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

Utah

Analysis of the Management Situation

Grand Staircase-Escalante National Monument and Kanab-Escalante Planning Area

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1 Introduction

On December 4, 2017, Presidential Proclamation 9682 divided the Grand Staircase Escalante National Monument (GSENM) into the Grand Staircase, Kaiparowits, and Escalante Canyons Units. Additionally, Proclamation 9682 modified the boundaries of GSENM, resulting in the exclusion of approximately 900,000 acres of land that was previously in GSENM. This land is now managed by the Kanab Field Office (KFO) and is called the Kanab-Escalante Planning Area (KEPA). This Analysis of the Management Situation (AMS) includes information for all of these areas.

The Department of the Interior (DOI) Bureau of Land Management (BLM) is preparing to create four new land use plans (LUPs):

- GSENM Grand Staircase Unit Management Plan
- GSENM Kaiparowits Unit Management Plan
- GSENM Escalante Canyons Unit Management Plan
- KEPA Management Plan

An AMS is one of the first steps in the preparation of an LUP. It describes how the resources in the Planning Area are currently being managed and identifies what changes could be made to better protect or enhance these resources. This information is then used to formulate the alternatives considered when creating the new LUPs. The Planning Area is currently subject to the GSENM Monument Management Plan (MMP), approved in 2000.

1.1 Purpose and Need for the Land Use Plan Revision

The Federal Land Policy and Management Act of 1976 (FLPMA) requires that BLM "develop, maintain, and when appropriate, revise land use plans" (43 United States Code [U.S.C.] 1712(a)). BLM has determined it is necessary to create new MMPs for the Grand Staircase, Kaiparowits, and Escalante Canyons Units of GSENM and a Resource Management Plan (RMP) for the new KEPA. An LUP is a set of comprehensive, long-range decisions regarding the use and management of resources administered by BLM. In general, an LUP should define the goals for maintaining or improving the conditions of the lands and resources and resolve conflicts or issues between competing uses of the lands and resources.

The BLM planning process, explained in Title 43 of the Code of Federal Regulations (CFR), Part 1600, BLM 1601 Manual, and BLM Land Use Planning Handbook (H-1601-1), falls within the framework of the National Environmental Policy Act of 1969 (NEPA) environmental analysis and decisionmaking process described in the Council on Environmental Quality regulations of 40 CFR 1500–1508, the DOI NEPA Manual (516 DM 1-7), and the BLM NEPA Handbook H-1790-1.

The LUPs will establish consolidated guidance and updated objectives and management actions for the public lands in the Planning Area. They will be comprehensive in nature and will address issues that have been identified through interagency and public scoping.

1.2 Purpose of Analysis of the Management Situation

This AMS provides a brief description of the resource conditions within the Planning Area and how these resources are currently being managed. It will serve as a baseline for the development of the alternatives in the Environmental Impact Statement (EIS) associated with the LUPs. This document represents an early component of the planning process. The AMS is not a comprehensive, detail-oriented document on various resources. It is intended to provide a summary of existing management practices, including direction from existing plans and agency policy, local resources, and social and economic conditions.

1.3 General Description of Planning Area

The *Planning Area* is the region within which BLM will make decisions during a planning effort. A Planning Area boundary includes all lands regardless of jurisdiction. BLM will only make decisions for the *Decision Area,* which includes lands that fall under BLM jurisdiction, including subsurface minerals. For the purposes of this document, the Planning Area refers to the entire area outlined in Appendix 1, Map 1.

The Planning Area is located in south-central Utah. It includes all public lands and Federal minerals managed by the Grand Staircase, Kaiparowits, and Escalante Canyons Units of GSENM and the KEPA. Of approximately 1,894,971 acres of land within the Planning Area, the LUPs will make decisions for approximately 1,880,873 acres of public land administered by BLM.

Table 1 Surface Ownership in the Planning Area

Jurisdiction	Acres
BLM KEPA	874,532
BLM Grand Staircase Unit of GSENM	211,983
BLM Kaiparowits Unit of GSENM	551,117
BLM Escalante Canyons Unit of GSENM	243,241
Private	14,098
U.S. Forest Service	0
State of Utah	0
Indian Reservation	0
National Park Service	0
Total	1,894,971

BLM – Bureau of Land Management, GSENM – Grand Staircase-Escalante National Monument, KEPA – Kanab-Escalante Planning Area

The Planning Area is near or adjacent to areas of national and international significance, including Bryce Canyon National Park, Zion National Park, North Rim of the Grand Canyon, Glen Canyon National Recreation Area (NRA), Pipe Spring National Monument, Cedar Breaks National Monument, Grand Canyon-Parashant and Vermilion Cliffs National Monuments, Kodachrome Basin State Park, Escalante Petrified Forest State Park, and Coral Pink Sand Dunes State Park.

1.4 Key Findings

Key issues currently needing resolution are predominantly the result of changes in administrative boundaries. The GSENM MMP was completed in 2000. Resource conditions have not changed substantially since the completion of that document, but management objectives for parts of the Planning Area have. Other key findings were provided through public scoping.

1.4.1 Changes in Administrative Boundaries

The modification of GSENM into the Grand Staircase, Kaiparowits, and Escalante Canyons Units and the KEPA will require four new LUPs. Each of these LUPs will include decisions specific to the goals and objectives appropriate for the management area.

1.4.2 Key Findings Identified in Scoping

A summary of the public scoping process and issues identified is located in Chapter 7 of this document. The issue categories that were identified most frequently included (1) opposition to monument modifications; (2) process; (3) public involvement; (4) trails and travel management; (5) recreation and visitor services; (6) minerals management; (7) livestock grazing; (8) cultural resources; and (9) Native American concerns.

2 Area Profile

This chapter describes the resources in the Planning Area and their current and potential uses. The chapter includes the following sections. This information will become the basis for the Affected Environment chapters of the EIS associated with the LUPs.

- Regional Setting
- Resources
- Resource Uses
- Special Designations
- Social and Economic Features

2.1 Regional Setting

The Planning Area is situated primarily within the Colorado Plateau physiographic province. The Colorado Plateau is characterized by rugged tableland topography with precipitous canyon walls that mark abrupt changes in local relief. The region contains a mixture of pinyon-juniper woodlands, grasses, and shrubs in the higher elevations, and saltbrush-greasewood communities in the lower elevations. A Rapid Ecoregional Assessment (REA) has been completed for the Colorado Plateau area (Bryce et al. 2012), which further describes the regional setting of the Planning Area.

The REA may be accessed online at https://landscape.blm.gov/geoportal/catalog/REAs/REAs.page.

2.2 Resources

The following sections discuss in detail each resource present in the Decision Area and include, where applicable, a discussion of the following five factors:

- Indicators: Factors that describe the resource condition
- Current Condition: Location, extent, and current condition of the resources
- Trends: Degree and direction of change between the present and some point in the past
- Forecast: Predicted changes in the condition of resources given current management
- Key Features: Geographic location, distribution, areas, or types of resource features that should guide management decisions

2.2.1 Air Quality

2.2.1.1 Indicators

Criteria Air Pollutants

To protect human health and welfare, the 1963 Clean Air Act (CAA; Public Law 91-604), as amended in 1977 (Public Law 95-9) and reaffirmed in 1990 amendments, requires that the United States Environmental Protection Agency (EPA) establish standards for certain pollutants based on the best available science. The National Ambient Air Quality Standards (NAAQS) have thus been established for six air pollutants: particulate matter, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone (O_3), and lead. The Utah Division of Air Quality (UDAQ)

is responsible for ensuring compliance with the NAAQS within the State of Utah. Table 2 shows current NAAQS for the EPA-designated criteria pollutants (EPA 2018).

Table 2. Primary Criteria Pollutant National Ambient Air Quality Standards

Pollutant	Primary/ Secondary	Averaging Time	Level[1]	Form
Carbon Monoxide (CO)	primary	8 hours	9 ppm	Not to be exceeded more than once per year
		1 hour	35 ppm	
Lead (Pb)	primary and secondary	Rolling 3-month average	0.15 µg/m^3[2]	Not to be exceeded
Nitrogen Dioxide (NO_2)	primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	primary and secondary	1 year	53 ppb[3]	Annual mean
Ozone (O_3)	primary and secondary	8 hours	0.070 ppm[4]	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Fine Particulate Matter ($PM_{2.5}$)	primary	1 year	12.0 µg/m^3	Annual mean, averaged over 3 years
	secondary	1 year	15.0 µg/m^3	Annual mean, averaged over 3 years
	primary and secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years
Respirable Particulate Matter (PM_{10})	primary and secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)	primary	1 hour	75 ppb[5]	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

Source: EPA 2016

[1] Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter of air (µg/m^3).

[2] In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m^3 as a calendar quarter average) also remain in effect.

[3] The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

[4] Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

[5] The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and that is designated nonattainment under the previous SO_2 standards or is not meeting the requirements of a State Implementation Plan (SIP) call under the previous SO_2 standards (40 Code of Federal Regulations 50.4(3)). A SIP call is an Environmental Protection Agency action requiring a state to resubmit all or part of its SIP to demonstrate attainment of the required National Ambient Air Quality Standards.

Visibility and Regional Haze

Visibility is important to visitors who come to enjoy the scenic beauty of public lands in the Planning Area, often from a long distance. Having clear days for such viewing opportunities is especially important for many visitors who are in the area for only a short period. Visibility is affected by pollutant concentrations, plume impairment, regional haze, relative humidity, sunlight, and cloud characteristics. Aerosols (small particles made of solid and/or liquid molecules dispersed in the air) are the pollutants that most often affect visibility in the Class I areas. Five key contributors to visibility impairments are sulfate (SO_4), nitrate (NO_3), organic carbon, elemental carbon, and crustal materials.

The 1977 CAA included legislation to prevent future and remedy existing visibility impairment in Class I areas. In 1985, EPA established a collaborative monitoring program called the Interagency Monitoring of Protected Visual Environments (IMPROVE) to monitor visibility in Class I areas. The IMPROVE network operates a monitor in Bryce Canyon National Park.

Hazardous Air Pollutants

Hazardous air pollutants (HAPs) are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental impacts. EPA has classified 187 air pollutants as HAPs.

The CAA requires EPA to regulate emissions of toxic air pollutants from a published list of industrial sources referred to as "source categories." EPA has developed a list of source categories that must meet control technology requirements for these toxic air pollutants. Under Section 112(d) of the CAA, EPA is required to develop regulations establishing national emission standards for HAPs for all industries that emit one or more of the pollutants in major source quantities. These standards are established to reflect the maximum degree of reduction in HAP emissions through application of maximum achievable control technology. Source categories for which maximum achievable control technology standards have been implemented include oil and natural gas production and natural gas transmission and storage.

Although HAPs do not have Federal air quality standards (exposure thresholds do exist), some States have established "significance thresholds" to evaluate human exposure for potential chronic inhalation illness and cancer risks. There are no applicable Federal or State of Utah ambient air quality standards for assessing potential HAP impacts on human health, and monitored background concentrations are rarely available. Therefore, reference concentrations for chronic inhalation exposures and reference exposure levels for acute inhalation exposures are applied as significance criteria. Reference concentrations represent an estimate of the continuous (i.e., annual average) inhalation exposure rate to the human population (including sensitive subgroups such as children and the elderly) without an appreciable risk of harmful effects. Reference exposure levels represent the acute (i.e., 1-hour average) concentration at or below which no adverse health effects are expected.

Prevention of Significant Deterioration

The Prevention of Significant Deterioration (PSD) program of the CAA ensures that air quality in areas with clean air does not significantly deteriorate, while maintaining an allowable margin for future industrial growth. Under the PSD provisions of the CAA, incremental increases of specific pollutant concentrations are limited above a legally defined baseline level. The PSD program applies to new major sources or major modifications at existing sources for pollutants

where the area the source is located is in attainment or unclassified with the NAAQS. Many National Parks and wilderness areas are designated as PSD Class I. The PSD program protects air quality within Class I areas by allowing only slight incremental increases in pollutant concentrations. Areas of Utah not designated as PSD Class I are classified as Class II. For Class II areas, greater incremental increases in ambient pollutant concentrations are allowed as a result of controlled growth.

Atmospheric Deposition

Atmospheric deposition refers to the processes by which air pollutants are removed from the atmosphere and deposited on terrestrial and aquatic ecosystems, and is reported as the mass of material deposited on an area (kilogram per hectare) per year. Atmospheric deposition can cause acidification of lakes and streams. One expression of lake acidification is change in acid-neutralizing capacity, the lake's capacity to resist acidification from atmospheric deposition. Acid-neutralizing capacity is expressed in units of micro-equivalents per liter.

Wet deposition refers to air pollutants deposited by precipitation, such as rain and snow. One expression of wet deposition is precipitation pH, a measure of the acidity or alkalinity of the precipitation. There are five National Atmospheric Deposition Program stations in Utah: Logan, Murphy Ridge, Green River, Bryce Canyon National Park, and Canyonlands National Park. The National Atmospheric Deposition Program stations in Bryce Canyon National Park and Canyonlands National Park have assessed precipitation chemistry since 1985 and 1997, respectively.

Dry deposition refers to the transfer of airborne gaseous and particulate material from the atmosphere to the Earth's surface. The Clean Air Status and Trends network has measured dry deposition of O_3, SO_2, nitric acid, SO_4, NO_3, and ammonium (NH_4), in the United States since the late 1980s. There is one Clean Air Status and Trends network station in Utah at Canyonlands National Park.

2.2.1.2 Current Condition

The existing air quality in the Planning Area is typical of undeveloped regions in the western United States. Specifically, Kane and Garfield Counties are designated as attainment or unclassified for all NAAQS. UDAQ is responsible for regulating and monitoring air quality in Utah and emphasizes air quality monitoring in more developed areas of the State where non-attainment of established criteria is more problematic. At present, the Utah Air Monitoring Network does not include monitoring stations in Garfield and Kane Counties.

The most recent UDAQ Statewide Emissions Inventory Report (UDAQ 2017) estimates the primary air pollutant in Kane and Garfield Counties is volatile organic compounds (VOCs) from biological sources, followed by CO, particulate matter less than 10 microns in diameter (PM_{10}), nitrogen oxides (NO_X), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and sulfur oxides (SO_X). Table 3 lists the criteria pollutant levels (those compounds for which pollution criteria have been established) in tons per year from the Statewide Emissions Inventory.

Table 3. 2014 Criteria Pollutant Inventory (tons per year)

County	Source	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_X	VOCs
Kane	Area Source	178.05	320.72	1,363.97	167.90	1.70	98.51
	Oil and Gas	0.00	0.00	0.00	0.00	0.00	0.00

County	Source	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_X	VOCs
	Non-road Mobile	2,173.12	83.20	28.11	25.98	0.36	821.93
	On-road Mobile	1,054.00	396.90	105.07	35.46	1.36	110.40
	Point Source	27.16	53.69	47.31	5.27	8.88	10.90
	Biogenics	9,038.86	0.00	0.00	0.00	0.00	42,588.57
	Wildfires	0.00	0.00	0.00	0.00	0.00	0.00
	Total	12,471.19	854.50	1,544.46	234.61	12.29	46,630.31
Garfield	Area Source	719.72	279.13	2,088.77	323.19	1.42	280.78
	Oil & Gas	13.12	8.53	0.17	0.17	0.03	130.26
	Non-road Mobile	2,230.15	84.52	34.29	31.77	0.42	896.46
	On-road Mobile	809.90	275.40	59.02	20.99	1.04	79.01
	Point Source	3.86	1.74	1.26	0.40	0.92	0.36
	Biogenics	8,853.31	0.00	0.00	0.00	0.00	42,892.08
	Wildfires	24.62	0.70	2.98	2.68	0.00	4.20
	Total	12,654.67	650.01	2,186.49	379.19	3.83	44,283.16

CO – carbon monoxide, NO_X – nitrogen oxide, PM_{10} – particulate matter 10 microns or less in diameter, $PM_{2.5}$ – particulate matter 2.5 microns or less in diameter, SO_X – sulfur oxide, VOCs – volatile organic compounds

VOCs are organic compounds that easily become vapors or gases. Biogenic releases of VOCs are from biological sources such as vegetation and soils. Along with carbon, VOCs can contain elements such as hydrogen, oxygen, fluorine, chlorine, bromine, sulfur, or nitrogen. Many VOCs are hazardous air pollutants. VOCs combined with NO_X and sunlight react in the atmosphere to form ground-level O_3, or smog. While not a recognized air quality issue in the Planning Area, ground-level O_3 is a regional issue affecting Class 1, metropolitan, and energy-producing areas in Utah and surrounding States. O_3 and its precursors (VOCs and NO_X) can be transported both into and out of the Planning Area, and therefore are pollutants of concern.

Burning fuel such as gasoline, coal, natural gas, and wood releases VOCs. VOCs would be expected to increase during periods of high wildfire or prescribed burning activity. VOCs and smog formation are more problematic during periods of atmospheric stability, and in valley bottom areas prone to inversions, and much less problematic during periods of atmospheric instability (i.e., high-velocity ground-level winds and winds aloft).

CO is produced by the incomplete burning of various fuels, including coal, wood, charcoal, oil, kerosene, propane, and natural gas. Products and equipment powered by internal combustion engines such as portable generators, cars, heavy construction equipment, off-highway vehicles (OHVs), airplanes, and trains also produce CO. CO combines with oxygen in the atmosphere to create carbon dioxide (CO_2). NO_X is emitted through the use of nitrogen fertilizers and when fuel burns at high temperatures, such as in internal combustion engines. Both on-road and off-road mobile sources are responsible for more than half of all NO_X emissions in Kane and Garfield Counties.

Natural sources of SO_2 include volcanoes and hot springs. SO_2 is formed by the oxidation of hydrogen sulfide (H_2S), a toxic gas that smells like rotten eggs. Oxidation occurs when H_2S combines with the oxygen in air. Man-made sources of SO_2 include fossil fuel processing and burning, with high-sulfur fuels generally producing higher levels of SO_2 as a byproduct.

Inhalable particulate matter (PM_{10} and $PM_{2.5}$) concentrations are expected to be higher near towns, unpaved roads that experience high volumes of traffic, and areas with depleted vegetative cover. Regional PM_{10} and $PM_{2.5}$ levels are likely a result of fugitive dust sources. BLM regularly authorizes projects that, without adequate mitigation measures applied, would have the potential to raise levels of fugitive dust, PM_{10}, and $PM_{2.5}$. Locations vulnerable to decreasing air quality include the immediate operation areas around surface-disturbing activities such as energy and mineral development, construction of major rights-of-way (ROWs) projects, farm tilling, and local population centers affected by residential and light industrial emissions.

Fugitive dust is likely to occur naturally across the Planning Area during high-wind events. Areas such as dry lakebeds, deserts, dunes, and recovering wildfire areas are prone to high-wind dust events. Given the potential for localized impacts from fugitive dust, and the need for active management of this source category related to BLM-authorized activities, particulate matter (both PM_{10} and $PM_{2.5}$) is considered a pollutant of concern.

Any smoke emissions resulting from annual prescribed burning projects or treatments in the Planning Area are managed in compliance with guidelines in the Utah Smoke Management Plan (SMP) and interagency group program (UDAQ 2006). Active group participants include various Federal and State agency land managers, and UDAQ. The purpose of this program and the SMP is to ensure the implementation of mitigation measures to reduce the impacts on public health and safety and visibility from prescribed fire and wildland fire used for resource benefits. Compliance with the SMP is the primary mechanism for land managers to implement prescribed burns while ensuring compliance with the CAA.

Burn plans written under this program include actions to minimize fire emissions, exposure-reduction procedures, a smoke dispersion evaluation, and an air quality monitoring plan. The program coordinator reviews proposed burns daily and approves or denies burns based on current weather and air quality conditions.

Class I air quality areas include National Parks larger than 6,000 acres and wilderness areas larger than 5,000 acres that existed or were authorized as of August 7, 1977. They receive the highest degree of air quality protection under the CAA. The three closest National Parks that meet these criteria that have the highest potential to be downwind receptors from BLM-authorized actions in the Planning Area are Bryce Canyon, Capitol Reef, and Zion National Parks.

2.2.1.3 Trends

While UDAQ has no air monitoring stations in Garfield and Kane Counties, Federal agencies have collected data in the region related to O_3 concentrations, visibility, and atmospheric deposition.

Pollutants of Concern

Existing sources of air pollution that emit O_3 precursor gases are found in the management area; O_3 is a primary pollutant of concern. O_3 is a regional problem typical in the western States, as precursor gases (NO_X and VOCs) from forest fires, transport from shipping lanes, electric power generation, oil and gas production, and a conglomerate of other sources combine under certain meteorological conditions to form O_3.

Data collected at Canyonlands National Park, Zion National Park, and GSENM show that recent O_3 concentrations remain below the NAAQS. These data are presented in Figure 1. The long-term trend from 2002 through 2017 show a reduction in O_3 concentrations at these monitoring locations. However, while current O_3 concentrations are below the NAAQS, they are still near the standard, and the historic data record shows past exceedances.

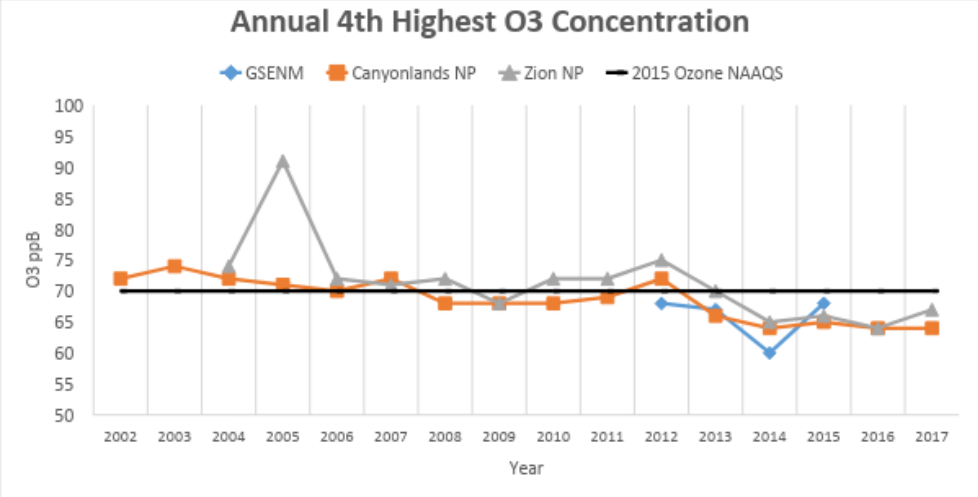


Figure 1. Ozone Concentrations

Visibility

Regional haze has been an issue of growing concern throughout the West. Regional haze causes visual impairment by obscuring the clarity, color, texture, and form of what can be seen. As part of the IMPROVE network, visual air quality in Bryce Canyon, Capitol Reef, and Zion National Parks has been monitored since the early 1990s. The 2009 *Annual Performance and Progress Report on Air Quality Goals at National Parks* report measured trends over the past 10 years of data (NPS 2009). The report indicates that the visibility trend in all three parks is showing statistically significant improvement on the clearest days. There was no apparent trend reported for the three parks on hazy days. Table 4 lists the visibility results for the three parks.

Table 4. Trend Results for Select National Parks, 1999–2008

	Visibility				Atmospheric Deposition						Ozone	
	Clear Days		Hazy Days		Ammonium		Nitrate		Sulfate		Annual 4th highest 8-hour	
Park	dv/yr	p value	dv/yr	p value	µeq/liter/yr	p value	µeq/liter/yr	p value	µeq/liter/yr	p value	ppb/yr	p value
Bryce Canyon	-0.16	<0.01	0.00	0.50	0.51	0.14	-0.64	0.05	-0.51	0.03	N/A	N/A
Capitol Reef	-0.16	<0.01	0.00	0.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Zion	-0.16	<0.01	0.00	0.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

dv/yr – deciviews per year, µeq/liter/yr – micro-equivalents per liter per year, ppb/yr – parts per billion per year, N/A – not available

Atmospheric Deposition

Atmospheric deposition of air pollutants can increase the acidity of soils and water resources. Measurements of atmospheric deposition are currently being taken in the Bryce Canyon National Park Class I area. The 2009 *Annual Performance Report on Air Quality Goals at National Parks* indicates rates of atmospheric deposition of NH_4, NO_3, and SO_4 in precipitation is relatively low in Bryce Canyon National Park, but elevated above natural conditions. Trend analysis shows a possible increase in NH_4, a possible decrease in NO_3, and a statistically significant decrease in SO_4 deposition (see Table 4).

2.2.1.4 Forecast

Currently, air quality is good within the Management Area; however, because EPA and the Utah Department of Environmental Quality (DEQ) are continually reassessing air quality standards, compliance may be harder to achieve in the future, thereby making constant and effective planning and management for the control of specific project pollutant emissions more challenging. The forecast for the Planning Area is for increased population growth, tourism and recreation, and possible resource development. Increased populations inevitably lead to increased use of carbon fuels. As a result of increased use of fuel, the trend will be for the release of increased levels of VOCs, CO and CO_2, ground-level O_3, and SO_X into the atmosphere. With increased vehicular recreation and demand for utility scale ROWs, fugitive dust will likely increase across the Planning Area. Fugitive dust will also increase if climate change yields warmer and drier conditions. If, as some predict, increased precipitation accompanies climate change, the increase in precipitation might help to mitigate temperature increases, resulting in a less radical increase in fugitive dust. It is anticipated that as fuel treatments continue to be performed under controlled conditions across the Planning Area, haze and smoke from uncharacteristic wildfires will lessen over the Planning Area. Resource development may lead to increased levels of NAAQS pollutants and fugitive dust through the use of machinery combusting carbon fuels and surface disturbance, respectively.

2.2.1.5 Key Features

Two key features related to air quality in the Planning Area are O_3 and fugitive dust. While O_3 concentration levels are currently below the NAAQS and trending downward, they have in the past exceeded the current NAAQS of 70 parts per billion. The Planning Area is prone to high winds from the south and southwest in the spring and summer seasons. Fugitive dust from wildfire areas is also a concern.

BLM regularly authorizes projects that have the potential to raise levels of fugitive dust, PM_{10}, and $PM_{2.5}$. Locations vulnerable to decreasing air quality include the immediate operation areas around surface-disturbing activities such as energy and minerals development, construction of major ROW projects, farm tilling, and local population centers affected by residential and light industrial emissions. Avoiding areas with sensitive soils prone to blowing and identifying and implementing best management practices (BMPs) and other mitigation measures are key to minimizing fugitive dust.

Another key feature is protecting air quality–related values for areas that have been designated as Class I or Class II under the PSD program. There are three nearby National Parks that have been designated as PSD Class I areas: Canyonlands National Park, Bryce Canyon National Park, and Zion National Park.

2.2.2 Climate Change

Climate change is defined by the Intergovernmental Panel on Climate Change (IPCC) as "a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcing such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use" (IPCC 2013).

In January 2009, DOI issued Amendment 1 to Secretarial Order 3226 to provide guidance on how bureaus and offices can respond to emerging climate change issues. One of the tasks within the order requires each bureau and office within DOI to consider and analyze the potential climate change impacts in planning exercises and when making decisions affecting DOI resources. To fulfill the mandate of the amendment, BLM issued Instruction Memorandum (IM) No. 2013-082 outlining policy for the use of REA information in managing the public lands.

2.2.2.1 Indicators

Ongoing scientific research has identified the potential impacts of greenhouse gas (GHG) emissions (including CO_2, methane, nitrous oxide, and several trace gases) on global climate. Through complex interactions on a regional and global scale, these GHG emissions cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the Earth back into space. Although GHG levels have varied for millennia, recent industrialization and burning of fossil carbon sources have caused CO_2 equivalent (CO_2e) concentrations to increase dramatically, and are likely to contribute to overall global climatic changes.

In the Planning Area, like in most of the United States, GHG emissions come primarily from the combustion of fossil fuels in energy use. Energy use is largely driven by economic growth, with short-term fluctuations in its growth rate created by weather patterns that affect heating and cooling needs, and changes in the fuel used in electricity generation. In 2015, CO_2 emissions from combustion of fossil fuel for energy production in the United States were equal to 77 percent of total U.S. anthropogenic GHG emissions (based on global warming potential [GWP]) (EIA 2018).

Sources of CO, CO_2, and nitrous oxides are described above. Another GHG, methane, comes from landfills, coal mines, oil and natural gas operations, and agricultural operations. It represents up to 9 percent of total GHG emissions. The GWP was developed to allow comparisons of the global warming impacts of different GHGs. Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of CO_2. Shown in Table 5, the GHGs are presented using the unit of metric tons of CO_2e, a metric to express the impact of each different GHG in terms of the amount of CO_2, making it possible to express GHGs as a single number. For example, 1 ton of methane would be equal to 25 tons of CO_2e, because it has a GWP over 25 times that of CO_2. The GWP accounts for the intensity of each GHG's heat-trapping effect and its longevity in the atmosphere. The GWP provides a method to quantify the cumulative effects of multiple GHGs released into the atmosphere by calculating CO_2e for the GHGs.

Table 5. Greenhouse Gases and Their Global Warming Potentials

GHG	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NF_3
GWP	1	25	298	Up to 14,800	7,390–12,200	22,800	17,200

GHG – greenhouse gas, CO_2 – carbon dioxide, CH_4 – methane, N_2O – nitrous oxide, HFCs – hydrofluorocarbons, PFCs – perfluorinated compounds, SF_6 – sulfur hexafluoride, NF_3 – nitrogen trifluoride, GWP – global warming potential

Additional indicators of climate change include various plant and animal species. Discussion about indicator species is contained in their respective sections.

2.2.2.2 Current Condition

Eco-regions are large areas of similar climate where ecosystems recur in predictable patterns. The Planning Area is within the Colorado Plateau ecoregion. An REA has been completed for the Colorado Plateau. The REAs are important because they are the primary sources for climate change assessment information related to the Planning Area. Current and predicted climate change trends for the Colorado Plateau are discussed below.

Colorado Plateau Ecoregion

The Colorado Plateau ecoregion covers the southeastern half of Utah, western Colorado, northern New Mexico, and northwestern Arizona.

The climate of the Colorado Plateau varies from north to south and from low to high elevations. In the north, the climate is closely tied to that of the Great Basin; summers are hot with infrequent afternoon thunderstorms that tend to focus mostly on higher-elevation areas. In the south, peak precipitation occurs in the winter and again in the summer because of moisture from southern monsoonal weather patterns. Spring and fall are generally the driest periods. Annual precipitation amounts are less than 10 inches at the mid and lower elevations, while areas above 8,000 feet receive over 20 inches of precipitation. The few and highly scattered mountains that reach elevations near or over 11,000 feet can receive nearly 3 feet of precipitation. Temperatures also vary considerably in the ecoregion. In the southern and lower elevations, temperatures range from approximately 20 to 25 degrees Fahrenheit (°F) (-4 to -6 degrees Celsius [°C]) in the winter to approximately 95 °F (35 °C) in the summer. At mid and upper elevations, temperatures range from the low 60s and 70s °F (15 to 21 °C) in the summer, to the single digits and low teens °F (-17 to -7 °C) in the winter (BLM 2011a).

2.2.2.3 Trends

GHGs are necessary to life as we know it, because they keep Earth's surface warmer than it otherwise would be. However, as the concentrations of these gases continue to increase in the atmosphere, Earth's temperature is climbing above past levels. Continuing a long-term warming trend, globally averaged temperatures in 2017 were 1.62 °F (0.90 °C) warmer than the 1951 to 1980 mean (NASA 2018), and second only to global temperatures in 2016. Global temperatures in 2017 were also the third consecutive year in which they were more than 1.8 °F (1.0 °C) above late nineteenth-century levels. IPCC concluded that "warming of the climate system is unequivocal" and "It is extremely likely that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in greenhouse gas concentrations and other anthropogenic forcings together" (IPCC

2013). Other aspects of the climate, such as rainfall patterns, snow and ice cover, and sea level, are also changing.

Climate change modeling predictions show that the ecoregion is expected to undergo general warming over the entire region, with the greatest warming occurring in the southern portion of the ecoregion and with average winter temperatures increasing more than average summer temperatures (Bryce et al. 2012). Climate change modeling predicts up to a 1.08 °F (0.6 °C) increase (2015 to 2030) and 1.8 °F (1 °C) increase (2045 to 2060) in average summer temperatures in the northern portion of the ecoregion and up to a 1.44 °F (0.8 °C) increase (2015 to 2030) and 2.16 °F (1.2 °C) increase (2045 to 2060) in the southern portion of the ecoregion (Bryce et al. 2012).

Precipitation is expected to decline throughout much of the year during the 2015 to 2030 time period (with the exception of a couple months in the fall), with severe drought likely to occur in some areas. The 2045 to 2060 time period would remain drier (or comparable to historic conditions) during most of the year, but sporadic wetter months (e.g., February, June, and October) could result in overall increases in annual precipitation in some areas (Bryce et al. 2012).

