

# CHAPTER 4—ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED KANAB RESOURCE MANAGEMENT PLAN

## 4.1 INTRODUCTION

This chapter evaluates potential environmental impacts that could occur from implementing the Proposed Resource Management Plan (RMP) described in Chapter 2. Potential impacts considered in this chapter include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, and health impacts (40 Code of Federal Regulations [CFR] 1508.8). The baseline used to determine the potential impacts is the current resource condition described in Chapter 3.

### 4.1.1 Organization of Chapter 4

The impact analysis is organized by resource program and discloses the potential impacts on each resource program from implementing the Proposed RMP. Although a resource or resource use is not specifically identified, the impacts from these are discussed. For example, vegetation treatments are proposed under soil resources, water resources, vegetation, and livestock grazing management decisions; however, the impacts from vegetation treatments are referred to collectively. Similarly, in the alternatives, restrictions are placed on oil and gas leasing by a number of resources, such as areas of environmental concern (ACEC), non-Wilderness Study Area (WSA) lands with wilderness characteristics, special status species, and fish and wildlife resources. However, where possible, the impacts that would result from these restrictions are grouped and addressed collectively.

The introductory section of each resource program establishes the scope of the analysis, describes the general types of impacts discussed in the analysis, and presents the assumptions associated with that resource program that were used throughout the analysis. Impacts on each resource program from implementing the Proposed RMP are grouped by impact type. Following analysis of each resource, a summary of the impacts from the Proposed RMP is presented, as well as disclosure of potential irreversible and irretrievable commitment of resources, unavoidable impacts, and the relationship between local, short-term uses and long-term productivity. The chapter concludes with a discussion of cumulative impacts, organized by resource program.

### 4.1.2 Types of Impacts

The following analysis focuses on identifying types of impacts and estimating their potential effects on the resources, resource uses, special designations, and support programs. This chapter uses the terms *impacts* and *effects* interchangeably and the terms *increase* and *decrease* for comparison purposes. The terms used to describe impacts are presented in Table 4-1. Cumulative impacts and methodologies used in the cumulative analysis are discussed in Section 4.6.

**Table 4-1. Types of Impacts**

Type	Description
Direct Impacts	Effects that are caused by the action and occur at the same time and place. Examples include elimination of original land use through erection of a structure. Direct impacts may cause indirect impacts, such as ground disturbance resulting in suspension of dust.

Type	Description
Indirect Impacts	Effects that are caused by the action but occur later in time or are farther removed in distance, yet are still reasonably foreseeable and related to the action by a chain of cause and effect. Indirect impacts may reach beyond the natural and physical environment (e.g., environmental impact) to include growth-inducing effects and other effects related to induced changes in resource users (e.g., social impact).
Cumulative Impacts	Effects that result from the incremental impact of the action when it is added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions that take place over time.

This analysis considers the context, intensity, and duration of an impact. *Context* relates to environmental circumstances at the location of the impact and in the immediate vicinity, affected interests, and the locality. *Intensity* refers to the severity or extent of the impact or magnitude of change from existing conditions. *Duration* refers to the permanence and longevity of the impacts, which is described as short term or long term. *Short term* is defined as anticipated to end within the first 5 years after the action is implemented. *Long term* is defined as lasting more than 5 years after the action is implemented, or beyond the planning time frame addressed in the RMP.

For ease of reading, impacts presented are direct, broad (occurring within the decision area), and long term, unless otherwise noted as indirect, localized, or short term/temporary. Potential significant impacts are also identified in the impact analysis. Because an impact may be perceived as beneficial or adverse, these terms are not used in defining impacts.

### 4.1.3 General Analytical Assumptions

Several assumptions were made in the analysis regarding level of land use activity, resource condition, and relationships between resources. Potential impacts and their significance were determined based on these assumptions. The following general assumptions were used in the analysis; additional assumptions are presented under each resource topic, but apply to the analysis as a whole:

- Management actions proposed in the Proposed RMP apply to public lands only.
- The impact analysis applies only to the decision area; however, the cumulative impact analyses consider potential actions on affected resources/uses regardless of ownership and administration and beyond the planning area boundaries.
- The alternatives would be implemented over the life of the plan in accordance with laws, regulations, and standard management guidelines.
- Funding would be available to fully monitor and implement the management actions.
- BLM policies, including *Standards for Rangeland Health* and *Guidelines for Grazing Management for BLM Lands in Utah* (Standards and Guidelines), would be applied as appropriate. These would assess rangeland health and provide strategies to achieve desired resource conditions and management objectives.
- Best management practices (BMP) are tools that would minimize or mitigate site-specific impacts on resources and would be applied and adjusted on a case-by-case basis.
- Mitigation requirements would prevent or limit direct impacts associated with land use activities or would reclaim the land after the activity has been completed.
- Projected levels of activity for land use would change based on historical trends, existing land use authorizations such as leases or permits, and statements of interest in land use by individuals and industry organizations.
- Public land users would comply with the decisions and allocations contained in the alternatives.

- Actions associated with emergencies or public safety would be performed at the discretion of the Authorized Officer.
- All acreages and percentages presented in this chapter pertain to the entire decision area unless otherwise stated.

#### 4.1.4 Determining Significance of Impacts

Determining the significance of impacts is complex, particularly at the RMP planning level. The significance of a resource or impact is dynamic and may change during the planning period. Significance can be real and supportable by fact, or perceived and perhaps not fully supportable even with rigorous study. For this analysis, the approach to establishing significance was based on legal issues, public perception, and professional judgment. The significance of the impacts of implementation-level decisions will be determined on the basis of more site-specific analysis and further consideration of the context and intensity of impacts, as explained in the Council on Environmental Quality's (CEQ) Significance Criteria found at 40 CFR 1508.27.

#### 4.1.5 Critical Elements

The BLM *National Environmental Policy Act Handbook* (H-1790-1) requires that all environmental impact statements (EIS) address certain topics, which the BLM refers to as Critical Elements of the Human Environment. The list of critical elements in the BLM handbook has been expanded by BLM Instruction Memoranda (IM) and by Executive Orders (EO). These elements are presented in Table 4-2 in the order in which they appear in Chapters 3 and 4, followed by corresponding Relevant Authorities and the status of the critical element in this document.

**Table 4-2. Critical Elements**

Critical Element	Relevant Authority	Status
Air Quality	The Clean Air Act as amended (42 United States Code [U.S.C.] 7401 <i>et seq.</i> )	Addressed in its own section
Farm Lands (prime or unique)	Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 <i>et seq.</i> )	As noted in the soils section in Chapter 3 of the Draft RMP/EIS, none are present in the decision area; therefore, they are not addressed in Chapter 4
Water Quality (Drinking/Ground) <sup>1</sup>	Safe Drinking Water Act, as amended (42 U.S.C. 300f <i>et seq.</i> ) Clean Water Act of 1977 (33 U.S.C. 1251 <i>et seq.</i> ) Colorado River Basin Salinity Control Act of 1974, as amended	Addressed in the Water Resources section
Floodplains	EO 11988, Floodplain Management	Addressed generally in the Water section (No projects or activities are proposed in the RMP that would result in diversions in or placement of permanent facilities on active floodplains of major rivers)
Wetlands/Riparian Zones	EO 11990, Protection of Wetlands	Addressed in the Vegetation section

Critical Element	Relevant Authority	Status
Invasive, Non-Native Species <sup>1</sup>	Federal Noxious Weed Act of 1974, as amended Endangered Species Act of 1973, as amended EO 13112, Invasive Species	Addressed in the Vegetation section
Threatened or Endangered Species	Endangered Species Act of 1973 as amended (16 U.S.C. 1531)	Addressed in its own section
Cultural Resources	National Historic Preservation Act as amended (16 U.S.C. 470)	Addressed in its own section
Areas of Critical Environmental Concern	Federal Land Policy and Management Act of 1976 (FLPMA) (43 U.S.C. 1701 <i>et seq.</i> )	Addressed in its own section
Wild and Scenic Rivers	Wild and Scenic Rivers Act as amended (16 U.S.C. 1271)	Addressed in its own section
Wilderness	FLPMA and Wilderness Act of 1964 (16 U.S.C. 1131 <i>et seq.</i> )	Addressed in its own section
Environmental Justice <sup>1</sup>	EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	Addressed in the Social and Economic section
Native American Religious Concerns	American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996) EO 13007, Indian Sacred Sites	Addressed in the Social and Economic and Cultural Resource sections
Wastes (Hazardous or Solid)	Resource Conservation and Recovery Act of 1976 (42 U.S.C. 6901 <i>et seq.</i> ) Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended (42 U.S.C. 9615)	Addressed in the Social and Economic section
<sup>1</sup> Critical element added by Interim Guidance—Changes to the List of Critical Elements of the Human Environment (IM-1999-178) in the <i>BLM National Environmental Policy Act Handbook</i>		

Source: BLM H-1790-1, Appendix 5

## 4.1.6 Incomplete or Unavailable Information

CEQ regulations implementing the National Environmental Policy Act (NEPA) require agencies evaluating effects on the human environment in an EIS to identify incomplete or unavailable information, if that information is essential to a reasoned choice among alternatives (43 CFR 1502.22).

As is typical in programmatic planning efforts, site-specific data is used to the extent possible and may not be entirely available; however, this data is not essential for a reasoned choice among alternatives. The best available information pertinent to management actions was used to develop this Proposed RMP/Final EIS. Considerable effort has been made to acquire and convert resource data—from both BLM and outside sources—into digital format for use in the plan. However, certain information was unavailable for use in developing this plan, usually because inventories have not been conducted or are not complete. For these resources, estimates were made regarding the number, type, and significance of these resources based on previous surveys and existing knowledge. Some of the major types of unavailable data include the following:

- Air quality baseline data within the decision area

- Detailed soil surveys throughout the decision area (should be completed within the planning period, including characteristics to help determine fragile soil characteristics)
- Field inventories for some wildlife and special status species occurrence, condition, and trend
- Complete inventories (of the entire field office) for cultural and paleontological resources
- Native American traditional use areas
- Inventory of abandoned mines
- Direct recreation visitation based on actual use and economic expenditure data associated with such use.

In addition, some impacts cannot be quantified given the proposed management actions. Where such a gap occurs, impacts are projected in qualitative terms or, in some instances, are described as unknown. Subsequent implementation-level and project-level analysis will provide the opportunity to collect and examine site-specific inventory data required to determine appropriate application of the RMP guidance. In addition, ongoing inventory efforts by the BLM and other agencies continue to update and refine the information used to implement this plan.

Potential impacts of certain land use activities can be compared visually and numerically among the alternatives by using geographic information system (GIS) data. Due to differences in the level of detail between GIS datasets, small errors in acreage calculations and analysis overlays can occur. To reduce the potential for such errors and resulting inconsistencies within the analysis, acreage figures were rounded according to a graduated scale. As such, acreage calculations used in this analysis are approximate projections used for comparison of alternatives and analytic purposes only; they do not reflect exact measurements of on-the-ground resources and actions.

## 4.2 RESOURCES

### 4.2.1 Impacts on Air Quality

This section presents the impacts on air quality from implementation of the Proposed RMP. A qualitative emission comparison approach was selected for the Kanab RMP analysis of impacts on air quality. This approach was selected because of uncertainties about the number, nature, and specific location of future sources and activities. The emissions calculations were based on the best available engineering data and assumptions; air, visibility, and emission inventory procedures; and professional and scientific judgment. However, assumptions were used when specific data or procedures were unavailable. A general statement about National Ambient Air Quality Standards (NAAQS) and Utah Ambient Air Quality Standards can be made for this qualitative analysis. This emission comparison approach is defensible and provides a sound basis for comparing base year air quality emissions with those expected to be produced from the Proposed RMP.

Maximum potential near-field particulate matter (PM) emissions from traffic on unpaved roads and well pad construction were used to estimate emissions for PM<sub>2.5</sub> and PM<sub>10</sub> impacts. Maximum air pollutant emissions from each gas well would be temporary (i.e., occurring during a 12-day construction period) and would occur in isolation, without significantly interacting with adjacent well locations. PM emissions from well pad and road maintenance and construction would be minimized by applying water and/or chemical dust suppressants. The control efficiency of these dust suppressants was computed at 50 percent during construction.

For any future project, potential air quality impacts will include local, state, tribal, and federally enforced legal requirements to ensure that site-specific activities do not generate emissions that contribute to an exceedance of the NAAQS, Prevention of Significant Deterioration (PSD) increments, or other regulatory standards.

A direct relationship between emissions and visibility impairment does not exist, and so the qualitative emissions analysis cannot be used to assess potential visibility impacts on nearby Class I areas from activities within the decision area. However, implementation and compliance with the State Implementation Plan, specifically Section XVII, Visibility Protection, is expected to result in meeting visibility goals under all management alternatives. In addition, site-specific EISs and Environmental Assessments (EA) will include a quantitative visibility analysis, if warranted by the project.

The emissions inventory was developed for the decision area using calculations based on the best available information about activities on BLM land provided by the Kanab Field Office (KFO). The calculations used emissions factors that are accepted and recognized by state and federal regulatory agencies. This analysis selected two time frames to evaluate future emissions. The time frames reflect the current base year conditions and the long-term impacts. It is assumed that all, if any, increases in emissions will be constant and linear in time. The inventory time frames are:

- Current emissions (using the year 2006 as a basis)
- 20-year potential emissions for the long term (2026).

The analysis is based on the following assumptions:

- Emission factors recommended by the U.S. Environmental Protection Agency (EPA) (EPA 1995) are appropriate for all activities.

- Activity factors (i.e., the quantification of activity for each resource, such as oil and gas development, miles of routes maintained, vegetation treatments, and vehicle miles driven), including reasonably foreseeable developments (RFD), are appropriate for the base year and future time frame.
- Any anticipated recreational growth would follow growth trends for Utah over the past 10 years.
- For the qualitative analysis, only emissions from BLM-administered activities are included. (For the cumulative analysis, emissions calculated from the State of Utah are discussed.)
- Coal production will be 2 to 3 million tons per year for a total of 40 million tons over the life of the mine. Because underground coal mining does not have emission factors, surface mining factors are used (this is a conservative case assumption).
- Criteria pollutants and Hazardous Air Pollutants (HAP) are included in the calculations.
- Prescribed fire emissions are estimated using the Simple Approach Smoke Estimation Model (Sestak and Riebau 1988).

The most conservative case assumptions for air quality were used for the qualitative analysis. When a range of activity factors was assumed, the upper limit of the range was used to complete calculations for future time frames.

Emissions were calculated for the following activities: oil and gas development, lands and realty actions, livestock grazing, off-highway vehicle (OHV) use, maintenance of roads (emissions associated with exhaust and particulate matter from the operation of graders and other maintenance vehicles on unpaved roads and road shoulders), coal and salable mineral development, vegetation management, and prescribed burning. Although wildfires can occur in the decision area and may impact air quality, emissions from these sources were not included in the calculations because these are not considered human-caused sources and, unlike prescribed burns, are not under the control of the BLM.

Table 4-3 provides the base year emissions that are used to compare air quality impacts. Increase in air emissions is anticipated from the long-term BLM activities. The table is broken down by activity and shows emissions for the base year. Emissions are calculated on an annual basis (tons per year).

Using the well numbers, individual tables for all BLM activities in the decision area were calculated in linked spreadsheets. Because oil and gas field activities occur in phases (e.g., exploration, development, production, and closure), the components that must be included in emissions calculations are complex. These assumptions and calculations are available on an emissions CD. To understand the elements and assumptions used in the emissions please refer to the emissions CD, which is available from the BLM KFO. The assumptions and inputs used for each resource area are identified in the first two tabs of each major spreadsheet.

Table 4-3 summarizes the total BLM emissions, estimated for the base year (2006) and Table 4-4 summarizes the total BLM emissions for the long term (2026). The tables are broken down by activity and show emissions for the time frame referenced (e.g., base year and long term). Emissions are calculated on an annual basis (tons per year). In addition, for both the base year and the long-term time frames, emissions were calculated for each alternative.

Because this air quality analysis is qualitative, it is not possible to determine the specific impacts of resource activities on air quality. No air emissions are expected as a result of implementing the Proposed RMP for the following resources, resource uses, and designations, and therefore they are not discussed in the air quality impacts discussion: water resources, special status species, visual resources, and other designations (i.e., National Historic Trails, National Scenic Byways, State Scenic Byways, Utah Scenic Backways, and BLM Backcountry Byways).

The assessment of climate changing pollutant emissions and climate change is in its formative phase; therefore, it is not yet possible to know with confidence the net impact to climate. However, the Intergovernmental Panel on Climate Change (IPCC 2007) recently concluded that “warming of the climate system is unequivocal” and “most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic [man-made] greenhouse gas concentrations.”

The lack of scientific tools designed to predict climate change on regional or local scales limits the ability to quantify potential future impacts. Currently BLM does not have an established mechanism to accurately predict the effect of resource management-level decisions from this planning effort on global climate change. However, potential impacts to air quality due to climate change are likely to be varied. For example, if global climate change results in a warmer and drier climate, increased particulate matter impacts could occur due to increased wind blown dust from drier and less stable soils. Cool season plant species’ spatial ranges are predicted to move north and to higher elevations, and extinction of endemic threatened/endangered plants may be accelerated. 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. Less snow at lower elevations would be likely to impact the timing and quantity of snowmelt, which, in turn, could impact aquatic species. In the future, as tools for predicting climate changes in a management area improve and/or changes in climate affect resources and necessitate changes in how resources are managed, BLM may be able to re-evaluate decisions made as part of this planning process and adjust management accordingly.

## **Proposed RMP**

The air quality monitoring activities, which include construction of monitoring stations and vehicular travel to service the monitoring stations, would have minimal impact on air resources. Air quality monitoring would be the responsibility of the lessee. Information obtained from monitoring likely would add to the knowledge base on which future air-related decisions would be made.

Wildland fires and prescribed fires would cause short-term emissions of PM and carbon monoxide (CO) that could be spread over large portions of the decision area depending on the size of the fire and on wind conditions. In addition, PM emissions, CO, nitrogen oxides (NO<sub>x</sub>), and hydrocarbons (which include HAPs) would result from use of heavy equipment during fire-suppression activities. Emissions would include those generated by internal combustion engines and non-vehicular emissions. The use of heavy equipment on unpaved and paved roads would cause emissions of PM, CO, NO<sub>x</sub>, and hydrocarbons.

The various construction activities authorized under lands and realty for rights-of-way (ROW) (e.g., powerlines, communication sites, transmission lines, pipelines projects) produce PM emissions. Soil disturbing activities, including grading, bulldozing, trench digging, and travel on unpaved roads, are considered the main causes of the emissions. Exhausts from vehicular travel and emissions from equipment use also would occur.

Livestock grazing and support of grazing activities, which includes trucking livestock into and out of the decision area and checking livestock range improvements and fences, generate both vehicular exhausts and dust. These emissions are also produced by construction activities and travel on unpaved and paved roads.

Air emissions would be produced during all phases of oil and gas development, including exploration, well development, production, and well and road reclamation. Emissions of PM, CO, NO<sub>x</sub>, sulfur dioxide (SO<sub>2</sub>), and hydrocarbons (including HAPs) would occur during exploration and development from traffic on unpaved and paved roads and during well development and completion from well flaring and

associated emissions. Also, during well development, drilling and construction activities using heavy equipment would cause PM emissions and gaseous emissions. Air emissions are probable during gas production. Emissions of NO<sub>x</sub> and CO from compression activities (burning of natural gas) would occur. PM, CO, NO<sub>x</sub>, and hydrocarbon emissions (volatile organic compounds [VOC]) would be produced from any glycol operations and flashing. Any flaring would cause PM, CO, NO<sub>x</sub>, SO<sub>2</sub>, and hydrocarbon emissions (including HAPs). During well abandonment and road closure, PM emissions would be caused by travel on unpaved roads and demolition activities.

Air emissions would be produced during mining operations and reclamation activities. During coal and salable mineral mining activities, PM emissions would be produced from overburden removal, blasting, truck loading, bulldozing, grading, storage piles, and travel of heavy equipment over unpaved roads. Vehicular exhausts (CO, NO<sub>x</sub>, SO<sub>2</sub>, and hydrocarbons) would result from heavy equipment and vehicular travel.

The major recreational impact on air quality would be from use of OHVs, including all-terrain vehicles (ATV) and off-highway motorcycles. Use of this popular recreational equipment would cause fugitive PM dust emissions from traffic on unpaved trails and vehicular exhausts of PM, CO, NO<sub>x</sub>, and hydrocarbons.

Upward trends in populations within and surrounding the decision area would create the potential for long-term additional increases in emissions from many other resource management programs.

The maintenance of unpaved roads and shoulders of paved roads would cause PM emissions and emissions from vehicular exhausts. The primary source of these PM emissions is road graders.

Vegetation management and manipulation and the equipment used for these activities (e.g., fire engines and bulldozers) could cause dust from unpaved roads. Prescribed fires used for vegetation treatment could cause similar particulate and gaseous emissions as detailed in the previous discussion of emissions associated with wildland and prescribed fires. Areas receiving vegetation treatment could add short-term increases in PM until the vegetation recovers sufficiently to stabilize exposed soil.

Construction activity to manage wildlife and fish habitat would contribute PM to air emissions. To a lesser degree, CO, NO<sub>x</sub>, SO<sub>2</sub>, and hydrocarbons would be generated by vehicular exhaust. These impacts would be short term.

Because a quantitative relationship between the expected air emissions calculated above and the subsequent potential impacts on the air quality values of visibility, atmospheric deposition, or ozone are not known, it is not possible to draw any conclusions about the potential impacts expected on these air quality values. The BLM intends to make quantitative estimates required for project-specific EISs.

Emissions were calculated for all existing activities and oil and gas well development for the base year (2006) to compare the potential increase in emissions from these activities over a 20-year time horizon (2026). Table 4-3 displays a summary of total emissions estimated by the BLM for the base year (2006) broken down by activity. Emissions are calculated on an annual basis (tons per year). The total estimated emissions calculated for 2006 are 2,694 tons.

**Table 4-3. Base Year (2006) Emissions Inventory for the Decision Area (tons per year)**

Activity	PM <sub>10</sub>	PM <sub>2.5</sub>	NO <sub>x</sub>	SO <sub>2</sub>	CO	VOC	HAPs <sup>b</sup>
<b>Oil and Gas Well Development and Exploration</b>							
Oil and Gas – Construction	14	3	37	1	9	1	0

Activity	PM <sub>10</sub>	PM <sub>2.5</sub>	NO <sub>x</sub>	SO <sub>2</sub>	CO	VOC	HAPs <sup>b</sup>
Oil and Gas – Operations	7	2	23	0	21	18	2
Oil and Gas – Maintenance	0	0	0	0	0	0	0
<b>Sub-Total: Oil and Gas<sup>c</sup></b>	<b>21</b>	<b>5</b>	<b>60</b>	<b>1</b>	<b>30</b>	<b>20</b>	<b>2</b>
<b>Non-Oil and Gas Well Activities</b>							
Coal Mining	318	318	409	45	724	38	4
Lands and Realty	2	0	1	0	0	0	0
Livestock Grazing	9	1	1	0	0	0	0
Off-Highway Vehicles (OHV) <sup>a</sup>	7	7	3	-	616	225	22
Road Maintenance	0	0	0	0	0	0	0
Salable Minerals	3	0	-	-	-	-	-
Vegetation	3	1	5	1	1	0	0
Prescribed Burning	152	126					
<b>Sub-Total: Non-Oil and Gas Well Activities<sup>c</sup></b>	<b>494</b>	<b>455</b>	<b>418</b>	<b>46</b>	<b>1,342</b>	<b>263</b>	<b>26</b>
<b>Grand Total: Baseline (2006) – Existing Development<sup>c</sup></b>	<b>514</b>	<b>460</b>	<b>478</b>	<b>47</b>	<b>1,372</b>	<b>283</b>	<b>28</b>

Notes:

In December 2006 the Federal Government adopted new PM standards, which tighten the 24-hour fine particle (PM<sub>2.5</sub>) standard from 65 micrograms per cubic meter (µg/m<sup>3</sup>) to 35 µg/m<sup>3</sup> and retained the current annual fine particle standard at 15 µg/m<sup>3</sup>. The existing 24-hour PM<sub>10</sub> standard of 150 µg/m<sup>3</sup> was retained and the annual PM<sub>10</sub> standard was revoked due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution. Although the Federal Government adopted the new standards, the states have not yet engaged in rule making to adopt the new standards.

<sup>a</sup> PM<sub>2.5</sub> assumed = PM<sub>10</sub> for this activity.

<sup>b</sup> HAPs = Hazardous Air Pollutants; assumed = VOCs \* 0.1.

<sup>c</sup> Total emissions are rounded to the nearest whole number; emissions less than 1 ton per year are designated as 0.

Table 4-4 summarizes total and specific pollutant emissions for the Proposed RMP. These emissions were estimated for the base year (2006) time frame and for the long-term 20-year horizon. The total emissions for the Proposed RMP increase over time from the base year of 2,694 tons per year of pollutants to 3,554 tons per year by 2026.

Given the low ambient concentrations that exist in the decision area for some of the pollutants, it is expected that the increase in emissions of CO, NO<sub>x</sub>, SO<sub>2</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub> for the Proposed RMP would not cause any exceedance of state or federal ambient air quality standards.

**Table 4-4. Proposed RMP Long-Term (2026) Emissions Inventory for the Decision Area (tons per year)**

Activity	PM <sub>10</sub>	PM <sub>2.5</sub>	NO <sub>x</sub>	SO <sub>2</sub>	CO	VOC	HAPs <sup>b</sup>
<b>Oil and Gas Well Development and Exploration</b>							
Oil and Gas – Construction	14	3	37	1	9	1	0
Oil and Gas – Operations	12	3	28	0	23	22	2
Oil and Gas – Maintenance	1	0	0	0	0	0	0
<b>Sub-Total: Oil and Gas<sup>c</sup></b>	<b>27</b>	<b>6</b>	<b>65</b>	<b>1</b>	<b>32</b>	<b>24</b>	<b>2</b>

Activity	PM <sub>10</sub>	PM <sub>2.5</sub>	NO <sub>x</sub>	SO <sub>2</sub>	CO	VOC	HAPs <sup>b</sup>
<b>Non-Oil and Gas Well Activities</b>							
Coal Mining <sup>a</sup>	318	318	409	45	724	38	4
Lands and Realty	2	0	1	0	0	0	0
Livestock Grazing	9	1	1	0	0	0	0
Off-Highway Vehicles (OHV) <sup>a</sup>	15	15	7	-	1,223	448	45
Road Maintenance	0	0	0	0	0	0	0
Salable Minerals	3	0	-	-	-	-	-
Vegetation	3	1	5	1	1	0	0
Prescribed Burning	152	126					
<b>Sub-Total: Non-Oil and Gas Well Activities</b>	<b>501</b>	<b>462</b>	<b>422</b>	<b>46</b>	<b>1,949</b>	<b>487</b>	<b>49</b>
<b>Grand Total: Long Term (2026)<sup>c</sup></b>	<b>528</b>	<b>468</b>	<b>488</b>	<b>47</b>	<b>1,981</b>	<b>511</b>	<b>51</b>

Notes:

<sup>a</sup> PM<sub>2.5</sub> assumed = PM<sub>10</sub> for this activity.<sup>b</sup> HAPs = Hazardous Air Pollutants; assumed = VOCs \* 0.1.<sup>c</sup> Total emissions are rounded to the nearest whole number; emissions less than 1 ton per year are designated as 0.

## Summary

A qualitative emission comparison approach was selected for the air quality impact analysis. This analysis shows that under the Proposed RMP, there will be little to no impacts. The emissions calculations were based on the best available engineering data and assumptions, on air, visibility, and atmospheric deposition data, on emission inventory procedures, and on professional and scientific judgment. However, where specific data or procedures were not available, assumptions were made. There are limitations associated with this approach. However, given uncertainties about the number, nature, and specific location of future sources and activities, the emission comparison approach is defensible and provides a sound basis for comparing alternatives.

The criteria pollutants addressed in this analysis include NO<sub>2</sub>, SO<sub>2</sub>, CO, PM<sub>10</sub>, and PM<sub>2.5</sub>.

The emissions inventory results and qualitative impacts for the Proposed RMP are shown in Table 4-4. The total emissions for the Proposed RMP increase over time from the base year of 2,694 tons per year of pollutants to 3,554 tons per year by 2026. Table 4-5 shows the increase in emissions for from the baseline year to the long term in 2026. The table also shows the percent increase in emissions from the base year to the long term, and the percent increase for the Proposed RMP.

**Table 4-5. Increase in Annual Air Emissions from 2006 Conditions in the Decision Area (tons per year)**

Time Frame	PM <sub>10</sub>	PM <sub>2.5</sub>	NO <sub>x</sub>	SO <sub>2</sub>	CO	VOC	HAPs
<b>Proposed RMP</b>							
2026	14	8	10	0	609	228	23
Percent increase in emissions from base year	(3%)	(2%)	(2%)	(0%)	(44%)	(81%)	(82%)
Percent increase in emissions from current management	-1 (0%)	-1 (0%)	0 (0%)	0 (0%)	-83 (-4%)	-30 (-6%)	-3 (-6%)

### **Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

Impacts on the air quality resource in the decision area are not irreversible or irretrievable. However, committed actions that consume PSD increments would use up available PSD increments for other proposed sources. For this EIS, there are no proposed or reasonably foreseeable actions by the BLM that will require PSD permitting.

There will be no loss of long-term productivity due to short-term uses proposed in the alternatives. Activities planned will produce some level of air emissions even with mitigation. However, none of the activities proposed in this EIS will produce unavoidable adverse impacts on the air quality resource.

## 4.2.2 Impacts on Soil Resources

This section discusses impacts on soils from implementing the Proposed RMP. Soils, especially in sensitive soil areas, are susceptible to impacts from surface disturbance and compaction, which can lead to accelerated erosion, soil loss, and reduced productivity. Management actions involving ground disturbing activities that reduce vegetation cover, and using vehicles and heavy machinery could contribute to soils impacts. Management actions that restrict surface disturbing activities could protect soil resources, especially on soils identified as fragile.

This analysis was based on the following assumptions:

- Sensitive soils would be managed to minimize erosion above natural levels and maintain soil productivity.
- Soil resources would be managed to help maintain site productivity.

Although management actions would be designed to minimize impacts, and BMPs and other necessary protection measures would be implemented, there are greater inherent risks when surface disturbing activities occur on soils identified as fragile. The analysis considered the location of fragile soils and the potential proposed locations of management activities.

Impacts on soil resources would occur from activities associated with transportation management, vegetation, wildland fire ecology, minerals and energy, and livestock grazing. Soils management actions and actions that prohibit surface disturbing actions such as management associated with ACECs, wild and scenic rivers (WSR), non-WSA lands with wilderness characteristics, fish and wildlife, and special status species habitat could maintain or improve soil conditions.

Under the Proposed RMP, impacts on soil resources are not anticipated as a result of implementing management actions for the following resources and designations: air quality, paleontological resources, and other designations.

### Proposed RMP

#### *Wildland Fire*

In the short term, loss of vegetative cover due to wildland fire could affect soil quality through the loss of soil structure and temporary reduction in porosity of soils in the impacted areas. The reduction in porosity and loss of structure could result in a decrease in infiltration rates and increased erosion and runoff (Ralston and Hatchell 1971). However, BMPs associated with wildland fire ecology management actions would reduce impacts associated with soil loss and the potential for sediment loading and sedimentation. Erosion control measures and seeding may be proposed as post-fire treatments (emergency stabilization and rehabilitation [ESR] or other) to stabilize these sites and to contain and control soil loss.

Where it is expected that fire severity could adversely impact sensitive soils, an appropriate management response (AMR) would be implemented. Some level of ground disturbing activities associated with suppression, prescribed fire, and non-fire fuel treatments would be likely to occur. Indirect impacts include potential soil loss from wind and water erosion.

Over the long term, as areas within the decision area are treated and experience fire return intervals closer to historic fire return intervals, a trend toward less severe wildland fires would occur, resulting in fewer impacts on soils (including microbial populations, soil temperatures, and the chemical and physical

structure of the soil). Wildland fire ecology management actions would continue to allow for aggressive fire suppression in areas with sensitive soils and where fire has not played a significant role in the past.

To foster healthy native understory communities and to maintain and/or improve soil resources and reduce erosion potential over the long term, planned fire management and fuel reduction actions would be implemented. These actions could also decrease the potential for destruction of biological crusts by severe fire events. Planned actions (prescribed fire and non-fire fuel treatments) could also continue to reduce the likelihood of severe wildland fires and subsequent loss of soil structure, altered porosity, and altered infiltration rates. As the role of fire returns to a more natural pattern, there would be fewer indirect impacts from large, severe wildland fires, including a reduction in wind and water erosion.

#### ***Fragile Soil Areas***

Implementing site-specific restrictions and/or mitigations for surface disturbing activities (e.g., open to oil and gas leasing subject to moderate constraints [controlled surface use]) and not allowing cross-country OHV use in fragile soil areas would help minimize the risk of soil erosion. Prioritizing land treatments in fragile soil areas with the objective of reducing erosion would help maintain or improve vegetation conditions, maintain or reduce erosion rates and improve soil productivity. More than 80 percent of the areas with identified fragile soils (5,100 acres) would be prioritized for such treatment.

#### ***Actions that Actively Affect Vegetation***

Vegetation treatments on an average of no more than 22,300 acres annually would decrease vegetation cover, which could reduce soil protection from rain, surface runoff, and wind erosion in the initial year after treatment. Mitigations based on site-specific soil characteristics, plus initial growth of desired plant species would reduce these short-term impacts. Over the long term, these treatments should improve vegetation health and cover, maintain soil resources, and improve soil productivity. However, if less than an annual average of 4,650 acres were treated, shrublands generally would convert into woodlands and reduce understory vegetation. The loss of understory vegetation could, over the long term, increase the susceptibility of soil resources to erosion.

Similar to vegetation treatments, managing areas for forest and woodland product harvest could result in short-term increases in erosion and soil loss. However, long-term results would be to maintain soil resources and allow understory vegetation to be established or restored.

#### ***Actions Resulting in Soil Disturbance or Compaction***

Implementing BMPs, erosion control measures, and other decisions that mitigate surface disturbing activities would reduce or minimize water and wind erosion, stabilize soils, reduce soil compaction, and maintain soil productivity. Managing livestock grazing according to the Standards and Guidelines would help to meet soil resource objectives and reduce soil erosion. Localized removal of plant cover, soil compaction, and lower infiltration rates could occur in areas of livestock concentration and trailing. However, these impacts would be site specific, short term, and localized. Adhering to the grazing guidelines and managing to maintain or make progress toward the *Standards for Rangeland Health* would help maintain or improve existing soil conditions and help prevent impacts from becoming significant.

It is anticipated that development of coal resources would result in the total disturbance of 3,600 acres over the 20-year planning horizon (Appendix 15), which could result in localized loss of topsoil, removal of plant cover, and soil compaction. However, applying BMPs to and reclaiming land concurrently with the coal mining (approximately 100 acres per year) would reduce these impacts on soil resources. In addition, site-specific NEPA analysis of the impacts on soil resources is required prior to approval of a coal lease.

The magnitude and intensity of the impacts from surface disturbing activities would decrease based on more restrictions and stipulations on surface disturbing activities, including increasing restrictions on oil and gas activities and establishing ROW avoidance and exclusion areas. Management actions for resources and resource uses that apply stipulations to surface disturbing activities could help reduce soil erosion. These management actions include areas open to oil and gas leasing subject to moderate constraints (timing limitations, CSU) (296,200 acres), areas open to oil and gas leasing subject to major constraints (no surface occupancy [NSO]) (83,400 acres), and areas closed to oil and gas leasing (79,000 acres) (Map 14). The RFD (Appendix 15) projects a total of 90 wells (70 exploration and 20 new production wells) could be drilled during the next 20 years, which could result in a future surface disturbance of 2,070 acres, with 906 acres of disturbance from seismic operations. Approximately 2,370 acres of the total 2,976 acres would be reclaimed (Appendix 15) over the long term. Applying BMPs identified in Appendix 1, such as promptly reclaiming disturbed areas and establishing vegetation cover on disturbed areas, would further reduce soil erosion.

In addition to oil and gas leasing stipulations, locatable mineral withdrawals (9,500 acres) and mineral material closures (105,000 acres) could similarly help reduce soil erosion by restricting surface disturbances. The Cottonwood Canyon ACEC and suitable WSR corridors would be recommended for withdrawal from locatable minerals activities (Map 12) and closed to mineral material disposals (Map 16). In addition, areas managed as no surface disturbing actions (23,800 acres), areas with seasonal limitations on surface disturbing actions (407,500 acres) (Map 19), and ROW exclusion areas (75,700 acres or 14 percent) (Map 11) would further restrict surface disturbing activities.

Visual Resource Management (VRM) Class I areas (76,000 acres, 14 percent) would limit the amount of surface disturbance, which would indirectly maintain soil resources. Areas designated as VRM Class I would be managed to preserve the existing landscape characters; thus, there would be little or no surface disturbance that could contribute to increased soil compaction, soil loss, and erosion. Reclamation would be expected to stabilize soils and reduce or eliminate long-term soil erosion.

Impacts on soils from cross-country OHV use would nearly be eliminated because the number of acres open to OHV use would be 1,000 acres, mainly in areas with naturally disturbed soils such as sand dunes. Instead of cross-country OHV use, OHV use would be limited to 1,403 miles of designated routes on 528,000 acres (95 percent), indirectly protecting nearby soils from increased erosion by focusing impacts on compacted surfaces that have already been impacted. Closing 25,000 acres (5 percent) to OHV use likely would reduce OHV-related soil impacts in these areas.

#### ***Recreation (Not Including OHV Use)***

Although identification of and development within Special Recreation Management Areas (SRMA) (95,100 acres, 17 percent) could result in soil compaction in some areas, increasing management presence would decrease campsite establishment or expansion and decrease the associated impacts on soils of compaction and overland erosion. Motorized activities in SRMAs (except for the Moquith Mountain Dunes Recreation Management Zone [RMZ], which is open to cross-country OHV use) could increase use on routes, which could indirectly protect nearby soils from increased erosion because surface disturbance would be focused in areas that have already been impacted. Non-motorized activities in SRMAs would be more dispersed, which could have site-specific impacts in areas of concentrated use. Proper management and public education would reduce the intensity and magnitude of these impacts on soil resources.

Dispersed recreation activities and special recreation permits (SRP) could have site-specific impacts in areas of concentrated use. Impacts could include a reduction in plant cover, soil compaction, and loss of soil productivity. However, restrictions attached to SRPs would minimize these impacts.

## Summary

Surface disturbing activities could remove vegetation and topsoil and result in compaction or loss of some of the exposed soil surface, resulting in the majority of impacts on soil resources. Management actions that limit surface disturbing activities or implement BMPs (Appendix 1) and mitigation measures would protect and maintain current soil resources and minimize erosion. The Proposed RMP would help protect soil resources by limiting cross-country OHV use and placing restrictions on mineral development. Vegetation treatments would decrease vegetation cover, which could reduce soil surface protection from rain, surface runoff, and wind erosion in the initial year after treatment. Over the long term, treatments would improve vegetation health and cover, maintain soil resources, and improve soil productivity. Vegetation treatment management actions under the Proposed RMP would improve soil condition by improving vegetation and decreasing the potential for soil loss and erosion.

### **Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

Implementation of management actions would not result in irreversible or irretrievable loss of resources. Surface disturbing activities could remove vegetation, increase erosion, and contribute to soil loss. However, management actions and BMPs are intended to reduce the magnitude and results of these possible impacts.

The short-term use of soil resources generally would not affect long-term productivity where BMPs are appropriately applied. BMPs could include reclaiming disturbed areas to the extent possible, establishing vegetation cover as soon as possible, or designing facilities to minimize surface disturbance.

Surface disturbing activities could result in unavoidable adverse impacts. Although these impacts would be mitigated to the extent possible, some unavoidable impacts would occur. Loss of soil resources to other uses, such as transportation and mineral and energy development, could result in a long-term loss of site-specific soil productivity on approximately 8,426 acres associated with such development, although after mitigation such impacts would be limited to 4,056 acres.

### 4.2.3 Impacts on Water Resources

This section presents potential impacts on water resources from implementing the Proposed RMP. The discussion of impacts on water resources is limited to the effects of surface disturbing activities on water quality and watershed health. Activities that disturb the land surface, decrease vegetation cover, or otherwise alter land surface cover would potentially affect water quality and watershed health. Watershed health is characterized by watersheds that are in, or making significant progress toward, properly functioning physical condition (including their upland, riparian/wetland, and aquatic components) where soil and plant conditions support infiltration and soil moisture storage and where the release of water is in balance with climate and landform and maintains or improves water quality, water quantity, and timing and duration of flow (BLM 1997a).

The analysis is based on the following assumptions:

- Substantial surface disturbance to soil, including compaction of soil or loss of vegetative cover, could increase water runoff and downstream sediment loads, thereby degrading water quality, altering channel structure, and affecting overall watershed health.
- The degree of impact attributed to any one disturbance or series of disturbances would be affected by several factors, including location within the watershed, time and degree of disturbance, existing vegetation, soil type, and precipitation.
- Restrictions on surface disturbing activities should help protect and maintain current water quality and minimize erosion and sedimentation.
- A change of pollutants in surface waters could affect other beneficial uses (e.g., stock-watering, irrigation, fisheries/aquatic life, recreation, and/or drinking water supplies).

Under the Proposed RMP, impacts on water resources are not anticipated as a result of implementing management actions for the following resources and designations: air quality, paleontological resources, and other designations.

#### Proposed RMP

##### *Activities on Fragile Soils*

Implementing site-specific restrictions and/or mitigations for surface disturbing activities (e.g., open to oil and gas leasing subject to moderate constraints [CSU]) and not allowing cross-country OHV use in fragile soil areas would help minimize the risk of soil erosion and sedimentation. Allowing surface disturbance in fragile soil areas and mitigating impacts would not affect water quality or watershed health. Prioritizing land treatments in fragile soil areas with the objective of reducing erosion and restoring watersheds would help maintain water quality by reducing the amount of sediment loading from these saline soils to nearby streams from disturbed fragile soil areas. More than 80 percent of the areas with identified fragile soils (5,100 acres) would be prioritized for such treatment.

##### *Planned Actions that Affect Vegetation*

Vegetation treatments, including vegetation treatments for ecological purposes, rangeland treatments, or non-fire fuels treatments, on an average of no more than 22,300 acres annually would decrease vegetation cover and increase overland flow and sediment loading in the initial year after treatment. Short-term soil exposure and reduced vegetation cover could affect watershed health by reducing water infiltration rates and increasing overland flow and sediment loading, which could affect water quality parameters, including turbidity, temperature, and nutrient loading. Mitigations based on site-specific characteristics and initial growth of desired plant species would reduce these short-term impacts. Over the long term, these treatments should improve vegetation health and cover, which would reduce overland flow and

sediment loading. However, if less than an annual average of 4,650 acres were treated, then shrublands would convert into woodlands and reduce understory vegetation. The loss of understory vegetation could, over the long term, increase the susceptibility of resources to erosion, which could increase the potential for an increase in sedimentation and a decrease in water quality.

Managing livestock grazing according to the Standards and Guidelines would eliminate long-term impacts from site-specific, short-term disturbance associated with concentrated livestock use. Erosion of exposed soils resulting from short-term concentrated grazing use would decrease, resulting in stabilized soils and less site-specific erosion so that areas meet *Standards for Rangeland Health*. This would improve water quality and decrease siltation and sediment loading of streams. Minimizing site-specific erosion and minimizing any reduction in plant cover would reduce long-term sediment loading to nearby creeks and springs.

### ***Wildland Fire***

In the short term, the potential increase in wildland fire acres (including wildland fire use), prescribed fire, and non-fire fuel treatments could increase runoff, erosion, and stream temperatures. Increased erosion and runoff could result in greater nutrient concentration and turbidity in surface waters. Disturbance associated with prescribed fire and non-fire fuel treatments would be evaluated through an environmental planning and review process that would consider impacts related to surface runoff, soil loss, and sediment input to surface waters. Often these impacts are short term and conditions return to pre-fire levels or better once vegetation is reestablished.

The wildland fire ecology management actions would allow more flexibility in planned activities to manage fuel loads and would implement resource protection measures to reduce potential effects on water resources. Potential impacts on water resource issues would be considered before implementing prescribed burns, non-fire fuel treatments, or ESR efforts.

In the short term, minor impacts on groundwater quality may result from altered water absorption patterns (due to a decrease in vegetation cover following wildland fire or fuel treatments) and soil compaction (due to mechanical equipment). In addition, infiltration capacity could temporarily decrease after a fire due to the formation of a hydrophobic soil layer. Altered water infiltration rates could temporarily increase or decrease the chemical levels (i.e., dissolved solids) in shallow aquifers (Allison et al. 1994). The impact on groundwater would depend on the depth to groundwater below ground surface and the type of sediments or bedrock through which it passes. The possible changes in the infiltration capacity of soils would depend on fire severity, soil type, pervasiveness of vegetation root structures, and vegetation's ability to reoccupy a site following fire.

Over the long term, wildland fires would tend to be less severe, resulting in relatively fewer impacts on storm flows and nutrient and sediment loads. A trend toward fewer severe wildland fires would help maintain soil stability and could enhance overall watershed health. Some areas would have a more sustainable supply of woody debris or stream bank vegetation, both of which would tend to also increase stream bank stability.

Over the long term, planned fire actions and eventual restoration of natural fire regimes could improve water resources by reducing the risk of high-severity wildland fire and promoting self-sustaining native vegetation types. The wildland fire ecology management actions would reduce erosion potential over the long term by fostering a healthy, native understory. These actions would allow more flexibility in implementing and timing planned actions that would protect water resources.

***Planned (BLM) or Permitted (BLM-Approved) Actions Requiring Surface Disturbance***

Water resource management actions, including implementing BMPs and erosion control measures, and vegetation management actions regarding riparian areas would help to meet watershed objectives and reduce erosion and sediment loading to nearby streams and rivers. Applying the BMPs to surface disturbing activities (Appendix 1) would help maintain water quality and watershed health by decreasing siltation and sediment loading to nearby streams.

Reclamation of surface disturbances should increase plant cover and reduce erosion and sediment loading to nearby streams and rivers. Requiring reclamation of surface disturbances would help maintain water quality and watershed health.

Continuing to implement the *Upper Sevier River Watershed Management Plan* would assist in meeting watershed objectives and minimizing potential impacts on water quality and watershed health.

Managing oil and gas in the areas surrounding the Kanab culinary water wells as open to oil and gas leasing subject to moderate constraints (timing limitations, CSU) (296,200 acres) would help protect surface water and groundwater quality from oil and gas development. In these areas, well placement would be relocated to eliminate potential contamination or pollution sources, and design standards would be implemented to prevent contaminated discharges to groundwater.

Applying BMPs to oil and gas activities, designing road crossings to allow fish passage, and incorporating erosion control stipulations in coal mining plans would help to meet watershed objectives, reduce erosion and sediment loading to nearby streams and rivers, and maintain water quality.

Encouraging treatment and onsite or offsite beneficial use of produced water from coalbed natural gas (CBNG) activities could protect surface water and groundwater quality and avoid the potential for increased salinity. Not allowing produced water to be discharged in the Colorado River Basin could protect the water quality of the Colorado River and avoid the potential for increased salinity.

The development of coal resources would be anticipated to result in the total disturbance of 3,600 acres over the 20-year planning horizon, which could result in site-specific increases in overland flow and sedimentation. However, applying BMPs to and reclaiming disturbed areas concurrently with the coal mining would reduce these impacts on water resources. In addition, site-specific NEPA analysis of the impacts on water resources is required prior to approval of the coal lease.

Impacts on water resources from cross-country OHV use would nearly be eliminated because only 1,000 acres would be open to use, mainly in areas with naturally disturbed soils such as sand dunes. Instead of cross-country OHV use, OHV use would be limited to 1,403 miles of designated routes on 528,000 acres (95 percent). OHV use on designated routes would maintain existing vegetation and soil resources by focusing impacts on existing linear disturbances that have already been affected. Closing 25,000 acres (5 percent) to OHV use would eliminate OHV-related water impacts in these areas.

Maintaining or improving stream habitat for Bonneville cutthroat trout, roundtail chub, bluehead sucker, and flannelmouth sucker and restoring riparian habitat for the Southwestern willow flycatcher could help maintain water quality in these areas by reducing the amount of sediment entering the stream and by stabilizing stream banks.

Closing the Water Canyon Allotment to livestock grazing (48 animal unit months [AUM]) would help to protect Fredonia's municipal water supply by removing contamination sources.

### ***Applying Stipulations to Surface Disturbing Activities***

Increasing stipulations on oil and gas exploration and development activities could help protect and maintain current water quality and reduce sedimentation resulting from surface disturbing activities. Management actions for resources and resource uses that apply stipulations to surface disturbing activities include areas open to oil and gas leasing subject to moderate constraints (timing limitations, CSU) (296,200 acres), areas open to oil and gas leasing subject to major constraints (NSO) (83,400 acres), and areas closed to oil and gas leasing (79,000 acres) (Map 14). The RFD (Appendix 15) projects a total of 90 wells (70 exploration and 20 new production wells) could be drilled during the next 20 years, which could result in a future surface disturbance of 2,070 acres and 906 acres of disturbance from seismic operations. Approximately 2,370 acres of the total 2,976 acres would be reclaimed (Appendix 15) over the long term. Applying BMPs identified in Appendix 1, such as promptly reclaiming disturbed areas and establishing vegetation cover on disturbed areas, would help to maintain current water quality and reduce sedimentation.

Areas within 330 feet of riparian/wetland areas are included in the acres open to oil and gas leasing subject to major constraints (NSO). Not allowing surface occupancy near riparian/wetland areas would protect stream banks and water quality from surface disturbing activities by retaining vegetation that would help trap sediment before it reaches nearby streams and rivers.

In addition to oil and gas leasing stipulations, stipulations on locatable mineral withdrawals (9,500 acres) and mineral material closures (105,000 acres) would similarly help protect and maintain current water quality and reduce sedimentation by restricting surface disturbances. The Cottonwood Canyon ACEC and suitable WSR corridors would be recommended for withdrawal from locatable minerals (Map 12) and closed to mineral material disposals (Map 16). In addition, areas managed as no surface disturbing actions (23,800 acres) and areas with seasonal limitations on surface disturbing actions (407,500 acres) would further restrict surface disturbing activities (Map 19). These actions would help protect existing water quality of the streams and rivers in these areas by retaining vegetation and reducing erosion.

Management protecting the scenic and cultural relevant and important (R&I) values within the Cottonwood Canyon ACEC (3,800 acres, less than 1 percent) would help protect the water quality and watershed health of the culinary water source by reducing the possibility of surface disturbing activities and limiting contamination and pollution sources. Within this ACEC this water is used by the city of Fredonia, Arizona, as a primary source of culinary water.

### ***Recreation (Not Including OHV Use)***

Identification of and development within SRMAs (95,100 acres, 17 percent) could result in soil compaction or reduction of vegetation cover in some areas, which could result in increased overland flow and sediment loading to nearby streams and rivers. These impacts would be more likely in SRMAs with motorized activities. In SRMAs with non-motorized activities, the impacts would be more site specific in areas of concentrated use. Increasing the frequency of patrols in SRMAs and public education could decrease associated recreation impacts on water quality.

Dispersed recreation activities and SRPs could have site-specific impacts such as a reduction in plant cover and soil compaction in small, localized, and isolated areas, which would result in a small increase in overland flow and sediment loading to nearby streams and rivers. However, restrictions attached to SRPs would minimize these impacts on water resources.

## Summary

Surface disturbing activities could reduce watershed health and water quality. Management actions that limit surface disturbing activities or implement BMPs and mitigation measures could protect and maintain current water quality and minimize erosion and sedimentation. The Proposed RMP would restrict surface disturbing activities, which would help protect soil resources.

### **Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

There would be no irreversible and irretrievable commitment of water resources under the Proposed RMP. Long-term impacts on water quality and watershed health could be restored.

Short-term use of an area to accommodate energy and minerals, ROWs, and cross-country OHV use could result in site-specific increases in sedimentation that could affect water quality and water resources. The limited extent of foreseeable development, mitigating management actions, and application of BMPs would minimize decreases in long-term productivity from short-term uses.

Surface disturbing activities could result in unavoidable adverse impacts, although these impacts could be decreased by applying BMPs and site-specific mitigation efforts.

## 4.2.4 Impacts on Vegetation

This analysis addresses potential impacts on vegetation (consisting of upland vegetation, riparian/wetland, and forests and woodlands) from implementing the Proposed RMP. This analysis focuses on those management alternatives or actions that have the potential to directly or indirectly disturb or remove vegetation that could result in a reduction or loss of structure, function, or diversity within a vegetation community, or that have the potential to facilitate the establishment and enhancement of vegetation communities.

Upland vegetation communities include oak/mountain shrub (15,100 acres), desert scrub (22,300 acres), and sagebrush steppe (145,900 acres), which together constitute 34 percent of the decision area. Riparian/wetlands communities constitute 70 miles and 390 acres within the decision area. Forest and woodland communities include aspen (350 acres), mixed conifer (550 acres), ponderosa pine (4,200 acres), and pinyon-juniper woodland (324,800 acres), which together constitute 60 percent of the decision area.

The effects of management actions on upland vegetation, riparian/wetland areas, and forests and woodlands may vary widely, depending on a variety of factors such as the type of soils, moisture, topography, and plant reproductive characteristics. Impacts on vegetation resources also vary depending on the seral stage and composition of the vegetation communities discussed in Chapter 3. The composition of a plant community changes over time as a result of interactions with a variety of factors, such as climate, resource uses, and disturbance. Surface disturbance can result in the most immediate direct impact on an area by removing existing vegetation and thus increasing opportunities for establishment of noxious weeds and invasive species. This could in turn reduce vegetation diversity, production, desirable plant cover, and overall ecological health of vegetation communities. Decreased ecological health would make vegetation communities less resilient to disease, drought, fire, invasive species invasion, and other natural disturbances/stressors. Indirectly, surface disturbance could increase erosion rates, modify soil composition, and alter water flow patterns across the landscape. On the contrary, implementing vegetation treatments (mechanical, fire, biological, and chemical), managing vegetation/ecological resources to meet desired vegetation conditions, and limiting or restricting surface disturbances could generally improve vegetation/ecological conditions. Although short-term losses of vegetation cover would occur, over the long term these actions would help remove undesirable species, increase species diversity and age class, improve vegetation composition and structure, and increase vegetation cover and ecological condition. This would result in healthier vegetation communities that are more capable of retaining moisture and nutrients and resisting disease, invasive species invasion, drought, and other natural disturbances/stressors.

