management of public lands to other federal agencies.

Wood product sales/harvest. Any wood-collection activity other than incidental use involving the severance and/or removal of any vegetative material for personal use requiring a permit or commercial use requiring a contract.

Xeroriparian area. An area or vegetative community that exists in arid environments and is characterized by dry washes exposed to only intermittent flows of water (ephemeral streams) associated with discrete precipitation events.

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