Appendix 1, Map 2 shows the long-term potential for climate change within the Colorado Plateau Ecoregion. The Escalante Canyons Unit shows moderate-low to moderate potential for long-term climate change. The Kaiparowits Unit shows mostly moderate potential with some areas of moderately low, moderately high, and very high potential. Potential for long-term climate change in the Grand Staircase Unit is predominantly moderate, but some areas show very high potential. Areas outside GSENM range from moderate-low to very high.

Overall, the southern portion of the ecoregion is expected to experience more extreme long-range climate change effects than the northern portion of the ecoregion. This is because the northern portion of the ecoregion is north of the influence of the summer monsoon; it may also be considered transitional to the mid- and northern latitudes, where climate change predictions may differ from those for the southwestern region (Bryce et al. 2012). Some models predict that winters in mid-latitudes will be wetter as well as warmer (Miller et al. 2011).

2.2.2.4 Forecast

If atmospheric levels of GHGs continue to increase, climate models predict that the average temperature at Earth's surface could increase from 0.5 to 8.6 ºF by 2100 (IPCC 2013). Results from the National Oceanic and Atmospheric Administration (NOAA) technical report on regional surface climate conditions in the Coupled-Model Intercomparison Project phases 3 and 5 similarly show that the simulated median of annual mean temperatures in the U.S. Southwest for the period 2041–2070 could range from 3.3 to 6.1 °F warmer compared to the 1971–2000 period (NOAA 2015). Scientists are certain that human activities are changing the composition of the atmosphere, and that increasing the concentration of GHGs will change Earth's climate. However, they are not sure by how much it will change, at what rate it will change, or what the exact effects will be.

Coupled with unknown rates of temperature changes are unknown rates of precipitation change. It is not known whether precipitation will contribute to or detract from such things as plant growth and changes in plant compositions. One forecast shows median simulated change

in mean precipitation may vary from -1.0 to 7.3 percent in the winter, -0.6 to -9.9 percent in the spring, -8.6 to 3.2 percent in the summer, and -2.9 to 0.6 percent in the fall (NOAA 2015).

2.2.2.5 Key Features

Climate change is an aspect that is difficult to address on a regional or national level, let alone at a local level such as the Planning Area. Key features of the Planning Area are vegetation and potential resource development. BLM should make a constant and consistent effort to maintain vegetative communities in good vegetative and soil health. Healthy soils and vegetation, particularly woodlands and forests, are important in storing carbon and preventing its release into the atmosphere. Unhealthy soils and plant communities—with large amounts of vegetation that is either overused and lacking productivity or, conversely, underused and high in oxidized material—cannot store but instead release carbon into the atmosphere. A second aspect to maintaining healthy vegetative communities is their inherent resistance to uncharacteristic wildfires. Resource development activities such as mining or oil and gas may contribute to climate change.

2.2.3 Cultural Resources

Cultural resource is a broad term that encompasses numerous categories of historic properties, sacred Native American sites, and resources of tribal concern. Under the National Historic Preservation Act (NHPA), historic properties are defined specifically as sites, buildings, structures, objects, and districts that are included on or that are eligible for inclusion on the National Register of Historic Places (NRHP). The term cultural resource is not defined in NEPA, but it requires agencies to consider the impacts of their actions on all aspects of the human environment, including the cultural environment.

Examples of cultural resources are prehistoric and historic archaeological sites, artifacts; residential and commercial buildings; structures, such as bridges, roads, railroads, irrigation ditches, and historic trails; objects, such as roadside markers, monuments, signs, and sculptures; and historic districts, which may encompass one of more of these resource types in a concentrated, geographically definable area. Cultural resources can be significant in the context of national, regional, or local history, architecture, archaeology, engineering, or culture. They may also include sacred sites and natural features significant to extant communities or peoples.

In general, prehistoric resources are those that predate Euro-American contact and therefore are associated with cultural activities that occurred before European settlement in the New World. Historic resources are those that follow the period of European settlement. This period began with the establishment of Euro-American settlement and thus varies in origination date by specific region. Ethnographic resources are those that are directly associated with the cultural practices and beliefs of living cultures.

Also included under cultural resources are traditional cultural properties (TCPs). The National Park Service (NPS) defines TCPs in National Register Bulletin 38 as “districts, sites, buildings, structures, or objects that are eligible for inclusion in the [NRHP] because of [their] association with cultural practices or beliefs of a living community that (a) are rooted in that community’s history, and (b) are important in maintaining the continuing cultural identity of the community” (Parker and King 1998).

Other Federal legislation, such as the Archaeological Resources Protection Act, Native American Graves Protection and Repatriation Act of 1990, and American Indian Religious Freedom Act of 1978, also require the Federal government to protect various cultural resources. The American Indian Religious Freedom Act requires the Federal government to consider the effects of their actions on resources and practices that may not meet the definition of a historic property under the NHPA.

The NPS (1998) provides additional cultural resource categories in its *Cultural Resource Management Guidelines*, including archaeological resources, cultural landscapes, structures, museum objects, and ethnographic resources. These NPS guidelines also acknowledge the primacy of the NHPA and NRHP in meeting its Federal obligations. "Cultural resources" may be used as a broad term, irrespective of their NRHP listing or eligibility; nevertheless, "historic properties," as defined in the NHPA (36 CFR 60), is used when discussing cultural resources that have been determined as eligible to the NRHP. Furthermore, when comparable classes of cultural resources are discussed, both terms—NHPA/NRHP and NPS definitions—are used together. BLM and other Federal agencies generally use the definitions for historic properties and NRHP eligibility (36 CFR 60 and 800) when considering cultural resources on the lands they manage.

Additional information is included in Appendix 2. A map of known cultural resources and historic trails is contained in Appendix 1, Map 3.

2.2.3.1 Indicators

This section describes the condition of historic properties in the Planning Area. The understanding of these historic properties serves as the baseline for analysis, including determining the impacts of the various alternatives on resources. Resource descriptions are depicted only in as much detail as needed to analyze the effects of the proposed actions.

The proclamation establishing GSENM noted various cultural resources and historic properties in the new monument. One such example is prehistoric Anasazi and Fremont (also known as Ancestral Puebloan) culture archaeological sites, such as rock art panels, campsites, and granaries. Other examples are the Dance Hall Rock National Historic Site, which continues in its importance to local ranchers and Mormons to this day, and the route and associated sites from the John Wesley Powell Expedition. Additionally, the proclamation notes the significance of the "early Mormon pioneers [who] left many historic [remains], including trails, inscriptions, ghost towns such as the Old Paria townsite, rock houses, and cowboy line camps, and built and traversed the renowned Hole-in-the-Rock Trail as part of their epic colonization efforts" (Proclamation 6920, GSENM).

This essentially recognizes the role of GSENM as a steward in preserving a record of more than 10,000 years of human presence, adaptation, and exploration in the monument, as exemplified by archaeological and historic sites, cultural landscapes, and potential TCPs. These cultural resources illustrate the connection of people with the landscape of the GSENM region and remain significant places for many descendant communities. They provide opportunities for people to connect with cultural values and associations that are both ancient and contemporary.

BLM must consider the impacts of its actions, in accordance with the criteria of adverse effects; these are defined as "direct or indirect alteration of the characteristics that qualify a [historic]

property for inclusion in the NRHP in a manner that diminishes integrity of location, design, setting, materials, workmanship, feeling, or association" (36 CFR 800.5(a)(1)). BLM follows the guidance of the NHPA, as detailed in BLM Handbook Series 8100, and evaluates cultural resources using the NRHP criteria.

A historic property must have integrity in all or some of the seven aforementioned aspects—location, design, setting, materials, workmanship, feeling, and association—and be listed on, or eligible for listing on, the NRHP under one or more of the criteria listed below (36 CFR 60; NPS 2002):

- Criterion A—Association with events important in local, regional, or national history
- Criterion B—Association with lives of important historical persons
- Criterion C—Displaying the characteristics of a specific type, period, or method of construction, the work of a master, possessing high artistic value, or being part of an entity whose components lack individual distinction (such as a historic district)
- Criterion D—Having yielded, or being likely to yield, information important in prehistory or history

2.2.3.2 Current Condition

Paleoarchaic/Paleoindian Period (10,000–5500 BC)

The arrival of the earliest humans on the northern Colorado Plateau, commonly referred to in the literature as Paleoindians, has always been a topic of considerable fascination to both professional researchers and casual observers. Until relatively recently, most archaeologists denied the presence of early humans on the Colorado Plateau, citing the paucity of Pleistocene megafauna that could have been exploited by the earliest big game hunters. As late as the 1960s, Jennings argued that "probably because of aridity and a dearth of the big game animals, the classic big game hunters of the Plains…are not found west of the Rockies." Since that time, however, archaeologists and paleontologists have documented not only a significant catalog of extinct Pleistocene faunal remains in the region, but distinctive artifacts typically associated with the hunting of extinct and modern fauna present during terminal Ice Age times (Janetski et al. 2012).

In recent years, archaeologists have come to recognize two different big game hunting traditions: the Paleoindian, which features a lithic tool kit similar or identical to that utilized by big game hunters on the Great Plains and Southwest (east and south of the Colorado River), and Paleoarchaic, which is characterized by regionally distinct tool kits and a broader-based subsistence strategy that is evident in regions west of the Front Range of the Rocky Mountains. The GSENM area is located entirely within the spatial range of Paleoarchaic adaptations in the Intermountain West, although small numbers of Paleoindian artifacts characteristic of the Great Plains complexes have also been identified here. In this overview, we recognize that two different big game hunting traditions might have utilized the region concurrently and might even have interacted with one another.

In brief, Paleoindian groups with distinctive lithic technologies moved west from the Plains into the Rocky Mountains and northern Southwest, exploiting herds of late-Pleistocene mammals who might have been tethered to riverine systems. Paleoarchaic groups moved southeast out of the Columbia Basin into the Great Basin where they exploited environments around what was left of Lake Bonneville, adopting a broader-based subsistence strategy that included large

and small mammals, birds, and plants. Some researchers see continuity between Paleoarchaic and early Archaic adaptations in the region. Both traditions apparently interacted in the Intermountain West, as evidenced by Plains-style points at Paleoarchaic sites.

While the human occupation of the Southwest may span up to 13,500 years, archaeological knowledge of the Planning Area's earliest prehistory remains limited—although surface finds have been identified. The presumed timeline for the Paleoindian/Paleoarchaic Period varies, depending on the researcher, but it is generally considered to span from 10,000 BC to 5500 BC. This period represents the first well-documented presence of human populations in North America, although there is growing acceptance of data indicating earlier occupations in other areas. The Paleoindian/Paleoarchaic Period is typically divided into three sub-periods, each equated with widespread cultures or complexes—Clovis (10,000 to 9000 BC), Folsom (9000 to 8000 BC), and Late Paleoindian (8000 to 5500 BC). The Clovis culture represents the earliest, widely accepted occupation of North America, although compelling evidence for a pre-Clovis presence is now beginning to emerge.

The natural environment during the Paleoindian/Paleoarchaic Period and the Late Pleistocene/Early Holocene were characterized by environmental change, with glaciers that had covered much of North America retreating in previous millennia. There were great fluctuations in climate and in distributions of plants and animals that are now extinct. The effects of deglaciation in southern Utah were undoubtedly profound. At North Creek Shelter, located in the GSENM area at the upper edge of the pinyon-juniper zone today, the local environments were considerably wetter during Paleoindian/ Paleoarchaic times. These supported mixed forests of aspen, spruce, and firs, as well as subalpine grass lands and wet meadows, all environmental characteristics found today at much higher elevations (Janetski et al. 2012: 151; see also Newbold 2009). According to paleoenvironmental data from other regional alcove sites, the northern Southwest was probably a sagebrush-steppe with a riparian community near the streams and rivers during late Pleistocene times.

The human use model of this landscape is that people crossed large expanses of land as highly mobile, nomadic hunter-gatherers, manufacturing and using sophisticated tool kits for hunting, butchering game, and processing hides and bone. Paleoenvironmental data indicate that the earliest specialized artifacts, such as fluted projectile points, appeared after a period of increased moisture, when there was more surface water in the Southwest than there is today.

Paleoindian/Paleoarchaic lithic technological organization is typically understood as employing a curated versus expedient behavioral strategy tied to a highly mobile lifestyle (Bamforth 1986; Binford 1979). Curated behavior involves conserving high-quality raw material from distant sources in anticipation of future need and preparing materials ahead of time so that time spent in tool manufacturing is minimized. Therefore, tools within curated strategies are easily transported, reliable, and carefully designed to fulfill multiple future tasks. Paleoindian lithic toolkits generally consist of distinctive lanceolate spear points made of high-quality raw material from disparate sources, atlatls or "spear throwers," bifaces, and scrapers.

Paleoindian/Paleoarchaic sites are rare, in general, and none have been recorded in the Decision Area, although isolated finds have been identified. There is evidence of megafauna in the region, including mammoths; however, there are no data that support exploitation of this resource by Paleoindian/Paleoarchaic peoples in GSENM. Instead, occasional surface finds of large, stemmed points and rarer finds of both Clovis and Folsom fluted projectile points are the only indications of Paleoindian/ Paleoarchaic occupations or activities that have been

documented. These projectile points can be diagnostic or presumed to be representative of association with cultural complexes in the Paleoindian/Paleoarchaic Period, based on their shape and manufacture; however, the occurrence of these points does not necessarily provide conclusive evidence of Paleoindian/Paleoarchaic activities at the location of the discovery. Later groups, such as those from the Archaic Period, are known to have curated and reused artifacts from other areas and temporal associations. Prehistoric trade is also documented and may obscure the geographic and archaeological record (McFadden 2012).

As noted by Spangler et al. (2018), "It cannot be stated with certainty when the last Paleolithic hunters were present in southern Utah, but evidence from North Creek Shelter suggests their stemmed point tradition had been replaced by Pinto series dart points and groundstone tools by about 7000 BC. An Archaic lifeway characterized by an expanding diet-breadth and wider flexibility in resource-oriented subsistence patterns was evident throughout the region by this time, and it became ubiquitous by 6000 BC. The earliest Archaic hunters and gatherers might have coexisted with Paleoarchaic hunters before the later moved on, or the last of the Paleoarchaic hunters might simply have adapted their subsistence patterns to drier Holocene environments, relying more on hunting, trapping, and snaring small game and gathering more predictable plant foods, including small seeds."

Archaic Period (6000 BC–1000 BC)

During the Archaic Period (6000 BC to 1000 BC), there was a continuation of mobile hunting and gathering, but a shift toward a more generalized subsistence base than in the preceding Paleoindian/Paleoarchaic Period. This broadening of diet breadth was likely necessitated by the decline in the abundance of large-bodied game. Archaic groups generally exploited a wider range of environmental settings, but within more geographically restricted areas. Archaeological evidence indicates that mobility was seasonal and tied to the density and distribution of key plant resources across the landscape.

The expansion of diet breadth, which included a greater reliance on plant foods and small game, is reflected in Archaic technology. This is exemplified by grinding slabs, milling stones, various forms of basketry, roasting pits, storage features, various notched and shouldered dart points, and items associated with small-game procurement, such as snares and nets. Although settlement patterns are diverse in the Southwest, Archaic sites are generally small and seasonal. They include both base camps and limited activity or logistical sites, commonly characterized by hearths, roasting features (evidenced by fire-cracked rock), ground-stone tools, and sometimes pit structures. One probable residential pit structure has been identified on GSENM (McFadden 2000, 2012).

There is abundant evidence that, by 6000 BC, Archaic hunting and gathering occurred throughout the northern Colorado Plateau, most of it derived from deposits in alcoves, caves, and rock shelters. Hunting and gathering remained the predominant subsistence strategy, but with periods of greater and lesser intensity, until 3,000 years ago when limited agriculture was first added to a foraging lifeway in some but not all areas of GSENM. Based on a growing corpus of radiocarbon dates from the region, there is no convincing evidence of long cultural hiatuses during the Archaic, nor is there convincing evidence of major changes in hunting and gathering strategies through time. In fact, site types, site complexity, and spatial patterning remain remarkably uniform throughout the Archaic (Spangler et al. 2018).

The Archaic Period encompasses a long span of time that is characterized by an emphasis on a hunter-gatherer subsistence lifeway. It is seen as an adaptation to a wider use of plants and other animals after the extinction of the Late Pleistocene megafauna and the evolution of environments that are closer to modern conditions. During this period, the climate in the Southwest continued to fluctuate, but ultimately it trended toward a drier pattern, with monsoons and concurrent changes to local and regional ecology. Archaeological evidence from throughout the region indicates that hunter-gatherers increasingly relied on locally available resources and a diverse range of fauna and flora.

The material culture of the Archaic provides evidence for this shift in resource exploitation. These adaptations, in contrast with the Paleoindian Period, include the following:

- Greatly altered and diverse projectile point styles
- Relatively numerous items associated with plant food procurement and processing, such as grinding slabs, milling stones, various forms of basketry, roasting pits, and storage features

The contrast between Paleoindian/Paleoarchaic and Archaic technology undoubtedly results from a variety of factors, including varied subsistence orientations, different activities associated with sites in more diverse locations, and differential artifact and site preservation (Fairley 1989:89). Diagnostic tools and projectile points, along with obsidian hydration and radiocarbon dating, provide the most conclusive identification and temporal placement of any prehistoric archaeological site, including those from the Archaic. Site depositional characteristics, their location on landforms, habitations, such as pit structures, and sandal and basketry construction also assist in identifying Archaic sites.

Researchers commonly divide the Archaic Period on the Colorado Plateau into the Early, Middle, and Late Phases, although some researchers have proposed one long, continuous phase, or as many as seven phases. Within the various phases, there are many perspectives among researchers regarding point typologies, specifically whether technologies found in the archaeological record represent different cultural traditions or different patterns of group mobility.

Archaic sites are well represented in the region that encompasses the Planning Area; however, diagnostic projectile points from the early and middle intervals are relatively scarce on GSENM (BLM 2008b). Early Archaic sites (approximately 6000 to 3500 BC) have mostly been classified as short-term campsites. Broken Arrow Cave, an Early Archaic site, was excavated in an alcove near modern-day Wahweap Bay of Lake Powell, outside of GSENM. Artifacts found at the Broken Arrow Cave include portions of sandals, yucca cordage, and plant processing tools (Talbot et al. 1999; Spangler 2001).

Middle Archaic Period sites dating from 3500 to 2000 BC are relatively scarce in the Planning Area; however, radiocarbon dates from sites on the Kaibab Plateau and in Glen Canyon indicate a Middle Archaic presence. These sites appear to represent small seasonal hunting or plant-processing camps (Spangler 2001:416–417).

Late Archaic sites are more abundant when compared with the earlier periods, suggesting an increase in population from the Middle Archaic. Late Archaic point types, such as Gypsum points, are relatively common in the Planning Area, indicating that a broad diversity of microenvironments were in use by that time. In fact, a buried Late Archaic residential site has been identified in an alluviated canyon bottom in the Grand Staircase physiographic province

(McFadden 2012). Rock art diagnostic of at least the Late Archaic includes Barrier Canyon and Glen Canyon Linear styles.

Early Agricultural (1500 BC–AD 700)

The Early Agricultural Period spans the end of the Late Archaic, generally from about 1000 BC and into the Basketmaker III Period (400 to 700 AD). It represents a transition from a completely hunter-gatherer lifeway to adopting self-sustaining agriculture. Basketmaker II sites, on occasion, contain the earliest forms of pottery in the Southwest, which, among other things, allowed for storage and greater processing of maize and other early cultivated plants. However, ceramics were not commonly and widely adopted until the following Basketmaker III Period.

Over the past several decades, archaeologists have presented three models for the origins of agriculture in the northern Southwest. The first model for the origins of Colorado Plateau agriculture suggests in situ Archaic populations integrated maize technology through a steady process of diffusion. The transition to agriculture was the result of Archaic populations obtaining agricultural knowledge and adopting farming. Under the diffusion scenario, the transfer of technology to hunter-gatherer groups may occur through the exchange of marriage partners or through fluid band membership (Terlep 2012).

The second model for the development of maize agriculture proposes that groups from the southern Basin and Range, possibly the San Pedro Cochise, migrated north and dispersed across the Colorado Plateau. Similarities between San Pedro Cochise and Basketmaker II pit structures and material culture support the migration model. In addition, supporters of the migration model suggest that the Colorado Plateau was only sparsely populated during the Late Archaic and Terminal Archaic Periods. According to this model, the process of agricultural diffusion, therefore, would not have been feasible, given the low populations on the Colorado Plateau (Terlep 2012).

A third model involving both in-migration and diffusion may also be possible, with maize technology diffusing to Archaic populations from a migration of San Pedro Cochise culture bearers. Under this model, based on linguistic and mitochondrial DNA evidence, there was a migration from the Great Basin east and south at approximately 7000 BC. Migrants began to occupy northern Arizona, while others continued south into northern and central Mexico. This model argues that with the advent of maize farming in central Mexico, around 4000 BC, the group-to-group diffusion of agricultural technology into the American Southwest occurred rapidly through a similar language family (Terlep 2012).

Empirical data suggest the early Basketmakers employed a semi-sedentary subsistence strategy, relying on a mix of maize and foraging. Basketmaker habitations had open air and sheltered subterranean storage cists and pit houses. Basketmaker sites are difficult to discern from earlier Archaic sites, because the botanical evidence from this period rarely survives in open sites. Sheltered sites, such as alcoves, have a better chance of preserving perishable materials, such as pollen and organic artifacts.

Evidence from the Arizona Strip demonstrates that, before they shifted to upland dry areas, Basketmaker populations incorporated floodwater and sub-irrigation techniques for cultivation in the alluvial flats, near the Vermilion Cliff drainages. Terlep (2012) provides a detailed synthesis of archaeological scholarship that indicates Basketmaker II populations began to incorporate dry farming strategies before the advent of pottery.

Early Agricultural Period sites provide significant evidence for many hypotheses surrounding this period; specifically, they show that by the end of Basketmaker II, local populations were full-time farmers. They had all of the advantages—permanent shelter, stable food source, increasingly complex social life—and many of the disadvantages of this more sedentary and agricultural lifestyle—poor dental health and common presence of certain deficiency diseases (Zweifel et al. 2006). The Early Agricultural Period is the stage during which mobile hunters and gathers became more sedentary and, presumably, more socially complex.

Formative Period (100 BC–AD 1250)

Under McFadden's (2016) chronology for the area, the Formative Period (100 BC to AD 1250) overlaps the end of the Basketmaker II Period. The Formative Period is characterized by the practice of agriculture, construction of substantial dwellings, development of long-term storage facilities, and eventually, wide-scale production of pottery. Two separate, archaeologically defined, Ancestral Puebloan cultures are recognized in the Planning Area: the Anasazi and the Fremont (McFadden 2016). These cultures have much in common with one another; however, they are separable, based on their material culture, the geographies they occupied, and their distinctive adaptations to the unique environments found throughout the Planning Area. D'Andrea (2015) has documented aboriginal burning practices apart from natural fire regimes in both the Grand Staircase and Kaiparowits Plateau provinces.

The Fremont occupied much of northern Utah. In the study area their material culture extended south to the Pink Cliffs of the Grand Staircase, on to portions of Kaiparowits Plateau and into the Escalante drainage basin. Based largely on their use of the Emery Gray ceramic type, they have been assumed to be an extension of the San Rafael Fremont. The long sequence of dates in the Planning Area strongly suggests that Fremont occupation in the Escalante drainage represents a long-lived local adaptation that began in the Archaic Period and continued as an identifiable entity until contact with the Anasazi during Pueblo II times.

The Virgin Anasazi occupied the Grand Staircase physiographic section of GSENM and portions of Glen Canyon. Their communities are well documented in a wide range of environments in the St. George Basin, southeastern Nevada, and the Arizona Strip (McFadden 2016).

The two groups shared several important traits, including architecture, agriculture, and ceramics. There were also marked differences in their adaptations that clearly distinguish the two cultures. The Virgin Anasazi were agriculturalists that practiced residential mobility. Full-time farmers, they apparently moved farmsteads frequently in response to changing conditions, possibly including resource availability, condition of arable lands, insect infestations, and short- and long-term climatic fluctuations. Virgin Anasazi architecture shows farmsteads and structures that were repeatedly occupied, abandoned, reoccupied, and modified.

Typical farmstead layouts have a residential structure such as a pithouse, or surface residence constructed of masonry or waddle-and-daub, with associated, onsite storage for surplus foods. Cliff-side granaries were often utilized as offsite storage locations, and were apparently supplemental to onsite storage. Alcoves and overhangs were commonly used for granary locations, but very rarely were these used for residential structure locations. Kivas, while common to adjacent Anasazi groups such as the Kayenta and Mesa Verde Anasazi, are found only in a very few locations in the Grand Staircase, and then apparently only in associated with an influx of Kayenta culture-bearers in the early to mid-1100s. Early ceramics were of a plain

type, not decorated with painted designs or corrugation. As time progressed, black-on-white decorations became more common and elaborate, and corrugation was added about AD 1050. Locally produced redwares (ceramics intentionally fired to a brick red color) did not appear until the mid-1100s, although similar redwares were a common trade or import item prior to that time.

It has been proposed that the Fremont, by contrast, practiced seasonal mobility, moving into the watered valley bottoms or spring locations in the summer to farm, and then returning to the uplands in the winter, moving out of the shaded and colder areas to take advantage of better solar exposure and such resources as big game and firewood. Fremont residential sites typically had a well-constructed pithouse, but lacked onsite food storage. Instead, the Fremont made extensive use of isolated granaries in remote canyon locations. This is likely a response to the seasonal mobility, where one would not want to leave a house and its associated onsite stored food unguarded for months at a time, open to predation by animals or other humans. Fremont pottery in the GSENM area was plain gray throughout the Formative Period, and was never corrugated or decorated with painted designs.

There are indications in the eastern portions of the Kaiparowits Plateau, the Escalante River, and in the Grand Staircase of possibly a third agricultural group, the Kayenta Anasazi. Pueblo II Period Virgin pottery decorations begin to mimic those found in the Kayenta region to the south and east of the GSENM area across the Colorado River. As noted above, a small number of kivas appear in the Grand Staircase area in the mid-1100s. Kivas were a significant part of most residential or communal Kayenta site layouts, but the idea apparently never took hold in the Virgin Anasazi area. McFadden (2016) suggests an influx of Kayenta traits, possibly representing a migration of Kayenta culture bearers, into the Virgin Anasazi area in the early 1100s, and that within a few decades these Kayenta traits (and potentially individuals) had been absorbed into the Virgin Anasazi cultural traditions. Some, such as pottery decorations and Bull Creek projectile points, caught on, while others, such as kivas, did not. The architectural differences between the sites on Fiftymile Mountain, the Virgin Anasazi sites to the west, and the previous Fremont sites are significant enough that some researchers see these as evidence of what might be considered a distinct cultural group. Traits from the Anasazi groups and Fremont were re-mixed to an extent, with these people utilizing the best of the different cultural adaptations from the three groups. However, this phenomenon was relatively short lived, and by the mid-1200s or slightly later both the Anasazi and local Fremont cultures had disappeared from north and west of the Colorado River.

Post-Formative Period (AD 1250–1500)

The Post-Formative or Late Prehistoric/Protohistoric Period refers to the time after the exodus of the Ancestral Puebloans. Based on the existing archaeological record, the agricultural system on lands in the Planning Area seems to have ended sometime during the mid to late AD 1200s. This is roughly concurrent with a period of change throughout the Southwest that has been attributed to prolonged drought, high population levels, an extreme local climate downturn, or changes in adaptive behavior. Possibly as early as the AD 1300s, but certainly by AD 1500, there is evidence for a general abandonment of agriculture, decreased population, and return to hunting and gathering lifeways (McFadden 2016).

Numic speakers expanding into the region constitutes an additional hypothesis for the Ancestral Puebloan depopulation of the Arizona Strip. Whether aggression from new groups in

the region factors into this Ancestral Puebloan depopulation remains unknown. Nevertheless, the southern Numic speakers remained in the region throughout this period. Southern Paiute bands are the probable descendants of Numic speakers and Ancestral Paiutes in or near the study area.

The prehistoric Southern Paiute had a mobile hunter-gatherer lifestyle that followed the seasonal rounds of plants, animals, water, and material availability. Family groups would aggregate into larger bands, in response to late summer pinyon nut harvests, communal rabbit drives, and big game hunts. Then they would split again into smaller extended family units and disperse in the winter to their base camps. Surplus foods were cached and recovered as necessary later. Horticulture was very limited. Gardens might be planted in the spring and left untended until harvest time or were tended by older persons while the balance of the band was hunting and foraging (BLM 2008). Recent investigations have documented Late Prehistoric bean farming in Johnson Canyon, within the Grand Staircase (D'Andrea 2015).

Architecture was limited to brush shelters, lightly constructed in the summer and heavier and more durable in the winter. Basketry was highly developed, and although some ceramic vessels were constructed, their use remained secondary. Heavy items such as metates (grinding stones) might be cached at various locations. Distinctive projectile points, ceramics, and basketry are good indicators of Southern Paiute archaeological sites in the study area.

Basketry constituted the most developed technological product of the Southern Paiute, although brownware ceramics were also crafted. The construction of Numic basketry consists of a mixed twined and coiled technique (Fairley 1989:150–151). Southern Numic hunting tools include desert side-notched projectile points, reused Puebloan points, and possibly fire-hardened wooden points. Seasonal camps of the Southern Paiute consist of conical brush structures, rockshelters, and possibly the remains of Ancestral Puebloan structures. Few early Numic structures are currently identified in the Arizona Strip (Fairley 1989:151–152). None are known within the GSENM area.

Recent studies have shown that most of the obsidian on the Grand Staircase came in two waves, one in the Archaic and the second during the Late Prehistoric. Obsidian is sometimes found on apparent Formatives sites, but hydration dating suggests that this obsidian is most often associated with Archaic or Late Prehistoric use of the same location. Obsidian recovered from Formative contexts sometimes shows both Formative and Archaic dates, indicating curation of obsidian dropped or lost by the earlier Archaic users. The Archaic materials represent a much broader ancestral native tradition and cannot be attributed to any one group; the Late Prehistoric materials are likely attributed to the Paiute or ancestral Paiute (Zweifel 2008a).

Historic Period (1829–1950)

The historic period in the GSENM area is characterized by relatively late settlement performed mostly in conjunction with the Mormon pioneers. Previous incursions by Euro-Americans included the 1829–1830 original version of the Old Spanish Trail, blazed by Antonio Armijo, who wanted to establish a trade route between the New Mexico settlements and those in California. The trail Armijo and company used proved to be a torturous route that crossed many miles of canyon country between Abiquisi (now Abiquiu), New Mexico, and San Bernardino, California. So rugged was this route that it was used only for the first round trip, with later versions adding many miles to circumvent the canyon country by a more northern route.

Armijo's journal is brief and rather cryptic, and does not include much in the way of description of the countryside or peoples encountered. He does mention seeing a few "Payuche" (Paiute) natives, who were considered "timid and docile" (Warren 1974). It should be noted that, by this time, the local Paiute peoples had already been subject to slaving raids by neighboring tribes.

An earlier excursion by Fathers Dominguez and Escalante, in 1776, had tried but failed to establish a trade route similar to the Old Spanish Trail. Their route went both north and south of the GSENM area, but did not actually cross it. Their fording of the Colorado River took place at what became known as the "Crossing of the Fathers," which was also used by Armijo more than 50 years later—"December 6, 1829, to the Crossing of the Fathers, we recognized the ford and found it in good condition. Three people who were crossing the river saw fresh tracks of three people and they followed them until dark without catching anyone."

There was little other Euro-American presence in the area until the late 1850s and early 1860s, when Mormon pioneers began settling the Kanab, Panguitch, and Long Valley areas, and the Escalante area in the 1870s. Mormon settlement was directed to a large extent by the Latter Day Saints (LDS) Church, and was based around planned communities and a large degree of communal support. Livestock grazing quickly became an important part of local lifeways, but in a planned and church-controlled context that differed significantly from the typical picture (since promoted by Hollywood) of the rugged independent rancher facing outlaws, hostile natives, and encroaching settlers and farmers. The GSENM area was settled on and by direction from the church, but shaped by grazing. This and much of the following information is condensed from Spangler and Holland (2018).

In response to increasing pioneer populations and a related decrease in available arable and irrigable lands, and pushing out from communities such as Cedar City and St. George, settlers encountered the "sea of grass" that was the Arizona Strip, and before long began settling the Kanab area. By 1863, local Arizona Strip rancher James Whitmore was running more than 11,000 sheep and 500 head of cattle; this figure is noted here to help envision the numbers of livestock that moved relatively quickly into the area. By the 1870s, a new generation of Mormon young men were coming of age and needed to expand into adjacent areas in order to establish their own farms. Many of these young men had served in the Blackhawk Wars and had ridden far into previously unexplored country, and noted its potential for settlement. As these men and their families moved into recently discovered arable enclaves, they became the first settlers of the Garfield County area.