The analysis is based on the following assumptions:

- Adequate vegetative ground cover and species composition for site stabilization would typically occur within 5 to 10 years in sagebrush/grass communities, depending on climate, soil, and site potential.
- Plant communities would be managed toward achieving a mix of species composition, cover, and age classes.
- The degree of impact attributed to any one disturbance or series of disturbances would be affected by several factors, including location within the watershed; the type, time, and degree of disturbance; existing vegetation; and precipitation.
- Noxious and invasive weeds would continue to try and invade and spread as a result of surface disturbing activities, vehicle traffic, recreational activities, wildlife and livestock grazing, and natural causes.

- Weed and pest control would be carried out in coordination with the appropriate county, public, and private interests.
- Climatic fluctuation would continue to affect the health and productivity of plant communities on an annual basis.

The analysis of vegetation, which includes structure, productivity, vigor, percent cover, density, and species composition, was based on likely changes relative to movement toward or away from desired vegetation conditions. In the absence of quantitative data, professional judgment was used, and impacts are sometimes described using ranges of potential impacts or using qualitative terms, if appropriate. Particular emphasis was on vegetation communities with the greatest sensitivity to changes in structure and species composition and that are most at risk from potentially severe mortality events such as drought, insects, and disease infestation.

Under the Proposed RMP, impacts on vegetation would not be anticipated as a result of implementing management actions for the following resources and designations: air quality, cultural resources, paleontological resources, and other designations.

## Proposed RMP

### *Surface Uses and Disturbances*

Grazing by livestock and/or wildlife can alter upland vegetation communities by removing portions of plants (degree of alteration would depend on the extent of the removal), length of grazing period, and climatic conditions. Grazing animals' hooves could trample plants and compact soils from concentrated use. Grazing by livestock and/or wildlife can lead to trampling and/or removal of seedlings and understory vegetation and could hinder regeneration and diversity within forests and woodlands. Concentrated grazing can alter vegetation structure and species composition (Kimball and Schiffman 2003, Howery 1999). Managing livestock grazing according to the Standards and Guidelines would minimize long-term impacts from concentrated livestock use. Trampling and altered vegetation structure would decrease, resulting in vegetation communities that are meeting or moving toward ecological site potential.

Proper grazing could improve the ecological conditions of upland communities by reducing vegetation removal, decreasing erosion, and reducing opportunities for establishment of noxious weeds and invasive species. In riparian areas, monitoring grazing use and making adjustments could maintain or improve the ecological condition of riparian/wetland communities by reducing vegetation removal, decreasing erosion, and reducing opportunities for establishment of noxious weeds and invasive species. In forests and woodlands, monitoring grazing use and making adjustments could also minimize excessive removal of vegetation if it inhibits diversity and regeneration.

Using livestock grazing to enhance ecosystem health and/or help accomplish resource objectives on allotments (e.g., noxious/invasive weed control and hazardous fuel reduction) on a case-by-case basis could maintain and/or improve upland vegetation conditions and reduce cheatgrass and other invasive weeds. In forests and woodlands, this action would reduce fuel loads and noxious and invasive weeds, leading to improved health of these communities.

Land exchanges and disposals could reduce fragmentation of BLM-administered lands. This could improve the BLM's ability to implement management actions that result in increased diversity or that improve ecological health of upland communities, riparian/wetland areas, and forests and woodlands.

Surface uses and disturbances would be restricted in the Proposed RMP and would occur in areas open to oil and gas leasing subject to standard terms and conditions (95,400 acres), open for mineral material

sales (475,500 acres, 86 percent), open to locatable mineral entry (519,900 acres, 94 percent), and open to cross-country OHV recreation use (1,000 acres, less than 1). The initial surface disturbance from mineral exploration activities combined with the development of roads, pipelines, and drill pads per well pad would amount to 23 acres during the planning horizon (Appendix 15). Although about 80 percent of the initial disturbance area would be reclaimed within the planning horizon, approximately 20 percent of the disturbed area would be devoid of vegetation for the life of the well. Areas disturbed and then reclaimed would increase the amount of early successional vegetation in these communities. The improvement of roads associated with mineral development would also remove vegetation. Increased vehicle travel to well pads could increase the spread of noxious weeds. Anticipated mineral exploration and development of 90 oil and gas wells would result in an estimated 2,976 acres (2% of upland vegetation within the decision area) of initial surface disturbance over the 20-year planning horizon. After reclamation, the amount of disturbance area would be reduced to 607 acres, which represents the anticipated amount of long-term surface disturbance. The long-term disturbance of 607 acres would result in relatively minor impacts on vegetation, because it would comprise only 0.3 percent of upland vegetation within the decision area. The development of coal resources would be anticipated to result in the total disturbance of 3,600 acres (2% of upland vegetation within the decision area) over the 20-year planning horizon, which would result in temporary vegetation removal in these areas. However, because reclamation is estimated to occur concurrently with mining, the long-term disturbance would result in relatively minor impacts on vegetation.

Avoiding (106,670 acres) or excluding areas (75,700 acres) from ROW development could decrease the extent of related vegetation removal associated with these activities. Collocating ROWs would further reduce surface disturbances and removal of vegetation. In addition, surface disturbance would not be allowed within 330 feet of riparian/wetland areas and mitigation would be implemented where appropriate on a site-specific basis for oil and gas authorizations and energy ROWs, which would minimize and mitigate these impacts on riparian/wetland communities.

SRMA management actions in the Proposed RMP would help to reduce impacts from recreational opportunities. Management of the Kanab Community SRMA (OHV RMZ), Paria SRMA (Canyons RMZ), Moquith Mountain SRMA, and Escalante SRMA (57,400 acres, 10 percent) would further emphasize recreational opportunities and consequently increase the potential for vegetation removal. However, implementing surface use restrictions within the SRMAs and increasing the management of these areas would help to reduce the degree of impact from recreational and other uses. Encouraging primitive types of recreation and prohibiting surface disturbance from oil and gas development in the Kanab Community SRMA (non-motorized RMZ), Paria SRMA (uplands RMZ), Orderville Canyon SRMA, and North Fork Virgin River SRMA (37,700 acres, 7 percent) would help to reduce impacts on vegetation communities from recreational use.

The commercial harvest of forest and woodland products and associated surface disturbances would remove seedlings, understory vegetation, and mature trees where harvest occurs. Protecting riparian areas from all surface uses and disturbances through protective stipulations and not allowing surface disturbance within 330 feet of riparian/wetland areas would minimize the potential for these impacts on riparian/wetland communities. Monitoring riparian conditions, as needed, for any surface uses that could affect riparian areas would help ensure that appropriate action to protect these vegetation communities are taken before functioning conditions become impaired. Over the long term, the harvest of forest and woodland products would increase penetration of light to understory vegetation (i.e., grasses and forbs) and could also increase diversity, composition, and structure, reduce fuel loads, and maintain a variety of successional stages. This, in turn, would make forests and woodlands more resilient to disease, drought, fire, invasion by non-native species, and other natural disturbances/stressors.

### *Limits or Restrictions on Surface Uses and Disturbances*

Implementing BMPs to minimize detrimental impacts on soils and water quality from ground disturbing activities and maintaining and/or enhancing riparian areas through project design features and/or stipulations would help to reduce soil erosion, surface runoff, and sedimentation of streams. This would help to maintain or improve upland vegetation and riparian/wetland communities. Making necessary management adjustments to meet watershed objectives (e.g., *Upper Sevier River Watershed Management Plan, Standards for Rangeland Health*, and *Utah Riparian Management Policy* [UT 2005-091]) and protecting municipal water supplies through restricting OHV and livestock grazing where necessary in key watershed areas generally would maintain or improve upland vegetation and riparian/wetland communities and reduce trampling and/or removal of understory vegetation in key watershed areas.

Incorporating design and operation stipulations on new or amended ROWs as necessary to protect riparian and aquatic resources, and to monitor riparian conditions, as needed, for any surface disturbing activity, would maintain or improve upland vegetation conditions and riparian/wetland communities and could reduce removal of vegetation.

Management actions for resources and resource uses that apply stipulations to surface disturbing activities could help maintain or improve upland, riparian, and forest and woodland conditions. These management actions include areas open to oil and gas leasing subject to moderate constraints (timing limitations, CSU) (296,200 acres), areas open to oil and gas leasing subject to major constraints (NSO) (83,400 acres), and areas closed to oil and gas leasing (79,000 acres) (Map 14).

In addition to oil and gas leasing stipulations, stipulations on locatable mineral withdrawals (9,500 acres) and mineral material closures (105,000 acres) could similarly help maintain or improve upland, riparian, and forest and woodland conditions. The Cottonwood Canyon ACEC and suitable WSR corridors would be recommended for withdrawal from locatable minerals (Map 12) and closed to mineral material disposals (Map 16). In addition, areas managed as no surface disturbing actions (23,800 acres), areas with seasonal limitations on surface disturbing actions (407,500 acres) (Map 19), ROW exclusion areas (75,700 acres) (Map 11), and areas closed to OHV recreation use (25,000 acres) would further restrict surface disturbing activities. These restrictions would help reduce associated impacts on upland vegetation, riparian/wetland communities, and forests and woodlands.

Management of special status species could affect vegetation through habitat improvements and land use restrictions. Controlling surface disturbing and disruptive activities to minimize impacts on identified crucial habitat for sensitive species, applying BMPs to avoid or reduce habitat fragmentation, prohibiting surface disturbing activities within ½ mile of active or suitable Utah prairie dog habitat, applying a CSU stipulation to relocate well placement in federally listed and candidate plant species occupied and suitable habitat, and applying an NSO stipulation within ½ mile of Greater sage-grouse leks would all help to maintain or improve upland, riparian, and forest and woodland conditions. These actions could also constrain vegetation treatments (including fire use), treatment methods, and size of the treatment; however, applying exceptions, waivers, or modifications to treatments (Appendix 3) could allow treatments that improve habitat. Maintaining or improving stream habitat in special status fish habitat would help to maintain or improve the composition and vegetation cover in upland and riparian communities.

Cross-country OHV use would be precluded in fragile soil areas and additional efforts would be conducted to reclaim areas subject to surface disturbances and temporary roads. This would further reduce soil erosion and maintain or improve upland and riparian communities.

Implementing mitigation measures to minimize impacts on water quality and prohibiting surface discharge of produced water in the Colorado River Basin would reduce soil and salt loads to water

sources and help maintain appropriate stream discharge rates. This would in turn maintain or enhance the composition of upland and riparian communities. Not allowing new surface disturbing activities within 330 feet of riparian/wetland areas generally would maintain or improve upland and riparian vegetation conditions.

Implementing additional measures to manage and improve vegetation, including managing vegetation resources to achieve 51 percent or more of the potential natural community (PNC) and using the full range of vegetation treatment methods and tools, could improve vegetation health. Vegetation resources would be managed to achieve 51 percent or more of PNC, which would create a target for rehabilitation efforts that could increase the extent of successfully rehabilitated areas. Restoring forest and woodland old-growth stands to a pre-fire-suppression condition could increase tree spacing and encourage understory vegetation in these areas.

VRM Class I areas would increase to 76,000 acres (14 percent) and VRM Class II areas would increase to 94,400 acres (17 percent) under the Proposed RMP. This would further reduce the extent of surface disturbance and thereby reduce related surface and vegetative disturbance.

Management prescriptions associated with ACECs would restrict surface uses that could otherwise result in removal and disturbance of vegetation. Managing the Cottonwood Canyon ACEC (3,800 acres) as a VRM Class II area and requiring NSO stipulations on new oil and gas leases would reduce the extent of surface disturbance in the ACEC in upland and riparian communities and forests and woodlands.

Managing WSRs would include surface use restrictions. Such restrictions would reduce surface disturbance and related vegetation removal, and thereby help to maintain existing upland and riparian/wetland communities. Only six eligible river segments (5,530 acres of river corridors, 1 percent) would be determined suitable and managed to protect their outstandingly remarkable values (ORV), free-flowing nature, and tentative classification.

#### ***Vegetation Management and Habitat Manipulation***

Management of vegetation resources generally would enhance upland communities, riparian/wetland communities, and forests and woodlands. Continued implementation of noxious weed and invasive species control actions to prevent and control their spread would reduce competition with desirable plant species and help maintain or improve the health of these three vegetation communities. Applying the *Standards for Rangeland Health* to all uses in management of rangelands would help manage surface uses properly and help maintain or improve vegetation conditions.

Habitat improvements for special status species and fish and wildlife could maintain or improve vegetation conditions. However, surface disturbance restrictions intended to protect special status species and fish and wildlife, such as prohibiting disruptive activities within ½ mile of bald eagle nests and Mexican spotted owl nests, could also restrict opportunities for vegetation treatments, including fire use, but applying exceptions, waivers, or modifications to treatments (Appendix 3) could allow treatments that improve habitat.

Vegetation treatments (e.g., wildlife habitat treatments, watershed treatments, livestock rangeland treatments, fuels treatments, and stewardship contracting) on an annual average of no more than 22,300 acres (446,000 acres over the life of the plan), using the full range of vegetation treatment methods and tools (i.e., prescribed fire, mechanical, chemical, biological, woodland product removal, and wildland fire use), would help maintain or improve the health of vegetation communities. Prioritizing treatments to restore areas functioning at less than 51 percent of PNC, restore areas with noxious weeds and/or invasive plants, maintain previously treated areas, and achieve other objectives identified in this RMP likely would further improve vegetation conditions in upland areas and riparian/wetland areas. Treatments would be

conducted in areas containing ponderosa pine, which likely would increase tree spacing, improve vegetation diversity, reduce fuel loads, and reduce the potential for larger crown fires and associated loss of ponderosa pine stands. Prioritizing rehabilitation efforts and management adjustments in functioning at-risk and then non-functioning riparian areas would create a process to maintain or improve vegetation conditions in upland and riparian communities and forests and woodlands.

Prioritizing land treatments to reduce soil loss by watershed and reclaiming associated disturbances would further maintain or enhance vegetative conditions. Allowing vegetation treatments in fragile soil areas where such treatments would over the long term reduce erosion and restore watersheds would maintain or improve vegetation conditions in fragile soil areas. In addition, these actions would help to reestablish seedlings and understory vegetation and retain soil moisture and nutrients.

### ***Wildland Fire***

Using wildland fire and prescribed fire to protect, maintain, and enhance resources could help improve vegetation conditions. Frequent, low-intensity fires are necessary to rejuvenate aspen stands, minimize understory fuel loads that could otherwise lead to larger crown fires, and minimize pinyon-juniper encroachment. Fire use through an AMR would also reduce the occurrence of catastrophic fires and stand-replacing fires and thereby help to maintain desired vegetation cover. Fire use would help increase vegetative diversity and resistance to disease and insect pest infestations because it would help improve the ecological health of treated vegetation communities. This type of fire management could decrease the risk of establishment of noxious weeds and invasive plant species over the long term.

Suppressing wildland fires in upland and riparian communities could limit fire from functioning in its natural role, which could reduce resistance to disease and insect pest infestations and increase the risk of uncharacteristically large or intense wildfires that could alter upland and riparian communities. In forest and woodland communities, suppressing wildland fire can alter natural disturbance regimes, which in turn can alter the distribution and health of aspen, ponderosa pine, and pinyon-juniper woodlands. This could also reduce resistance to disease and insect pest infestations and increase the risk of stand-replacing wildfire. However, using non-fire fuels treatments could reduce the potential for these impacts to occur. Although suppression actions can create surface disturbances and remove vegetation, implementing ESR actions after suppression activities could help to mitigate these impacts and foster regeneration of desired communities.

## **Summary**

Vegetation treatment management actions under the Proposed RMP would provide measures to manage and improve vegetation, which would generally maintain or improve the overall health of vegetation communities.

### **Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

There would be no irreversible and irretrievable commitment of vegetation resources under any of the alternatives. Long-term impacts on vegetation structure, composition, and health could be restored.

Short-term use of an area to accommodate energy and minerals, ROWs, and cross-country OHV use could result in long-term loss of vegetation diversity and increases in noxious and invasive species that could deteriorate the health of the vegetation community. The limited extent of foreseeable development, mitigating management actions, and application of BMPs would minimize the decreases in long-term productivity from short-term uses.

Surface disturbing activities could result in unavoidable adverse impacts, although these impacts could be mitigated to the extent possible. Permanent conversion of areas to other uses such as transportation and mineral and energy development would decrease vegetated areas. Applying BMPs, site-specific mitigation efforts, and restoration would decrease these impacts to the degree possible. Permanent mineral developments and their associated infrastructure would be mitigated to the extent possible to minimize loss of range resources.

## 4.2.5 Impacts on Special Status Species (Threatened, Endangered, and Sensitive)

This analysis focuses on impacts on special status species, including federally listed species, federal proposed and candidate species, BLM sensitive species, and Utah sensitive species, as a result of management actions that affect species or their populations and changes to the condition of their habitats. Although some data on known locations and habitats within the decision area are available, the data is neither complete nor comprehensive on all special status species known to occur or on 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 these areas was also considered and, as a result, some impacts are discussed in more general terms. Impacts on other fish and wildlife species and their habitats are addressed in the Fish and Wildlife section.

Various laws, regulations, and policies require that special status species be fully analyzed in any BLM decision that could affect those species or their habitat. Analysis would include inventory, monitoring, evaluation, and identification of mitigation of effects. Mitigation actions would include project relocation or redesign (avoidance), monitoring, and site-specific mitigation.

Although information on locations of all special status species sites in the decision area is incomplete, the analysis considers the management alternatives and their potential to directly or indirectly affect special status species resources, as noted above. The number of species that could be affected by various actions is directly correlated with the degree, nature, and quantity of surface disturbing activities in the decision area. Impacts are quantified where possible. In the absence of quantitative data, best professional judgment was used. Some of the decisions in this document are programmatic; others may be implemented immediately (i.e., route designation, oil and gas leasing stipulations and conditions). To ensure preservation of specific species, further analyses will be required at the implementation level following site-specific species inventories.

Three general categories of impacts would be anticipated to be the most influential on special status species and their habitat—habitat alteration, fragmentation, and/or loss; displacement; and habitat enhancement. Habitat alteration occurs when decisions change the existing habitat character. Surface disturbing activities, development, or other activities that degrade habitat could lead to habitat alteration, fragmentation, or loss. Habitat alteration, fragmentation, and loss may affect the usable ranges and routes for special status species wildlife movement. In addition, loss of habitat for pollinators of special status plants could result in the decline or loss of special status plant populations. Special status species wildlife displacement occurs when land use activities result in the movement of wildlife into other habitats, increasing stress on individual animals, and increasing competition for habitat resources. Impacts on special status species from displacement depend on the location, extent, timing, and/or the intensity of the disruptive activity or human presence. Occurrences of these disruptive activities in areas adjacent to special status species habitat cause displacement of special status species wildlife. Impacts from displacement could be greater for special status species wildlife with limited existing habitat and/or a low tolerance for disturbance. Habitat maintenance and enhancement can maintain or improve the condition of vegetation and levels of forage species and maintain existing erosion rates or reduce soil loss through vegetation treatments and restrictions on surface disturbing activities.

The following assumptions were used in the analysis:

- Local populations are naturally affected by non-human-caused factors such as climate, natural predation, disease outbreaks, natural fire regimes, and competition for available habitat from other native species.

- Ground disturbing activities could lead to modification (positive or negative), loss (short-term or long-term), or fragmentation of special status species habitat and/or loss or gain of individuals, depending on the amount of area disturbed, species affected, and location of the disturbance.
- Changes in air, water, and habitat quality could lead to direct impacts and could have cumulative impacts on species survival.
- Impacts on special status species could be more significant than impacts on non-special status species.
- The U.S. Fish and Wildlife Service (USFWS) would be consulted on any action that could potentially affect any listed plant or animal species or their habitat.

In accordance with Section 7(a) 2 of the Endangered Species Act of 1973 (ESA), as amended, the BLM KFO initiated Section 7 consultation with the USFWS. This process involves preparing a biological assessment (BA) that includes impact analyses and subsequent determinations for all federally listed and proposed species. The BA considers potential project-related effects (direct and indirect) on each species and its habitat from the management actions presented in the Proposed RMP. Additional consultation with the USFWS would still be required for all implementation-level activities if they would be implemented within suitable or potentially suitable habitat for federally listed species.

Under the Proposed RMP, impacts on special status species are not anticipated as a result of implementing management actions for the following resources and designations: air quality and other designations.

## Proposed RMP

### *Habitat Alteration, Fragmentation, and/or Loss*

Some of the goals and wildland fire ecology decisions provide for the restoration of historical habitats and native plant species and to enhance, maintain, and protect ecological resources. Short-term loss of habitat would be offset by long-term effects of rehabilitation activities, protection of ecological resources (from effective fire suppression), and reduction of fuels (following prescribed fire, non-fire fuel treatment, or implementation of wildland fire use). The subsequent, gradual return to a more natural fire regime would result in long-term habitat enhancement.

Effects of fire on special status species and their habitat vary widely depending on the vegetation type with which the species is associated and the size and intensity of the fire, fuel type, location, topography, season, and duration. For example, special status species habitat associated with aspen is less likely to be destroyed or severely altered by wildland fires than special status species associated with sagebrush, because aspen stands do not easily burn and often act as natural fuel breaks during wildland fires. Most sagebrush species do not sprout after fire, and most plants are killed by low- to high-intensity fires. The result of wildfire in special status species habitat associated with native grasslands would be similar to that in sagebrush because native grasslands are usually seral to sagebrush, and so have a similar fire regime. Wildfire in most mountain shrub communities would be similar to that in aspen stands because most species of mountain shrubs resprout following low- to moderate-severity fire. Sprouting mountain shrub communities generally recover following wildland fire and are considered fire-tolerant. High-severity fire can destroy large areas of habitat and make the recovery of those habitats a long-term process. Both low- and high-severity wildland fires can destroy important habitat, displace animal species, and inflict direct mortality. However, low-severity fires have the potential to enhance and sustain a more natural and beneficial habitat. Wildland fire suppression activities have the highest potential for effects on special status species because resource protection measures would not necessarily be fully implemented due to risks to firefighters or public safety, and because emergency fire suppression action sometimes requires a quick response without detailed, site-specific data or analysis. Examples of impacts from wildfires include heat stress or mortality to special status plants from wildland fire operations;

damage to the seedbank of special status plants from severe fire or mechanical disruption during fire suppression operations; and removal of key habitat components for nesting, denning, foraging, roosting, or cover due to equipment use or operational tactics. Prescribed fire could have similar effects; however, due to site-specific project plans for prescribed fire, the BLM would minimize or avoid these effects. With suppression being implemented where unplanned wildfire is not desirable, and wildland fire use, prescribed fire, and non-fire fuel treatments being used to minimize fuel loading, vegetation communities and wildlife habitats would transition over time to more closely reflect conditions associated with a habitat's natural fire regime. This would create a more balanced (diverse) and stable ecosystem that would have a reduced threat of severe wildland fire.

Authorized excavation of cultural sites and paleontological localities could result in localized loss of special status species habitat. The short- and long-term impacts associated with these actions would not be detrimental to the species and their associated habitat given the limited footprint of such actions on the landscape.

Unlike permitted activities (e.g., mineral exploration and development, ROWs, SRPs, and forestry and woodland harvest) that are subject to site-specific environmental review and monitoring, recreation and OHV activity would have limited special status species reviews before each use, which could result in effects to special status species as dispersed use increases over time. Dispersed recreation users could inadvertently trample special status plant species or damage special status species habitats while camping, hiking, or exploring. Humans, pets, and vehicles could also act as dispersal agents for invasive weeds, which degrade special status species habitat. Although damage to special status species habitats would continue to be monitored, impacts from dispersed use would not be apparent until after the damage has occurred, which would then be appropriately mitigated to the extent practical and feasible.

Constructing new trails and recreation facilities, which would be subject to site-specific environmental NEPA review, could introduce new areas of surface disturbance and concentrate human presence, depending on the location of the trails/facilities, in sensitive special status species habitat. This could decrease special status species populations or cause special status species displacement and provide avenues for the spread of noxious weeds, which could result in modification of a special status species forage base.

Managing OHV use throughout the majority of the decision area (528,000 acres, 95 percent) as limited to 1,403 miles of designated routes would minimize surface disturbances to special status species and their habitats, greatly reducing surface disturbance of special status species habitat. The 1,000 acres open to cross-country OHV use would occur within areas that have been subject to disturbance over the past several years, either through natural processes (e.g., sand dunes) or human use (e.g., topsoil pit). Continued disturbance in the topsoil pit would not result in any additional loss of habitat values causing little to no effects on special status species and associated habitat. In the case of the Coral Pink Sand Dunes tiger beetle, Knisley and Gowan (2005) determined that a decline in population numbers was likely a result of ensuing drought in the area and that the presence of the protected area did not prevent wide swings in beetle abundance. They did determine, however, that the protected area may play a critical role during years of low abundance because when populations are low, beetles concentrate in the protected areas, and having a refuge from OHV activity is critical given the small population. In the case of Welsh's milkweed, because the milkweed is a pioneer species and prefers unvegetated dune sites, as communities expand from vegetated areas into unvegetated dunes individual plants could be affected by uses in these areas.

Precluding cross-country OHV use in Greater sage-grouse nesting and brood-rearing habitat would prevent habitat alteration or loss from OHV activity. Seasonally limiting OHV use within nesting and roosting sites for special status species raptors would provide protection to these species during sensitive

life stages, and protection of habitat would occur outside of the seasonal limits due to OHV use being limited to designated routes. Prohibiting motorized use in and through islands of vegetation in designated critical habitat for Welsh's milkweed (790 acres) would provide immediate protection for the species; however, indirect effects of the shifting nature of the dunes could result in difficulty monitoring and OHV user self-policing, which could result in take of some plants. Esplin (2005 and 2006) determined that Welsh's milkweed moves with the dunes and is, therefore, more susceptible to stem damage from OHV use (plants were shown to survive with damage); however, no reliable correlation could be made in his research between OHV use and decreasing stem counts. Esplin (2005 and 2006) concluded that Welsh's milkweed thrives and competes best in actively moving dunes and that the most likely factor affecting survival of the plant is competition from other vegetation. Closing an overall 25,000 acres and 75 miles of routes to OHV use would provide protection of special status species and associated habitat from OHV impacts.

Precluding cross-country OHV use and avoiding ROWs with high-profile structures within 1 mile of active leks or in nesting and brood-rearing habitat would provide protection to sage-grouse habitats. Managing oil and gas leasing as open to leasing subject to major constraints (NSO) within ½ mile of leks would provide direct protection to leks from surface disturbance associated with oil and gas development, and allowing no surface disturbing or otherwise disruptive activities within 2 miles of active Greater sage-grouse leks during strutting and nesting and brood-rearing seasons would minimize or eliminate disturbance during sensitive periods. Avoiding insecticide use during the early development stages of sage-grouse chicks would increase their survivability.

Permitted surface disturbing activities cause habitat alteration, fragmentation, and/or loss depending on the type, amount, and location of activity. Habitat fragmentation occurs when a contiguous habitat is broken up (fragmented) by surface disturbing activities, causing a reduction in usable ranges; disruption of movements among habitats, transitional areas, and breeding areas; isolation of smaller, less mobile species; and increase in habitat generalists that are characteristic of disturbed environments (Harris 1991). Allowing oil and gas leasing subject to the standard terms and conditions on 95,400 acres could result in fragmentation through reduction of usable habitat and disruption of movements among habitats, transitional areas, and breeding areas associated with the construction of access roads, facilities, and wells. Oil and gas exploration and development activities would disturb approximately 2,976 acres over 20 years. Approximately 2,370 acres would be reclaimed within 20 years. Authorized wells would not be anticipated to adversely affect species populations; however, population function could decline and become significant as development increases. Species that have expansive habitat requirements in areas that do not restrict mineral activity, such as the BLM Sensitive Greater sage-grouse and other sagebrush-obligate species could be indirectly affected by loss of important habitat components resulting from introduction of noxious and invasive weeds, and conversion of large areas to early seral vegetation as well pads are reclaimed. Disturbance to habitats could displace special status species and the possible long-term habitat deterioration could eliminate potential habitat that might otherwise foster expansion of special status species from current territories. On the contrary, conversion of large expanses to early seral vegetation could provide additional habitat that fosters some special status species, such as the Utah prairie dog. Big game winter range oil and gas development timing limitation stipulations would indirectly provide temporary refuge for special status species sensitive to activity that may occur in conjunction with these areas; however, it would not provide long-term protection of habitat.

Stipulations on disturbance in special status species habitat would decrease the potential for the impacts from surface disturbance associated with oil and gas exploration and development. In general, areas open to oil and gas leasing subject to moderate constraints (timing limitations, CSU) (296,200 acres) would enable the BLM to provide some protection of special status species habitat by controlling where development activities occur; however, overall reduction in usable habitat and disruption of movements among habitats associated with the construction of access roads, facilities, and wells could still occur in

these areas. Areas open to oil and gas leasing subject to major constraints (NSO) (83,400 acres) would protect and enhance special status species habitat characteristics from oil and gas development activities. Closing areas (79,000 acres) to oil and gas leasing consistent with BLM interim management policy would protect and enhance special status species habitat characteristics from oil and gas development activities.

Forest and woodland harvest, road construction, facility construction, other mineral development and construction of associated facilities, and ROW construction could result in the loss of special status species habitat. Special status species habitat losses include potential habitat for special status species plants; cover for small mammals and reptiles; winter concentration, nesting, and foraging habitat for birds; and roost and foraging areas for bats. In addition, the loss of habitat for pollinators of special status plants could result in the decline or loss of special status plant populations. Seclusion areas for special status wildlife species would become smaller, more fragmented, and dispersed in these areas, which could lead to a decrease in special status species wildlife populations as a result of habitat loss. Surface disturbing activities could increase sediment delivery to streams, which could interfere with the life history requisites of special status fish. Excluding outstanding natural areas and areas of recent surface reclamation from wood product disposal, prohibiting cutting of standing ponderosa pine, and maintaining live or dead standing trees would reduce the effect of commercial forest and woodland product harvest on special status species habitat and provide direct protection to some species of special status raptors. These measures would also reduce or eliminate displacement of raptors from nesting areas. Forest and woodland product harvest would be allowed in the entire decision area on a case-by-case basis. However, the current and anticipated low demand for forest and woodland products would result in minimal impacts.

Management of locatable minerals and mineral materials would result in short-term localized and indirect impacts on special status species and associated habitat through surface disturbance and habitat loss. Impacts would be minimal for locatable mineral development because a plan of operation, including a reclamation plan, is required prior to development of locatable minerals. Surface disturbance from development of locatable minerals and mineral materials would be approximately 1,050 acres over 20 years; site-specific impacts would be addressed prior to development. The development of locatable minerals and mineral materials could cause localized impacts on special status species through the disturbance of habitat.

In general, ROW development (including powerlines, pipelines, wind and solar projects, and communication sites) would disturb habitats that could be occupied by special status species where ROW developments are authorized. Most ROWs would be located in common (within existing or shared ROWs), which would result in concentrated surface disturbances and habitat deterioration or loss. Special status plants would be most affected by ROW development due to their inability to seek alternative habitats, whereas the majority of special status wildlife could seek alternative habitats if available. ROWs located in common could also reduce the degree of habitat fragmentation within the decision area if properly located outside of or on the fringe of special status species habitat. Locating ROWs in common could actually increase habitat loss or fragmentation if improperly located through habitat.

Designing road crossings to support fish passage in areas that support fish would allow for areas to be recolonized from a neighboring population and allow natural movement of fish populations in fisheries. This could also allow for movement of more aggressive introduced species into special status fish species habitat.

### ***Displacement***

Recreation activity likely would have an effect on special status species and their habitats. Motorized use would have greater effects than non-motorized use. Users could introduce noise that could disturb species during sensitive periods, which could indirectly affect reproduction or cause species to abandon areas,

such as nest sites or areas containing key habitat components containing important food sources. Stress inflicted on species could also deteriorate species health, which could affect survivability. Displaced wildlife incurs a physiological cost through excitement (preparation for exertion) and/or through locomotion. A fleeing or displaced animal incurs additional costs through loss of food intake and potential displacement to lower quality habitat. Chronic or continuous disturbance could result in reduced animal fitness and reproductive potential, and abandonment of young (mortality) (Geist 1978). Effects likely would be greater in areas that receive frequent and/or intense recreation use; however, the number of areas of frequent and/or intense recreation use is small. Areas that would be subject to more visitation would include easily accessible locations, such as along major roads, near communities, or in areas that offer attractive opportunities for recreation. Although damage to special status species habitats would continue to be monitored, impacts from dispersed use would not be apparent until after the damage has occurred, which would then be appropriately mitigated to the extent practical and feasible.

Allowing cross-country OHV use (more than 1,000 acres) on 1,403 miles of designated routes in areas where OHV use is limited to designated routes (528,000 acres, 95 percent) would result in the displacement of special status species through the human presence, noise, dust, and disruptive activities. Areas closed to OHV use (25,000 acres, 5 percent) or areas away from designated routes where OHV use is limited to designated routes would avoid impacts associated with disruption and preserve habitat characteristics.

Vegetation treatments on an annual average of no more than 22,300 acres would result in temporary displacement of special status species wildlife during treatment. However, over the long term, the treated areas would provide improved forage conditions and reduced erosion, which would enhance special status species wildlife habitat and fisheries.

Permitted activities (including mineral exploration and development, ROW and facility construction, and other activities subject to site-specific NEPA evaluation and monitoring) could result in displacement of special status species from noise and human presence associated with these activities. Construction and maintenance noise associated with mining, vehicular traffic, and other human activities could cause disturbances to species during sensitive periods, which could potentially cause special status species to abandon roosts or nest sites. BLM management of areas allowable for permitted activity and protection of special status species habitats could reduce any potential for cumulative habitat degradation, such as NSO and seasonal closures. NSO buffers for special status species and their habitats would afford direct protection to those species and refuge for special status species sensitive to activity that could occur within these areas. Seasonal closures of special status species habitats would provide direct protection from disruptive activity during sensitive periods.

The possibility of increased human presence in SRMAs, concentrating around staging areas, trails, and other developed recreation sites, could displace wildlife species from habitat surrounding interpretive sites and result in trampling, collection, and other inadvertent removal of plant species, depending on the location and level of human presence associated with the site. Mitigation (e.g., timing, location, and group size limits) would be identified during site-specific NEPA analysis, thus reducing the potential for impacts. Increasing management presence in SRMAs (95,100 acres, 17 percent) would decrease impacts from dispersed recreation activities. Implementation plans for each SRMA could include mitigations to avoid special status plant species and minimize trampling of plant species. Management of recreation by allowing dispersed camping could result in trampling and removal of special status plant species and likely would result in minor localized harassment of special status species wildlife due to human presence and disruptive activities.

Special status species habitat within the Alton coal field could be lost in the short and long term due to surface coal mining activities on and adjacent to these areas. Specifically, this would affect the southern-

most population of the Greater sage-grouse. Although the federally administered coal resources do not coincide with the lek used by the local population, the development of the coal mine would eliminate habitat resources on brood-rearing habitat and habitat adjacent to the lek. Development of the coal mine, removal of the overburden, and surface mining operations would result in the long-term (life of the RMP) loss of habitat resources and displacement of individual birds. Although mitigation and reclamation could reduce the impacts, development of the coal mine could result in displacement or loss of the local population.

Closing raptor areas (including those associated with special status species) to rock climbing could result in the elimination of long-term disruptive effects on nesting activities during sensitive periods, which could indirectly affect reproduction and cause species to not abandon areas. Limiting SRP groups to 12 people per group within wetland or riparian zones, WSAs, and designated critical habitat for special status species and limiting SRP groups to 25 people per group in the remainder of the decision area could reduce the effects of displacement from large groups of people.

#### ***Habitat Maintenance and/or Enhancement***

Implementing decisions to increase populations of special status species, developing and implementing monitoring and conservation measures for listed and sensitive species and their habitats, and working with the Utah Division of Wildlife Resources (UDWR) and other partners to implement the Utah Comprehensive Wildlife Conservation Strategy (UDWR 2005a) for preventing the need for further listing of species would protect and foster recovery of special status species and maintain habitat conditions. Impacts on special status species from applying *Standards for Rangeland Health* to all rangelands and *Guidelines for Grazing Management for BLM Lands in Utah* (BLM 1997a) for rehabilitation of rangelands would offer protection for special status species and assist in maintaining or improving the ecological health and condition of rangeland ecosystems over the long term, which could provide necessary habitat components for special status species.

Focusing vegetation treatments on identified high-priority areas and increasing the potential treatment acres would target areas where habitat function could be most improved; site-specific impacts would be addressed prior to treatment. In addition, treatments associated with maintaining or restoring special status species habitat, including Greater sage-grouse, would improve overall habitat conditions for these species. This would result in an increase in habitat components, including increased forage and shelter. Vegetation treatments on an average of no more than 22,300 acres annually could maintain natural disturbance rates.

General vegetation management of rehabilitation objectives, including managing for 51 percent or higher of PNC, would maintain available forage and maintain or enhance special status species habitat. Vegetation management in riparian areas would maintain or improve special status species habitat conditions, provide direct protection of special status species habitat, and retain adequate water supply to support fisheries. Protecting hanging gardens could have similar results in these areas. Restoring sagebrush steppe communities and old-growth forest and woodland stands would improve the long-term ecological health and habitat condition. Treatments for sagebrush steppe restoration could cause temporary disturbances to special status species occupying these areas.

Management of noxious and invasive species would improve the ecological health and condition in treated areas over time, which may provide necessary habitat components for special status species, but could cause temporary disturbances to special status species occupying treated areas. Closing and reclaiming roads, facilities, or improvements that are no longer necessary could deter continued use of the area, resulting in reduced disturbance to special status species habitat. Reclaiming roads would enhance special status species wildlife habitat through removal of disturbed areas, increase in forage, and

reduction of habitat fragmentation. In addition, noise and disturbance associated with roads would be eliminated by reclaiming roads.

Implementation of the Welsh's milkweed and Siler's pincushion cactus recovery plans would provide overall protection to maintain or improve habitat conditions for these species. In addition, prohibiting motorized use in and through islands of vegetation in designated critical habitat for Welsh's milkweed (790 acres) would eliminate further potential disturbance to this species from these activities.

Maintaining the overall stand health of ponderosa pine, as opposed to just protecting trees under the current management situation, in addition to protecting bald eagle feeding and concentration areas, peregrine falcon use areas, and other raptor nest sites would provide direct protection to special status raptors and avoid and reduce habitat deterioration in areas occupied by special status species. These measures would also reduce or eliminate displacement of raptors from feeding and nesting areas, reducing or eliminating possible effects of increased stress and abandonment of the habitat. However, temporary disturbance from treatments to restore stand health would occur. Using *Best Management Practices for Raptors and Their Associated Habitats* (BLM 2006a) would provide for use of seasonal and spatial buffers, as well as mitigation, to maintain and enhance special status species raptor nesting and foraging habitat.

The Proposed RMP would be more restrictive to surface disturbing activities than the current management situation. Areas that are closed to surface disturbing activities (23,800 acres, 4 percent), open to oil and gas leasing subject to major constraints (NSO), and closed to oil and gas leasing (162,400 acres, 29 percent); areas withdrawn and recommended for withdrawal from minerals entry (24,591 acres, 4 percent, and 9,500 acres, 2 percent, respectively); areas closed to mineral material disposals (105,000 acres, 19 percent); ROW exclusion areas (75,700 acres, 14 percent) and ROW avoidance areas (106,670 acres, 19 percent); and areas closed to OHV use (25,000 acres, 5 percent) would protect special status species habitat from such activities. These decisions include restrictions on uses of fish and wildlife habitat, special status species habitat, ACECs, SRMAs, WSAs, WSRs, and areas that are sensitive to disturbance (e.g., fragile soils and riparian/wetland areas). The reduction or elimination of development in these areas would limit surface disturbance, maintain special status species habitat quality, and reduce or eliminate the effects of displacement from human presence. Protection of fragile soil areas and implementation of erosion control measures would reduce erosion and surface runoff, which could enhance special status species habitat. Applying BMPs to avoid or reduce fragmenting habitat, and mitigating habitat losses for listed and sensitive species where appropriate, could avoid and reduce habitat fragmentation and losses for special status species. In addition, mitigation would be considered where appropriate, which could reduce habitat fragmentation and losses for special status species.

Incorporating erosion control measures on slopes greater than 15 percent would further reduce erosion and surface runoff, which could enhance special status species habitat. In addition, cooperative implementation of the *Upper Sevier Watershed Management Plan*, managing the Sevier River in accordance with the total maximum daily load (TMDL), and avoiding or minimizing impacts on water quality could maintain or improve the conditions of fisheries. Managing the discharge of produced waters, including no surface discharge in the Colorado River Basin, would maintain special status species habitat by preventing possible degradation of water quality and fisheries.

In general, management actions for bald eagles and Utah prairie dogs would provide direct protection to these species and associated habitats and avoid or reduce habitat deterioration in areas occupied by special status species. Management of the plague and other diseases in Utah prairie dog colonies could reduce the spread of plague in this species and others.

Management actions for the Mexican spotted owl, such as permitting no surface activities or occupancy within ½ mile of Mexican spotted owl nests and no surface disturbing activities from March 1 to August

31 in protected activity centers (PACs), breeding habitats, or designated critical habitat, would provide direct protection and minimize disturbance to Mexican spotted owl nesting and fledgling habitat and minimize disturbance or harassment to Mexican spotted owl during the breeding season. These decisions would also provide habitat protection for other special status species that may also be sensitive to disruptive activities in these areas. Surveying would aid in identifying locations and distribution of Mexican spotted owl and other special status species and in protecting occurrences that are identified. Protective management measures for the Mexican spotted owl, including prohibiting new recreation facilities or trails within PACs, seasonal closures of existing facilities, and limiting SRP groups to 12 persons per group or less would protect and enhance this species habitat and reduce human presence and disruptive activities.

Management actions for the Western yellow-billed cuckoo and Southwestern willow flycatcher, such as monitoring and restricting authorized or casual use activities that may adversely impact Southwestern willow flycatchers or their habitats, would provide direct protection and minimize disturbance in Western yellow-billed cuckoo and Southwestern willow flycatcher habitats. These decisions would also provide habitat protection for other special status species that may be sensitive to disruptive activities. Surveying would aid in identifying locations and distribution of Western yellow-billed cuckoos and Southwestern willow flycatchers and other special status species and in protecting occurrences that are identified. Management actions associated with water quality and watershed health such as BMPs, protection of culinary water supplies, and water source protection zones could maintain or improve the conditions of riparian areas and water sources that may be occupied by special status species. Management of riparian areas through project design features or stipulations and water retention would maintain or improve special status species habitat conditions and retain adequate water supply for special status species.

Permitting commercial timber harvest for the purpose of promoting forest health would improve the long-term health of forest habitats. However, this could cause temporary disturbances or displacement during project implementation. Site-specific impacts would be addressed prior to harvest. Management actions for woodland product harvest, such as closing WSAs to harvest except for incidental collection for onsite campfire use and administrative purposes, would provide a source of cover and habitat for prey species and ensure a prey base for raptors and other predators. Permitting woodland product harvesting in riparian areas in proper functioning condition (PFC) on a case-by-case basis for maintenance and/or improvement of riparian ecosystems could provide long-term habitat enhancement through overall forest health and habitat diversity.

Management of ROWs and ROW corridors for the siting and construction of communication towers using measures to avoid and minimize impacts on migratory birds likely would minimize or eliminate loss of migratory birds from guy wires and other associated features of communication towers, enhancing overall habitat for migratory birds. Managing powerlines to reduce the risk of raptor electrocution or line-strike would reduce raptor injury and mortality. In addition, burying new and reconstructed utility lines could further reduce electrocution risks to raptors and collision potential for migratory birds.

Implementing measures for protection and not allowing surface disturbing activities within 330 feet of riparian/wetland areas would minimize changes in stream characteristics, which could result in altered water chemistry (e.g., phosphorous loading), increased sediment loads, or elevated mineral concentrations (e.g., selenium). Reducing sediment loading in the decision area would protect important habitat characteristics of special status species fish in the decision area, and downstream in both the Virgin and Colorado River drainages.

Restrictions on visually obtrusive developments on VRM Class I and Class II areas would limit development on approximately 170,400 acres, which would provide more protection to special status species and associated habitat from development activities within these areas.

Special designations (e.g., ACECs, WSAs, and WSRs) management could reduce or eliminate surface disturbance, thereby protecting special status species habitats. Management aimed at conserving vegetation and limitations on surface disturbing and other disruptive activities would maintain overall habitat conditions. Management of the Cottonwood Canyon ACEC would indirectly provide protection to special status species habitat characteristics from surface disturbances through stipulations on oil and gas leasing subject to major constraints (NSO), closures to mineral entry and disposal, and limiting OHV use to designated routes. Managing suitable river segments to protect their ORVs, free-flowing nature, and tentative classification would provide direct protection to wildlife ORVs within 3,770 acres of river corridors (21 miles). Management in WSAs consistent with BLM interim management policy would indirectly protect and enhance special status species habitat characteristics.

## Summary

Habitat alteration, fragmentation, and/or loss occurs when habitat components needed for species survival (e.g., forage and cover) are removed or when contiguous habitat is broken up (fragmented) by surface disturbing activities. This results in a reduction in usable ranges and disruption of movements among habitats, transitional areas, and breeding areas (Harris 1991).

Displacing activities may not directly affect components, but they force animals to move into less desirable habitat, increasing competition for available resources with other species and uses. Users could introduce noise or dust that could disturb species during sensitive periods, which could indirectly affect reproduction or cause species to abandon areas such as nest sites or areas that contain key habitat components such as important food sources. Stress inflicted on species could also deteriorate species' health, which could affect survivability. Displaced wildlife incurs a physiological cost either through excitement (preparation for exertion) or through locomotion.

Habitat maintenance and/or enhancement occur as a result of vegetation treatments to reduce soil loss, improve crucial big game habitat, restore ecological function, and increase forage production. In general, vegetation treatments would improve habitat conditions or provide missing habitat components, reduce sedimentation in water sources occupied by special status species, and improve wildlife habitat for special status species with similar forage requirements. These treatments could provide diverse habitats for various special status species.

The Proposed RMP would provide protection for special status species and associated habitat. Management actions would prevent habitat alteration and surface disturbance in special status species habitat. The Proposed RMP would provide habitat maintenance and enhancement due to species-specific management (particularly for Greater sage-grouse), vegetation treatments that mimic natural processes, management of ACECs, and management of WSR-suitable segments. However, special status species habitat within the Alton coal field could be lost over the long term due to surface coal mining activities on and adjacent to these areas.

## Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts

Implementation of RMP management actions would result in surface disturbing activities, including dispersed recreation, OHV use, mineral and energy development, and ROW development, that could result in irreversible or irretrievable loss of wildlife habitat. Irreversible and irretrievable loss of wildlife habitat could reduce the amount of suitable special status species habitat that could be used for expansion. However, management prescriptions and mitigation prescribed under the alternatives are intended to reduce the magnitude of these impacts and restore some of the soil, vegetation, and habitat lost.

Laws protecting threatened and endangered species generally would provide for mitigation of irreversible and irretrievable impacts from permitted activities. Areas open to cross-country OHV use, specifically in designated critical or crucial habitat, could result in the loss of some resources, which would be individually irreversible.

Short-term uses of BLM lands for some permitted activities could affect the long-term sustainability of some special status species habitat. Uses could affect species by displacing animals or removing plants from primary habitats and removing components of these habitats that may not be restored for more than 20 years. For example, because translocation of Greater sage-grouse between populations has not proven successful, long-term loss of sage-grouse habitat due to oil and gas development and other mineral activity could result in the displacement and/or loss of localized sage-grouse populations.

Unavoidable damage to special status species from permitted activities could occur if resources undetected during surveys were identified during ground disturbing activities. In such instances, activities would be halted upon discovery and mitigation would be implemented to minimize further damage to or loss of individuals. Unavoidable loss of species due to non-recognition, lack of information and documentation, and inadvertent damage or use could also occur.

## 4.2.6 Impacts on Fish and Wildlife Habitat

This section presents potential impacts on fish and wildlife habitat from implementing the Proposed RMP. Threatened and endangered species habitat impacts are addressed in the special status species section and in the BA.

Wildlife populations fluctuate, sometimes widely, in response to natural factors such as wildfire, abundance or scarcity of forage or prey items, and climate extremes such as drought and severe winters. These factors make it difficult to discern potential impacts on wildlife resulting from specific management actions and from impacts caused by natural factors. Changes or stressors to habitat components (e.g., vegetation, water, soil, or air) are likely to cause direct and indirect effects on wildlife and fish. Therefore, potential effects on habitats are the principal focus of this assessment.

Impacts on fish and wildlife include actions that result in habitat alteration, fragmentation, or loss; wildlife displacement; and habitat maintenance and enhancement. Habitat alteration occurs when activities alter the existing habitat character. Surface disturbing activities, such as energy developments, ROWs, road and trail construction, or other activities may reduce habitat quality or lead to habitat alteration, fragmentation, or loss. Habitat alteration, fragmentation, and loss affect the usable ranges and routes for wildlife movement. Wildlife displacement occurs when land use activities result in the movement of wildlife into other habitats, increasing stress on individual animals, and increasing competition for habitat resources. Impacts on fish and wildlife from displacement depend on the location, extent, timing, and/or the intensity of the disruptive activity or human presence. Occurrence of these disruptive activities over an extended period of time in areas on or adjacent to fish and wildlife habitat could cause either temporary or permanent displacement of wildlife. Impacts from displacement would be greater for those fish or wildlife species with limited existing habitat and/or a low tolerance for disturbance. Habitat maintenance or enhancement can maintain or improve vegetative conditions, reduce soil loss, improve soil water-holding capabilities, control the spread of invasive species, and restore ecological integrity.

The following assumptions were used in the analysis:

- If monitoring reveals that mitigation is unsuccessful in reducing or eliminating impacts, immediate measures to prevent further impacts would be implemented as appropriate to the species affected.
- Impacts on big game populations that exceed the current population objective levels would not be considered significant if the impacts would not reduce the populations below the objective levels.
- Sufficient habitat exists to maintain current fish and wildlife population objectives.
- Disruptive activities would displace wildlife, although some wildlife adaptation would occur.

Under the Proposed RMP, impacts on fish and wildlife are not anticipated as a result of implementing management actions for the following resources and designations: air quality and other designations.

### Proposed RMP

#### *Habitat Alteration, Fragmentation, and/or Loss*

Fire management activities have the potential to directly and indirectly affect fisheries and wildlife habitat throughout the decision area, depending on treatment timing, extent, location, elevation, duration, fuel, severity of fires, and habitat type or vegetation community and soil type of treated area. Effects on vegetation have the potential to directly or indirectly affect fish and wildlife species that inhabit them or areas adjacent to (or downstream from) them.

Resource protection measures would limit short-term and long-term impacts on fisheries and aquatic resources from wildland fire. Direct effects may result from the introduction of fire retardant aviation fuel or lubricants into streams and wetlands, erosion of exposed soils from fire line construction on steep slopes adjacent to streams, damaged riparian vegetation and soils (resulting in erosion) from the use of heavy equipment and establishment of fire camps, or reduced natural stream flow during water drafting and pumping. These impacts could degrade the water quality of fisheries. The collective short-term impacts of increased sedimentation (from erosion) could have watershed-wide adverse effects, including changes in temperature, turbidity, and water chemistry. Because actions to protect resources and project-specific analyses would limit impacts of prescribed fire and would place constraints on non-fire fuel treatments in and adjacent to wetlands, riparian zones, and water habitats, short-term impacts from these fire management activities would be minimized or eliminated. Over the long term, wildland fire management actions would reduce the risk of severe wildland fire and associated suppression activities.

Wildland fire likely would affect suitable habitat used by raptors, migratory birds, small mammals, carnivores and predators, amphibians and reptiles, and a variety of habitats used by upland big game species. Resource protection measures would minimize short-term impacts on non-game and big game species (e.g., direct species mortality, habitat destruction, and habitat displacement). Direct effects from wildland fire suppression could include damaged vegetation (including forage resources) from the use of heavy equipment and establishment of fire camps, weed invasion, an increase in acres of undesirable habitat types, and a decrease in understory diversity and overall species richness (Adams and Simmons 1999). These effects could cause species displacement and potential mortality. Indirect impacts could include changes in the survival or successful reproduction of aquatic prey species (e.g., for birds and carnivores) due to increased sedimentation and subsequent habitat modification as a result of upstream erosion.

Resource protection measures would be considered and implemented, as appropriate, for wildland fire use and planned actions, and direct impacts on raptors and migratory birds would be limited to those associated with wildfire suppression activities. These include mortality, habitat destruction, and temporary displacement. Indirect impacts could include short-term reduction in available prey sources. Raptors and migratory birds found in desert and riparian/wetland habitats would be more likely to incur project-related impacts because these habitats are relatively far removed from their natural fire regimes.

Over the long term, mortality or long-term displacement of species likely would be reduced because wildland fire use and prescribed fire would not likely consist of large fires, and rehabilitation would be implemented as necessary and appropriate. Populations could be displaced for longer periods of time if management activities were implemented repeatedly within the same treatment area (e.g., mechanical treatment followed by prescribed fire followed by biological treatment). Long-term effects on habitat would include a gradual increase in species diversity that would more closely reflect conditions associated with a natural fire regime.

Wildlife habitat contained within the Alton area could be lost due to surface coal mining activities on and adjacent to 3,600 acres. Reclamation activities, beginning within 3 years of initial disturbance, would begin to reestablish wildlife habitat in the disturbed areas. On average, 100 acres would be reclaimed per year. Sagebrush communities that are disturbed or removed take 20 to 100 years to reestablish; therefore, successful mitigation could result in the restoration of habitat values over the long term.

Locating ROWs in common would result in concentrated surface disturbances and habitat deterioration or loss causing species to seek alternative habitats. Locating ROWs in common could actually increase habitat loss or fragmentation if improperly located through habitat.

Authorized excavation of cultural sites, paleontological localities, or cultural inventories would have local and short-term impacts on wildlife and their habitats. The short- and long-term impacts associated with these actions would not be detrimental to wildlife and their associated habitat given the limited footprint of such actions on the landscape.

Habitat fragmentation occurs when a contiguous habitat is broken up (fragmented) by surface disturbing activities. This may cause a reduction in usable ranges and disruption of movements among crucial habitats (Harris 1991). Under this alternative, more wildlife habitat would be protected by additional stipulations on oil and gas exploration and development. However, allowing oil and gas leasing subject to the standard terms and conditions on 95,400 acres could result in fragmentation through the reduction of usable habitat and disruption of movement among habitats, transitional areas, and parturition areas associated with the construction of access roads, facilities, and wells depending on the location and timing of development. Oil and gas exploration and development activities would disturb approximately 2,976 acres over 20 years, which would constitute approximately 1 percent of the planning area. Approximately 2,370 acres would be reclaimed within 20 years. Wildlife habitat not reclaimed (606 acres) in these areas would be lost due to oil and gas exploration and development. Overall, effects on fish and wildlife habitat would be relatively minor over the entire planning area.

Forest and woodland product harvest, areas open to cross-country OHV use (1,000 acres, less than 1 percent), road construction, facility construction, mineral development and construction of associated facilities, and ROW construction could reduce a source of cover for small mammals and reptiles, habitat for birds, and big game winter range and parturition areas. Concentrated cross-country OHV use could remove existing vegetation, which would result in increased runoff, thus reducing wildlife and fisheries habitat quality. Surface disturbing activities could increase sediment delivery to streams, which could interfere with the life history requisites of fish. Forest and woodland product harvest would be allowed on a case-by-case basis except in WSAs and non-WSA lands with wilderness characteristics, and cross-country OHV use would be allowed in previously disturbed areas. The current and anticipated demand for forest and woodland products would not result in an increase in impacts. Although cross-country OHV use would be allowed on more than 1,000 acres (less than 1 percent), fish and wildlife habitat values would not be impacted because the areas being proposed for cross-country use have been subject to disturbance over the past several years, either through natural processes (e.g., sand dunes) or human use (e.g., sand dunes and topsoil pits). In these areas, continued disturbance of previously disturbed areas would not result in additional loss of habitat values.

Management of locatable minerals and mineral materials would result in short-term and direct impacts on wildlife and associated habitat through surface disturbance and habitat loss; however, impacts would be minimal. Impacts from locatable mineral development would be minimal because a plan of operation, including a reclamation plan, is required for all mining claim disturbances. The development of locatable minerals and mineral materials would disturb approximately 1,050 acres over 20 years. The development of locatable minerals and mineral materials could cause localized impacts on wildlife through the disturbance of habitat.

Designing road crossings to support fish passage in areas that support fish would allow for areas to be recolonized from a neighboring population and allow natural movement of fish populations in fisheries. This could also allow for more aggressive introduced species into native fish population habitat.

### ***Displacement***

Displacement from surface disturbance or disruptive activities moves animals into less desirable habitat and increases competition for available resources with other species and uses. Impacts of human activity on big game crucial winter range include habitat and forage loss caused by surface disturbing and other disruptive activities at any time of the year. Dispersed recreation activity, mineral exploration and

development, and ROW development could result in displacement and physiological stress to wildlife from human presence and activity during sensitive life stages. Under the Proposed RMP, seasonal restrictions on surface disturbing activities during sensitive life stages, including in lambing, breeding, and fawning seasons and in crucial deer and elk winter, migration, and transitional ranges, would decrease the possibility of displacement and physiological stress to wildlife from human presence and activity during these sensitive life stages. The possibility of increased human presence in SRMAs, concentrating around staging areas, trails, and other developed recreation sites, could displace wildlife species from habitat surrounding interpretive sites, depending on the location and level of human presence associated with the site. Increasing management presence in SRMAs (95,100 acres, 17 percent) would decrease the potential for these impacts from dispersed recreation activities.

Allowing dispersed camping would result in minor localized harassment of wildlife due to human presence and disruptive activities. Dispersed recreation activities could impact fish and wildlife species by introducing noise that could disturb species during sensitive periods. This could indirectly affect reproduction or cause species to abandon areas such as nest sites or areas that contain key habitat components such as important food sources. Effects would be greater in areas that receive frequent and/or intense recreation use. Areas subject to more visitation would include easily accessible locations, such as along major roads, near communities, or in areas that offer attractive opportunities for recreation. Although damage to fish and wildlife habitats would continue to be monitored, detrimental effects from casual use would not be apparent until after the damage has occurred, which would then be appropriately mitigated to the extent practical and feasible.

Oil and natural gas production could result in the use of pits to separate oil from produced water or to evaporate large volumes of water with high levels of total dissolved solids (TDS). Birds are attracted to these pits because they mistake them for natural bodies of water. The sticky oil then entraps the birds in the pits and they die from exposure and exhaustion. Birds that do manage to escape can die from starvation or experience impaired reproduction caused by the toxic effects of oil ingested during preening and loss of embryos from oil on feathers of adults incubating eggs. Scavengers and predators can also suffer adverse effects from consuming oiled birds. Pits or ponds containing hypersaline water can pose a mortality threat to migratory birds through ingestion of toxic brine, susceptibility to avian botulism, and sodium crystallization on feathers, which destroys thermoregulatory and buoyancy functions. It is BLM standard practice that pits containing harmful fluids be maintained in a manner that prevents migratory bird mortality, thus eliminating potential effects.

Vegetation treatments on an annual average of no more than 22,300 acres would result in temporary displacement of wildlife that uses the treatment areas for a portion of their life cycle. Some species would recover quickly and would reoccupy the sites, although others may be displaced for longer, until the habitat conditions required by the species become reestablished. However, over the long term, the treated areas would provide improved habitat conditions and reduced erosion, which would enhance habitat for wildlife and fish. If less than an annual average of 4,650 acres were treated, shrublands generally would convert into woodlands and reduce understory vegetation. The loss of understory vegetation could, over the long term, decrease forage species, but increase habitat for species dependent on pinyon-juniper woodlands.

The possibility of increased human presence in areas of additional interpretive sites for cultural resources and public education and developed recreation sites could displace wildlife species from habitat surrounding interpretive sites, depending on the location and level of human presence associated with the site.

In general, travel management activities that result in increased human presence would have a localized impact on fish and wildlife species. Impacts could include increased displacement of wildlife, increased

stress during critical time periods, and degradation of habitats. OHV use can alter the seasonal use patterns of many wildlife species. Of particular concern are raptor nesting sites, big game parturition areas, and winter habitats. Allowing cross-country OHV use on 1,000 acres and on 1,403 miles of designated routes in areas where OHV use is limited to designated routes (528,000 acres, 95 percent) would result in the displacement of wildlife through human presence and disruptive activities; however, severely reducing the area available for cross-country OHV use would reduce the overall effect on wildlife from OHV use. Areas closed to OHV use (25,000 acres, 5 percent) or away from designated routes where OHV use is limited to designated routes would avoid impacts associated with the disruption of wintering big game and preserve habitat characteristics. Seasonal restrictions on 2 miles of OHV routes in Pugh Canyon for raptor species would provide protection from disturbance and habitat degradation during the closure period from February 1 to August 31.

Closing raptor areas to rock climbing could result in the elimination of long-term disruptive effects on nesting activities during sensitive periods, which could indirectly affect reproduction and cause species to not abandon areas. Limiting SRP groups to 12 people per group within wetland/riparian zones, WSAs, and designated critical habitat for special status species, and limiting SRP groups to 25 people per group in the remainder of the decision area could reduce wildlife displacement from large groups.

#### ***Habitat Maintenance and/or Enhancement***

Applying *Standards for Rangeland Health* to all rangelands and *Guidelines for Grazing Management for BLM Lands in Utah* (BLM 1997a) for rehabilitation of rangelands would offer protection for fish and wildlife habitat by maintaining or improving the ecological health and condition of rangeland ecosystems. Using livestock grazing to enhance ecosystem health or mitigate resource problems (e.g., noxious/invasive weed control and hazardous fuel reduction) where supported by site-specific environmental analysis could result in enhancement of overall wildlife habitat and over the long term could decrease invasive species. Continuing to implement noxious weed and invasive species control measures would maintain or improve fish and wildlife habitat, but could cause localized temporary disturbances during control measures.

Focusing vegetation treatments in identified high-priority areas and increasing the potential treatment acres would target areas where habitat function could be most improved. This would result in an increase in habitat components, including increased forage and shelter. Vegetation treatments on an average of no more than 22,300 acres annually could maintain natural disturbance rates, providing for greater habitat diversity; however, if less than an annual average of 4,650 acres were treated, then habitat values, including forage and shelter, may not function within their natural disturbance regimes, altering the value of the habitat. In addition, treatments associated with maintaining or restoring special status species habitat could improve wildlife habitat in the same area.

General vegetation management of rehabilitation objectives, including managing for 51 percent or higher of PNC, would maintain available forage and maintain or enhance wildlife habitat. Vegetation management in riparian areas and hanging gardens would maintain or improve fish and wildlife habitat conditions, provide direct protection of fish and wildlife habitat, and retain adequate water supply to support fisheries. Restoring sagebrush steppe communities and maintaining old-growth forest and woodland stands could improve the long-term ecological health and habitat condition and help support diverse wildlife and sagebrush-obligate species and their food sources. Treatments for sagebrush steppe restoration could cause temporary disturbances to wildlife occupying these areas.

The Proposed RMP proposes more restrictions on surface disturbing activities than the current management situation. Areas that are closed to surface disturbing activities (23,800 acres, 4 percent), open to oil and gas leasing subject to major constraints (NSO) and closed to oil and gas leasing (162,400 acres, 29 percent); areas withdrawn and recommended for withdrawal from minerals entry (24,591 acres,

4 percent, and 9,500 acres, 2 percent, respectively); closed to mineral material disposals (105,000 acres, 19 percent); ROW exclusion areas (75,700 acres, 14 percent) and ROW avoidance areas (106,670 acres, 19 percent); and areas closed to OHV use (25,000 acres, 5 percent) would protect fish and wildlife habitat from surface disturbance and disruptive activities. These decisions include restrictions on uses of fish and wildlife habitat, special status species habitat, ACECs, SRMAs, WSAs, WSRs, Wilderness, and areas that are sensitive to disturbance (e.g., fragile soils and riparian/wetland areas). The reduction or elimination of development in these areas would limit surface disturbance, maintain fish and wildlife habitat quality, and reduce or eliminate the effects of displacement from human presence. Areas open to oil and gas leasing subject to moderate constraints (timing limitations, CSU) (296,200 acres, 54 percent) would include stipulations to minimize impacts from oil and gas exploration and development on big game crucial winter, migration, and transitional ranges, on Desert bighorn sheep lambing and fawning seasons, and on seasonal buffers for raptor habitat. Protection of fragile soil areas and implementation of erosion control measures would reduce erosion and surface runoff, which could enhance fish and wildlife habitat. Applying BMPs to avoid or reduce fragmenting habitat and mitigating habitat losses for listed and sensitive species where appropriate could avoid and reduce habitat fragmentation and losses for fish and wildlife. In addition, mitigation would be considered where appropriate, which could reduce habitat fragmentation and losses.

Closing and reclaiming roads, facilities, or improvements that are no longer necessary could deter continued use of the area, resulting in reduced disturbance to fish and wildlife habitat. Reclaiming roads would enhance wildlife habitat through removal of disturbed areas, increases in forage, and reduced habitat fragmentation.

Incorporating erosion control measures on slopes greater than 15 percent would further reduce erosion and surface runoff, which could enhance fish and wildlife habitat. In addition, cooperative implementation of the *Upper Sevier Watershed Management Plan*, managing the Sevier River in accordance with the TMDL, and avoiding or minimizing impacts on water quality could maintain or improve the conditions of fisheries. Managing the discharge of produced waters, including no surface discharge in the Colorado River Basin, would maintain fish and wildlife habitat by preventing possible degradation of water quality and fisheries.

Management actions associated with water quality and watershed health, soils, and fish and wildlife, including BMPs, protection of culinary water supplies, and water source protection zones, could maintain or improve riparian habitat conditions and fisheries. Management of riparian areas through project design features or stipulations and water retention would maintain or improve riparian habitat conditions and retain adequate water supply. Implementing BMPs designed to minimize detrimental impacts on soils for ground disturbing activities would reduce the potential for localized habitat deterioration that may occur.

Management of the plague and other diseases in Utah prairie dog colonies could reduce the spread of plague in chipmunks and ground squirrels. Protective management measures for the Mexican spotted owl, including prohibiting new recreation facilities or trails within PACs, seasonal closures of existing facilities, and limiting SRP groups to 12 persons or fewer per group, would protect and enhance fish and wildlife habitat and reduce human presence and disruptive activities.

Management actions for desired future conditions of important wildlife and fish habitat would improve habitat conditions, especially deer winter range and sagebrush habitats, by maintaining and prioritizing habitat vegetation treatments in areas of crucial deer and Greater sage-grouse winter range and sage-grouse brood-rearing habitat. Providing for fish passage on road crossings would minimize impacts on population function and interaction.

Management of habitat to provide for wildlife management objectives, authorization of wildlife habitat improvement projects, and retaining crucial wildlife habitat in public ownership would protect or enhance fish and wildlife habitat and provide key habitat components. However, this could cause temporary disturbances during project construction. Fish and wildlife translocation, transplantation, augmentation, and reestablishment would allow for management flexibility to ensure healthy wildlife populations.

Permitting commercial forest and woodland product harvest for the purpose of promoting forest health would improve the long-term health of forest habitats. However, this could cause temporary disturbances or displacement during project implementation. Management actions for woodland product harvest, such as closing WSAs and non-WSA lands with wilderness characteristics to harvest except for incidental collection for onsite campfire use and administrative purposes, would provide a source of cover and habitat for prey species and ensure a prey base for raptors and other predators. Permitting woodland product harvesting in riparian areas in PFC for maintenance and/or improvement of riparian ecosystems could provide long-term habitat enhancement through overall forest health and habitat diversity.

Management of forage allocation by allocating 11,045 AUMs to wildlife throughout the decision area and closing 48 AUMs on the Water Canyon Allotment to livestock grazing would provide an increased amount of forage allotted to ungulate and other species in the Water Canyon Allotment. Management to mitigate conflicts between grazing and other uses could provide a mechanism to ensure that habitat deterioration would not occur due to overuse by multiple uses.

Management of ROWs and ROW corridors for the siting and construction of communication towers with consideration of measures to avoid and minimize impacts on migratory birds likely would minimize or eliminate loss of migratory birds from guy wires and other associated features of communication towers. Managing powerlines to reduce the risk of raptor electrocution or line-strike would reduce raptor injury and mortality. In addition, burying new and reconstructed utility lines could further reduce electrocution risk to raptors and collision potential for migratory birds.

Restrictions on visually obtrusive developments on VRM Class I and Class II areas would limit development on approximately 170,400 acres.

Management prescriptions associated with ACECs would restrict surface uses that could otherwise result in loss and disturbance of habitat. Managing the Cottonwood Canyon ACEC (3,800 acres) as a VRM Class II area and requiring NSO stipulations on new leases would reduce the extent of surface disturbance in the ACEC in upland, riparian, and forest and woodlands habitat.

Managing suitable river segments to protect their ORVs, free-flowing nature, and tentative classification would provide direct protection to wildlife ORVs within 3,770 acres of river corridors (21 miles).

Management outlined in the *Paria Canyon–Vermilion Cliffs Wilderness Plan* and Interim Management Policy (IMP) (in WSAs) would indirectly protect and enhance habitat characteristics of species such as raptors, fish, and big game.

## **Summary**

Habitat alteration, fragmentation, and/or loss occurs when habitat components needed for species survival (e.g., forage and cover) are removed or when contiguous habitat is broken up (fragmented) by surface disturbing activities. This results in a reduction in usable ranges and disruption of movements among habitats, transitional areas, and breeding areas (Harris 1991).

Displacing activities may not directly affect components, but they force animals to move into less desirable habitat, increasing competition for available resources with other species and uses. Users could introduce noise or dust that could disturb species during sensitive periods, which could indirectly affect reproduction or cause species to abandon areas such as nest sites or areas containing key habitat components such as important food sources. Stress inflicted on species could also deteriorate species health, which could affect survivability. A fleeing or displaced animal incurs additional costs through loss of food intake and potential displacement to poorer (lower) quality habitat.

Habitat maintenance and/or enhancements occur as a result of vegetation treatments to reduce soil loss, improve crucial big game habitat, restore ecological function, and increase forage production. Vegetation treatments would result in short-term reduction of habitat values (e.g., forage and shelter) until vegetation communities are reestablished. However, over the long term the treated areas would provide improved forage conditions and reduced erosion, which would enhance wildlife habitat and fisheries. Vegetation treatments would improve the diversity of vegetation age classes and lead to greater herbaceous vegetation production and forage quantity and quality, improving palatability for some wildlife species.

The Proposed RMP would restrict surface disturbing activities and disturbances, resulting in varying degrees of protection for fish and wildlife habitat. Management actions that would protect fish and wildlife habitat from surface disturbing and disruptive activities include ACEC designations, mineral exploration and development closures, and OHV use closures. Over the long term, vegetation treatments would also maintain or enhance habitat characteristics. Surface disturbing activities and disruptive activities, such as recreation, mineral exploration and development, OHV use, and vegetation treatments, would be the most common sources of displacement.

#### **Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

Due to the limited extent of foreseeable development and the existing health of wildlife populations, there would be no irreversible or irretrievable impacts.

Management actions could result in various short-term impacts on habitat, such as increased localized soil erosion and vegetation damage. Surface disturbing activities could result in the greatest potential for impacts on long-term productivity. Existing health of wildlife population, limited extent of foreseeable development, management actions, and application of BMPs would minimize the effect of short-term uses.

Unavoidable damage to fish and wildlife from permitted activities could occur if resources undetected during surveys were identified during ground disturbing activities. Unavoidable loss of species due to lack of information, documentation, and inadvertent damage or use could also occur.

Surface disturbing activities could result in unavoidable adverse impacts, although these impacts could be mitigated to the extent possible. Permanent conversion of areas to other uses such as transportation and mineral and energy development would decrease the relative abundance of species within portions of plant communities, reducing habitat values in these areas. Oil and gas wells and their associated infrastructure would be mitigated to the extent possible to minimize fragmentation and avoid the most significant wildlife habitat values.

## 4.2.7 Impacts on Wildland Fire Ecology

This analysis addresses the potential impacts on fire ecology from implementing the Proposed RMP. Impacts on resources, resource uses, and designations resulting from implementation of the fire management program are discussed in the resource sections in this chapter. This analysis focuses on the management alternatives or actions that affect fire intensity, frequency, and suppression efforts.

Fire intensity could be affected by activities that decrease fuel loading, such as vegetation treatments and harvesting of forest and woodland products, and activities that alter the composition and structure of vegetation communities. High-intensity fires generally result in a greater loss of vegetation cover, changes to soil chemistry, damage to root structures, and a greater ability for non-native species to become established. Activities that could introduce ignition sources (e.g., recreation use and mineral exploration and development) would have the greatest effect on fire frequency. These additional ignition sources would increase the probability of wildland fire occurrence and increase the need for fire suppression activities. The ability to use certain fire suppression techniques could be affected by restrictions designed to protect sensitive resources from surface disturbing activities. Such restrictions are associated with the management of wilderness, WSAs, sensitive viewsheds, cultural and paleontological resources, and special status species.

The analysis is based on the following assumptions:

- Fire is an important functional, natural disturbance in many of the ecological systems found in the decision area.
- A direct relationship exists between the density of human use within the decision area and the frequency of human-caused fires.
- Fire size and intensity are more likely to increase as fuel loading increases.
- Wildland fire use would be expected to not require rehabilitation. If unintentional resource damage does occur, rehabilitation will be applied.
- Demand for fuels treatment will continue to increase over the life of the plan.
- ATVs and off-road motorcycles have a reduced potential for ignition sources because they have raised exhaust systems and spark arresters.
- Burned acres for wildfires would not exceed 87,100 acres for a 20-year cumulative maximum (BLM 2005c). If these acres are exceeded, it may require additional analysis.
- Wildland fire use would not exceed 390 acres for a 20-year cumulative maximum (BLM 2005c). If these acres are exceeded, it may require additional analysis.
- Prescribed fire acres would not exceed 103,000 acres for a 20-year cumulative maximum (BLM 2005c). If these acres are exceeded, it may require additional analysis.
- Non-fire fuels treatment acres would not exceed 117,500 acres for a 20-year cumulative maximum (BLM 2005c). If these acres are exceeded, it may require additional analysis.
- ESR acres would not exceed 87,100 acres for a 20-year cumulative maximum (BLM 2005c). If these acres are exceeded, it may require additional analysis.

In the absence of quantitative data, best professional judgment was used, and impacts are sometimes described using ranges of potential impacts or in qualitative terms, if appropriate. Under the Proposed RMP, impacts on fire ecology would not be anticipated as a result of implementing management actions for other designations.

## Proposed RMP

### *Fire Ecology Management*

Activities associated with fire ecology management likely would have the greatest effect on the ability to control wildland fires. Using wildland fire and prescribed fire to protect, maintain, and enhance resources would reduce fuel loading and promote healthy, diverse vegetation communities, both of which would decrease the intensity of wildland fires and facilitate suppression efforts. Suppressing wildland fires in areas where fire is not desired (such as areas with high resource values, structures, cultural sites, and habitat for sensitive species) may in the short term reduce fire size and intensity in these areas and increase the ability to control fires and protect important resources from fire damage. This management action would also directly facilitate achievement of the goals of the fire program; however, implementing fire suppression would continue to limit and exclude fire from functioning in its natural role, resulting in further departure from the historic fire regime over the long term, and would indirectly result in a longer fire-return interval, the continued buildup of fuel loads, and the promotion of vegetation communities that would more likely fuel high-intensity fires. Fire-dependent plant communities could deteriorate over the long term if fire were prevented from occurring within these communities.

### *Management Actions that Affect Fuel Loads*

Grazing by livestock and/or wildlife would reduce fire frequency by reducing fine fuels (e.g., grasses) that serve as ignition sources and allow low-intensity wildland fires to spread. Using livestock grazing to help accomplish resource objectives on allotments (e.g., hazardous fuel reduction) on a case-by-case basis would further reduce fuel loads. Although this could result in fewer fires in the decision area, decreasing the probability of ignition could also provide more time for the accumulation of larger fuel sources (e.g., shrub vegetation) between fires, which could increase the intensity of wildland fires over the long term. Applying the *Standards for Rangeland Health* to all rangelands would prevent severe removal of fine fuels by surface uses, which would help maintain fine fuel cover and the occurrence of low-intensity fires. The standards would also promote healthy, diverse vegetation communities that generally fuel low-intensity fires.

Vegetation and weed treatments would decrease both standing and non-standing vegetation (fuel load) across the decision area, which would decrease the intensity of wildland fires and allow fires to be more easily controlled. 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 low-intensity fires. Specifically, efforts to reduce incursion of non-native annual grasses (primarily cheatgrass), encroachment of shrubby vegetation, buildup of biomass in forested areas, and spread of noxious and invasive weeds would help to achieve this effect. Habitat improvements for special status species and fish and wildlife could also have similar impacts. Treating vegetation to improve resource conditions would continue to reduce the occurrence of uncharacteristic wildland fire, damage and catastrophic suppression, and rehabilitation costs.

Conducting annual vegetation and land treatments (e.g., wildlife habitat treatments, watershed treatments, livestock rangeland treatments, fuels treatments, and stewardship contracting) on an annual average of no more than 22,300 acres (446,000 acres over the life of the plan) using the full range of vegetation treatment methods and tools (i.e., prescribed fire, mechanical, chemical, biological, woodland product removal, and wildland fire) would decrease fuel loading, which would decrease the intensity of wildland fires and allow fires to be more easily controlled. Vegetation and weed treatments would decrease both standing and non-standing vegetation (fuel load) across the decision area, which would decrease the intensity of wildland fires, and allow fires to be more easily controlled. 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

low-intensity fires. Specifically, efforts to reduce incursion of non-native annual grasses (primarily cheatgrass), encroachment of shrubby vegetation, buildup of biomass in forested areas, and spread of noxious and invasive weeds would help to achieve this effect. Habitat improvements for special status species and fish and wildlife could also have similar impacts. Treating vegetation to improve resource conditions would continue to reduce the occurrence of uncharacteristic wildland fire, damage and catastrophic suppression, and rehabilitation costs. In addition, managing to achieve the 51 percent or higher of PNC could promote diverse vegetation communities that would burn with less intensity and be more easily controlled or could increase fire intensity.

Under the Proposed RMP, treatments would be conducted in areas containing ponderosa pine for stand health, which would increase tree spacing, decrease fuel loading, and thereby decrease fire size/intensity. Fuels regimes would move toward Condition Class 1. Managing for old-growth forests and woodland stands would reduce the amount of dead and downed fuels attributed to insects, disease, and overgrowth. This would maintain old-growth stands, with sufficient surface cover and ladder fuels to ensure that wildland fires would be low-intensity, small, and easy to control. By managing for the desired condition these vegetation types would move toward fire regime Condition Class 1.

The harvesting of forest and woodland products would reduce fuel accumulations in wooded areas and subsequently reduce wildland fire intensity. This activity would reduce overall canopy density, which would inhibit the movement of fire through the canopy. Harvest of woodland products would reduce the fuel load and help reduce the encroachment of pinyon-juniper woodlands into the sagebrush steppe. However, this impact would be localized because the demand is limited. Individual treatment areas could act as firebreaks, changing wildland fire behavior in these areas. In addition, permitting harvest of forest and woodland products to promote or sustain forest health on a case-by-case basis would further reduce loads and improve forest health and could move those areas harvested toward fire regime Condition Class 1.

#### ***Management Actions that Affect Fire Suppression Activities***

Maintaining air quality standards within thresholds established by the State of Utah could result in fewer prescribed fires or more suppression efforts on wildland fires. If it were determined that air quality or Class I airsheds would be adversely impacted, wildland fire use and prescribed fires would be suspended. Consideration of regional haze could increase the restrictions on wildland fire use or prescribed fire. These restrictions would lead to increased fuel loads.

The presence of significant cultural and paleontological resources would require suppression of wildfires threatening the sites. Their presence also would limit and/or restrict certain types of fire suppression methods and fuels treatments. This could affect the ability of firefighters to protect cultural sites and surrounding areas during wildland fire suppression activities. The need for suppression actions during wildland fire events would be reduced for cultural sites that received hazardous fuels treatments. This impact would occur in small, localized areas where such resources are known to exist.

Areas where surface disturbing actions would be precluded would increase to 23,800 acres (4 percent). This would increase the area where fire suppression activities could be limited or restricted.

Surface disturbance restrictions intended to protect natural values, including Wilderness, WSAs, WSRs, fish and wildlife, and special status species (e.g., prohibiting ground disturbing activities within ½ mile of bald eagle nests and Mexican spotted owl nests), could preclude certain types of fire suppression activities, which would limit the ability to control fires and to protect these sensitive resources. Seasonal restrictions could preclude certain types of fire suppression activities within the restricted time frame. Controlling surface disturbing and disruptive activities to minimize impacts on identified crucial habitat for sensitive species, applying BMPs to avoid or reduce habitat fragmentation, prohibiting surface

disturbing activities within ½ mile of active or suitable Utah prairie dog habitat, and applying seasonal restrictions in big game habitats could restrict certain types of fire suppression activities, which could limit the ability to control fires and to protect these sensitive resources.

Under the Proposed RMP, VRM Class I areas would increase to 76,000 acres (14 percent) and VRM Class II areas would increase to 94,400 acres (17 percent). This could limit mechanical land treatments, which could result in fuels buildup and increased risk of catastrophic wildfires in this area.

Six eligible river segment corridors (5,530 acres) would be determined suitable and managed to protect their ORVs, free-flowing nature, and tentative classification. This would increase the area where fire suppression activities could be limited or restricted. Although management associated with the Cottonwood Canyon ACEC does not specifically address wildland fire management, fire suppression activities would have to consider its resources, which could affect some of the suppression tactics available.

The full range of suppression activities are available within Wilderness areas and WSAs, although the suppression methods that result in the least long-term disturbance (i.e., use minimum tool standard in the Wilderness area and nonimpairment criteria for WSAs) while protecting human life and property would be preferred. In addition, wilderness policy and the IMP could affect fire suppression activities and equipment used in WSAs and in the Paria Canyon–Vermilion Cliffs Wilderness. This could affect fire suppression efforts and the ability to control large, intense wildland fires. Wilderness and WSA management would allow the use of chemical, biological, or mechanical treatments, which would help restore ecological functions. These areas would move toward fire regime Condition Class 1 as a result of the various forms of treatment.

Aboveground ROWs and communication sites would require additional efforts by firefighters to protect these areas in wildland fire events. Underground ROWs would need to be avoided during suppression efforts such as the construction of fire lines. Development of ROWs would result in clearing vegetation to make way for linear features, such as roads, pipelines, and transmission lines. ROWs could provide fuel breaks, which could be effective in preventing the spread of wildland fires. Some ROWs could also provide firefighters with access routes to remote areas. The magnitude of impacts from ROWs would decrease because 75,700 acres (less than 14 percent) would be excluded from new ROWs. In addition, new ROWs would be avoided in 106,670 acres (19 percent) of the decision area. This could reduce the areas where ROWs would need to be protected. However, it would also reduce the fuel breaks and access routes associated with the ROWs.

#### ***Management Actions that Affect Fire Frequency***

Recreational activities in the decision area could affect fire management. The recreational opportunities in the decision area attract increasing numbers of visitors, which increases the probability of unintentional fire starts and the need for fire suppression activities. Campfires and exhaust systems on motorized vehicles both can cause unintentional ignitions. Developed campsites would act as safety zones and fuel breaks, but would also require additional protection in wildland fire events. Ignition would be less likely in developed campsites (fire rings, safety) because of fire restrictions.

Because OHV use allows visitors to access remote areas, human-caused fires (e.g., due to unattended campfires and vehicle sparks) could occur in areas that are difficult to access with fire suppression equipment. The routes that provide motorized access to public lands within the decision area facilitate travel, and increase the distribution of visitors throughout the decision area, thus increasing the extent of related effects. OHV use allows visitors to access even the most remote areas of the decision area, which can make access difficult for fire suppression equipment in wildland fire events. However, the routes would also provide access for suppression efforts and natural fuel breaks. Developing more recreation

sites and facilities would concentrate ignition sources to areas of high use. In these areas, the lack of fuels would be less likely to result in ignitions. Additional restrictions on OHV use would decrease the potential for wildland fire occurrence. Decreasing the areas open to cross-country OHV use to 1,000 acres (less than 1 percent) and increasing the area limited to 1,403 miles of designated routes on 528,000 acres (95 percent) would decrease the potential for wildland fire occurrence because less area would be easily accessible to visitors.

Activities associated with mineral exploration and development would increase human presence and the use of heavy equipment in the decision area, which would introduce additional ignition sources and increase the probability of wildland fire occurrence and the need for fire suppression activities. Related long-term disturbance of about 607 acres would result in degraded vegetation communities that could more likely fuel high-intensity fires; however, developed areas could provide increased accessibility to remote areas for fire suppression equipment, and provide fuel breaks in the case of wildland fire events.

Surface disturbance caused by development activities could modify the composition and structure of vegetation communities, including the spread of noxious weeds. These disturbed areas could be more likely to fuel high-intensity fires.

## **Summary**

Vegetation treatment and forest and woodland product harvest under the Proposed RMP would reduce fuel loading and the intensity of wildfire.

## **Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

There would be no irreversible and irretrievable commitment of resources. There are no short-term uses proposed that would affect the long-term productivity of wildland fire ecology because of the application of identified resource protection measures. Recreational activities, development of mineral resources, and general use of the decision area will continue to increase, introducing additional ignition sources and increasing the potential for wildland fires. Wildland fires from these ignition sources are not desired, and would increase the need for suppression activities.

## 4.2.8 Impacts on Cultural Resources

The primary cultural resource impact is the disturbance of artifacts, sites, and features of sites that reduces their scientific integrity, alters their association with traditional values, reduces their public use values, and reduces the potential to provide significant data. This can occur from activities or processes that disturb the surface, remove vegetation, increase soil erosion, or otherwise lead to cultural artifacts being damaged or moved from their original positions (in situ) prior to scientific documentation. Cultural resource information and values can also be damaged or lost if the soil matrix at a site is lost or removed without the potential for scientific study. Although deterioration of cultural sites and their artifacts may be slowed or halted, physical damage to objects and sites cannot typically be reversed. Cultural values can also be affected if the physical setting associated with a site is altered in a way that changes the relationship between the site and its physical surroundings. Short-term impacts on these cultural resource values from visual or auditory disturbance generally affect public or traditional uses of cultural sites or areas. These impacts can diminish the site's traditional use values, but can often be ameliorated or accommodated through activity planning.

To preserve cultural resource values as a part of our national heritage, various laws, regulations, and policies require that cultural resources be considered in any agency decision that could affect cultural resources. Consideration usually includes inventory, evaluation, and mitigation of effects. Addressing effects on cultural sites includes either project relocation or redesign (avoidance), or scientific data recovery methods such as recordation, surface collection, subsurface testing, and excavation.

Although information on locations of all cultural sites in the decision area is incomplete, the analysis considers the management alternatives and their potential to directly or indirectly affect cultural resources, as noted above. The number of sites that could be affected by various actions is directly correlated with the degree, nature, and quantity of surface disturbing activities in the decision area and whether the activity occurs in an area of high or low site density. Impacts are quantified where possible. In the absence of quantitative data, best professional judgment was used. Some of the decisions in this document are programmatic; others may be implemented immediately (e.g., route designation or oil and gas leasing stipulations). To ensure preservation of specific cultural resource sites, further analyses will be required at the implementation level following site-specific cultural resource inventories.

The required consultations for Section 106 of the National Historic Preservation Act (NHPA) are in progress. The BLM has forwarded to the State Historic Preservation Office a determination that, although in some cases, management actions in this plan may have a potential to affect historic properties, there would be no adverse affect to these historic properties. Section 106 consultation will be completed prior to signature of the Record of Decision (ROD).

The analysis is based on the following assumptions:

- Cultural resources would continue to be discovered throughout the decision area.
- As access to an area increases, incidental damage of cultural resources adjacent to the access routes would increase. Impacts from incidental damage would be reduced as distance from the access route increases.
- The demand for use of cultural resources (e.g., public use, scientific use, and traditional use) will increase as access to and use of the planning area increases.
- The number of sites that could be impacted by various actions would be directly correlated with the degree, nature, and quantity of surface disturbing activities within the decision area and whether the activity occurs in an area of high or low site density.

Under the Proposed RMP impacts on cultural resources are not anticipated as a result of implementing management actions for the following resources and designations: air quality and other designations.

## Proposed RMP

### *Cultural Resource Management Actions*

Cultural resources would be managed in compliance with laws, regulations, and bureau policy, addressing their management when a site is identified during inventory associated with a surface disturbing activity. Each alternative would comply with federal laws and agency guidelines governing the identification, evaluation, and protection of cultural resources and Native American sacred/traditional sites. Cultural resources would continue to be identified, evaluated, and considered in association with all federal undertakings. Impacts on known cultural resource sites from surface disturbing actions would be mitigated. Impact mitigation, such as the scientific excavation of identified sites, would minimize the potential for adverse effects to known cultural resource sites. Monitoring identified cultural sites that have known impacts and sites that are sensitive to incidental impacts would indicate if management actions are needed to protect the sites, decreasing the potential for losing cultural values as a result of deterioration and impact.

Updating the Class I cultural resource inventory every 10 years would provide the landscape-level understanding of the cultural resources in the decision area. This would ensure that mandatory inventories, proactive inventories, and research designs would build on the cultural resource inventories and studies already completed. Associated with using proactive research, protection, and inventories involving universities, avocational and service groups, site stewards, tribes, and community outreach, the knowledge of, information about, and protection and preservation of cultural resources and the associated information they contain would be increased. Allocating cultural sites to use categories and managing them for their various uses would result in sites being proactively managed considering cultural resource sites' varied values. Because most cultural sites would be managed for scientific use, no use would occur on the sites until scientific study could recover the information associated with the sites. Allowing changes to site use allocations would allow for site-specific characteristics and circumstances to be addressed as varying situations arise.

Providing interpretive opportunities could provide more cultural resource sites for public use and education. This action would require inventories to recover scientifically important data prior to allowing public use of the sites. Increased interpretation opportunities would increase public appreciation for the decision area's cultural values. Increased emotional linkages associated with appreciation could lead to increased user stewardship behavior (Sharpe and Ewert 2000). Major impacts associated with stewardship behavior include increased protection of cultural sites, decreased inadvertent damage to or disturbance of cultural sites, decreased vandalism and looting, and preservation of the integrity of cultural resources.

The prioritization of areas for proactive cultural resource inventories would result in the identification of cultural resources and sites, increasing the database of known sites in areas where the potential for incidental impacts is greatest and areas where the potential to identify sites is greatest. This information would assist in National Register recommendations and would increase the knowledge base in this area while providing for improved management of these resources.

Precluding surface disturbing activities within ¼ mile or within the visual horizon, whichever is closer, of cultural landscapes eligible for the National Register generally would protect these areas from visual intrusions. However, there could be areas where cultural landscapes extend beyond the ¼ mile where visual intrusions in the landscape could be allowed. In these areas, adherence to federal regulations would result in consideration and mitigation of these impacts. However, it would be easier to mitigate visual intrusions beyond the ¼ mile due to the setback.

Coordination with Native American Tribes to identify and manage traditional cultural properties could result in the identification of traditional cultural properties. If traditional cultural properties were identified, management of these sites for traditional use could result in avoidance of surface disturbing actions in and around the sites, either temporally or spatially. The cultural resource sites would be preserved in place, and Native American concerns taken into account.

#### ***OHV Access and Use (Cross-Country Use and Use on Designated Routes)***

Cross-country OHV use would be allowed on approximately 1,000 acres (less than 1 percent). However, there would be a very low potential for impacts on cultural resources in these areas because they have been subject to previous Section 106 (DD Topsoil Pit) or Section 110 (sand dunes) inventories that have not identified any cultural sites.

Managing most of the decision area as closed to cross-country OHV use and limiting OHV use to designated routes on 528,000 acres (95 percent) would increase protection to cultural resources. Cultural resources away from designated routes would be protected from OHV impacts. Rather than the potential for increased disturbance and incidental damage associated with pioneered routes in areas open to cross-country use, impacts on cultural resources from OHV use on designated routes would be limited to 1,403 miles (95 percent) of designated routes. There would be no impacts from OHV use on 25,000 acres (5 percent) closed to OHV use, in areas away from the designated routes, and on 75 miles (5 percent) of closed routes.

Reducing temporary roads associated with temporary projects and reclaiming unnecessary facilities and improvements would maintain and/or improve the isolated nature of the cultural sites, protecting them from incidental damage. Limiting OHV use to designated routes in areas with fragile soils would eliminate impacts from cross-country OHV use and not increase erosion above natural rates in these areas. This would maintain existing levels of natural deterioration to cultural sites.

#### ***Mineral Development***

Mineral development as a result of implementing the mineral decisions would involve direct and indirect impacts on cultural resources. Direct impacts are related to the level of surface disturbance assumed under the RFD scenario. Because the actual placement of each mineral development or associated feature is unknown at this level of planning, impacts on cultural resources are noted as potential impacts. Impacts also vary based on the type of mineral decision and areas available for development of the various minerals.

Cultural resource values on 391,600 acres (71 percent) open to oil and gas leasing subject to the standard terms and conditions and open to oil and gas leasing subject to moderate constraints (timing limitations, CSU) could be impacted by oil and gas leasing. Although cultural site densities vary in different areas throughout the decision area (Chapter 3, Cultural Resources section), site densities are low enough to provide for the avoidance, following identification, of cultural sites when lease holders exercise initial development rights associated with oil and gas leases. Based on the RFD, oil and gas developments within these areas would impact 2,070 acres over the life of this plan (Appendix 15). Development on these acres would typically be subject to Class III cultural resource inventories and evaluation on a project-by-project basis prior to allowing disturbance. This likely would result in the identification of between 10 (low site density) and 226 (high site density) cultural sites in these areas. Site densities throughout the decision area generally would result in the identification and avoidance of cultural sites during development. However, development in areas of very high cultural site density could result in the identification of sites that are unavoidable to mineral development. Sites that are unavoidable would be physically altered or eliminated during mitigation activities such as data recovery or other onsite means, as determined through the Section 106 process. Although the physical site could be altered or eliminated,

excavation would preserve the artifacts and information associated with the site, maintaining the cultural values.

Managing 475,000 acres (86 percent) as open to oil and gas leasing (open to oil and gas leasing subject to the standard terms and conditions, open to oil and gas leasing subject to moderate constraints [timing limitations, CSU], and open to oil and gas leasing subject to major constraints [NSO]) could result in 906 acres of surface disturbance from seismic operations supporting oil and gas leases. This likely would result in the identification of between 4 (low site density) and 99 (high site density) cultural sites in these areas. On identification, seismic operations likely would be able to avoid all the identified sites.

Although more of the decision area is available for further coal leasing consideration, the RFD anticipates one surface mine would be developed in the Alton area, disturbing approximately 3,600 acres over the life of the plan (Appendix 15). Although the exact placement of the mine is not a proposed decision in this document, based on the density of cultural sites within the Alton area disturbance of this many acres would result in the identification of approximately 100 sites. Because the surface coal mine would result in the complete disturbance of surface resources, these sites would not be able to be avoided, resulting in mitigation through data recovery for many of these sites. This would increase the knowledge of the cultural resources in the area, but it would also eliminate these sites from future study and uses (e.g., public, traditional, and scientific). However, because of the large number of sites, it may not be feasible to mitigate all of the sites through data recovery. As a result, some National Register-eligible sites could be lost without any data recovery. Development of a scientific research design prior to development of the coal mine would result in mitigation of the sites with the greatest potential for data recovery and information, limiting the extent of this impact to the degree possible.

Potential long-term impacts on cultural resources from mineral development include the identification of cultural resources during inventories preceding development activities. Identification of sites would increase the knowledge of the cultural resources in the areas. Most sites identified during these inventories would be avoided because of project relocation or redesign, which would protect the cultural resource site. When it is not possible to avoid sites, the archaeological sites would be physically altered or eliminated during mitigation activities, such as data recovery or other onsite means, as determined through the Section 106 process. Although the physical site could be altered or eliminated, excavation would preserve the artifacts and information associated with the site, maintaining the cultural values. During implementation of mineral development activities, there is also a potential for inadvertent damage to sites not identified during the inventories.

Although cultural sites within the area of mineral development will have been identified and either avoided or mitigated as part of the specific mineral development projects, sites not located within the footprints of undertakings are also vulnerable to impacts because human traffic in the general area increases. Potential indirect effects on cultural resources include increased erosion on cultural resource sites located in the vicinity of mineral developments where vegetation cover has been reduced or eliminated, and the potential for inadvertent impacts associated with increased human activities in these areas.

Because approval of mineral material sites is a discretionary decision, the inventories at the implementation level prior to development of approximately 650 acres (Appendix 15) likely would identify between 3 (low site density) and 70 (high site density) cultural sites. In addition, inventories prior to the development of locatable minerals on approximately 400 acres (Appendix 15) likely would identify between 2 (low site density) and 44 (high site density) cultural sites. These sites would be either avoided or mitigated through other means identified in the Section 106 consultation process.

Other impacts from mineral exploration and development include short-term disruption from visual or auditory effects such as drilling and automobile traffic. These impacts usually affect cultural landscapes or traditional uses and would be mitigated or accommodated through measures identified in the Section 106 consultation process.

#### ***Planned (BLM) or Permitted (BLM-Approved) Surface Disturbing Actions***

Surface disturbing activities (e.g., mineral development activities, construction within ROWs, recreation site development, and construction of range improvements) could result in significant impacts on cultural resources in the absence of mitigation; however, these impacts would be mitigated through implementation of existing laws and policy, such as Section 106 of NHPA and FLPMA. Cultural values would be protected (i.e., data recovery or preserved in place) through compliance with these laws, regulations, and policies. Federal undertakings typically require cultural resource inventories that would result in the identification of cultural resource sites and determination of eligibility for the National Register of Historic Places (NRHP). The cultural resources data acquired through inventories and evaluations would increase knowledge of cultural resources in the region. Following site identification from site-specific inventories, mitigation measures would be prescribed as necessary for eligible properties. Using this process, significant impacts on cultural resources eligible for the NRHP would be avoided or mitigated. Avoidance is the BLM's preferred measure to eliminate potential adverse effects on cultural resources. Avoidance preserves the cultural resource in place. If this is not possible under reasonable circumstances, data recovery is an alternative mitigation method. Data recovery preserves as much of the cultural record as possible through archaeological methods, documenting cultural resources by making archival records associated with collected artifacts. Although data recovery preserves as much data as possible, the property or the site is still lost or damaged. Most data recovery methods eliminate a site's features through excavation. Removing cultural resources from a site using current scientific methods also reduces future scientific value if more accurate methods of analysis are developed. Mitigation through data recovery also reduces or eliminates other uses of cultural resources sites, such as traditional, public, conservation, or experimental use. Standard inventory and avoidance procedures conducted in conjunction with surface disturbing actions would protect most cultural resources from significant impacts.

Despite the BLM's best efforts to identify all eligible resources, there remains a potential for inadvertent impacts on previously undiscovered sites, especially buried sites with no surface indications. There is a set process, through Section 106, for identifying, evaluating, and treating the effects of inadvertent discoveries, reducing potential impacts from these discoveries.

#### ***Management that Restricts Surface Disturbing Activities***

Management decisions that restrict surface disturbance in an area, such as controlling erosion in frail watersheds, implementing BMPs, limiting disturbance in special status species habitat, or managing areas for wilderness characteristics, would preserve cultural resources in place. Prohibiting or restricting surface disturbing activities or excluding areas from surface disturbance would result in fewer Section 106 inventories, thus reducing the potential for incidental damage and the potential for site identification and recordation through data recovery associated with development. Controlling erosion in frail watersheds would ensure disturbance does not result in increased soil erosion in these areas. Erosion control measures would protect cultural resources in these areas from degradation associated with erosion above natural rates.

Areas that are closed to surface disturbing activities (23,800 acres, 4 percent) would protect cultural resources from such activities. Such decisions include restrictions on cultural sites and uses of fish and wildlife and special status species habitat and riparian/wetland areas. The reduction or elimination of development in these areas would result in fewer Section 106 inventories, reducing the potential for site

identification and recordation through data recovery associated with surface disturbing developments. In addition, such restrictions on surface disturbance could make cultural resource studies more difficult. However, inventories associated with other activities (e.g., vegetation treatments for soils, watersheds, habitat, livestock grazing, and fuels reduction) could still result in the identification of cultural sites, as noted in the impacts from those decisions throughout this analysis.

Cultural resources on 162,400 acres (29 percent) open to oil and gas leasing subject to major constraints (NSO) and closed to oil and gas leasing would be preserved in place from oil and gas development. This would include areas of high cultural site density near water sources, reducing the potential to identify sites and the potential to have unavoidable sites that require data recovery. In these areas there would be a reduction in the potential for site identification and recordation associated with oil and gas development compared with areas open for oil and gas leasing subject to the standard terms and conditions and areas open to oil and gas leasing subject to moderate constraints (timing limitations, CSU). In addition, cultural resources in areas that would be closed to mineral materials activities (105,000 acres, 19 percent) or withdrawn and recommended for withdrawal from minerals entry (24,591 acres, 4 percent, and 9,500 acres, 2 percent, respectively) would also be protected in place from extraction of those minerals.

### ***Recreation Use***

The identification of and management associated with six SRMAs on 95,100 acres (17 percent) would provide for management at popular dispersed use areas. This could result in some minor developments that would focus recreation use, minimizing long-term impacts. This would decrease the potential for inadvertent damage of cultural sites. In addition, allowing vehicle parking for dispersed camping within 150 feet of designated routes could result in vehicles associated with dispersed camping generally impacting surface features, breaking artifacts, and otherwise disturbing cultural resources at the surface.

Increased public awareness through educational opportunities would emphasize the importance of protecting cultural resources. Interpretive signs and markers identifying cultural resources would inform and educate the public, thereby increasing compliance with RMP actions and increasing preservation of cultural resources. In addition, providing interpretive opportunities could provide more cultural resource sites for public use and education. This may require inventories to recover scientifically important data prior to allowing public use of the sites. Increased interpretation opportunities would increase public appreciation for the decision area's cultural values. Increased emotional linkages associated with public appreciation could lead to increased user stewardship behavior (Sharpe and Ewert 2000). Major impacts associated with stewardship behavior include increased protection of cultural sites, decreased inadvertent damage to or disturbance of cultural sites, decreased vandalism and looting, and preserving the integrity of cultural resources.

Providing heritage tourism opportunities throughout the decision area could provide more cultural resource sites for public use and education. This may require inventories to recover scientifically important data prior to allowing public use of the sites.

Requiring SRPs when sensitive cultural resources could be impacted by permitted recreation use would allow for potentially affected cultural resource sites to be avoided. Limiting rock climbing within 300 feet of cultural sites would protect cultural resource sites from inadvertent human disturbance.

### ***Livestock Grazing***

Implementing *Standards for Rangeland Health* would contribute to maintained or improved range conditions and soil and vegetation stability. This would reduce the potential for new or continued impacts on cultural resources from erosion and vegetation-related impacts related to livestock grazing. In addition, using livestock grazing to enhance ecosystem health could improve vegetation structure and maintain

natural disturbance regimes (e.g., removing cheatgrass). Although there could be short-term impacts from livestock congregation and trampling cultural sites, over the long term improved ecosystem health would help treated areas avoid increased fire frequency, protecting cultural sites from impacts from fire. Site-specific cultural reviews prior to implementation of such grazing use would eliminate the potential for unmitigated damage from livestock congregation.

The dispersed nature of livestock grazing generally results in livestock on an allotment being scattered in very small groups of 2-5 animals over large areas. However, in areas where livestock tend to congregate and/or trail, that disturbance could be concentrated in small, localized areas. In these small, localized areas, cultural resource sites could possibly be impacted by short-term removal of protective vegetation cover and increased soil compaction. These types of impacts would be site-specific and localized. Adherence to the Standards and Guidelines would result in mitigation of these possible impacts and a decrease in potential erosion and trampling. Impacts on specific areas would be identified and mitigated through a number of different means related to the grazing permit administration process (e.g., moving salt blocks or water locations, fencing). With mitigation these impacts likely would be relatively minimal. Changes to grazing management could be subject to adherence of Section 106, which would mitigate impacts on cultural resources. In addition, reallocating forage from livestock on the Water Canyon Allotment would eliminate the potential for grazing-related impacts on cultural resources in this area.

### ***Wildland Fire***

Wildfire, wildfire suppression efforts (including ESR actions), wildland fire use, and prescribed fire could impact cultural resource sites throughout the decision area, including the eligibility characteristics of sites that are listed or eligible for listing on the NRHP. Because not all cultural resource sites are known, the potential for impacts on cultural resources exists where wildland fire occurs within the decision area.

Impacts from wildland fire vary, depending on the temperature and duration of exposure to heat. Generally, higher temperatures and/or longer duration of exposure to heat increase the potential for damage to cultural resources. Prehistoric and historic resources potentially affected by wildfire may be inorganic (e.g., lithic/rock, ceramics, cans, glass, and rock art) or organic (e.g., basketry, wooden structures, and dendroglyphs). Generally, organic materials are more at risk because they tend to burn or to be altered at lower temperatures than inorganic items. Wildfire impacts on inorganic cultural resources include fracturing, shattering, and changes in color and internal luster, which might reduce an artifact's ability to render information about the past. Hotter temperatures and longer exposure to fire are more likely to affect lithic materials. When these materials are likely to be present, it may be necessary to take protective measures. Wooden substructures, common in adobe structures, could be destroyed, possibly compromising the structure as a whole if exposed to fire. Historic earthworks such as trails, roads, irrigation ditches, and canals are less sensitive to fire. Wildfire could also impact rock art. Although there are no specific temperature guidelines for rock art, fire effects include soot smudging and discoloration from smoke, which obscure the rock art images; degradation of the rock surface from spalling, exfoliation, and increased weathering; changes in organic paints due to heat; and damage to rock varnish, which may destroy the potential to date the art (Tratebas 2004, Kelly and McCarthy 2001). Wildfire could also affect the dating potential of cultural data from both organic and inorganic material (Deal n.d., Buenger 2003, Loyd et al. 2002, Shackley et al. 2002, Solomon 2002).

As a general rule, fire would not affect buried cultural materials. Studies show that even a few centimeters of soil cover (4 inches) are sufficient to protect cultural materials (Oster n.d.). Wildfires that burn hot and fast through a site may have less of an effect on certain types of cultural materials than fires that smolder in the duff or burn for a long time period, allowing heat from the fire to penetrate the surface. In addition, heat from wildland fires could change the physical nature of the ground, making it harder to identify cultural resources.

The temporary reduction in vegetation cover following wildland fires would enhance surface visibility in the short term, which could allow otherwise undetected cultural materials to be identified and recorded. Increased visibility could also increase incidental damage to cultural resources from public land users in the area before the vegetation provides surface cover. Loss of vegetation cover could also lead to a loss of cultural data through increased damage from increased soil erosion and alteration of soil characteristics, changes in drainage patterns, and flooding after a fire.

Often, cultural resources are more at risk of impact due to fire suppression activities than from wildland fire. Suppression efforts, such as fire line construction (hand and bulldozer lines) and the establishment of helicopter bases, safety zones, and fire camps, could disturb the surface and potentially destroy artifacts and the integrity of cultural resource sites. Water, foam detergents, and fire retardants could damage artifacts and features by causing swelling and then contraction. Other potential impacts from the use of retardants would include rapid cooling and subsequent damage (e.g., breakage, spalling, corrosion, staining, and rusting) to archaeological materials. Discoloration or warping of metallic surfaces could also occur. Rock art is particularly sensitive to damage from retardants. Impacts from wildland fire would be limited to less than 190,490 acres (34 percent), which would include less than 87,100 acres of wildfire, less than 390 acres of wildland fire use, and less than 103,000 acres of prescribed fire fuel treatments. Mitigation of these impacts would be provided through adherence to resource protection measures. Consultation with a cultural resource specialist during suppression activities in areas containing sensitive cultural resources would help to minimize impacts.

Following suppression, ESR actions on less than 87,100 acres (16 percent) are subject to NHPA Section 106 requirements, as amended (36 CFR 800, consultation with the Utah State Historic Preservation Officer). The areas that would be subjected to surface disturbance are subject to Class III cultural resource inventory. Inventories would result in the identification of cultural sites and lower the potential for impacts on cultural resources. Many areas used traditionally for hunting would be expected to be revegetated following a wildfire event. For localities where food or medicinal or raw material plants are gathered, the threat of invasive species occupying those areas may be an issue.

Wildland fires and prescribed fires typically burn at a lower temperature and duration than large wildfire events, which means that potential impacts would be less severe than those of unmanaged wildland fire. Prescribed fire events are occasionally preceded by non-fire fuels reduction actions to obtain a smaller, more manageable, and less intense planned burn. The relatively small acreages available for wildland fire use, relative to other possible fire management actions, would minimize the potential for impacts from such use. The potential impacts from these methods would typically have less long-term impact than from an unmanaged wildland fire event. Although loss of or damage to cultural resources during all planned fuel treatments is possible, proper planning and consultation with a cultural resource specialist would reduce these impacts to a negligible level. Over the long term, managing areas to restore fire regimes would result in less intense wildland fires and greater protection of susceptible or sensitive cultural resources.