The period of the 1870s to the 1890s was characterized by rapid population growth within the GSENM area. In 1870, the Kanab Census Precinct noted a population of 72 individuals, and none in the Garfield County area (then part of Iron County). By 1880, there were 1,396 persons in Kane County and 1,715 in what would become Garfield County. In 1890, the numbers had risen to 1,685 in Kane County and 2,457 in what was by this time Garfield County.

During this period, the LDS Church also experimented with church cooperatives and later the United Order, where all property was to be held in common. This included livestock, and the open range was subjected to large communal herds of both sheep and cattle. The LDS Church quickly became the largest grazing operator in the area. By the late 1870s, the herds had attracted some degree of the outlaw element, although mention in the local news of these activities was minimal. The cooperatives and the United Order had by the 1890s been disbanded, as they proved largely unpopular in most communities. Ranching, especially in the

more isolated Garfield County area, then turned to family and private operations, although some very large ranching operations were taking shape, particularly on the Arizona Strip.

By the 1890s, there were herds of hundreds of thousands of livestock, primarily sheep and cattle, grazing over Kane and Garfield Counties and the adjacent Arizona Strip. The large numbers of livestock, in conjunction with severe droughts in the 1870s, had reduced the once-lush "sea of grass" to a severely overgrazed rangeland. As early as the 1860s, Mormon Apostle Orson Hyde lamented, "I find the longer we live in these valleys that the range is becoming more and more destitute of grass; the grass is not only eaten up by the great amount of stock that feed upon it, but they tramp it out by the very roots; and where the grass once grew luxuriantly, there is now nothing but desert weed, and hardly a spear of grass is to be seen." Regarding range conditions in 1903, Garfield County resident Lenora LeFevre wrote "The once rich meadows on the [Boulder] mountain had turned to dust beds. Herds of sheep were bedding along the streams and dying along the banks. Bones of cattle bleached on dry benches. The cattle lingered around the mud holes. Those in weakened condition would flounder in the mud and die. Poison weeds that grew after the better feed was gone added to the death toll of the starving cattle."

The decades between the 1890s and the early 1930s saw increasing attention to the problems of overgrazing. Cattlemen tended to place blame on sheep, who grazed the grass down to stubs; some even claimed the sheep had "poisonous" breath that would kill the grass. Others blamed the cattle outfits that ran tens of thousands of head with no regard for what the range could handle. At this time the lands were open range under the jurisdiction of Congress, and individual herdsmen, needing to act in their own interest in an unregulated environment, ran as many cattle and sheep as possible. The first Federal attempts at Federal land management were headed by the Forest Reserve Act of 1891, although it was not until 1896 that the concept of "leasing" Federal lands to ranchers came into play. Throughout the early 1900s, actual management was sparse due to the difficulties of enforcement in a very rural environment, but some large-scale ranchers took their herds and moved elsewhere rather than pay government grazing fees. Although public opinion was divided, most local ranchers agreed that the passage of the Taylor Grazing Act of 1934 was long overdue; local ranchers now had to obtain government permits and pay fees to graze on allotted sections of range, but they had control over who grazed that portion of land. The days of "first come, first served" were largely over.

Most historic sites scattered across the GSENM area deal with ranching. These include historic stock trails, fence lines, range improvements, roads, corrals, and the occasional line shack. Settlements within what is now GSENM were rare, with the Pahreah (now Paria) townsite being the best example. Flooding and erosion along the Paria River has erased most of the old town, which was established in the 1860s but largely abandoned by the 1890s due to repeated flooding of the river. Little remains of the townsite today. Mining sites are not common across most of the GSENM area, although small-scale coal mines and at least one manganese mine are known. Uranium mining in the late 1950s and early 1960s had a brief flurry of activity in the Circle Cliffs area; several such mines and associated features have been documented. The Civilian Conservation Corps work in the area included roads and water (erosion) control features and an occasional corral, some of which are still apparent today.

General Conditions

In general, historic properties across the Planning Area are in nearly stable condition, but most suffer from exposure to natural erosive forces. The condition of very few sites could be said to be improving or likely to improve, as by their very nature archaeological and historical sites tend to be subject to natural erosive and destructive forces. Sites in an open setting might be subject to more rapid erosion than, for example, a prehistoric masonry granary located in a protected alcove, but in time erosion will affect most sites. Sufficient vegetation can protect sites to a degree; however, in time roots of trees can be a destructive force. The only sites that can be considered in truly stable condition are those that are buried in stable land forms, are not exposed to natural weathering, and lie below the animal burrowing zone and root zone. However, sites of this sort are almost impossible to detect using standard techniques, and estimating the number of such sites in the study area is currently impossible.

A recent study that examined the records for 293 archaeological sites located on the adjacent KFO found that 83 percent of the sites suffered from natural impacts, primarily from erosion and burrowing animals, 40 percent suffered from man-induced impacts (intentional and otherwise), and 14 percent suffered from grazing-related impacts including fence construction (Zweifel 2010). It is possible that this study does not accurately reflect current all-terrain vehicle (ATV)/OHV impacts, as many of these site records pre-date the common use of such vehicles.

A more recent study, concentrating on grazing-related impacts at GSENM sites, directly examined 719 sites through monitoring or new recordings. This study concentrated on sites that had "grazing impacts" noted on existing site forms, or were newly recorded generally in areas where cattle might tend to congregate. Of the 719 sites, 10.7 percent exhibited current grazing-related impacts (Zweifel 2016). Other impacts were noted but not quantified for that report. This study, having used on-the-ground data, is considered a more accurate reflection of current grazing-related impacts than the study mentioned above.

Overall, recent work has shown that natural impacts, generally related to erosion and, to a lesser degree, native fauna, adversely affect the largest number of sites. Second to natural processes is disturbance by man, either intentional (vandalism, looting, intentional disregard during construction or development projects) or unintentional (firewood cutting, accidental impacts during construction or development projects, recreational use, unknowingly camping on sites, ATV use across sites). Grazing-related impacts take a distant third place, but should not be ignored or disregarded.

The majority of the sites within the study area are considered "stable," as naturally occurring adverse effects cannot reasonably be avoided. Up to 40 percent may be suffering man-induced impacts on the KFO, but it is suspected that, were a similar study to be performed, this figure would be lower on GSENM and KEPA due to greater historic restrictions on off-road ATV travel, a greater Site Steward presence, and historically less recreational use of far-flung GSENM and KEPA grounds. Looting of sites, which has been considered a great risk in the past, has lessened dramatically with the advent of monument designation and associated educational and interpretive programs at GSENM. Vandalism of rock art sites has always been an issue, and was noted (along with livestock impacts) in the Kanab vicinity by Neil Judd as early as 1916 (Judd 1926). Rock art vandalism, which took an initial downturn following monument designation, has climbed recently as southern Utah in general has become the seasonal destination for ever-increasing numbers of tourists, campers, hikers, and backpackers. This

seems to indicate that the majority of vandalism problems are no longer "homegrown," but come with tourists and recreationalists.

No TCPs have been documented in the GSENM and KEPA areas, although both the Kaibab Paiute and the Navajo have claimed certain locations that would qualify as such. The Hole-in-the-Rock Trail is listed on the NRHP and is currently under consideration as an LDS TCP.

2.2.3.3 Trends

The general finding of monitoring activities and long-term association is that the majority of cultural resource sites are in a stable condition, or as stable as natural erosion conditions permit (see above). Large-scale looting of sites is becoming rare, and has not been reported in the Planning Area for many years. Smaller-scale looting, such as exploratory shovel pits, are sometimes encountered, but are limited to only a few such discoveries per year. Casual artifact collection has always been, and probably will continue to be, a problem that is very hard to address. Educational and interpretive programs offered by BLM have made a noticeable difference in local perceptions of archaeological sites, and vandalism at present seems to be largely a problem related to out-of-town and out-of-state visitors.

Certain forms of impacts have risen over the years. OHV use has proven to be destructive to sites, first because of the direct impacts of such use on cultural resource sites, and also because of the ease of access to previously distant locations that an OHV can provide. However, with greater law enforcement of off-road prohibitions, this has become much less of a problem over the course of the past 20 years. Vandalism of rock art sites, as noted above, declined for many years following monument designation in 1996, but has recently begun to climb again as southern Utah becomes an increasingly popular tourist and recreationist destination. In light of the large numbers of visitors, it is highly likely that "keeper arrowheads" and decorated and corrugated ceramic sherds will continue to disappear.

An in-depth analysis of grazing-related impacts was recently conducted on 24 grazing allotments within the study area (Zweifel 2016). Analysis showed that in all grazing allotments that had previously documented grazing impacts at cultural resource sites, such impacts had been significantly reduced over the course of the past several years. There is some question as to whether the sites were initially suffering grazing impacts or the simple presence of cattle had been recorded as an adverse impact, but a trend toward lessening grazing-related impacts is certainly suggested. This could be due to many factors, such as the possible lessening of actual grazing pressures, differential land use by cattle year to year, vegetative changes, and simple weather-related erasure of cattle use indicators over time and between seasons of use.

2.2.3.4 Forecast

Under current management, conditions will probably remain fairly constant overall, but with fluctuations in different aspects of cultural resources. Grazing-related impacts, discussed above, will likely decrease as more attention is paid to the issue and as at-risk sites are identified and impacts mitigated. Reduction or increase of numbers of livestock does not always equal reduction or increase of livestock-related impacts. However, increased stocking rates on those allotments that already show adverse effects should be done only in conjunction with increased monitoring and mitigation options.

Visitor-related adverse impacts, be they unintentional or intentional, will likely increase over time. Sheer numbers of people can adversely affect sites just by their presence as sites get

"loved to death." Casual artifact collection will continue, as will vandalism at rock art sites. Continued education and interpretation, active prosecution of those parties guilty of NHPA and Archaeological Resources Protection Act of 1979 violations, and a comprehensive and active Site Steward program are the keys to limiting such impacts. Careful planning of recreation improvements and a good Backcountry Ranger presence should also be considered mandatory.

The Special Recreation Permit (SRP) system is very active, with dozens of SRP holders operating in the Planning Area at any given time. This is unlikely to be reduced. SRP holders usually do not request visits to cultural resource sites, but those who do act as official or unofficial Site Stewards. With a forecast of increased visitation for the foreseeable future and the related potential impacts (see above), a robust SRP compliance system is essential.

Development projects, such as mining and oil and gas wells, have very limited potential on GSENM, but more favorable prospects on the surrounding and intermixed KEPA lands. Compliance with Section 106 of the NHPA will address site discoveries and mitigation or avoidance, but such development projects can affect the setting, feeling, and association (see Section 2.2.3.1, *Indicators*, above) of sites and TCPs. Rangeland management projects, such as pinion/juniper thinning and sagebrush restoration, will continue to be employed, probably more so on KEPA lands than GSENM lands. These are generally large-scale projects involving hundreds or thousands of acres, and have the potential to affect numerous sites. Continued adherence to NHPA Section 106 responsibilities will be key to preventing adverse effects on sites while implementing machine-based projects. Smaller projects, such as water catchments and pipelines, have similar impact potential but still must respond to Section 106 requirements. The ability to seek alternative locations for such projects will be needed if vulnerable sites are identified at the project location or if increased numbers of livestock will result at nearby sites.

Over the years, GSENM has successfully employed many NHPA Section 110 projects or archaeological survey projects designed to collect background information and for scientific inquiry rather than as a response to ground-disturbing projects. Set aside as a monument with protection and research goals, GSENM has hosted many archaeological researchers, field schools, and graduate students. GSENM has also produced several important archaeological studies and documents, and has been the only contributor to the Utah BLM Cultural Resource publication series for the past 20 years or more. In addition, GSENM has sponsored additional research that has contributed many more important research documents to the realm of archaeological research. Some of these are destined to become the "bibles" of local archaeological research and should have a marked influence on such research for decades to come. The future of GSENM will see continued support for such projects, budgets permitting, but KEPA lands may not see an emphasis on research projects. Given that the lands in the KEPA contain some of the highest site densities and most important sites in the Planning Area, this could be a serious loss of research potential.

2.2.3.5 Key Features

The Planning Area is composed of three separate but adjacent physiographic areas. From west to east these are the Grand Staircase, the Kaiparowits Plateau, and the Escalante Canyons and Benches. Each has its own geology, geomorphology and, to an extent, flora and fauna. Each province is also host to numerous cultural archaeological and historical sites, with distinct differences between them as well as many similarities. Archaic and Late Prehistoric

archaeological sites are found scattered across the landscape in all three areas, as are historic grazing-related sites. However, Formative sites, and historic sites of certain types, are much more restricted in their distribution. For example, Formative residential and farming sites, where the residents were dependent on agriculture, are restricted by certain environmental parameters such as elevation and temperature. Likewise, historic uranium mining sites are restricted to certain geologic formations. A description of what may be found in these three areas is contained in Appendix 2.

2.2.4 Fire and Fuels

2.2.4.1 Indicators

National and State BLM fire policy requires current and desired resource conditions related to fire management be described in terms of five fire regimes (Appendix 3, Table 1) and three condition classes (Appendix 3, Table 2). The Healthy Forests Restoration Act also adopts the classification system known as the Fire Regime Condition Class (FRCC), which describes the amount of departure of an area or landscape from historic to present conditions. This departure from the natural state can be a result of changes in one or more ecosystem components such as fuel composition, fire frequency, and other ecological disturbances. Fire regimes and FRCCs are useful indicators in all levels of project planning.

The National Fire Management Strategy is designed as a three-phased approach to allow for inclusiveness and understanding of complexities in managing wildfire risk across the country. The best available science was used to help guide the future of wildlife fire management. Goals of this strategy are to restore and maintain landscapes, create fire-adapted communities, and respond to wildfires.

2.2.4.2 Current Condition

Fire Regimes

For the four planning units, there is a mix of acreages in Fire Regimes I, II, and V with zero to only 104 acres in Fire Regimes III and IV (Table 6). This is largely driven by vegetation types found within the four planning units (sagebrush, salt desert scrub, pinyon/juniper, and oak). A more detailed discussion of vegetation types in the four units and response to fire can be found in Appendix 3, Fire Interaction With Vegetation. The dominance of Fire Regimes I, II, and V, along with the types of vegetation found in these units, is predictive of future mixed severity and large-scale wildfire.

Table 6. Fire Regime Class

Unit	Fire Regime Class											
	I		II		III		IV		V		Total	
	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Grand Staircase	25,733	12.42	159,780	77.11	0	0.00	104	0.05	21,594	10.42	207,211	100
Kaiparowits	19,962	3.65	391,763	71.64	0	0.00	0	0.00	135,113	24.71	546,838	100
Escalante Canyons	84,736	37.66	68,029	30.23	0	0.00	0	0.00	72,258	32.11	225,023	100
Kanab-Escalante Planning Area	111,229	12.74	422,317	48.36	0	0.00	0	0.00	339,682	38.90	873,228	100
Total	241,660	13.05	1,041,889	56.25	0	0.00	104	0.01	568,647	30.70	1,852,300	100

Fire Regime Condition Class

Approximately 94 percent to 97 percent of the Planning Area units are in FRCC 3 (lands that are significantly altered from their historical range). The remaining 2 percent to 5 percent of the Planning Area units are in FRCC 2 (lands that have been moderately altered by either decreased or increased fire frequency (Table 7). The Escalante Canyons and KEPA Units have the largest number of acres in FRCC 2 (5 percent) likely due to recent fires and proactive vegetation treatments, which have changed the vegetation composition to earlier seral stages.

Table 7. Fire Regime Condition Class by Unit

	Fire Regime Condition Class						Total Acres/Unit
	1		2		3		
Unit	Acres	%	Acres	%	Acres	%	No
Grand Staircase	0	0	5,939	2.87	201,271	97.13	207,210
Kaiparowits	0	0	23,483	4.36	515,589	95.64	539,072
Escalante Canyons	0	0	11,824	5.25	213,200	94.75	225,024
Kanab-Escalante Planning Area	0	0	49,877	5.71	823,352	94.29	873,229
Total Acres	0	0	91,125	4.94	1,753,415	95.06	1,844,540

Fire Occurrence

Due to the remoteness of many of the planning units, there have been very few human-caused fires over the past 17 years (years for which fire data are available). Human-caused fires have accounted for only 31 acres burned (28 fires total). These units have largely been influenced by lightning-caused fires (498 total), which have burned 4,842 acres. However, the total acres burned reflects a very small portion (1 percent) of total acres within the four planning units (Table 8). This number may be reflective of the steep, varied terrain associated with the planning units, which would keep fires from spreading, as well as the lack of available data on fires within the planning units (also due to the steep, varied terrain). Regardless, to date, fire has played a very small role in altering much of this landscape. A more detailed table, showing acres burned by each unit and acres burned by year, is contained in Appendix 3, Table 3.

Table 8. Total Number of Acres Burned

Fire Management Unit Acres	Total Acres	Acres Burned	% Acres Burned
Grand Staircase	211,900	1319	0.62
Kaiparowits	543,340	1943	0.36
Escalante Canyons	243,168	9.8	0.00
Kanab-Escalante Planning Area	874,362	1597	0.18
Total	1,872,770	4,869	1

Fuels Management

The number of fuels projects has increased in recent years, especially within the areas covered by the KEPA Unit. Projects in the fuels program in the past 5 years have focused on achieving two goals: (1) reducing fire hazard with an emphasis on wildland-urban interface (WUI) areas, and (2) restoring and/or improving FRCC in the Decision Area. These goals are accomplished through interdisciplinary partnerships such as the Utah Watershed Restoration Initiative. Together, these partnerships identify priority watersheds to address a variety of interdependent resource issues and improve long-term watershed conservation and restoration. These watersheds are then targeted and prioritized for funding through BLM program dollars, with additional coordination and funding prioritized through the Watershed Restoration Initiative. Treatment types have mainly included mechanical treatments (hand thinning, hand piling, brush crunching, mowing, Dixie harrow, Ely chaining and mechanical mulching, and hand treatments). These treatments are also completed for a variety of other reasons, including fuels reduction, protecting WUI areas, improving wildlife habitat, improving watershed conditions, and improving rangeland resources. Seeding is used in conjunction with each treatment where appropriate. Mechanical treatments account for 1,000 to 3,000 acres per year, per unit, with the largest numbers of treatments occurring on the KEPA Unit (Appendix 3, Table 4). There are no pro-active treatment records for the Kaiparowits or Escalante Canyons Units.

Prescribed Fire Treatments

Prescribed fire has played a very small role within the planning units over the past 20 years. This is likely due to a variety of factors, including weather, resource availability, clearing index, and risk. The use of the planning units by tourism, as well as the monument values at risk (MMP), also factors into the use of prescribed fire. Prescribed fire has only been utilized on 393 acres in the Grand Staircase Unit and 880 acres in the KEPA Unit over the past 20 years.

Emergency Stabilization and Rehabilitation

There is an active emergency stabilization and rehabilitation (ESR) program in the Color Country District. As suggested, the Color Country District is currently responsive to the four planning units for wildfire response and emergency stabilization. The size of the ESR program is in proportion to the severity of the wildfire season. Due to the low number of wildfires within the four planning units, ESR efforts have not been utilized in these areas. However, ESR could be a valuable tool in future management scenarios.

Fire Management Plan

The Color Country District Fire Management Program covers BLM, U.S. Forest Service, and State lands in the Planning Area, and fires on private land. Fire personnel handle fire management responsibilities such as preparedness, suppression, and extended attack, with dispatching occurring from the Color Country Interagency Dispatch Center in Cedar City, Utah.

The current suppression strategy for the Planning Area calls for Appropriate Management Response (AMR) on all wildland fires in accordance with management objectives and based on current conditions and fire location. Every wildland fire is assigned an AMR to protect firefighters, the public, and values at risk, and to minimize suppression costs. The protection of human life is the single overriding priority, with the other priorities being communities, property

and improvements, natural and cultural resource values, human health and safety, and the costs of suppression. AMR can vary from aggressive initial action to monitoring.

The BLM Fire Management Plan (FMP), which BLM updates periodically, describes fire and fuels management activities in the Planning Area. The FMP provides for firefighter and public safety and includes fire management strategies, tactics, and alternatives based on direction outlined in the RMP. The FMP identifies values to protect and public health issues, describes fuels and restoration projects, and is consistent with resource management objectives. Suppression tactics outlined in the Southern Utah Support Area FMP vary by vegetative type and resource values at risk. The four planning units are covered under the FMP. Acreages for each Fire Management Unit (FMU) by planning unit are summarized in Table 9.

Table 9. Fire Management Unit Names and Acres

Unit	Fire Management Unit	Acres	BLM Acres	Private Acres	State
Grand Staircase	East Sands	974	974	0	0
	Kanab-Johnson Canyon	0.57	0.57	0	0
	Kaiparowits	685	685	0	0
	Glendale Bench	7,689	7,649	40	0
	Big Deer	202,553	200,592	1,961	0
Kaiparowits	The Blues	5,637	5,637	0	0
	Collet-Fiftymile Mtn	118,479	118,479	0	0
	Kaiparowits	278,975	278,975	5	0
	Escalante-Circle Cliffs	37,411	37,411	0	0
	Big Deer	110,544	110,436	85	5
	U.S. Forest Service	40	40	0	0
Escalante Canyons	Escalante-Circle Cliffs	243,168	242,753	415	0
Kanab-Escalante Planning Area	Big Deer	214,994	206,005	8,988	1.364
	Collet-Fiftymile Mtn	492,23	492,23	0	0
	East Sands	25.5	25.5	0	0
	Escalante-Circle Cliffs	268,441	267,037	1,389	14
	Glendale Bench	5,409	5,409	0	0
	Kaiparowits	289,303	288,750	553	0
	Kanab-Johnson Canyon	12	0	12	0
	Paria	21,550	20,874	676	0
	The Blues	25,410	25,106	304	0
	U.S. Forest Service	46	46	0	0

BLM – Bureau of Land Management

FMUs are specific land management areas within the FMP defined by fire management objectives, management constraints, topographic features, access, values to protect, political boundaries, and fuel types. The FMUs were created based on similarities of the specific resource objectives identified in the four planning units.

Specific goals and objectives for each of these FMUs are found in the current FMP (2005). This document is hereby incorporated by reference. A summary of changes in direction for each

FMU is updated every 5 years to reflect more current conditions. The changes to the 2005 FMP for each of the planning units was last updated in 2015. At that time, no changes were recommended to the FMUs based on current conditions.

Fire Ecology

Fire is an inherent component of ecosystems and historically has played an important role in the promotion of plant succession and the development of plant community character. Control of fires during the last century has changed plant communities and resulted in conditions that can sustain large-scale fires when natural ignition of vegetation occurs. As discussed above, fires in the four planning units have been both naturally occurring and human caused.

Wildfire in many of Utah's vegetative communities was historically a regular occurrence that helped define species composition, structure, and productivity (Bradley et al. 1992; Paysen et al. 2000). Therefore, many plants that make up these communities are adapted to withstand wildland fire. Grasslands, sagebrush, mountain shrub, aspen, and mixed conifer are examples of fire-adapted vegetative communities in the Decision Area. Frequent wildland fire is not part of the normal ecology of other vegetative communities. Salt desert shrub and blackbrush are examples of vegetative communities with long fire-return intervals. Fire in these communities is viewed as detrimental because it can take decades to centuries for the vegetation to recover.

The widespread presence of invasive nonnative species has greatly altered the resource character and values across the landscape and could pose an even greater threat in the future. Historic post-fire recovery processes might no longer dominate the recovery and regeneration process due to introduced species. Cheatgrass and some other types of vegetation are known to alter fire-return intervals and can dramatically expand their range after fire. These communities can facilitate expansion of invasive species, have lower biological resource values, and have increased fire hazards. Appendix 3, Fire Interaction with Vegetation, describes how fire interacts with different vegetative communities.

2.2.4.3 Trends

See the discussion on fire history above for the overall trend in wildfires in the four planning units. Although there have not been a significant number of fires or acres burned over the past 10 years, there is potential for more acres to be burned. Fire frequency and fire severity are expected to be higher than historical levels because most of the Planning Area is in FRCC 2 and FRCC 3. Invasion of annual grasses and conifer woodlands into shrub and grassland and increased live and dead fuel loads within conifer stands are the primary factors for this potential trend. Increased recreational and backcountry use into the four planning units could also increase the risk of human-caused wildfires. Table 10 provides a summary of vegetation types within the four planning units and the dominant condition class and fire regime. The KEPA Unit is likely the highest at risk for more frequent wildfires, based on vegetation conditions. However, it is the unit most likely to respond to proactive fuels treatments.

Table 10. Dominant Fire Regime Condition Class and Fire Regime for All Four of the Planning Units, by Vegetation Type

Vegetation Type	Grand Staircase		Kaiparowits		Escalante Canyons		Kanab-Escalante Planning Area	
	Condition Class	Fire Regime	Condition Class	Fire Regime	Condition Class	Fire Regime	Condition Class	Fire Regime
Desert Grassland	3	1	3	1	3	1	3	1
Grassland	3	1	3	1	3	1	3	1
Juniper	3	2	3	2	3	2	3	2
Oak	N/A	N/A	2	1			2	1
Pinyon	2	2	2	2	2	2	2	2
Pinyon-Juniper	3	2	3	2	3	2	3	2
Sagebrush	3	2	3	2	3	2	3	2
Sagebrush/Perennial Grass	3	2	3	2	3	2	3	2
Salt Desert Shrub	3	5	3	5	3	5	3	5
Greasewood	N/A	N/A	3	5	N/A	N/A	N/A	N/A
Dry Meadow	N/A	N/A	3	1	N/A	N/A	3	1
Ponderosa Pine	N/A	N/A	3	1	N/A	N/A	3	1
Ponderosa Pine/ Mountain Shrub	N/A	N/A	3	1	N/A	N/A	3	1
Mountain Shrub	N/A	N/A	2	2	N/A	N/A	2	2
Blackbrush	2	5	N/A	N/A	2	5	2	5
Mountain Riparian	N/A	N/A	N/A	N/A	N/A	N/A	2	4

N/A – not applicable

2.2.4.4 Forecast

Wildland fire management options for the four planning units typically include AMR; prescribed fire; non-fire fuels treatments, including mechanical, biological, chemical, and biomass removal; post-fire rehabilitation and restoration; and community protection and assistance and rural fire assistance. In an effort to minimize the impact of wildland fire and reduce the spread of invasive and noxious weeds, the Color Country Field Office has developed and implemented the ESR program. Collectively, the fire management program addresses current FRCCs and impacts on other resources. It is expected that due to the current fire regime conditions in the Planning Area and factors outside the control of the fire program (e.g., invasive weed control, vegetation management issues, drought, and grazing), FRCC categories would be maintained at or near their current conditions.

Based on prolonged drought conditions and establishment of invasive species, it is anticipated that the potential for uncharacteristic wildfire effects will continue under present management in the lower elevation sagebrush plant communities. It is also anticipated that under continued management, live and dead fuel loadings in forest stands and conifer/juniper encroachment into aspen and higher elevation sagebrush communities will continue, increasing the risk for wildfires with potentially uncharacteristic fire effects. Management actions to reduce fire

severity, including green strips, hazardous fuel reductions, and ESR, could slow the decline of resources.

2.2.4.5 Key Features

Key features include WUI areas and special management areas in the FMUs. Special management areas include Areas of Critical Environmental Concern (ACECs), Wilderness Study Areas (WSAs), Wild and Scenic Rivers (WSRs), and communications sites (Table 11). Special status species are addressed in the FMP.

Table 11. Key Features

Unit	FMU	WUI	ACECs	WSAs	WSRs	Comm. Sites
Grand Staircase	East Sands	None	None	None	None	None identified
	Kanab-Johnson Canyon	None	None	None	None	None identified
	Kaiparowits	None	None	The Cockscomb	Paria River	Powerlines
	Glendale Bench	None	None	None	None	None identified
	Big Deer	None	None	Paria-Hackberry	Bull Valley Gorge, Sheep Creek, Paria River, Deer Creek Canyon, Kitchen Canyon	Powerlines
Kaiparowits	The Blues	None	None	The Blues	None	Powerlines
	Collet-Fiftymile Mtn	None	None	Fiftymile Mountain	None	None identified
	Kaiparowits	None	None	Wahweap	None	None identified
	Escalante-Circle Cliffs	None	None	Devil's Garden ISA	None	None identified
	Big Deer	None	None	Paria-Hackberry	Hackberry Creek, Hogeye Creek, Paria River, Snake Creek, Sheep Creek	Powerlines
	U.S. Forest Service	None	None	Mud Spring Canyon	None	None identified

Unit	FMU	WUI	ACECs	WSAs	WSRs	Comm. Sites
Escalante Canyons	Escalante-Circle Cliffs	None	None	Steep Creek, Scorpion, Phipps-Death Hollow* ISA, North Escalante Canyons/The Gulch ISA*Contain 6,970 acres not managed as WSA	The Gulch, Lamanite Arch Canyon, Steep Creek, Water Canyon, Cotton Wood Canyon, Slickrock Canyon, Blackwater Canyon, Calf Creek, Dry Hollow Creek, Death Hollow Creek, Escalante River, Harris Wash, Little Death Hollow, Lower Boulder Creek, Lower Deer Creek, Lower Horse Canyon, Lower Sand Creek, Mamie Creek and West Tributary, Phipps Wash and tributaries, unnamed tributary, Willow Patch Creek, Wolverine Creek	Powerlines, radio repeaters
Kanab-Escalante Planning Area	Big Deer	No	No	No	Hackberry Creek, Paria River	Powerlines
	Collet-Fiftymile Mtn	Blue Spring	No	Carcass Canyon	No	No
	East Sands	No	No	No	No	No
	Escalante-Circle Cliffs	Upper Valley	No	Scorpion	Harris Wash, Twentyfivemile Wash #2, unnamed washes (4), Wolverine Creek, Little Death Hollow, Scorpion Gulch, Coyote Gulch #2	Powerlines
	Glendale Bench	No	No	No	No	No
	Kaiparowits	No	No	The Cockscomb, Wahweap, Burning Hills	No	Powerlines
	Kanab-Johnson Canyon	No	No	No	No	No
	Paria	No	No	No	Paria River	Powerlines
	The Blues	No	No	The Blues	No	Powerlines
	U.S. Forest Service	No	No	No	No	No

FMU – Fire Management Unit, WUI – Wildland Urban Interface, ACEC – Area of Critical Environmental Concern, WSA – Wilderness Study Area, WSR – Wild and Scenic River, Comm. – communications, ISA – Instant Study Area

2.2.5 Fish and Wildlife

The Planning Area supports complex and fragile ecosystems with fish and wildlife that have developed unique adaptations to the conditions of their environments. Typical of the Colorado

Plateau, the highly diverse topography and vegetation of the Planning Area create important habitat for a diverse range of invertebrate species and vertebrate animals including mammals, fish, reptiles, amphibians, and birds.

BLM works closely with the Utah Division of Wildlife Resources (UDWR) to manage habitat for fish and wildlife (including big game, upland game, waterfowl, neotropical migratory birds, small mammals, amphibians, and reptiles) to achieve and maintain suitable habitat for desired population levels and distribution within the Decision Area. UDWR is responsible for managing wildlife population levels, while BLM is responsible for managing wildlife and fisheries habitat in a condition that will support desired levels of species. BLM works cooperatively with UDWR through habitat management and restoration to maintain and reestablish populations of species that have used the historic range located within the Planning Area.

2.2.5.1 Indicators

Fish

Stream habitat conditions affect the ability of the stream system to sustain fish populations. Dewatering and loss of stream habitat quality have eliminated or led to reduced fish populations in the Planning Area compared to their historic levels. Human factors have caused fish habitat degradation. Stream diversions and dewatering for agriculture and human consumption are the greatest causes of loss of fish habitat and degradation in the Planning Area.

Parameters BLM, in coordination with UDWR, can measure to evaluate habitat conditions include channel width, water width, riffle width, pool width and class, depths, stream bottom materials, streambank cover, streambank stability, stream gradient, water temperature, air temperature, turbidity, percentage of stream shading, discharge, seasonal flow rates, and fish population and production estimates. BLM also uses Multiple Indicator Monitoring that includes greenline vegetation composition, streambank alteration, streambank stability and cover, residual vegetation measurement (stubble height), woody species regeneration, woody species use, channel width (greenline to greenline), maximum water depth (Thalweg Depth), water width, and substrate composition.