Management to decrease current fuel loads could result in short-term increases in acres burned, but it would also decrease the number of large severe fires over the long term, which would in turn result in a decrease in the level of suppression required on an average wildland fire. A decrease in impacts on cultural resources from ground disturbing and other suppression activities would be realized over the long term. Heat- and duration-related impacts would be similarly reduced over time. In addition, as the long-term fire regime condition class approaches more natural conditions that would not support undesirable fires, non-fire fuel treatments could be phased out as a prescribed fire pretreatment, reducing the potential impacts on sites.

### ***Non-Fire Vegetation Treatments***

Vegetation treatments (e.g., wildlife habitat treatments, watershed treatments, livestock rangeland treatments, fuels treatments, and stewardship contracting) would not be allowed to exceed an annual average of 22,300 acres (446,000 acres over the life of the plan). This would ensure that vegetation manipulation and associated short-term increases in soil erosion do not exceed historic levels of disturbance. In addition, allowing use of the full range of upland vegetation treatment methods and tools (i.e., prescribed fire, mechanical, chemical, biological, woodland product removal, and wildland fire use) would provide for the most acres of vegetation to be treated. Over the long term, the increase in the opportunities for vegetation treatments also could reduce the potential for impacts from catastrophic wildfires and have the greatest long-term reduction in pinyon-juniper encroachment and the associated reduction in soil erosion. However, because no acres would be required to be treated, vegetation could continue to trend toward increased woodland cover, decreasing shrubs and grasses and therefore increasing erosion, and thus increasing deterioration of sites.

Non-fire vegetation treatments and other planned actions with the potential to affect cultural resources are subject to the requirements of Section 106 of NHPA, as amended (36 CFR 800, consultation with the Utah State Historic Preservation Officer). Areas affected by surface disturbance would be subject to a cultural resource inventory. Inventories would result in the identification of more cultural sites and lower the potential for impacts on cultural resources.

Non-fire vegetation treatments could directly impact cultural resources, depending on their location and type. Mechanical treatments (e.g., brush crunching and Dixie harrow) are more likely to impact cultural resources than are low-intensity treatments such as chemical treatments or hand lop-and-scatter. Some types of historic properties, such as historic mining-related features, could benefit from implementation of hazardous fuel reduction projects that would lessen the potential for severe, high-intensity wildland fires that could damage or destroy fire-susceptible sites.

Non-fire vegetation treatments involving surface and shallow subsurface disturbance could introduce organic materials to lower soil layers, contaminating shallow subsurface cultural resource sites containing early historic or prehistoric datable organics, such as charcoal, wood, or preserved plant materials. Plant and pollen contamination would lead to incorrect or inaccurate analytical results by researchers studying such remains preserved at sites. Surface and shallow subsurface effects could also include horizontal and vertical displacement of the upper portion of soils in which cultural resources are contained, compromising depositional context and integrity and causing artifact damage or destruction.

### ***Other Management Actions***

Cultural resources (particularly archaeological sites and historic ranches) are often located adjacent to water resources and/or riparian/wetland areas. Managing riparian/wetland areas in PFC would reduce stream bank erosion from localized flooding events and other soil disturbing actions, which would preserve cultural resources in place in or directly adjacent to riparian areas.

Cultural resource inventories and evaluations would be required before transferring lands from federal jurisdiction, ensuring that cultural resource sites are inventoried, documented, and mitigated before ownership changes. The BLM may retain or obtain lands containing important cultural and historic resources, providing protection under federal management policies.

Cultural inventories and clearances prior to paleontological data recovery projects could identify cultural sites. In addition, paleontological resource assessments and inventories could result in the identification of cultural sites.

Management in the *Paria Canyon–Vermilion Cliffs Wilderness Plan* and IMPs (in WSAs) should provide long-term protection of cultural resources.

Retaining crucial wildlife habitat and riparian areas in public ownership could also result in cultural sites being retained, ensuring that the sites are protected.

Restrictions on visually obtrusive developments on VRM Class I and Class II areas would limit development on 174,000 acres (31 percent). Although not a restriction on surface disturbance, management to preserve and maintain the landscape could reduce disturbance that could impact cultural resources. This long-term impact generally would preserve cultural resources in place.

Potential impacts from commercial live plant and seed collecting would be identified through the permitting process and mitigated prior to implementation. In areas proposed for harvest, an increased potential would exist for identifying cultural resource sites. Mitigation for impacts would usually be avoidance.

Impacts on cultural resources from implementing silvicultural practices and Native American harvest activities would be identified through the permitting process and mitigated prior to implementation. In areas proposed for harvest or treatment, there would be an increased potential for identifying cultural resource sites. Mitigation for impacts would usually involve avoidance of any sites. Impacts from non-commercial harvest activities not required to obtain permits would be similar to the impacts from dispersed recreation.

## Summary

The BLM would continue to mitigate impacts on cultural resources from authorized uses through project avoidance, redesign, and, if necessary, data recovery. However, cultural resources would continue to deteriorate through natural agents and inadvertent damage.

Under the Proposed RMP, increased restrictions on areas of high cultural resource potential would decrease the number of sites that could be identified or affected by mineral development because such development would be occurring in areas of lower site density. Due to inventories associated with mineral development (mineral materials, locatable minerals, oil and gas, and coal), between 28 (low site density) and 658 (high site density) cultural sites would be identified over the life of the plan. Most identified sites would be avoided, although sites identified during development of the surface coal mine (between 9 and 219 sites) likely would be eliminated following data recovery.

Under the Proposed RMP cross-country OHV use would be limited to areas that have already been disturbed. In areas limited to designated routes, impacts from vehicle use off the route would be eliminated, but sites adjacent to routes could be damaged. These sites would be identified through inventories of routes on a case-by-case basis.

## Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts

Laws protecting cultural resources generally would provide for mitigation of irreversible and irretrievable impacts on cultural resources from permitted activity. However, development of a surface coal mine would impact a large number of sites (approximately 100). The large number of sites might make it not feasible to mitigate all of the National Register–eligible sites through data recovery. Loss of these sites without mitigation would result in an irretrievable loss of data. Development of a scientific research design prior to development of the coal mine would result in mitigation of those sites with the greatest

potential for data recovery. Cultural sites that are wholly eliminated due to short-term uses such as scientific data recovery efforts and data recovery supporting surface disturbing activities would no longer be available for further study. Although data would be recovered through scientific means, the complete excavation of a site would result in an irreversible and irretrievable commitment of resources.

Unavoidable damage to cultural resources from permitted activities could occur if resources that were not detected during surveys were identified during ground disturbing activities. In these instances, further impacts would be halted upon discovery and the resource would be mitigated to minimize data loss. Because areas open to cross-country OHV use in the Proposed RMP are not in areas of high cultural sensitivity, there would be a low potential for unavoidable impacts. Unavoidable loss of cultural resources due to non-recognition, lack of information and documentation, erosion, and inadvertent damage or use would also occur. Broad-scale sampling and classification of areas with a high likelihood of containing cultural resources would be expected to reduce the probability of unavoidable adverse impacts on the resource.

## 4.2.9 Impacts on Paleontological Resources

Impacts on paleontological resources occur from natural weathering and erosion, surface disturbing activities, excavation, and theft or vandalism. In general, fossil resources are physically destroyed through such agents or activities, or in the case of theft and vandalism important contextual data is also irretrievably lost. Unlike cultural resources, which exist largely at or near the land surface, paleontological resources are found both at the surface and throughout the subsurface environment. As a result, actions that may destroy a fossil presently at the surface (e.g., coal mining or road construction) may at the same time expose new resources that were deeply buried in rock strata. In this same manner, erosion is continually bringing new fossils to the surface even as it destroys what is presently exposed. For management purposes, impacts must be set against the context of the rarity of individual fossil specimens. As erosion brings a particular fossil specimen to the surface, if it is a relatively common and well understood fossil species or is a non-diagnostic portion of a potentially rare form, impacts on that resource up to and including its complete physical destruction are not significant. By definition, all vertebrate fossils are considered rare by the BLM, and impacts on these types of fossils are of greatest concern.

BLM paleontological resource management policy is to identify, evaluate, and, where appropriate, protect scientifically significant paleontological resources, ensuring that proposed land uses, initiated or authorized by the BLM, do not inadvertently damage or destroy these resources (BLM Manual 8270, *Paleontological Resource Management*). BLM policy also requires the facilitation of appropriate scientific, educational, and recreational uses of paleontological resources, such as research and interpretation. Surface disturbing actions are required to mitigate damage to paleontological resources. Mitigation measures include project relocation or redesign (avoidance) and use of scientific data recovery methods. Avoidance is the BLM's preferred mitigation measure for surface disturbing activities. Standard assessment/inventory and avoidance procedures conducted in conjunction with surface disturbing actions would protect most paleontological resources from significant impacts. In general, impacts on paleontological resources from ground disturbance are long term in nature. Although natural erosion, exposure, and deterioration of paleontological localities may be slowed or halted, damage to fossils and localities cannot typically be reversed.

The impact analysis and conclusions are based on the BLM's knowledge of resources and the project area, review of existing literature, spatial analysis, and information provided by other agencies. Impacts are quantified where possible. In the absence of quantitative data, qualitative impacts and the direction of impact were identified. The analysis is based on the following assumptions:

- Paleontological resources will continue to be discovered throughout the decision area.
- Recovery and curation in paleontological resources by permitted specialists results in resource protection and preservation of paleontological values and in educational opportunities.
- Paleontological resources identified during assessments and inventories would be protected through data collection and mitigation.
- The number of localities that could be impacted by various actions would be directly correlated with the degree, nature, and quantity of surface disturbing activities within the decision area.
- Surface disturbing activities could expose, dislodge, or damage paleontological resources and features that were not visible prior to surface disturbance.

Under the Proposed RMP, impacts on paleontological resources are not anticipated as a result of implementing management actions for the following resources, resource uses, and designations: air quality, cultural resources, livestock grazing, and other designations.

## Proposed RMP

### *Paleontological Resource Management*

Monitoring scientifically significant paleontological localities would document the rate of deterioration and provide baseline data for possible site protection, restoration, or data retrieval.

Paleontological inventory data for the decision area is crucial for sound resource protection decisions. Annual compilations of all new paleontological localities should be updated and entered into a single comprehensive geographic information system (GIS) database that is accessible to local resource specialists. This would ultimately lead to better resource protection because decision-makers would be empowered with emerging patterns for the spatial and temporal distribution of paleontological resources.

Providing interpretive opportunities could provide more paleontological resource sites for public use and education because inventories would be required to recover scientifically important data prior to allowing public use of the sites. Increased paleontological interpretation could also increase public appreciation for the decision area's paleontological values. Increased public appreciation could lead to increased user stewardship. Impacts associated with stewardship attitudes include increased protection of paleontological sites, decreased inadvertent damage to or disturbance of paleontological sites, decreased vandalism and looting, and improved preservation of the integrity of paleontological resources.

### *Paleontological Resource Assessments/Inventories*

Requiring on-the-ground paleontological inventories prior to permitting surface disturbing activities in areas with a high potential for paleontological resources would result in the identification, evaluation, and protection, where appropriate, of scientifically significant fossil resources. By focusing on areas with a high potential, the formation and facies most likely to contain scientifically significant fossils would be scrutinized. If fossil resources are identified, mitigation measures could be applied to protect the resource. Mitigation measures include project relocation or redesign (avoidance) and various scientific data recovery methods, such as recordation, surface collection, subsurface testing, or excavation. These mitigation actions would prevent significant impacts on paleontological resources and increase the knowledge and understanding of the area's paleontological resources and of the history of life on Earth. In addition, projects such as development/construction within ROWs, recreation site development, or construction of range improvements would be studied prior to implementation.

Requiring assessments in areas with a medium potential for paleontological resources would allow for mitigation needs to be identified and implemented in areas less likely to contain significant fossils. There is a potential for some localities in areas with a medium potential to be damaged after surface disturbance begins if a field inventory were not performed. Based on the findings of the assessment, mitigation would be implemented at all phases of development.

As the number of paleontological inventories and assessments increases, knowledge of the area's paleontological resources would increase. More paleontological localities would be identified and there would be an associated reduction in the number of localities that are damaged prior to surface disturbing activity.

The prioritization of these areas for proactive inventories would identify paleontological resources and sites, increasing the database of resources. This would increase the knowledge base in this area while providing for improved management of these resources.

Consulting and coordinating with other local, state, and federal land agency paleontological resource specialists (if available) before undertaking significant ground disturbing activities in areas with a high

potential for paleontological resources would ensure that information gathered concerning similar geologic formations and facies is shared among agencies. This will ensure that similar resources are protected both within and outside the decision area.

#### ***Other Paleontological Resource Management***

Allowing surface collection of common invertebrate and botanical paleontological resources throughout the decision area could result in the incidental collection of scientifically significant resources. However, identifying and closing to casual collection areas with rare and significant fossils could reduce impacts from incidental collection.

Targeting fossil sites with high scientific value for excavation and curation would ensure that fossil sites with high scientific value are protected either through excavation and data recovery or through increased monitoring. In addition, monitoring high-significance (scientific or interpretive) sites with fossil resources that are not feasible or desirable to excavate or collect would ensure that fossil sites important to science and the public are protected from inadvertent damage or natural deterioration.

#### ***Route Designation and Accessibility***

Although cross-country OHV use would be allowed on more than 1,000 acres (less than 1 percent), paleontological resources would not likely be damaged because the areas being proposed for cross-country use have been subject to disturbance over the past several years, either through natural processes (e.g., sand dunes) or human use (e.g., sand dunes and topsoil pit). In these areas, continued disturbance of previously disturbed areas would not result in impacts on paleontological localities.

Limiting OHV use to designated routes on 528,000 acres (95 percent) would provide increased protection to paleontological resources. The change from managing most of the decision area as open to cross-country OHV use under the current management situation to limiting OHV use to designated routes would decrease impacts. Paleontological resources away from designated routes would be protected from OHV impacts. Rather than the potential for increased disturbance and incidental damage associated with pioneered routes in areas open to cross-country use, impacts on paleontological resources from OHV use on designated routes would be limited to 1,403 miles (95 percent) of designated routes. There would be no impacts from OHV use on 25,000 acres (5 percent) closed to OHV use, in areas away from the designated routes, and on 75 miles (5 percent) of closed routes. However, restricting motorized use to designated routes could also limit access for paleontological study and excavations. In addition, reducing temporary roads associated with temporary projects and reclaiming unnecessary facilities and improvements would further reduce access for paleontological resource study, increasing their isolated nature. Although such isolation provides indirect protection from inadvertent damage, it also increases the potential for a locality to be damaged through natural deterioration prior to being identified and recovered.

#### ***Dispersed Recreation Activities***

Unlike permitted activities (e.g., mineral development or ROW development) that are subject to site-specific evaluations and monitoring, dispersed recreation activities are not under the same degree of scrutiny prior to use. Because of their widespread occurrence and generally unsupervised nature, casual recreational use likely would result in unmitigated impacts on paleontological resources exposed at the surface. Most of this impact would result from unauthorized collecting and vandalism; however, unmitigated impacts could also result from any surface disturbing aspect of recreation.

#### ***Mineral Development***

Areas would be open to oil and gas leasing subject to the standard terms and conditions and open to oil and gas leasing subject to moderate constraints (timing limitations, CSU) on approximately 343,000 acres

(62 percent) of areas with a high or medium potential for paleontological resources. Based on the RFD, oil and gas development within these areas could impact up to 2,070 acres over the life of this plan (Appendix 15). Required inventories for areas that have a high potential for paleontological resources would result in the identification of more paleontological localities. In these areas, impacts on paleontological resources would be limited to damage of subsurface fossils not identified in the inventory. Required assessments in areas with a medium potential for paleontological resources could also result in the identification of more paleontological resources. However, there would still be a potential for fossils in these areas to be damaged after surface disturbance begins.

Managing 475,000 acres (86 percent) as open to oil and gas leasing (i.e., open to oil and gas leasing subject to the standard terms and conditions, open to oil and gas leasing subject to moderate constraints [timing limitations, CSU], and open to oil and gas leasing subject to major constraints [NSO]) could result in 906 acres of surface disturbance from seismic operations supporting oil and gas leases. If assessments were performed prior to these activities, paleontological localities could be identified. However, the potential for significant impacts would remain because of the lack of required inventories prior to surface disturbance.

Based on the RFD, oil and gas development could impact up to 2,070 acres over the life of this plan (Appendix 15). Vertebrate or other scientifically significant fossils could be inadvertently damaged from disturbance if they were not identified and avoided. However, under the Proposed RMP, inventories would be required in areas with a high potential for paleontological resources and assessments would be required in areas with medium potential. Required inventories and assessments could identify more paleontological localities. However, the potential for impacts would remain in areas with a medium potential because of the lack of required inventories prior to surface disturbance.

Surface disturbance associated with the development of mineral materials (650 acres) and locatable minerals (400 acres) could impact paleontological resources in a manner similar to the impacts noted for oil and gas development. Under the Proposed RMP, more localities could be identified prior to surface disturbance because of required inventories and assessments, which would result in avoidance and/or recovery of fossil resources.

#### ***Management that Restricts Surface Disturbing Activities***

Areas that are closed to surface disturbing activities (23,800 acres, 4 percent) would protect paleontological resources from such activities. Such decisions include restrictions on uses of fish and wildlife and special status species habitat and areas that are sensitive to disturbance (e.g., fragile soils and riparian/wetland areas). The reduction or elimination of development in these areas would result in fewer paleontological inventories, reducing the potential for locality identification and recordation through data recovery associated with surface disturbing developments. In addition, such restrictions on surface disturbance could make paleontological resource studies more difficult.

Paleontological resources on approximately 159,000 acres with a high or medium potential (29 percent of areas with high and medium paleontological resource potential) that are open to oil and gas leasing subject to major constraints (NSO) and closed to oil and gas leasing would be preserved in place from oil and gas development. In these areas there would be a reduction in the potential for identification and recordation of localities associated with oil and gas development, compared with areas open for oil and gas leasing subject to the standard terms and conditions and areas open to oil and gas leasing subject to moderate constraints (timing limitations, CSU). In addition, paleontological resources in areas that would be closed to mineral materials activities (105,000 acres, 19 percent) or withdrawn and recommended for withdrawal from minerals entry (24,591 acres, 4 percent, and 9,500 acres, 2 percent, respectively) would also be protected from potential impacts associated with the extraction of those minerals. There would be

a reduction in the potential to identify localities associated with locatable mineral entry, compared with areas open to such location.

***Actions that Affect Vegetation Conditions***

Wildland fire suppression activities (e.g., construction of fire lines, bulldozing of access roads, and general movement of heavy equipment) could disturb the surface, creating impacts on mineral soils and bedrock. Fossils could be dislodged or damaged from such disturbance.

The number of acres that could receive vegetation treatments (e.g., wildlife habitat treatments, watershed treatments, livestock rangeland treatments, fuels treatments, and stewardship contracting) could increase, potentially increasing the impacts on paleontological resources. Not allowing treatments to exceed an annual average of 22,300 acres (446,000 over the life of the plan) would ensure vegetation manipulation and associated short-term increases in soil erosion do not exceed historic levels of disturbance. In addition, allowing use of the full range of upland vegetation treatment methods and tools (i.e., prescribed fire, mechanical, chemical, biological, woodland product removal, and wildland fire use) would provide for the most acres of vegetation to be treated. This could result in the identification of more paleontological resource sites associated with more acres of vegetation treatment. Over the long term, opportunities for vegetation treatments could also reduce the potential for impacts from catastrophic wildfires and the potential for long-term reduction in pinyon-juniper encroachment and the associated reduction in soil erosion. However because no acres would be required to be treated, the potential for impacts on paleontological resources could be low.

***Planned (BLM) or Permitted (BLM-Approved) Surface Disturbing Actions***

Surface disturbing activities in an area where there are known or potential fossil resources could have significant impacts on those resources. Although in general the best places to see fossils exposed at the surface are where there is little to no vegetation, the spatial distribution of fossils is not controlled by soil or vegetative cover. Potential resource loss can occur even in soiled-over or heavily vegetated areas if the ground disturbance is deep enough to reach underlying bedrock. As a result the largest potential impacts on paleontological resources would occur where the largest surface disturbances occur in formations with high potential for paleontological resources.

Development of a 3,600-acre mine in the Alton coal field would result in damage to or loss of subsurface paleontological resources. This area is overlain by Tropic shale, which has a high potential for paleontological resources. The process of stripping the overburden would fragment and displace fossil resources and remove them from their context. Monitoring the spoil heaps (stripped overburden) could result in the identification and recovery of some fossil resources, mitigating some of the loss.

***Other Management Actions***

Land exchanges, sales, or other disposals that remove public lands with fossil resources from federal ownership could create significant impacts on those resources by their irretrievable loss to the public. On the other hand, acquisition of fossil-rich lands through similar realty-related actions may actually benefit paleontological resources. Prior to any transfer of land from public ownership, paleontological resources must be inventoried, evaluated, and mitigated whenever necessary to ensure that lands with scientifically significant paleontological resources are retained or that the maximum benefit from known resources is obtained prior to disposal of such lands, in accordance with all existing federal policy.

Granting of special ROWs that preclude access, or any activity or designation that prevents scientific inquiry or excavation, could ultimately make recovery and preservation of specific significant specimens extremely difficult or impossible.

Restrictions on visually obtrusive developments on VRM Class I and Class II areas would limit development on 174,000 acres (31 percent). Although not a restriction on surface disturbance, management to preserve and maintain the landscape could reduce disturbance that could impact paleontological resources. This long-term impact generally would protect paleontological resources.

Impacts on paleontological resources from implementing silvicultural practices would be identified through the permitting process and mitigated prior to implementation. In areas proposed for harvest or treatment, an increased potential would exist for identifying paleontological resource sites. Mitigation for impacts would usually include avoidance.

## Summary

Under the Proposed RMP, requiring paleontological assessments prior to permitting surface disturbing activities would provide a degree of protection to paleontological resources. The degree of damage from surface disturbing activities depends on many things, including paleontological potential in the area of proposed disturbance, the level of disturbance, and the type/level of assessment or inventory used to identify the paleontological resources. The Proposed RMP would require inventories in areas with a high potential, focusing on areas where damage would most likely occur. On identification, paleontological resources would be protected through project avoidance, redesign, abandonment, and data recovery investigations.

### Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts

Inventories completed prior to surface disturbing activities generally would provide for mitigation of irreversible and irretrievable impacts on identified surface paleontological resources from permitted activities. However, subsurface paleontological resources could be irreversibly and irretrievably damaged and lost from activities that go deep into bedrock. Damage and loss of these subsurface resources would constitute an unavoidable adverse impact. For example, development of the coal mine in the Alton area would result in these irreversible and irretrievable impacts and unavoidable adverse impacts. Areas open to cross-country OHV use, specifically areas of high potential for paleontological resources, could result in destruction of some resources, which would be irreversible and irretrievable. Land exchanges, sales, or other disposals that remove public lands with fossil resources from federal ownership could result in their irretrievable loss to the public. Short-term data recovery (collection) measures would result in long-term preservation of paleontological resources, limiting the loss of scientific values associated with the physical resources.

Unavoidable damage to paleontological resources from permitted activities could occur if resources undetected during assessments were identified during ground disturbing activities. If paleontological resources are identified during ground disturbance, further disturbance would cease and mitigation would be implemented to minimize data loss. Unavoidable loss of paleontological resources due to non-recognition, lack of information and documentation, erosion, and inadvertent damage or use would also occur. Broad-scale sampling and classification of areas with a high likelihood of containing paleontological resources would be expected to reduce the probability of unavoidable adverse impacts on the resource.

## 4.2.10 Impacts on Visual Resources

This section presents potential impacts on visual resources, specifically the potential for management decisions to create visual changes in or contrasts from the existing landscape, from implementing the Proposed RMP. Visual resources generally are impacted by activities that introduce new visual elements into the landscape, changing the features that characterize the existing landscape (e.g., the form, line, color, and/or texture of the landform, water, vegetation, or structures). Generally, the greater the surface disturbance the greater is the change to the landscape. This impact analysis and these conclusions are based on knowledge of resources and the decision area, review of existing literature, spatial and temporal analysis, and information provided by other agencies. Effects are quantified where possible. In the absence of quantitative data, professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms, if appropriate.

The analysis is based on the following assumptions:

- VRM classes (objectives) are prescriptive for all resources and uses. Activities proposed that would not initially meet VRM objectives for the area would be mitigated to the extent needed to meet the objectives. Those activities proposed that could not be mitigated would not be authorized.
- The visual resources “inventory classes represent the relative value of the visual resources” (BLM-H-8410 Visual Resource Inventory).
- New surface disturbing activities proposed would be subject to NEPA analysis, including a VRM contrast rating.
- Potential impacts on scenic quality were estimated by evaluating the potential for management actions to noticeably change existing landscapes. Current visual resource conditions, against which management impacts are compared, were identified through an inventory of visual resources. The scenic qualities of the landscape are measured comparatively by application of visual resources management classes (I, II, III, and IV) generated from the inventory (see VRM, Chapter 3). Impacts from actions proposed in Chapter 2, including alternative VRM objectives, are measured against the scenic quality of the existing landscape (as characterized by the inventory classes) identified in the inventory. Landscape modifications and impacts on visual resources would occur under any management objective (class). The degree of impact would depend on the visual objectives, the nature of the proposed project, and the observation point of the visitor.

All surface disturbing activities, regardless of the alternative or management action, would be subject to the management objectives of the area within which the activity takes place. The visual resource contrast rating system is used to analyze the potential site-specific impacts of surface disturbance and the facility design and placement. Surface disturbing activities and facilities would be designed to mitigate their visual impacts and conform to the area’s designated VRM objective. Mitigation could include painting, facility design, and placement.

Under the Proposed RMP, impacts on visual resources are not anticipated as a result of implementing management actions for the following resources, resource uses, and designations: air quality, cultural resources, and paleontological resources.

## Proposed RMP

### *Visual Resource Management Classes*

Management decisions that result in surface disturbance would have direct impacts on scenic quality by changing existing landscape characteristics. Similarly, decisions that reduce surface disturbance generally would decrease changes to the landscape or preserve scenic quality. The area of impact is not limited to the specific area of disturbance. Rather, the viewshed in which the disturbance occurs would be impacted. The severity of the impact, or the degree of change and contrast from the existing visual conditions, generally would decrease as distance from the disturbance increases. In addition, the larger the disturbance, the more visible it would be from foreground and middle ground viewpoints, and thus the greater the impact on visual quality.

Setting VRM objectives would impact visual quality. Objectives for VRM Classes I and II would provide for the least amount of landscape change and the highest level of visual resource protection, both short and long term. VRM Classes III and IV objectives are less protective and would allow for more surface disturbing impacts and landscape change. VRM Class I areas would provide the greatest protection to visual resources throughout the decision area by restricting surface disturbance and development. Surface disturbing activities would not be allowed unless impacts could be mitigated to meet Class I objectives. Class II objectives would provide protection of visual qualities, retaining the existing character of the landscape. Class III objectives would not emphasize protection of an unmodified landscape and visual resources. Class IV objectives allow for major modifications of the landscape. Activities that occur in these areas would result in greater change to the characteristic landscape, and may not protect scenic values. For more information on VRM class objectives, see the Visual Resources section in Chapter 3.

Under the Proposed RMP, more than twice as many acres would be managed to preserve their existing landscape character (Class I management objectives) as were inventoried as Class I (Table 4-6). The acres that would be managed by Class I objectives generally were inventoried as Class II and were adjusted due to the presence of a WSA. There would also be a shift of Class IV inventory areas to Class III management objectives on approximately 24,600 acres. This change in management would require visually obtrusive activities to decrease their visual impact through mitigation measures. In addition, the portion of the decision area southwest of U.S. Highway 89 between Kanab and Mt. Carmel Junction would be managed as VRM Class III even though much of it was inventoried as VRM Class II. This will allow vegetation treatments to be implemented to a greater extent in this concentrated area of pinyon-juniper woodland encroachment.

**Table 4-6. Visual Resource Management Class Acreages—Differences from Inventory Class Acreages**

	<b>Class I</b>	<b>Class II</b>	<b>Class III</b>	<b>Class IV</b>
Visual Resource Inventory Class Acres	21,400	165,900	169,200	197,500
<b>Proposed RMP</b>				
Visual Resource Management Class Acres	76,000	94,400	210,700	172,900
Acres Different from Inventory Class	+54,600	-71,500	+41,500	-24,600
Percent Change from Inventory Class	+255%	- 43%	+25%	-12%

### *Wildland Fire*

Fire (wild and prescribed fire) and fire suppression have many effects on the landscape, and thus its visual values, in both the short and long term. Most noticeably, fire affects vegetation. But fire suppression also

affects, to a lesser degree, landform. When fire burns, it consumes vegetation. Fire severity varies depending on the vegetation community. In the decision area, fire in sagebrush communities would remove shrubs and grasses and stimulate regrowth of new vigorous plants, maintaining the vegetative element of the landscape. Fire in these communities can also result in the invasion of exotic plants such as cheatgrass. In areas with the potential for invasion, fire would facilitate conversion of a landscape with some vegetative variety to a monoculture of grasses, and less visual interest and appeal. In pinyon-juniper woodlands, however, fire would help maintain openings in the woodland forest, more vegetation variety, and more visual appeal. In a coniferous forest, fire may contribute to the loss of trees and understory brush and grasses. The fire, however, would also create openings in forests, and stimulate regrowth of shrubs, forbs, and grasses, introducing new lines, colors, and textures to the vegetative component of the landscape. More variety often leads to more interest and more visual appeal to the visitor. Fire suppression would result in construction of fire lines (hand and bulldozer) that remove vegetation and expose the underlying soil. These actions would create noticeable lines in the vegetation and some disturbance to the landform. Soil disturbances would be rehabilitated at the end of the suppression effort, restoring the landform to a near natural condition. Linear vegetation removal, however, would take longer to recover, especially in forest and woodland environments. In the short term, burned vegetation would be unpleasant to view for many visitors. Over the long term, however, fire would often create variety in the vegetation of a landscape that is interesting and appealing to view, depending on vegetation type and size of the fire.

The effects of fire suppression on visual resources would vary depending on the methods used for suppression and the landform and vegetation community in which the fire occurs. Construction of fire lines (hand or bull dozer), firebreaks, and access roads for the suppression effort would produce short- and long-term changes to the landscape and visual resources. Construction of firebreaks, fire lines, and temporary access roads would result in linear features in the vegetation community and landform. Depending on the vegetation community where the fire occurs, distance, and observation point, the contrast may be easily seen (e.g., in pinyon-juniper or coniferous forest communities) or less noticeable (e.g., in grassland or sage brush communities). Fire lines and access routes constructed by bulldozers would result in some leveling of landforms and exposure of soils, creating apparent lines in color, form, and texture of the landform. Effective rehabilitation would restore disturbed landforms in the short term, but disturbances in forest and woodland vegetation communities would remain for a much longer period of time. Access to areas in the vicinity of bulldozer lines and firebreaks would be restricted in the short term to speed vegetation recovery and soil stabilization, thus decreasing the duration of long-term visual contrasts in vegetation. Use of fire retardant would result in short-term impacts on the color of the vegetation. The characteristic red color of retardant would often be easily seen, but the color fades over time.

#### ***Planned (BLM) or Permitted (BLM-Approved) Surface Disturbing Actions***

Construction of recreation sites and facilities (e.g., campgrounds, signs, interpretive sites, trailheads, roads, and parking areas) and the associated landform and vegetation disturbances needed to accommodate the facilities would directly impact visual resources by adding unnatural features at the site of the facilities and to the surrounding landscape. These facilities would be designed and located to meet visual objectives for the given area, but the effects would remain localized and long term. The visual effect would be less noticeable on a larger, landscape scale.

Development of coal and locatable and mineral materials (e.g., sand and gravel) would result in removal of vegetation, alteration of the landform, and placement of structures on the landscape. The construction of roads to the mine or materials site would create lines in the landscape through removal of vegetation and cutting and filling of soils for the roadbed. The type of vegetation and the slope of the landform would affect the degree of contrast created. Road construction on steep slopes would require more cutting and filling of soil than construction on shallower slopes. Placement of roads in dense vegetation would

result in more evident lines through the vegetation. Roads on gentle terrain through sparse vegetation generally would result in less contrast on the landscape. Construction of mine pits, tunnels, and adits and the resultant waste piles would introduce horizontal lines and terraces, especially on steep or angular slopes. Removal of vegetation to accommodate these mine features would create changes in the line and texture of vegetation. Removal of mine ore or materials would result in pits, terraces, and stockpiles that would contrast with the existing form and line of the land. The exposure of soils likely would result in noticeable changes in the color of the landform. Mine equipment and buildings, and other support facilities would introduce human-made structures to an otherwise more natural landscape. The size and degree of these changes would vary with the size of the mining operation, topography (landform), soil type (color and texture), vegetation type, and position of the observer. Withdrawing areas from mineral entry and closure to mineral material disposal would maintain existing landscape and visual qualities of surrounding areas.

Although mineral development is projected to disturb 8,426 acres (Appendix 15), the broader, surrounding landscape on which this disturbance is located would be altered by changes in landform, vegetation removal, and placement of structures. Any areas within the viewshed of the disturbances would be affected, reducing visual quality over larger areas. The complete magnitude of this impact would vary depending on the topography, vegetation, size of disturbance, and any mitigation actions that could be applied to reduce visual impacts.

Surface disturbances associated with the construction of pipelines, powerlines, and communication lines and towers would create both short- and long-term changes to the landscape. ROWs for these types of facilities are typically linear, and introduce strong lines to the landscape. Removal of vegetation (depending on the vegetation type) to facilitate construction and maintenance would create noticeable lines (edges) in the vegetation. Exposure of the underlying soil (depending on the color and texture) would also create strong lines in the landscape. Rehabilitation of the surface over buried facilities would reduce some of these impacts over the long term, but travel routes along the corridors to accommodate access for inspection and maintenance would maintain noticeable lines in the landscape. The placement of permanent facilities, such as towers, powerlines, and pipelines, would add noticeable linear horizontal and vertical structures to the landscape and would permanently alter viewsheds, particularly in undeveloped landscapes. ROW corridors would concentrate these facilities and reduce visual contrast throughout much of the rest of the decision area. Wind and solar energy development also would introduce highly visible structures, which would alter the existing character of the landscape.

Visual resource values on 391,600 acres (71 percent) that would be open to oil and gas leasing subject to the standard terms and conditions or open to oil and gas leasing subject to moderate constraints (timing limitation, CSU) could be impacted by exploration and development where such activity occurs. The construction of well pads, access roads, pipelines, compressor stations, and other support facilities associated with oil and gas exploration and development would result in modification of the landscape on approximately 2,070 acres. Construction of these facilities would alter the landform, remove vegetation, and introduce human-made structures to the landscape. On steeper slopes, road and well pad construction would result in cutting and filling of soil to produce roadbeds and well pads. More soil disturbance would occur on steeper slopes than on gentler slopes. Vegetation removal and soil disturbance associated with roads and well pads would create lines and openings on the landscape because of vegetation removal and exposure of the underlying soil. Contrast would occur in the color, line, and texture of the vegetation community. Depending on the amount of cutting and filling for roads and well pads, changes to landform would also be observed (e.g., leveling of angular slopes). The degree of contrast would also be affected by the vegetation community (density and type of vegetation), soil type (color and texture), and observation point of the viewer. Installation of pipelines, compressor stations, and other support facilities would result in vegetation removal, soil disturbance, and placement of human-made structures on the landscape. The size of the facilities would dictate the degree of vegetation removal. The steepness of

slope would affect the amount of soil disturbance and landform change. The design and location of facilities would impact their visibility on the land. When pipelines are buried and the soils and vegetation are rehabilitated, the changes to the landscape would be shorter term. Roads, well pads, wellheads, pump jacks, and aboveground facilities would affect the landscape, and thus its visual appeal, over the long term. The density of development (i.e., well spacing) would affect the overall degree of impact, which could be small and localized or evident at a broader landscape level.

Generally, geophysical exploration would not result in changes to the landform or long-term placement of structures on the landscape. Geophysical exploration could result in short-term and site-specific impacts on vegetation on approximately 906 acres. The resultant impacts on visual resources would be small, localized, and temporary.

#### ***Management that Restricts Surface Disturbing Activities***

Prohibiting surface disturbance in areas that contain special status species, as well as in WSAs and the Paria Canyon–Vermilion Cliffs Wilderness, would also prevent long-term changes to the character of the landscape and thus its visual values. Habitat restoration measures that include surface or vegetation disturbance, however, could create noticeable short-term changes in the landscape, as described in the effects of vegetation treatments. Protecting wildlife habitat through stipulations on other land uses (e.g., collocation of ROWs, utility corridors, and oil and gas wells and limiting motorized travel) would reduce surface disturbance and landscape change, indirectly protecting scenic quality over the long term.

Areas that are closed to surface disturbing activities (23,800 acres, 4 percent) would protect the existing character of the landscape. Such decisions include restrictions on uses of fish and wildlife and special status species habitat, and areas that are sensitive to disturbance (e.g., fragile soils and riparian/wetland areas). On 162,400 acres (29 percent) open to oil and gas leasing subject to major constraints (NSO) and areas closed to oil and gas leasing, changes to the landscape would be prohibited by limitations on surface disturbance and occupancy. Visual resources values in areas closed to mineral materials activities (105,000 acres, 19 percent) or withdrawn and recommended for withdrawal from minerals entry (24,591 acres, 4 percent, and 9,500 acres, 2 percent, respectively) would be protected from changes in the landscape created by development of these minerals. In addition, excluding ROW development on 75,700 acres (14 percent) would eliminate the long-term changes to the character of the landscape, and thus its visual values from such development.

#### ***OHV Use and Route Designations***

OHV routes create visible lines on the landscape. Depending on topography, the vegetation community, and the observation points, those lines would be visible to varying degrees. In addition, removal of vegetation would reveal the underlying soil, which often is a contrasting color and texture to the surrounding vegetation. This would further accentuate the change to the landscape. Implementing a recreational OHV system of designated routes throughout the decision area would limit landscape disturbance caused by OHVs. Designating small areas of previous disturbance as open to cross-country OHV use would not result in additional impacts from the removal of vegetation and exposure of soil.

Areas where OHV use is limited to designated routes would limit impacts on the landscape to the existing transportation system, and eliminate the creation of new routes that would result in further changes to the landscape and visual quality. Impacts from OHV use on designated routes would occur on 1,403 miles of designated routes on 528,000 acres (95 percent). Limiting OHV use to designated routes under the Proposed RMP would decrease impacts from OHV use throughout most of the decision area. Scenic quality on 25,000 acres (5 percent) of the decision area closed to OHV use would be protected from the impacts of motorized use. Over the long term, routes closed to OHV use would become obscured as vegetation extends into the route.

### ***Livestock Grazing***

Where livestock grazing continues to be authorized, the installation of livestock facilities (e.g., fences, cattle guards, water developments, and roads) and the landform and vegetation disturbances needed to accommodate the facilities would directly impact visual resources by adding features not found in the surrounding landscape. Such impacts would be localized and long term. Areas with Class I or II management objectives would be more sensitive to construction of new facilities. Incorporating rangeland management practices and visual mitigation measures would help reduce the extent of visual impacts on the landscape.

### ***Changes in Vegetation (Vegetation Restoration, Habitat Manipulation, Fuels Treatments)***

Pinyon-juniper woodlands are naturally interspersed with openings of shrubs and grasslands. Over time, pinyon and juniper trees invade these grasslands. Wildfire once maintained these natural openings. Using a variety of treatments to reduce this encroachment would create openings in large expanses of pinyon-juniper woodlands. Focusing on reducing the encroachment of pinyon-juniper woodlands would create natural openings in large expanses of pinyon-juniper woodlands. The treatments would create noticeable lines along edges, changes in color, and changes in texture between the woodlands and grasslands. These contrasts would create variety and interest in an otherwise monotonous landscape maintained under the current management conditions.

## **Summary**

Decisions that result in surface disturbance would have direct impacts on scenic quality by changing existing landscape characteristics. Similarly, decisions that reduce surface disturbance generally would decrease changes to the landscape or preserve scenic quality.

Under the Proposed RMP, development of all minerals is anticipated to disturb 8,426 acres (Appendix 15). Any areas within the viewshed of the disturbances would be affected, reducing visual quality over larger areas. The complete magnitude of this impact would vary depending on the topography, vegetation, size of disturbance, and any mitigation actions that could be applied during site specific analysis and design to reduce visual impacts.

Areas subject to vegetation treatments would add vegetation variety and contrast to the landscape, increasing interest and variety in form, line, color, and texture. In the short term, this would create direct visual changes to the landscape. Over the long term, restoration and vegetation treatments designed to improve ecological conditions would create a mosaic in vegetation pattern that would increase visual variety and interest and improve scenic quality.

### **Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

There would be no irreversible and irretrievable commitment of resources. Surface disturbing actions and those that affect vegetation would result in various short-term effects, such as decreased visual resource quality associated with development actions on the landscape. Surface disturbing activities, including mineral and energy development (e.g., coal, oil and gas, and hard rock), infrastructure development (e.g., livestock waters, wildlife guzzlers, recreation sites, powerlines, and communication sites), and human use, would have the greatest potential for short-term uses affecting the long-term landscape character. Construction of roads, well pads, and other transportation infrastructure improvements could impair important visual elements, particularly if these developments occurred in areas of high visual sensitivity (i.e., near communities or areas of high recreation use). Many of these visual intrusions likely would affect the visual resources over the life of this plan.

## 4.2.11 Impacts on Non-WSA Lands with Wilderness Characteristics

The Proposed RMP provides management decisions to protect, preserve, and maintain wilderness characteristics on five non-WSA areas (27,770 acres) with wilderness characteristics. It does not provide any specific management decisions in order to protect, preserve or maintain wilderness characteristics for the other 62,010 acres of non-WSA lands found to have wilderness characteristics. This section addresses impacts on wilderness characteristics which include the appearance of naturalness and outstanding opportunities for primitive recreation or solitude. Impacts could include actions that maintain, protect, or improve wilderness characteristics or actions that result in the complete or partial loss of these characteristics. Within non-WSA areas, the magnitude and intensity of impacts to wilderness characteristics constitute a number of variables. These variables include the size and configuration of the area, topography, vegetation type, sequence of development, and reclamation time.

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, presence or lack of native vegetation communities, connectivity of wildlife habitats, or other actions that result in or preclude surface disturbing activities. All these activities affect the presence or absence of human activity and, therefore, could affect an area's natural appearance.

Two other wilderness characteristics (i.e., outstanding opportunities for solitude or primitive, unconfined types of recreation) are related to the human experience in an area. Visitors may 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 non-motorized, non-mechanical means; and where no or minimal developed recreation facilities are encountered. Impacts are quantified where possible; however, the lack of project specific locations results in impacts often being identified qualitatively. In the absence of quantitative data, best professional judgment was used.

The analysis is based on the following assumptions:

- Surface disturbances related to mineral exploration and development identified in the RFD (Appendix 15) would occur within the decision area.
- Seismic operations would occur uniformly throughout the decision area.
- Because non-WSA lands with wilderness characteristics constitute approximately 16 percent of the decision area, approximately 16 percent of the 906 acres (150 acres) of disturbance associated with oil and gas exploration (Appendix 15) could occur on non-WSA lands with wilderness characteristics. Restrictions on oil and gas development from management actions in non-WSA lands with wilderness characteristics could change this acreage.
- Exploration wells would be developed uniformly throughout the area with high oil and gas development potential.
- Because non-WSA lands with wilderness characteristics constitute approximately 27 percent of areas with high oil and gas development potential, approximately 27 percent of the 32 exploration wells (approximately 9 wells) anticipated in areas with high oil and gas development potential would occur within non-WSA lands with wilderness characteristics. With approximately 23 acres of disturbance per well (Appendix 15), development of 9 exploration wells would result in disturbance of approximately 210 acres of non-WSA lands with wilderness characteristics. Restrictions on oil and gas development from management actions in non-WSA lands with wilderness characteristics could reduce this acreage.

Under the Proposed RMP, impacts on non-WSA lands with wilderness characteristics are not anticipated as a result of implementing management actions for the following resources and designations: air quality, wilderness, WSAs, and other designations.

## Proposed RMP

### Management that Restricts Surface Disturbing Activities

Management prescriptions on approximately 31 percent (27,770 acres) of the inventoried non-WSA lands with wilderness characteristics would protect, preserve, and maintain the wilderness characteristics in five non-WSA lands with wilderness characteristics (Table 4-7). In addition, prescriptions from other resources or special designations could provide additional indirect protection to the wilderness characteristics of the non-WSA lands with wilderness characteristics in Table 4-7, as well as the remaining non-WSA lands with wilderness characteristics described in Chapter 3 (Table 3-22).

**Table 4-7. Proposed RMP Non-WSA Lands with Wilderness Characteristics Managed for their Wilderness Characteristics**

Name of Non-WSA Land with Wilderness Characteristics <sup>1</sup>	Acres	Percent <sup>2</sup>
East of Bryce	850	99%
Moquith Mountain	9,600	88%
Orderville Canyon	2,700	100%
Parunuweap Canyon	120	2%
Upper Kanab Creek	14,500	33%
<b>Total</b>	<b>27,770</b>	<b>44%</b>

Notes:

- 1 – Non-WSA lands with wilderness characteristics not noted in this table will have no acres managed specifically to protect, preserve, and maintain their wilderness characteristics.
- 2 – Number shows the percent of the evaluated acres determined to have wilderness characteristics (Table 3-22) that will be managed specifically to protect, preserve, and maintain wilderness characteristics

Management decisions that restrict surface disturbance in non-WSA lands with wilderness characteristics would also indirectly protect those characteristics. Such decisions include restrictions on uses of fish and wildlife habitat, vegetation management, protection of wild and scenic rivers (WSR), and areas that are sensitive to disturbance (e.g., fragile soils, riparian/wetland areas, and incorporated municipalities). Approximately 320 acres of the Orderville Canyon area of non-WSA lands with wilderness characteristics overlap the corridors of two suitable WSR segments. Management that protects the tentative classification and ORVs within these corridors also would provide protection to the wilderness characteristics.

### Motorized Use of Routes

#### *Non-WSA Lands Managed for Protection of Wilderness Characteristics*

None of five areas comprising 27,770 acres of non-WSA areas would be open to cross-country OHV travel, thus protecting these areas from any long-term impacts from cross-country OHV use. All five areas would limit OHV use to designated roads and trails. There would be no routes designated with East of Bryce non-WSA area. There would be 0.3 miles of routes designated in Parunuweap Canyon, and 15.2 miles of routes designated within Upper Kanab Creek. In the Moquith Mountain non-WSA area, 2.9 miles of routes would be designated for OHV use, while 0.8 miles of routes would be closed to OHV use.

In the Orderville Canyon non-WSA area being protected, preserved, and maintained for its wilderness characteristics, 8.2 miles of routes would be designated for OHV use, while 0.4 miles would be closed to OHV use. In all five areas, a total of 26.6 miles of routes would be designated for OHV use.

All of these areas were found to have wilderness characteristics with ongoing OHV use of the designated routes. Allowing motor vehicle use to continue along the designated routes within the non-WSA lands with wilderness characteristics could impact recreation users' perception of opportunities for solitude and primitive recreation as a result of the occasional sound and presence of OHV users. When the OHV user passes beyond sight and hearing range, opportunities for solitude and primitive recreation would return and natural soundscapes would be restored. Limiting OHV recreation use to these designated routes would minimize disturbance of adjacent lands, protecting the natural character of areas adjacent to these routes. The appearance of naturalness would be temporarily reduced by any signs and barricades that may be needed to keep vehicles on existing routes. Such structures would be temporary, limited to the routes, and would not affect the whole non-WSA lands with wilderness characteristics. This use would not expand beyond these routes nor impact the long-term naturalness of the non-WSA lands with wilderness characteristics. Occasional use of the designated routes by OHV users would continue to provide management that allows for the protection, preservation, and maintenance of the wilderness characteristics in these areas. There are no inventoried routes in the 320 acres in the Orderville Canyon area of non-WSA lands that would be closed to OHV use because it also overlaps a suitable wild and scenic river with a "wild" classification.

#### ***Non-WSA Lands Not Managed for Protection of Wilderness Characteristics***

Not designating any non-WSA lands with wilderness characteristics for cross-country OHV use would protect these areas from any long-term impacts from cross-country OHV use. Allowing motor vehicle use along the 91.4 miles of designated routes within 62,010 acres of non-WSA lands with wilderness characteristics limited to designated routes could impact recreation users' perception of opportunities for solitude and primitive recreation. The appearance of naturalness would be temporarily reduced by any signs and barricades that may be needed to keep vehicles on existing routes. Such structures would be temporary, limited to the routes, and would not affect the whole non-WSA lands with wilderness characteristics. In addition, the sound and presence of an increasing number of OHV users would reduce non-motorized recreation users' perception of opportunities for solitude and primitive recreation. When the OHV user passed beyond sight and hearing range, opportunities for solitude and primitive recreation would return and natural soundscapes would be restored. Limiting OHV recreation use to these designated routes would minimize disturbance of adjacent lands, protecting the natural character of areas adjacent to these routes. This use would not expand beyond these routes nor impact the long-term naturalness of the non-WSA lands with wilderness characteristics. Closing 3 miles of routes in the Vermilion Cliffs area of non-WSA lands with wilderness characteristics not managed to protect, preserve or maintain its wilderness characteristics would eliminate all OHV impacts on wilderness characteristics in this area. Approximately 9,600 acres of the Vermilion Cliffs area of non-WSA lands with wilderness characteristics overlap the Kanab Community SRMA. Prescriptions to management for non-motorized recreation in the Non-Motorized RMZ provide indirect protection for wilderness characteristics in this area.

#### **Visual Resources Management**

##### ***Non-WSA Lands Managed for Protection of Wilderness Characteristics***

Approximately 320 acres of the Orderville Canyon area of non-WSA lands with wilderness characteristics managed to protect, preserve, and maintain its wilderness characteristics that also overlaps a wild and scenic river with a "wild" classification would be managed as VRM Class I (Table 4-8), which would preserve the naturalness and opportunity for solitude and primitive recreation. All of the other

lands being managed for their wilderness characteristics values (27,450 acres) would be managed under VRM Class II objectives. The naturalness of these areas would be protected because of restrictions that require development activities to retain the existing character of the landscape.

#### ***Non-WSA Lands Not Managed for Protection of Wilderness Characteristics***

The level of landscape change would be low on 22,280 acres on all or portions of five non-WSA lands with wilderness characteristics managed as VRM Class II. This VRM objective class was attributed to these areas due to other resource considerations, not because of their wilderness characteristics. The naturalness of these areas would be protected because of restrictions that require development activities to retain the existing character of the landscape. Naturalness would not be protected if visually intrusive activities occurred on 39,410 acres (44 percent) on eight non- WSA lands with wilderness characteristics managed wholly or partially as VRM Class III and Class IV areas. Disturbances and/or developments in these areas could introduce unnatural-looking visual intrusions, reducing the naturalness at a site-specific and landscape level.

**Table 4-8. Proposed RMP VRM Class of Non-WSA Lands with Wilderness Characteristics**

Non-WSA Lands with Wilderness Characteristics	VRM Class I		VRM Class II		VRM Class III		VRM Class IV	
	Acres	% <sup>1</sup>	Acres	% <sup>1</sup>	Acres	% <sup>1</sup>	Acres	% <sup>1</sup>
Canaan Mountain	0	0%	0	0%	3,800	54%	3,200	46%
Carcass Canyon	0	0%	0	0%	200	91%	20	9%
East of Bryce <sup>2</sup>	0	0%	860	100%	0	0%	0	0%
Moquith Mountain <sup>2</sup>	0	0%	10,810	99%	90	1%	0	0%
Orderville Canyon <sup>2</sup>	320	12%	2,380	88%	0	0%	0	0%
Paria/Pine Hollow	0	0%	0	0%	0	0%	900	100%
Parunuweap Canyon <sup>2</sup>	0	0%	1,100	19%	4,200	74%	400	7%
Upper Kanab Creek <sup>2</sup>	0	0%	24,200	56%	13,900	32%	5,500	13%
Vermilion Cliffs	0	0%	10,700	96%	400	4%	0	0%
Wide Hollow	0	0%	0	0%	6,800	100%	0	0%
<b>Total</b>	<b>320</b>	<b>0%</b>	<b>50,050</b>	<b>56%</b>	<b>29,390</b>	<b>33%</b>	<b>10,020</b>	<b>11%</b>

Notes:

1 – Percent of area of non-WSA lands with wilderness characteristics.

2 – All or portions of this area would be managed to protect, preserve, and maintain their wilderness characteristics under the Proposed RMP (see Table 4-7)

## **Recreation Use**

### ***All Non-WSA Lands with Wilderness Characteristics***

High concentrations of recreation users (large group sizes and/or frequent group encounters) in non-WSA lands with wilderness characteristics could decrease outstanding opportunities for solitude. However, most of the non-WSA lands with wilderness characteristics would not receive consistent concentrated recreation use. Early research proposed that solitude is impacted mainly by increasing number of inter-group contacts and not by the number within a user's own group (Watson et al. 1998). More recent research has shown that the loss of solitude is not explained by the mere presence of others, but by the behavior of other groups conflicting with expectations of user behavior (Watson 2001). For example, interaction between OHV users and hikers in a wilderness setting could create a greater loss of solitude

for the hikers due to expectations placed on what activities they anticipated seeing while hiking that day or for the uses they personally deem “appropriate” for that area. Likewise, the differences in general recreation goals between day-users (less concerned about solitude, more interested in scenic beauty) and multi-day users (more concerned with the “purer” wilderness experience) could create conflicts based on only the expectations being sought by the individual recreationists (Cole 2001). Concerns about solitude and the number of groups encountered appear to be more important in more lightly used portions of wilderness, but are less helpful for setting use limits where use is heavy (Cole 2001). In general, the loss of solitude has been associated more with the behavior of other wilderness users, whether actually witnessed by others or interpreted through evidence of natural impacts, and the degree to which that behavior is beyond that expected (Freimund and Cole 2001).

Under the Proposed RMP, limiting group sizes associated with SRPs within riparian areas and designated critical habitat to 12 people would help protect opportunities for solitude and primitive unconfined recreation. These impacts would be most evident in the areas currently receiving high levels of use, such as the Orderville Canyon area of non-WSA lands with wilderness characteristics surrounding the North Fork Virgin River and Orderville Canyon WSAs. Throughout the remainder of the non-WSA lands with wilderness characteristics, generally in more open landscapes, limiting SRP group sizes to 25 would keep group sizes low while allowing users to be able to seek out opportunities for solitude. In addition to the reduction in the number of users, supporting education and outreach programs such as Tread Lightly and Leave No Trace would reduce impacts from increasing numbers of overnight users as campers recreate in a manner that leaves fewer impacts.

Limiting OHV use to designated routes throughout the decision area could increase the use of wheeled game carriers away from the designated routes. However, the overall impact from OHVs driving cross-country would be eliminated.

### **Planned (BLM) or Permitted (BLM-Approved) Surface Disturbing Actions**

#### ***Non-WSA Lands Managed for Protection of Wilderness Characteristics***

The five non-WSA lands with wilderness characteristics managed for their wilderness characteristics (27,770 acres) would be protected from oil and gas development (full-field wells or wildcat well/exploratory wells) activities due to NSO stipulations from non-WSA lands with wilderness characteristics management or closure to leasing from other management decisions (850 acres in East of Bryce area for are closed due to municiple boundaries and 320 acres of Orderville Canyon area are closed due to wild and scenic suitable “wild” segment). There are no waivers, exceptions, or modifications to the NSO stipulation. Long-term naturalness and opportunities for solitude and primitive recreation would be protected from oil and gas development in these areas. However, NSO stipulations do not necessarily preclude oil and gas exploration activities, on lease or off-lease, that do not result in surface occupancy. As a result, oil and gas exploration activities could result in impacts to wilderness characteristics on an estimated 50 acres within the 26,600 acres of non-WSA lands with wilderness characteristics managed for their wilderness characteristics that are open to oil and gas leasing subject to major constraints (NSO). These 50 acres of impacts reduce the appearance of naturalness and eliminate opportunities for solitude within the sights and sounds of the exploration activities. Naturalness would be impacted by increases in visual intrusions and human activity associated with the exploration, as well as short-term disturbance of vegetation. Increased noise levels, visual impacts (e.g., presence of equipment), presence of other people, and associated vehicular travel would eliminate opportunities for solitude and primitive recreation near the activity. Depending on the location of the exploration activities, and the adjacent terrain, vegetation, and atmospheric conditions, impacts resulting from oil and gas exploration could result in a short-term reduction in opportunities for solitude and primitive recreation to less than outstanding on portions of the four of the non-WSA lands with wilderness characteristics managed for wilderness characteristics. When exploration activities are completed, opportunities for solitude and primitive recreation would return and

there would be no long-term effects. Impacts to naturalness would generally be rehabilitated and re-vegetated within one growing season, although the rate would depend greatly on the vegetation type, soil conditions, and precipitation. Site-specific soil types and climatic variations would be major determinants in the length of time and success of reclamation.

Overlapping management stipulations from other resource decisions would close 1,170 acres of non-WSA lands with wilderness characteristics managed for their wilderness characteristics to oil and gas leasing (850 acres in East of Bryce area for are closed due to municipal boundaries and 320 acres of Orderville Canyon area are closed due to wild and scenic suitable “wild” segment). This would precluding any impacts from oil and gas exploration or development activities, protecting, preserving and maintaining wilderness characteristics in these areas.

All 27,770 acres of the non-WSA lands with wilderness characteristics managed to protect, preserve, and maintain their wilderness characteristics in the Proposed RMP (Table 4-7) would be closed to mineral material disposal. Wilderness characteristics in these areas would be protected from the losses of naturalness, solitude and opportunities for primitive recreation that would accompany such development.

Approximately 320 acres in the Orderville Canyon and 890 acres in the Upper Kanab Creek non-WSA lands with wilderness characteristics that are managed to protect, preserve, and maintain their wilderness characteristics would be recommended for withdrawal from mineral entry due to wild and scenic river, and relict vegetation management, respectively. This would eliminate the potential for impacts from locatable mineral exploration and development. The remainder of the non-WSA lands with wilderness characteristics would be open to locatable mineral entry and are not recommended for withdrawal from mineral location. If development were to occur within these areas, impacts would result in the loss of naturalness, solitude, and opportunities for primitive recreation. The development potential for these minerals is low in the five non-WSA lands with wilderness characteristics being managed for those value, thus, the potential for impact would be low.

All 27,770 acres of non-WSA lands with wilderness characteristics managed to protect, preserve, and maintain their wilderness characteristics in the Proposed RMP (Table 4-7) would be managed as ROW avoidance areas. Any approved ROWs would need to comply with the VRM Class II objectives. This would help mitigate affects to naturalness. If construction activities were necessary, those activities may temporarily affect solitude experiences or primitive recreation opportunities. Although some of the non-WSA lands with wilderness characteristics managed to protect, preserve, and maintain with wilderness characteristics are remote and may have a low probability for ROW requests, the decision area has been one of the few areas in the region where ROWs can still be located. On 320 acres along the wild and scenic river segment of Orderville Canyon, a right-of-way exclusion zone would preclude rights-of-way authorizations.

#### ***Non-WSA Lands Not Managed for Protection of Wilderness Characteristics***

Mineral leasing exploration and development occurring within the non-WSA lands with wilderness characteristics not managed to protect, preserve or maintain their characteristics could impact both the naturalness and opportunities for solitude and primitive recreation from surface disturbance associated with exploration and development. Naturalness would be impacted primarily from increases in visual intrusions, human activity, and modifications to the landscape. Increased noise levels, visual impacts, presence of other people, and associated vehicular travel would impact opportunities for solitude and primitive recreation. The noise, people, vehicles, and equipment present during exploration for and development of mineral resources would eliminate opportunities for solitude and primitive recreation near the activity. Depending on the location of the well pads and roads, the terrain, vegetation, and atmospheric conditions, impacts resulting from mineral exploration and development would reduce the opportunities for solitude and primitive recreation to less than outstanding in all or a substantial portion of

the various non-WSA lands with wilderness characteristics. Naturalness could also be lost indirectly throughout the non-WSA lands with wilderness characteristics open for oil and gas leasing (standard terms and conditions, moderate constraints, and major constraints), if direct impacts involve multiple road networks and wells. The quality of the opportunity for solitude and primitive recreation could also be compromised. When development is completed, opportunities for solitude and primitive recreation could return. However, productive wells would remain in place and would be substantially noticeable until the wells are decommissioned and disturbance is reclaimed, eliminating naturalness for the life of the well. Restoration activities would reduce the loss of naturalness from surface disturbing activities, especially on exploration wells that would be rehabilitated and re-vegetated within 2–5 years. Site-specific soil types and climatic variations would be major determinants in the length of time and success of reclamation. The magnitude of these impacts would vary based on the acres of oil and gas leasing stipulations by each area of non-WSA lands with wilderness characteristics (Table 4-9).

Managing approximately 55 percent of the non-WSA lands with wilderness characteristics not managed for wilderness characteristics (49,280 acres) as open to leasing subject to standard, or moderate constraints could result in impacts to naturalness, solitude and primitive recreation opportunities. This activity could eliminate naturalness and opportunities for solitude on or within the sights and sounds of the activities, as described above. Although 55 percent of the non-WSA lands with wilderness characteristics would be open to mineral leasing subject to standard terms and conditions or subject to moderate constraints, the RFD and analysis assumptions project no more than 120 acres of direct disturbance due to exploration activities and 140 acres of direct disturbance due to development of exploration wells. An additional 460 acres could be disturbed if the one very small oil/gas field is developed on non-WSA lands with wilderness characteristics. Based on these exploration and development acres, wilderness characteristics could be directly eliminated on approximately one percent of non-WSA lands with wilderness characteristics that are not managed for those characteristics. However, naturalness and outstanding opportunities for solitude could be impacted beyond these 720 acres, depending on topographic and vegetation characteristics surrounding the wells. Over the long term, because most of the wells (32 of 52 wells in high-potential areas) would be exploratory, continued loss of naturalness would not occur and reclamation would generally restore the natural-looking conditions.

Overlapping management stipulations from other resource decisions, would protect wilderness characteristics from oil and gas development on 12,670 acres within the non-WSA lands not being carried forward for protective management of their wilderness characteristics by closing these areas to leasing or requiring leases to be subject to major constraints (NSO) (Table 4-9).

**Table 4-9. Proposed RMP Acres of Oil and Gas Leasing Stipulations Within Non-WSA Lands with Wilderness Characteristics**

Non-WSA Lands with Wilderness Characteristics Name	Open, Subject to Standard Terms and Conditions		Open Subject to Moderate Constraints		Open Subject to Major Constraints		Closed to Leasing	
	Acres	% <sup>1</sup>	Acres	% <sup>1</sup>	Acres	% <sup>1</sup>	Acres	% <sup>1</sup>
Canaan Mountain	0	0%	7,000	100%	0	0%	0	0%
Carcass Canyon	220	100%	0	0%	0	0%	0	0%
East of Bryce <sup>2</sup>	0	0%	0	0%	0	0%	860	100%
Moquith Mountain <sup>2</sup>	0	0%	0	0%	10,900	100%	0	0%
Orderville Canyon <sup>2</sup>	0	0%	0	0%	2,380	88%	320	12%
Paria/Pine Hollow	550	61%	350	39%	0	0%	0	0%
Parunuweap Canyon <sup>2</sup>	0	0%	5,580	98%	120	2%	0	0%

Non-WSA Lands with Wilderness Characteristics Name	Open, Subject to Standard Terms and Conditions		Open Subject to Moderate Constraints		Open Subject to Major Constraints		Closed to Leasing	
	Acres	% <sup>1</sup>	Acres	% <sup>1</sup>	Acres	% <sup>1</sup>	Acres	% <sup>1</sup>
Upper Kanab Creek <sup>2</sup>	7,700	18%	20,500	47%	14,800	34%	600	1%
Vermilion Cliffs	0	0%	1,280	12%	9,800	88%	20	<1%
Wide Hollow	0	0%	6,100	90%	700	10%	0	0%
<b>Total</b>	<b>8,470</b>	<b>9%</b>	<b>40,810</b>	<b>46%</b>	<b>38,700</b>	<b>43%</b>	<b>1,800</b>	<b>2%</b>

Notes:

1 – Percent of area of non-WSA lands with wilderness characteristics.

2 – All or portions of this area would be managed to protect, preserve, and maintain their wilderness characteristics under the Proposed RMP (see Table 4-7)

Management of the Cottonwood Canyon ACEC would provide protection from mineral material disposal on 1,200 acres not managed to protect, preserve, and maintain wilderness characteristics within the Moquith Mountain area of non-WSA lands with wilderness characteristics. This is because the ACEC would be closed to such activities. The remainder of the non-WSA lands with wilderness characteristics not managed for protection of wilderness characteristics would be open to mineral material disposal. Development of such resources could create a loss of naturalness, impact solitude and result in loss of primitive recreation opportunities due to surface disturbance, noise from heavy equipment operation, and associated traffic.

Approximately 1,200 acres in the Moquith Mountain area would be recommended for withdrawal from mineral entry due to ACEC designation. This would eliminate the potential for impacts from locatable mineral exploration and development. The remainder of the non-WSA lands with wilderness characteristics not managed for protection of wilderness characteristics would not be recommended for withdrawal from mineral location. If development were to occur within these areas, impacts would be similar to those noted for oil and gas above, resulting in the loss of naturalness, solitude, and opportunities for primitive recreation. The development potential for these minerals is moderate or low in non-WSA lands with wilderness characteristics, and the potential for impact would be low.

Development of ROWs in non-WSA lands with wilderness characteristics not managed for protection of their wilderness characteristics would remove opportunities for solitude and primitive recreation during construction. The surface disturbance associated with the development would eliminate naturalness in these areas. Following construction activities, naturalness would remain impacted for above-ground facilities, while reclamation of subsurface ROWs would reduce the loss of naturalness.

### Changes in Vegetation (Vegetation Restoration, Habitat Manipulation, Fuels Treatments)

#### *All Non-WSA Lands with Wilderness Characteristics*

One of the factors related to opportunities for solitude is the presence of vegetation to provide screening. Healthy upland and riparian/wetland areas provide vegetation screening, improving opportunities for solitude. Maintaining and/or restoring riparian areas protects naturalness in these areas and improves vegetation screening to protect site-specific opportunities for solitude. Decisions associated with soil, water, fish and wildlife, livestock grazing, vegetation, wildland fire ecology, and special status species alternatives that result in direct changes to vegetation—whether intended to enhance, protect, and restore habitat; reduce soil erosion; increase livestock forage; or restore ecological functions—could be implemented in all non-WSA lands with wilderness characteristics. Solitude and naturalness could experience short-term losses while work was being conducted due to the sights and sounds associated

with the vegetation treatments and from the evidence of other people assisting in management activities. Long-term impacts would depend on the size and scope of the project. Allowing up to 446,000 acres of treatment over the life of the plan would result in these impacts occurring within some of the non-WSA lands with wilderness characteristics.

Most vegetation treatments likely would occur in areas with invaded pinyon-juniper woodlands. Vegetation treatments in these areas could result in stumps, evidence of disturbed vegetation, or unnatural-looking edge patterns, reducing the short-term appearance of naturalness. Over the long term, these impacts would be rehabilitated and become unnoticeable. In addition, the change of vegetation from woodland to shrubland would help restore these areas to a more pre-settlement condition. However, the change could also reduce tall vegetation that is conducive to screening, decreasing opportunities for solitude and primitive recreation. Over the long term, allowing high levels of vegetation treatment would help maintain and/or enhance naturalness by bringing the fire regime condition class to a point that would allow fire to play its natural role in the ecosystem. However, not requiring treatments could result in further expansion of pinyon-juniper woodlands, improving screening and associated opportunities for solitude, but decreasing naturalness because vegetation communities continue to be outside their natural disturbance regimes.

The five non-WSA lands with wilderness characteristics that are being managed for their wilderness characteristics would be closed to harvesting of woodland products. This would prevent impacts to the naturalness of these areas and preclude temporary impacts to solitude and primitive recreation from noise and human disturbance associated with wood cutting. Allowing harvesting of woodland products in the remaining 62,010 acres could impact non-WSA lands with wilderness characteristics by detracting from the natural character of the area and impacting opportunities for solitude. Impacts on natural character would be similar to the impacts from vegetation treatments noted above.

### **Wildland Fire and Suppression**

#### *All Non-WSA Lands with Wilderness Characteristics*

Non-WSA lands with wilderness characteristics are affected by a variety of influences. Environmental actions, including changes to vegetation communities and the resulting modification of fire's role and regime, have resulted in an existing environment much different from the historical condition. Likewise, a variety of political and regulatory management constraints associated with other resource needs and safety considerations affect how the role of fire or non-fire fuels management can be applied within these areas.

The goals of the wildland fire ecology program would be to allow wildland fire to function in its natural ecological role, mirroring the historical fire return interval and severity. Recognizing that vegetation conditions and fuel loading within these lands are not in a historically natural condition, fire would still be considered a natural, but managed, component within these areas. Management of fire in its natural role within these areas would be implemented through a variety of control strategies associated with naturally ignited wildland fires and through planned prescribed fires. Planned projects would each undergo a site specific environmental evaluation to determine the potential impacts on the resource prior to being approved.

The application of AMRs to naturally ignited wildland fires to accomplish specific resource management objectives may be identified in predefined designated portions of these areas. Full suppression of wildland fires in these areas may be implemented to control fire size and severity. Likewise, managing naturally ignited fires may occur as appropriate for letting fire play its natural role. Although minimized by following the resource protection measures, short-term impacts on naturalness resulting from management response to wildland fire efforts may still include ground disturbances associated with

suppression efforts. ESR actions may be prioritized within these areas to stabilize wildfire areas, minimize the threat of invasive and noxious weed species becoming established, and preserve the natural and unique values inherent to them. The use of prescribed fire and non-fire treatments as a method to manage hazardous fuels and undesired vegetation cover may also be implemented. Short-term impacts on naturalness would be similar to fire suppression and ESR actions.

Opportunities for solitude and primitive and unconfined recreation may be restricted (e.g., access) or impaired (e.g., visibility) during all naturally ignited and planned fire events. However, these impacts on the quality of visitor experience would be limited to the fire area and duration, and likely would not affect overall use and wilderness characteristics outside of the fire area.

Over the long term, the wildland fire ecology decisions would result in modification of the current condition to one that would be more representative of the pre-European settlement vegetation cover. Long-term effects associated with the application of AMRs to fires and planned actions (movement toward natural fire regime and reduced severity of fire events) would outweigh any short-term loss of naturalness, access, and quality of experience impacts associated with opportunities for solitude and primitive and unconfined recreation. By implementing the proposed fire management goals of reducing hazardous fuels to restore natural ecosystems and allowing fire to function in its natural ecological role, natural conditions and the array of supplemental values contained within these management areas would be enhanced and preserved. Likewise, visitor experience and opportunities for solitude and primitive and unconfined recreation may be enhanced by restoration of the historical natural condition.

## Land Tenure Adjustments

### *All Non-WSA Lands with Wilderness Characteristics*

None of the lands within the five areas being managed for protecting, preserving, or maintaining their wilderness characteristics would be available for FLPMA Section 203 sales or for land exchanges. Maintaining the integrity of these lands in public ownership would continue to allow BLM to manage for their wilderness characteristics.

Within the 62,010 acres of non-WSA lands found to have wilderness characteristics, there are approximately 220 acres identified as available for FLPMA Section 203 sale. Selling these lands could result in a loss of naturalness and opportunities for solitude and primitive recreation because BLM would no longer manage these lands. The proposed 220 acres is limited to the entire Carcass Canyon area of non-WSA lands with wilderness characteristics within the decision area, which is not being managed to protect, preserve, or maintain its wilderness characteristics. This area and the adjacent public lands that do not have wilderness characteristics are isolated from other public lands within the decision area; however, it is adjacent to the Carcass Canyon WSA managed by the Grand Staircase–Escalante National Monument (GSENM). While disposal could result in a loss of opportunities in this area, it would eliminate the need to manage these isolated tracts.

Lands within the 62,010 acres not identified for management of their wilderness characteristics could also be available for land exchange if they meet the criteria for land exchange identified in Chapter 2. If exchanged, the BLM would no longer manage these lands and the wilderness characteristics may be lost due to private ownership actions and management.

## Livestock Grazing

### *All Non-WSA Lands with Wilderness Characteristics*

Areas frequented by livestock, such as springs or water developments, could have an unnatural appearance to some wilderness users and reduce the quality of primitive recreation opportunities. It is

important to note that the steep canyon topography in some of the non-WSA lands with wilderness characteristics makes livestock access difficult. While recreational use is commonly concentrated in the canyons, livestock use is generally outside of these areas, reducing potential impacts. Forage allocations in the Water Canyon Allotment (0 AUMs for livestock grazing) would eliminate the potential for livestock grazing impacts in portions of the Moquith Mountain area of non-WSA lands with wilderness characteristics which is not being managed to protect, preserve, or maintain its wilderness characteristics.

In addition, forage allocations in the Zion Park Allotment (0 AUMs for livestock grazing) would eliminate the potential for livestock grazing impacts on portions of the Orderville Canyon area of non-WSA lands with wilderness characteristics which is being managed to protect, preserve, and maintain its wilderness characteristics. Where grazing has been historically permitted and is an ongoing use, the non-WSA areas were still found to have wilderness characteristics. It is not expected that this continued use would create new impacts to the wilderness character to any of these areas.

Maintenance and construction of range improvements could result in short-term loss of opportunities for solitude during implementation and a long-term decrease in naturalness; however, due to the small size and localized nature of most non-vegetation-manipulation range improvements, this would not eliminate naturalness throughout non-WSA lands with wilderness characteristics. Using livestock grazing to enhance the ecosystem health and/or help accomplish resource objectives, such as noxious and invasive weed control and hazardous fuel reduction, could impact the naturalness of these areas in the short term.

### **Other Management Actions**

#### ***All Non-WSA Lands with Wilderness Characteristics***

Short-term impacts on non-WSA lands with wilderness characteristics could be associated with cultural and paleontological inventories. During the survey and/or inventory there would be a loss of solitude, and during and following excavation there would be a loss of naturalness due to excavation activities. However, the number and size of these activities and, therefore, the related impact would be very low.

Extensive seed collection and use of vegetative materials on non-WSA lands with wilderness characteristics could also result in short-term impacts on naturalness from soil disturbance. This would result in the loss of opportunities for solitude during collection.

Soil management actions that would result in reclaiming surface disturbances where appropriate, closing and reclaiming temporary roads associated with projects, and removing and reclaiming facilities or improvements no longer necessary would reduce the amount of disturbance within non-WSA lands with wilderness characteristics. This could help restore naturalness in these areas and improve opportunities for solitude and primitive recreation.

### **Summary**

Approximately 31 percent of non-WSA lands with wilderness characteristics (27,770 acres), within five areas, would be managed to protect, preserve, and maintain their wilderness characteristics. In these areas, management prescriptions would protect naturalness and outstanding opportunities for primitive recreation and solitude from new surface disturbing activities. Limiting OHV use to 26.6 miles of designated routes in non-WSA lands with wilderness characteristics being managed for those values could result in short-term perceived loss of opportunities for solitude and primitive recreation, but would not preclude the preservation, protection, or maintenance of those wilderness characteristics in those areas. This is because these lands were found to have wilderness characteristics even with those routes and occasional use by OHVs. In addition, some of the routes are being closed in these areas.

There could be impacts from oil and gas exploration and development to wilderness characteristics on portions of the non-WSA lands with wilderness characteristics not managed to protect, preserve, or maintain their wilderness characteristics (62,010 acres). Under the Proposed RMP, approximately 260 acres of non-WSA lands with wilderness characteristics that are not being managed to protect, preserve or maintain their wilderness characteristics could be directly disturbed through oil and gas exploration and development activities, with an additional 460 acres that could be impacted if the oil and gas field development were to occur in non-WSA lands with wilderness characteristics. While less than 1 percent of all non-WSA lands with wilderness characteristics (managed for protection or not) would be directly impacted, the number of acres affected by oil and gas development could increase depending on site-specific topographical and vegetative conditions and the ability to see and hear the development and function of oil and gas wells, but other management would affect the visibility of these developments. The potential for impacts from mineral materials and locatable mineral development is low, due largely to low development potential in the non-WSA lands with wilderness characteristics.

The Proposed RMP also provides protection to wilderness characteristics through adherence to VRM classes. More than 56 percent of the non-WSA lands with wilderness characteristics (50,370 acres) would be managed as either VRM Class I or Class II, preserving or retaining the existing character of the landscape in these areas. All projects implemented in these areas would be required to adhere to the VRM class, minimizing their visual impact on the non-WSA lands with wilderness characteristics and protecting naturalness and outstanding opportunities for solitude.

#### **Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

There would be no irreversible and irretrievable commitment of resources. There could be a short-term loss of wilderness characteristics due to mineral development during the life of the plan. Beyond the life of this plan, however, naturalness and opportunities for primitive recreation and solitude could be restored in most cases. This impact indicates a trade-off between the potential short-term uses and long-term preservation of every acre that has been identified as an area of non-WSA lands with wilderness characteristics. Generational uses of public lands have demonstrated that opportunities for solitude, primitive recreation, and, over time, the naturalness of these lands might be restored. For example, the enjoyment of wilderness characteristics is now available in places elsewhere in the western United States where uranium mines were predominant during the Cold War era of the 20th century. Time, reclamation, and the absence of human activities have restored and can continue to restore these attributes, although generally beyond the period this plan will be in effect.

There is a potential for unavoidable adverse impacts and subsequent loss of one or all of the wilderness characteristics on some non-WSA lands with wilderness characteristics from mineral development. Due to the location of the non-WSA lands with wilderness characteristics and the development potential for minerals, the magnitude of acres affected would be small if development occurs on these lands. Managing 45 percent of the non-WSA lands with wilderness characteristics as closed to leasing or open to leasing subject to major constraints would protect wilderness characteristics from this impact. None of the lands being managed for these values (27,770 acres) would be affected by fluid mineral development because these lands would be managed under a no surface occupancy stipulation with no waivers, exceptions, or modifications or be closed to leasing.

## 4.3 RESOURCE USES

### 4.3.1 Impacts on Forestry and Woodland Products

This analysis addresses potential impacts on forest and woodland products harvest from implementing the Proposed RMP. This analysis focuses on those management alternatives or actions that place limitations and/or affect the quantity or quality of products on the approximately 478,000 acres available for forest and woodland product harvest in the decision area, as discussed in Chapter 3. In the absence of quantitative data, best professional judgment was used, and impacts are sometimes described using ranges of potential impacts or in qualitative terms, if appropriate.

The analysis is based on the following assumptions:

- Several traditional woodland products (e.g., Christmas trees, posts, and poles) may be harvested from tree species growing on sites not classified as forest or woodland.
- Demand for forest and woodland products is not anticipated to grow substantially over the planning period; however, biomass utilization may increase in the future.
- Supply of forestry and woodland products would continue to substantially exceed demand.

Under the Proposed RMP, impacts on forest and woodland products harvest would not be anticipated as a result of implementing management actions for the following resources and designations: air quality, livestock grazing, energy and minerals, recreation management, and lands and realty.

### Proposed RMP

#### *Forest and Woodland Harvest Management*

Implementing a management plan for woodland and/or forest products would result in long-term increases in sustainability of forest and woodland product harvest.

Permitting commercial forest and woodland product harvest for the purposes of promoting or sustaining forest health on a case-by-case basis would allow harvests to occur, but would limit the potential for commercial harvest because it would be used only for the purpose of promoting or sustaining forest health.

Permitting commercial and non-commercial harvest of green or dead pinyon and juniper woodland products (e.g., cedar posts, Christmas trees, fuelwood, and biomass utilization) areawide unless otherwise designated or stipulated and other woodland species on a case-by-case basis would facilitate woodland products harvest. Permitting harvest of woodland products in riparian areas in PFC on a case-by-case basis for the maintenance and/or improvement of riparian ecosystems would facilitate woodland products harvest.

Closing WSAs (53,900 acres) and non-WSA lands with wilderness characteristics (27,770 acres) to woodland product harvest, except for incidental collection for onsite campfire use and administrative purposes, would preclude woodland products harvest in these areas.

#### *Limits or Restrictions on Harvest*

Implementing BMPs to minimize detrimental impacts on soils and water quality from ground disturbing activities and maintaining and/or enhancing riparian areas through project design features and/or stipulations would place limitations on harvest and could possibly prevent harvest in these locations.

Additional restrictions would be applied to surface disturbing activities, which would reduce the areas available for harvest. No surface disturbing action would be allowed on 23,800 acres (4 percent), increasing the area not allowed for harvest. The no surface disturbance restriction would be applied to areas within ¼ mile or the visual horizon of cultural sites; within ½ mile of active bald eagle nest sites and Mexican spotted owl nests; within ½ mile of active, suitable, or potential reintroduction Utah prairie dog habitat/sites; and within 330 feet of riparian areas.

Controlling surface disturbing and disruptive activities to minimize impacts on identified crucial habitat for sensitive species, applying BMPs to avoid or reduce habitat fragmentation, and prohibiting surface disturbing activities within ½ mile of active or suitable prairie dog habitat would restrict the location, extent, or method of opportunities for product harvest in these areas.

VRM Class I areas would be 76,000 acres (14 percent) and VRM Class II areas would be 94,400 acres (17 percent). This would alter the location, extent, or method of forest and woodland harvest and restrict harvest opportunities. Alterations would be dependent on site-specific conditions and VRM class objectives following a visual contrast rating analysis and other environmental review.

Management prescriptions associated with non-WSA lands with wilderness characteristics would restrict use of forest and woodland product harvest on 27,770 acres managed to protect, preserve, and maintain their wilderness characteristics. ACEC management could also restrict surface uses, including harvests. Under the Proposed RMP, the area of ACECs managed as VRM Class II would be increased to 3,800 acres with the designation of the Cottonwood Canyon ACEC. These management prescriptions would further restrict surface forest and woodland uses, including harvests.

Managing river segments as suitable for inclusion in the National Wild and Scenic Rivers System (NWSRS) could alter the location where forest and woodland product harvest can occur. Under the Proposed RMP, only six eligible river segments and corridors (5,530 acres) would be determined suitable and managed to protect their ORVs, free-flowing nature, and tentative classification.

Restrictions on surface disturbing activities near cultural and paleontological sites could prevent or restrict harvest of forest and woodland products.

#### ***Vegetation Management and Habitat Manipulation***

Vegetation treatments (e.g., wildlife habitat treatments, watershed treatments, livestock rangeland treatments, fuels treatments, and stewardship contracting) on an annual average of no more than 22,300 acres (446,000 acres over the life of the plan) using the full range of vegetation treatment methods and tools (i.e., prescribed fire, mechanical, chemical, biological, woodland product removal, and wildland fire use) could reduce the extent of pinyon-juniper within the sagebrush steppe communities by converting treated areas to a grass/shrub-dominated community. Over the long term, treatments likely would decrease pinyon-juniper cover, but improve the productivity and health of existing stands and could increase the quantity and quality of products available for harvest. Over the long term, improving the ecological health of vegetation could increase the quality of forest products (Sonne and Briggs 2001, Prestemon et al. 2005). Based on recent woodland product demand, decreases in woodland cover would not affect the availability of woodland products.

Vegetation resources would be managed to achieve 51 percent or higher of PNC, which would create a target for rehabilitation efforts that could increase the extent of successfully rehabilitated areas. Treatments would be allowed in areas containing ponderosa pine trees, which would improve the quantity and quality of harvest in these areas by reducing fuel loads and the potential for larger crown fires that lead to a loss of forest stands. Restoring forest and woodland old-growth stands to a pre-fire-suppression

condition could increase tree spacing and encourage understory vegetation in these areas. This likely would increase the quantity and quality of forest and woodland products available for harvest.

### ***Wildland Fire***

Using wildland fire and prescribed fire to protect, maintain, and enhance resources would decrease the acres of woodlands available for harvest; however, rangeland health would be improved. Depending on the degree of severity, burned wood may or may not be useful. Suppressing wildland fires in areas where fire is not desired could increase the quantity of forest and woodland products. Fire suppression usually results in denser forest stands, increasing the risk of uncharacteristically larger or intense wildfires and mortality from insect pests and disease.

### **Summary**

The Proposed RMP would allow harvest to continue; however, forest and woodland product harvest would be limited to only those areas that promote or sustain forest health. Vegetation treatment management actions under the Proposed RMP would provide additional measures to manage and improve vegetation, which maintain or improve the quantity and quality of forest and woodland products available for harvest.

### **Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

There would be no irreversible and irretrievable commitment of resources and no unavoidable adverse impacts. Based on historic and anticipated demand, short-term uses of forest and woodland products under each of the alternatives would not result in a loss of the long-term productivity of the forests and woodlands.

### 4.3.2 Impacts on Livestock Grazing

This section describes potential impacts on livestock grazing from implementing the Proposed RMP. Impacts on resources and resource uses resulting from implementation of the livestock grazing program are discussed in those particular resource sections of this chapter. Impacts on livestock grazing activities are generally the result of activities that affect forage levels, land use restrictions that affect the ability to construct range improvements, and human disturbance/harassment of livestock within grazing allotments. Conducting vegetation treatments likely would have the greatest effect on livestock grazing because such treatments could increase vegetation production and forage available for livestock. Activities that result in surface disturbance (e.g., mineral development, ROW construction, and recreation) or management of resources that results in limiting surface disturbance (e.g., fish and wildlife, vegetation, water resources, soil resources, and visual resources) also would impact livestock grazing by affecting forage levels. Management of fire and forest and woodland products would affect livestock grazing by either preserving or increasing available forage for livestock over the long term.

Impact analyses and conclusions are based on interdisciplinary team knowledge of resources and the project area, review of existing literature, and information provided by BLM resource specialists. Effects are quantified where possible or are described in qualitative terms in the absence of quantitative data.

The analysis is based on the following assumptions:

- Livestock grazing will be managed in accordance with the *Standards for Rangeland Health* and *Guidelines for Grazing Management for BLM Lands in Utah*.
- Livestock grazing will occur throughout the majority of the decision area.
- In the short term, actual forage use in the decision area may increase from current levels due to improving range condition and range recovery from recent drought. Over the long term, forage demand may continue at historic levels.

Under the Proposed RMP, impacts on livestock grazing would not be anticipated as a result of implementing management actions for the following resources and designations: air quality, wilderness, WSAs, and other designations.

### Proposed RMP

#### *Livestock Grazing Management*

Impacts resulting from livestock grazing would primarily be related to forage removal by grazing livestock. Managing livestock grazing according to the *Guidelines for Grazing Management for BLM Lands in Utah* would improve livestock dispersal throughout pastures; control the season, duration, and intensity of grazing; and achieve range condition objectives. The intent of any applied practices and projects would be to improve the condition of the forage, thereby improving grazing management opportunities. Closing the Water Canyon Allotment (48 AUMs) to livestock grazing for the life of the plan would eliminate the opportunity to graze livestock in this allotment.

Using livestock grazing to enhance ecosystem health and/or to help accomplish resource objectives on a case-by-case basis could provide for short-term, non-renewable increases in forage for livestock grazing. These increases would not be added to the existing grazing permit, so permittees would not be able to regularly plan on incorporating such forage use in seasonal grazing patterns.

### ***Actions that Directly Affect Vegetation Conditions***

Management of vegetation resources would generally enhance vegetative conditions and indirectly affect livestock grazing by increasing forage production and stabilizing livestock grazing. Applying the *Standards for Rangeland Health* under the vegetation management program would help to manage surface uses and thereby enhance rangeland conditions, increase long-term forage production, and stabilize livestock grazing. However, managing rangelands according to the *Standards for Rangeland Health* could also affect livestock operators on those allotments not meeting *Standards for Rangeland Health* for reasons attributed to grazing. Such adjustments could include season-of-use changes, forage allocation adjustments, implementation of grazing management practices (e.g., growing season deferment, riparian pastures, or exclosures), forage utilization limits, or conversions in kind or type of livestock. Management changes such as these could result in increased operating costs to the livestock operator. Over the long term, achieving the standards would result in maintained/increased water availability and forage production, which would benefit livestock through improved animal distribution, increased weight gain, and improved animal health.

Conducting vegetation treatments on an annual average of up to 22,300 acres, particularly livestock rangeland treatments, would enhance vegetation conditions and indirectly affect livestock grazing by increasing forage production. These treatments would have a short-term effect on livestock grazing through forage removal and by excluding livestock use for two growing seasons on treated areas, but enhanced rangeland conditions would be realized over the long term. Increasing the acres of vegetation treated would increase the short-term displacement of livestock following the treatments, but over the long term increasing treatments would increase and improve vegetation types valuable for livestock grazing. However, because there is no requirement to treat a set acreage, there could be no short-term decreases in forage. If few or no vegetation treatments were implemented, the existing active use AUMs likely would decrease as pinyon-juniper woodlands continue to expand, invading sagebrush steppe vegetation types and reducing understory forage species.

Treatment of invasive species and noxious weeds would serve to control and contain weed species infestations, thereby maintaining forage production, diversity, and vigor. These actions could temporarily displace livestock and reduce available forage. Guidelines for livestock grazing would be implemented to discourage the introduction and spread of weeds. Vegetation treatments would be prioritized to restore areas functioning at less than 51 percent of PNC, restore areas with noxious weed and/or non-native invasive plants, maintain previously treated areas, and achieve other objectives identified in the RMP. This would result in a systematic approach to treating vegetation communities, which likely would improve vegetation conditions and increase forage production. Treatments could be conducted in areas containing ponderosa pine trees, which likely would increase tree spacing and encourage forage production.

### ***Surface Disturbing Activities***

Surface disturbing activities associated with the development of minerals could disturb soils, remove vegetation, and increase the potential for the introduction and spread of noxious weeds. This would cause a loss of livestock forage and associated AUMs on 2,976 acres over the short term. Reclamation of 2,370 acres would result in 606 acres of long-term surface disturbance. Mineral development activities could increase the potential for livestock harassment and livestock loss from vehicle collisions. However, the improvement of roads associated with mineral development could facilitate livestock management operations by improving access to remote locations within allotments. Given that livestock grazing occurs across most of the decision area, long-term disturbance would result in relatively minor impacts on livestock grazing.

The development of coal resources would be anticipated to result in the initial disturbance of 3,600 acres over the 20-year planning horizon, which would result in a loss of livestock forage in these areas. Reclamation is estimated to begin within 3 years of mining, and an average of 100 acres of disturbance per year would be reclaimed over the long term. Given that livestock grazing occurs across most of the decision area, the long-term disturbance would result in relatively minor impacts on livestock grazing.

Construction activities related to the development of ROWs would remove a small amount of vegetation over the short term and increase the potential for the introduction and spread of noxious weeds, thereby causing a possible loss of livestock forage and associated AUMs. Increased vehicle travel on new roads also would increase the potential for the spread of weeds, animal harassment or injury, or interference with livestock grazing management. However, an increase in improved roads could facilitate livestock management operations by increasing access to remote locations within allotments. Under the Proposed RMP, 75,700 acres would be excluded from ROW development. This could decrease the extent of related forage removal, but also decrease opportunities for access to remote locations within allotments.

### ***Controlling Surface Uses and Surface Disturbance***

Implementing BMPs to minimize detrimental impacts on soils from ground disturbing activities and maintaining and/or enhancing riparian areas (*Utah Riparian Management Policy* [UT 2005-091]) through project design features and/or stipulations would help to reduce soil erosion, surface runoff, and sedimentation of streams. This would help to maintain and enhance vegetation and water quality and increase channel stability, which would indirectly provide forage and water for livestock.

Activities associated with the management of cultural and paleontological resources would affect relatively small, localized areas and would not have measurable effects on livestock forage. Mitigating adverse impacts on cultural and paleontological resources and allowing for preservation and interpretation of such resources could include excavation of known sites, which would result in soil disturbances and forage removal. However, restrictions on surface disturbing activities near cultural and paleontological sites could prevent the removal of forage in these areas, but also could result in the modification or relocation of range improvements.

Management actions to enhance wildlife habitat could affect livestock grazing by improving vegetation conditions and indirectly maintaining and/or increasing forage production. However, implementing decisions to increase populations of special status species, implementing conservation measures for listed and sensitive species, and prohibiting ground disturbing activities within ½ mile of bald eagle nests and Mexican spotted owl nests could also restrict opportunities for range improvements and other grazing management actions.

Management of special status species could affect livestock grazing through habitat improvements and land use restrictions. Controlling surface disturbing and disruptive activities to minimize impacts on identified crucial habitat for sensitive species, applying BMPs to avoid or reduce habitat fragmentation, prohibiting surface disturbing activities within ½ mile of active or suitable prairie dog habitat, applying a CSU stipulation to avoid placing oil and gas wells in federally listed and candidate plant species occupied and suitable habitat, and applying an NSO stipulation within ½ mile of Greater sage-grouse leks could help to improve vegetation conditions and thereby improve forage production. However, these actions could also constrain rangeland improvement options by limiting the location of the proposed improvement. Maintaining or improving stream habitat in special status fish habitat would help to improve riparian vegetation and overall stream health, which could increase forage production and enhance water sources used by livestock.

The management actions for soil resources would preclude cross-country OHV use in fragile soil areas and include additional efforts to reclaim surface disturbances and temporary roads. This could further

reduce soil erosion and improve vegetation conditions, which would indirectly increase forage for livestock.

Implementing mitigation measures to minimize impacts on water quality and prohibiting surface discharge of produced water in the Colorado River Basin would reduce soil and salt loads to water sources and help maintain appropriate stream discharge rates. This would in turn maintain and enhance riparian vegetation and water quality, which would indirectly provide forage and water for livestock.

Implementing additional measures to manage and improve vegetation could increase livestock forage. Vegetation resources would be managed to achieve 51 percent or higher of PNC, which would create a target for rehabilitation efforts that could increase the extent of successfully rehabilitated areas. Restoring forest and woodland old-growth stands to a pre-fire-suppression condition could increase tree spacing and encourage understory forage production in these areas.

The effects from management of visual resources would be affected by the increase of VRM Class I areas (76,000 acres). This would further reduce the extent of surface disturbance and thereby indirectly reduce related forage removal due to surface disturbing activities. Managing visual resources could also limit the location of rangeland improvements.

#### ***Wildland Fire***

Using wildland fire to protect, maintain, and enhance resources could help to improve vegetation conditions and increase forage production and availability for livestock. However, a short-term loss of forage may occur following a fire event. Suppressing wildfires in concert with increased fuels treatments could reduce the occurrence of catastrophic fires and thereby help to maintain vegetation cover and conserve livestock forage. Although suppression actions can create surface disturbances and result in the removal of forage through use of heavy equipment, implementing emergency stabilization and rehabilitation actions after suppression activities would help to mitigate these impacts.

#### ***Recreation Use***

Recreational activities could impact livestock grazing through direct human disturbance. These impacts could include animal displacement, harassment, or injury or interference with livestock grazing management. In addition, concentrated recreation use, especially OHV use, could result in loss of vegetation. However, reducing cross-country OHV use to 1,000 acres would eliminate the impacts on livestock forage because the areas remaining open for cross-country OHV use are not conducive to livestock grazing. The remaining impacts on vegetation of OHV use along 1,403 miles of designated routes would be minimal.

Management of the Kanab Community SRMA, Paria SRMA, Moquith Mountain SRMA, Orderville SRMA, North Fork Virgin River SRMA, and Escalante SRMA (95,100 total acres) would further emphasize the recreational opportunities available in the decision area and consequently increase the potential for livestock displacement, harassment, or injury or interference with livestock grazing management. However, implementing surface use restrictions within the SRMAs would help to reduce the degree of impact from recreational and other uses. Encouraging primitive types of recreation and prohibiting surface disturbance from oil and gas development in the Kanab Community SRMA (Non-Motorized RMZ), Paria SRMA, Orderville Canyon SRMA, and North Fork Virgin River SRMA would help to reduce effects related to recreational use.

#### ***Special Designations***

Management prescriptions associated with ACECs would affect livestock grazing management by restricting land uses that could result in livestock harassment and forage losses. Managing the

Cottonwood Canyon ACEC (3,800 acres) as a VRM Class II area and requiring NSO stipulations on new leases would reduce the extent of surface disturbance in the ACEC and thereby reduce related forage removal and damage. In addition, closing the Water Canyon Allotment to livestock grazing for the life of the plan would eliminate the opportunity to graze livestock in this allotment.

Management of river segments to protect their ORVs, free-flowing nature, and tentative classification would include surface use restrictions. Such restrictions would minimize surface disturbance and related vegetation removal, which could help to maintain forage for livestock. Under the Proposed RMP, only six eligible river segments (5,530 acres) would be determined suitable and managed to protect their ORVs, free-flowing nature, and tentative classification.

### ***Commercial Forest and Woodland Product Harvest***

The commercial harvest of forest and woodland products and associated surface disturbances could result in a short-term loss of livestock forage. Over the long term, such activities would increase light penetration to understory vegetation communities (i.e., grasses and forbs) and thereby increase forage production. Forest and woodland product harvest activities could also temporarily displace livestock.

## **Summary**

Under the Proposed RMP, adherence to the *Standards for Rangeland Health* and *Guidelines for Grazing Management for BLM Lands in Utah* would improve the long-term condition of the range and the orderly use of the range. While surface disturbing activities, recreational activities, and general human disturbance could lead to site-specific loss of forage, spread of noxious weeds, and displacement of livestock, vegetation treatments would help to offset forage losses by increasing forage production in treatment areas. Management of SRMAs (95,100 total acres) would reduce the impacts of increased recreation use within the decision area. While increased use could increase the degree of forage removal and disturbance to livestock, managing these areas as SRMAs would provide for increased management attention to resource conflicts.

Under the Proposed RMP, vegetation treatments would be prioritized to restore areas functioning at less than 51 percent of PNC, restore areas with noxious weed and/or non-native invasive plants, and maintain previously treated areas to achieve other objectives identified in the RMP. This likely would improve vegetation conditions and increase forage production.

### **Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

Vegetation treatments and wildland fires that modify range conditions would temporarily reduce forage and would require restricting livestock from treated areas until vegetation becomes sufficiently established to withstand grazing (generally two growing seasons as per Utah Grazing Guidelines). However, this short-term impact would be reversible, and over the long term the treated/restored area would provide improved forage for livestock.

Management actions could result in various short-term impacts on habitat, such as increased localized soil erosion, vegetation damage, and decreased visual resource quality. Surface disturbing activities could result in the greatest potential for impacts on long-term productivity. The limited extent of foreseeable development, mitigating management actions, and application of BMPs would minimize decreases in long-term productivity from short-term uses. There should not be any loss of long-term productivity for livestock grazing because grasses and other forage species could be reclaimed within 2 to 5 years.

Wildland fires and surface disturbing activities could result in unavoidable adverse impacts, although these impacts could be mitigated to the extent possible. Permanent conversion of areas to other uses such as transportation and mineral and energy development would decrease vegetated areas. Applying BMPs, site-specific mitigation efforts, and restoration would decrease these impacts to the degree possible. Permanent mineral developments and their associated infrastructure would be mitigated to the extent possible to minimize loss of range resources.

### 4.3.3 Impacts on Recreation

This section presents potential impacts on recreation resources, opportunities, and experiences from implementing the Proposed RMP. Recreation uses within the decision area include backpacking, recreational OHV use, hiking, camping, sightseeing/viewing nature, hunting, fishing, mountain biking, rock climbing, and horseback riding. Impacts on recreation primarily occur from management actions related to other resources or resource uses that result in long-term elimination or reduction of recreation opportunities or degradation of the recreation setting and experience (e.g., limited access, development activities, and the presence of man-made facilities).

Impact analysis and conclusions are based on interdisciplinary team knowledge of resources and the decision area, review of existing literature, and information from other agencies. Effects are quantified where possible. In the absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms if appropriate.

The analysis is based on the following assumptions:

- Recreation use within the planning area will continue to increase during the life of the RMP.
- The incidence of resource damage and conflicts between recreationists involved in motorized and non-motorized activities will increase with increasing use of public lands.
- The existing transportation network will be sufficient to meet the demand of recreational OHV opportunities.
- There will be sufficient opportunities to meet the demand of non-motorized recreation (e.g., hiking, mountain biking, and equestrian).

Under the Proposed RMP, impacts on recreation would not be anticipated as a result of implementing management actions for the following resources and designations: air quality and other designations.

## Proposed RMP

### *Recreation Management Areas*

Management of the Kanab Community SRMA (33,100 acres) would provide motorized and non-motorized recreation opportunities in close proximity to the town of Kanab. SRMA management would address user and resource conflicts that occur in the area between these two user groups and would protect and improve the recreation experience for both groups in both SRMA zones.

Management of the Moquith Mountain SRMA (15,000 acres) would provide intensive recreation management for motorized recreation in sand dune areas (open to OHV use) and wooded environments (scenic trail use). Management of the SRMA would address user and resource conflicts while providing for a quality, motorized experience for different types of users. Identification of the Kanab Community and Moquith Mountain SRMAs would allow for focused recreation management in these areas and would diversify recreation opportunities in the area.

Identifying the Paria Canyon area as a SRMA (21,200 acres) and managing the area as closed to OHV use and as a VRM Class I area would protect primitive recreation values and the opportunity for solitude and primitive/unconfined recreation.

Management of the Orderville Canyon SRMA (1,950) and North Fork Virgin River SRMA (1,050 acres) would provide for primitive riparian canyon recreational opportunities; however, OHV use would be allowed on designated routes. This would provide opportunities for motorized recreation in an area with

high scenic quality, but could also increase the potential for user conflicts and displacement of users seeking solitude.

Management of the Escalante SRMA (22,800 acres) would allow for motorized and non-motorized recreation opportunities in close proximity to the town of Escalante. A trail network would provide for hiking, equestrian, and scenery and wildlife viewing opportunities. Because of its proximity to town and allowed OHV use, the SRMA would not provide opportunities and experiences associated with solitude and primitive/unconfined recreation, but would provide for non-motorized uses in an outdoor natural-looking setting.

#### ***Off-Highway Vehicle Use***

Opportunities for unrestricted, cross-country OHV use would be restricted to 1,000 acres. Most of the decision area would be limited to designated routes under the Proposed RMP. In these areas use would be limited to 1,403 miles of routes open year-round and 2 miles of routes closed seasonally. Closing 75 miles of routes to OHV use would eliminate opportunities for OHV use in these areas, but these areas would remain open for non-motorized recreation opportunities. In addition, the extent of areas closed to OHV use would be 25,000 acres, which would reduce opportunities for OHV travel and camping in remote areas. However, this increase in the level of restriction on OHV use would reduce conflicts between motorized and non-motorized users, increase public safety, and enhance the recreational experience associated with non-motorized recreation activities.

Approximately 450 miles of new roads would be developed to support exploration and development of oil and gas, but roads associated with non-producing wells would be reclaimed within the life of the plan and would not be open for motorized use. Approximately 100 miles of new roads developed to access producing oil and gas wells would remain open for the life of the plan, but these would be open to recreation use on a case-by-case basis.

#### ***Mineral Development***

Areas open to oil and gas leasing subject to standard terms and conditions would be 95,400 acres. These areas would generally be managed as open to oil and gas leasing subject to moderate constraints (296,200 acres) or major constraints (83,400 acres). While the acres of surface disturbance associated with oil and gas exploration and development would not change (Appendix 15), increasing the acres with the various stipulations would result in more and larger areas where surface disturbance associated with mineral development would not be encountered. This would reduce the potential for conflict between mineral developments and recreation opportunities and experiences for recreationists seeking natural landscapes. Areas closed to leasing would be 79,000 acres, but would be in areas associated with primitive recreation opportunities, protecting the experiences of those recreationists.

Areas open to locatable mineral development and mineral material sales could allow surface disturbance that could impact the desirability of these areas for recreation use. Recreation opportunities for recreationists seeking natural landscapes would be reduced in these areas. Closing 105,000 acres to mineral material sales would reduce related surface disturbance and help protect recreation opportunities and experiences in these areas.

Recommending an additional 9,500 acres for withdrawal from locatable mineral entry would reduce the area in which locatable mineral development activities could occur. This would protect opportunities for primitive/unconfined recreation activities and enhance the experience of users seeking this type of recreation opportunity.

The development of coal resources would be anticipated to result in the initial disturbance of 3,600 acres over the 20-year planning horizon, which could reduce the quality of recreational experiences such as hunting, displace recreationists to other less-developed areas, and eliminate some recreation opportunities. Reclamation is estimated to occur within 3 years of mining, with the disturbed area being reclaimed over the long term. The reclamation would be concurrent/phased as the mining proceeds.

Opportunities for recreational rock-hounding would decrease due to restrictions on collection of natural resources associated with SRPs, unless authorized. This stipulation would ensure natural resources in popular areas for SRP tours are managed in a sustainable manner, protecting the recreational setting that draws the tours. Collection would still be allowed upon authorization, so the opportunity for such use would not be eliminated, but the collection of natural resources (including rock-hounding) can be spontaneous. Requiring authorization could reduce the experience of some recreationists associated with SRPs.

### ***Controlling Surface Disturbance and Improving Habitat***

Management of VRM Class I areas (76,000 acres, 258 percent increase) would protect scenic quality by restricting landscape change, which would maintain and enhance the recreation experience for users seeking the opportunity for solitude and primitive/unconfined recreation. Application of VRM Class II designations (94,400 acres, 6 percent decrease) would retain the existing character of the landscape and would maintain scenic quality, which would enhance the recreation experience throughout these areas. Management of VRM Class III areas (210,700 acres, 207 percent increase) would generally not limit the type or amount of recreation use that would occur in these areas. Management of VRM Class IV areas (172,900 acres, 46 percent decrease) would allow for major modifications to the landscape, which would diminish scenic quality to a degree that would detract from recreation experiences for recreationists seeking natural landscapes.

Management of soils to reduce soil loss on identified areas through land treatments and reseeding actions would protect the quality of the recreational experience in areas where surface occupancy would be allowed and reduce conflicts between recreationists and development activities, thus maintaining recreation opportunities and improving the recreation experience for recreationists seeking natural landscapes. Short-term impacts could occur due to temporary displacement of users during treatment activities. In addition, cross-country OHV use would be precluded in fragile soil areas and additional efforts would be conducted to reclaim surface disturbances and temporary roads. This would further reduce soil erosion and improve vegetation conditions, which would indirectly improve the general recreation experience for consumptive and non-consumptive users by enhancing the setting in which recreation activities take place.

Implementing additional measures to manage and improve vegetation could enhance the recreation setting and experience for recreationists seeking natural landscapes. Vegetation treatments would be prioritized to restore areas functioning at less than 51 percent of PNC, restore areas with noxious weed and/or non-native invasive plants, maintain previously treated areas, and achieve other objectives identified in this RMP. Treatments would be conducted in areas containing ponderosa pine trees, which likely would increase tree spacing and encourage forage production. This would further improve vegetation conditions and improve the long-term aesthetics of the area, which would indirectly enhance the recreation experience and setting for recreationists seeking natural landscapes.

Management of special status species could affect recreation through habitat improvements and land use restrictions. Controlling surface disturbing and disruptive activities to minimize impacts on identified crucial habitat for sensitive species, applying BMPs to avoid or reduce habitat fragmentation, prohibiting surface disturbing activities within ½ mile of active or suitable prairie dog habitat, applying a CSU stipulation to relocate well placement in federally listed and candidate plant species occupied and suitable

habitat, and applying an NSO stipulation within ½ mile of Greater sage-grouse leks would all help to improve ecosystem conditions and the aesthetic value of these areas. This would indirectly enhance the recreation experience by improving the setting in which these activities take place. However, these actions could also constrain the development of recreation facilities and OHV use. Maintaining or improving stream habitat in special status fish habitat would help to improve riparian conditions, which could enhance the recreation setting and experience in these areas for recreationists seeking natural landscapes.

Prohibiting surface disturbing activities on a seasonal basis in mule deer and elk crucial winter range, crucial Desert bighorn sheep habitat, and crucial pronghorn habitat and precluding oil and gas development and ROW construction in big game migration and transitional ranges would improve opportunities and experience associated with hunting and wildlife observation. These restrictions would affect opportunities and experiences associated with hunting and wildlife observation.

#### ***Lands and Realty Actions***

Managing areas as ROW exclusion (75,700 acres) and avoidance (106,670 acres) areas would affect recreation opportunities, setting, and experience. ROWs would be prohibited in exclusion areas or mitigated in avoidance areas to reduce their impact on the natural environment. Reducing overall development in these areas could increase opportunities for primitive/unconfined recreation activities and enhance the experience of users seeking this type of recreation opportunity.

#### ***Wildland Fire***

Short-term closures of recreation areas and facilities could occur in fire areas during fire suppression activities and through the use of prescribed fire, limiting recreation opportunities in these areas. However, managing the decision area for suppression in areas with high resource values and recreation facilities would help maintain and protect recreation facilities and opportunities. In addition, wildland fire could affect other recreation opportunities. Wildland fire could improve wildlife habitat and hunting and viewing opportunities over the long term.

#### ***Vegetation Improvement***

Implementing BMPs to minimize detrimental impacts on soils from ground disturbing activities and maintaining and/or enhancing riparian areas (*Utah Riparian Management Policy* [UT 2005-091]) through project design features and/or stipulations would help to reduce soil erosion, surface runoff, and sedimentation of streams. This would help to maintain and enhance vegetation and water quality and increase channel stability, which would indirectly improve the general recreation experience for consumptive and non-consumptive users by enhancing the riparian setting in which recreation activities, such as hiking, picnicking, camping, and fishing, take place.