Wildlife and Habitat

Indicators vary with wildlife habitat types and species. Many indicators apply to habitats for common wildlife species and special status species, so they will not be repeated in Section 2.2.10, *Special Status Species*. Some important indicators BLM may use are:

- Distribution, abundance, and vigor of trees, shrubs, grasses, and forbs (functional and structural plant groups) in upland and riparian habitats
- Percentage of shrub canopy cover
- Shrub height and maturity
- Relative proportions and spatial distribution of important wildlife habitat types
- Wildlife habitat connectivity, or lack thereof, at fine and mid scales (small landscapes of hundreds of acres to larger landscapes of thousands of acres)
- Woodland plant canopy cover, height, and maturity (important species such as willow, aspen, cottonwood, ponderosa pine, white fir, and pinyon pine)
- Presence or absence of old-growth trees and snags

- Herbaceous and woody plant recruitment
- Invasive/noxious plant presence (cheatgrass, Scotch thistle, and others, and Utah juniper in sagebrush steppe)
- Growth form of desirable mountain shrubs such as bitterbrush, mountain mahogany, and serviceberry
- Location and availability of water
- Landform, slope, and aspect
- Timing, intensity, duration, and location of resource uses and activities
- Rangeland monitoring studies (typically indications of upward or downward trend for important plant species)

Each species or suite of species in the Planning Area requires a specific set of habitat conditions to meet its particular needs for survival and reproduction. Different plant community seral stages are also important in providing habitat requirements. As seral stages move from one stage to another, habitats are occupied by different wildlife species. For example, different seral stages of a sagebrush/grassland plant community provide habitat for the nesting and foraging requirements of a number of neotropical and upland birds. Some may require a more open sagebrush canopy with a greater percentage of grasses and forbs in the understory, while others would need a higher percentage of shrub canopy closure for nesting and protection from predators. For these and other reasons, it is usually important to provide for a continuous mosaic pattern of various seral stages of healthy plant communities, composed of native species, across the landscape in order to accommodate the needs of all wildlife.

The importance of habitat connectivity is reinforced by the large body of evidence documenting the effects of habitat fragmentation on wildlife (Trombulak and Frissell 2000; Wilbert et al. 2008; Hebblewhite 2008; Rowland et al. 2004). Such effects include direct removal of habitat; long-term displacement; changes in migration, feeding, courtship, and breeding; and increased movement rates (Hebblewhite 2008:49; Rowland et al. 2004:494; Trombulak and Frissell 2000:20, Wilbert et al. 2008:3, 4). Effects have been documented in numerous vertebrate and invertebrate species (Trombulak and Frissell 2000; Hebblewhite 2008; Doherty et al. 2008).

Fish and wildlife habitat is generally managed according to the guiding principles outlined by BLM Wildlife 2000, *Riparian-Wetlands Initiative for the 1990's* (BLM 1991a), *Waterfowl Habitat Management on Public Lands: A Strategy for the Future* (BLM 1989), Watchable Wildlife, the Recreational Fisheries Program, and other species- and habitat-specific direction. BLM implements this general guidance through specific management actions associated with species in the Planning Area.

2.2.5.2 Current Condition

Fish

The Planning Area contains two river systems, the Paria and Escalante, that support fish populations. A tributary to the Colorado River, the Paria River (KEPA Unit) is characterized as a warm water system. One native fish species, speckled dace (*Rhinichthys osculus*), has been verified within the river system.

The Escalante River drainage (Escalante Canyons Unit) has both warm water and cold water habitats. Five native fish species have been identified during past fish inventories (Mueller et al. 1999:16): speckled dace, flannelmouth sucker (*Catostomus latipinnis*), bluehead sucker (*C.*

discobolus), roundtail chub (*Gila robusta*), and cutthroat trout (*Oncorhynchus clarki*). Speckled dace was the most abundant native species. Cutthroat trout is present in the Escalante River drainage but is limited to cooler waters above and upstream of the Planning Area. Calf Creek, a tributary to the Escalante River, has two species of cutthroat trout above the lower falls. Eleven nonnative species have been identified (Mueller et al. 1999:16): brown trout (*Salmo trutta*), rainbow trout (*Oncorhynchus mykiss*), brook trout (*Salvelinus fontinalis*), fathead minnow (*Pimephales promelas*), channel catfish (*Ictalurus punctatus*), common carp (*Cyprinus carpio*), red shiner (*Cyprinella lutrensis*), yellow bullhead (*Ameiurus natalis*), striped bass (*Morone saxatilis*), largemouth bass (*Micropterus salmoides*), and green sunfish (*Lepomis cyanellus*).

Aquatic habitats in the Planning Area also support a diverse assemblage of aquatic invertebrate species (Vinson and Dinger 2008:377). These organisms provide critical food sources for fish. Other habitat components important to healthy aquatic systems are stable riparian conditions, well-vegetated banks, and riparian zones with a multilayered canopy of woody and non-woody riparian vegetation. These features support the maintenance of water temperatures, facilitate dissipation of energy from storm runoff, and provide substrates for fish reproduction.

Wildlife and Habitat

Wildlife habitat needs vary significantly by species. It is generally true that healthy and sustainable wildlife populations can be supported where there is a diverse mix of vegetation communities to supply structure, forage, cover, and other specific habitat requirements. The current conditions in this section are generalized for the planning units and not specific to any one unit but constitute inventories, museum records, and research conducted on GSENM.

In recent surveys by the Utah Heritage Program, 29 species of amphibians and reptiles were documented: 1 salamander, 4 anurans (frogs and toads), 13 lizards, and 11 snakes. It is likely that one other species of snake, Smith's black-headed snake (*Tantilla hobartsmithi*), occurs in the Planning Area, as it was recorded previously (Oliver 2003:3). Ubiquitous and relatively abundant throughout the Planning Area (Oliver 2003:5, 9) are the Great Basin spadefoot (*Spea intermontana*), side-blotched lizard (*Uta stansburiana*), tiger whiptail (*Aspidoscelis tigris*), striped whipsnake (*Masticophis taeniatus*), gopher snake (*Pituophis catenifer*), night snake (*Hypsiglena torquata*), and prairie rattlesnake (*Crotalus viridis*). Other species are widespread but patchy or relatively rare and localized in certain areas of the Planning Area (Oliver 2003:9). A baseline study of amphibians and reptiles in the Planning Area is currently being undertaken. As inventories are conducted, new occurrences and range extensions are being discovered.

There are over 350 species of birds in GSENM, including bald eagles and peregrine falcons. Neotropical birds concentrate around the Paria and Escalante Rivers and other riparian corridors in the Planning Area. The Planning Area is in Bird Conservation Region 16, Southern Rockies/Colorado Plateau (USFWS 2008a:18). The 17 Bird Species of Conservation Concern listed in Appendix 4, Bird Species of Conservation Concern, have the potential to occur in the Planning Area.

A literature and museum survey of the mammals of the Planning Area lists 82 confirmed contemporary species (including the big game species discussed below). As many as 24 rodent species are thought to occur in the Planning Area (Flinders et al. 2002). Rodents are the most represented group; woodrats (*Neotoma* spp.), which are known for their storage and waste structures, called middens, pocket mice (*Perognathus* spp.), and kangaroo rats (*Dipodomys*

spp.) are common (NPS 2007). Chipmunks (*Tamias* spp.), pocket gophers (*Thomomys* spp.), and mice (*Peromyscus* spp.) are also common rodents represented in the region. Dr. David Willey of Montana State University recorded 12 distinct rodent species while conducting a Mexican spotted owl prey study in the Planning Area (Willey 2007).

Black-tailed jackrabbit (*Lepus californicus*) and desert cottontail (*Sylvilagus audubonii*) are the only rabbit species in GSENM. Carnivorous mammals include coyote (*Canis latrans*), bobcat (*Lynx rufus*), and mountain lion (*Puma concolor*). These species prey on rodents, birds, lizards, domesticated animals, and other large mammals (Flinders et al. 2002).

Sixteen bat species have been observed in the Planning Area (Flinders et al. 2002 and recent capture data) including pallid bat (*Antrozous pallidus*), big brown bat (*Eptesicus fuscus*), little brown myotis (*Myotis lucifugus*), fringed myotis (*M. thysanodes*), western pipistrelle (*Pipistrellus hesperus*), and Brazilian free-tailed bat (*Tadarida brasiliensis*). Bats in GSENM include both year-round residents and those observed only during migration. Bats lower their temperature during the day to conserve energy, as they roost alone or in colonies in the cliffs and canyon walls, and emerge at dusk to hunt for insects.

Game animals provide an important recreation and economic benefit through hunting and wildlife viewing. Game populations in the area are desert bighorn sheep, mule deer, pronghorn (Appendix 1, Map 4), elk, upland game birds, mountain lion, and bear. These species, as well as cougar, furbearers, and upland game birds, are described in Appendix 4, Big Game and Other Wildlife Species. UDWR manages wildlife populations and hunting seasons. The Planning Area is in UDWR game management units 25C/26 (Boulder/Kaiparowits Plateau) and 27 (Paunsaugunt). The major habitat types utilized by wildlife species in the Planning Area are described in Appendix 4, Major Habitat Types.

Migratory Birds

The overall decline of some migratory birds has been well documented. Reasons for the decline are complex and include such factors as loss of habitat due to fragmentation, alteration, urban expansion, natural disasters; loss or alteration of habitat in non-breeding areas along migratory routes; and brood parasitism (Parrish et al. 2002). Numerous programs have been initiated to combat this decline. Federal agencies are required to consider the effects that planned or authorized activities will have on migratory birds and their habitats and to consider migratory birds in their land use planning efforts.

The *Coordinated Implementation Plan for Bird Conservation in Utah* reflects the habitat priorities of all bird conservation programs in Utah. The plan identifies portions of two Bird Habitat Conservation Areas that occur within the Planning Area (Paria River, Escalante River). The U.S. Fish and Wildlife Service (USFWS), in compliance with the Fish and Wildlife Conservation Act, published the *Birds of Conservation Concern 2008*, which is a report that identifies migratory and non-migratory bird species (beyond those already federally designated as threatened or endangered) that represent the highest need for conservation initiatives.

To date, over 400 species of birds have been identified within the State of Utah. Of them, 231 species have been recognized as regular breeders in the State and in need of consideration in the Utah Avian Conservation Strategy process. Of the 231 species, 132 (57 percent) are neotropical migratory birds and 29 (12 percent) are considered State Sensitive species, two of which are also federally listed as endangered and four as threatened (Parrish et al. 2002).

Primary and secondary breeding habitat preferences have been identified for each of the 231 species. Primary habitat is considered to be the nesting habitat most commonly used by a species, while secondary breeding habitat is the second most common. Winter habitat preferences have also been identified.

Appendix 4, Bird Species of Conservation Concern, identifies both migratory and non-migratory Birds of Conservation Concern that occur within the Planning Area. USFWS has identified these species as needing special conservation actions.

2.2.5.3 Trends

Fish

Some of the Planning Area's aquatic habitats, notably the Paria River, have gradually declined over the last century due to a combination of human influences such as water diversions, irrigation projects, improper livestock grazing, roads, improper farming/ ranching practices, mining, and recreational use. Such activities have led to a loss of wetland and riparian habitats, reduced water quantity and quality, increased water temperatures, increased loss of instream habitat, and fragmented stream reaches, all of which have led to declining native fish populations. Fish species in the Escalante River drainage are monitored by UDWR. The current diversity of native and nonnative species has been present in the river system for decades.

Wildlife

Most fish and wildlife species are not monitored thoroughly enough to determine changes in distribution and abundance. However, big game populations and trends are estimated in each species' statewide 5-year management plan. Specific trends in the Planning Area are unknown.

As of 2013, UDWR estimates the population of desert bighorn sheep in Utah to be 2,000, indicating a relatively stable population for the past 10 years (UDWR 2013a:4). As of 2015, the statewide population estimate is approximately 2,600 sheep, and UDWR estimates a population of approximately 730 bighorn sheep in the Kaiparowits Management Unit in the Planning Area.

For mule deer, the 2013 post-season statewide population estimate in Utah was 332,900; despite adverse drought and weather in some populations, the statewide deer population has grown at an average rate of 1.6 percent over the past 20 years and is now at a level not seen since 1992 (UDWR 2014:6). Habitat conditions in the Kaiparowits and Paunsaugunt population units in the Planning Area have been declining; desert conditions, along with limited water distribution, may exacerbate habitat limitations (UDWR 2012a:2, 2012b:2).

The Utah statewide population estimate for pronghorn is 12,000 to 14,000, and efforts are ongoing to reintroduce the species into historic habitats and augment existing populations (UDWR 2009:4). The Kaiparowits population was estimated at 100 in 2008 and was stable. The Paunsaugunt population was estimated at 600 in 2008 and was also stable (UDWR 2009:20); however, the small band of Paunsaugunt pronghorn in GSENM is fewer than 12 individuals.

Elk are well established throughout Utah, with the current statewide population estimated at approximately 81,000 (UDWR 2015a). From 1975 to 1990, the elk population in Utah grew rapidly from an estimated 18,000 to 58,000 elk, largely due to population levels below carrying capacity and the abundance of available habitat. From 1990 to 2005, population growth

slowed considerably from expanded harvest management designed to reduce population growth rates (UDWR 2015a).

2.2.5.4 Forecast

Fish

BLM has little influence over the uses occurring in the upper reaches of the Paria River. Irrigation and water rights allowing diversion and dewatering are outside of the span of control of BLM. Streams and river systems in the Planning Area are flashy in nature and experience extreme ranges in flow patterns due to monsoonal events. Restoration or improvement of fisheries, where possible, is mainly tied to sustainable water flows, instream habitat (pools and riffles), and riparian vegetation. Opportunity for restoration of native fish species (Colorado cutthroat trout) exists in the tributaries of the Escalante River, such as Calf Creek. In areas where the fishery is tied to riparian conditions, BLM could implement habitat improvement projects. BLM could coordinate among all landowners (Federal, State, and private) to ensure that watershed conditions are adequate to support fish populations and to ensure protection of fisheries habitats. Whenever possible, BLM could work with the State of Utah to secure instream flows.

Wildlife

The threat of climate change and its associated impacts is a significant threat faced by fish and wildlife. Warming temperatures, drought, wildfire, and other extreme weather effects are expected to increase in frequency. This will likely contribute to impacts on fish and wildlife and their habitats as climate change continues. The Colorado Plateau REA suggests that the ecoregion is expected to undergo general warming over the entire region, with as much as a 3.6 °F (2 °C) increase by 2060 in some locations, particularly in the southern portion of the ecoregion (Bryce et al. 2012:130). Average summer temperatures are expected to increase, but even greater increases are simulated for the winter (Bryce et al. 2012:130).

Vegetation communities expected to have the greatest exposure (i.e., higher probability for change) to climate change are shrublands (especially big sagebrush and blackbrush-Mormon tea communities), riparian vegetation, and pinyon-juniper woodland (Bryce et al. 2012:155).

Insects and disease will play a collateral role to the impacts of climate change in altering the dominance and distribution of various vegetation species (Bryce et al. 2012:155); this will in turn alter the distribution and availability of habitat for fish and wildlife.

Another major threat further exacerbated by climate change is shifts in vegetation community structure and composition. Pinyon-juniper woodlands have increased dramatically in the Planning Area over the past century and now occupy many other vegetative communities where they were once not present or at least not dominant. Shrub-steppe communities, especially sagebrush communities, have suffered greatly due to this vegetation shift. Sagebrush obligate wildlife species such as songbirds, sage-grouse, and big game have declined in western States. Although this expansion has slowed in recent years, the impacts from the expansion remain. Opportunities are numerous within the Planning Area to restore degraded habitats.

2.2.5.5 Key Features

Fish and Wildlife

Several habitat attributes are necessary for healthy fish populations and sustainability, including healthy riparian conditions, channel stability, habitat diversity, sediment load, high-flow frequency, low-flow frequency, oxygen, temperature, and pollutants. BLM can manage where applicable for all of these stream characteristics except high and low flows, which are highly variable and depend on weather, snow accumulation, and water rights.

The survival, growth, and diversity of species in a stream depend on the amounts and types of impacts on that stream system. Fish and other aquatic lifeforms require good water quality for survival. Certain water quality standards are needed to meet basic biological needs for fish, including turbidity, pH (measure of acidity or alkalinity), dissolved oxygen, stream temperature, and pollutants. BLM should work with the State of Utah to manage public lands to reduce or eliminate, as practical, those negative factors on streams and reservoirs. Key wildlife habitat features are listed in Table 12.

Table 12. Key Wildlife Habitat Features

Features and Use Areas	Values Provided
1. Important Landforms	
Canyons with perennial water such as Paria, Hogeye, Snake, Starlight, Box Elder, Hackberry, Cottonwood, Henrieville, Last Chance, Aley Wash	Raptor nesting and wintering, including eagles, falcons, and owls. Foraging and nesting habitat for forest, rangeland, and riparian wildlife. Water source.
Rock outcrops, canyons, cliffs, and ledges	Habitat for nesting raptors, swallows, and swifts, reptiles, and eagle roosting.
Caves, crevices, mine shafts, and adits	Bat life history needs. Falcon nest sites in cracks and crevices and on ledges.
Flat to gently sloping landforms within low vegetation	Important for pronghorn seasonal habitat.
Cliffs and rock escarpments	Desert bighorn sheep year-round habitat.
2. Important Use Areas	
Concentrated use areas (could apply to winter, spring, summer, or fall use)	Various geographic locations that support high numbers of mule deer, elk, pronghorn, greater sage-grouse, raptors, or other important species. Includes wintering areas for raptors or waterfowl.
3. Important Plant Community Composition and Structure	
Shrubland habitats (greater than or equal to 5% shrub canopy cover)	Sage-grouse nesting and early brood-rearing, land-bird nesting activity, and big game cover. Big sagebrush canopy cover greater than or equal to 25% is associated with sagebrush steppe wildlife occupation. Mule deer crucial winter habitat and elk winter habitat. Raptor foraging areas.
Grass/forb dominated habitats (less than 10% shrub canopy cover)	Pronghorn year-round habitat.

Features and Use Areas	Values Provided
Mixed mountain shrubs such as Utah serviceberry, mountain big sagebrush, and bitterbrush	Mid- to late-seral stage habitat; provides quality cover and food (including fruits) for game and non-game wildlife. Mule deer fawning and summer habitat. Elk habitat.
Pinyon pine and juniper woodlands in appropriate sites based on ecological sites.	Thermal cover patches for mule deer and elk winter range, song-bird nesting and feeding, ferruginous hawk nesting, and accipiter nesting in some areas. Berries and nuts are important food sources for big game, wild turkeys, and non-game wildlife. Pinyon jays require large mature stands of pinyon pine/juniper for nesting.
Snags	Bird and bat occupation, roosting, nesting, and feeding.
Dead and down woody material	Bird foraging, mammalian denning activity, perching, hiding, and thermal cover. Can be very important for reptiles, cottontails, and jackrabbits.
Springs, seeps, and streams	Free drinking water and succulent green forage year-round. Fish, frog, and toad habitat.
Natural or man-made open water habitat	Migratory bird resting and feeding, free drinking water. Very important to bats, birds, small mammals, and big game species.
Riparian habitat associated with natural or man-made water habitats	Waterbird, shorebird, songbird, and raptor nesting, big game shelter and forage, and reproduction habitat for amphibians. Provides forage and cover to most wildlife species. Frog and toad habitat. Essential for southwestern willow flycatcher habitat.
Cottonwood stands	Raptor and songbird nesting, migratory bird stopover habitat during migrations, big game hiding cover and food. Bald eagle winter day and night roosts and nesting sites.
Ponderosa pine	Provides habitat for northern goshawk, Lewis's woodpecker, and many other species.
Oak woodlands (Gambel or live oak)	Important habitat for many species, including big game, upland game birds, migratory birds, and small mammals. Provides nesting, thermal, and hiding cover. Mast crop is important forage.

2.2.6 Geology

The Planning Area is located near the western margin of the Colorado Plateau physiographic province. It comprises a series of plateaus, buttes, and mesas that reflect the type and structure of the underlying geologic strata (Appendix 1, Map 5). The Colorado Plateau is characterized by relatively flat-lying strata that have been locally offset and folded during vertical movements along north-/south-oriented blocks in the Earth's crust. This uplift and folding have created the spectacular scenery for which the area is known worldwide.

2.2.6.1 Indicators

Indicators for geological resources include protection of unique geologic features, hobby collection of geologic materials, and the potential for injury from geologic hazards, such as rock falls and landslides.

2.2.6.2 Current Condition

The high visitor use in the Planning Area is predominantly the result of the regional geology and the scenery it creates. Climbing on, or collecting parts of, unique geologic features can destroy these features. This use is not currently controlled in the Planning Area. Hobby collection is occurring and could reduce or deplete unique materials. While injuries from geologic hazards are not common, rock falls occur along Cottonwood Road.

2.2.6.3 Trend and Forecast

Visitor use is increasing in the Planning Area. This will increase the probability of unique geologic features and materials being affected. More visitor use will result in a greater potential for accident or injury from geologic hazards.

2.2.6.4 Key Features

Geologic features that may need protection include the Devils Garden and Wahweap Hoodoos, the Cockscomb, and the Toadstools. Other special geologic areas include arches, bridges, and slot canyons. Areas of high use include Navajo Sandstone slickrock between Boulder and Escalante and between the creeks off Skutumpah (Paria River Canyon). Hobby collecting should be considered for protection. This could include Moki Marbles, septarian nodules, agates, and petrified wood. Rock falls have occurred along Cottonwood Road. This potential exists for any road, campground, or day use area that exists near cliff faces, such as the Gut, Kelly Grade, and the Burr Trail.

2.2.7 Lands With Wilderness Characteristics

Lands with wilderness characteristics are roadless areas larger than 5,000 acres (or areas smaller than 5,000 acres that are contiguous to designated wilderness, WSAs, or other lands administratively endorsed for wilderness by other agencies or, in accordance with the Wilderness Act's language, are areas "of sufficient size as to make practicable its preservation and use in an unimpaired condition") that contain either outstanding opportunities for solitude or outstanding opportunities for primitive and unconfined recreation.

2.2.7.1 Indicators

For lands with wilderness characteristics, the indicators are size, naturalness, outstanding opportunities for primitive and unconfined recreation, outstanding opportunities for solitude, or any identified supplemental values for a unit. These specific elements are defined in Manual 6310 – Conducting Wilderness Characteristics Inventory on BLM Lands.

2.2.7.2 Current Condition

There are approximately 482,100 acres outside of existing WSAs that are identified by BLM as having wilderness characteristics (Table 13 and Appendix 1, Map 6).

Table 13. Lands with Wilderness Characteristics

Unit Name	Total Acres(1)	Acres in Grand Staircase Unit	Acres in Kaiparowits Unit	Acres in Escalante Canyons Unit	Kanab-Escalante Planning Area
Box Canyon (1999)	2,926	0	0	0	2,926

Unit Name	Total Acres[1]	Acres in Grand Staircase Unit	Acres in Kaiparowits Unit	Acres in Escalante Canyons Unit	Kanab-Escalante Planning Area
Burning Hills (1999)	12,968	0	1,755	0	11,213
Burning Hills C (2018)	697	0	0	0	697
Carcass Canyon (1999)	33,793	0	11,032	0	22,541
Carcass Canyon A (2018)	635	0	0	0	635
Carcass Canyon B (2018)	197	0	197	0	0
Cave Point (1999)	5,172	0	0	0	5,172
Colt Mesa (1999)	28,335	0	0	0	28,335
Death Ridge A (2018)	135	0	135	0	0
Death Ridge B (2018)	144	0	0	0	144
Fiftymile Mountain (1999)	44,972	0	3,029	0	41,943
Fiftymile Mountain A (2018)	88	0	88	0	0
Fiftymile Mountain B (2018)	847	0	847	0	0
Horse Mountain (1999)	12,447	0	0	0	12,447
Horse Spring Canyon (1999)	31,703	0	0	0	31,703
Hurricane Wash (1999)	9,021	0	0	0	9,021
Lamp Stand (1999)	3,511	0	0	0	3,511
Little Egypt (1999)	22,383	0	0	18,676	3,706
Mud Spring Canyon (1999)	21,668	0	21,668	0	0
Mud Spring Canyon West (2018)	41	0	41	0	0
Nipple Bench (1999)	27,686	0	1,140	0	26,546
Nipple Bench Area (2018)	3422	0	0	0	3422
North Escalante Canyons (1999)	25,295	0	0	13,428	11,863
Paria Canyon A (2018)	110	0	0	0	110
Paria Canyon B (2018)	75	0	0	0	75
Paria Canyon C (2018)	2426	0	0	0	2426
Paria Canyon D (2018)	129	0	0	0	129
Paria-Hackberry (1999)	33,595	9,793	2,121	0	21,682
Pioneer Mesa (2018)	11148	0	0	0	11148
Phipps-Death Hollow (1999)	4,602	0	0	4,602	0
Scorpion (1999)	13,656	0	0	0	13,656
Squaw Canyon (1999)	14,764	0	0	0	14,764
Steep Creek (1999)	7,959	0	0	0	7,959
Steep Creek (2018)	287	0	0	0	287

Unit Name	Total Acres[1]	Acres in Grand Staircase Unit	Acres in Kaiparowits Unit	Acres in Escalante Canyons Unit	Kanab-Escalante Planning Area
Studhorse Peaks (1999)	22,439	0	0	13	22,426
Sunset Arch (1999)	5,469	0	658	0	4,811
The Blues (1999)	1,679	0	1	0	1,678
The Blues B (2018)	208	0	0	0	208
The Blues C (2018)	640	0	0	0	640
The Cockscomb (1999)	1,426	510	29	0	887
The Cockscomb A (2018)	112	0	0	0	112
The Cockscomb C (2018)	2	0	0	0	2
The Cockscomb D (2018)	69	54	0	0	15
The Cockscomb D (2018)					
Upper Kanab Creek (1999)	5,087	5,0870	0	0	0
Upper Kanab Creek B (2018)	134	134	0	0	0
Wahweap-Death Ridge (1999)	42,246	0	38,796	0	3,450
Wahweap A (2018)	454	0	0	0	454
Wahweap B (2018)	299	0	0	0	299
Warm Creek (1999)	24,198	0	8	0	24,190
Totals	481,954	15,531	81,547	36,713	347,379

[1] Total acres taken from geographic information system data; may differ slightly from totals reported elsewhere.

In addition to the approximately 482,000 acres with recent findings on record (BLM 1999, 2018), there are 86 former State and Institutional Trust Lands Administration (SITLA) sections totaling approximately 54,450 acres that are completely surrounded by WSAs within the Planning Area. These lands were previously "inholdings" within WSAs managed by the State of Utah that were legislatively exchanged to BLM through the Utah Schools and Lands Exchange Act of 1998 (P.L. 105-335).

Under IM-UT-2005-003, BLM formally determined that, "the FLPMA land exchange regulations at 43 CFR 2200.0-6(f) and (g) and 43 CFR 2201.9(b) do not apply" to the lands acquired through the Exchange Act of 1998. BLM concluded that "none of the lands acquired by the United States through the Exchange Act of 1998 are WSAs or managed as WSAs." Instead, management of these WSA inholdings is subject to land use plan decisions. Of these sections, 78 are within the "Primitive Zone" established by the 2000 MMP, while portions of 8 sections are in both the "Primitive" and "Outback" zones.

BLM has updated inventory findings for former SITLA "edgeholdings"—or lands that were mostly, but not completely, surrounded by a WSA (BLM 1999, 2018). However, BLM did not update formal findings for lands with wilderness characteristics for these WSA "inholdings." These parcels are remote, generally inaccessible except by foot or packstock, and could not be field verified during the time frame associated with this planning effort. Instead, BLM conducted a geographic information system (GIS) analysis of these lands to consider whether

there was a reasonable probability that these lands contain wilderness characteristics. The agency concluded there is a reasonable probability that these 86 sections (approximately 54,450 acres) generally contain the same apparent naturalness and outstanding opportunities for solitude or primitive and unconfined recreation as on the contiguous WSA and must consider an appropriate range of alternatives for the management of these lands.

2.2.7.3 Trends

Since WSAs were established in the 1980s, Utah wilderness inventories and related decisions have become prominent issues. For more than 40 years, the public has debated which lands have wilderness characteristics and should be considered by Congress for wilderness designation. An inventory of BLM-administered surface land was begun in 1996 and completed in early 1999. Out of 3.1 million acres inventoried in the 1999 Utah Wilderness Inventory, BLM found 2.6 million acres with wilderness characteristics (in addition to the existing WSAs statewide), approximately 460,000 acres of which are located within the Planning Area.

Although BLM's authority under FLPMA Section 603 (43 U.S.C. 1782) expired in 1991, Congress gave BLM broad authority and discretion under other sections of FLPMA, aside from Section 603, to identify lands with wilderness characteristics and, if appropriate, to manage lands to protect such characteristics. Under Section 201 of FLPMA and per guidance in Manual 6310, BLM also updated findings for lands with wilderness characteristics to support this planning effort.

2.2.7.4 Forecast

Interest in wilderness resources throughout the Planning Area has local, regional, and national significance. Public interest in BLM's inventory determinations, and management actions for these areas, has increased dramatically in the past 20 years and is expected to increase in the future. As areas that meet the definition of lands with wilderness characteristics found in BLM Manuals 6310 and 6320 become more limited, increased pressure on the lands that meet the definition is expected to increase. Conflict between development interests and preservation interests is expected to increase, as well.

2.2.7.5 Key Features

Key features of wilderness characteristics include size, apparent naturalness, opportunities for solitude, and/or primitive and unconfined recreation. The 1999 Utah Wilderness Inventory contains descriptions of the lands with wilderness characteristics identified in 1999 within the Planning Area. In 2018, BLM updated the lands with wilderness characteristics inventory to support this planning effort. Summary findings are available on request or on the project website.

2.2.8 Paleontological Resources

The Planning Area includes bedrock geologic formations ranging in age from Permian to Late Cretaceous age (265 to 73 million years ago), and unconsolidated Neogene deposits probably dating back to at least the early Pleistocene. Permian through Jurassic units yield fossil fauna and flora that can largely be viewed over wide areas of the Colorado Plateau. Fossils occur in all bedrock formations and in the Neogene units in the Planning Area, but the most scientifically important bedrock formations are the Chinle Formation, Morrison Formation, and the entire Late Cretaceous succession. Of these three, the Late Cretaceous succession is unique to the

Planning Area and holds extremely high scientific and public significance. Dozens of new dinosaur and other large vertebrate taxa (e.g., giant turtles, giant alligators), as well as hundreds of species of fish, turtles, amphibians, lizards, snakes, birds, and mammals, have been found (Titus et al. 2017), making it one of the most complete Late Cretaceous age terrestrial fossil vertebrate successions in the world. Formation-by-formation summaries of resource type, distribution, and Potential Fossil Yield Classification for all geological units in the Planning Area are given in Appendix 5 and shown in Appendix 1, Map 7. Because of the high significance of the Cretaceous and other fossil resources within the Planning Area, BLM has actively managed this resource since 2000, through both an in-house program comparable to that at Dinosaur National Monument or John Day Fossil Beds National Monument and by engaging in long-term partnerships with various museums and universities. Because of the high quality of preservation of animals in the Kaiparowits Formation (preservation of skin, nails, beaks, and other soft tissue), the continuity of the fossil record through the Late Cretaceous, and the uniqueness of this fossil record to the Kaiparowits Plateau region, the western Kaiparowits Plateau in particular could probably qualify as a world heritage site. Outside of special designation frameworks such as monuments, FLPMA and the Paleontological Resources Preservation Act of 2009 provide the broad legal framework for Federal agencies to manage fossil resources on public lands.

2.2.8.1 Indicators

Fossils occur subsurface in unconsolidated or bedrock units or weathering on the surface in recent colluvium or in private and public collections. Traditionally, BLM has measured its condition with a single indicator: are fossils in collections for the field in good condition? However, beyond their simple presence in the landscape as inanimate mineral objects integrated into the geology, they derive most of their value to humans as objects of scientific, public, hobby, or artistic use. In other words, the true indicators of resource condition and effective management are how well fossils are being effectively utilized by various interest groups that are legally permitted to use them. Are the truly scientifically significant fossils the subject of the research they require? Are petrified wood, fossil leaves, or common invertebrates accessible to the public for hobby collecting? Are scientifically significant, aesthetically beautiful, or otherwise intrinsically valuable fossils available for the public to enjoy in museums, exhibits, or field interpretive sites? While this is a little more work to implement and assess, it is imperative that special designation areas like GSENM strive toward such holistic active management. Such approaches are appropriately used in many NPS units that manage fossil resources of similar or even lesser significance. Resource indicators thus include the following:

- Number of acres in areas with significant fossil potential being proactively inventoried
- Number of fossils currently in collections being actively managed to curatorial standards
- Number of research papers or publications produced annually on significant resources
- Number of significant fossils collected and curated annually
- Number of partnerships formed to leverage resources and scientific expertise in management
- Number of in situ field sites monitored for resource condition and trend
- Number of paleontology-specific exhibits or other interpretive materials or events produced each year

- Number of in situ fossil sites dedicated for public visitation and supported by interpretation, signage, etc.
- Number of public collecting sites managed; desired number is as many as resources and the law allows

2.2.8.2 Current Condition

Within the Planning Area, GSENM has been actively managing fossil resources since 2000, when the first full-time staff paleontologist was hired. Since that time, the program has been working toward the desired condition for all of these indicators except for developing sites for public collecting, which is prohibited under the current MMP. In theory, even such collecting sites could be permissible within a BLM-managed monument (multiple use under FLPMA), but this would complicate enforcement of rules against illegal collecting. On former GSENM lands in the KEPA, establishing areas for legal public collection of common invertebrate and plant fossils should be a desired outcome.