Management of vegetation resources and implementing actions to enhance wildlife habitat through active treatments could affect recreation by improving ecosystem health and scenic quality. This would indirectly improve the general recreation experience for consumptive and non-consumptive users by enhancing the setting in which recreation activities take place. However, implementing decisions to increase populations of special status species and implementing conservation measures for listed and sensitive species could also restrict opportunities for certain types of recreation opportunities, such as OHV use.

#### ***Special Designations***

Managing the Cottonwood Canyon ACEC (3,800 acres) would maintain primitive recreation opportunities and recreational experiences in the area by protecting natural resources important to recreationists. The boundary of this ACEC would increase from the existing 220-acre Water

Canyon/South Fork Indian Canyon ACEC to include considerably more land that would receive protective management. In addition, OHV use would be allowed on designated routes, which would provide for more OHV opportunities, but could also increase the potential for conflicts between motorized and non-motorized users.

Outstanding river-related recreation opportunities would benefit from protection of recreation values. Under the Proposed RMP, only six eligible river segments (5,530 acres) would be determined suitable and managed to protect their ORVs, free-flowing nature, and tentative classification.

### ***Interpretive Opportunities***

Providing information regarding interpretation of natural and human history and conducting outreach programs through organizations, schools, and partnerships would help to build emotional, intellectual, and recreational ties with the cultural and natural resources within the decision area. In addition, coordinating with local communities and other groups to foster heritage tourism in the decision area would increase such recreation opportunities and enhance associated experiences.

### ***Protecting Specific Recreation Opportunities***

Areas that are specifically managed for protection of wilderness characteristics are frequent destinations for users seeking solitude and primitive/unconfined recreation opportunities. Maintaining the Paria Canyon–Vermilion Cliffs Wilderness (21,200 acres), five WSAs (53,900 acres) and managing 27,770 acres of non-WSA lands with wilderness characteristics to protect, preserve and maintain those characteristics would protect the opportunities for non-motorized wilderness recreation experiences, while excluding activities that cause conflicts or diminished recreation experiences.

The viewing of cultural resources and collection of some paleontological resources (invertebrate and botanical) are recreational activities that occur within the decision area. Protecting and mitigating impacts on cultural and paleontological resources would help to protect and preserve such resources and thereby maintain these recreation opportunities and related experiences.

## **Summary**

Development activities that create surface disturbances could displace recreationists, reduce opportunities for primitive/unconfined recreation, and degrade the recreation setting and experience of other recreation activities that use natural settings as a component of their activity (e.g., hunting, driving for pleasure, wildlife watching, OHV riding, picnicking). Impacts also would occur in the form of conflicts among recreation users. Motorized recreation use would conflict with non-motorized recreation when they occur in close proximity, and would result in degradation of the setting and experience associated with non-motorized recreation activities.

Land use restrictions would help to reduce these impacts by enhancing the setting in which recreation activities take place and precluding certain activities in areas of user conflict. However, some restrictions could limit opportunities for motorized and hunting activities. In other areas, management decisions would manage for motorized activities, reducing the experience of non-motorized activities that occur in those areas. Under the Proposed RMP, increased land use restrictions to mitigate impacts from mineral development and to protect vegetation and biological resources would be implemented. This would help to maintain recreation opportunities and enhance the recreation setting and experience for recreationists who seek a natural setting in which to recreate (e.g., hunting, driving for pleasure, wildlife watching, OHV riding, picnicking).

Management associated with the SRMAs would focus on preservation of scenic, cultural, and biological resources and on allocating lands to different types of recreation uses. Under the Proposed RMP, portions of the SRMAs would be managed for motorized and non-motorized uses. In addition to reducing user conflicts, this would enhance the recreation setting and experience.

Under the Proposed RMP, opportunities for cross-country OHV use would be considerably reduced because open OHV areas would be reduced by 99 percent. However, trail-based OHV opportunities would remain over most of the decision area, and opportunities for cross-country use would remain at Coral Pink Sand Dunes and a few other small locations.

#### **Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

There could be short-term impacts if recreation users are displaced or their experiences or desired outcomes are substantially interfered with by another activity or land use. However, these impacts would not be irreversible. Recreationists will individually implement coping techniques when confronted with undesirable situations while recreating. In addition, the levels of recreation use throughout most of the decision area are low enough that extended periods of interaction between recreation groups are rare.

Long-term disturbance of areas for mineral development (approximately 600 acres) could affect the long-term use of some lands for certain recreation users seeking natural recreation settings. Some mineral development activities associated with the management actions of the alternatives would have unavoidable, adverse impacts on recreation opportunities and experiences. Exploration and development could fragment hunting areas and impact dispersed recreation.

### 4.3.4 Impacts on Transportation

This section describes potential impacts on transportation and access from implementing the Proposed RMP. Impacts on resources and resource uses resulting from implementation of the transportation program are discussed in those particular resource sections of this chapter.

The transportation program provides for ingress, egress, and access in the decision area. The following discussion of the effects on transportation and access focuses on management actions that restrict or facilitate transportation and access opportunities. Impacts on opportunities for OHV use are addressed in the recreation impact analysis.

This analysis describes the degree of access and the extent of usable transportation systems within the decision area. This includes actions that would limit the degree of travel opportunities and the ability to access certain portions of the decision area. The majority of motorized access issues are related to OHV use; this form of transportation provides a major source of travel opportunities.

Impacts on transportation and access as defined above (i.e., via local roads, state-maintained highways, and BLM-maintained system roads) would be anticipated primarily from route designations and the implementation of management actions that consolidate public land through purchases, exchanges, and disposal of isolated tracts.

The analysis was based on the following assumptions:

- The existing transportation network will remain in place throughout the life of this plan except as noted in the alternatives.
- Revised Statute (RS) 2477 assertions may be evaluated by the BLM's administrative review procedures, adjudicated by court decision, or other legal means.

Impacts on transportation and access would not be anticipated from implementing management actions for the following resources: air quality, water, vegetation, wildland fire ecology, cultural resources, paleontological resources, visual resources, forestry and woodland products, livestock grazing, minerals and energy, and other designations.

## Proposed RMP

### *Transportation Management*

Limiting OHV use to designated routes on 528,000 acres (95 percent) would reduce the ability to gain motorized access to every acre in the decision area because access would be restricted to designated routes (Map 9). Motorized access in these areas would be allowed on 1,403 miles of routes. The designated routes in these areas would provide for motorized access to most of the decision area, where non-motorized access could be obtained in the areas beyond the designated routes. The 75 miles of routes closed to use would not eliminate access to any portion of the decision area, although in some areas motorized access would require travel on more miles of routes to access the same area. Closing 25,000 acres (5 percent) to OHV use would limit access in these areas to non-motorized means. Allowing cross-country OHV use on 1,000 acres (less than 1 percent) would provide unlimited motorized access to only a limited portion of the decision area.

### *Lands and Realty*

Allowing land tenure adjustments based on the criteria in the lands and realty management actions in the Proposed RMP would ensure accessibility to public lands where access is needed and could not be

otherwise obtained and would consolidate public lands, which could potentially contribute to a more cohesive transportation system. This could improve access to public lands and facilitate travel across the decision area. However, disposal actions would remove lands from federal ownership, which could also eliminate public access to those disposed parcels. Conversely, land acquisitions would allow for access to newly acquired lands and facilitate access to adjacent public lands through the creation of a more contiguous decision area. In addition, pursuing easements for access to public lands could provide access as needed and improve motorized OHV opportunities.

Under the lands and realty program, the disposal (via Section 203 sales) of scattered tracts of public land (6,400 total acres) could improve access to private and public land parcels and facilitate travel across the decision area. Approximately 9,500 acres would be considered for withdrawal from public land laws, which would preclude future disposal actions in these areas.

### **Other Management Actions**

Special status species and fish and wildlife actions that limit or prohibit disruptive activities within habitats would limit or eliminate access to some areas, depending on the magnitude and type of use along designated routes. However, roads developed to facilitate mineral exploration and development would increase access to portions of the decision area, if they are available for public use. Based on the RFD scenario (Appendix 15) an average of 5 miles of new road would be constructed for each well. Assuming that 20 of the 90 wells would be new production wells, there could be up to 100 miles of new roads associated with oil and gas development. These additional 100 miles of roads would augment the transportation network and improve access.

Coordinating transportation planning with Kane and Garfield counties would provide for cooperative management of transportation systems. This would reduce access issues and management conflicts, improve the safety and convenience of the traveling public, and provide for more efficient use of resources.

### **Summary**

The Proposed RMP would allow cross-country OHV use on 1,000 acres (less than 1 percent), which would provide unlimited motorized access to only a limited portion of the decision area. Under the Proposed RMP, approximately 95 percent of the decision area would be limited to designated routes, which would reduce the ability to access any area using motorized means. However, designated routes in the majority of the planning area would provide for motorized access to most of the decision area, where non-motorized access could be obtained in the areas beyond the designated routes.

Land tenure adjustments could increase opportunities to consolidate public lands, improve access, and facilitate travel in portions of the decision area. Disposals would remove lands from federal ownership, which could eliminate public access.

### **Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

There would be no irreversible and irretrievable commitment of resources. Limiting use in most of the area to designated routes in the action alternatives would result in a perceived short-term loss of access, but long-term access on designated routes would be maintained due to decreases in impacts on other resource values. Unavoidable adverse impacts also would occur on motorized access. OHV area designations would limit motorized access to designated routes, preclude cross-country travel in the majority of the decision area, and preclude motorized access in the rest of the decision area.

### 4.3.5 Impacts on Lands and Realty

Lands and realty is a resource use rather than an environmental component. Consequently, impacts on lands and realty are a direct result of the emphasis of other resource programs. The discussion of the effects on lands will be limited to the effects on permitted or authorized uses and land tenure adjustments.

The analysis is based on the following assumptions:

- Existing ROWs may be modified or amended if the action is consistent with the RMP.
- ROW holders may renew their ROWs within the terms of the original ROW grant.
- The BLM would continue to process land tenure adjustments consistent with RMP goals and decisions.
- Lands identified for FLPMA Section 203 sale may be sold or otherwise disposed of within the life of the plan.
- The demand for communication sites and ROW corridors would increase within the life of this plan.
- Lands and interests in lands could be acquired from willing landowners by purchase consistent with RMP goals and decisions.

Under the Proposed RMP, impacts on lands and realty are not anticipated as a result of implementing management actions for the following resources and resource uses: air quality, paleontological resources, forestry and woodland products, livestock grazing, transportation, minerals and energy, and wildland fire ecology.

### Proposed RMP

#### *ROWs, Leases, and Permits*

ROWs would be excluded on 75,700 acres (14 percent) (Map 11). ROW exclusion areas include WSAs, wilderness areas, and suitable WSR corridors with a tentative classification of “wild” or “scenic.” ROWs would be avoided on 106,670 acres (19 percent). ROW avoidance areas include the areas managed for wilderness characteristics, Greater sage-grouse habitat, and Utah prairie dog colonies. In VRM Class I areas (76,000 acres) and Class II areas (94,400 acres), stipulations to meet VRM objectives could be applied to lands and realty actions. These designations and VRM classes could require design and siting requirements and affect associated costs on new ROWs or amended ROWs. Such requirements may restrict placement and could limit future access, delay availability of energy supply (by restricting pipelines, transmission lines, and wind and solar projects), and create dead zones or delay availability of communications service. Such requirements could also require utility corridors and communication sites to be installed in less desirable locations or areas with more restrictions on accessibility or construction.

ROW stipulations could require design and siting requirements and affect associated costs on new or amended ROWs. Restrictions may limit placement of future ROWs. Such requirements could also require utility corridors and communication sites to be installed in less desirable locations or areas with more restrictions on accessibility or construction. These restrictions include restricting disturbance in Utah prairie dog and Mexican spotted owl habitats. Seasonal limitations within 1 mile of bald eagle nest sites, within ½ mile of bald eagle winter concentration areas, and year-round restrictions on ground disturbing activities within ½ mile of bald eagle nest sites could limit access and delay project construction of new ROWs. Where seasonal restrictions limit the time available to complete activities, relocation of surface facilities could be required; however, allowing case-by-case exceptions could minimize the potential to affect placement and costs for new ROWs or amended ROWs.

Not allowing surface disturbing actions on 23,800 acres (4 percent) would apply to all ground disturbing activities including lands and realty actions (Map 19). Some of these areas coincide with ROW exclusion and ROW avoidance areas. These stipulations would restrict ROW facilities and communication sites from being sited in these areas.

Designating 15,200 acres (3 percent) as ROW seasonal restriction areas (Map 11) and 407,500 acres (74 percent) as seasonal limitations on surface disturbing actions could limit the time available to complete activities and require relocation of surface facilities (Map 19). The ROW seasonal exclusion areas occur around a portion of U.S. Highway 89 between Mt. Carmel Junction and Kanab and a portion of State Route (SR) 9. However, allowing case-by-case exceptions could minimize the potential to affect placement and costs for ROWs.

Allowing filming permits throughout the decision area following site-specific NEPA analysis could lead to site-specific restrictions applied to the permit. The restrictions could include design and siting requirements, which could affect the filming location and increase costs to conduct filming activities.

Areas available for ROW development (including powerlines, pipelines, wind and solar projects, and communication sites) would accommodate desired placement of facilities, accommodate access and efficient energy supply (by allowing pipelines and transmission lines), and minimize additional costs.

### ***Land Tenure Adjustments***

Allowing land tenure adjustments that meet the criteria identified under the lands and realty management actions and considering land acquisitions to preserve cultural resources would facilitate access, improve management ability, and reduce conflicts between private landowners and uses within the planning area. Allowing land tenure adjustments, including FLPMA Section 203 disposals (6,400 acres, 1 percent), also would accommodate resource management needs within the decision area and adjacent communities (Map 13).

Retaining public lands that contain riparian areas, crucial wildlife habitat, Cottonwood Canyon ACEC, sensitive cultural sites, and the Old Spanish National Historic Trail (Highway 89/20 segment in Garfield County) in the public ownership would protect natural resources in these areas. In addition, retaining Cottonwood Canyon ACEC would maintain the current watershed conditions of this culinary water source.

## **Summary**

The Proposed RMP would allow for use of the Western Utility Group corridors. The Proposed RMP would designate approximately 185,000 acres as ROW exclusion or avoidance areas. The Proposed RMP would allow FLPMA Section 203 sales of 6,400 acres while retaining public lands that contain riparian areas, crucial wildlife habitat, and sensitive cultural sites.

### **Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

There would be no irreversible and irretrievable commitment of resources, no loss of long-term productivity from short-term uses, and no unavoidable adverse impacts.

### 4.3.6 Impacts on Minerals and Energy

This section presents potential impacts on energy minerals and non-energy minerals from implementing the Proposed RMP. Energy minerals include oil, gas, and coal. Non-energy minerals include locatable minerals, such as gypsum and limestone, and salable minerals, such as sand, gravel, and stone.

The analysis is based on the following assumptions:

- Valid existing leases would be managed under the stipulations in effect when the leases were issued, and new stipulations proposed under this RMP would apply if leases are renewed.
- Leasing and drilling could occur throughout the entire decision area, except where restricted by management actions in the Proposed RMP.
- A total of 90 wells (70 exploration and 20 new production wells) could be drilled during the next 20 years, which could result in a future surface disturbance of 2,070 acres and 906 acres of disturbance from seismic operations. Approximately 2,370 acres of the total 2,976 acres would be reclaimed (Appendix 15).
- The RFD for 90 oil and gas wells would not vary by alternative due to the low level of development anticipated, acres open for leasing (subject to standard, moderate, or major constraints) under each alternative, and the historic levels of development.
- The estimated total surface disturbance from coal mining of federal coal in the decision area could entail about 3,600 acres including haul roads and surface facilities. The average annual surface disturbance would be approximately 100 acres, and reclamation would follow shortly behind mining.
- The estimated total surface disturbance from locatable minerals would be from septarian and gypsum (alabaster). Septarian concretions and gypsum mining likely would disturb about 1 acre per year, resulting in a total 20-year surface disturbance of 20 acres.
- The estimated total surface disturbance from salable minerals would be from sand and gravel, stone, and clay operations. Sand and gravel development would result in a total 20-year surface disturbance of 625 acres, with approximately 70 percent on BLM lands. Stone developments likely would be about 20 acres disturbed per year for stone, resulting in a total 20-year surface disturbance of 400 acres. About 70 percent of the disturbance is expected to be on BLM land. Clay exploration or development is expected to result in a surface disturbance of 5 acres.
- As population growth and the demand for energy increase, so will the demand for leasable minerals, mineral materials, and other energy sources.

Under the Proposed RMP, impacts on minerals and energy resources are not anticipated as a result of implementing management actions for the following resources, resource uses, and designations: air quality, wildland fire ecology, paleontological resources, forestry and woodland products, livestock grazing, transportation, and other designations.

#### Proposed RMP

##### *Oil and Gas Leasing*

Approximately 79,000 acres would be closed to oil and gas leasing, which would preclude new oil and gas development. However, the impacts from closed areas on oil and gas exploration and development would be relatively minor because only 3,800 acres closed to leasing (less than 1 percent) are within areas of high development potential. The remaining areas closed to oil and gas leasing are in areas with low potential for oil and gas development.

Areas open to leasing subject to major constraints (NSO) (83,400 acres) could require directional drilling or other extraction methods to access resources. This management action could result in the relocation of facilities, increased extraction costs, and the possible loss of energy resources that cannot be reached by current or future drilling technologies or where directional drilling is not a viable option. Approximately 76 percent of these areas (63,200 acres) occurs within areas of high potential for oil and gas, 5 percent coincides within areas of moderate potential, and 19 percent within low potential areas. However, impacts on oil and gas leasing would be relatively minor because the major constraints would apply to only 15 percent of the decision area.

Areas open to leasing subject to moderate constraints (CSU and timing limitation stipulations) (296,200 acres) could in some cases result in the relocation of mineral facilities, including oil and gas facilities, or restrict the time available to complete exploration and development activities. CSU stipulations could require construction and installation of facilities in areas that are more difficult to develop or reclaim, or that are located farther from the mineral resource, which would potentially increase operating expenses. Timing limitation stipulations could defer oil and gas development activities and could require adjustments in drilling or exploration. Where seasonal restrictions severely limit the time available to complete activities, relocation of surface facilities may be required. Approximately 64 percent of this area (188,450 acres) occurs within areas of high potential for oil and gas, 5 percent coincides within areas of moderate potential, and 31 percent within low potential areas. The majority of the areas with moderate constraints are within areas with high potential, which could impact oil and gas exploration and development. However, exceptions to seasonal restrictions would in some cases allow development activities to occur.

Areas open to leasing subject to standard terms and conditions (95,400 acres) would allow for oil and gas operations with the least number of restrictions. Approximately 82 percent of this area (78,200 acres) occurs within areas of high potential for oil and gas, 3 percent coincides with areas of moderate potential, and 15 percent with low potential areas. The majority of the oil and gas exploration and development activities likely would occur in these areas.

An analysis of the oil and gas leasing stipulations based on the Energy Policy and Conservation Act (EPCA) report (U.S. Department of the Interior [USDO] et al. 2006) reveals the effect of cumulative timing stipulations from the Proposed RMP on oil and gas exploration and development and on areas open to leasing subject to standard terms and conditions, areas open to leasing subject to moderate constraints (timing limitations, CSU), areas open to leasing subject to major constraints (NSO), and areas closed to leasing (Table 4-10). Cumulative timing limitations are divided into periods of less than 3 months, 3 to 6 months, 6 to 9 months, and more than 9 months. Approximately 75,100 acres of the areas closed to leasing are WSAs.

**Table 4-10. Proposed RMP Oil and Gas Leasing Restrictions and Cumulative Timing Limitations**

Oil and Gas Leasing	Oil and Gas Potential			Total Acres
	High Development Potential (acres)	Moderate Development Potential (acres)	Low Development Potential (includes restricted lands) (acres)	
Open to leasing subject to the standard terms and conditions on the lease form	78,200	2,600	14,600	95,400

Oil and Gas Leasing	Oil and Gas Potential			Total Acres
	High Development Potential (acres)	Moderate Development Potential (acres)	Low Development Potential (includes restricted lands) (acres)	
Open to leasing subject to moderate constraints (timing limitation <3 months)	400	0	10	410
Open to leasing subject to moderate constraints (timing limitation 3 to 6 months)	153,300	11,600	83,700	248,600
Open to leasing subject to moderate constraints (timing limitation 6 to 9 months)	50	2,800	3,200	6,050
Open to leasing subject to moderate constraints (timing limitation >9 months)	24,000	340	6,100	30,440
Open to leasing subject to moderate constraints (CSU)	10,700	0	0	10,700
Open to leasing subject to major constraints (NSO)	63,200	4,000	16,200	83,400
Closed to leasing	3,800	0	75,200	79,000

The EPCA report (USDOI et al. 2006) estimated the oil and gas reserves in the western United States. Data from the report was used to approximate the number of barrels of oil and cubic feet of gas under areas closed to leasing and areas open to leasing subject to major constraints (NSO). Based on information from the EPCA report, approximately 29 thousands of barrels of oil and 3 million cubic feet of gas would be in non-recoverable areas open to leasing subject to major constraints (NSO). In addition, approximately 151 thousands of barrels of oil and 15 million cubic feet of gas would be in areas closed to leasing and would not be available for development within the decision area (Table 4-11).

**Table 4-11. Proposed RMP EPCA Analysis**

Proposed RMP	Acres	Total Liquids*	Total Natural Gas**
		(Thousands of Barrels)***	(Millions of Cubic Feet)***
<b>Proved Reserves and Undiscovered Technically Recoverable Resources</b>			
Open to leasing subject to major constraints (NSO beyond ½ mile)	15,300	29	3
Closed to leasing	79,000	151	15

\* Comprising oil, natural gas liquids, and liquids associated with natural gas reservoirs

\*\*Comprising associated dissolved and non-associated natural gas

\*\*\* Estimate based on data from the Scientific Inventory of Onshore Federal Lands' Oil and Gas Resources and Reserves and the Extent and Nature of Restrictions or Impediments to Their Development, January 2006 (USDOI et al. 2006).

Restrictions on surface disturbing activities near bald eagle nests and winter concentration areas; in Mexican spotted owl breeding habitat, designated critical habitat, or identified PACs; and in Western yellow-billed cuckoo and Southwestern willow flycatcher potentially suitable habitat would allow for oil and gas leasing subject to moderate constraints and major constraints. The moderate constraints could

result in the relocation of mineral facilities, including oil and gas facilities, or restrict the time available to complete exploration and development activities. The major constraints could require directional drilling or other extraction methods to access resources. Exceptions to moderate constraints (Appendix 3) could in some cases allow for exploration and development activities to occur.

#### ***Locatable Minerals and Mineral Materials***

Approximately 9,500 acres (2 percent) would be recommended for withdrawal from locatable mineral entry, which would not affect gypsum and septarian prospects. Only very small-scale gypsum and exploration and development activity is expected in the decision area over the next 20 years (Appendix 15). The majority of these areas recommended for withdrawal do not coincide with gypsum/septarian concretions development potential areas.

Approximately 105,000 acres (19 percent) would be closed to mineral material sales, which would not affect sand and gravel and clay disposals. The majority of these areas closed to mineral material sales do not coincide with sand and gravel high development potential areas.

#### ***Coal***

Coal management actions would allow for the leasing and development of coal resources on lands identified as suitable (Appendix 6). The RFD scenario for coal (Appendix 15) anticipates a coal mine in the Alton area of the Alton coal field. This area has a high development potential for coal. Based on the coal unsuitability criteria, approximately 113,629 acres would be suitable for further leasing consideration (Map 15). Prior to leasing federal coal lands and permitting a coal mine, further NEPA consideration to address conflicts between multiple uses would be required.

## **Summary**

#### ***Oil and Gas Leasing***

Closing areas to oil and gas leasing or applying major or moderate constraints to leases directly impacts oil and gas exploration and development. Areas closed to oil and gas leasing would preclude new oil and gas development. Areas open to leasing subject to major constraints could require direction drilling or other extraction methods to access resources. Areas open to leasing subject to moderate constraints could in some cases result in the relocation of mineral facilities or restrict the time available to complete the exploration and development activities. Under the Proposed RMP, 14 percent of the decision area would be closed to leasing. Oil and gas exploration and development could occur on the remaining 86 percent of the decision area.

#### ***Locatable Minerals and Mineral Materials***

In addition to the 24,591 acres currently withdrawn from locatable mineral entry, recommending withdrawing areas from locatable mineral entry would directly impact locatable mineral exploration and development activities. The Proposed RMP would recommend 94 percent of the decision area would be open to locatable mineral development. The areas recommended for withdrawal would not affect gypsum exploration and development activities.

Closing areas to mineral material disposals would directly impact mineral material exploration and development activities. The majority of the areas closed to mineral material disposals would not close areas with high potential for sand and gravel and stone development.

### *Coal*

Coal management actions would allow for the leasing and development of coal resources on lands identified as suitable (Appendix 6). The anticipated coal mine in the Alton area of the Alton coal field could be considered for further leasing under each alternative.

### **Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

An irreversible commitment of oil and gas, coal, and locatable minerals and mineral materials would occur from development over the next 20 years. There are no impacts on long-term productivity from short-term uses or unavoidable impacts on minerals exploration and development activities.

## 4.4 SPECIAL DESIGNATIONS

### 4.4.1 Impacts on Areas of Critical Environmental Concern

There is one existing and five potential ACECs discussed in Chapter 3. The existing ACEC is contained wholly within the boundaries of the potential Cottonwood Canyon ACEC. Of the six potential ACECs discussed in the Draft RMP/EIS, all include scenic R&I values, four include cultural values and wildlife resources, and five include botanical resources. Other R&I values, resources, systems or processes, and hazards/safety/public welfare issues addressed during this analysis include geologic features, special status species, and human safety. Appendix 14 contains documentation of the process to evaluate nominations for ACECs and the R&I values for each ACEC.

An ACEC is administratively designated by the BLM for “areas within the public lands where special management attention is required.” FLPMA defines an ACEC as an area:

*“within the public lands 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” (FLPMA Section 103(a)).*

This analysis identifies effects of the Proposed RMP on the BLM’s ability to protect against and prevent irreparable damage to the R&I values associated with each potential ACEC across the alternatives. This analysis addresses impacts on R&I values, which were confirmed by the interdisciplinary team. Protection of R&I values can occur as a result of management associated with designating ACECs, management associated with other special designations (e.g., WSAs and WSRs), general management of public lands (VRM classes, SRMAs, restrictions on wildlife habitat, special status species management alternatives), or through geographic or topographic characteristics. The most restrictive management that protects an area with R&I values will be the focus of the analysis. Analysis of less restrictive management that would not provide additional protection to an R&I value will not be addressed. For example, if part of an ACEC with scenic R&I values threatened by oil and gas development overlaps a WSA, the WSA management would eliminate the threat of irreparable damage. Therefore, the analysis would not address the impacts of ACEC management for those portions of the ACEC within the WSA, but would analyze the impacts from the WSA.

In concert with BLM guidelines, the impact analysis considers management actions that “defend or guard against damage or loss” to the R&I values. This includes damaged values that can be restored over time and those that are irreparable. The management actions associated with the alternatives could either degrade or protect the R&I values and either cause or prevent irreparable damage to such values.

This section is organized by ACEC in the order they appear in Chapter 3.

Under the Proposed RMP, impacts on identified R&I values are not anticipated as a result of implementing management actions for the following resources, resource uses, and designations: air quality, soil resources, water resources, vegetation, wildland fire ecology, paleontological resources, forestry and woodland products, livestock grazing, lands and realty, WSRs, wilderness, and other designations.

## Water Canyon/South Fork Indian Canyon ACEC

Impacts on the existing Water Canyon/South Fork Indian Canyon ACEC could occur if there were a threat of irreparable damage to scenic values and botanical and biological natural systems or processes. Potential threats include oil and gas development, OHV use, and locatable mineral exploration and development.

### Proposed RMP

The existing ACEC would be included in the potential Cottonwood Canyon ACEC. See that section below for a discussion of impacts.

## Cottonwood Canyon ACEC

Impacts on the potential Cottonwood Canyon ACEC could occur if there were a threat of irreparable damage to scenic and cultural values, wildlife resources, botanical and geologic systems or processes, or hazards/safety/public welfare. Potential threats include mineral development, unregulated OHV use, rock climbing, and general surface disturbance.

### Proposed RMP

The ACEC designation and proposed management direction would be sufficient to protect R&I values from potential threats. Allowing oil and gas leasing subject to major constraints (NSO) would eliminate visual intrusions from surface occupancy. In addition, closing the area to mineral materials and locatable mineral entry would eliminate the potential for development of these minerals to potentially contaminate the Town of Fredonia's water source and would protect scenic values and wildlife resources. Allowing OHV use limited to one 4-mile identified route would eliminate the potential for degradation from unregulated OHV use. Recreation management would regulate or limit rock climbing near cultural sites and important raptor habitat. This management would protect cultural values and wildlife resources from harm associated with rock climbing.

Approximately 2,400 acres (63 percent of potential ACEC) would be within the Moquith Mountain WSA. Managing the area under the IMP would protect and prevent irreparable damage to the R&I values from surface disturbing activities, including mineral development.

## Welsh's Milkweed ACEC

Impacts on the potential Welsh's Milkweed ACEC could occur if there were a threat of irreparable damage to scenic, geologic, or special status species (Coral Pink Sand Dunes tiger beetle and Welsh's milkweed) values. Potential threats to these values include visual intrusions, surface disturbance, removal of vegetation, and OHV use.

### Proposed RMP

Although the potential ACEC would not be designated, 1,250 acres (96 percent of the potential ACEC) would be within the Moquith Mountain WSA. Managing the area under the IMP would protect and prevent irreparable damage to the R&I scenic values and geologic processes from surface disturbing activities, including mineral development. In addition, harvest of woodland products would not be allowed in the WSA, eliminating the potential for disturbance of Welsh's milkweed habitat. Managing the 50 acres outside the WSA (4 percent of the potential ACEC) as VRM Class II would generally maintain

the existing character of the landscape, reducing the level of change on the landscape and protecting the scenic R&I values.

Special status species management would prohibit motorized use in and through vegetation in designated critical habitat for Welsh's milkweed, protecting this value from irreparable damage associated with OHV disturbance. Similarly, implementing conservation actions identified in the Conservation Agreement and Strategy for the Coral Pink Sand Dunes tiger beetle, including maintaining the established 370-acre conservation area, would protect this R&I resource from irreparable damage.

### **Vermilion Cliffs ACEC**

Impacts on the potential Vermilion Cliffs ACEC could occur if there were a threat of irreparable damage to scenic and cultural values, wildlife resources, and botanical and geologic systems or processes. Potential threats include visual intrusions, mineral development, and OHV use.

### **Proposed RMP**

The potential Vermilion Cliffs ACEC is not designated under the Proposed RMP. Managing 13,000 acres (56 percent) of the potential ACEC as VRM Class II would protect much of the R&I scenic and cultural values from irreparable damage. Managing 9,200 acres (39 percent) of the potential ACEC as VRM Class III would allow for some degree of change to the landscape, allowing for the introduction of visual intrusions into the area. ROWs would be allowed in VRM Class III and IV areas (10,400 acres), which could lead to surface disturbance in localized areas over the short term. Collocating ROWs would reduce these impacts.

Management associated with the Kanab Community SRMA would result in 18,800 acres (80 percent) of the potential ACEC being open for oil and gas leasing subject to major constraints (NSO). This would eliminate the potential for visual intrusions from oil and gas development and for disturbance to the R&I wildlife (raptor) resources. Fish and wildlife and special status species management in the Proposed RMP prohibits disruptive activities within established buffers and seasons to protect raptor species. These restrictions would allow impacts from discretionary activities such as mineral material disposal to be eliminated, protecting the R&I wildlife (raptor) resources from irreparable damage. In addition, management of special status species in the Proposed RMP allows for surface disturbing and disruptive activities to be controlled or regulated to minimize impacts on identified crucial habitat for sensitive species. This would protect the R&I botanical natural processes or systems (special status plants) from irreparable damage associated with surface disturbing activities.

OHV use throughout the potential ACEC would be limited to 63 miles of designated routes that already exist, with use being closed seasonally on 14 miles to protect raptor species. Limiting OHV use to these existing designated routes where disturbance has already occurred would protect the R&I cultural values and natural process (special status species plants) from irreparable damage associated with OHV use.

### **White Cliffs ACEC**

Impacts on the potential White Cliffs ACEC could occur if there were a threat of irreparable damage to scenic and cultural values, wildlife resources, and botanical natural systems or processes. Potential threats include visual intrusions, mineral development, and OHV use.

## Proposed RMP

Although the potential ACEC would not be designated, managing 22,400 acres (86 percent) of the potential ACEC as VRM Class II would protect much of the R&I scenic and cultural values from irreparable damage. Managing 3,600 acres (14 percent) of the potential ACEC as VRM Class III would allow for some degree of change to the landscape, allowing for the introduction of visual intrusions into portions of the area. The Class III areas are gentle sloping areas covered in pinyon-juniper woodlands, away from the Class A scenery that qualified as the R&I value.

The R&I values in the potential ACEC would receive protection from oil and gas development impacts through management prescriptions from visual resource management, non-WSA lands with wilderness characteristics management, and other sensitive areas (e.g., special status species habitat, riparian areas, and incorporated municipalities). While 11,470 acres (44 percent) of the potential ACEC is open to oil and gas leasing subject to the standard terms of the lease form or subject to moderate constraints, management of the fish and wildlife and special status species in the Proposed RMP prohibits disruptive activities within established buffers and seasons to protect raptor species. These restrictions would reduce impacts from disruptive activities such as oil and gas, mineral material, and locatable mineral exploration and development, protecting the R&I wildlife (raptor) resources from irreparable damage. In addition, special status species management in the Proposed RMP allows for surface disturbing and disruptive activities to be controlled or regulated to minimize impacts on identified crucial habitat for sensitive species. This would protect special status species plants from irreparable damage associated with surface disturbing activities. Additionally, oil and gas developments in this area would also be required to meet the VRM Class II standards, which would provide protection to the scenic values and indirect protection to the other R&I values. Managing 14,530 acres (56 percent) of the potential ACEC as open to leasing subject to major constraints (NSO) or closed to leasing due to managing the area for its wilderness characteristics would eliminate the potential for threats from mineral development in these areas.

OHV use throughout the potential ACEC would be limited to 35 miles of designated routes that already exist. Limiting OHV use to these existing designated routes where disturbance has already occurred would protect the cultural sites and special status species plants from irreparable damage associated with OHV use.

Managing 14,130 acres (54 percent) of the potential ACEC for wilderness character (Upper Kanab Creek) would provide further protection from surface disturbing activities and would further protect the R&I values from irreparable damage.

## Parunuweap Canyon ACEC

Impacts on the potential Parunuweap Canyon ACEC could occur if there were a threat of irreparable damage to scenic and cultural values and wildlife resources. Potential threats to these values include rock climbing, camping on cultural sites, visual intrusions, mineral development, and OHV use.

## Proposed RMP

Although the potential Parunuweap Canyon ACEC would not be designated under the Proposed RMP, 6,100 acres (100 percent) of the potential ACEC would be within the Parunuweap Canyon WSA. Managing the area under the IMP would protect and prevent irreparable damage to the R&I scenic and cultural values from surface disturbing activities and visual intrusions, including mineral development. Recreation management decisions from the Proposed RMP would provide avenues to eliminate the threat of irreparable damage to R&I cultural values from inadvertent camping on cultural sites. Using environmental education and interpretation and signage to control unauthorized use could educate

dispersed users concerning safe locations in which to camp. In addition, issuing SRPs following evaluation of factors, including specific resources that could be impacted such as cultural values and wildlife resources, would provide for education and implementation-specific decisions concerning campsites to eliminate this impact. Due to these recreation decisions, there would be no threat of irreparable damage to R&I cultural values from camping.

## **Summary**

Under the Proposed RMP, only the Cottonwood Canyon ACEC would be designated, with management prescriptions that would protect the R&I values, resources, processes, systems, or hazards/safety/public welfare. Management associated with other resource program decisions would protect the R&I values, resources, processes, or systems in the other potential ACECs from threat of irreparable damage.

## **Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

There would be no irreversible and irretrievable commitment of resources within potential ACECs under the Proposed RMP. The Proposed RMP includes management actions to eliminate threats of irreparable damage to all R&I values associated with all potential ACECs. Through this management, the R&I values would be protected from short-term uses over the life of the plan. Therefore, there are no unavoidable adverse impacts that would result in the irreparable damage to R&I values associated with potential ACECs.

## 4.4.2 Impacts on Wild and Scenic Rivers

This section discusses impacts on eligible WSR segments that would occur from implementing the Proposed RMP. Analysis of impacts on WSRs is limited to the river segment corridor, which includes the viewshed within ¼ mile on each side of a river's high-water mark. In many cases the corridor would be limited to the canyon in which the river segment is located.

The analysis of impacts on WSRs includes an evaluation of where management actions may be inconsistent with the tentative classification given to all eligible or suitable segments and of potential impacts on the ORVs of any eligible or suitable segment. Impacts on the tentative classification of the segments for each alternative will be discussed first, followed by impacts associated with the segment's ORVs. No impacts on WSRs are expected to occur under any alternatives from management actions associated with air quality and other designations. For a more detailed explanation of ORVs, the criteria associated with each ORV, river classifications, and what is allowed within the corridor of each classification, see Appendix 13.

### Proposed RMP

Under the Proposed RMP, six segments, totaling 5,530 acres/30 miles, would be determined as suitable for inclusion in the National Wild and Scenic Rivers System (NWSRS) and would be managed to protect their free-flowing nature, ORVs, and tentative classification. Tentative classification of the six segments is as follows: five segments (4,570 acres/25 miles) are "wild" and 1 segment (960 acres/5 miles) is "scenic" (Map 18). By determining nine of the eligible segments to be not suitable for inclusion in the NWSRS, BLM would no longer provide any direct protections of these segments' ORVs or tentative classifications. Any protections afforded these values would occur indirectly from management actions associated with other resources. Because no direct protections would be afforded to the eligible segments, there is a potential that impacts on the ORVs could occur that could be severe enough to preclude them from future WSR consideration.

#### *Soil, Water, and Vegetation*

Soil, water, and vegetation management actions would not allow new surface disturbance within 330 feet of riparian/wetland areas, which would provide greater indirect protections to WSRs. This would protect the tentative classification of both "wild" and "scenic" segments by providing additional protections to maintain the integrity of the area. These stipulations also would provide indirect protections to many of the segments' ORVs, such as scenic, fish, wildlife or ecologic ORVs, precluding disturbing activities that may effect the condition or presence of the values.

#### *Special Status Species and Fish and Wildlife*

Management of special status species and migratory bird decisions in fish and wildlife would include additional protective stipulations under the Proposed RMP to eliminate or reduce surface disturbing and disruptive activities, maintaining the various tentative classifications and protecting fish and wildlife ORVs of eligible and suitable segments. Mitigation to restore habitat loss and prioritize habitat vegetation treatments, various surface disturbance timing stipulations, group size limits, monitoring efforts, and efforts to reestablish native and naturalized fish and wildlife species would provide additional protections to wildlife and fish ORVs. Impacts from such actions would be site-specific and short-term and over the long term likely would provide additional protections to the fish and wildlife ORVs.

#### *Wildland Fire Ecology*

During and immediately after fire events, access to suitable segments for enjoyment of the opportunities associated with them may be restricted or impaired. Full suppression of wildland fires in these areas may

be implemented to control fire size and severity, thus protecting the ORVs within the segment corridors. Short-term impacts could include disturbance to soils, surfaces and groundwater, watershed functions, vegetation conditions, and habitats for special status species and fish and wildlife. Impacts would be minimized by post-fire rehabilitation efforts. Appropriate management response may include limiting the use of mechanical suppression activities or other techniques for reducing impacts on tentative classifications and ORVs. Suppression may be prioritized to protect the unique values threatened by wildfire. To minimize the impairment of the ORVs, Resource Protection Measures have been developed (Appendix 8). It is BLM policy to protect suitable rivers being studied in conjunction with Section 5(d)(1) of the Wild and Scenic Rivers Act. ESR actions would be implemented to stabilize wildfire areas and to minimize the threat of invasive and noxious weed species becoming established.

### ***Cultural and Paleontology***

Law and policy guiding cultural and paleontological resources management would provide indirect protection to six segments (two suitable and four eligible) that contain cultural or historic ORVs by placing restrictions on surface disturbance activities and avoiding disturbance of the various cultural and historical sites. Cultural restrictions could occur on segments containing scenic, recreational, fish, wildlife, and ecologic ORVs, providing indirect protections of these values as well. Precluding surface disturbing activities within ¼ mile or within the visual horizon (whichever is closer) for cultural sites where landscape association contributes to the eligibility on the NRHP could provide protections to the “wild” and “scenic” tentative classification of two suitable segments of the East Fork Virgin River containing cultural ORVs and to the cultural ORVs themselves.

### ***Visual Resource Management***

VRM management would help protect the six suitable segments because they would be either managed as VRM Class I (“wild” segments) or wholly contained within a WSA, which are managed as VRM Class I. Restrictions associated with VRM Class I would preserve the natural appearance of the area, providing protections to the tentative classifications and scenic and other ORVs of the segments by restricting visually impairing actions that could potentially cause impacts on the segments and values. The eligible segments not found suitable could receive protection due to VRM classifications associated with WSAs, ACECs, or non-WSA lands with wilderness characteristics managed to protect, preserve, and maintain their wilderness characteristics.

### ***Forestry and Woodlands Products***

All or portions of the six suitable segments are inside WSAs where forest and woodland product harvest would be prohibited. This would further protect the scenic ORVs. The eligible segments not found suitable could receive protection due to forestry and woodland product harvest management actions associated with WSAs, ACECs, or non-WSA lands with wilderness characteristics managed to protect, preserve, and maintain their wilderness characteristics.

### ***Livestock Grazing***

Livestock grazing management prescriptions would be compatible with the tentative classification of the one segment tentatively classified as “scenic”; however, there is a potential that certain rangeland improvements (e.g., fencing and water crossings) could be incompatible in some of the suitable and eligible segments tentatively classified as “wild” because of visual intrusions to the natural character of the area. In general, management actions of livestock grazing, which are subject to *Standards for Rangeland Health*, would be compatible with protective management of the segments’ ORVs.

### ***Recreation***

Under the Proposed RMP, suitable WSRs would receive indirect protection from more detailed recreation management associated with the establishment of SRMAs. Three of the six suitable segments (North Fork Virgin River, Orderville Gulch, and Paria River) listed in Table 4-12 are located within three of the SRMAs identified under the Proposed RMP. All of these areas are also with either WSAs or designated wilderness, which would generally be more restrictive than the SRMA management. However, management associated with the SRMAs would provide for protection to the recreational ORVs of the suitable segments. Six eligible segments in the Cottonwood Canyon area (Table 4-13) are located within the Moquith Mountain SRMA which is identified under the Proposed RMP. Management associated with the SRMA would provide indirect protection to the tentative classifications and ORVs of these eligible segments.

### ***Transportation***

Limiting OHV use to designated routes along the East Fork Virgin River segment tentatively classified as “scenic” would be compatible with the classification. Less than 1 mile of route would be designated on the east end of the scenic segment and the remainder of the viewshed would have no designated routes. No impacts would occur from OHV designation to the suitable segments with a tentative classification as “wild” because the five segments would be closed to OHV use. Restrictions on OHV use within the suitable segments would provide indirect protections to the segments’ ORVs, particularly scenic and wildlife, by restricting use that may reduce the natural character of the area or cause displacement of wildlife. Seven of the nine eligible segments are located in the Parunuweap and Moquith Mountain WSAs (Table 4-13). Managing for the IMP in these WSAs would be limited to designated routes. This would provide protection to the segments’ scenic and wildlife ORVs as only one route (way) accesses these segments. No routes are designated in the Deep Creek eligible segment, and the designated routes in the Three Mile Creek eligible segment would not eliminate the fish ORV associated with it.

### ***Lands and Realty***

Under the Proposed RMP, lands and realty management actions would exclude new ROWs from suitable segment corridors with a tentative classification of “wild” or “scenic.” This would preclude these surface disturbing and potentially visually obtrusive activities that could potentially impact the segment’s ORVs. Seven eligible segments are located in the Parunuweap and Moquith Mountain WSAs (Table 4-13). Managing for the IMP in these WSAs would exclude new ROWs and protect the segments’ scenic ORVs.

### ***Minerals and Energy***

No impacts on the tentative classification or ORVs of the six suitable segments would occur because there are no existing leases located within the segment corridors and because all segments are closed to mineral development. Seven of the nine eligible segments (Table 4-13) are located within WSAs or an ACEC which are closed to leasing and open to leasing subject to major constraints (NSO) respectively. This would indirectly protect the scenic, recreational, wildlife, and cultural ORVs. For those eligible segments or portions of segments outside the ACEC and WSAs, there could be impacts from mineral development, although management from other resources, such as VRM, special status species, or non-WSA lands with wilderness characteristics, would provide indirect protection to mitigate impacts on the eligible tentative classifications and ORVs.

### ***ACECs, WSAs, Wilderness***

Management associated with ACECs, WSAs, and wilderness would be compatible with the tentative classification of the suitable and eligible segments that are entirely or partially located within these areas and would provide additional protections to the segments’ ORVs. This would particularly be true for segments located within WSAs and wilderness because of restrictions placed on surface disturbance,

OHV use, and from managing the wilderness and WSAs as VRM Class I, protecting scenic ORVs and indirectly protecting other ORVs. In addition, WSAs and wilderness management actions would limit SRP group sizes to 12 or less. This would provide protection to recreational and wildlife ORVs, reducing the number of encounters, maintaining the primitive feel of the areas, and reducing wildlife displacement by recreationists. Table 4-12 and Table 4-13 indicate which suitable and eligible segments, respectively, would be located within one of these areas. Under the Proposed RMP no indirect protections would be afforded suitable segments from ACECs management because no segments would be located within designated ACECs.

**Table 4-12. Proposed RMP Suitable Segments Coinciding with WSAs or Wilderness Area**

Suitable Segment	Acres Within WSA	Acres Within Wilderness
North Fork Virgin River	North Fork Virgin River (200 acres, 46% of corridor)	-
East Fork Virgin River (Segment 37-40a)	Parunuweap (960 acres, 100% of corridor)	-
East Fork Virgin River (Segment 40a-41)	Parunuweap (770 acres, 100% of corridor)	-
Orderville Gulch	Orderville Canyon (500 acres, 84% of corridor)	-
Meadow Creek/Mineral Gulch	Parunuweap (1,570 acres, 89% of corridor)	-
Paria River	-	Paria–Vermilion (1,020 acres, 100% of corridor)

**Table 4-13. Proposed RMP Eligible Segments Coinciding with ACECs or WSAs**

Eligible Segment	Acres Within ACEC	Acres Within WSA
East Fork Virgin River (Segment 36-37)	-	Parunuweap (750 acres, 100% of corridor)
Deep Creek	-	-
Cottonwood Creek	Cottonwood Canyon (280 acres 100% of corridor)	Moquith Mountain (20 acres, 9% of corridor)
Indian Canyon	Cottonwood Canyon (20 acres, 14% of corridor)	Moquith Mountain (20 acres, 17% of corridor)
South Fork Indian Canyon	Cottonwood Canyon (130 acres, 29% of corridor)	Moquith Mountain (450 acres, 100% of corridor)
North Branch of South Fork Indian Canyon	Cottonwood Canyon (40 acres, 48% of corridor)	Moquith Mountain (90 acres, 100% of corridor)
Water Canyon	Cottonwood Canyon (600 acres, 84% of corridor)	Moquith Mountain (710 acres, 100% of corridor)
Hell Dive Canyon	Cottonwood Canyon (175 acres, 50% of corridor)	Moquith Mountain (310 acres, 88% of corridor)
Three Mile Creek	-	-

### ***Wild and Scenic Rivers***

Management of suitable WSRs would protect the tentative classifications and ORVs, through protective management allocations on other resources and uses (e.g., oil and gas leasing stipulations, VRM classifications, OHV area and route designations). Overall, these management actions would provide more protection for suitable segments, but non-suitable segments would be vulnerable to change.

Under the Proposed RMP, nine of the eligible river segments (15.9 miles and 3,700 acres) would not be managed as suitable for inclusion in the NWSRS. Therefore, the BLM would no longer provide any direct protections to the segments' ORVs or tentative classifications. Any protections afforded these values would occur indirectly from management actions associated with other resources. Examples of such indirect protections could include management associated with WSAs, ACECs, or various forms of restrictions placed on surface disturbance activities associated with resource management. Because no direct protections would be afforded to non-suitable segments, there is a potential that impacts could occur on the ORVs (impacts on each ORV are presented under their respective resources) and tentative classifications that could be severe enough to preclude them from future WSR consideration.

### **Summary**

Impacts on the tentative classification of eligible and suitable segments would primarily occur to "wild" segments from increased access to river corridors associated with OHV designations. However, under the Proposed RMP the majority of the segments would be located within WSAs, and OHV restrictions are in place. Impacts on eligible and suitable segments' ORVs would primarily occur from surface disturbing activities that would impact the scenic quality of the area and in some instance cause impacts on fish, wildlife, and recreational values. However, under the Proposed RMP the potential for impacts would decrease because of indirect protections from management of other resources (e.g., soil, water, fish and wildlife, and special status species), WSAs and wilderness. Additional protections also would be afforded to the ORVs of some segments from SRMA management.

Under the Proposed RMP, by not managing all eligible segments in a protective manner there is a potential that impacts could occur to the ORVs and tentative classifications that could be severe enough to preclude them from future opportunities for WSR consideration. Any protections for these values would be an indirect result of management of other resources, such as WSAs.

### **Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

Based on their location and management of other resources, uses, and designations, impacts on WSRs are not irreversible or irretrievable. There will be no loss of long-term productivity due to short-term uses proposed in the alternatives. None of the activities proposed in this Proposed RMP/Final EIS will produce unavoidable adverse impacts on WSRs.

### 4.4.3 Impacts on Wilderness

This section discusses potential impacts on the portions of the Paria Canyon–Vermilion Cliffs Wilderness within the decision area from implementing the Proposed RMP. Wilderness areas are managed according to the Wilderness Act to preserve their wilderness characteristics (i.e., solitude, naturalness, and primitive/unconfined recreation). As such, the BLM cannot allow activities to occur within wilderness areas that would affect their wilderness characteristics. This section focuses on impacts on wilderness characteristics within the designated wilderness area. Because there are no existing mineral leases located within the wilderness area and Congress has closed wilderness areas to mineral development, wilderness characteristics are primarily influenced by the volume and density of recreational users and range and wildlife management projects. These impacts normally come from vegetation treatments, and the installation, maintenance, and use of range/wildlife improvements allowed under the Wilderness Act and Congressional Wilderness Grazing Guidelines.

The analysis is based on the following assumptions:

- Any new surface disturbing activities proposed would be subject to NEPA analysis and the minimum tool requirement.
- Activities proposed that would not initially meet wilderness objectives for the area would be mitigated to the extent possible to meet the objectives. Activities that could not be mitigated may not be authorized.
- Some proactive restoration of areas that do not meet desired wilderness objectives may be completed each year.

Under the Proposed RMP, impacts on wilderness are not anticipated as a result of implementing management actions for the following resources, resource uses, and designations: air quality, soil resources, water resources, cultural resources, paleontological resources, forestry and woodland products, lands and realty, minerals and energy, ACECs, WSRs, WSAs, and other designations.

#### **Proposed RMP**

Minimizing change on the landscape would preserve the characteristic landscape; be in compliance with the Wilderness Act; and continue to maintain naturalness, solitude, and opportunities for primitive recreation while implementing other management actions. In addition, consideration of soundscapes would protect the perception of solitude, maintaining or restoring the natural quiet of the area.

#### ***Recreation Management***

Implementing adaptive management principles to regulate group size based on the monitoring of the wilderness area resources and social conditions would mitigate impacts on solitude associated with increased recreation use. Indirect impacts on the wilderness area also would occur from establishing the Paria Canyon SRMA, which would implement management consistent with wilderness policy. In addition, supporting Tread Lightly and Leave No Trace programs throughout the decision area would reduce impacts on designated wilderness as recreation users recreate in a manner that leaves fewer long-term impacts.

#### ***Vegetation Manipulation***

Vegetation manipulation projects, whether to restore ecological function, reduce hazardous fuels, improve habitat, or reduce invasive species, would be under the minimum tool requirement, and direct impacts likely would be localized and short term. Allowing the full suite of restoration tools (chemical, biological, mechanical, fire, natural processes) would allow the broadest approach to controlling invasive species and

restoring ecological function. Solitude experienced by recreational users could be reduced in the short term while the treatment is implemented. Over the long term, naturalness would remain unchanged; the magnitude of this restoration would depend on the type and scope of vegetation restoration. All impacts would be localized, and over the long term naturalness would be enhanced by restoring natural vegetation structures and patterns. While allowing the broadest range of treatment methods could increase short-term impacts, the long-term restoration of natural function could occur in more areas and in a shorter time period.

### ***Wilderness Management***

Managing the Paria Canyon–Vermilion Cliffs Wilderness to protect wilderness characteristics would protect wilderness values through application of the minimum tool analysis for all surface disturbing activities. Implementation of the Wilderness Management Plan allows for periodic adjustments to site-specific management in order to ensure wilderness characteristics are preserved.

Visitors may 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 and/or frequent group encounters) would decrease outstanding opportunities for solitude in wilderness. Continuing the current group size and visitor use limits required for use in the Paria Canyon, subject to adaptive management decisions deemed necessary through monitoring and evaluation of resources and social conditions, would preserve opportunities for solitude.

Continuing to manage the wilderness area as VRM Class I and closed to OHV use and all motorized and mechanized vehicles, with no designated routes, would preserve wilderness character from these potentially intrusive activities. In accordance with Wilderness Act Section 4(d), exceptions to exclusions on motorized and mechanized vehicles could result in a short-term detraction from the natural character of the area. In addition, there is a potential for a short-term elimination of solitude and naturalness from increased sights and sounds associated with the use of equipment and mechanical transport. These impacts would be uncommon and short term in nature, if they do occur.

### ***Wildland Fire Suppression***

Wildland fire suppression tactics and ESR activities following fire events could result in a short-term loss of solitude related to the presence of personnel to implement the activity; however, over the long term vegetation in the area would appear natural, providing a diverse and desirable vegetative cover. These activities would take into account factors including existing wilderness characteristics of the area, need to prevent impairing actions, historic fire occurrence, natural role of fire, proposed degree of suppression, smoke management, use of natural firebreaks, and adequate buffer zones. Adherence to resource protection measures while implementing wildland fire activities would limit intrusion on wilderness characteristics to the extent possible while protecting human life. The vegetation in the wilderness area is not adapted to frequent wildland fires; the potential for impacts from wildland fire activities would be low.

### ***Livestock Grazing***

Livestock grazing could have a perceived impact on wilderness character. Primitive recreational experiences could be impacted by the presence of livestock in a wilderness setting. Areas frequented by livestock, such as springs or water developments, could have a perceived unnatural appearance to some wilderness users. It should be noted that livestock seen in Paria Canyon generate some visitor comments on the trailhead comment form. Maintenance of range improvements allowed by the Wilderness Act and Congressional Wilderness Grazing Guidelines could result in short-term impacts on solitude and naturalness.

## **Summary**

Wilderness characteristics in the Paria Canyon–Vermilion Cliffs Wilderness would generally be protected due to management associated with the wilderness alternatives. The Proposed RMP could result in short-term loss of solitude during vegetation treatments, but over the long term naturalness would be restored. There also could be some loss of naturalness from the presence of livestock grazing as allowed by the Wilderness Act and Congressional Wilderness Grazing Guidelines; however, the level of impact would be based on individual perception.

### **Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

There would be no irreversible and irretrievable commitment of resources. No short-term uses would be permitted if they resulted in the long-term impairment of wilderness characteristics. Due to application of the minimum tool requirements, there would be no unavoidable adverse impacts.

#### 4.4.4 Impacts on Wilderness Study Areas

Under BLM policy, WSAs are managed according to the IMP (H-8550-1) to protect the area's identified wilderness characteristics until such time that Congress acts on BLM 1992 recommendations. The IMP provides direction for managing other resource uses within WSAs. Any management schemes considered in this RMP must be within the parameters provided by the IMP.

WSAs will continue to be managed to the non-impairment standard, and as such the BLM cannot allow activities to occur within WSAs that would impair their suitability for preservation as wilderness. Therefore, significant impacts on WSAs (i.e., impairment) would not occur under any of the alternatives. Although impacts on natural resources within WSAs would occur from a variety of uses, they would be non-impairing and therefore would not result in long-term impacts on the wilderness characteristics of the WSAs. Some uses that may be impairing to wilderness characteristics in a WSA may be permitted under IMP because they are only temporary uses that do not create substantial surface disturbance.

The analysis is based on the following assumptions:

- Managing WSAs according to the IMP will protect the wilderness characteristics of WSAs in a manner that will not "impair the suitability of such areas for preservation as wilderness" (FLPMA Section 603(c)).
- Management actions that enhance biological or environmental characteristics would improve the wilderness quality and suitability of the WSAs.

Under the Proposed RMP, impacts on WSAs are not anticipated as a result of implementing management actions for the following resources, resource uses, and designations: air quality, cultural resources, paleontological resources, forestry and woodland products, lands and realty, minerals and energy, ACECs, WSRs, wilderness, and other designations.

### Proposed RMP

#### *Motorized Use of Routes (Inventoried Ways)*

Impacts from allowing motor vehicle use along designated routes (inventoried ways) within the Parunuweap Canyon, Orderville Canyon, and Moquith Mountain WSAs would decrease because 7.6 miles of routes (inventoried ways) in these areas would be closed to motorized use. The short-term impacts from OHV use on opportunities for solitude and primitive recreation would be eliminated along and adjacent to these routes (inventoried ways). OHV use along the remaining 25.0 miles of designated routes (inventoried ways) could impact recreation users' perception of opportunities for solitude and primitive recreation. The appearance of naturalness within WSAs would be temporarily reduced by any signs and barricades that may be needed to keep vehicles on existing routes (inventoried ways). Such structures would be temporary, limited to the routes (inventoried ways), and would not affect the WSA as a whole. In addition, the sound and presence of OHV users would reduce non-motorized recreation users' perception of opportunities for solitude and primitive recreation. When the OHV user passed beyond sight and hearing range, opportunities for solitude and primitive recreation would return and natural soundscapes would be restored.

Limiting OHV recreation use to these designated routes (inventoried ways) could minimize disturbance of adjacent lands, protecting the natural character of areas adjacent to these routes. However, with vehicle use of inventoried routes (inventoried ways) continuing in the WSAs, there is greater risk that users will inappropriately leave the routes and form new trails, which could impair wilderness suitability. Therefore, under this alternative, motorized use would be actively monitored by the BLM, and any traces resulting

from inappropriate vehicle use off of existing routes (inventoried ways) would be immediately removed so that new OHV trails do not form. OHV use would be conditional and would not be allowed to expand beyond these routes (inventoried ways) or further impact the natural character of the WSAs. Because impacts would be short term and localized, no lands within these WSAs would be disqualified from consideration as wilderness by Congress.

### ***Recreation***

The intensity of impacts from recreation use within WSAs would decrease due to limiting group sizes associated with SRPs within WSAs to 12 people, protecting opportunities for solitude and primitive unconfined recreation. These impacts would be most evident in the areas currently receiving high levels of use, such as the North Fork Virgin River, Orderville Canyon, and Parunuweap Canyon WSAs. However, reducing group sizes in the face of increases in the number of groups could result in a continuation of the existing levels of impact. In addition to the reduction in the number of users, supporting education and outreach programs such as Tread Lightly and Leave No Trace would reduce impacts from increasing numbers of overnight users as campers recreate in a manner that leaves fewer impacts.

### ***Visual Resources Management***

VRM Class I objectives would support the IMP guidelines to not impair the natural character of the existing landscape. The objective of VRM Class I is to preserve the existing character of the landscape. While the VRM objective provides for natural ecological changes, level of change to the landscape should be very low and must not attract attention. The IMP prevents the impairment of wilderness values, but allows some modifications to the natural character of the area if modifications are found not to impair or because of valid rights, grandfathered activities, safety considerations, or other reasons. In such cases, managing the WSAs as VRM Class I complements the IMP by providing techniques to ensure that potential changes are designed not to attract attention, protecting naturalness, opportunities for solitude, and primitive recreation.

### ***Wildland Fire and Suppression***

During and immediately after fire events, access to WSA areas and enjoyment of opportunities for primitive recreation associated with them may be restricted or impaired. Full suppression of wildland fires in these areas may be implemented to control fire size and severity, protecting these opportunities.

Wildfire suppression activities could result in short-term impacts, including disturbance to soils, surfaces and groundwater, watershed functions, and vegetation conditions. Impacts would be minimized by post-fire rehabilitation efforts. Appropriate management response within WSAs could limit the use of mechanical suppression activities or other techniques for reducing these impacts. Temporary disturbances may occur to resources and values; however, these effects would be short term while wilderness values are assessed on a long-term scale.

Long-term impacts associated with the use of an appropriate management response to wildfire suppression, wildland fire use, and the planned actions of prescribed fire and non-fire fuel treatments on WSAs are the decreased risk of large severe wildfire events. With the removal of hazardous fuels, a trend increasing the preservation of naturalness and opportunities for primitive recreation would be in place. Because fire is a part of the natural environment, the WSAs' natural character would not only be protected, but also likely enhanced.

### ***Livestock Grazing***

Livestock grazing could have a perceived impact on wilderness character. Primitive recreational experiences could be impacted by the presence of livestock in a wilderness setting. Areas frequented by

livestock, such as springs or water developments, could have a perceived unnatural appearance to some wilderness users. It is important to note that the steep canyon topography in many of the WSAs makes livestock access difficult in some areas. While recreational use is commonly concentrated in the canyons, livestock use is generally outside these areas, reducing potential impacts.

Maintenance of range improvements allowed by the IMP could result in short-term impacts on solitude and naturalness; however, long-term impacts would not meet the non-impairment criteria. Using livestock grazing to enhance the ecosystem health and/or help accomplish resource objectives, such as noxious and invasive weed control and hazardous fuels reduction, could beneficially impact the naturalness of the wilderness area by reducing opportunities for noxious and invasive weed infestation and limiting the potential for severe fire damage.

#### ***Changes in Vegetation (Vegetation Restoration, Habitat Manipulation, Fuels Treatments)***

Decisions associated with soil, water, fish and wildlife, livestock grazing, vegetation, wildland fire ecology, and special status species alternatives that result in direct changes to vegetation—whether intended to reduce soil erosion or restore ecological functions—may be implemented in WSAs, but could be limited to protect the wilderness characteristics. Site-specific treatment actions would go through environmental planning and review to analyze potential impacts on naturalness and opportunities for primitive recreation and solitude. There could be impacts on solitude from increased sights and sounds associated with the vegetation treatments and from the evidence of other people assisting in management activities. Depending on the magnitude and duration of the task, there could also be impacts on the natural character of the area associated with habitat management. Over the long term, vegetation and fuels treatments would help maintain the naturalness of WSAs by bringing the fire regime condition class to a point allowing fire to play its natural role in the ecosystem. Any proposals would be considered on a case-by-case basis and must enhance wilderness characteristics in order to be permitted.

### **Summary**

Wilderness characteristics within WSAs would be protected under the Proposed RMP. There could be short-term loss of perceived naturalness and opportunities for primitive recreation due to OHV use along designated routes (inventoried ways) and in the Moquith Mountain sand dunes area, but there would be no long-term impacts.

Under the Proposed RMP, there could be short-term impacts on opportunities for solitude from the increasing presence and numbers of encounters with other visitors to the WSAs, specifically those that border Zion National Park. There could also be long-term impacts from increasing non-motorized recreation use associated with camping in these areas. Under the Proposed RMP, these impacts would decrease due to limitations on group size associated with SRPs permitted in these areas, although increases in the number of groups could result in a continuation of the existing levels of impact.

### **Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

There would be no irreversible and irretrievable commitment of resources. No short-term uses would be permitted if they resulted in the long-term impairment of wilderness characteristics. Due to application of the non-impairment standard, there would be no unavoidable adverse impacts.

## 4.4.5 Impacts on Other Designations

This section addresses impacts on other designations, including National and State Scenic Byways and Backways and the Old Spanish National Historic Trail. The Proposed RMP does not include a proposal for a BLM Backcountry Byway, which is the only byway or backway designation administered and managed by the BLM. Therefore, the only impact on byways and backways is associated with the BLM's responsibility to coordinate with the various state and national organizations that designate and administer the byways and backways. The impacts of the decisions related to these byways and backways will be addressed in the cumulative impact analysis.

The analysis is based on the following assumptions:

- Existing development along the two segments of the Old Spanish National Historic Trail within the decision area has removed actual trail tread or associated sites.
- Mineral development in the Old Spanish National Historic Trail corridor would be limited to mineral material sites (sand or gravel) or minor hard rock development.

Under the Proposed RMP, impacts on other designations are not anticipated as a result of implementing management actions for the following resources, resource uses, and designations: air quality, soil resources, water resources, vegetation, special status species, fish and wildlife, wildland fire ecology, cultural resources, paleontological resources, forestry and woodland products, livestock grazing, recreation, lands and realty, ACECs, WSRs, wilderness, and WSAs.

### Proposed RMP

#### *Old Spanish National Historic Trail Management*

Due to the degree of existing development along the Highway 89/20-Garfield County segment (e.g., U.S. Highway 89, SR 20, private farms, and utility ROWs) and the lack of identified trail tread, impacts would largely be associated with highly visible developments within the corridor and viewshed beyond the current extent. Managing for VRM objectives would help to maintain the landscape associated with the Old Spanish Trail.

Providing interpretive opportunities for both segments of the Old Spanish National Historic Trail would increase public appreciation for the trail's values and significance in the region and in the Nation's history. Increased public appreciation could lead to increased user stewardship, appreciation, and protection of the corridor.

Coordinating management of the Old Spanish National Historic Trail with the National Park Service (NPS) and other BLM offices would assist in providing consistent management throughout its extent, preserving the values for which it was designated.

#### *Actions that Result in Visible Changes to the Trail Corridor*

Managing northern portions of the Highway 89/20-Garfield County segment as VRM Class II would maintain the existing landscape with minimal changes. While existing development has changed the landscape from its condition at the time of trail use, this management would maintain the portions of the corridor most similar to the historical conditions. Managing the visual resources in the southern portions of this segment's corridor, which have been more altered by existing development and landscape alteration, as VRM Class III and IV would allow for continued changes to the landscape. Over the long term, this could affect the landscape associated with this portion of the trail.

Managing the few parcels of public land along the Highway 89-Kane County segment as VRM Class IV could allow changes to the landscape. The level of current visual changes to this portion of the trail is consistent with this designation.

Route designations surrounding both segments would maintain the existing character of the landscape without allowing extensive new routes. This would maintain the existing character of the landscape in these areas.

VRM stipulations on the northern portion of the Highway 89/20-Garfield County segment in the decision area (VRM II) would reduce the potential impacts to the the existing character of the landscape.

## **Summary**

Under the Proposed RMP, management would provide for consideration of the historic values present along the corridor and the subsequent developments that have occurred. In addition, the management actions provide for coordination and interpretative efforts to increase public appreciation for the trail's values and significance in the region and Nation's history.

### **Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

There would be no irreversible and irretrievable commitment of resources associated with other designations. There will be no loss of long-term productivity or condition of other designations due to short-term uses proposed in the alternatives. None of the activities in this Proposed RMP/Final EIS will produce unavoidable adverse impacts on the other designations.

## 4.5 SOCIAL AND ECONOMIC

This section is subdivided into three general areas:

- Impacts on social and economic conditions
- Impacts on tribal interests
- Impacts on public safety.

### 4.5.1 Impacts on Social and Economic Conditions

This section describes potential social and economic impacts from implementing the Proposed RMP. Such impacts may result from specific individual management actions, but also often reflect the collective effect of a number of actions under a particular alternative. Thus, this section presents impacts from the specific management actions of various resource programs and alternatives on the local economy, population, community services, public finance, and social customs and culture. Environmental justice, a BLM critical element, is also addressed.

Potential economic impacts include changes in employment, income, business costs, and tax revenue to local, state and Federal Government entities. Changes in employment and income can then cause indirect socioeconomic impacts, such as changes in population, which can lead to community impacts on housing, infrastructure, and other government services. These economic impacts may then produce social impacts, such as changes in community structure as new people move in to take new jobs. Management of resources can have direct social impacts on residents and visitors, affecting livelihoods, lifestyles, attitudes, opinions, quality of life, and social structures.

The socioeconomic impact analysis and conclusions are based on BLM knowledge of resource uses in the project area; review of existing literature; and information provided by BLM specialists, local and state cooperating entities, and industry contacts. Impacts are quantified where possible and described in qualitative terms in the absence of reliable quantitative data. The analysis of socioeconomic impacts is intended to capture the most notable, overall socioeconomic impacts under each alternative, and cannot address all potential impacts.

### Economic Impact Analysis Approach and Quantitative Results

Economic impacts can be described qualitatively, and in certain cases where adequate data exists they can be quantified. Qualitative impact analysis involves identifying the most likely direction of change in economic conditions resulting from a particular management action or a set of management actions expected to have similar effects. For example, based on the type of action, a likely increase or decrease in production values or costs for certain producers may be identified, or an increase or decrease in tourist expenditures in the planning area may be deemed likely. These determinations are based on experience in the local area or other, similar areas and professional judgment. The results of all qualitative impact analyses are presented below for each alternative.

Quantitative economic impact analysis requires that sufficient information exists to quantify current conditions or a change in the value of production or in costs or expenditures resulting from a specific management action or set of actions. Where sufficient data exists, these changes in value or costs can then be analyzed with an economic model to estimate likely changes in employment and income. In other cases, employment and income effects cannot be quantified, but the basic data on costs and values can be presented.

This section details the approach used for each quantitative economic impact analysis. Descriptions of the approach and relevant data are presented first for each sector for which quantification of employment and income impacts was possible. Next, the approach for additional sectors for which a simple cost and value analysis was possible is presented. Then the quantitative results are presented. It is most efficient to present the quantitative results together with the methodology discussion and to provide tables showing quantitative results in one section so that differences between the alternatives can easily be seen.

Employment and income impacts are estimated in this study with the IMPLAN computer model (IMPLAN version 2.0.1025). IMPLAN is a regional economic impact model that provides a mathematical accounting of the flow of dollars and commodities through a region's economy. The region, or socioeconomic study area, for economic impacts in this study is Garfield and Kane counties.

The IMPLAN model requires inputs of impacts on an industry or industries in the study area in terms of changes in the value of production or expenditures. These changes in value or cost require data and assumptions specific to the study area. Information from various sources regarding current management strategies and uses and how these uses may change under each alternative provides physical, quantitative measures of impacts (e.g., tons of coal produced, number of gas wells drilled and completed, and AUMs). Information from various other sources provides unit values and unit costs. Table 4-14 summarizes the primary data and sources used to estimate value and cost inputs for the IMPLAN model for those resource uses for which quantification of employment and income impacts is possible.

**Table 4-14. Data Types and Sources for Sectors for Which Quantification of Employment and Income Impacts Is Possible**

<b>Resource Use</b>	<b>Required Data</b>	<b>Data Sources</b>
<b>Oil and Gas Drilling and Production</b>	<ul style="list-style-type: none"> <li>• Number of wells to be drilled</li> <li>• Success ratios</li> <li>• Drilling and completion costs</li> <li>• Production costs</li> <li>• Expected proportion of costs incurred locally</li> </ul>	<ul style="list-style-type: none"> <li>• Utah Geological Survey</li> <li>• U.S. Department of Energy</li> <li>• Interviews with Utah oil and gas companies</li> <li>• BLM, including RFD scenario</li> <li>• Kanab Draft RMP/EIS Alternatives</li> </ul>
<b>Coal</b>	<ul style="list-style-type: none"> <li>• Historical and forecasted prices</li> <li>• Projected tonnage per year</li> </ul>	<ul style="list-style-type: none"> <li>• Utah Geological Survey</li> <li>• U.S. Department of Energy</li> <li>• Interviews with Utah coal companies</li> <li>• BLM, including RFD scenario</li> <li>• Kanab Draft RMP/EIS alternatives</li> </ul>
<b>Grazing</b>	<ul style="list-style-type: none"> <li>• Historical allocated AUMs for livestock within the decision area</li> <li>• Historical livestock prices</li> <li>• Allocated AUMs under each Draft RMP/EIS alternative</li> </ul>	<ul style="list-style-type: none"> <li>• BLM</li> <li>• Utah agriculture statistics</li> <li>• Kanab Draft RMP/EIS alternatives</li> </ul>

For each resource use, future economic activity is dependent on a variety of factors beyond the control of the BLM. For instance, the extent, pace, and timing of energy development activities depend on national and international energy demand and prices, production factors within each industry, and business strategies of operators. Because the pace of energy development in the planning area is unknown, a constant rate of production is assumed in this analysis for coal production and oil and gas drilling and

production. Likewise, use of livestock AUMs is assumed to be constant throughout the study period based on the AUM allocations for each alternative. Actual economic impacts may vary if the rate of production in any of these industries changes over the study period.

The specific approach to use of the data outlined in Table 4-14 is detailed below. This data is used to determine primary impacts, in terms of changes in the value of production or in expenditures. These primary impacts serve as the inputs into the IMPLAN model to analyze the total economic impact of each alternative. The total economic impact includes the following changes in income and employment:

- Direct impacts are the employment and income directly supported by the industry in question (e.g., coal).
- Indirect impacts are the employment and income generated by industries (e.g., trucking) that support the subject industry (e.g., coal).
- Induced impacts are the employment and income generated as a result of household expenditures supported by income from the industry in question (e.g., spending of labor income from the coal industry).

Employment figures in the results below represent total employment. IMPLAN does not distinguish between full-time and part-time jobs.

### Coal Production Economic Impact Analysis Methodology

Based on the RFD, the production of coal is expected to commence within the life of the RMP. A coal company is taking necessary actions to begin coal mining activity on the Alton coal field. Once initiated, coal mining is expected to continue for many years in the future. The Alton coal field falls partially within the RMP/EIS decision area and is addressed in Chapter 2 and in the unsuitability report (Appendix 6). According to the RFD, coal production is expected to begin on private mineral-owned lands and then transition to the adjacent decision area lands.

According to the RFD, a coal company plans to mine at least 40 million tons of coal. For the purposes of the economic impact analysis, it was assumed that this amount will be mined over 20 years, at a constant rate of 2.0 million tons per year, beginning in 2010. Based on the private-to-federal landownership ratio for the mine stated in the RFD (570 acres and 1,430 acres, respectively), it was assumed that mining from the decision area federal mineral estate will begin in 2010, with 1.43 million tons mined from the decision area annually. The economic impact of additional coal production from private land, 0.57 million tons per year, is addressed in the cumulative impacts section.

The value of coal production within the decision area was estimated by applying an annual price forecast per short ton to the annual production rates stated above. The average forecasted price was obtained from the U.S. Energy Information Administration (2006) and represents the average forecasted minemouth price for the United States over the period 2003 through 2030. Table 4-15 summarizes the production and price assumptions for coal mining over the 20-year time period. The economic contribution of this activity in terms of jobs and earnings was estimated by running the forecasted value of coal production through IMPLAN Sector 20, Coal Mining for Garfield and Kane counties, which constitute the socioeconomic study area.<sup>1</sup> An economic profile of this sector based on IMPLAN data for Emery and

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<sup>1</sup> *IMPLAN allows impacts to be estimated in two ways. First, if the total value of output is known or estimated, this value can be run through IMPLAN in the specific industry being evaluated. For instance, the economic contribution of the coal industry to Garfield and Kane counties can be estimated by running the total value of production through IMPLAN Sector 20, Coal Mining. Economic contributions can also be estimated using IMPLAN by examining the direct expenditures needed to produce a good or service. This approach is used to estimate impacts of oil and gas development on Garfield and Kane counties.*

Carbon counties was used as a proxy for the socioeconomic study area's coal mining industry because the industry does not yet exist within this area.

BLM management decisions under each alternative are not expected to alter potential coal production levels. Thus, the expected socioeconomic impacts associated with coal production are expected to be the same under each alternative as described below.

**Table 4-15. Annual Coal Mining Value of Production from Federal Mineral Estate**

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Federal Production (1,000 Short Tons)	1,430	1,430	1,430	1,430	1,430	1,430	1,430	1,430	1,430	1,430
Average Minemouth Price (2006\$)	20.84	20.63	20.42	20.37	20.34	20.44	20.83	21.19	22.41	22.89
Value of Production (1,000\$)	\$29,807	\$29,508	\$29,195	\$29,126	\$29,086	\$29,229	\$29,792	\$30,300	\$32,044	\$32,727
Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Federal Production (1,000 Short Tons)	1,430	1,430	1,430	1,430	1,430	1,430	1,430	1,430	1,430	1,430
Average Minemouth Price (2006\$)	23.89	24.08	24.72	25.71	26.39	27.65	28.31	28.88	29.37	29.61
Value of Production (1,000\$)	\$34,167	\$34,430	\$35,353	\$36,771	\$37,733	\$39,537	\$40,488	\$41,291	\$41,993	\$42,349

### Oil and Gas Drilling and Production Economic Impact Analysis Methodology

The economic impact of oil and gas operations was analyzed in two phases:

- Phase I: Exploration and Development
- Phase II: Production.

Phase I considered how many exploratory and development wells would be drilled in the decision area and how many would be completed as producing wells. The average number of wells expected to be drilled within the decision area was taken from the RFD. While the RFD figure encompasses the entire planning area, insufficient information exists to allocate the RFD wells to planning area lands versus other lands. It was assumed that all wells predicted in the RFD are on decision area land. This assumption is consistent with RMP/EIS oil and gas assumptions for other resources and resource uses. This is an appropriate approach when the level of activity in a sector is relatively small. This assumption results in an analysis that indicates the maximum potential economic contribution to the local economy of oil and

gas activity on decision area lands. This maximum contribution can then be compared to the contribution of other sectors to assist in understanding the relative impacts. A number of additional assumptions were necessary for this analysis; they are summarized in Table 4-16.

**Table 4-16. Assumptions for Fluid Minerals Economic Impact Analysis (in 2005 Dollars)**

Item	Assumption/Estimate	Source
Number of wells drilled per year	4.5	Appendix 15, RFD Table 15-1 figures of 90 total wells divided by 20-year period
Number of wells entering production per year*	1	Appendix 15, RFD Table 15-1 figures of 20 production wells divided by 20-year period
Type of wells: Oil Conventional Gas	Not germane	A breakdown by type of well is not necessary because the costs of drilling and completion for both types are estimated to be the same.
Average cost of drilling and completion to producing well: Oil Conventional Gas	\$2.25 million \$2.25 million	BLM State Office mineral staff, based on costs in recent "Paying Well Determination" submittals for wells similar to those expected in the Kanab RMP/EIS decision area.
Average cost of drilling and completion to dry hole: Oil Conventional Gas	\$1.35 million \$1.35 million	BLM State Office mineral staff professional judgment.
Average annual operating costs: Oil Conventional Gas	\$60,000 \$60,000	BLM State Office mineral staff, based on costs in recent "Paying Well Determination" submittals for wells similar to those expected in the decision area.

Note: \* Development of the 20 expected production wells likely would occur in a single field, developed within a few-year span. However, there is no way of knowing when and where the oil and gas development will happen. For analysis purposes the development is spread out annually, at one well per year, to estimate economic impacts.

With regard to Phase I, the assumptions result in figures of \$6.975 million for annual oil and gas well drilling and completion costs. Not all of these expenditures benefit the socioeconomic study area because the oil and gas industry within the socioeconomic study area is quite small due to the low level of development that has occurred in this area. It was therefore assumed for this analysis that all the drilling operators would originate from areas outside the study area. Investment in oil and gas drilling would have less of an economic impact on the area because most of the direct expenditures (labor costs in particular) would not be recirculated back into the local economy. However, some businesses that would support drilling activities indirectly are located in the study area; for example, water hauling is used by the drilling crews. A study of impacts of gas drilling in Carbon and Emery counties concluded that only 40 percent of the direct expenditures for new wells would occur locally (Utah Department of Natural Resources 1995). The same assumption was used for oil and gas exploration and development activities in the decision area. Therefore, 40 percent of the drilling and completion costs were run through IMPLAN Sector 28, Support for Oil and Gas Activities, to estimate employment and income impacts of this potential activity. An economic profile of this sector based on IMPLAN data for Emery and Carbon counties was used as a proxy for the socioeconomic study area's oil and gas support activities industry because the drilling industry has not been active in the area since before the data for the IMPLAN model was compiled.

The impacts associated with oil and gas production were estimated under Phase II. Here, the annual direct expenditures needed to operate each completed oil and gas well, as summarized in Table 4-16, were used

to estimate employment and income impacts. These expenditures were assumed to be 100 percent local. This assumption would overestimate the impacts associated with oil and gas production if some of these expenditures are actually made outside of the local planning area. The annual economic contribution of this activity was estimated by running the annual direct expenditures for well operations through IMPLAN Sector 19, Oil and Gas Extraction, for counties within the socioeconomic study area. The annual amount and impact of these expenditures would grow throughout the planning period as more and more successful wells come into production each year.

Insufficient information exists in the Draft RMP/EIS alternatives to quantitatively differentiate drilling and production levels by alternative.

### Livestock Grazing Economic Impact Analysis Methodology

Historical data on domestic livestock forage active use (see Chapter 3) and varying management policies by alternative were used to estimate future livestock use under each alternative, as summarized in Table 4-17. The estimates summarized in this table represent two approaches to projecting the AUMs that would be used by permittees on an annual basis. Permitted use under the Proposed RMP would be greater than 18,000 AUMs. However, in recent years the active use (paid for in each year) of grazing allocations has been considerably less than permitted use. In the 2000 to 2006 period, on average 7,731 AUMs were active of 18,241 permitted, or 42.4 percent. This active use of 42.4 percent is due to a severe drought during 1999–2004. This rate of active use is likely to be lower than future active use as the region comes out of the drought—and active use in 2005 and 2006 did show an upward trend. Evaluating average active use and total permitted use, which is the maximum use under current permitted AUMs, provides a range that brackets likely future use. Thus the estimated future active use under each alternative is assumed to be between the average active use (42.4 percent) and the total permitted use. Given that grazing of sheep and horses is currently minimal in the planning area and that use is not expected to change over the next 20 years, economic impacts from these activities were not quantified.

**Table 4-17. Livestock Use per Alternative (AUMs)**

	Proposed RMP
Total Permitted Use	18,193
Conversion Factor to Current Active Use	42.4%
Current Active Use	7,710

Over the past 10 years, less than 2 percent of active AUMs have been used for sheep and horses (Table 3-25). For the purposes of this analysis, it is assumed that all AUMs would be used for cattle grazing, which produces higher value per AUM than sheep grazing.

The value of cattle grazing per AUM was estimated as summarized in Table 4-18. Data was obtained from the Utah Agricultural Statistical Service, as shown in columns 2 and 3, and includes the value of cattle sold in Utah from 2000 through 2004. Total cattle sales were divided by the number of cows that had calved, which provided a value per cow sold, as summarized in column 4. The value per cow was then divided by an AUM conversion factor, resulting in an estimated value per AUM in nominal dollars. An inflation factor was used to convert nominal dollars to real dollars (2006) as summarized in column 7. Using this method, the average value of cattle AUMs in Utah from 2000 through 2004 was estimated to be \$48.82.

**Table 4-18. Estimated Value of Cattle AUMs**

Year	Value of Production (1,000\$ <sup>a</sup> )	Cows That Have Calved (1,000 Head) <sup>a</sup>	Value Per Cow	Conversion to AUMs (AUMs/Cow) <sup>b</sup>	Value of Production per AUM Nominal \$ <sup>s</sup>	Value of Production per AUM Real 2006\$ <sup>s</sup>
2000	\$296,585	450	\$659.08	16	\$41.19	\$47.27
2001	\$314,868	450	\$699.71	16	\$43.73	\$49.03
2002	\$284,580	450	\$632.40	16	\$39.53	\$43.48
2003	\$323,040	430	\$751.26	16	\$46.95	\$50.65
2004	\$358,715	440	\$815.26	16	\$50.95	\$53.68
<b>5-year average</b>						<b>\$48.82</b>

Notes:

<sup>a</sup> Utah Agricultural Statistics

<sup>b</sup> (Workman 1986)

The total estimated range of values of livestock production for each alternative was then estimated by multiplying the average value per AUM by the estimated number of total permitted AUMs and current active AUMs to get the range of total current value of production from grazing allocations on BLM lands within the planning area. The results are summarized in Table 4-19.

**Table 4-19. Estimated Value of Livestock Production per Year**

	Proposed RMP
Value of Total Permitted Use	\$888,161
Value of Current Active Use	\$376,404

The economic contribution of this activity in terms of jobs and income was estimated by running the value of grazing activities—under current active use and total permitted use scenarios—through IMPLAN Sector 11, Cattle Ranching and Farming, for Garfield and Kane counties.

### Other Sectors

Some sectors have sufficient data to allow quantification of basic costs and market values, but insufficient data to allow quantification of employment and income impacts. These sectors are:

- Vegetation—plants and seeds. Insufficient data (e.g., species and size) is available for plants, but costs and values of seeds can be calculated.
- Woodland products—fuelwood, posts, and Christmas trees.

For these sectors, basic data was collected on quantities harvested, costs charged by the BLM, and approximate values in the local market. This data allowed calculation of (a) total costs paid to the BLM, (b) total value in the local market, and (c) total savings, defined as total market value minus total cost. Employment and income impacts could not be calculated because IMPLAN does not have economic sectors that are specific enough to these products. However, given the relatively small values shown below, employment and income generated by these harvests are small compared to the other sectors discussed above.

There were sectors for which quantification of economic impacts might be expected but was not possible. For these sectors (Table 4-20), qualitative description of economic impacts is provided under each alternative if there are any economically discernable differences in the alternatives.

**Table 4-20. Sectors for Which Quantification of Economic Impacts Is Not Possible**

Use	Reason(s) Impacts Cannot Be Quantified
Locatable minerals; specifically, septarian concretions and gypsum	The RFD indicates limited development will occur. However, there is insufficient information on quantities expected to be mined.
Salable minerals; specifically, sand and gravel, stone, and clay	The RFD indicates sand and gravel and stone development is expected, and limited clay development will occur. However, there is insufficient information on quantities expected to be mined.
All other minerals	According to the RFD, no exploration or development of other minerals is expected.
Lands and realty	There is insufficient information on actions that would occur or would be precluded to allow quantification of economic impacts. Parcel-specific information, including projected sales prices and rental rates, would be required.
Recreation; transportation (OHV use)	Recreation Management Information System (RMIS) data from Chapter 3 is not considered accurate enough to allow for credible estimates of economic impacts. In other cases (e.g., OHV registrations), there is insufficient information to attribute use specifically to decision area lands, or insufficient information (e.g., recreation permit data) on expenditures of recreators for specific uses in the decision area or similar areas.

Fiscal impacts are a separate category of impacts from those addressed by the IMPLAN model. Fiscal impact analysis is highly data intensive and depends on very specific assumptions. Currently, there is insufficient data to accomplish quantitative fiscal impact analysis of the alternatives. However, some qualitative comments on fiscal impacts are possible and are included by alternative below.

### Results: Impacts on Regional Employment and Income

The total economic impacts from coal mining, oil and gas drilling and production, and livestock grazing from activities directly attributable to decision area lands were estimated using IMPLAN and the total value of expenditures or production developed from the data and assumptions discussed above. Table 4-21 provides the results for employment (full- and part-time jobs) and labor income on an annual basis.

The coal mining, oil and gas production, and livestock production figures are given as ranges. For coal, this is because the forecasted selling price rises each year. For oil and gas production, operating expenditures will increase as more wells come online over the 20-year RFD planning period. For livestock production, the range indicates the economic impacts under recent rates of active AUM use and the impacts if full permitted AUM use should occur. In the case of oil and gas exploration and development, due to the conservative assumptions of the analysis, the figures in Table 4-21 are the maximum potential economic benefits; the benefits specifically attributable to decision area lands could be less.

For all resource uses in Table 4-21 except livestock grazing, the IMPLAN analysis was based on the current management situation because insufficient information is available to allow quantification of economic differences between the alternatives. In the case of livestock grazing, the alternatives include differences in the number of AUMs allocated to livestock. However, the resulting differences in the value of production, when run through the IMPLAN model, produced differences for employment of less than

one job and differences in labor income of only a few hundred dollars for current active AUMs and total permitted AUMs—in both cases within the margin of error of any economic model and within the rounding margin for reporting of results. Therefore, the quantifiable economic impacts of the grazing alternatives are deemed identical.

The lack of quantifiable differences in economic impacts in Table 4-21 does not mean that differences would not occur. Some differences are simply not quantifiable given the available data. The most important potential variations in economic activity between the alternatives are noted in the narratives below for each alternative.

It is very important to note that BLM public lands generate additional jobs and income that is not shown in Table 4-21. The economic contributions of a number of uses of BLM lands could not be quantified. In particular, recreational activities (including OHV-based recreation) no doubt generate substantial employment and income. The other activities discussed in Table 4-20 make smaller, but important, economic contributions.

Employment and income generated by activities associated with the BLM lands in this Proposed RMP/Final EIS are a small percentage of total employment and personal income in the two-county socioeconomic study area. IMPLAN reports that total employment in the study area exceeded 7,300 while income topped \$239 million in 2003.

**Table 4-21. Annual Employment and Income (in 2006 Dollars) Generated in the Socioeconomic Study Area from Use of BLM Lands Under RMP/EIS Alternatives**

Sector	Average Annual Employment		Average Annual Labor Income	
	Direct	Indirect/ Induced	Direct	Indirect/ Induced
Coal Mining*	125 to 178	42 to 59	\$9,483,000 to \$13,473,000	\$1,389,000 to \$1,973,000
Oil and Gas Drilling*	9	3	\$774,000	\$85,000
Oil and Gas Production*	<1 to 6	<1 to 1	\$9,000 to \$173,000	\$2,000 to \$38,000
Livestock Production**	8 to 18	3 to 8	\$19,000 to \$44,000	\$37,000 to \$88,000
Notes: *Estimates are based on the current management situation. Insufficient information is available to quantify differences between the current management situation and the Proposed RMP. Ranges in the values for coal mining reflect increases in the value (price) of coal over the study period, and the ranges for oil and gas production reflect more production wells coming online during the study period. **Differences in AUMs and resulting value of production by alternative were calculated; however, the resulting differences in employment and income were not significant and were within the rounding margin. The range in employment and income reflects current active use (low value) and full permitted use (high value).				

Source: IMPLAN model, based on data and assumptions for production from BLM lands as detailed in the text.

**Results: Basic Cost and Value Analysis**

Table 3-7 of the Draft RMP/EIS provides quantities of seeds collected from decision area lands. Table 3-23 of the Draft RMP/EIS provides quantities of fuelwood, posts, and Christmas trees collected. This data allows a basic analysis of costs and values, as shown in Table 4-22.

**Table 4-22. Costs and Values of Harvests from BLM Public Lands**

Product	Average Harvest, 2001–2006 <sup>a</sup>	BLM Charge per Unit <sup>b</sup>	Market Value per Unit <sup>c</sup>	Total Cost to Harvester/Revenue to BLM	Total Market Value	Total Savings to Harvester	Total Savings at Highest Harvest <sup>d</sup>
Sagebrush seeds (pounds)	200	\$0.34	\$4	\$67	\$800	\$733	\$733
Four-wing Saltbush seeds (pounds)	300	\$0.15	\$4	\$45	\$1,200	\$1,155	\$1,155
Winterfat seeds (pounds)	10	\$0.30	\$8	\$3	\$80	\$77	\$77
Fuelwood (cords)	501	\$5.00	\$100	\$2,504	\$50,083	\$47,579	\$56,810
Posts (number)	3,527	\$0.40	\$5	\$1,411	\$17,636	\$16,225	\$22,563
Christmas trees (number)	119	\$5.00	\$40	\$597	\$4,773	\$4,177	\$5,215

<sup>a</sup> Seed figures were available only for 2006.

<sup>b</sup> Seed charges are from BLM Utah State Office IM No. UT 2003-080, Seed Collection Policy and Pricing, July 31, 2003. Other charges are from Kanab Field Office personnel.

<sup>c</sup> Market values for seeds are typical “dirt weight” prices paid to harvesters (not retail prices) from Granite Seed Company, Lehi, Utah, per April 2007 interview. Other values are from Kanab Field Office personnel.

<sup>d</sup> Values in this column are based on the highest harvest level in the available data.

The figures in Table 4-22 for the total savings to the harvester represent different types of value, depending on the product and the harvester. In the case of seeds, which are largely harvested for resale to retail seed companies, the total savings represents the revenue from which a commercial seed harvester can pay wages and other costs and take profits. For fuelwood, posts, and Christmas trees, the total savings represent either the same type of revenue pool, such as for commercial operators who resell the products, or, for individuals and families who harvest these products for their own use, represent money they save by harvesting from BLM public lands. These savings allow them to spend this portion of their income on other needs.

### Social Impact Analysis Approach

Along with fish, wildlife, vegetation, and the physical environment, people are an integral part of ecosystems. Livelihoods, lifestyles, attitudes, beliefs, values, social structure, culture, and population characteristics affect and are affected by management actions such as those made by the BLM. In addition, BLM lands and BLM management of these lands have emotional meanings to many people.

As discussed in the socioeconomic conditions section in Chapter 3, there are a number of broad but distinct types of use of and interests in BLM land. These categories reflect the different linkages people have to the land. They are characterized by distinct sets of values, opinions, and perceptions about BLM lands and the effects of various land management policies and actions. The interest categories, as defined in Section 3.5.1, are:

- Local traditional use
- Motorized recreation
- Non-motorized recreation
- Outfitter-based recreation
- Livestock grazing
- Natural resource development
- Preservation.

The social impact analysis in this Proposed RMP/Final EIS uses these categories of interest to differentiate impacts of management actions under each alternative. The analysis is written in terms of impacts on individuals or groups that have interests in each specific category. This is not meant to imply that all individuals and social groups fit neatly into a single category; many specific individuals or organizations may have multiple interests and would see themselves reflected in more than one category. Nonetheless, these categories provide a useful way of organizing the discussion of social impacts. The social impact analysis is qualitative and based on knowledge of resource uses and social patterns and conditions in the socioeconomic study area.

## Proposed RMP

### Economic Impacts

Certain activities within the planning area are now occurring, or are expected to commence, and are expected to continue in the future. The activities that are expected to have the greatest impacts on the regional economy include coal production, oil and gas exploration and production, livestock grazing, and recreation and tourism. The economic impacts that are expected from the Proposed RMP are as follows:

- Direct economic benefits to the socioeconomic study area would accrue from BLM-influenced activities such as coal production, oil and gas development, livestock grazing, and recreation and tourism.
- Various industries in the regional economy would continue to be indirectly affected by activities within the planning area, including retail establishments and services that benefit from expenditures of labor income generated by resource uses on BLM public lands.
- Tax and other revenues derived from activities on BLM-administered lands would continue to have fiscal implications for the Federal Government, the State of Utah, and communities near the planning area.
- BLM KFO budgets will provide inputs to the local economy. Payroll for field office employees and material purchases and contracts for restoration and rehabilitation of public lands (e.g., vegetation treatments to achieve vegetation and range management goals and Desired Wildland Fire Conditions) represent inflows of money to the socioeconomic study area.
- Economic benefits from development of locatable minerals are expected to be low. Excepting septarian nodules and alabaster, there is low potential for locatable minerals in the decision area, and the Proposed RMP is not expected to affect development.
- Economic benefits from sand and gravel and stone development are expected to increase over the planning period. Exclusions from mineral material disposal will have little impact on these economic contributions because ample sites for development are available under the Proposed RMP. Economic benefits will include jobs and income from production and sale of mineral materials, and cost savings to local governments and other entities resulting from avoidance of transport or purchase of mineral materials from more distant locations.
- Commercial timber harvesting has not occurred in recent years on decision area lands and is not expected to occur under any of the alternatives.

- Population growth would continue regardless of BLM management actions, and this growth, not activities on BLM lands, would drive most of the economic changes expected to occur in the socioeconomic study area over the planning period.
- Designations of ACECs, wilderness areas, WSRs, and other designations would produce “designation effects” that draw non-local visitors to the socioeconomic study area, resulting in monetary inflows to the area through expenditures in local establishments. The economic impacts due to these effects are encompassed within the discussions below related to specific resource uses.

### Impacts on Population

Any population change that could be associated with implementation of the Proposed RMP in the Proposed RMP/Final EIS likely would be linked to employment changes. The most notable employment change expected under the Proposed RMP/Final EIS would derive from the initiation of coal mining in the decision area. Coal development could produce approximately 237 new jobs in the planning area by the end of the planning period. This is a large amount of jobs compared to the population base of the area near the proposed mine. It is unlikely these jobs would all be absorbed by the existing population of the nearest communities—Census 2000 total populations were 134 in Alton, 355 in Glendale, 596 in Orderville, and 127 in Hatch—or by the population growth through the planning period that would be expected in these communities without the mine. Some of the jobs might be also be absorbed by the existing and growing—but more distant—populations of Kanab and Panguitch (3,596 and 1,623 in 2000, respectively). Nonetheless, it appears likely that the proposed mine would result in some population growth above and beyond the growth expected in the socioeconomic study area without the mine, particularly in the communities closest to the proposed mine. Detailed characterization of possible population changes is beyond the scope of the Proposed RMP/Final EIS, but would be addressed in an EIS that would be required for the proposed coal mine.

Other employment changes due to Proposed RMP/Final EIS decisions would not result in notable population changes. New oil and gas development and production expected under the Proposed RMP would produce at most 19 jobs. Some differences between the alternatives in management actions with respect to recreation, transportation (OHV use), and grazing could result in variations in employment. These variations cannot be quantified given available information. However, these variations would be small in relation to the overall employment supported by these resource uses under the Proposed RMP because substantial recreation, OHV, and grazing activity would occur.

### Impacts on Community Services

The Proposed RMP decisions could cause impacts on local government services in various ways. For example, changes in demand for local government services could vary with changes in population tied to management actions. As discussed above, with the exception of coal development, notable population changes are not expected. The level of coal development and production expected under the Proposed RMP would lead to an increase in employment that would probably result in population increases. These increases could be locally significant, resulting in new demands on community services. For example, demands on schools and utilities in the communities closest to the proposed coal mine could increase. It is not clear whether existing infrastructure in these communities could absorb these increased demands.

Management actions could also affect local government services directly. For example, the proposed coal mine would increase road maintenance and traffic control requirements on nearby roads and highways due to increased employee and heavy truck traffic. Detailed characterization of possible direct and indirect community services impacts is beyond the scope of the RMP, but would be addressed in an EIS

that would be required for the proposed coal mine. Specific actions to mitigate community service impacts of the coal mine would be determined in the coal mine EIS.

Other activities supported by the Proposed RMP management decisions have implications for community services. For example, increased recreational use of decision area lands (including OHV use), which is likely to occur due to regional and national trends, would increase the demand for local government services associated with safety, emergency services, and police protection. While local search and rescue operations use volunteers, there would be a growing need for training, equipment, and resources. In addition, these operations must be supported by the Sheriff's Office in each county. Road maintenance and traffic control requirements might also increase with the increased recreational demand expected. The types of community service impacts noted here could be mitigated through cooperation between the BLM, other local federal and state agencies, and local governments to establish efficient means for providing the necessary services.

Increased government services also may be needed to support oil and gas development and production. This could include emergency and safety services and road maintenance. However, oil and gas development is very limited compared to major oil and gas producing areas in other parts of the western United States. Any community service impacts would be limited and could be mitigated through cooperation between the BLM and local governments to efficiently provide necessary services.

### **Impacts on Public Finance**

Management decisions under the Proposed RMP could affect various revenues collected by the federal, state, and various local governments. The Socioeconomic Baseline Report (BLM 2005b) details a variety of revenue sources that are tied to or related to natural resource management on BLM lands.

The largest revenue changes expected under the RMP would stem from new coal mining activity. The Federal Government would collect substantial new mineral rents, royalties, and possibly bonuses from the coal mine operator. Fifty percent of these revenues would be retained by the Federal Government, and 50 percent forwarded to the State of Utah. The state would provide some of these revenues to local governments through a variety of funds, only one of which is directly proportional to the mineral revenues produced by each county. The state would probably obtain some new income tax revenue from the coal mine operator. The state has no severance tax on coal. Local governments likely would obtain some new natural resource property tax revenues from the coal mine. They cannot be quantified given currently available information, and it cannot currently be determined if new state and local government revenues would offset the financial requirements of any increased demands on community services. Such fiscal impacts should be examined in an EIS that would be required for the proposed coal mine.

Oil and gas production expected under the Proposed RMP would produce some new federal and state mineral revenues, and the state would in turn provide some oil and gas revenues to the counties of origin. The state also would obtain new revenues from its oil and gas severance tax, oil and gas conservation fee, and income taxes. Local governments would obtain new revenues from associated natural resource property taxes. Because the amount of oil production is unknown these impacts cannot be quantified.

Under the Proposed RMP, the BLM would collect revenues through ROW rents, recreation fees, grazing fees, mineral material fees, and other permit fees. Some of these fees would be forwarded to the federal treasury; others would be returned to state and local governments and local grazing boards or retained and used by the KFO.

The Proposed RMP management actions are expected to continue to generate local sales and lodging tax revenues through expenditures of visitors in local establishments. These revenues would increase through

the planning period as visitation increases due to regional and national trends and management actions that increase the attractiveness of the decision area to non-local visitors.

Land tenure adjustments under the BLM lands and realty program could potentially impact local government finances. Disposal of BLM lands to private ownership may reduce Payments in Lieu of Taxes (PILT) by the Federal Government to local government, but also would result in payments of property taxes to local government by the new private property owners. Land exchanges to other governments may also impact PILT payments. Acquisition of private land by the BLM would reduce property taxes paid to local government but would increase PILT payments.

### **Social Impacts**

A number of social impacts could occur:

- Activities and resources available in and around the planning area would continue to be important to the quality of life of current and future residents and visitors.
- Management of BLM lands within the decision area has and will continue to have important social implications for many individuals and groups. This includes local residents that depend on development activities on BLM lands as a source of employment, income, or subsistence. Others are tied to the public lands for natural beauty, open space, recreational activities, and general ecosystem health.
- Livestock grazing tied to the planning area would continue to have social and cultural importance in the study area. Challenges to continuation of these traditions would continue regardless of BLM management decisions, due to broader trends in the economics of grazing, inter-generational transfer of grazing operations, and other considerations.
- Conflicts between resource users would continue.
- The Proposed RMP would not significantly impact local residents' "Sunday drive" enjoyment of BLM lands or other casual, dispersed uses not involving OHVs or harvesting of products off of BLM land.
- The population increases resulting from a new coal mining operation are likely to result in social changes as people move to the socioeconomic study area to take some of the coal mine and supporting jobs. Some of these new residents likely would have values and preferences that differ from existing residents. The number of new jobs and new residents due to the coal mine is fairly small compared to overall socioeconomic study area figures, but could be locally significant.
- WSAs would continue to be managed for potential designation under the Proposed RMP, thus maintaining values in these areas related to resource preservation and possibly foregoing values related to resource development until specific wilderness status decisions are made by Congress.

### **Environmental Justice**

No environmental justice populations exist in the socioeconomic study area, based on federal criteria and the analysis in the Socioeconomic Baseline Report (BLM 2005b). Although not in the socioeconomic study area of Kane and Garfield counties, Utah, the Kaibab-Paiute Tribe reservation is adjacent to the planning area along the Utah-Arizona border. While the Kaibab-Paiute Tribe qualifies as an environmental justice population, no disproportionate adverse impacts to this area of higher density minority populations would occur from implementation of any of the management actions, resource programs, or objectives proposed under any of the alternatives.

## Economic Impacts

### *Vegetation—Plant and Seed Collection*

Continuation of plant and seed collection is permitted and likely under the Proposed RMP. Table 4-22 shows the value of these practices to the BLM, in terms of the revenues received from fees charged to collectors, and to the collectors, in terms of the value they receive from seed companies that purchase the seeds. As shown in the table, these values are relatively small, totaling \$115 in revenue to the BLM in 2006 and \$2,080 in market value or \$1,965 in net value to the collectors.

### *Coal Production*

Coal production on BLM-administered lands is considered likely under the Proposed RMP. Coal mining would directly support 125 jobs, increasing to 178 jobs in the local economy by the end of the planning period. Spending of income from these jobs is expected to generate additional economic activity in the local economy that would support, on average, 42 indirect and induced jobs, increasing to 59 indirect and induced jobs. Therefore, coal production on BLM-administered lands is expected to support up to 237 total jobs. Coal production is also expected to generate more than \$15.446 million in total annual earnings by the end of the planning period. Because changes in management described under each alternative are not expected to impact coal production (but may impact operational costs), the economic contributions estimated for coal are not expected to differ under any of the alternatives.

### *Oil and Gas Drilling and Production*

Historically, the planning area has seen limited oil and gas exploration and very little development. Interest has recently increased with increased oil and gas prices. The RFD predicts 90 wells will be drilled in the planning area over the 20-year planning period. This is an average rate of about 4.5 wells per year. Using the data and assumptions outlined above, annual expenditures for oil and gas drilling attributable to decision area lands are expected to support at most nine direct jobs, three indirect and induced jobs, and \$859,000 in labor income in the two-county socioeconomic study area. Additional, unquantifiable but very small numbers of jobs and income would be supported by geophysical survey activity. Expenditures on oil and gas production would support less than one job and \$11,000 in labor income in the first year of the planning period, increasing to seven jobs and \$211,000 in labor income in the last year.

Although the total number of acres closed to fluid mineral leasing (79,000 acres) or open to leasing with major constraints (NSO) (83,400 acres) is greater than the current management situation, this likely would not have substantial effects on oil and gas development and production activity and resulting jobs and income because substantial high-potential areas would remain open with standard stipulations or moderate constraints such as seasonal limitations. Thus, the level of oil and gas development estimated in the RFD scenario would be achieved. Increased areas open to oil and gas leasing subject to moderate and major constraints under the Proposed RMP could increase the costs of oil and gas development somewhat.

### *Livestock Grazing*

Grazing use of BLM lands would continue to provide jobs and income in the socioeconomic study area. Levels of grazing likely would be between current active use (which reflects recent drought conditions) and total permitted use. Based on the annual value of production from current active use of BLM grazing AUMs and the IMPLAN model, employment directly supported by livestock grazing on BLM lands for current active use is estimated to be eight full- or part-time jobs, with another three jobs from indirect and induced effects in the local economy. Employment directly supported by livestock grazing on BLM lands for total permitted use is estimated to be 18 full- or part-time jobs, with another eight jobs from indirect and induced effects in the local economy. Livestock production attributable to BLM land from current active use would result in \$19,000 in direct labor income per year and another \$37,000 in indirect and

induced income, while livestock production attributable to BLM land from total permitted use would result in \$44,000 in direct labor income per year and another \$88,000 in indirect and induced income.

Under the Proposed RMP, livestock grazing could be discontinued after voluntary relinquishment of all or part of a grazing preference. This could result in some foregone opportunities for other ranchers and a small decrease in jobs and income due to discontinuation of grazing on the specific relinquished preference. However, the economics of grazing may be improved and sustained, because grazing systems and range improvements would be designed to achieve and maintain healthy rangelands. Land treatments could lead to increased active use and increased livestock production, but the amount of any increase cannot be determined.

### ***Recreation***

Identification and management of SRMAs under the Proposed RMP would result in reduced conflicts between uses and improved recreational experiences. These results could lead to increased draw for recreationists from outside the two-county socioeconomic study area, resulting in monetary inflows and increased economic activity. A variety of general recreation management actions, including improved interpretation, environmental education, heritage tourism activities, and recreation management actions attendant on SRPs, likely would contribute to increased attractiveness of the decision area to non-residents for commercial and private recreational uses, also leading to increased economic activity.

### ***Transportation***

Changes in OHV management actions under the Proposed RMP could affect the beneficial economic impacts from OHV use, in particular the draw for OHV users from outside the socioeconomic study area, which would affect monetary inflows. Very little of the decision area would remain open to cross-country OHV use. However, 528,000 acres would be available for use on designated routes, and 25,000 acres would be closed to OHV use. Under the Proposed RMP, 75 miles of the OHV routes would be closed. It is unlikely that increased management of OHV access under this scenario would lead to decreased draw of OHV riders from beyond the socioeconomic study area. It is more likely that an increased emphasis on designated routes, coupled with other trends in OHV use regionally, would lead to increased visibility to and visitation by non-local OHV riders, resulting in increased monetary inflows and benefits to the local economy. The supporting trends include increasing participation by local and non-local (e.g., from the Wasatch Front) OHV groups in signage and maintenance of routes in the region. Improvement of routes within and outside the decision area would contribute to the overall attractiveness of the socioeconomic study area for OHV use by non-local OHV riders. However, closing 7.5 miles of routes within the WSAs would reduce the opportunities for income associated with motorized-dependent SRPs and general OHV recreationists accessing these remote and scenic areas.