Number of acres in areas with significant fossil potential being proactively inventoried. On average, within the Planning Area, approximately 5,000 to 6,000 new acres are inventoried proactively. About 1,500 of these acres are accomplished by BLM's in-house program and the remainder are the result of work done through cooperative agreements with museums. Because of the nature of cyclic erosion in badlands, a 50-year timetable to re-examine the highest-potential, highest-significance areas has been targeted, and the current numbers would allow the program to reach that target.

Number of fossils currently in collections being actively managed to curatorial standards. Approximately 15,000 specimens are housed at the Natural History Museum of Utah, GSENM's official repository. An additional 30,000 specimens (10,000 vertebrates, 20,000 plants) are housed at the Denver Museum of Nature and Science, the largest collection. Smaller but significant collections (approximately 7,000 specimens) of GSENM fossils are housed at the Museum of Northern Arizona (Flagstaff), the Sam Noble Museum of Natural History (Norman, Oklahoma), the Raymond Alf Museum (Claremont, California), and elsewhere. High numbers of specimens not being housed to Federal guidelines indicate a threat to the resource and a need for intensive intervention by BLM.

Number of research papers or publications produced annually on significant resources. Collectively, this number averages about 2 to 10 publications (including abstracts) a year. Higher numbers indicate effective, proactive management of the research component.

Number of significant fossils collected and curated annually. Currently, on average, about 5 to 15 larger quarries and about 300 to 500 new specimens are added to collections each year. This pace generally keeps up with the natural erosional threats to resources and ensures their protection.

Number of partnerships formed to leverage resources and scientific expertise in management. Major partnerships exist with five major institutions. These facilitate the cleaning and stabilizations of fossils; the curation of important specimens; the field collection of significant specimens, exhibits, and interpretation; and research. The higher the number, the more benefit the public and the fossils will receive. These do not necessarily need financial support.

Number of in situ field sites monitored for resource condition and trend. Each year about 30 to 50 sites are monitored for public impacts (including theft, vandalism, and unintentional

impacts), scientific potential, and basic condition. This ensures the data needed to manage and conserve the sites are available.

Number of paleontology-specific exhibits or other interpretive materials or events produced each year. Approximately two to three exhibits are produced each year for public exhibition. Some of these are portable and others are fixed at institutions like visitor centers and museum exhibit halls. Special events and outreach to the public via lectures, schoolroom demonstrations, field tours, etc. keep them informed on issues and discoveries and gain their support for resource management.

Number of in situ fossil sites dedicated for public visitation and supported by interpretation, signage, etc. Five sites are currently managed for field-based paleontological interpretation or education: The Blues Overlook, Flag Point Tracksite, Twentymile Wash Dinosaur Tracksite, Cottonwood Canyon Oyster Beds, and Wolverine Petrified Wood Area. Of these five, all but the Cottonwood Canyon Oyster Beds are still in GSENM.

Number of public collecting sites managed. There were no provisions for any public casual collecting of fossils for hobby or educational purposes in GSENM.

2.2.8.3 Trends

Number of acres in areas with significant fossil potential being proactively inventoried. This number has stayed relatively constant since 2000, when the program of inventory was established.

Number of fossils currently in collections being actively managed to curatorial standards. This number has steadily increased over the years as new collections are made. No instances of objects being housed in unacceptable conditions have arisen, and that is the desired condition.

Number of research papers or publications produced annually on significant resources. The number of publications per year on paleontology has steadily increased since GSENM was established, largely as a result of direct BLM support of research and inventory.

Number of significant fossils collected and curated annually. This number has stayed relatively constant over the last 17 years.

Number of partnerships formed to leverage resources and scientific expertise in management. The number of major partners has stayed about the same over the years, with an increasing number of them finding their own support as BLM financial support has dwindled.

Number of in situ field sites monitored for resource condition and trend. This number fluctuates wildly, depending on the number of sites that are excavated each year. A core set of about 20 sites are visited every year. An increasing number of sites is a positive trend, indicating a robust research and inventory program.

Number of paleontology-specific exhibits or other interpretive materials or events produced each year. This number has been stable for most of the 17 years. An increase in this number would indicate a positive trend in public appreciation of fossil resources.

Number of in situ fossil sites dedicated for public visitation and supported by interpretation, signage, etc. The higher the number of sites, the more effective outreach and interpretation is, the greater the public enjoyment.

Number of public collecting sites managed. As an important aspect of public education and multiple use enjoyment, the desired number of such sites is as many as resources and the law allows.

2.2.8.4 Forecast

Given the general trend of current intensive management, the number of scientifically important specimens in museums will increase, the number of scientific publications and described species will increase, public enjoyment and understanding of the unique nature of the resource should increase, and the protection of important in-situ fossils should continue. Outreach efforts should also help to counter looting and vandalism and lead to greater citizen stewardship.

2.2.8.5 Key Features

The Late Cretaceous fossil vertebrates from the western Kaiparowits Plateau to the Skutumpah Terrace are globally unique and are the highest significance, most sensitive paleontological resource in the Planning Area. Management strategies should continue to make the active management of the fossils in these areas a priority. Secondarily, vertebrate fossils of the Chinle and Morrison Formations should also receive elevated management. Beyond this, resources with potential looting issues (petrified wood sites) and/or high visitation potential should be prioritized. Additional information about each formation is provided in Appendix 5.

2.2.9 Soil Resources

2.2.9.1 Indicator

Indicators include soil health, specifically the ability of soils to support vegetation and biological soil crusts representative of a particular ecological site (e.g., vegetation type, diversity, density, and vigor); soil vulnerability to impacts (i.e., fragile or sensitive soils; Bryce et al. 2012, Section 4.1.3.1); BLM Utah's Standards for Rangeland Health and Guidelines for Grazing Management, and land disturbance.

2.2.9.2 Current Condition

Soil Characteristics

Most of the soils in the Planning Area are semiarid, young, and poorly developed. Chemical and biological soil development processes, such as rock weathering, decomposition of plant materials, accumulation of organic matter, and nutrient cycling, proceed slowly in this environment. In many areas, natural or geologic erosion rates are too fast to develop distinct, deep soil horizons. Most soils are less than 0.5 meter deep to bedrock. The deeper soils are formed in recent alluvium. Almost all of the local soils are derived from sedimentary rock. The dominant topographic features are structural benches, mesas, valley floors, valley plains, alluvial fans, stream terraces, hills, cuestas, and mountainsides. The Natural Resources Conservation Service (NRCS) has completed soil surveys for BLM in the area.

Dominant soil orders in the Decision Area are Aridisols, Entisols, and Mollisols. Aridisols are dry soils with low organic matter content, and tend to have salt accumulations due to an imbalance between evapotranspiration and precipitation. They are sparsely vegetated by drought- or salt-tolerant plants and, therefore, erosion by wind and water can be severe. Entisols are soils that

have little development, and most are basically unaltered from their parent material. Many different parent materials contribute to varied soil properties of Entisols, and they are often found in areas where soil material is not in place long enough to form distinctive horizons, or associated with parent materials that are highly resistant to weathering (e.g., quartz). Mollisols form in semiarid to subhumid areas and are characterized by high base cation saturation and a significant accumulation of humus in the surface horizons. These mineral soils are typically formed under native grass vegetation and are highly arable. In the Decision Area, approximately 261,000 acres are Aridisols, 840,300 acres are Entisols, and 5,600 acres are Mollisols. Rock outcrops and badlands are also predominant in the Planning Area, accounting for 449,500 acres and 219,400 acres, respectively. Appendix 1, Map 8 shows how the dominant soil orders, and areas with no soil (i.e., rock outcrops and badlands), are distributed within the Planning Area.

Sensitive Soil

Soils that have characteristics that make them extremely susceptible to impacts and difficult to restore or reclaim are considered sensitive soils. Appendix 1, Map 9 is from the Colorado Plateau REA (Bryce et al. 2012) and shows all classes of sensitive soils within each land use Planning Area. Sensitivity classes are combined and include droughty (marked by little or no precipitation or humidity), shallow, hydric (soils permanently or seasonally saturated by water), gypsiferous (soils containing sufficient quantities of gypsum to interfere with plant growth), saline, and high calcium carbonate (calcareous) soils. It should be noted that the REA combines data that are mapped at different scales and does not include data for all sensitive soils in the ecoregion. Table 14 summarizes the acres of sensitive soils within each planning unit.

Table 14. Acres of Sensitive Soil

Land Use Planning Area	Sensitive Soils (acres)
Grand Staircase Unit	179,437
Kaiparowits Unit	354,753
Escalante Canyons Unit	225,091
Kanab-Escalante Planning Area	538,573

Biological Soil Crust

Technical Reference 1730-2, *Biological Soil Crusts: Ecology and Management*, contains a description of biological soil crust distribution and factors influencing species composition, ecological roles, response to natural and human actions, management techniques, and monitoring methods (DOI 2001). It also explains various ecological roles of biological soil crusts.

Biological soils crusts comprise cyanobacteria, fungi, and lichen growing in a symbiotic relationship on the soil surface (Bryce et al. 2012). Soil crusts serve as intermediaries between soil and vegetation. Crusts on fine-textured soils often appear dark, rough, and pinnacled. Those on sand usually do not develop pinnacles and instead appear as a dark, two-dimensional layer on the surface.

Biological soil crusts are an important component of ecosystems in semiarid areas and may represent up to 70 percent of the living cover (Belnap 1995:179). Research has shown that

biological soil crusts provide important contributions to soil stabilization, hydrologic processes, nutrient cycling, and biological diversity in rangeland ecosystems (Miller 2008:251). Biological soil crusts have a stronger direct effect on surface soil stability than plants or mycorrhizal fungi (Chaudhary et al. 2009:116). Biological soil crusts are susceptible to damage by compression caused by grazing or off-road driving and can be adversely affected by fire. Researchers have developed models to facilitate the comparison between actual and potential cover and composition of biological soil crusts. This is so that sites in poor condition can be identified and management changes can be implemented (Miller 2008:251; Bowker et al. 2006:519).

Due to the importance of biological soil crusts in rangeland health, biological soil crust integrity was also assessed in the Planning Area (Miller 2008). Quantitative data on biological soil crust composition, abundance, and distribution were compared to reference areas; ratings were informed by preliminary results from a concurrent project to develop a spatial predictive model of biological soil crust cover in GSENM (Bowker et al. 2006). The study found that fine-loamy soils associated with the semidesert loam ecological site had high potential to support biological soil crust development (Miller 2008:259). This ecological site corresponds to the Wyoming Big Sagebrush, Saltbush, Blackbrush, Spiny Hopsage, Black Sagebrush, Torrey's Jointfir, Utah Juniper – James' Galleta, and Utah Juniper-Pinyon ecological site types, which are present throughout the Planning Area. Given the sensitivity of soils and high biological soil crust potential of these sites, and the importance that biological soil crusts play in soil stabilization and other rangeland health factors, the functional significance for biological soil crusts in these sites is particularly high (Miller 2008:259).

Soil crusts are useful ecological indicators of desert condition because they are not only sensitive to disturbance but they respond to disturbances in predictable and quantifiable ways (Bryce et al. 2012). Semi-arid and arid landscapes with sparse vegetation and biological soil crust cover lack redundancy in function (Bryce et al. 2012). In other words, when crust is eliminated, so too are the essential functions it provides: nitrogen fixation, carbon storage, the capture of dust and airborne nutrients, moisture retention, and the provision of microsites for native plant germination. Soil crusts may take decades to recover from disturbance. Therefore, they are not good short-term indicators of the appropriateness of current management actions.

Biological soil crusts are ubiquitous within the Planning Area. Maps of potential crust abundance indicate the potential quantitative cover of biological crusts and major crust constituents (mosses, lichens, dark cyanobacterial crusts) across the Colorado Plateau (Appendix 1, Map 10 and Map 11). Comparisons of observed crust distribution with potential distribution can serve as a surrogate for reference condition.

2.2.9.3 Trends

Persistent wind and water erosion of soil are natural phenomena in desert ecosystems. However, human activities, including past mining, recreation, and grazing, disturb the soil surface, affecting protective crusts and vascular plants and exposing underlying soils to wind and water erosion (Bryce et al. 2012).

Six allotments did not meet Standard 1 in the 2006 Rangeland Health Determinations. Since 2006, BLM, in coordination with permittees, has made changes in the Circle Cliffs, Coyote, Mollies Nipple, Soda, Upper Paria, and Vermilion allotments, which failed to meet Standard 1 due to livestock grazing. Such changes include seeding restoration, restriction of seasons of use, maintenance of range improvements, voluntary nonuse, and removal of feral cattle. As a

result of these changes, many areas that did not meet standards are now making progress toward doing so, based on recent upland assessments. See Appendix 9, Table 2, for more information.

2.2.9.4 Forecast

BLM expects human activities to continue to disturb soil surfaces, thereby affecting soil surface conditions and biological soil crusts and exposing underlying soils to wind and water erosion.

2.2.9.5 Key Features

According to the Colorado Plateau REA, biological soil crust is a key conservation element (Bryce et al. 2012). Biological soil crusts are also identified as a monument object, along with unusual and diverse soils.

2.2.10 Special Status Species (Threatened, Endangered, and Sensitive)

On the lands it manages in the Decision Area, BLM is directly responsible for managing habitat for special status species and is indirectly responsible for the health of special status species that these habitats support. These species are animals and plants that require specific management attention as a result of population or habitat concerns. The four categories of these species are:

- Federally Listed Threatened and Endangered Species and Designated Critical Habitats
- Federally Proposed Species and Proposed Critical Habitats
- Federal Candidate Species
- Bureau Sensitive Species as designated by the State Director, including all documented or suspected Federal candidate species, those that are listed by Utah as endangered or threatened, and any other species that may be designated by the director

Endangered or threatened species are those that the Secretary of the Interior has officially listed under the Endangered Species Act (ESA) and for which a final rule has been published in the *Federal Register*. Proposed species are those that the Secretary has officially proposed for listing as endangered or threatened and for which a proposed rule has been published in the *Federal Register*. Candidate species are those that USFWS has designated as candidates for listing as endangered or threatened and are included on a list published in the *Federal Register*. Candidate status indicates that existing information warrants listing the species but other species have higher priority for listing.

BLM has two objectives for special status species: to conserve or allow to recover ESA-listed species and their habitats so that ESA protections are no longer needed and to initiate conservation measures that reduce or eliminate threats to Bureau sensitive species so as to minimize the likelihood of, and need for, listing under the ESA (BLM 2008b).

It is BLM's policy to provide sensitive species with the same level of protection provided to candidate species (BLM 2008b); that is, to ensure that actions authorized, funded, or carried out do not contribute to the need for the species to become listed. The sensitive species designation is normally used for species that occur on BLM-administered surface land for which it has the capability to significantly affect the conservation status of the species through management.

The Utah BLM State Director's sensitive species list includes sensitive animal and plant species that BLM and UDWR recognize. Many of the sensitive species listed by BLM overlap with the Utah sensitive species list; however, because the lists are maintained separately, they differ slightly. These lists are subject to periodic updates, and new lists will be incorporated into the LUP through plan maintenance or amendments. The most recent IM listing Utah BLM State sensitive species is IM UT-2011-037 (BLM 2011b), updated July 27, 2011.

2.2.10.1 Indicators

Plants

The indicators for special status plants include population demographics, species range-wide distribution, habitat quality and distribution, fecundity, pollinator status, presence of invasive species, threats to and impacts on the species, existence of recovery or conservation strategies or other formalized conservation planning tools, climate change, and changes in fire frequency and intensity.

The objectives of the BLM Special Status Plant Species Program are to (1) conserve and/or recover ESA-listed species and the ecosystems on which they depend so that ESA protections are no longer needed for these species, and (2) to initiate proactive conservation measures that reduce or eliminate threats to BLM-designated sensitive species to minimize the likelihood of and need for listing of these species under the ESA.

Special status plants are routinely surveyed for as part of project clearances. Mitigation measures are implemented when special status plants are present in areas of planned management activities. Locations of special status plants are recorded on survey forms and via GIS.

Wildlife

Federally listed species can have critical habitat identified as crucial to species viability. For listed species that have not had critical habitat designations identified, BLM cooperates with USFWS to determine and manage habitats of importance. The mission of USFWS is to work with other Federal, State, and local agencies to conserve, protect, and enhance fish, wildlife, and plant species and their habitats. Protective measures for migratory birds are provided in accordance with the Migratory Bird Treaty Act and the Bald and Golden Eagle Act. Other fish and wildlife resources are considered under the Fish and Wildlife Coordination Act of 1934.

It is in the interest of BLM to implement conservation actions for sensitive, non-listed species before listing is warranted. It is also in the interest of the public for BLM to implement conservation actions that improve the status of such species so that their Bureau sensitive recognition is no longer warranted. In so doing, BLM will have greater flexibility in managing the public lands to accomplish native species conservation objectives and other legal mandates. BLM Manual 6840 provides policy and guidance for the conservation of BLM special status species and the ecosystems upon which they depend on BLM-administered lands (BLM 2008a).

The BLM State Director designates Bureau sensitive species, which must be native species found on BLM-administered lands for which BLM has the capability to significantly affect the conservation status of the species through management, and either:

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

BLM must address Bureau sensitive species and their habitats in LUPs and associated NEPA documents. When appropriate, LUPs should be sufficiently detailed to identify and resolve significant land use conflicts with Bureau sensitive species without deferring conflict resolution to implementation-level planning. Implementation-level planning should consider all site-specific methods and procedures needed to bring species and their habitats to the condition under which management under the Bureau sensitive species policies would no longer be necessary.

The discussion of fish in Section 2.2.5, *Fish and Wildlife*, describes habitat indicators relevant to management of both common and special status wildlife species. The same wildlife and wildlife habitat relationships from that section also apply to special status wildlife and fish species.

2.2.10.2 Current Condition

Federal Listed Species

USFWS included a list of species and critical habitat that have been documented in or may be found in the Planning Area. BLM biologists reviewed this list and narrowed it down to special status species that are present or have the potential to be present in the Planning Area. These species are listed in Table 15 below. Accounts for these species follow the table. BLM biologists reviewed and narrowed down the Utah Bureau Sensitive Species List (BLM 2011b) to species in or with potential to occur in the Planning Area. Additional special status species documented in or with the potential to occur in the Planning Area were determined by reviewing the existing MMP (BLM 2000), including the record of consultation with USFWS (BLM 2000:76–82) conducted in preparation of the MMP. These species are described further in Appendix 6, Special Status Species. A map of Mexican spotted owl, southwest willow flycatcher, and greater sage-grouse habitat is contained in Appendix 1, Map 12.

Table 15. Federally Listed Species and Critical Habitat Documented in or Potentially Occurring in the Planning Area

Species	Common name	Federal Status	BLM Status	State Status
Plants				
Asclepias welshii	Welsh's milkweed	T	SS	—
Carex specuicola	Navajo sedge	T	SS	—
Cycladenia humilis var. *jonesii*	Jones's cycladenia	T	SS	—
Physaria tumulosa	Kodachrome bladderpod	E	SS	—
Pediocactus sileri (=Echinocactus s., Utahia s.)	Siler pincushion cactus	T	SS	—
Spiranthes diluvialis	Ute ladies'-tresses	T	SS	—

Species	Common name	Federal Status	BLM Status	State Status
Birds				
Empidonax traillii extimus	Southwestern willow flycatcher	E	SS	FE
Coccyzus americanus	Yellow-billed cuckoo	T	SS	FC[1]
Gymnogyps californianus	California condor	Exp	Exp	Exp
Strix occidentalis lucida	Mexican spotted owl	T	SS	FT
Fishes				
Gila cypha	Humpback chub	E	SS	FE
G. elegans	Bonytail chub	E	SS	FE
Ptychocheilus lucius	Colorado pikeminnow	E	SS	FE
Xyrauchen texanus	Razorback sucker	E	SS	FE

Sources: McQuivey 2015; BLM 2000, 2011; EPA GIS 2015; Spence 2014; UDWR 2011
[1] Yellow-billed cuckoo was federally listed as threatened in 2014; the Utah list has not yet been updated to reflect this change.
Federal status codes: E = Endangered; T = Threatened; C = Candidate; DL = Delisted; Exp = Experimental Population
BLM status code: SS = Sensitive Species; CN = Candidate Species; CA = Conservation Agreement Species
State status codes: SC = Species of Concern; FE = Federal Endangered Species; FT = Federal Threatened Species; FC = Federal Candidate Species; CA = Conservation Agreement Species
BLM – Bureau of Land Management

Bureau Sensitive Species

Bureau sensitive and Utah State rare species are included in Table 16. The table includes a brief description of documented or potential presence in the Planning Area for each species.

Table 16. BLM and State Sensitive Species Documented in or Potentially Occurring in the Planning Area

Species	Common Name	BLM Status	State Status	Occurrence in Planning Area
Plants				
Astragalus ampullarius	Gumbo milkvetch	SS	—	Mixed desert shrub and juniper communities on clay soils of the Chinle and Tropic Shale Formations. In the Planning Area, occurs on Chinle shale outcrops in Cottonwood and Mollies Nipple Allotments; suitable habitat in several additional allotments (BLM 2014).
A. striatiflorus	Escarpment milkvetch	SS	—	Interdune valleys, sandy depressions on ledges, and bars and terraces in stream channels. Occurs in the Planning Area, Coral Pink Sand Dunes State Park, and on private lands.
Dalea flavescens var. *epica*	Hole-in-the-rock prairie-clover	SS	—	Sandstone bedrock and sandy areas in blackbrush and mixed desert shrub communities. Not currently known from Planning Area, though potential habitat exists.

Species	Common Name	BLM Status	State Status	Occurrence in Planning Area
Euphorbia nephradenia	Paria spurge	SS	—	On clay hills, blow sand, and stabilized dunes, mainly from Tropic Shale and Entrada Formations. In the Planning Area, observed on Tropic Shale substrates in the Cottonwood Allotment; potential habitat in several additional allotments (BLM 2014).
Lupinus caudatus var. *cutleri*	Cutler's lupine	SS	—	Pinyon-juniper woodland. In the Planning Area, present in the Clark Bench Allotment; suitable habitat in several additional allotments (BLM 2014).
Oenothera murdockii	Chinle evening-primrose	SS	—	Pinyon-juniper communities on silty clay barrens of the Chinle and possibly Moenkopi Formations. In the Planning Area, on Chinle shale outcrops in the Cottonwood and Mollies Nipple Allotments; suitable habitat in several additional allotments (BLM 2014).
Pediomelum epipsilum	Kane breadroot	SS	—	Pinyon-juniper woodland and desert shrub communities on the Chinle and Moenkopi formations. In the Planning Area, on Moenkopi-derived soils in the Mollies Nipple and White Sage Allotments; suitable habitat in additional allotments (BLM 2014).
Phacelia cronquistiana	Cronquist's phacelia	SS	—	Clay outcrops in pinyon-juniper-sagebrush and ponderosa pine communities. In the Planning Area, on alluvial soils from the Carmel Formation in the Ford Well Allotment (BLM 2014).
P. pulchella var. *atwoodii*	Atwood's pretty phacelia	SS	—	In juniper tree litter on Moenkopi and Carmel soils. In the Planning Area, occurs on outcrops of the Kaiparowits Formation in the Cottonwood, Headwaters, and Mollies Nipple Allotments; suitable habitat in several additional allotments (BLM 2014).
Salvia columbariae var. *argillacea*	Chinle chia	SS	—	Sparsely vegetated pinyon-juniper woodlands on fine-textured, saline clay-silts of the Chinle Formation. In the Planning Area, on barren exposures of Chinle shale in Mollies Nipple Allotment; suitable habitat in several additional allotments (BLM 2014).
Sphaeralcea grossulariifolia var. *fumariensis*	Smoky Mountain mallow	SS	—	Grows with matchweed, ephedra, blackbrush, galleta, shadscale, and juniper; endemic on the Straight Cliffs, Tropic Shale, and Dakota Formations around Smoky Mountain. In the Planning Area, on clinker and alluvial deposits in the Last Chance, Nipple Bench, Rock Creek, Upper Warm Creek, and Wiregrass Allotments (BLM 2014).

Species	Common Name	BLM Status	State Status	Occurrence in Planning Area
Thelypodiopsis ambigua var. *erecta*	Kanab thelypody	SS	—	Pinyon-juniper woodland and desert shrub communities on clay soils derived from purple Chinle shales. In the Planning Area, on Chinle shale in the Mollies Nipple Allotment; suitable habitat in several additional allotments (BLM 2014).
Birds				
Accipiter gentiles	Northern goshawk	CA	CA	One confirmed territory in Mud Springs Canyon; one additional territory in Rock Creek/Mudholes (Kaiparowits Planning Unit). Occasionally observed in winter in pinyon-juniper habitat.
Aquila chrysaetos	Golden eagle	SS	SC	Permanent resident in the Planning Area, commonly observed.
Athene cunicularia	Burrowing owl	SS	SC	Documented in the Hole-in-the-Rock area as well as near Church Wells. Suitable habitat in Kaiparowits Unit (BLM 2014).
Asio flammeus	Short-eared owl	SS	SC	Uncommon permanent resident in the Planning Area.
Buteo regalis	Ferruginous hawk	SS	SC	Commonly observed during winter raptor surveys; two historic unoccupied nests on West Clark Bench.
Centrocercus urophasianus	Greater sage-grouse	CN	FC	Approximately 5,841 acres of wintering habitat PHMA in the Skutumpah/Glendale Bench area (3,969 acres on KEPA Unit and 1,872 acres on Grand Staircase Unit). Approximately 17,813 acres of Opportunity Habitat (13,841 acres on Grand Staircase Unit and 3,972 on KEPA Unit).
Haliaeetus leucocephalus	Bald eagle	SS	SC	Winter resident in the Planning Area. Commonly seen during winter raptor surveys.
Melanerpes lewis	Lewis's woodpecker	SS	SC	Uncommonly observed in pinyon-juniper and oak habitats in the Planning Area.
Mammals				
Corynorhinus townsendii	Townsend's big-eared bat	SS	SC	Know to occur in the Planning Area.
Euderma maculatum	Spotted bat	SS	SC	
Idionycteris phyllotis	Allen's big-eared bat	SS	SC	Known to occur in Planning Area.
Lasiurus blossevillii	Western red bat	SS	SC	Potential habitat in Planning Area.
Myotis thysanodes	Fringed myotis	SS	SC	Known to occur in the Planning Area.
Nyctinomops macrotis	Big free-tailed bat	SS	SC	Confirmed at the Planning Area through mist net capture (BLM 2008b).
Amphibians				

Species	Common Name	BLM Status	State Status	Occurrence in Planning Area
Bufo microscaphus	Arizona toad	SS	SC	Very localized at Sheep Creek crossing on Skutumpah Road, where a concrete weir or spillway impounds and creates standing water (Oliver 2003).
Reptiles				
Sauromalus ater	Common chuckwalla	SS	SC	Localized in southern portion of the Planning Area, along lower Little Valley, Croton, and Last Chance Creek Canyons (Oliver 2003). Present in the KEPA and Kaiparowits Units only.
Xantusia vigilis	Desert night lizard	SS	SC	Localized between Kelly Grade and Last Chance Creek along the Smoky Mountain Road (Oliver 2003); potentially in Glen Canyon (NPS 2014:118). Present in the KEPA and Kaiparowits Planning Units only.
Fishes				
Catostomus discobolus	Bluehead sucker	CA	CA	Present in the Escalante Canyons Planning Unit only.
C. latipinnis	Flannel mouth sucker	CA	CA	Present in the Escalante Canyons Planning Unit only.
Gila robusta	Roundtail chub	CA	CA	Present in the Escalante Canyons Planning Unit only.

Sources: BLM GIS 2015; Hughes 2015; McQuivey 2015; additional references in table
BLM Status Code: SS = Sensitive Species; CN = Candidate Species; CA = Conservation Agreement Species
State Status Codes: SC = Species of Concern; FE = Federal Endangered Species; FT = Federal Threatened Species; FC = Federal Candidate Species; CA = Conservation Agreement Species
BLM – Bureau of Land Management, KEPA – Kanab-Escalante Planning Area, PHMA – Priority Habitat Management Area

Greater Sage-Grouse

Greater sage-grouse is considered a sagebrush ecosystem obligate species; it relies on sagebrush on a landscape level and on a microhabitat scale. It requires large, intact, interconnected expanses of sagebrush shrubland to exist (Connelly et al. 2004; Wisdom et al. 2011). As a landscape-scale species, it moves between habitats seasonally, and generally requires contiguous winter, breeding, nesting, and summer habitats to sustain a population (Connelly et al. 2011).

During the spring breeding season, male greater sage-grouse congregate to perform courtship displays to attract females on areas called leks. Females nest under shrubs with an herbaceous understory, thus providing cover and hiding them from view (Bunnell 2000). Chick survival is associated with higher grass and forb understory cover. This is because chicks eat insects for their first 3 weeks and mostly forbs until they are 3 months old (Barnett and Crawford 1994; Gregg et al. 1994; Connelly et al. 2004; Casazza et al. 2011:4-9). As the herbaceous understory in sagebrush habitats begins to dry out in midsummer, greater sage-grouse move to where the herbaceous understory is green, including higher elevations or in valleys where succulent forbs are present (Bunnell 2000). In winter, they rely almost entirely on sagebrush for food and thermal cover. They congregate at lower elevations, where sagebrush habitat is available above snow (Crawford et al. 2004; Schroeder et al. 1999).

There are approximately 5,841 acres of greater sage-grouse Priority Habitat Management Area (PHMA) and 17,813 acres of Opportunity Habitat in the Skutumpah/Glendale Bench of the Planning Area. PHMAs are areas identified as having the highest conservation value for maintaining sustainable greater sage-grouse populations. PHMA in the Planning Area comprises the far southern portion of the Panguitch population area, and it is identified as wintering habitat (BLM and U.S. Forest Service 2015: see Maps 1.1 and 1.2). Opportunity Habitat is identified as areas that contain elements of sage-grouse habitat and could become occupied with land management practices promoting healthy sagebrush steppe. Habitat in the Panguitch population area is experiencing localized threats of habitat loss from pinyon-juniper encroachment. Greater sage-grouse habitat acreages in the Planning Area and Decision Area are presented below and shown in Appendix 1, Map 12.

Table 17. Greater Sage-Grouse Habitat in the Planning and Decision Areas

Greater Sage-Grouse Habitat	Acres By Planning Unit			
	KEPA	Grand Staircase	Kaiparowits	Escalante Canyons
PHMA	3,969	1,872	0	0
Opportunity Habitat	3,972	13,841	0	0

KEPA – Kanab-Escalante Planning Area, PHMA – Priority Habitat Management Area

2.2.10.3 Trends and Forecast

Utah is rich in native flora and is remarkable for its large numbers of endemic and rare plants, which are attributed to the State's diverse range of habitats (UDWR 1998:3, 4). Monitoring for three federally listed plant species in the Planning Area indicates that trends for individual species range from relatively stable to declining. A range of threats, including habitat degradation from improper livestock grazing, trampling, unauthorized or cross-country OHV use, weed spread, and pinyon-juniper encroachment, may affect individual species in different ways. However, the threat of climate change and its associated precipitation, wildfire, and herbivory effects may be the most significant threat faced by the species. Little information is available documenting the current trends, habitat conditions, and population size of most special status plant populations throughout the State (UDWR 2005).

As mentioned above, droughts pose a substantial threat to vegetation, fish, and wildlife, including special status species. Warming temperatures, drought, and other extreme weather effects are expected to increase in frequency and will likely contribute to impacts on special status plant and animal species and their habitat as climate change continues.

The Colorado Plateau REA suggests that that the ecoregion is expected to undergo general warming over the entire region, with as much as a 3.6 °F (2 °C) increase by 2060 in some locations, particularly in the southern portion of the ecoregion (Bryce et al. 2012:130). Average summer temperatures are expected to increase, but even greater increases are simulated for the winter (Bryce et al. 2012:130). Vegetation communities expected to have the greatest exposure (i.e., higher probability for change) to climate change are shrublands (especially big sagebrush and blackbrush-Mormon tea communities), riparian vegetation, and pinyon-juniper woodland (Bryce et al. 2012:155). Insects and disease will play a collateral role with the effects of climate change in altering the dominance and distribution of various vegetation species (Bryce et al. 2012:155), which will in turn alter the distribution and availability of habitat for special status species.

Few data exist to determine trends for special status fish species in the Planning Area. Surveys of fish species richness in the Escalante River in Glen Canyon and what was to become the Planning Area in the 1970s commonly found both native and introduced fish species (Holden and Irvine 1975; BLM 2008b). More recent inventories in the Planning Area identified four native, special status fish species: speckled dace, flannelmouth sucker, bluehead sucker, and roundtail chub (Fridell et al. 2003).