### ***Forestry and Woodland Products***

Domestic and limited commercial harvesting of woodland products (e.g., cedar posts, Christmas trees, and fuelwood) is expected to continue under this alternative, and biomass utilization could occur. These harvests provide small amounts of income to some local residents and help reduce household expenses for others. As shown in Table 4-22, on average the savings to households, compared to purchases at market rates, amount to \$47,500 for fuelwood, \$16,200 for cedar posts, and \$4,200 for Christmas trees. Consolidation and simplification of permitting practices for woodland products under the Proposed RMP would not dramatically open up new areas for woodland product harvests or alter demand, and therefore would have little or no effect on the economic value of such harvests.

### ***Lands and Realty Program***

Requests for ROWs, permits, leases, withdrawals, and land tenure adjustments from other RMP programs or outside entities are expected to increase as neighboring communities grow and the demand for use of public lands increases. The Proposed RMP specifies a specific acreage (6,400 acres) of public land that would be available for FLPMA Section 203 sales with NEPA compliance and consistent with other decisions in this RMP. Disposal of BLM lands to local governments or private parties may further economic development within the socioeconomic study area or serve other important social purposes such as provision of special recreational areas. Exclusions and constraints on ROWs under the Proposed RMP are not expected to substantially constrain local economic development. Neither the increased economic activity nor other social benefits or costs can be quantified within the framework of the Draft RMP/EIS process because these impacts depend on the location and timing of the specific land tenure adjustments. Analysis of these impacts would properly occur at the implementation level. Withdrawal of certain areas from mineral entry under the Proposed RMP is not expected to reduce the economic contributions of mineral and energy utilization due to the limited extent of withdrawals relative to the total lands available for mineral entry.

### **Social Impacts**

The Proposed RMP is expected to result in social impacts as described for the following interests:

- *Local traditional use.* Under the Proposed RMP, utilization of woodland products could continue much as at present; the Proposed RMP decisions do not substantially change the availability of BLM land for these harvests. However, some local residents would have their access to woodland products complicated by closure of most of the decision area to cross-country OHV use. Closing 7.5 miles of inventoried ways in WSAs could result in a loss of opportunity to access areas traditionally used for uses such as family gatherings, hunting, and dispersed recreation.
- *Motorized recreation.* Individuals and groups with a strong preference for cross-country OHV use would lose many opportunities for this type of use under the Proposed RMP. However, because 95 percent of existing OHV routes would remain available, most OHV users would be able to find satisfactory experiences. In addition, the Proposed RMP includes provision of increased facilities and other improvements that likely would improve the recreational experience for many OHV riders. Also, emphasis on designated routes likely would reduce some conflicts with non-motorized recreationists because both groups' expectations of where OHV use would and would not occur would be clarified. However, closing 7.5 miles of inventoried ways in WSAs would result in a loss of opportunity to access remote, scenic areas by OHV.
- *Non-motorized recreation.* Recreational experiences of persons interested in non-motorized recreation would improve for several reasons. Areas and trails for motorized and non-motorized uses would be clarified. Identification and management of a number of SRMAs would clarify uses, provide facilities, and result in other improvements that enhance recreational experiences. A variety of general recreation management policies and practices, and increased interpretive and environmental education activities, also would enhance recreational experiences for motorized and non-motorized recreationists. In addition, closing 7.5 miles of inventoried ways in WSAs would eliminate interactions with OHV users and increase opportunities for solitude and naturalness on and adjacent to these ways.
- *Outfitter-based recreation.* The Proposed RMP likely would have little social impact on persons interested in this type of recreational experience throughout most of the decision area. However, closing 7.5 miles of inventoried ways in WSAs would reduce the opportunity for OHV tours into remote, scenic areas. A number of decisions related to SRPs would place some limitations on

permitting and practices of outfitters, but many of these same decisions, such as limitations on group size, may also enhance the recreation experiences of persons who use outfitters.

- *Livestock grazing.* Impacts on livestock grazing custom and culture would be limited. There is little difference in the initial allocation of AUMs, and the Proposed RMP would include land treatments that could increase availability of forage for livestock. Potentially there could be some social impacts resulting from the Proposed RMP decision that AUMs voluntarily relinquished by a grazing preference holder could be reallocated to other uses, such as wildlife forage. This could result in some foregone opportunities to maintain local grazing custom and culture by allowing other ranchers to obtain the allotments.
- *Natural resource development.* Persons and groups interested in natural resource development would experience few impacts from the Proposed RMP. Commercial timber harvesting would still be permitted on a case-by-case basis. The total acreage closed to oil and gas leasing or open with major constraints (NSO) would increase somewhat, and the acreage open to leasing with moderate constraints such as seasonal limitations would increase substantially. Nonetheless, significant opportunities for oil and gas development would remain. These decisions could increase costs for operators, but would not result in less than full achievement of the RFD oil and gas development projections. The Proposed RMP provides more defined policies for granting of ROWs for various economic activities, but would not substantially limit these uses of BLM lands.
- *Preservation.* The Proposed RMP would satisfy many individuals and groups with preservation interests by substantially reducing cross-country OHV use. Increased constraints on or closures to oil and gas development would increase protection of habitat, ecosystem, visual, and other values held by persons and groups interested in preservation. Some who have this interest in preservation may consider the decision to find only 6 of 15 river segments suitable for WSR status a loss of value compared to continued management of all segments as eligible. In addition, closing 7.5 miles of inventoried ways in WSAs would satisfy individuals and groups with preservation interests by increasing restrictions on uses that may result in impacts on WSAs.

## Summary

The Proposed RMP would allow the reasonably foreseeable coal mine near Alton to continue on a path toward development. This coal mine would provide by far the largest new economic stimulus to the socioeconomic study area of all activities contemplated in the Proposed RMP. However, the population growth associated with the coal mine may lead to new demands and impacts on community services. Most employment and income-generating activity would find ample opportunities under the Proposed RMP.

The Proposed RMP would provide improved management approaches to use of resources that would address many potential resource use conflicts. The closure of almost all land to cross-country OHV use would produce some impacts on local custom and culture such as some woodland product harvest practices, and would restrict some motorized recreation users of BLM lands. At the same time, preservation of 95 percent of existing OHV routes and provision of increased facilities and other improvements would improve the recreational experience for many motorized recreation users and would reduce some conflicts with non-motorized users. The Proposed RMP would include land treatments to increase livestock forage availability that would be welcomed by livestock grazing interests. Preservation interests would welcome the increased constraints on natural resource development. At the same time, natural resource development interests would still find substantial development opportunities available under the Proposed RMP.

**Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

There are no irreversible or irretrievable commitment of resources associated with socioeconomics.

## 4.5.2 Impacts on Tribal Interests

There are two main types of impacts on Native American tribal interests: (1) damage to or loss of religiously/spiritually significant sites, and (2) actions that affect tribal treaty rights or the ability to access areas/resources for traditional/ceremonial purposes. The BLM coordinates and officially consults regularly with various Native American tribes/groups to identify and consider their concerns in BLM land use planning and decision-making. Further consultation (as part of this planning effort and during implementation of the RMP) will continue to identify specific sites or areas.

The Proposed RMP has measures to protect cultural resource sites, including those related to traditional uses and practices. Impacts from the alternative decisions to cultural resource sites are discussed and analyzed in the Cultural Resources section. Physical impacts on religiously/spiritually significant sites would not be different than those noted in the cultural resources impact analysis and therefore will not be repeated here. However, religiously/spiritually significant sites differ from more typical archaeological and historical sites because of their sacredness to Native Americans and because the loss of information and damage on the site cannot be mitigated by recovery of scientific information. Federal mandates encourage the BLM to protect these places and to make accommodations to allow their traditional and/or religious use by Native American people to the extent possible within the bounds of other appropriate regulations. Therefore, in addition to the impacts on the physical site noted in the Cultural Resources section, impacts from surface disturbing activities could include a disruption from visual or auditory effects of such actions (e.g., drilling, earth-moving equipment, and automobile traffic). The duration of these impacts are directly related to the duration of the disruptive activity. For example, disruptions from an exploratory oil and gas well would be eliminated upon reclamation (3 to 5 years), while disruptions associated with a surface coal mine would extend over the life of the mine. The spiritual/religious significance and the experience of people on sites at or adjacent to these disturbances would be reduced or lost due to the intrusions. Mitigation identified in the tribal and Section 106 consultation processes would identify measures to reduce impacts to the extent possible. Through the process of mineral development, most of these impacts would be avoidable. However, development of a coal mine in the Alton area could result in the elimination of sites that could be religiously/spiritually significant.

Because no tribal treaty rights or trust responsibilities are known within the Kanab Field Office, management actions on the part of the BLM will have no impact on such rights. The remainder of this section will address impacts on the ability to access areas/resources for traditional/ceremonial purposes.

Under the Proposed RMP, impacts on tribal interests other than those identified in the cultural section and described above are not anticipated as a result of implementing management actions for the following resources, resource uses, and designations: air quality, soil resources, special status species, fish and wildlife, paleontological resources, livestock grazing, recreation, transportation, minerals and energy, ACECs, WSRs, wilderness, WSAs, and other designations.

### Proposed RMP

#### *Identification and Protection of Religiously/Spiritually Significant Sites*

Based on the American Indian Religious Freedom Act Amendments of 1994, the BLM will “protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions...including but not limited to access to sites...and the freedom to worship through ceremonials and traditional rites.” In addition, EO 13007 directs federal land management agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites, to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions. Sacred sites would be identified on a

case-by-case basis through consultation efforts with Native American tribes. As these sacred sites are identified, the BLM would protect them and the access to them through site-specific means identified on a case-by-case basis.

Tribal knowledge contributes to the management of cultural resources and traditional use areas or sacred sites. Working with Native American Tribes to protect their rights to practice their religions could result in the identification and management of cultural resource sites and areas for traditional and religious/spiritual uses. Maintaining current agreements and establishing new agreements with Native American Tribes could allow areas of religious concern to be identified and protected for traditional, spiritual, or other uses prior to permitting other activities that could affect these areas. In addition, these agreements could improve communication concerning the consultation process and the specific land management projects in which the various tribes are most interested. This type of proactive coordination with interested tribes could result in the identification and management of traditional use areas and Native American religious sites prior to disruptive projects being proposed.

#### ***Condition and Accessibility of Resources for Traditional Uses***

Native American traditional use of vegetation, forest, and woodland resources would be allowed through permits. While requiring a permit would result in the identification of areas and species on a case-by-case basis, the Proposed RMP management decisions would ensure that opportunities for such uses are allowed.

Implementing up to 22,300 acres of annual vegetation treatments would increase beyond just acres for wildland fires or fuels treatments. These treatments could result in a short-term loss of traditional use opportunities, but in the long term vegetation conditions would move toward a pre-European settlement state, improving the condition of traditionally used species.

Not allowing surface disturbing activities within 330 feet of riparian areas would protect these areas and their associated water sources. In addition, implementing no surface disturbance at hanging gardens, which are usually associated with springs, would protect these areas that have been noted as ethnographically sensitive.

#### ***Land Tenure Adjustments***

While 6,400 acres would be available for potential FLPMA Section 203 sale, none of these areas are located adjacent to the Kaibab-Paiute Reservation. The nearest parcels available for sale are three parcels southeast of the town of Kanab. In addition, these acres do not include any of the areas that the Kaibab-Paiute Tribe requested be made available for disposal.

### **Summary**

The Proposed RMP would result in the consideration and/or protection of religiously/spiritually significant sites due to adherence to existing laws and policies. Proactive coordination with interested tribes could result in the identification and management of traditional use areas and Native American religious sites and improve avoidance and other mitigations to these sites prior to disruptive projects being proposed.

Identification of areas and species for traditional use, and access to these areas, would require permits under the Proposed RMP. While requiring a permit would result in the identification of areas and species on a case-by-case basis, the management decisions in these alternatives would ensure that opportunities for such uses are allowed.

Each alternative will manage vegetation communities to restore vegetation to pre-European settlement conditions. However, the Proposed RMP would move vegetation to this condition at a faster rate through a full range of vegetation treatment techniques. Treatments would result in a short-term loss of traditional use opportunities, but in the long term vegetation conditions would move toward a pre-European settlement state, improving the condition of traditionally used species. Management actions under the Proposed RMP would provide protection to springs and riparian areas.

The Proposed RMP would provide lands available for FLPMA Section 203 sale and provide the opportunities to purchase lands, including lands near the reservation.

**Irreversible and Irretrievable/Short-Term Uses Versus Long-Term Productivity/Unavoidable Adverse Impacts**

Laws protecting Native American religious/spiritual sites would generally provide for mitigation of irreversible and irretrievable impacts from permitted activities. Cultural sites that are wholly eliminated due to short-term uses such as scientific data recovery efforts and data recovery supporting surface disturbing activities would no longer be available for traditional use of the resources at the site. As such, complete excavation of a site would result in an irreversible and irretrievable commitment of resources. In addition, it may not be feasible to mitigate all of the sites associated with development of a surface coal mine. As a result, some religiously/spiritually significant sites could be lost.

Due to the sacred nature of some traditional uses, areas, and sites, these areas/sites are generally not known or discussed outside of the affected community. There is a potential unavoidable loss of these resources, areas, and sites due to non-recognition or lack of information and documentation. Under the Proposed RMP, proactive consultation efforts would improve the potential for these sites to be identified, improving the potential for mitigation of surface disturbing activities.

### 4.5.3 Impacts on Public Safety

#### Proposed RMP

The potential for impacts from hazardous material and waste would be low because hazardous waste sites do not currently exist within the decision area. Impacts would be further limited through federal regulation of hazardous materials, substances, and waste; national contingency plans; BLM policy on hazardous waste disposal; and continued coordination with federal and state partners regarding hazardous materials and waste issues (e.g., abandoned mine lands [AML]). BLM-administered public land sites contaminated with hazardous wastes would be reported, secured, and remediated according to applicable federal and state regulations and contingency plans. Such efforts would be costly and likely involve several regulatory agencies and other entities or individuals. If remediation of a large hazardous waste site was necessary, considerable funding would be required for the public health and safety program, which could result in significant impacts. Because hazardous waste sites do not currently exist within the decision area, the potential for this to occur would be low.

The BLM would work with the state AML program to identify and close/render these sites safe and to help ensure program funds are made available. On sites where the BLM shares ownership with other entities, cooperative efforts with the State of Utah to address remediation needs would be required. Evaluating all AML sites to determine effective methods for remediation would require substantial effort and funding over the 20-year planning period. Conducting actual remediation efforts would greatly increase costs associated with managing the public health and safety program.

## 4.6 CUMULATIVE IMPACTS

Cumulative impacts are the effects on the environment that result from the impact of implementing any one of the alternatives of the Draft RMP/EIS in combination with other actions outside the scope of this plan, either within the planning area or outside it. The CEQ regulations for implementing NEPA define cumulative impacts as:

*“...the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.” (40 CFR 1500–1508)*

Cumulative impact analysis is required to evaluate the environmental conditions that result from many different actions that act together. The real effect of any single action cannot be determined by considering that action in isolation but must be determined by considering the likely result of that action when acting in conjunction with many others. Management decisions may well be influenced by activities and conditions on intermingled non-public lands and on adjacent lands beyond the planning area boundary. Therefore, assessment data and information may span multiple scales, land ownerships, and jurisdictions. These involve determinations that are often complex and to some degree subjective.

The analysis of cumulative impacts serves to place the projected incremental impacts from the RMP alternatives in the context of past, present, and future impacts. Combining the projected impacts of RMP alternatives with past, present, and future impacts necessarily involves projections and limited analyses, to the extent possible. Analyses are limited and qualitative in nature due to the inability to isolate the specific contribution of all past and present impacts from non-federal lands ; challenges of predicting potential impacts for reasonably foreseeable future actions; the broad programmatic and strategic nature of RMP alternatives; unknown nature and pace of resource uses and technological changes that could occur; and changing circumstances related to agency priorities, policies, and the economy. It is neither practical nor required to exhaustively analyze all possible cumulative impacts. Instead, CEQ indicates the cumulative impact analysis should focus on meaningful impacts due to the nature of the RMP decisions

### 4.6.1 Cumulative Analysis Methodology

The cumulative impacts discussion that follows considers the Proposed RMP in the context of the broader human environment and specifically actions that occur outside the scope and geographic area covered by the RMP. Because of the programmatic, broad-scale nature of this RMP, this assessment is broad and generalized to address potential effects that could occur from a hypothetical management scenario when combined with other activities or projects. This assessment is primarily qualitative for many resources because of the lack of detailed information that would result from project-level decisions, site-specific resource conditions, and other activities or projects.

Cumulative impact analysis is limited to important issues of national, regional, or local significance. Therefore, not all issues identified for direct or indirect impact assessment in this EIS are analyzed for cumulative effects. Because of the wide geographic scope of a cumulative impact assessment and the variety of activities assessed, cumulative impacts are commonly examined at a more qualitative and less detailed level than are the direct and indirect impacts presented previously in this chapter. This analysis includes discussion of factors that have created the current environment that is described in Chapter 3, Affected Environment. These past actions are considered cumulatively with the alternatives of this RMP. Factors that could be expected to influence that environment in the future are also considered.

The spatial boundaries of each resource cumulative analysis, known as the cumulative impact analysis area, vary by resource and are larger for resources that are mobile or migrate compared to resources that are stationary. In some cases, spatial boundaries may be contained within the planning area or an area of the planning area. Evaluation of potential impacts considers incremental impacts that may occur resulting from the proposed project, while also considering impacts from past, present, and reasonably foreseeable future actions. Reasonably foreseeable future actions are those future action activities that have been committed to or that are known proposals that could take place within the 20-year planning period. Reasonably foreseeable future action scenarios are projections made only for the prediction of 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 such factors as economics; demand; and federal, state, and local laws and policies could result in different outcomes than those projected for this analysis.

The following factors were considered in this cumulative impact assessment:

- Federal, non-federal, and private actions
- The potential for synergistic effects or synergistic interaction among or between effects
- The potential for effects to cross political and administrative boundaries
- Other spatial and temporal characteristics of each affected resource
- The comparative scale of cumulative impacts across alternatives.

#### **4.6.2 Past, Present, and Reasonably Foreseeable Future Actions**

Projects and activities were identified through review of available information. The following general types of projects were identified as having the greatest likelihood of generating potential cumulative impacts:

- Regional minerals and energy projects
- Water projects
- Road improvement projects
- Neighboring land use planning and development.

Other potential future actions have been considered and eliminated from further analysis because there is only a small likelihood of these actions being pursued and implemented within the life of the plan or because there is so little known about the potential action that formulating an analysis of impacts would be premature. In addition, potential future actions that protect the environment (such as new, potentially threatened, or endangered species listings or regulations related to fugitive dust emissions) are unlikely to create significant environmental effects alone or in combination with this planning effort. Federal actions such as species listings would require the BLM to reconsider the decisions created from this plan because the consultations and relative impacts may no longer be appropriate. These potential future actions may have greater capacity to affect the resource uses within the decision area. However, until more information is developed, no reasonable estimate of impacts can be developed.

Continued surface disturbing activities are foreseeable actions anticipated in the decision area. Some management actions related to these uses have been considered within the range of the Draft RMP/EIS alternatives, but the continued existence of these activities is driven by the multiple-use mandate and will occur unless another legislative action intercedes. The potential cumulative impacts of these land uses are then inherent and are not clearly identifiable because these uses are historically connected to the condition of the land.

Data on the precise locations and overall extent of the resources within the decision area varies according to resource type and locale. Further, the 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.

## **Regional Minerals and Energy Projects**

### **West-Wide Energy Corridor Programmatic EIS**

The West-Wide Energy Corridor Draft Programmatic EIS (PEIS) was released to the public in October 2007. The Draft PEIS analyzes the environmental impacts of designating more than 6,000 miles of energy corridors on federal land in 11 western states and incorporating those designations into relevant land use and resource management plans. The Draft PEIS analyzes a No Action Alternative and a Proposed Action. Under the No Action Alternative, federal energy corridors would not be designated on federal lands in the 11 western states; the siting and development of energy transport projects would continue under current agency procedures for granting ROWs. Under the Proposed Action, the agencies would designate and incorporate through relevant land use and resource management plans certain federal energy corridors that would consist of existing, locally designated federal energy corridors together with additional, newly designated energy corridors located on federal land. The Energy Policy Act of 2005, Section 368, Energy Right-of-Way Corridors on Federal Land, required agencies to designate energy corridors, taking into account the need for upgraded and new electricity transmission and distribution facilities in order to improve reliability, relieve congestion, and enhance the capability of the national grid to deliver electricity.

The project requires federal agencies to cooperate using their respective authorities to (1) designate corridors for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities on federal land in the 11 contiguous western states; (2) perform any environmental reviews that may be required to complete the designations of such corridors; and (3) incorporate the designated corridors into the relevant agency land use and resource management plans or equivalent plans. The one corridor that crosses the decision area has been incorporated into the Proposed RMP.

### **BLM Wind Energy Development PEIS and Wind Energy Development Program**

A December 2005 ROD on the PEIS for wind energy development where appropriate on BLM-administered public lands in the western states amended several land use plans (LUP). Although the EIS identifies areas where development would be incompatible (wilderness, critical habitats, etc.), it prescribes BMPs for wind energy development projects on the public lands. The PEIS is intended to facilitate this form of renewable energy development on suitable areas of the public lands.

### **Coal Mine Development of Private Coal Resources in the Alton Area**

The State of Utah is considering an application to surface mine privately owned coal resources associated with the Alton Coal Lease Tract in Kane County. The privately owned tracts are adjacent to federally administered coal resources that BLM is considering for competitive leasing, as described in Chapter 3 and the RFD Scenario (Appendix 15). The tract is proposed for development by surface mining methods to ensure maximum economic recovery of the resource.

The development of private coal resources (fee coal) would occur as part of development of the federal coal resources administered by the BLM. Preliminary plans would be to mine the coal from private surface/federal subsurface (approximately 1,300 acres) first and then expand onto adjacent federal surface/federal subsurface (approximately 2,300 acres). In addition to the mining of federal coal,

preliminary plans would be to mine coal from private surface/fee coal (approximately 800 acres) for a total cumulative surface disturbance of 4,400 acres in the planning area. The average annual total surface disturbance would be approximately 220 acres.

### **Tropic to Hatch Transmission Line**

Garkane Energy Cooperative proposes to construct, operate, and maintain a 138 kilovolt (kV) electric transmission line requiring a Special Use Authorization, Grant of ROW, and/or Special Use Permit for an ROW. The proposed project will include the construction of a 138kV transmission line, associated substations, access roads, and the removal and reclamation of a portion of the existing transmission line. The proposed action would cross private lands and lands administered by the U.S. Forest Service (USFS), BLM, and the State of Utah.

The proposed corridor originates on private land at the proposed East Valley Substation and extends northeast following East Valley Road to an existing Rocky Mountain Power 230kV transmission line corridor. The project route then parallels the south side of the Rocky Mountain Power 230kV Transmission Line to the northwest through Cedar Fork Canyon. As the project route exits the Canyon on the Paunsaugunt Plateau, it diverges from the Rocky Mountain Power 230kV Transmission Line corridor and extends east across John's Valley for approximately 7 miles. At this point, the corridor turns south for approximately 2 miles, crossing SR 12 near the Bryce Canyon Pines Motel. The route then extends west through Johnson Bench until it intersects Forest Service Road 1150, and then parallels Forest Service Road 1150 to the head of the Hillsdale Canyon. The project route continues through a designated utility corridor west down the canyon to Forest Road 223 and turns north for approximately 0.5 mile. At this point, the project route leaves the road and extends due west across Long Valley paralleling section lines, and eventually crossing U.S. Route 89 where it then turns to the southwest for approximately 2 miles to the Hatch Substation. The proposed line would cross approximately 15 miles of National Forest; 3.67 miles of GSENM; and 3.53 miles of BLM KFO, 7.27 miles of state, and 1.76 miles of private lands.

## **Water Projects**

### **Lake Powell Pipeline**

The State of Utah Board of Water Resources and Washington, Kane, and Iron counties are pursuing the construction of a pipeline that would run from Lake Powell to Sand Hollow Reservoir. The pipeline would originate at Lake Powell near the Glen Canyon Dam, and would deliver water to Sand Hollow Reservoir, located approximately 10 miles east of St. George. The Lake Powell pipeline would consist of roughly 120 miles of estimated 66-inch pipe from Lake Powell to Sand Hollow Reservoir and 38 miles of 30-inch pipe from Sand Hollow to Cedar City. The corridor is anticipated to be 3,000 feet wide. As part of the initial feasibility studies, various alternative alignments are being investigated in an effort to identify the least costly alignment that would have minimal impact on the environment.

The pipeline is being proposed in order to meet the water demands of the growing population in southern Utah. The 158 miles of pipeline would bring 70,000 acre-feet of water to Washington County, 10,000 acre-feet to Kane County, and 20,000 acre-feet to Iron County. The pipeline would probably exceed \$494 million in current dollars. The Lake Powell pipeline would allow Utah to tap into the Upper Colorado River water.

The pipeline is most likely a project that is several years in the making. Prior to construction of the pipeline, additional engineering and financial feasibility studies must be completed and ROWs and various permits and agreements obtained. An extensive environmental review of the proposal to build the

pipeline will be conducted, and stakeholder and public input will take place. The actual construction of the pipeline is estimated to last 3 years.

### **Jackson Flat Reservoir–Kane County Water Conservancy District**

The Jackson Flat Reservoir is proposed on approximately 200 acres of non-BLM-administered lands within Kanab city limits. The reservoir would store 3,900 acre-feet of water. The reservoir could change flow regimes and water quality parameters south of Kanab (Kanab Creek fifth-level Hydrologic Unit Code [HUC]). In addition, the construction of the reservoir could increase the demand for mineral materials. A draft environmental assessment was released in fall 2007.

## **Road Improvement Projects**

### **Expansion of U.S. Highway 89**

U.S. Highway 89 is anticipated to be widened over the next 20 years. The widening of the highway would allow for an increase in traffic volume. In addition, portions of the highway would be developed into a four-lane divided highway.

## **Neighboring Land Use Planning and Development**

### **Conversion of Land Use**

Conversion of agricultural lands to residential and commercial uses would increase the demand for groundwater sources to support these additional uses. The conversion of these lands would make remaining undeveloped lands more important for wildlife habitat and other resource uses.

### **Management of Adjacent Lands**

Activities on adjacent lands could affect public land in the decision area, general public land management on adjacent lands, and management of private and state lands. There are no major projects identified on these lands, but there are differences or similarities in management.

Areas managed by federal land management agencies include:

- St. George BLM Field Office
- Richfield BLM Field Office
- Arizona Strip BLM Field Office
- Grand Staircase-Escalante National Monument
- Dixie National Forest
- Fishlake National Forest
- Glen Canyon National Recreation Area
- Bryce Canyon National Park
- Zion National Park.

Each of these areas has a LUP to guide the management of federal lands in these areas.

### 4.6.3 Cumulative Impacts by Resource

#### Air Quality

Dispersed recreation, prescribed burning activities, and mineral and energy development cause emissions of PM, CO, NO<sub>x</sub>, SO<sub>2</sub>, and VOC emissions currently below regulatory thresholds. In the future, these emissions could impact ambient air quality, visibility, and atmospheric deposition. The cumulative impact analysis of air quality within and near the planning area includes major sources such as coal-fired power plants and cogeneration facilities.

Data provided by KFO staff was used to determine the base year conditions after the development of proposed energy resources was complete. In addition, emissions data was gathered for the area. The most recent Utah Division of Air Quality (UDAQ) Statewide Emissions Inventory Report shows the primary air pollutants in Garfield and Kane counties are VOCs, followed by CO, PM<sub>10</sub>, NO<sub>x</sub>, SO<sub>x</sub>, and PM<sub>2.5</sub>. Table 4-23 shows the criteria pollutant levels in tons per year from the Statewide Emissions Inventory. The 2002 emissions from the sources in Kane and Garfield counties are 182,641 tons per year (UDAQ 2002). The emissions from future BLM activities for the Proposed RMP are 3,554 tons per year. Emissions from proposed actions from BLM activities in the decision area will contribute approximately one-tenth of a percent of the emissions of the State of Utah and 2 percent of the sum of emissions from Garfield and Kane counties.

**Table 4-23. 2002 Criteria Pollutant Inventory (tons per year)**

Area	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	NO <sub>x</sub>	VOC	CO	Total
Garfield	5,155	4,024	95	1,638	51,387	57,471	115,746
Kane	750	205	89	564	48,948	16,544	66,895
<b>Utah Total</b>	<b>82,439</b>	<b>23,288</b>	<b>49,090</b>	<b>205,313</b>	<b>911,310</b>	<b>1,314,041</b>	<b>2,562,193</b>
<b>Utah Average</b>	<b>3,053</b>	<b>1,208</b>	<b>1,818</b>	<b>7,604</b>	<b>33,752</b>	<b>48,668</b>	<b>94,895</b>

Sources: (UDAQ 2002) and (UDAQ 2003)

Considering that the permitted sources do not calculate emissions from some of the oil and gas sources and that the permitted emissions come from single point sources, the future anticipated emissions from BLM activities will be low in comparison to existing sources and would not cause exceedance of State or federal ambient air quality standards.

#### Soil Resources

The cumulative impact analysis boundary for soil resources is the planning area and the fifth order watersheds that intersect the planning area boundary. BLM management actions combined with the proposed construction and development of the Lake Powell pipeline, coal development activities, development of the West-wide energy corridor, and construction of the Jackson Flat Reservoir could increase localized erosion and decrease soil productivity, which could degrade downstream water quality. However, these permitted activities would comply with authorizing permit stipulations and apply BMPs that would minimize overall soil erosion and loss of soil productivity resulting in limited incremental impacts from BLM actions.

## Water Resources

The cumulative impact analysis boundary for water resources is the planning area and the fifth order watersheds that intersect the planning area boundary. BLM management actions combined with the proposed construction and development of the Lake Powell pipeline, coal development activities, development of the West-wide energy corridor, and construction of the Jackson Flat Reservoir could increase incremental impacts associated with localized erosion and sediment loading, which could degrade downstream water quality. However, BLM-permitted activities would comply with authorizing permit stipulations that would minimize soil erosion and degradation of water quality and are not expected to contribute to the overall cumulative effect to water quantity and quality from past, present, and reasonably foreseeable actions. In addition, fire use and vegetation treatments proposed by BLM under the Proposed RMP would incrementally improve watershed health, which could increase the ability of the watershed to retain moisture. This could increase the volume of water within the watershed.

## Vegetation

The cumulative impact analysis boundary for vegetation includes the entire decision area. Potential cumulative impacts on vegetation would occur from a combination of activities and land uses occurring within the analysis boundary. Such incremental impacts would result primarily from vegetation treatments, surface disturbing activities, and general human disturbance.

Loss of vegetation from activities on BLM-administered lands could result from surface uses and disturbances such as minerals development, ROW development, and open OHV use, which could alter the composition and structure of vegetation communities; increase the potential for the introduction and establishment of noxious weeds; and reduce species diversity, primary production, and the recruitment of new plants. Surface disturbance in riparian/wetland areas under the Proposed RMP could decrease riparian/wetland functioning conditions.

Past fire suppression has contributed to increasing pinyon-juniper encroachment in the decision area and to a concurrent decrease in aspen and ponderosa pine communities. Fire use and vegetation treatments under the Proposed RMP would generally maintain or improve vegetation communities by removing undesired species, increase species diversity and age class, improve vegetation composition and structure, and increase vegetation cover. In addition, vegetation treatments and range improvements on lands adjacent to the decision area (public and private) would increase available forage and water for wildlife populations and livestock (for use by private operators) in these areas. This also would improve distribution of livestock and wildlife, improving vegetation condition. These incremental impacts would result in healthier vegetation communities that are more capable of retaining moisture and nutrients and resisting disease, non-native species invasion, drought, and other natural disturbances and stressors.

## Special Status Species (Threatened, Endangered, and Sensitive)

The cumulative impact analysis boundary for effects on special status species is the planning area and the watershed boundaries that intersect the planning area. The development of the Lake Powell pipeline, highway construction, and ROW corridors proposed under the West-wide energy corridor project would result in a loss of habitat for special status species wildlife and plants and could temporarily displace special status species wildlife from these areas. The conversion of land use from agricultural lands to residential and commercial uses would increase the habitat values of undeveloped land. The change in land use could result in the loss of foraging and nesting habitat for some special status species. Management of adjacent lands would affect habitat conditions and special status species populations. Because the majority of adjacent lands are federally managed, special status species habitat values must be considered through federal landscape and activity planning. The surface development of private coal

resources in the Alton area (approximately 800 acres) (Appendix 15) would impact the southern-most lek of the Greater sage-grouse. Combined with mining operations on adjacent lands with federally administered coal resources (approximately 3,600 acres), this could result in the long-term loss of the local sage-grouse habitat and displacement of individuals. Presently there is an EIS underway as part of a coal leasing application in the Alton Amphitheater. High interest habitats will be addressed in that EIS. The anticipated incremental impact from the Proposed RMP on special status species would be minor when compared to the overall cumulative effect on special status species.

## **Fish and Wildlife**

The cumulative impact analysis boundary for effects on fish and wildlife is the planning area and the watershed boundaries that intersect the planning area. The development of the Lake Powell pipeline, highway construction, and the ROW corridors proposed under the West-wide energy corridor project would result in a loss of habitat and could temporarily displace wildlife from these areas. The conversion of land use from agricultural lands to residential and commercial uses would increase the habitat values of the remaining undeveloped land. The change in land use could result in the loss of habitat for some wildlife species. Management of adjacent lands would affect habitat conditions and wildlife populations. Because the majority of adjacent lands are federally managed, fish and wildlife habitat values must be considered through their landscape and activity planning. In addition, UDWR management of herd levels, including herd objectives and herd harvest levels, would directly affect wildlife populations and associated levels of habitat use. Vegetation treatments and range improvements on lands adjacent to the decision area (public and private) would increase available forage and water for wildlife populations and livestock (for use by private operators) in these areas. This also would improve distribution of livestock and wildlife, improving vegetation condition. The Proposed RMP management actions would increase vegetation treatments and range improvements that would incrementally improve the quality of the wildlife habitat.

## **Wildland Fire Ecology**

Effects on fire frequency, intensity, and suppression activities resulting from BLM actions within the decision area would combine with similar effects caused by activities sponsored by other groups and private interests to create cumulative impacts on fire management within the analysis boundary. As development, recreational activities, and general use of the area increased, so would the number of potential ignition sources and consequently the probability of wildland fire occurrence, which would increase the need for federal, state, and local agencies to suppress wildland fires to protect life, property, and sensitive resources. Development of the area also would increase the amount of Wildland-Urban Interface (WUI) areas, which would put additional pressure on fire suppression efforts because these are high-priority areas for fire suppression. Suppression activities within WUI areas could be more dangerous, time-consuming, and expensive than suppression in undeveloped areas. In addition, activities associated with fire suppression, recreation, development, and general land use would cumulatively contribute to the modification of the composition and structure of vegetation communities and increase the spread of noxious and invasive weeds. Such effects would in turn alter the decision area's fire regime, potentially increasing the frequency, size, and intensity of wildland fires. Developed areas and associated roads and ROW corridors could also provide increased accessibility to remote areas for fire suppression equipment and provide fuel breaks in the case of wildland fire events. The Proposed RMP would incrementally modify and improve the composition and structure of vegetation communities and move the decision area's fire regime towards condition class 1.

## Cultural Resources and Tribal Interests

Impacts associated with resource decisions from this RMP, combined with other past, present, and reasonably foreseeable actions, could produce cumulative impacts on cultural resources and resources of religious or traditional importance to Native American tribes associated with the decision area. The cumulative impact analysis area for cultural resources includes the planning area and neighboring lands with connected cultural resources, including parts of the GSENM, Iron and Piute counties, and the Kaibab-Paiute Reservation lands.

Land management of adjacent federal lands would provide protection for cultural resources throughout the region. Required inventories prior to surface disturbance would increase the number of identified sites and decrease the potential for damage from surface disturbing activities. Similar management direction and resource uses occur in these planning areas. In addition, any surface disturbance associated with water projects, regional minerals, or energy projects would require adherence to cultural resource laws and regulations, resulting in the inventory and identification of cultural sites and in some cases data recovery.

Under the Proposed RMP, cultural resources would be managed in compliance with federal law, regulation, and policies that require the preservation of cultural resources either in place or through data recovery, which would result in minor incremental impacts to cultural resources. Management from other resource programs (non-WSA lands with wilderness characteristics, special status species, riparian, fish and wildlife, SRMAs, and ACECs) would also provide protection from surface disturbing activities that could damage cultural resource sites.

Potential congressional designation of WSR segments would require a Class III cultural resource survey to identify and monitor cultural resources. Some cultural resources would require additional mitigation as a result of public interaction with the resource.

## Paleontological Resources

The cumulative impact analysis boundary for paleontological resources includes the decision area and neighboring lands with connected paleontological resources. Management activities on adjacent federal lands would provide protection for paleontological resources throughout the region. Inventories prior to surface disturbance would increase the number of identified localities and decrease the potential for damage from surface disturbing activities. These inventories also would increase the knowledge of the region's paleontological resources.

The cumulative effects of surface disturbing activities within paleontological Class I areas, especially mineral development in the region, have the potential to damage this fragile, non-renewable resource. However, existing laws, regulations, and policies provide for mitigation of effects through avoidance or data recovery efforts. Although it is expected that some fossils would be destroyed in the course of legitimate uses of public lands, mitigation measures likely would bring paleontologists to areas where fossils had not been previously studied. Thus, fossils that would otherwise have disintegrated over time due to weathering and erosion would be collected, placed in repositories, and protected in perpetuity. Beyond mineral development, cumulative impacts on paleontological resources could occur through incremental degradation of the resource base from a variety of sources, reducing the information and interpretive potential of the paleontological resource values. Mineral development on lands that are not protected by federal laws or policies protecting paleontological resources could decrease the regional resource base, increasing the scientific value of the paleontological resources within the decision area. This combined with the actions on BLM-administered lands could result in minor incremental impacts to paleontological resources.

## Visual Resources

The cumulative impact analysis boundary for visual resources includes the decision area and neighboring lands within the viewshed that overlap the decision area.

Development actions within and outside the decision area could produce long-term cumulative impacts on visual resources. Reasonably foreseeable future actions, including planning efforts to locate and develop mineral and hydrocarbon resources and establish ROW corridors, would have impacts on visual resources. Impacts would be caused by surface disturbance from production, exploration, and construction of drilling and mining facilities and development within ROWs. However, these projects would be required to conform to an area's VRM class objectives. Projects in VRM Class I and II areas could be required to conform to these VRM class objectives through design, camouflage, and/or topographic screening, which would prevent their cumulative impacts on visual resources from becoming dominant features on the landscape in sensitive VRM class designations. Cumulatively, the Proposed RMP would provide protections for visual resources because the 170,400 acres (31 percent) of VRM Class I and II would be in addition to restrictions on development on adjacent National Parks, National Monuments, Glen Canyon National Recreation Area, and wilderness areas. VRM Class III and IV area objectives in the decision area would not emphasize protection of an unmodified landscape and visual resources and would allow for major modifications to the landscape. Activities that occur in these areas could result in changes to the characteristic landscape and may not protect scenic values.

Continued recreational OHV use also would maintain the 1,403 routes on BLM land in addition to routes on private and state lands. These routes would result in cumulative impacts from the landscape contrast associated with linear route disturbances.

The growing need to decrease the potential for catastrophic fire in the region through mechanical treatments aimed at reducing fuel loads would gradually alter landscapes where treatments are conducted. Vegetation treatments would change the vegetation component of the landscape, and thus its visual character. The degree of change would vary depending on the vegetation type, size of the treatment area, and treatment method. For example, vegetation treatments in pinyon and juniper vegetation communities would be more visually apparent than vegetation treatments in sagebrush communities. Smoke from prescribed fires used for the same purpose would sporadically affect the quality of viewsheds and interfere with the public's viewing of scenery.

The overall contribution of the Proposed RMP to the cumulative impact on visual resources is expected to be a minor incremental increase to the visual disturbances as a result of mineral resource development, transportation, and vegetation treatments. Additionally, there would be incremental increases in the areas managed to protect visual resources.

### **Areas with Wilderness Characteristics (Wilderness, WSAs, and Non-WSA Lands with Wilderness Characteristics)**

The cumulative impact analysis boundary for areas with wilderness characteristics (designated wilderness, WSAs, and non-WSA lands with wilderness characteristics) includes areas within the planning area with identified wilderness characteristics and the full extent of those areas that overlap outside the planning area. In addition, areas with wilderness characteristics of adjacent land management agencies were considered as cumulative management of adjacent lands described above (Table 4-24).

**Table 4-24. Acres of Areas with Wilderness Characteristics in the Cumulative Impact Analysis Boundary**

Area Name	Designated Wilderness <sup>a</sup>	WSAs (BLM)/Forwarded to Congress (NPS) <sup>a</sup>	Non-WSA Lands with Wilderness Characteristics (BLM)/ Potential & Proposed for Wilderness (NPS) <sup>a</sup>	Total Areas with Wilderness Characteristics <sup>a</sup>
Kanab Field Office	21,200	53,900	27,770 <sup>b</sup>	<b>102,870</b>
Dixie National Forest <sup>1</sup>	25,600	0	0	<b>25,600</b>
Arizona Strip Field Office <sup>2</sup>	80,765	0	34,942 <sup>b</sup>	<b>115,707</b>
St. George Field Office <sup>3</sup>	2,690	94,916	0	<b>97,606</b>
Grand Staircase–Escalante NM <sup>4</sup>	0	881,997	457,049	<b>1,339,046</b>
Vermilion NM <sup>2</sup>	89,825	0	37,566 <sup>b</sup>	<b>127,391</b>
Grand Canyon/Parashant NM <sup>2</sup>	95,150	0	215,345 <sup>b</sup>	<b>310,495</b>
Zion NP <sup>5</sup>	0	120,620	11,995	<b>132,615</b>
Bryce Canyon NP <sup>6</sup>	0	20,810	0	<b>20,810</b>
Glen Canyon National Recreation Area <sup>6</sup>	0	0	637,250	<b>637,250</b>
Cedar Breaks NM <sup>6</sup>	0	4,830	0	<b>4,830</b>
Capitol Reef NP <sup>6</sup>	0	179,815	4,050	<b>183,865</b>
Grand Canyon NP <sup>6</sup>	0	0	1,111,902	<b>1,111,902</b>
Lake Mead National Recreation Area <sup>6</sup>	0	0	561,300	<b>561,300</b>
<b>Totals</b>	<b>315,230</b>	<b>1,356,888</b>	<b>3,099,169</b>	<b>4,771,287</b>
Notes: a - All figures are shown in acreages. b - Not total acres of non-WSA lands with wilderness characteristics, but total acres of non-WSA lands with wilderness characteristics proposed to be managed to maintain wilderness characteristics in the Proposed RMP/Final EIS.				

Sources: 1 - USFS 2006, 2 - BLM 2007, 3 - BLM 1999b, 4 - BLM 2000, 5 - NPS 2001b, 6 - NPS 2003

As a result of implementing the management prescriptions under the Proposed RMP, wilderness characteristics on approximately 27,770 acres of areas with wilderness characteristics would be managed to protect, preserve and maintain those characteristics within the decision area. Because of BLM WSA management, management of existing wilderness by the BLM and USFS, and management of lands administratively endorsed for wilderness by the NPS, the cumulative effect would be the protection of

wilderness characteristics on 4,314,238 acres throughout the region (all areas except non-WSA lands with wilderness characteristics within GSENM, which are not specifically managed to protect their wilderness characteristics). Not managing 62,010 acres of non-WSA lands with wilderness characteristics within the Kanab Field Office would contribute to a loss of areas with wilderness characteristics in the region. However, cumulatively the number of acres being protected for their wilderness characteristics in the region is much larger. In this context, the loss of wilderness characteristics on less than 1 percent of the non-WSA lands with wilderness characteristics in the decision area would not result in a significant incremental loss of these resources in the region.

Under the Proposed RMP, designation of a West-wide energy corridor, as proposed in the West-Wide Energy Corridor PEIS, would result in a 3,500-foot-wide ROW corridor being established through 1,580 acres of the Upper Kanab Creek area of non-WSA lands with wilderness characteristics and across 400 acres of the eastern portions of the Vermilion Cliffs area of non-WSA lands with wilderness characteristics. The portions of the Upper Kanab Creek area of non-WSA lands with wilderness characteristics east of the proposed energy corridor (9,690 acres) would remain at more than 5,000 acres and would retain its wilderness characteristics, as would the Vermilion Cliffs area of non-WSA lands with wilderness characteristics. Development of ROWs within the corridor would remove opportunities for solitude and primitive recreation during construction. The surface disturbance associated with the development would eliminate naturalness in these portions of the Upper Kanab Creek and Vermilion Cliffs areas of non-WSA lands with wilderness characteristics. Following construction activities, naturalness would remain impacted for above-ground facilities, while reclamation of subsurface ROWs would reduce the loss of naturalness.

Use and/or development of non-federal land inholdings within the Moquith Mountain and Parunuweap WSAs and the Paria Canyon–Vermilion Cliffs Wilderness could result in the loss of wilderness characteristics in portions of these areas. Based on the “Cotter Decision” (State of Utah v. Andrus, 1979), “BLM is obligated to provide reasonable access to State sections.” The decision notes that the BLM can regulate the method and route of access to State of Utah School and Institutional Trust Lands Administration (SITLA) lands encircled by federal land; however, the regulation may not prevent the State or its lessee from gaining access to its land, nor may it be so prohibitively restrictive as to render the land incapable of full economic development. While there has been no current demand for access to these sections, such actions could occur within the planning window. Providing access could diminish or eliminate wilderness characteristics in the areas adjacent to the access routes. The magnitude and duration of the impact would depend on the location of the route, type of access, and type of development being supported by the access. Because designated wilderness and WSAs (Congressionally mandated) would be managed to maintain their wilderness characteristics, impacts would be mitigated and likely would result in only localized and short-term disturbance.

## **Forestry and Woodland Products**

The cumulative impact analysis boundary for forest and woodland products is the planning area and watersheds that intersect the planning area. The availability of other forest and woodland products on adjacent lands could reduce the demand for these products within the decision area. The Proposed RMP management actions on the harvest of forest and woodland products would have a negligible incremental impact to the overall cumulative impact on the resource in the planning area.

## **Livestock Grazing**

The cumulative impact analysis boundary used to analyze cumulative impacts on livestock grazing includes all grazing allotments within the planning area. Potential, cumulative impacts on livestock grazing operations could occur from a combination of activities and land uses occurring within the

analysis boundary. Such impacts could result primarily from vegetation treatments, surface disturbing activities, the presence of grazing wildlife, and general human disturbance. Vegetation treatments and range improvements on lands adjacent to the decision area (public and private) would increase available forage and water for wildlife populations and livestock (for use by private operators) in these areas. This also would improve distribution of livestock and wildlife, improving rangeland conditions. In addition, vegetation treatments designed to enhance rangeland conditions would generally result in long-term increases in forage production. This could also result in short-term forage loss and livestock displacement directly in the areas of treatment.

Existing and future surface disturbing activities, recreation use, and big game populations located within the analysis boundary could incrementally reduce forage available for livestock and cause a incremental increase in soil disturbance, vegetation removal, spread of noxious weeds, and livestock displacement. Impacts would generally be greater in areas with large populations of big game and in areas of intense surface disturbance. These impacts could result in changes in rangeland health and jeopardize compliance with the *Standards for Rangeland Health* on some allotments. If livestock grazing is considered to be a factor in violating the *Standards for Rangeland Health*, the responsible livestock operator could be required to make adjustments to grazing practices.

Surface disturbing activities, including coal development activities and related construction of roads and infrastructure, could be a primary cause of site-specific loss of forage and the spread of noxious weeds. The implementation of BLM's mitigation guidelines, restrictions on surface use, *Standards for Rangeland Health*, vegetation treatments, and monitoring efforts would all provide measures of protection for forage resources on federal lands, which would help to incrementally reduce overall effects on livestock grazing operations.

## Recreation

The cumulative impact analysis boundary used to analyze cumulative impacts on recreation resources includes the planning area and all big game herd units that intersect the planning area. Because hunting is a major recreation activity within the planning area, any activities that affect game populations would in turn impact recreation opportunities and experience.

Cumulative impacts on recreation would potentially occur from a combination of land uses that result in conflicts for unconfined and primitive recreation opportunities. Such impacts are a result of increased recreational activity occurring within and outside of the planning area and other conflicts generated from permitted actions. Conflicts among recreationists would result in a major impact on the recreation setting and experience. Motorized recreation use would conflict with primitive/unconfined recreation when they occur in close proximity and would result in degradation of the setting and experience associated with primitive/unconfined recreation activities. There would be a negligible incremental impact to recreational opportunities and experiences from the Proposed RMP management actions.

## Transportation

The cumulative impact analysis boundary includes the planning area and immediately adjacent segments of state and local road networks including portions of Zion National Park, Capital Reef National Park, Glen Canyon National Recreation Area, GSENM, Arizona Strip Field Office, Richfield Field Office, St. George Field Office, Cedar City Field Office, Dixie National Forest, and regional State Trust Lands. These road networks include routes shared with the BLM and other federal agencies and routes shared with the GSENM. Cumulative impacts on transportation and access would primarily occur 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. The

Proposed RMP would provide for motorized access to most of the decision area, where non-motorized access could be obtained in the areas beyond the designated routes. Closures would not eliminate access to any portion of the decision area, although in some areas motorized access would require travel on more miles of routes to access the same area. 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. The Proposed RMP management actions to close 99 percent of the decision area to cross-country OHV travel in combination with similar management actions of adjacent field offices and agencies would incrementally reduce opportunities for cross-country OHV travel.

## **Lands and Realty**

The cumulative impact analysis boundary for lands and realty include the planning area and segments of ROW corridors that intersect its boundaries. The ROWs and ROW segments are maintained by state or local agencies, adjacent BLM field offices, and other federal agencies. The Tropic to Hatch transmission line, Lake Powell pipeline, West-wide energy corridor, expansion of U.S. Highway 89, and development along U.S. Highway 89 and SR 12 could affect the lands and realty program. These projects and developments would require approval of ROWs that cross the decision area. Under the Proposed RMP, restrictions on ROWs in the decision area, combined with restrictions from other management plans in the planning area, would have a minor incremental effect by limiting the location of ROWs.

## **Minerals and Energy**

The cumulative impact analysis boundary for minerals and energy resources varies by the type of mineral resource. The cumulative impact analysis boundary for oil and gas is the planning area and contiguous geological structures and oil and gas fields that intersect the planning area. The cumulative impact analysis boundary for coal is the planning area and the boundaries of adjacent coal fields (Alton, Kaiparowits, and Kolob). The cumulative impact analysis boundary for locatable minerals is the planning area. The cumulative impact analysis boundary for mineral materials is the planning area and adjacent mineral material sources. The development of the West-wide energy corridor project could lead to an increased interest in oil and gas activities. Stipulations on oil and gas leasing in the decision area would have a minor effect on the ability to develop oil and gas resources. The expansion of U.S. Highway 89 and continued development along U.S. Highway 89 and SR 12 and in local communities could increase the demand for mineral materials. The mineral material closures in the decision area would have a minor incremental effect on the ability to develop mineral materials.

## **Areas of Critical Environmental Concern**

The cumulative impact analysis boundary for ACECs is the potential ACEC boundaries. Cumulative impacts from the implementation of other resource decisions within and outside of the decision area on currently designated and potential ACECs would be minimal, with the exception of mineral and OHV decisions. The nature of the R&I values associated with the potential ACECs tends to result in impacts that occur quickly but recover slowly, if at all in the case of some visual impacts and impacts on cultural sites. As such, any impact would result in an incremental increase in the potential for irreparable damage to R&I values. Under the Proposed RMP, only the Cottonwood Canyon ACEC would be designated; management associated with other resource program decisions would protect the R&I values, resources, processes, or systems in the other potential ACECs. Management of adjacent lands would incrementally protect the R&I values from irreparable damage.

## Wild and Scenic Rivers

Impacts to WSRs would result from the river being managed to maintain its classification, free-flowing nature, and ORVs. Incremental impacts likely would not occur because eligible rivers are reviewed during the suitability process, and suitability is based on the environmental and economic consequences that would result from designation. In addition, the suitable segments are within existing WSA boundaries and would be protected from potential impacts. Because the BLM has no control over potential modification to a river's shoreline or any other form of development on non-public lands, minor incremental impacts could occur in these areas. Management actions to pursue land acquisitions of non-BLM lands to accomplish resource management goals would provide opportunities to manage ORVs and to mitigate any efforts that could impact the river's tentative classification or free-flowing nature.

## Other Designations

The cumulative impact analysis boundary for the Old Spanish National Historic Trail is the extent of the Old Spanish National Historic Trail. Adjacent federal land management agencies would be required to provide protection to this national designation. However, development on state and private land through scattered BLM land associated with both segments could incrementally decrease the historic character of the landscapes. In addition, road improvement projects and water projects could result in additional development within the segments of the Old Spanish National Historic Trail. These could incrementally reduce the historic character of the landscapes associated with both segments. The Proposed RMP management actions would maintain some of the character of the Highway 89/20-Garfield County segment, especially on the northern portions of that segment, regardless of cumulative actions. The Proposed RMP management actions would protect the historic nature of the Old Spanish National Historic Trail.

The cumulative impact analysis area for byways and backways is the extent of the ways. Cooperating with the managing authorities of the byways and backways to protect and preserve the associated landscape values would maintain and enhance these values and provide for heritage tourism opportunities. This cooperation could be accomplished through implementation-level planning and site developments that could interpret these resources and provide expanded visitor services in the area.

## Social and Economic Conditions

The cumulative impact analysis boundary for social and economic conditions is the socioeconomic study area, which includes the entirety of Garfield and Kane counties. Such impacts would include economic and social impacts related to short-term economic stimuli and possible short-term local community service impacts related to major construction projects and resource extraction activities in the socioeconomic study area. In addition to the coal mine on decision area lands, such major projects also would include the following, if and when they occur: the Lake Powell pipeline, construction of a divided highway parallel to U.S. Highway 89, an energy pipeline through the area, Jackson Flat Reservoir (proposed by the Kane County Water Conservancy District), and development of tar sands in Glen Canyon. The Proposed RMP management actions would allow for the increased demand for mineral materials (sand and gravel) to complete these major projects. The completion of these projects would indirectly allow for economic and population growth and the expansion of communities. Conversion of private agricultural lands to residential and other uses as the area grows would increase the importance of BLM public lands to the maintenance of the economy and culture of livestock grazing. The importance of BLM public lands to maintenance of other local livelihoods, customs, and culture also would depend on cumulative decisions regarding management of other lands in the area, including NPS, USFS, BLM, GSENM, and state and private lands.

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