Properly functioning riparian conditions in good ecological condition are necessary to maintain quality fish habitat; the amount of properly functioning riparian and wetland habitat may be used as a rough proxy for the current condition and trends of special status fish habitat in the Planning Area. Riparian proper functioning condition (PFC) assessments completed in the Planning Area between 2000 and 2013 show that 48 percent of lentic sites were in PFC, and an additional 16 percent were functioning at risk (FAR), with an upward trend toward PFC. Thirty-one percent of lentic sites were FAR, with a downward trend or no apparent trend, and 5 percent were nonfunctional. Of lotic sites, 49 percent were in PFC, 17 percent were FAR with an upward trend, 24 percent were FAR with no apparent or a downward trend, and 10 percent were nonfunctional (BLM 2015a). These data suggest that most riparian and wetland sites assessed are in functioning condition or are moving toward functioning condition and likely contribute to the maintenance of special status fish habitat in the Planning Area.

This trend is in contrast to wider regional and statewide trends for special status fish. Special status fish species populations have generally been declining throughout Utah. The downward trend is largely due to habitat degradation and loss of habitat complexity caused by erosion, riparian vegetation removal, and channelization (UDWR 2011). Additionally, increased drought, stream dewatering, and fish barriers pose substantial threats to sensitive aquatic species recovery and contribute to declining numbers. Nonnative predation on and resource competition with special status fish species also threaten native aquatic populations throughout Utah.

The Colorado Plateau REA modeled near-term (2025) aquatic habitat intactness in the Colorado Plateau ecoregion, which includes the Planning Area. Modeled habitat intactness for aquatic species, including razorback and flannelmouth sucker and Colorado cutthroat trout, declined from low to very low (Bryce et al. 2012:121), indicating declining trends for these species.

Trends for two federally listed bird species in the Planning Area may also be closely tied to the condition of the riparian system in the Planning Area. The southwestern willow flycatcher and western yellow-billed cuckoo both rely on dense riparian systems at critical stages of their life cycles (USFWS 2002a; UDWR 2011). Critical habitat for southwestern willow flycatcher in the Planning Area exists along the Paria River, and nonbreeding individuals have been observed in riparian areas in both the Paria and Escalante River corridors. Potentially suitable habitat for western yellow-billed cuckoo may be present in the Planning Area in riparian habitats. This species has been observed in dense riverside tamarisk thickets at several locations on the Colorado and San Juan Rivers (NPS 2014:120). However, this species has not been observed in the Planning Area. Improving riparian habitat in the Planning Area would improve potential breeding habitat for these species in the Planning Area.

Several breeding pairs of Mexican spotted owl have been observed over multiple years in the Planning Area (Willey 2007:3; Hockenbary and Willey 2010:9). Critical habitat exists in the Planning Area, and nesting territories are also protected by seven federally designated

protected activity centers (PACs), a component of the species' recovery plan (USFWS 2012). Population trends across the species' range remain unclear, due to few data on populations or occupancy rates (USFWS 2012:30); similarly, conclusions cannot be drawn from the limited data available in the Planning Area.

Regional habitat intactness can be used to gauge trends for terrestrial special status wildlife species. The Colorado Plateau REA modeled near-term (2025) terrestrial habitat intactness. Results indicate relatively small changes in the negative direction (i.e., lower habitat intactness). According to the REA near-term (2025) terrestrial habitat intactness model, greater sage-grouse showed the most notable declines in habitat quality of all the bird species, due to development projected in the ecoregion (Bryce et al. 2012:121). Because development density is much lower in the Planning Area, habitat declines there for greater sage-grouse would be less notable than modeled in the REA. Other bird species, including Mexican spotted owl, golden eagle, burrowing owl, and peregrine falcon, all currently have a wider range of more intact habitat classes (Bryce et al. 2012:121). These species showed consistent declines in higher-quality habitat intactness, with matching increases in lower-quality habitat intactness in the near term (2025) (Bryce et al. 2012:121).

2.2.10.4 Key Features

Key features include:

- Canyons with perennial water (such as Paria River, Hogeye Canyon, Snake Canyon, Starlight Canyon, Box Elder, Henrieville Creek, Alvey Wash, Deer Creek, and Boulder Creek) are valuable for raptor nesting and wintering, including eagles, falcons, and Mexican spotted owls, and as nesting and migration habitat for birds, and are important to all species of bats for foraging.
- Caves, crevices, mine shafts, and adits are valuable for bat life history needs. Falcons nest in cracks and crevices and on ledges.
- River systems such as Escalante River and Paria River are valuable for historic habitat for four threatened and endangered fish species, and act as current habitat for three sensitive species.
- Greater sage-grouse PHMA habitat on Skutumpah Terrace/Glendale Bench is valuable, as it is the last remaining occupied greater sage-grouse habitat within the Planning Area. It is critical to the survival of the species in the local area.
- Mexican spotted owl PACs are the center of activity for breeding and nesting Mexican spotted owls.
- Shrubland habitat (Skutumpah Terrace) is valuable because big sagebrush tall enough to be above snow cover supports greater sage-grouse winter use. Big sagebrush canopy cover of 15 to 25 percent is associated with successful greater sage-grouse nesting and early brood-rearing.
- Mixed conifer is important for bird nesting, bat roosting, and habitat for woodpeckers and raptors.
- Snags are important for bird and bat occupation, roosting, nesting, and feeding.
- Springs, seeps, and streams are important for drinking water and succulent green forage year-round. They are also fish, frog, and toad habitat.
- Natural or man-made open water habitat is very important to bats.
- Aspen is important for nesting sites for Northern goshawk.

- Ponderosa pine provides habitat for northern goshawk, Lewis's woodpecker, and many other species.

2.2.11 Vegetation

2.2.11.1 Upland Vegetation

Upland vegetation includes those species not associated with rivers, creeks, lakes, springs, wetlands, or other surface or shallow subsurface water. The vast majority of vegetation within the Planning Area is upland vegetation (Appendix 1, Map 13). Upland vegetation provides an enormous variety of functions in an ecosystem, and also provides for a variety of human and animal uses. Upland vegetation stabilizes soils, prevents erosion, uses carbon dioxide, releases oxygen, increases species diversity, and provides habitat and food for animals and resources for human use.

Ecosystems reflect complex sets of interactions between plants, animals, soil, water, air, temperature, topography, fire, and humans. Influences exerted on one component affect other components in the system. Upland vegetation provides many functions within ecosystems. Many of BLM's land management policies are directed toward managing for healthy upland vegetative communities that support resistant and resilient ecological systems.

Indicators

BLM Utah Rangeland Health Standards provide qualitative indicators to help in determining if standards are being met within the Planning Area and are appropriate to use at the planning level scale. Standard 3 is the most applicable to upland vegetation and states that desired species, including native, threatened, endangered, and special status species, are maintained at a level appropriate for the site and species involved. Other indicators may be appropriate depending on the scale of the analysis (e.g., project, planning, and landscape levels). BLM completed an evaluation of rangeland health in 2006 in the Planning Area. Additional upland assessments were conducted in 2013 and 2014.

Interpreting Indicators of Rangeland Health (Pellant et al. 2005) provides an assessment protocol for qualitative, preliminary evaluation of soil/site stability, hydrologic function, and biotic integrity at the ecological site level. The technical approach provides early warnings of potential problems and opportunities and helps communicate ecological concepts to a wide variety of audiences (Pellant et al. 2005:1). *Interpreting Indicators of Rangeland Health* requires the use of the ecological site concept, which is a classification system that divides landscapes based on the potential of the land to produce distinctive kinds, amounts, and proportions of vegetation. This potential is determined by soils, climate, and topography (Pellant et al. 2005:9). Personnel conducting the assessment evaluate the functional status of 17 qualitative indicators (Pellant et al. 2005:12).

Current Condition

The Colorado Plateau REA (Bryce et al. 2012) includes a discussion of the current condition of upland vegetation within the ecoregion. The REA designates eight upland vegetation types (as defined in the Southwest Regional Gap Analysis Project [SWReGAP]) as REA conservation elements. The upland vegetation types selected represent the regional range in elevation and aridity within the ecoregion.

Seven of the vegetation types are represented in the Decision Area; acres in the Decision Area are presented in parentheses in the following: Colorado Plateau Pinyon-Juniper Woodland (577,600 acres), Inter-Mountain Basins Big Sagebrush Shrubland (384,400 acres), Inter-Mountain Basins Montane Sagebrush Steppe (10,900 acres), Rocky Mountain Gambel Oak-Mixed Montane Shrubland (40,700 acres), Colorado Plateau Pinyon-Juniper Shrubland (10,900 acres), Colorado Plateau Blackbrush-Mormon-Tea Shrubland (245,400 acres), and Inter-Mountain Basins Mixed Salt Desert Scrub (139,800 acres) (Bryce et al. 2012:12; REA GIS 2012). Table 18 compares vegetation types described in the REA to the National Vegetation Classification System (NVCS) macrogroups described below. Acres reported above vary from those in Table 18 because of the different data sources for the REA vegetative communities and the NVCS macrogroups.

Table 18. Vegetation Types

REA Conservation Elements	SWReGAP Cover Type	NVCS Macrogroup	NVCS Code	Acres in Decision Area (%)[1]
Colorado Plateau Pinyon-Juniper Shrubland; Colorado Plateau Pinyon-Juniper Woodland	Colorado Plateau Pinyon-Juniper Shrubland; Colorado Plateau Pinyon-Juniper Woodland	Rocky Mountain Two-Needle Pinyon-Juniper Woodland	M027	946,100 (42%)
Not an REA Conservation Element	Colorado Plateau Mixed Bedrock Canyon and Tableland; Inter-Mountain Basins Active and Stabilized Dune; Inter-Mountain Basins Shale Badland; Inter-Mountain Basins Volcanic Rock and Cinder Land	Intermountain Basin Cliff, Scree, and Rock Vegetation	M118	607,100 (27%)
Colorado Plateau Blackbrush-Mormon-Tea Shrubland	Colorado Plateau Blackbrush-Mormon-Tea Shrubland; Inter-Mountain Basins Semi-Desert Shrub Steppe; Southern Colorado Plateau Sand Shrubland; Grassland; Inter-Mountain Basins	Great Basin and Intermountain Dry Shrubland and Grassland	M171	355,000 (16%)
Inter-Mountain Basins Big Sagebrush Shrubland; Inter-Mountain Basins Montane Sagebrush Steppe	Inter-Mountain Basins Big Sagebrush Shrubland; Inter-Mountain Basins Montane Sagebrush Steppe	Great Basin and Intermountain Tall Sagebrush Shrubland and Steppe	M169	182,400 (8%)
Inter-Mountain Basins Mixed Salt Desert Scrub	Inter-Mountain Basins Mat Saltbush Shrubland; Inter-Mountain Basins Mixed Salt Desert Scrub	Great Basin Saltbrush Scrub	M093	96,200 (4%)

REA Conservation Elements	SWReGAP Cover Type	NVCS Macrogroup	NVCS Code	Acres in Decision Area (%)[1]
Not an REA Conservation Element	Inter-Mountain Basins Greasewood Flat	Cool Semi-Desert Alkali-Saline Wetland	M082	21,400 (1%)
Not an REA Conservation Element	Rocky Mountain Ponderosa Pine Woodland; Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland	Northern Rocky Mountain Lower Montane and Foothill Forest	M017	14,700 (1%)
Not an REA Conservation Element	Rocky Mountain Lower Montane Riparian Woodland and Shrubland	Rocky Mountain and Great Basin Flooded and Swamp Forest	M034	7,100 (<1%)
Not an REA Conservation Element	Invasive Annual Grassland; Invasive Southwest Riparian Woodland and Shrubland; Invasive Annual and Biennial Forbland	Introduced and Semi Natural Vegetation	M332	8,100 (<1%)
Not an REA Conservation Element	Developed	Recently Disturbed or Modified	M333	7,000 (<1%)
Not an REA Conservation Element	Rocky Mountain Cliff and Canyon	Rocky Mountain Cliff, Scree and Rock Vegetation	M113	6,200 (<1%)
Rocky Mountain Gambel Oak-Mixed Montane Shrubland	Rocky Mountain Gambel Oak-Mixed Montane Shrubland	Southern Rocky Mountain Montane Grassland and Shrubland	M049	3,500 (<1%)

Source: NVCS GIS 2014
[1] Acres reported above vary from those previously described for the REA vegetative communities because of the different data sources for the REA vegetative communities and the NVCS macrogroups.
REA – Rapid Ecoregional Assessment, SWReGAP – Southwest Regional Gap Analysis Project, NVCS – National Vegetation Classification System

Within the last 50 years in the ecoregion, the large blocks of intact vegetation that characterized the Colorado Plateau have been fragmented or otherwise affected by nonnative plants, minerals development including oil and gas leasing and uranium mining, recreation, livestock grazing, and rural home development, road building, and expanding off-road vehicle usage (Bryce et al. 2012:45).

The Planning Area supports a diversity of existing and potential upland vegetation types. Vegetation types are controlled in large part by site-specific topography, soil type, and climatic conditions. Existing vegetation types in the Planning Area are described using the NVCS. It identifies 12 major existing vegetation types (macrogroups) in the Planning Area (Table 18). The NVCS macrogroups were identified by using BLM IM 2013-111 to crosswalk from the SWReGAP data (Table 18); the macrogroups represent the vegetation types that are present in the Planning Area.

The NVCS macrogroups do not distinguish between upland and riparian vegetation types. Ten of the vegetation types listed in Table 18 are upland vegetation types. Cool Semi-Desert Alkali-Saline Wetland (M082) and Rocky Mountain and Great Basin Flooded and Swamp Forest (M034) are riparian and/or wetland vegetation types and are included in the table for completeness. Riparian and wetland vegetation is discussed in the following section.

While NVCS macrogroups describe the vegetation types that are currently on the ground, ecological site descriptions may be used to describe the potential of a given area to support a certain vegetation community, regardless of what is presently on the site. Ecological site descriptions are a useful tool for evaluating the land's suitability for various land uses, capability to respond to different management activities or disturbance processes, and ability to sustain productivity over the long term.

An ecological site is a "distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation" (NRCS 2018). There are 62 recognized ecological sites within the Planning Area, though many of these sites contain similar vegetation types. Ecological site descriptions provide information on:

- Site characteristics, including physiographic, climate, soil, and water features
- Plant communities, including plant species, vegetation states, and ecological dynamics
- Site interpretations, including management alternatives for the site and its related resources
- Supporting information, such as relevant literature, information, and data sources

The same ecological site will be found on the landscape wherever the same prevailing climate, topographic, and soil characteristics occur. Information provided by ecological site descriptions can be used to interpret how a given site may respond to management actions when compared with other sites in the area. Ecological site descriptions also help to inform management over large areas that include many sites with different soils, topography, climate, and expected plant community composition, production, and disturbance regimes.

Over a 3-year period, *Interpreting Indicators of Rangeland Health* was used to evaluate the status of three ecosystem attributes (soil/site stability, hydrologic function, and biotic integrity) at over 500 locations in and adjacent to the Planning Area. The assessment results indicate that big sagebrush ecological sites with relatively high production potential had high frequencies of assessments with low ratings for all three ecosystem attributes; in contrast, shallow-soil ecological sites with relatively low production potential and the presence of Utah juniper and Colorado pinyon had low frequencies of assessments and low ratings for all three attributes (Miller 2008:260).

The low ratings were attributed to the following factors:

- Potential primary production and long-term exposure to production-dependent land-use activities such as livestock grazing
- The presence of unpalatable woody plants that have the capacity to increase and become persistent site dominants due to selective herbivory, absence of fire, or succession
- Soil texture through effects on hydrologic responses to grazing, trampling, and other disturbances

- Past management that resulted in high livestock use of ecological sites with sensitive fine-loamy soils following treatments designed to increase forage availability (Miller 2008:260)

Trends

Vegetation communities in the Colorado Plateau ecoregion and within the Planning Area have historically been affected primarily by invasive species conversion and uncharacteristic native vegetation (such as pinyon-juniper expansion). REA data show that the largest changes within the Planning Area occur in mixed mountain shrubland, where over 85 percent has been affected by uncharacteristic native vegetation, likely pinyon-juniper expansion. Pinyon-juniper shrubland has also experienced substantial changes, with over 20 percent affected by invasive grasses. Disturbances, such as fire and particularly mechanical treatments, have also affected vegetation communities in the Planning Area. The greatest effects from disturbances have occurred in the big sagebrush shrubland community, with 10 percent of the vegetation community affected (BLM GIS 2014a; REA GIS 2012). Other influences in the ecoregion include urbanization and roads, agriculture, and fire, though these have had less of an effect in the Planning Area (Bryce et al. 2012:86; BLM GIS 2014a; REA GIS 2012). Depending on the characteristics of the plant community and the type and intensity of grazing, livestock grazing has also had effects on vegetation, such as changes in plant species composition, aboveground primary productivity, and root and soil attributes (Milchunas 2006).

Rangeland health assessments and range monitoring indicate trends and issues in different vegetation communities. These trends are not always in agreement with the larger-scale REA data. This is because the rangeland health assessments are site specific, evaluating on-the-ground conditions. Most oak woodland and pinyon-juniper communities evaluated during rangeland health assessments had no to slight departure from reference conditions (BLM 2006). Many of the blackbrush, sagebrush grassland seedings, desert shrub, and grassland and meadow sites showed moderate, moderate to extreme, and extreme departures from reference conditions (BLM 2006). Departures from reference conditions for upland vegetation identified in rangeland health assessments are as follows (BLM 2006):

- Blackbrush—Soil erosion, exotic invasion, and loss of species composition
- Desert shrub—Shifts in species composition, exotic invasion, soil loss, and soil erosion
- Sagebrush grassland seedings—Reduction in biological soil crust, shift in functional/structural groups, increased soil erosion, and bare ground
- Seedings—Soil stability, desirable species composition, seeded species die-off, and increased cover of exotic annual plants, such as cheatgrass and scotch thistle

In addition, desert and semidesert sand ecological sites, originally a shrub-steppe type composed of Atriplex canescens-bunchgrass (Achnatherum and Hesperostipa), show some of the greatest departures from historical conditions. This appears to be due primarily to overgrazing in the past, possibly before World War II. This eliminated biological soil crusts and grass cover, followed by wind mobilization of sands, especially during periods of drought.

Pinyon-juniper woodlands have expanded over the last century into grassland and shrubland ecosystems throughout the western United States. Livestock grazing, changes in fire regimes, and increasing atmospheric CO_2 concentrations are thought to be more recent drivers of pinyon-juniper woodland distribution. However, one study suggests that past climate has been more important than livestock grazing in influencing pinyon-juniper persistence in the Planning Area (Barger et al. 2009:536). Furthermore, many old (over 200 years) pinyon pines were found

within the Planning Area, indicating that pinyon pines have long been established within the Planning Area (Barger et al. 2009:537). As such, juniper is likely the predominant species that expanded in the Planning Area.

Forecast

Climate change may affect vegetation, particularly as temperature increases interact with water limitations. In many vegetation communities, canopy cover of perennial plants has been shown to be sensitive to temperature, whereas canopy cover of annual plants responds to cool season precipitation (Munson et al. 2011:1). REA models predict increasing temperatures in all seasons. For 2015 to 2030, reductions in both the winter and summer precipitation (reduction in the monsoon) are expected; for 2045 to 2060, a slight increase in annual precipitation is expected, particularly during winter. Current annual precipitation rates in the Planning Area are shown in Appendix 1, Map 14.

Winter precipitation is critical to perennial native plants and enhances annual productivity for certain species (Bryce et al. 2012:145). If both winter and summer precipitation is reduced, trees, especially pinyon pine, and grasses may be reduced (Bryce et al. 2012:145; Munson et al. 2011:1; Barger et al. 2009:537), while shrubs are likely to continue to expand (Munson et al. 2011:1). For woody species, drought-induced water stress has been linked to bark beetle infestations leading to die-off (Breshears et al. 2005:15147). However, interspecific competition may play a role in mediating the effects of climate change (Derner et al. 2003:458).

The REA model predicts the contraction of some of the drier shrublands (sagebrush in particular), savanna pinyon-juniper, and some evergreen forest by 2060, while grasses are expected to expand in the ecoregion (Bryce et al. 2012:145). Within the Planning Area, the REA predicts a 26 percent reduction in evergreen tree savanna, such as ponderosa pine, and 17 percent reduction in evergreen shrub savanna, such as sagebrush and saltbrush. The largest expansions are predicted in grasslands, such as those composed of sandhill muhly and blue grama, with up to a twenty-fold predicted increase (BLM GIS 2014a; REA GIS 2012). For both the 2015 to 2030 and 2045 to 2050 periods, the seasonality and intensity of precipitation will be a key factor. If the trend is toward wetter winters or springs, the invasive grasses, such as cheatgrass, will spread and burn in the summer and fall, reinforcing their persistence over larger areas. If multiple wet years occur, grasses may have the advantage over shrubs in establishment and survival (Bryce et al. 2012:145).

Key Features

Early seral communities that are dominated by nonnative annual grasses and forbs are in a relatively stable state. These areas have crossed an ecological threshold and are likely not to return to native communities without a considerable investment. These areas are isolated in the Decision Area and generally occur in relation to wildfires. Wildfires are typically revegetated through ESR efforts. Although most of these efforts have been determined to be successful following the collection of monitoring data, there are isolated locations that have been unsuccessful and are dominated by annual grasses and forbs.

Management will focus on areas at risk with considerable quantities of desirable native vegetation and where trends can be monitored. However, it is important to ensure that all areas in the Decision Area continue to be monitored effectively and efficiently to ensure sustainable

management of the public land. Short-term and long-term monitoring tools will continue to be utilized to assess the condition of the vegetative community. The key area concept will be utilized extensively to monitor the management of public lands to ensure vegetative community maintenance/improvement.

The proclamation establishing GSENM (see Appendix 11) identifies the following objects related to vegetation: hanging gardens, tinajas, rock crevice, canyon bottom, and dunal pocket floristic communities; endemic plants and their pollinators; relict plant communities, including No Man's Mesa; pinyon-juniper communities with up to 1,400-year-old trees; and riparian corridors.

Utah has one of the highest rates of endemism in the U.S. and Kane and Garfield Counties have the highest rate of endemism in Utah. Many endemic species are also rare due to their restricted range. There are about 125 species of plants in GSENM that occur only in Utah or on the Colorado Plateau and 11 species of plants in GSENM are found nowhere else (Belnap 1997).

Relict plant communities are areas that have persisted despite the climate changes that have occurred in the west over the last few thousand years (BLM 2000:25) and/or have not been influenced by settlement and post-settlement activities (such as domestic livestock grazing). This isolation, over time and from disturbance, has created unique areas that can be used as a baseline for gauging impacts occurring elsewhere in GSENM and on the Colorado Plateau (BLM 2000).

Hanging gardens occur where groundwater surfaces along canyon walls from perched water tables or bedrock fractures. The existence of hanging gardens is dependent on a supply of water from these underground water sources. The geologic and geographic conditions for hanging gardens exist throughout southern Utah (BLM 2000:25), including in GSENM. Due to the conditions of isolation produced in hanging gardens, there is a potential for unique species in these areas (BLM 2000).

2.2.11.2 Riparian Vegetation

Riparian vegetation generally occurs next to rivers, creeks, lakes, springs, and wetlands. Riparian areas are a transition zone between upland and aquatic ecosystems. Riparian areas occur where water is perennial, intermittent, or ephemeral. Riparian areas are defined as a form of wetland transition between permanently saturated wetlands and upland areas. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. Lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels are typical riparian areas (Leonard et al. 1992:7).

Wetlands occur in spaces between terrestrial and aquatic systems where the water table is usually at or near the surface or where shallow water covers the land (Cowardin et al. 1979). Soil, water conditions, and vegetation type distinguish wetlands from all other ecosystems. The U.S. Army Corps of Engineers regulates wetlands, which are defined as "those areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and

similar areas" (U.S. Army Corps of Engineers 1987:9). Wetlands must have one or more of the following three attributes:

- At least periodically, the land supports predominantly hydrophytes (plants that grow only in water or very moist soil).
- The substrate is predominantly undrained hydric soil (soil formed under conditions of saturation, flooding, or ponding).
- The substrate is not solid, is saturated with water, or is covered by shallow water at some time during the growing season of each year.

Both riparian areas and wetlands are composed of aquatic vegetation with unique soil characteristics that developed under the influence of perennial water. The increased moisture found in these areas produces unique plant communities that differ noticeably from the surrounding upland vegetation.

Indicators

PFC is a qualitative method for assessing the condition of riparian-wetland areas. The term is used to describe both the assessment process and a defined, on-the-ground condition of a riparian-wetland area. The on-the-ground condition termed PFC refers to how well the physical processes are functioning. PFC is a state of resilience that allows an area to produce desired values. Riparian-wetland areas that are not functioning properly cannot sustain these values. PFC is a qualitative assessment performed by an interdisciplinary team. Functioning condition is rated by category to reflect ecosystem health. These are defined as follows:

- **PFC***:* When adequate vegetation, landform, or large woody debris is present to dissipate energy associated with high water flow; filter sediment, capture bedload, and aid floodplain development; improve floodwater retention and groundwater recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics; and support greater biodiversity.
- **FAR***:* Riparian-wetland areas that are in functioning condition, but an existing soil, water, or vegetation attribute makes them susceptible to degradation.
- **Nonfunctional**: Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows, and therefore are not reducing erosion, improving water quality, and the like.
- **Unknown**: Riparian-wetland areas that have not been inventoried or about which there is insufficient information to make any form of determination.

The *Standards for Rangeland Health and Guidelines for Grazing Management for BLM Lands in Utah* (BLM 1997) established guidelines for managing riparian-wetland resources. Standard 2 states: "Riparian and wetland areas are in properly functioning condition. Stream channel morphology and functions are appropriate to soil type, climate, and landform." PFC is one tool for determining whether livestock grazing management on an allotment is in compliance with this standard.

Riparian-wetland areas are monitored using quantitative short-term and long-term indicators. The methodology for measuring indicators is primarily based on *Monitoring Stream Channels and Riparian Vegetation – Multiple Indicators* (Burton et al. 2007), or Multiple Indicator Monitoring. This monitoring protocol addresses 10 procedures that can be used to monitor streams and associated riparian vegetation. Seven procedures provide indicators for long-term

trend. These indicators include greenline composition, woody species regeneration, streambank stability, channel and water width, water depth, and substrate composition. Permanent photo points are also used to determine trend. Three indicators help determine whether short-term guidelines are meeting allowable use criteria: woody species use, stubble height, and streambank alteration.

Current Condition

Many riparian ecosystems have been lost or degraded since Euro-American contact. Causes of this decline include direct conversion to other uses, changes in the natural flow regimes and suppression of fluvial processes, improper livestock grazing, and invasive species (Bryce et al. 2012). The mechanism by which this degradation occurs varies, depending on the threat. For example, improper livestock grazing has the potential to alter streamside morphology, increase sedimentation, degrade riparian vegetation through trampling and consumption, and cause nutrient loading to the system. In contrast, invasive plant species, such as tamarisk (*Tamarix* spp.) or Russian olive (*Elaeagnus angustifolia*), change riparian areas by successfully outcompeting native riparian species. Species such as tamarisk produce seeds multiple times in a year and are more tolerant of drought and flow alterations than native species (Bryce et al. 2012). In addition, Russian olive has been shown to alter stream hydrology and nutrient cycling and to substantially lower habitat quality for migratory bird species (Zouhar 2005).

In addition, while BLM considers tamarisk a significant change agent in the ecoregion, the species has been declining. This is due to the tamarisk leaf beetle (*Diorhabda carinulata*), which the United States Department of Agriculture (USDA), Agricultural Research Service in Lovelock, Nevada, released in 2001 as a bio-control agent for tamarisk. The beetle's range quickly expanded, and there are a number of sites in Utah where it has been released since 2004. Since then, the beetle has spread and has destroyed tamarisk in some parts of the Planning Area. Studies have shown that defoliation can destroy tamarisk in 3 to 5 years (Clements et al. 2012), but this may vary.

BLM has conducted PFC assessments on 192 lotic[sites and 142 lentic sites in all four Planning Areas. This was part of the rangeland health evaluations between 2000 and 2013 (Appendix 7, PFC Assessment Results for Lentic Sites, and Appendix 7, PFC Assessment Results for Lotic Sites). In 2006, BLM issued Rangeland Health Determinations; sites were determined to meet Standard 2 if they were rated FAR with an upward trend or PFC. Sites with other ratings were not considered to meet Standard 2. Since the 2006 rangeland health determinations, additional assessments have been conducted and assessment results have been updated.

As of the latest assessment, 68 lentic sites (48 percent of all sites assessed) were in PFC. In addition, 23 sites (16 percent) were FAR with an upward trend, while 44 sites (31 percent) were FAR with either no apparent trend or a downward trend, and 7 sites (5 percent) were nonfunctional. As presented in Appendix 7, PFC Assessment Results for Lotic Sites, 93 lotic sites (49 percent of all sites assessed) were in PFC as of the latest assessment. In addition, 32 sites (17 percent) were FAR with an upward trend, while 47 sites (24 percent) were FAR with either no apparent trend or a downward trend, and 20 sites (10 percent) were nonfunctional.

Springs and seeps also occur in the Planning Area. Springs occur where water flows from an underground aquifer to the surface and usually emerge from a single point. Seeps are similar to springs, though they generally have a lower flow rate than springs and emerge over a larger

area, having no well-defined origin. Due to their higher volume, springs have the potential to form a stream and create riparian habitat (USFWS undated). Springs are important components of the desert ecosystem for a number of reasons. Historically, springs were the only reliable source of water for humans and animals, other than perennial streams, which are limited in the Planning Area. Springs are biodiversity hotspots that support a large proportion of the aquatic and riparian species in arid regions (Sada and Pohlman 2002).

Trends

Riparian systems throughout the Colorado Plateau ecoregion have experienced substantial changes due to direct conversion to other uses, changes in the natural flow regimes and suppression of fluvial processes, livestock grazing, and invasive species (e.g., tamarisk) (Bryce et al. 2012:88). Given their productivity and importance to animals, riparian areas have a greater potential to be affected by livestock grazing compared with adjacent, less-productive communities, but also potential for more rapid recovery from disturbance because of faster vegetation growth rates (Milchunas 2006:80).

In the Planning Area, PFC assessments noted impacts from heavy use by livestock of riparian and wetland areas, such as increased sloughing and erosion of banks from hoof action and trampling of vegetation near springs, in many of the allotments assessed. Other impacts noted included dewatering, loss of riparian and wetland vegetation, poor recruitment of native species, and replacement of native species by tamarisk, Russian olive, and annual grasses and forbs. In many areas, a change to existing grazing administration was identified as needed to meet or make significant progress toward meeting the rangeland health standard for riparian and wetland areas (BLM 2006). To address these issues, BLM and permittees took a variety of measures on allotments not meeting rangeland health standards due to livestock grazing in 2006, including coordinating voluntary nonuse, removing feral cattle, fencing springs and seeps, repairing existing infrastructure, and changing season of use.

Since 2000, monitoring has occurred on approximately 360 miles of streams (i.e., lotic reaches) and at more than 100 seeps or springs (i.e., lentic sites). BLM has conducted additional PFC assessments in the Circle Cliffs, Collet, Cottonwood, Ford Well, Fortymile Ridge, Headwaters, Hells Bellows, Last Chance, Lower Cattle, Mollies Nipple, Soda, Swallow Park, Upper Paria, and Vermilion allotments since the assessments done for the 2006 rangeland health determinations.

In 2013, Garfield County contracted riparian PFC assessments on all riparian areas in the Cottonwood, Death Hollow, Lower Cattle, Mollies Nipple, and Soda allotments. These allotments are part of a group of 18 allotments found to be not meeting Standard 2 in the 2006 rangeland health determinations for the Planning Area.

The results of these assessments indicated that the BLM management actions to correct riparian issues associated with livestock grazing improved rangeland health. The report by the Garfield County contractor (Stager's Environmental Consulting 2014) concludes that the Cottonwood, Death Hollow, and Lower Cattle allotments are likely meeting BLM *Colorado Public Land Health Standards* as a result of BLM management. The report also concludes that Mollies Nipple and Soda allotments are likely not meeting BLM *Colorado Public Land Health Standards* due to livestock grazing, but that BLM has made measureable progress toward meeting standards since the 2006 determination (Stager's Environmental Consulting 2014). Overall, most of the evaluated riparian and wetland sites show an improvement.

Forecast

Based on recent PFC assessments, the condition of riparian and wetlands resources is improving on the assessed allotments (Stager's Environmental Consulting 2014). As BLM makes additional management adjustments on these and other allotments not meeting Standard 2, the overall riparian and wetland condition would improve .

Given the presence of the tamarisk leaf beetle, it is expected that tamarisk will reduce in density. Depending on future management, this could allow for the natural recolonization of native riparian vegetation.

Key Features

Key features for riparian-wetland resources include prioritizing riparian-wetlands areas, especially those not at PFC or not moving toward PFC. Riparian-wetland areas will be prioritized based on several factors including, but not limited to, species (both aquatic and terrestrial) affected, size, condition, public interest, intensity and timing of threats, and funding availability.

Monitoring, both qualitative and quantitative, riparian-wetland areas and identifying causal factors for why riparian-wetland areas are not meeting or moving toward PFC will be important in implementing management actions and projects to reverse trends. Monitoring will also evaluate the effectiveness of management changes and actions.

Special designations, such as ACECs and WSR suitability, can be used to protect important features of riparian-wetland areas in the Decision Area.

2.2.11.3 Noxious Weeds And Nonnative Invasive Plants

In general, weeds disrupt or have the potential to disrupt or alter the natural ecosystem function, composition, or diversity of the site they occupy. These species can complicate the use of local natural resources and may interfere with management objectives for the site.

Invasive plants are either not native to the area where they are growing or, if native, are a minor component of the original plant community or communities. These species have the potential to become a dominant or co-dominant species on the site if their future establishment and growth is not controlled by management interventions. Invasive plants also include noxious weeds. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants (BLM Handbook H-1740-2, Integrated Vegetation Management). Invasive plants are widespread and can damage crops, affect entire industries, and harm the environment and public health. Organisms that have been moved from their native habitat to a new location, especially from a different country, are typically referred to as nonnative.

Noxious weeds are plant species designated by a Federal or State law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or nonnative, new, or not common in the United States (BLM Handbook H-1740-2, Integrated Vegetation Management). Noxious weeds in the Planning Area are native or nonnative plants as designated by the Utah Noxious Weed Act of 2008. Although noxious weeds are usually nonnative, this document makes a distinction because native plants can be considered invasive.

Indicators

Invasive species include plants able to establish on a site where they were not present in the original plant community. Invasive species aggressively out-compete native species within a community and often alter the physical and biotic components enough to affect the entire ecological community. Invasive species are of particular concern following ground disturbances. Promotion of ecosystem health is essential to accomplish the BLM mandate of multiple use of the public lands.

BLM defines a noxious weed as "a plant that interferes with management objectives for a given area of land at a given point in time" (BLM 1996). Noxious weeds are defined in the Rangeland Health Standards and Guidelines (BLM 1997) as nonnative plants that are especially undesirable because they have no forage value and are sometimes toxic or are capable of invading plant communities and displacing native species. BLM recognizes noxious weed invasions as one of the greatest threats to the health of rangelands nationwide.

Most invasive and noxious weeds known to occur in Utah were originally introduced to North America from Europe and Asia. Most invasive plant introductions have been unintentional. Once established, these plants spread rapidly by natural (e.g., wind, water, and wildlife) and artificial (e.g., roads, equipment, and the movement of contaminated feed and seed) means. Invasive plants typically invade disturbed soils and stressed plant communities. Once established, invasive plants can invade healthy vegetative communities and significantly alter established ecosystems. Noxious and invasive plants mainly occur along roads, recreational destinations, pipelines, ROWs, and livestock/ wildlife/wild horse paths and congregation areas.

Invasive and noxious weeds typically have reproductive, morphological, and physiological attributes that allow them to effectively compete with native vegetation. Most invasive species have several of the following characteristics:

- Perennial in nature, reproducing by rhizomes, roots, and/or vegetative parts
- Continuous seed production throughout the growing season
- Production of high numbers of seed, up to 500,000 per year
- Unique ways of dispersing and spreading their seed
- Ability of seeds to remain dormant in the soil for extended periods
- Ability to grow under adverse conditions
- Adaptable to a wide variety of soil and climatic conditions
- Compete well for soil moisture and nutrients
- Possess genetic adaptability

Noxious weed management is a high priority for the Planning Area. A considerable budget allocation is made each year to support this program. BLM closely coordinates and cooperates with other Federal, State, and county agencies and adjoining private landowners; this is an important part of the BLM integrated management approach. In addition, there is a Cooperative Weed Management Area established with Kane County and Garfield County, which has been beneficial to the noxious weed control efforts.

Current Condition

Invasive plants are found in the Planning Area, particularly in areas disturbed by surface activities. These plants displace native plant communities and degrade wildlife habitat. Table

19 lists the Utah-designated noxious weeds that may occur in the region, the current management class for each species, and their occurrence in the Planning Area. In addition, Russian olive (*Elaeagnus angustifolia*), camelthorn (*Alhagi pseudalhagi*), and Ravenna grass (*Saccharum ravennae*) occur in Glen Canyon.

Table 19. Utah Noxious Weeds Occurrence in the Planning Area

Common Name	Scientific Name	Class	Occurrence
Bermudagrass	*Cynodon dactylon*	B	X
Canada thistle	*Cirsium arvense*	C	–
Dalmatian toadflax	*Linaria dalmatica*	B	–
Diffuse knapweed	*Centaurea diffusa*	A	–
Dyers woad	*Isatis tinctoria*	B	–
Field bindweed	*Convolvulus arvensis*	C	X
Hoary cress	*Cardaria* spp.	B	X
Houndstongue	*Cynoglossum officinale*	C	–
Johnsongrass	*Sorghum halepense*	A	X
Musk thistle	*Carduus nutans*	B	–
Perennial pepperweed	*Lepidium latifolium*	B	–
Poison hemlock	*Conium maculatum*	B	X
Purple loosestrife	*Lythrum salicaria*	A	–
Quackgrass	*Elytrigia repens*	C	X
Russian knapweed	*Acroptilon repens*	B	X
Tamarisk (salt cedar)	*Tamarix* spp.	C	X
Scotch thistle	*Onopordum acanthium*	B	X
Spotted knapweed	*Centaurea biebersteinii*	A	–
Squarrose knapweed	*Centaurea virgate*	B	–
Yellow starthistle	*Centaurea solstitialis*	A	–

Sources: Utah Weed Control Association 2014; Belliston et al. 2009

Class A weeds have a relatively low population size within the State and are of highest priority; they are considered an *Early Detection Rapid Response* weed. Class B weeds have a moderate population throughout the State and generally are thought to be controllable in most areas. Class C weeds are found extensively in the State and are thought to be beyond control. Statewide efforts would generally be toward containment of smaller infestations.

In the Colorado Plateau ecoregion, cheatgrass (*Bromus tectorum*) has been identified as a significant change agent; the species can alter ecosystem processes, such as fire regimes, has the potential to expand in distribution in spite of human and natural disturbances, and adapts and shifts its range in response to climate change (Bryce et al. 2012:96). However, cheatgrass is not considered as much of a threat in the Planning Area compared to other parts of the ecoregion.

BLM has inventoried and mapped some of the Planning Area to determine the extent of invasive plants. In 2012, BLM inventoried more than 4,600 acres in the Alvey Wash watershed, focusing on Russian olive and tamarisk. Other targeted species included hoary cress, Russian

knapweed, and perennial pepperweed, though no infestations of these species were identified. Within the inventoried area, biologists detected nearly 150 acres of Russian olive and more than 200 acres of tamarisk (Edvarchuk and Ransom 2012:39). Rangeland health assessments found that tamarisk (found at 68 percent of riparian sites), yellow clover (37 percent), and cheatgrass (32 percent) were common at riparian sites assessed between 2000 and 2003 (BLM 2006). Cheatgrass is the predominant nonnative, invasive species in upland sites, having been found in 54 percent of sites assessed; cheatgrass was a dominant species in over 20 percent of those sites (BLM 2006).

Trends

As ground disturbance and human visitation increase in areas of known populations, the likelihood that noxious weeds and invasive plants would move into this disturbance also increases. Another source of potential noxious weed and invasive plant infestations is routine monument operations, such as road maintenance, firefighting, and even weed control operations (Edvarchuk and Ransom 2012:41). Focused efforts have limited the spread and reduced the size of invasive plant populations in some areas. Such efforts include spot treatment of noxious weeds, pre-emergent herbicide application prior to seeding (targeting cheatgrass), mowing or Dixie harrowing and seeding, prescribed fire use, and follow-up seeding post-treatment.

Over a 6-year study in the Planning Area, researchers identified the following patterns across the landscape related to invasive plants:

- Native and nonnative plant species thrive in rare, mesic habitats that are high in soil fertility, moisture, and foliar cover.
- Highly disturbed habitats, such as post-burn areas, have exceedingly high levels of plant invasions related to the destruction of soil crusts and local displacement of native species by nonnative species.
- More common xeric habitats are high in endemic species and have considerably lower nonnative species and cover.
- Plant species life history can be an important predictor of successful invasion because it integrates specific environmental variables (Stohlgren et al. 2006:282).

Forecast

BLM expects noxious weeds and nonnative, invasive plant species to continue to spread in many areas. The REA predicts an 85 percent increase in invasive species distribution within the Planning Area by 2025 (BLM GIS 2014a; REA GIS 2012). In some areas, control efforts will eradicate species locally. The degree to which these species spread is directly correlated to human activities and control efforts in the area. Some of these species are very invasive and readily transported to uninfested areas. Surface-disturbing activities and vehicular travel mainly contribute to weed proliferation, although natural elements, such as wind and wildlife, will likely also contribute. Range animals, such as livestock and feral and domesticated horses, will also increase the opportunities for invasive plant species to spread and become established through transfer or improper grazing management practices through overgrazing.

Noxious weeds and nonnative, invasive plants will be more likely to establish in newly disturbed areas, especially near existing populations. Because management in the Planning Area discourages development, these areas are likely to be localized and easily treated.

While it is difficult to predict future introductions of noxious weeds and nonnative, invasive species, the most likely areas for introduction are those where new disturbances occur. Historic evidence indicates that new weed species introduced to the Planning Area will establish if not eradicated immediately.

Control of noxious weeds and nonnative, invasive plants would depend on the cost and feasibility of available treatment methods. Resource management strategies are in place that would contribute to maintaining current levels or reducing the expansion of these species. Examples of these strategies are minimizing surface disturbance and surface-disturbing activities, requiring prompt reclamation of these disturbed areas, reducing traffic through infested areas, and using fire suppression tactics. Research continues to develop new herbicide formulations and test the effectiveness of biological agents, including pathogens, as tools to control weed species.

Key Features

Noxious weeds are able to invade any habitat in the Planning Area. This makes noxious weeds especially hard to locate and monitor. As previously discussed, noxious weeds are excellent pioneering species, which allows them to be the first species established after ground disturbances. Common ground-disturbing activities that create habitats susceptible to noxious weed establishment across the Planning Area include fire, roads, ROWs, OHV use, and grazing. Once established in a disturbed area, noxious weeds are more effective at obtaining the required nutrients, water, and sunlight necessary for growth and survival, which prevents the establishment of desirable plants. Once firmly established in disturbed habitats and depending on the species, noxious weeds can be effective at invading previously undisturbed habitats.

Management will focus on areas that already have noxious weeds present and new areas of disturbance (e.g., wildfires and ROWs). In addition, BLM will continue supporting and working with established Cooperative Weed Management Area groups in Kane and Garfield Counties to provide for the control/elimination of noxious weeds.

2.2.12 Visual Resources

The BLM Visual Resource Management (VRM) system consists of three phases: the visual resource inventory (VRI), the establishment of management classes and corresponding objectives through the land use planning process, and the analysis of site-specific management actions to ensure compliance with the objectives established in the LUP. The intent is to minimize the visual impacts of all ground-disturbing activities, regardless of the management class in which they occur.

VRI classes are determined by documenting the following:

Scenic Quality – a measure of visual appeal. The scenic quality classes are:

- Class A: Distinctive, high degree of visual variety
- Class B: Common or typical, moderate degree of visual variety
- Class C: Minimal value or below average, low degree of visual variety

Viewer Sensitivity – a measure of the public's tolerance for change in the visual environment

- High sensitivity
- Medium sensitivity

- Low sensitivity

Distance Zones – where the landscape is viewed from:

- Foreground/Middleground Zone: from viewing platform to 3 to 5 miles out
- Background Zone: from edge of Foreground/Middleground Zone to 15 miles out
- Seldom-seen Zone: areas not visible in Foreground/Middleground or Background Zones and areas beyond the Background Zone

VRM classes are established during the land use planning process by balancing inventoried visual values with other resource needs and uses. These VRM classes establish defined objectives, as follows, for future management of BLM-administered surface land:

- ***Class I Objective***: To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention. (WSAs, wild sections of WSRs, and other congressionally and administratively designated areas where decisions have been made to preserve a natural landscape are assigned VRM Class I per policy clarification in IM No. 2000-096.)
- ***Class II Objective***: To retain the existing character of the landscape. The level of change to the characteristic landscape should be low.
- ***Class III Objective***: To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.
- ***Class IV Objective***: To provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

Dark Night Sky Resources

Agency-wide, BLM faces increasing interest in the use of BLM-administered surface lands for differing types of activities, developments, and visitor services. In many locations this increase in development activity has led to an increase in outdoor nighttime lighting. The increase in nighttime lighting can contribute to anthropogenic sky-glow that impairs the visible clarity of starlit skies, affects migratory bird flight patterns and other nocturnal wildlife behavior, and affects human health and welfare.

Changing natural night sky conditions can affect ecological, cultural, scientific, recreational, and scenic resources and can have unintended consequences on community economies. In addition to resource impacts, indiscriminate lighting that causes nighttime glare can also create unsafe conditions within outdoor work environments as well as health-related effects on people living nearby.

Night sky resources are increasingly of public concern and noted during scoping for planning efforts and review of proposed projects on BLM-administered surface lands. In response, the agency is currently developing BMPs to provide comprehensive technical guidance on practical methods for reducing impacts from artificial lighting that addresses the array of light sources, natural and social resources, and dark environments specific to BLM-administered surface lands and land uses.

2.2.12.1 Indicators

The resource condition of the Planning Area is one of exceedingly undeveloped and intact natural visual resource condition. One of the scoring factors that determines the Scenic Quality

Rating score is cultural modifications. Cultural modification scores can be assigned in both positive and negative values to rate whether modifications add favorably to the visual environment or create levels of strong disharmony with the natural, characteristic landscape. There are 48 Scenic Quality Rating Units in the inventory area and of those all or some portion of all units are within the Planning Areas. Ten of the 48 Scenic Quality Rating Units have negative cultural modification scores of -1.0 or -0.5 of a possible -4.0. These 10 units comprise less than 10 percent of the Planning Area.

Dark Night Sky Indicators

The resource condition of night skies within the Planning Area is exceptionally unpolluted dark night skies. More than 90 percent of the Planning Area qualifies as "pristine," which means that observers would see no indication of artificial sky-glow anywhere in the night sky, from the zenith down to the horizon.

2.2.12.2 Current Condition

GSENM and KEPA lands were partially inventoried in the early 1990s. Those data were used to prepare the existing GSENM MMP. An updated VRI for lands in the Planning Area and some additional KFO lands began in 2012 and was finalized in April 2018.

More than 60 percent of the lands within the Planning Area inventoried as VRI Class II, the highest classification based on combinations of scenic quality, public sensitivity, and proximity to viewing platforms like commonly used roads. Slightly more than 20 percent inventoried as VRI Class III and less than 20 percent inventoried as VRI Class IV. Additionally, the highest rated Scenic Quality Rating Unit in Utah BLM-administered surface lands is the Upper Escalante Unit (score of 28), which includes the upper reaches of the Escalante River, Calf Creek, and the lower reaches of Death Hollow. VRI Classes are shown in Appendix 1, Map 15 and Map 16. Current VRM classifications in the Planning Area are shown in Appendix 1, Map 17.

Table 20. Draft VRI Class Acres by Administrative Unit without VRI Class I Shown

Administrative Unit	VRI Class			Total Acres
	II	III	IV	
GSENM – Escalante Canyons	229,629	13,556	0	243,185
GSENM – Grand Staircase	176,347	22,368	13,186	211,901
GSENM – Kaiparowits	294,419	72,758	183,857	551,034
KEPA	459,666	277,752	137,147	874,565
Total	1,160,061	386,433	334,190	1,880,685

VRI – Visual Resource Inventory, GSENM – Grand Staircase-Escalante National Monument, KEPA – Kanab-Escalante Planning Area

Table 21. Draft VRI Class Acres by Administrative Unit with VRI Class I Shown

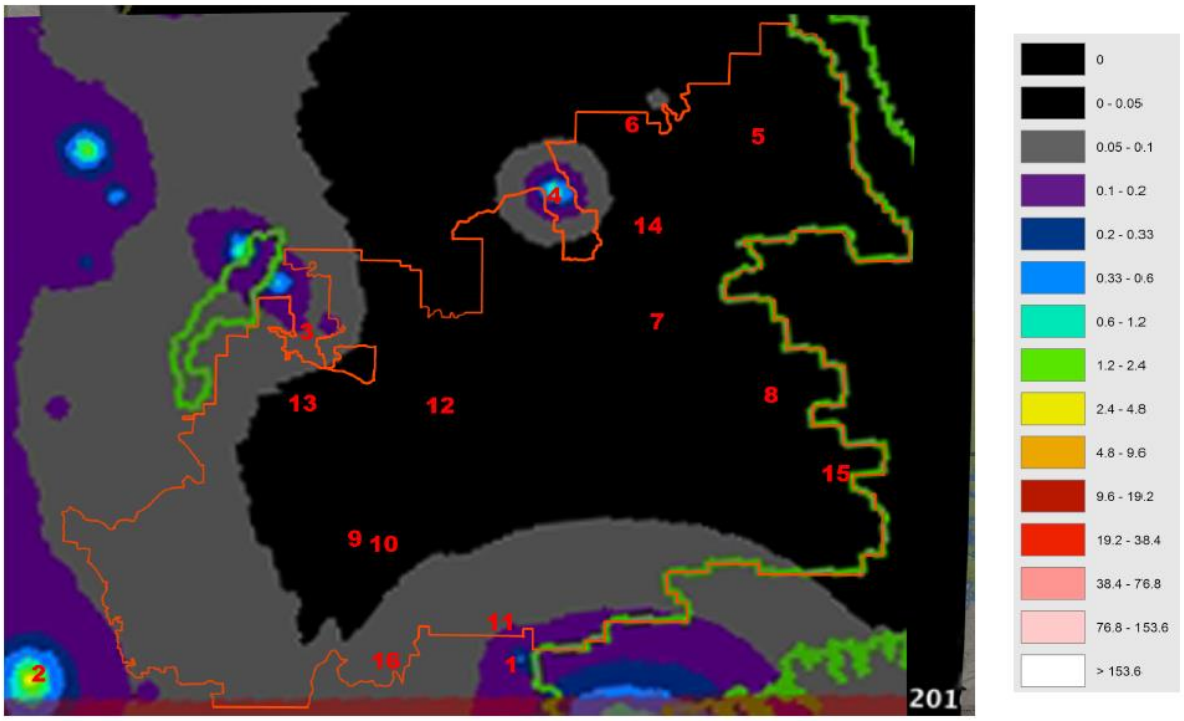
Administrative Unit	VRI Class				Total Acres
	I	II	III	IV	
GSENM – Escalante Canyons	184,822	53,497	4,866	0	243,185
GSENM – Grand Staircase	74,739	111,284	15,612	10,266	211,901
GSENM – Kaiparowits	411,890	55,900	15,335	67,909	551,034

Administrative Unit	VRI Class				Total Acres
	I	II	III	IV	
KEPA	209,829	337,236	206,567	120,934	874,565
Total	881,280	557,916	242,380	199,109	1,880,685

VRI – Visual Resource Inventory, GSENM – Grand Staircase-Escalante National Monument, KEPA – Kanab-Escalante Planning Area

Dark Night Sky Current Condition

In 2016, an inventory conducted by a Weber State University and International Dark Skies (IDA) team working under a GSENM science permit (UT-16-035-05-S) using satellite imagery and on-ground readings revealed that the Planning Area is one of the most naturally dark outdoor spaces left in the lower 48 States. Measurements from the Visible Infrared Imaging Radiometer Suite instrument aboard the Suomi National Polar-orbiting Partnership satellite suggest, on the basis of light escaping to space, that the night skies over 90 percent of the Planning Area qualifies under the descriptive term "pristine." In such conditions, only natural sources of light, such as starlight, airglow, aurora, and zodiacal light, are visible to the human eye. Ground measurements of zenith sky luminance in the Planning Area supported that conclusion: excluding measurements around populated places around the edges of the Planning Area, the mean zenith luminance was 21.8±0.06 magnitudes per square arcsecond, comparable to the lower limit of 21.9 to 22.0 magnitudes per square arcsecond established by natural night sky phenomena (IDA and Ogden Valley Starry Nights Chapter 2016).



Note: the black area indicates where true natural darkness exists.

Figure 2. Satellite-derived Artificial Light Ratio for the Planning Area

According to *The New World Atlas of Artificial Night Sky Brightness* (Falchi et al. 2016), only 30.4 percent of the land area of the United States experiences this degree of natural darkness on a regular basis, much of which is in the State of Alaska. The routinely seen pristine night skies in the Planning Area are a rarity.

An inventory in 2016 of fixed artificial light sources on developed structures within the Planning Area revealed that fewer than 30 total lights exist (Citation Oil facility: 18 lights [6 poles with 3 lights per pole]; Calf Creek Campground: 2 lights under the porches of the restroom and 2 lights inside each restroom, 7 lights on the Paria Contact Station buildings).

2.2.12.3 Trends

The vast majority of public lands in the Planning Area are undeveloped and exhibit intact natural visual characteristics due to the remote, rugged, and inaccessible quality of the area. Though not dominant in most locations, development imprints on the land include transmission lines, roads, livestock grazing infrastructure and vegetation treatments, and recreational developments. Sparse population density and a large contiguous tract of BLM-administered surface lands with few private inholdings or SITLA lands (which were traded out shortly after the designation of GSENM) have resulted in a stable trend for maintaining scenic quality in the Planning Area since designation of GSENM in 1996 where management decisions and objectives have limited large-scale development projects.

BLM analyzes all proposed projects on public lands for their visual impacts and compliance with VRM class objectives. Projects are planned to include design features to meet or exceed VRM class objectives so that projects blend in with the natural landscape character and impacts on the visual environment are minimized. This approach has been and continues to be effective in the Planning Area.

Dark Night Sky Trends

Development in the western United States is projected to continue to increase in coming decades. The nearest metropolitan area with a population more than 150,000 is St. George, Utah. It is currently one of the fastest-growing cities in the country and is about 125 straight miles from the core of the Planning Area (The Spectrum 2017). The next nearest large metropolitan areas are Las Vegas, Nevada, at about 225 straight miles to the southwest and Salt Lake City, Utah, at about 300 straight miles to the north. Increasing development typically results in increased levels of sky-glow, so additional sky-glow from peripheral and adjacent development areas is likely to be detected.

Utah surpassed Texas in 2015 with more IDA dark sky designations than any other State. To date, Utah has 12 dark sky designations (4 National Monuments, 2 National Parks, 4 State parks, 1 county park, and 1 town) and numerous others in process. The Planning Area is surrounded by several designations protecting night skies at a variety of scales.

Gateway communities to areas with dark night skies are seeing increasing visitation and economic development opportunities associated with astrotourism, such as dark sky festivals hosted by National Parks in the region. Such activities are currently hosted in the Bryce area to the west, in the Torrey area to the northwest, and in the Page, Arizona, area to the southeast.

2.2.12.4 Forecast

Anticipated future visitation increases will likely result in additional recreational infrastructure (trailheads, campgrounds, trails). Additional livestock grazing infrastructure and vegetation treatments are likely to be implemented. A modest number of local- and regional-scale utility ROWs are likely to be authorized if past trends continue. This range of developments could result in increased visual contrasts, especially foreground scenes, throughout the Planning Area.

Current management precludes development of mineral, oil and gas, and other extractive resources. Should those occur in the KEPA in the future, significant changes to the visual environment would occur, likely resulting in a downgrading of the VRI values.

Dark Night Sky Forecast

Residential and commercial development around the edges of the Planning Area is likely in the local communities, and with it would likely come an increase in artificial lighting. Concerns for protecting dark sky resources on public lands are projected to continue and increase based on existing trends. Current management of the Planning Area precludes the development of mineral, oil and gas, and other extractive resources, as well as the development of major recreational facilities. Should these or other developments with artificial lighting be authorized and implemented in the future on the KEPA, changes to the pristine dark sky environment could occur, even when utilizing BMPs.

2.2.12.5 Key Features

Lands within the Planning Area contain a high degree of scenic quality and a high level of visual sensitivity, drawing an increasing number of visitors each year who come to the area to recreate and sightsee. These visual attributes have made the Planning Area an internationally recognized, world-famous scenic destination. The GSENM *Recreational Experience Baseline Study Report* (Casey 2014) documented that "scenic quality" was selected more than any other response by focus group participants when asked, "What are the qualities of the place that make it special?" In general, high scenic quality within the Planning Area is a result of the area's extraordinary topography, geology, abundance of canyons and waterways, varieties of vegetation, and cultural history features. Scenically diverse vistas and canyons, rare and unusual geological formations, and colorful and highly contrasting sandstones contribute to the area's high visual quality.

The Planning Area contains thousands of miles of roads, trails, and undesignated routes in canyon bottoms, and more than a million of acres of expansive exploration country that are visited to enjoy the scenery. These areas are described in Section 2.3.7, *Transportation and Access*.

Dark Night Sky Key Features

The Planning Area contains an expansive area of pristine dark night skies. After conducting the analysis associated with the 2016 inventory, John Barentine[1] with IDA noted that:

[1] John Barentine (PhD, University of Texas Austin), Dark Sky Places manager for IDA. Served on the staff of Apache Point observatory in New Mexico (first as an observing specialist on the Astrophysical Research

- The interior (of the original GSENM) is literally as dark as can be measured.
- More than 90 percent of the land area consists of pristine sky, which is basically unprecedented in the continental United States for an area this size.

2.2.13 Water Resources

2.2.13.1 Indicators

Indicators for water resources include State and Federal water quality standards, water uses, and BLM Utah's Standards for Rangeland Health and Guidelines for Grazing Management.

2.2.13.2 Current Condition

Precipitation

In general, the average annual precipitation for the Planning Area is 10 to 20 inches, with areas around Lake Powell receiving fewer than 10 inches and areas north/northeast of Kanab receiving 20 to 30 inches (Utah Division of Water Resources 2014). Escalante has an average annual precipitation of 11 inches (Western Regional Climate Center 2014).

Surface Water Sources

Although water shaped much of the terrain of the Planning Area, there are limited sources of surface water. All the water in this region flows into the Colorado River (whether above or below Glen Canyon Dam). The Planning Area crosses four level four (Hydrologic Unit Code-8) subbasins. From west to east, they are the Kanab Creek Subbasin, the Paria River Subbasin, the Lower Lake Powell Subbasin, and the Escalante River Subbasin.

On the west side of the Planning Area, the Kanab Creek Subbasin (including Johnson Wash and its tributaries) drains into the Grand Canyon.

The Paria River Subbasin (including Hackberry Creek and Cottonwood Creek) extends from the Bryce Canyon-Bryce Valley area, terminating below Glen Canyon Dam near Lee's Ferry. The Paria River is perennial from below the town of Cannonville downstream to below the confluence of Cottonwood Creek, and then becomes intermittent to the Colorado River. The upper reaches of the Paria River are intermittent and often diverted for irrigation of agricultural lands near the towns of Tropic and Cannonville.

Last Chance Creek and Wahweap Creek within the Lower Lake Powell Subbasin are the primary tributaries off the Kaiparowits Plateau, flowing into the main body of Lake Powell. Wahweap Creek and Last Chance Creek are perennial only along portions of their length.

The Escalante River and tributaries—many of which are perennial—within the Escalante River Subbasin flows from the Aquarius Plateau into the upper portions of Lake Powell. Above the town of Escalante, most of the river's flow is diverted seasonally to Wide Hollow Reservoir for irrigation of agricultural lands.

In total, there are approximately 7,500 miles of streams and washes within the Planning Area (USGS 1999). Approximately 96 percent of these are intermittent or ephemeral.

Consortium 3.5-meter telescope and then as an observer for the Sloan Digital Sky Survey) and authored *The Lost Constellations* and *Uncharted Constellations,* both recently published by Springer International.

Groundwater Sources

The Colorado Plateau aquifers underlie the Planning Area (Robson and Banta 1995). The Colorado Plateau aquifers underlie an area of approximately 110,000 square miles in western Colorado, northwestern New Mexico, northeastern Arizona, and eastern Utah. In general, the aquifers in the Colorado Plateau area are composed of permeable, moderate- to well-consolidated sedimentary rocks. Much of the land in this sparsely populated region is underlain by rocks that contain aquifers capable of yielding usable quantities of water of a quality suitable for most agricultural and domestic uses. Groundwater quantity and quality in the Colorado Plateau aquifers are extremely variable.

There are several aquifer systems underlying the Planning Area. The major aquifer system is within the Navajo Sandstone and underlying sandstones that exist in most parts of the area. This system is part of a regional aquifer system that encompasses parts of Colorado, Arizona, and Utah and is now called the Glen Canyon aquifer. This aquifer is recharged partly by precipitation that infiltrates the Navajo Sandstone where it crops out in the northeastern and southwestern parts of GSENM, and partly by snowmelt and rainfall that infiltrate the higher plateaus to the north and the Kaiparowits Plateau where the water must move down through overlying strata before it reaches the Glen Canyon aquifer. The Glen Canyon aquifer sustains part of the base flow in Johnson Creek, the Paria River, and the Escalante River and its tributaries (Freethey 1997).

Other regional aquifers exist under the Planning Area. The Kaiparowits Plateau includes the Mesa Verde, the Dakota, the Morrison, and the Entrada-Preuss aquifers that overlie the Glen Canyon aquifer. Carbonate aquifers of Paleozoic age underlie all of the Planning Area, but are largely inaccessible because of depth. Direction of groundwater movement, estimated from water levels from a few wells and from knowledge about the nature of recharge to aquifers, is from the northwest to the southeast, toward Lake Powell. From meager data sites, it is thought that, locally, groundwater moves toward and discharges into the deepest canyons. Thickness of these regional aquifers ranges from 200 feet for the Dakota aquifer to 2,200 feet for the Glen Canyon aquifer (Freethey 1997).

Springs supply much of the natural water flow within the Planning Area and are important for sustaining ecosystem functions within riparian areas during drier periods. In addition, springs and underground wells supply much of the water used for domestic, municipal, irrigation, and livestock watering in the Planning Area. In 2013, BLM coordinated with the U.S. Geological Survey (USGS) to inventory wells and springs within the Planning Area in an effort to document potential locations for establishing a groundwater monitoring program. The inventory may also be used for estimating potential groundwater withdrawals. The inventory includes springs and wells within 10 miles of the Planning Area boundary. In total, 262 springs and 1,450 underground wells (active water rights) were identified in the Planning Area. Well estimates only include water rights that did not lapse/expire or were not rejected or terminated.

Water Quality

Every other year, the Utah DEQ, Division of Water Quality, compiles all readily available data and conducts analyses to determine whether water quality is sufficient to meet the beneficial uses assigned to waters in Utah (Utah DEQ 2018). The 303(d) List is a list of impaired waters that fail to meet water quality standards. Table 22 identifies the waters in the Decision Area that are on the 2016 draft 303(d) List and their reason for being on the list, and Appendix 1,

Map 18, shows the locations of the waters in the Decision Area that are on the 303(d) List. Data reported here are from the 2016 reporting year.

According to the 303(d) report, the probable sources contributing to impairment are largely unknown; however, where known they do not include livestock grazing or feeding operations, grazing in riparian or shoreline zones, or rangeland grazing. In some cases, livestock grazing may contribute to water quality impairment, whether by direct effects, such as those of animal waste on dissolved oxygen or nutrients (nitrogen or phosphorus), or by indirect effects, such as by increasing erosion, which increases sediment loading (turbidity), total dissolved solids (TDS), and associated metals. Such effects may also impair benthic macroinvertebrate and fish habitat and result in low observed/expected bioassessment scores.

Table 22. Utah 303(d) List of Waters for Reporting Year 2016

Water Body Name	Water Body ID	Location	Size	Cause of Impairment
Birch Creek	UT14070005-002_00	Birch Creek and tributaries from confluence with Escalante River to headwaters	30.355	Temperature
North Creek-Escalante	UT14070005-003_00	North Creek and tributaries from confluence with Escalante River to headwaters	49.72	Dissolved oxygen Temperature
Calf Creek	UT14070005-007_00	Calf Creek and tributaries from confluence with Escalante River to headwaters	8.121	Temperature
Escalante River Upper	UT14070005-012_00	Escalante River from Boulder Creek confluence to Birch Creek confluence	29.555	OE bioassessment Total dissolved solids
Wahweap Creek	UT14070006-001_00	Wahweap Creek and tributaries from Lake Powell to headwaters	0.113	Selenium, dissolved Temperature Total dissolved solids
Last Chance Creek	UT14070006-004_00	Chance Creek and tributaries from Lake Powell to headwaters	16.075	OE bioassessment Total dissolved solids
Paria River-1	UT14070007-001_00	Paria River from start of Paria River Gorge to headwaters	28.797	Temperature Total dissolved solids
Paria River-2	UT14070007-002_00	Paria River from Cottonwood Creek confluence to start of Paria Gorge	34.553	Temperature Total Dissolved Solids
Cottonwood Creek	UT14070007-004_00	Cottonwood Creek and tributaries from confluence with Paria River to headwaters	6.348	Dissolved oxygen
Paria River-3	UT14070007-005_00	Paria River and tributaries from Arizona-Utah State line to Cottonwood Creek confluence	11.031	OE bioassessment
Johnson Wash-1	UT15010003-004_00	Johnson Wash and tributaries from Utah-Arizona State line to Skutumpah Canyon confluence	22.113	Boron total Selenium, dissolved Total dissolved solids

Water Body Name	Water Body ID	Location	Size	Cause of Impairment
Johnson Wash-2	UT15010003-005_00	Johnson Wash and tributaries, from (including) Skutumpah Canyon to headwaters	27.082	Copper, dissolved Dissolved oxygen Lead, dissolved OE bioassessment Temperature Total dissolved solids Zinc, dissolved

OE – observed/expected

Water quality management plans were developed for the Escalante River and Paria River watersheds (Utah DEQ undated[a] and undated[b]) in the early 2000s to address exceedances of water quality standards in those areas. In 2002, the Upper Escalante River was identified as being impaired due to exceedance of Utah's temperature criteria for cold water species of game fish and other aquatic life (beneficial use category 3A). No anthropogenic heat sources were identified as contributing to the exceedances and the potential source of water temperature alteration within the Escalante River was attributed to livestock grazing (Utah DEQ undated[a]). In 1999, BLM worked with permittees to gradually reduce the potential effect of livestock grazing. BLM closed livestock grazing allotments along the main stem Escalante River, in the Sand and Death Hollow watersheds, primarily to improve riparian and wildlife habitat and reduce livestock recreation conflicts. BLM has implemented projects since adoption of the plan to restore altered watersheds and improve conditions (Utah DEQ undated[a]).

In 2002, two reaches (Reach 1 and Reach 3) within the Paria River were identified as being impaired due to exceedance of Utah's TDS criteria for protection of agricultural uses (Class-4 waters), including irrigation and stock watering. The Paria River Water Quality Management Plan identified that the predominant source of TDS loading in the Paria River is from naturally occurring geologic formations prevalent within the watershed, particularly Tropic Shale, as well as saline aquifers (Utah DEQ undated[b]). The plan recommended implementing site-specific TDS standards (2,500 milligrams per liter and 1,500 milligrams per liter for Reach 1 and Reach 3, respectively) to reflect the natural background concentrations of TDS in the river. The plan also recommends, to the extent possible, reducing TDS loads by reducing sediment loading and improving irrigation efficiency in the watershed.

Various public organizations and government entities conduct measures to control woody invasive plants. This work, principally on Russian olive and sometimes tamarisk, has been conducted in the Escalante watershed since 2009. To date approximately 89 stream miles have been treated within the Escalante River watershed (on the main stem and tributaries). Woody invasive plants were removed through passive and active methods in an effort to revegetate the riparian corridor with native species. This provides nonpoint source reduction through both bank stabilization and restoration/enhancement of the riparian community and associated hydrologic, sediment trapping, and biogeochemical processes (Utah DEQ 2013; Woody Invasive Control Committee 2010).

BLM coordinates water quality monitoring with other Federal, State, and technical agencies. Livestock grazing allotments in the Decision Area that do not meet Rangeland Standard 4 due to livestock grazing are Rock Creek-Mudholes and Vermilion. Grazing was a contributing factor, but not the sole causal factor, for Standard 4 not being met in the Headwaters, Last Chance,

and Nipple Bench allotments. Standard 4 was not met for the Cottonwood, Coyote, Fortymile Ridge, and Upper Paria allotments, but this was due to factors other than livestock grazing (BLM 2006). There are three additional allotments in the Decision Area that did not meet Standard 4 due to natural conditions and geology. Because the factors for not meeting Standard 4 are not issues that BLM can resolve through management, the allotments were considered to meet rangeland health standards. Those allotments are Deer Springs Point, Wahweap, and Wiregrass (BLM 2006). The criteria and water sources assessed for 303(d) listing and Standard 4 are not necessarily identical.

Flash Floods

A flash flood is a rapid rise of water (generally within 6 hours) along a stream or low-lying area after a heavy rainfall or from the failure of a dam, levee, or ice jam. Flash flooding can occur in canyons and washes in the Planning Area. The National Weather Service's Salt Lake City office produces a product called the Flash Flood Potential Rating for areas such as Glen Canyon and GSENM that is issued twice daily during the summer and fall seasons, approximately mid-May to late October (NOAA 2013). The Flash Flood Potential Rating provides a rating for the potential for flash flooding over the following 2 days.

Flash floods can cause damage to water resources and related infrastructure (e.g., range improvements). For example, flash floods can damage fences and instream pipelines, and increase the potential for erosion by stripping vegetation and other soil stabilizing agents from the landscape. Flash floods can also alter drainage patterns and deposit unusually high volumes of sediment or pollutants in water sources. The longevity of impacts from flash floods varies depending on a variety of factors, including the location, intensity, and duration of the flash flood, as well as the integrity of land surface conditions prior to the flash flood, and the type and location of structures within the flood's path.

2.2.13.3 Trends

TDS (i.e., salinity), temperature, total phosphorus, and benthic macroinvertebrate bioassessments are water quality problems in GSENM. Based on limited data, these water quality problems are believed to be stable and are not worsening.

Section 319 funding is awarded each year to the State of Utah through a grant from EPA in accordance with Section 319 of the Clean Water Act. Section 319(h) funds are distributed at the local level to help address water quality issues resulting from nonpoint source pollution. In 2012, Utah BLM continued to implement a Healthy Lands and Watershed Restoration program, focused on improving habitat, vegetation, and water quality by reducing erosion from BLM-administered surface land. These efforts included many watershed improvement projects that will contribute to improved land health and long-term reduction of erosion and sediment loading, which will also reduce TDS (salinity). GSENM efforts included the Escalante River Watershed Partnership, which involved woody invasive control, restoration, and inventory projects. GSENM efforts also included watershed improvement projects and riparian projects.

For the Colorado Plateau ecoregion, creeks, streams, and rivers have experienced diminished instream flow and altered flow regimes created by dams, channelization, canal systems, and water diversions (Bryce et al. 2012). River flow regulation, channelization, levees, and dikes have eliminated spring flooding in some cases.

New water rights appropriations occur occasionally within the Planning Area but are limited because water sources are considered by the State Engineer to be fully appropriated (Utah Division of Water Rights 2011a, 2011b). Where available, new appropriations are generally limited (cumulatively) to the requirements of one family, 0.25 acre of irrigation and 10 head of livestock (e.g., 1.73 acre-feet in total), or an equivalent amount for other uses. Although water uses are relatively static, use of Wide Hollow Reservoir has increased slightly, and Henrieville water use has also increased. Livestock water uses have remained fairly static.

Utah's weather is prone to extremes, from severe flooding to multiyear droughts (Wilkowske et al. 2003). Five major floods occurred during 1952, 1965, 1966, 1983, and 1984, and six multiyear droughts occurred during 1896–1905, 1930–1936, 1953–1965, 1974–1978, 1988–1993, and 1999–2002. During 2002, some areas of Utah experienced record-low stream flows. The areal extent of floods is generally limited in size from one to several watersheds. Droughts generally affect most or all of the State.

BLM issued IM 2013-094, Resource Management During Drought, to provide general guidance regarding BLM program management in the face of drought. Although this guidance is centered on the biological resource programs that have direct impacts on the long-term health of rangelands, the communication and coordination principles apply to many other resource programs, as well. The procedures outlined in the IM provide guidelines for line managers regarding their approach to formulating and implementing actions to mitigate the effects of BLM-authorized uses on drought-stressed resources. Not all procedures will be applicable to all situations and, where necessary, these may be adapted or modified to suit local circumstances. This policy is supplemental to standard BLM program procedures and is intended to be used as a tool to help address and mitigate the impacts of drought (IM 2013-094).

2.2.13.4 Forecast

BLM is beginning to make changes to its water quality monitoring plan to ensure there are enough monitoring sites and sufficient data for 303(d) streams in order to identify ways to improve water quality management. BLM is also working to compile more comprehensive information through monitoring of other aquatic resources.

Mitigation of disturbances to saline soils and management practices that mitigate transport of saline soils are essential for BLM to comply with the Colorado Plateau Salinity Control Act (BLM 1987) and with water quality standards. BLM will continue to implement management practices to reduce salt transport on public lands.

For the Decision Area, BLM assumes populations in nearby communities will remain constant or increase. Increasing populations are expected to place greater demands on recreation opportunities in GSENM and KEPA. Therefore, demand for water supplies to support the public and water-based recreation activities would experience a corresponding increase. There is unallocated water outside of GSENM and KEPA and new water rights are anticipated to occur occasionally. Use of the Escalante Reservoir is anticipated to increase, and Henrieville water use is also anticipated to increase. Livestock water uses are anticipated to remain fairly static. Increasing development in areas around Escalante and Boulder is expected to increase water use.

The number of allotments failing to meet Rangeland Standard 4 due to livestock grazing is expected to decrease or remain the same. Improvements in riparian areas, such as fencing out

livestock and providing alternate water sources to improve livestock distribution, are expected to improve previous water-related problems. This is expected to reduce the number of allotments not meeting Standard 4.

2.2.13.5 Key Features

Key water resource features that guide land use allocation or management decisions involve surface and groundwater. Surface water may be ephemeral, intermittent, or perennial. Surface water sources in the Planning Area include streams, springs, ponds, and lakes. Riparian areas and wetlands are also key features within the Planning Area, and are discussed separately in Section 2.2.11.2, *Riparian Vegetation*. Groundwater sources are aquifers that discharge to surface water and wells. Water sources are identified as one of the monument objects in the Proclamation (see Appendix 11, *National Monuments*).

2.2.14 Wild Horses

2.2.14.1 Indicators

Wild horse indicators are primarily in the form of numbers of animals and amount of forage utilized. Fewer plant species can remain ungrazed in areas occupied by wild horses compared to areas occupied by cattle and other ungulates. Because of this non-selectivity and use of a lower-quality diet, horses must consume 20 to 65 percent more forage than cattle per unit of body weight. In addition, horses physically are able to remove vegetation closer to the ground, sometimes with adverse effects. Wild horses can access areas with steep slopes and rough terrain, competing with wildlife for forage in areas that cattle cannot access.

2.2.14.2 Current Condition

There are two wild horse Herd Areas (HAs) within GSENM and the KEPA. Both the Moody-Wagon Box Mesa and the Harvey's Fear HAs occur primarily in the KEPA, but are partially within GSENM (see Appendix 1, Map 19). The Moody-Wagon Box Mesa HA is partially within the Escalante Canyons Unit, while the Harvey's Fear HA is partially within the Kaiparowits Unit. Wild horses are not managed for in either of the HAs and have an Appropriate Management Level of zero. However, the Harvey's Fear HA does have a population of wild horses that has ranged from 10 to 25 head since the passage of the Wild Horse and Burro Act in 1971.

2.2.14.3 Trends

Due to the extreme remoteness of the Harvey's Fear HA, no wild horses have been gathered and removed since the passage of the 1971 act. This population is kept in check by predators, natural death loss, and limited resources. No management action or change is recommended for these HAs at this time.

2.2.14.4 Forecast

No change in the current condition or trends is anticipated for the life of the plans.

2.2.14.5 Key Features

Key features include the water and forage availability in the HAs.

2.3 Resource Uses

The public lands administered by GSENM and the KFO are managed for multiple uses. Multiple use management includes management for resource uses as well as resource values (see *Glossary*). Resource uses involve activities that utilize the natural, biological, and/or cultural components of the Decision Area, such as mineral development, livestock grazing, forestry and woodland harvest, and recreation. The Decision Area is valued as the few remaining lands in the area where traditional commercial uses and relatively unrestricted recreational activities can still occur. These lands are considered by many to be vital to meeting the developing needs of neighboring communities and private lands, and contribute to the economic and social well-being of the area.

The following sections discuss resource uses in the Decision Area and include, where information is available, a discussion of the following three factors:

- Current Use: Level and locations of use
- Forecast: Anticipated demand for use—the Reasonably Foreseeable Development
- Key Features: Areas of high potential for use

2.3.1 Forestry and Woodland Products

Fuelwood is the largest use of forest or woodland resources. Individuals cutting firewood for personal use represents the greatest demand on the woodland resource. Historically, pinyon pine has been the preferred species for fuelwood. More recently, juniper is increasingly used for fuelwood. Seasonal Christmas tree harvesting by local residents is also a common use of the woodland resource. There are no designated fuelwood areas in the Grand Staircase, Kaiparowits, and Escalante Canyons Units of GSENM. Harvesting trees for posts is another type of woodland product. Posts are generally found on the more productive pinyon-juniper sites where the soils are deep and well drained.

2.3.1.1 Current Use

Woodland Products

Fuelwood harvesting, post cutting, and Christmas tree cutting are allowed by permit only in the Buckskin Mountain (19,437 acres) and Rock Springs Bench (4,553 acres) fuelwood designated areas. (Appendix 1, Map 20). Between these two areas, there are approximately 23,990 acres available for forest and woodland product harvest in the Decision Area. Table 23 shows the amount of woodland products harvested over the past 4 years.

Table 23. Woodland Product Harvest

Woodland Product	2015	2016	2017	2018
Cords of Fuelwood	232.5	262.5	390	336
Cedar Posts	25	40	37.5	108
Christmas Trees	15	14	8	N/A

N/A – not applicable

Stewardship Contracts

Since 2005, GSENM has had a "stewardship" program, under which BLM (nationally) has actively been promoting the utilization of "biomass" and the creation of a biomass industry. The stewardship program was authorized by Congress through September 2013 in the Omnibus Appropriations Bill of 2003 (Public Law 108-7, Section 323). The program authorized combining previously separate contract instruments (service contracts and product sale contracts) into one contract. It further required that any vegetative removal must be a byproduct of the project goals. Therefore, the stewardship program is to be used to address and strive to achieve land management goals and objectives.

From 2005 through 2010, GSENM awarded 14 stewardship contracts for land treatments on approximately 1,757 acres with a biomass volume approaching 4,800 tons. Projects addressed a diverse set of land management objectives including, but not limited to, forest health, wildlife habitat improvement, wildland fuels reduction, livestock grazing, public recreation, and visual resource management.

Table 24. Grand Staircase-Escalante Stewardship Contracts from 2005 through 2013

Fiscal Year	Stewardship Contract Name	Acres	Tons
2005	Buckskin Stateline	105	315
2007	Powerline 2	308	924
	Mustang 1	208	624
	Mustang 2	205	410
	Buckskin Research	82	164
	P/J 1	159	318
2008	Powerline 3	75	150
2009	Buckskin Sinkholes	95	285
	Pine Hollow 1	75	150
	Pine Hollow 2	52	104
	Pine Nut	132	396
2011	Buckskin Eagle Sink	101	202
2012	Telegraph 2012	80	160
2013	Telegraph	80	160
	Totals	1,757	4,797

In the Buckskin Mountain FUELWOOD AREA, GSENM/BLM partnered with UDWR and the Watershed Restoration Initiative to treat (hand thin with chainsaws) approximately 6,268 acres of pinyon/juniper trees with a biomass volume approaching 13,000 tons. The purpose of the project was to improve wildlife habitat by reducing the canopy cover of the pinyon/juniper trees.

Table 25. Buckskin Mountain Fuelwood Area Hand Thin Projects from 2008 through 2016

Fiscal Year	Name of Project	Acres	Tons
2008	UPCD1 2008	273	546
	UPCD2 2008	154	308
	UPCD3 2008	77	154
	UPCD Hand Thin 2008	650	1,350
2009	UPCD Hand Thin 2009	1,471	2,942
2011	UPCD Hand Thin 2011	1,782	3,564
	UDWR Hand Thin 2011	604	1,208
	UDWR Units 2011	598	1,196
2013	UPCD Hand Thin 2013	630	1,260
	Totals	6,239	12,528

UPCD – Utah Partners for Conservation and Development, UDWR – Utah Division of Wildlife Resources

The trees were hand thinned by a hand crew cutting them with chainsaws. The pinyon/juniper trees were limbed and bucked up into approximately 4 feet in length. These treatment areas within the Buckskin Mountain fuelwood area is where the majority of fuelwood harvesters have gathered their fuelwood since 2008. There have been no acres treated with within the Rock Spring Bench fuelwood area.

2.3.1.2 Forecast

Based on existing demand for harvest, forest and woodland resources provide ample opportunities for harvest of woodland products (i.e., post, fuelwood, Christmas trees). Demand for forest and woodland products has been relatively steady to slightly increasing over the long term, and this trend can be expected to continue. Interest in products generated from stewardship contracts has been growing and, where most of these contracts focus on the pinyon-juniper cover type, might depend mostly on the future of the biomass and bio-energy industries. Under current management direction, management of other forest types is limited by the inability to consider commercial timber harvest as a management tool to achieve land management objectives.

2.3.1.3 Key Features

As discussed in Section 2.2.11, *Vegetation*, many of the Planning Area's forested stands are in poor condition and are ecologically outside their natural range of variability, putting many stands at risk of loss. These stand types need to receive priority over the next planning cycle for restoration work to sustain these types in a healthy condition at an appropriate level of stocking and with an appropriate species mix.

Many pinyon-juniper woodlands, as with most pinyon-juniper woodlands across the West, have expanded over the past 150 or more years into vegetative types that were once mostly tree free. These stands should generally be managed for other vegetative types, with limited exceptions as determined by site-specific management objectives. Other pinyon-juniper stands are "persistent" woodlands and should be managed as such.

Wood products could be made available for personal and commercial use as by-products of land management treatments from both woodlands and forests.

2.3.2 Lands and Realty

2.3.2.1 Utility Corridors

Current Use

The Decision Area includes two formal utility corridors. The first is specified as Decision LAND-9 on page 50 of the February 2000 GSENM MMP. This states that Public Law 105-355 designated a utility corridor along U.S. Highway (US) 89 in Kane County, Utah, including the portion of US 89 within GSENM. The utility corridor extends 240 feet north from the highway centerline and 500 feet south from the centerline. If approved, the proposed Lake Powell Pipeline would be within this utility corridor. Aside from the highway itself, several other utilities, including a recently constructed buried fiber optic line and several above-ground powerlines, are within this route. This area is former GSENM territory now in the KEPA.

The second is Energy Corridor #68-116 under Section 368 of the Energy Policy Act of 2005 (Public Law 109-58), which spans portions of northern Arizona and southern Utah, including an area south of US 89 on former GSENM territory now in the KEPA. This segment is part of the regional West-Wide Energy Corridor project, and hosts a segment of the Navajo-McCullough 500 kilovolt (kV) powerline, which transmits electricity from the coal-fired power plant outside Page, Arizona, to Las Vegas, Nevada, and California. See Appendix 1, Map 21 for a map and Appendix 8, Lands and Realty, for a detailed description of Section 368 Corridor #68-116.

Several de facto utility corridors have also emerged along main transportation routes in the Decision Area, including the Johnson Canyon Road/Skutumpah Road corridor east of Kanab; the State Route (SR-) 12 corridor in eastern Garfield County; and Cottonwood Road, which hosts large power transmission lines operated by local power companies transmitting power from the Glen Canyon Dam Hydroelectric Power Plant. These de facto corridors include areas in both current and former GSENM jurisdiction.

Forecast

The Page, Arizona, coal plant is expected to close by the end of 2019, putting the future of the 500 kV Navajo-McCullough powerline in doubt. However, according to local power company officials, the line is being connected to the Glen Canyon Dam Hydroelectric Power Plant, which will create a need for continued operation of the Section 368 corridor. Due to its relatively isolated location, however, other new facilities will likely continue to be concentrated within the designated US 89 corridor and other de facto roadway corridors throughout the Decision Area.

Key Features

Regional utilities such as the West-Wide Energy Corridor and Lake Powell Pipeline would use designated utility corridors, while facilities serving local communities are more likely to be placed in the de facto utility corridors along roadways serving those communities. BLM encourages the use of these corridors as a way to minimize resource impacts while facilitating local community development.

2.3.2.2 Communication Sites

Current Use

BLM typically issues Communication Use Leases for communication facilities on public land. There are two multiple use communication sites in the Decision Area. They include Buckskin Ridge, which is in Kane County east of Kanab between US 89 and the Arizona border, and 50 Mile Head of Rocks, which is in Garfield County east of Escalante along the SR-12 corridor (Appendix 1, Map 22). Glen Canyon NRA also holds a lease for a standalone repeater site near Warm Butte, northeast of Big Water in Kane County.

Table 26. Communication Sites

Site	# Users	Location	Site Management Plan
50 Mile Head of Rocks	2	T. 35 S., R. 4 E., sec 22 (current GSENM)	September 12, 2014
Buckskin Ridge	6	T. 42 S., R. 2 W., sec 27 (former GSENM now KEPA)	September 26, 2017
Glen Canyon NRA	1	T. 42 S., R. 4 E., sec 31 (former GSENM now KEPA)	None

GSENM – Grand Staircase-Escalante National Monument, KEPA – Kanab-Escalante Planning Area, NRA – Natural Recreation Area

Forecast

Because of its location 10 miles east of Escalante, the 50 Mile Head of Rocks site should remain stable, with use by local, State, and Federal entities. Much of the planned development at the Buckskin Ridge site is already completed. Any future development would continue incrementally and in an orderly fashion, as outlined in the recently updated Buckskin Ridge Communication Site Management Plan.

Key Features

BLM plays an important role in meeting growing demand for telecommunication services by permitting companies and government organizations to locate communication facilities on mountaintops, ridges, and other key sites.

BLM policy is to co-locate new facilities within existing sites to the extent possible, and allows facility owners to sub-lease within existing buildings and towers under the terms of their communication use lease.

2.3.2.3 Land Use Authorizations

Current Use

There are approximately 150 active ROWs and other authorizations throughout the Decision Area. These are primarily access road ROWs and grants for other facilities, such as powerlines, irrigation and water pipelines, communication sites, fiber optic lines, and material sites. There are very few to no grants for oil and gas, mining, or renewable energy under the current MMP. Many authorizations predate monument designation and continue under the *Valid Existing Rights* (VER) language in the current GSENM MMP, while others were authorized under the current MMP for uses such as utilities and access roads. Authorized types of uses, such as

reasonable access to private land, are listed in the *Lands* decision section of the MMP starting on page 49. These authorizations are subject to visual resource management and other objectives as specified in the plan.

Appendix 8, Land Use Authorizations, lists active authorizations within current GSENM and KEPA lands. There are as many as six pending ROW applications or renewals that fall within former GSENM jurisdiction now in the KEPA. These cases cannot be resolved, as they are inconsistent with the current February 2000 GSENM MMP, and should be specifically considered in new planning efforts.

There are roughly half a dozen trespass cases active at any given time, as new cases are discovered as old cases are resolved. A few of the current cases are complicated and long-standing, however, and will need special attention from BLM managers and additional resources to address.

Forecast

The number of ROW applications is likely to remain constant over the short to medium term, with renewals, new applications, and the few remaining backlog cases at 10 to 12 per year. Even this relatively small number will be a challenge for the part-time realty staff.

The increased number of commercial film permit applications is likely to continue. These will increasingly be small-scale projects designed for websites and other social media platforms rather than more traditional television, motion picture, and advertising shoots. Many of these projects fall into gray or undefined policy areas. A proposed update to the current Utah IM on commercial film permits will address several of these challenges, but GSENM may wish to continue work on an updated Programmatic Environmental Assessment (EA) for commercial film permits within the Decision Area, particularly given the large percentage of applications that include requests to film in WSAs or other special designation zones.

Several pending cases will remain unresolved until a new MMP is completed to address these issues. Lack of sufficient staff is another serious problem, as current workload exceeds staffing levels. This means many trespass cases, applications, and compliance work will not be completed.

Key Features

BLM issues ROWs and other permits for projects on public land, under the guidance of FLPMA, current management plans, and other laws and regulations. This is done on a case-by-case basis to ensure authorizations cause no undue degradation to resource values while still facilitating development of local communities. The lack of staff has been a chronic problem in addressing the existing lands and realty caseload.

2.3.2.4 Land Tenure (Ownership)

Current Use

The September 18, 1996, proclamation establishing GSENM stated that, “All Federal lands and interests in lands within the boundaries of this monument are hereby appropriated and withdrawn from entry, location, selection, sale, leasing, or other disposition under the public laws, other than by exchange that furthers the protective purposes of the monuments.”

In addition, page 51 of the February 2000 GSENM MMP states that, "The Proclamation establishing the Monument withdrew all Federal lands and interests in lands within the Monument from entry, location, selection, sale, leasing, or other disposition (except from exchanges that further the protective purposes of the Monument)…"

Under MMP Decision VER-6, GSENM considered land exchanges and acquisitions so long as the current owner is a willing participant and the action is in the public interest and in accordance with other management goals and objectives. As such, GSENM consolidated land ownership patterns within GSENM boundaries through relatively large-scale land exchange with SITLA under Public Law 105-335, and completed several other acquisitions of inholdings parcels.

Apart from these exchanges and acquisitions, however, the MMP prohibited other types of land tenure actions allowed under FLPMA Title II, including Section 203 Sales, and other current disposal actions such as the Recreation and Public Purposes (R&PP) Act or the Desert-land Entry Act.

Forecast

BLM engages in land tenure adjustments when such actions enhance public resource values and improve land pattern and management capabilities of both private and public lands in the Decision Area.

Those lands now eligible for sale and other disposition under the public land laws will need to be analyzed according to FLPMA Title II and other applicable regulations to determine if disposal actions serve a public purpose. For example, planning should develop a list of potential FLPMA Section 203 Sales Disposal Parcels, which in order to qualify must be difficult and uneconomical to manage, not be suitable for management by another Federal agency, and serve important public objectives, such as economic development. BLM will manage land tenure actions in the Decision Area on a case-by-case basis as personnel and priority workload allow.

Key Features

Under the February 2000 GSENM MMP, sales and other land disposal actions other than exchanges and acquisitions were prohibited. However, under the December 2017 Proclamation modifying GSENM, sales and other disposal actions are allowed, but specific eligible parcels must be identified under a new planning effort before such actions can be considered.

2.3.2.5 Withdrawals

Current Use

As noted above, the September 18, 1996, proclamation establishing GSENM stated that, "All Federal lands and interests in lands within the boundaries of this monument are hereby appropriated and withdrawn from entry, location, selection, sale, leasing, or other disposition under the public laws, other than by exchange that furthers the protective purposes of the monuments."

This language is repeated in the Withdrawal Review section on page 56 of the February 2000 GSENM MMP, which stated, "The Proclamation establishing the Monument states 'All Federal lands and interests in land within the boundaries of the Monuments are hereby appropriated

and withdrawn from entry, location, selection, sale, leasing, or other disposition under the public laws…'"

Forecast

FLPMA Section 204 gives the Secretary of the Interior the authority to make, modify, extend, or revoke withdrawals, and mandates review of withdrawals. Interior Department Policy (DM 603) further requires that all withdrawals are kept to a minimum, consistent with the demonstrated needs of the agency requesting the withdrawals; lands shall be available for other public uses to the fullest extent possible, consistent with the purposes of the withdrawal; and a current and continuing review of existing withdrawals shall be instituted.

Withdrawals for public lands remaining under GSENM designation would continue, while KEPA lands removed from GSENM designation would be modified or revoked as described above. Additional planning must determine if new withdrawals in KEPA areas are required to meet specific management objectives, such as public water reserves. BLM would manage all withdrawn lands in accordance with the objectives of a new MMP and the management units in which they are located.

Key Features

Withdrawn lands within current GSENM jurisdiction will continue to be managed according to the September 1996 Proclamation and February 2000 GSENM MMP. Withdrawals within former GSENM jurisdiction, now within the KEPA, would be revoked, and the areas evaluated to determine if new withdrawals are needed.

2.3.3 Livestock Grazing

Livestock grazing in the area dates back to the 1860s, with the number of cattle, sheep, and horses increasing rapidly until the early 1900s. Grazing use within the region has substantially decreased from its peak in the early part of the 20th century. Range improvement projects, including fences, corrals, cattle guards, line cabins, water pipelines, well developments, spring development, stock ponds, water catchments, seedings, and vegetative enhancement projects, are used to assist in livestock and wildlife management.

2.3.3.1 Current Use

BLM administers permits in GSENM, Glen Canyon NRA, KFO, and BLM Arizona Strip. The Rock Reservoir and Coyote allotments in GSENM are administered by the BLM Arizona Strip Field Office. See Appendix 1, Map 23. The current grazing preferences are shown in Appendix 9, Table 1. Of the allotments that are open to livestock grazing (see Table 27), 79 have active permits. There are 91 permittees authorized to graze cattle and horses on the 79 active allotments.

Little Bowns Bench Allotment (130 animal unit months [AUMs]), the Wolverine Pasture of the Deer Creek Allotment (148 AUMs), and the Phipps Pasture of Phipps Allotment (140 AUMs) total 14,600 acres designated as forage reserves (BLM 1999) and together can supply up to 418 AUMs in emergency situations. Ten-year permits are not issued in these areas. Four allotments (Antone Flat, Long Canyon Stock Driveway, Varney Griffin, and an area in Glen Canyon) do not have an associated grazing preference. A total of 2,102,900 acres are open to livestock grazing.

The total grazing preference in the Decision Area is 106,202 AUMs, which includes 76,957 active AUMs (including from forage reserves) and 29,245 suspended AUMs.

Table 27. Available Livestock Grazing Allotments

Allotments Open to Grazing	Total Acres in Each Allotment	% GSENM	% KEPA	% Glen Canyon NRA Lands
Alvey Wash (Includes Pet Hollow and Little Desert Acreage)	60,216	21	79	0
Big Bowns Bench (River Pasture and Horse Canyon are closed)(1)	18,590	72	0	28
Big Horn	53,178	74	26	0
Black Ridge	11,657	21	79	0
Black Rock	9,348	14	86	0
Black Rock (State)	1,251	0	100	0
Boot	2,946	100	0	0
Boulder Creek	3,252	100	0	0
Bull Run (State)	631	0	100	0
Bunting Trust (State)	—	100	0	0
Calf Pasture	2,991	11	89	0
Circle Cliffs	31,762	14	86	0
Clark Bench	25,858	0	100	0
Cockscomb	3,695	1	99	0
Collet	16,723	76	24	0
Cottonwood	103,818	43	57	0
Coyote	32,669	15	85	0
Death Hollow	19,538	34	66	0
Deer Creek	12.807	100	0	0
Wolverine Pasture (forage reserve)(2)	—	—	—	—
Deer Range	11,748	62	38	0
Deer Spring Point	33,410	19	81	0
Dry Valley	15,775	27	52	0
First Point	3,015	99	1	0
Five Mile Mountain	18,082	0	100	0
Flood Canyon	13,575	100	0	0
Ford Well	9,088	43	57	0
Fortymile Ridge(1)	57,728	14	55	31
Granary Ranch	1,940	99	1	0
Hall Ranch	22	0	100	0
Haymaker Bench	3,153	100	0	0
Headwaters	154,436	99	1	0
Hells Bellows	2,513	77	23	0
Johnson Canyon	10,489	66	34	0

Allotments Open to Grazing	Total Acres in Each Allotment	% GSENM	% KEPA	% Glen Canyon NRA Lands
Johnson Lakes	11,142	100	0	0
Johnson Point	2,344	73	27	0
King Bench	54,329	63	37	0
Lake[1]	22,704	78	0	22
Lake Powell[1]	371	0	0	100
Last Chance[1]	249,979	48	43	9
Little Bowns Bench (Forage Reserve)	3,422	100	0	0
Locke Ridge	5,056	100	0	0
Lower Cattle[1]	81,168	12	65	23
Lower Hackberry	20,312	99	1	0
Lower Warm Creek[1]	23,915	0	0	100
Main Canyon (State)	312	0	100	0
Meadow Canyon	4,676	100	0	
Mollies Nipple	103,527	56	44	0
Moody[1]	43,418	1	36	53
Mud Springs	16,331	96	4	0
Neaf	1,284	82	18	0
Nipple Bench[1]	30,739	9	89	2
Phipps (Phipps pasture; Forage Reserve)	7,365	100	0	0
Pine Creek	5,740	2	98	0
Pine Creek (State)	590	82	18	0
Pine Point	9,728	46	54	0
Rock Creek-Mudholes[1]	78,013	22	33	45
Round Valley	10,562	62	38	0
Roy Willis	195	0	100	0
Rush Beds	18,765	100	0	0
School Section	754	97	3	0
Second Point	5,891	92	8	0
Sink Holes	5,591	0	100	0
Slick Rock (State)	643	0	100	0
Soda[1]	70,261	4	22	74
South Fork	120	0	100	0
Swallow Park	16,494	37	63	0
Timber Mountain	7,742	100	0	0
Upper Cattle[1]	92,313	58	34	8
Upper Hackberry	22,958	64	36	0
Upper Paria	126,451	28	72	0
Upper Warm Creek[1]	77,291	23	48	2

Allotments Open to Grazing	Total Acres in Each Allotment	% GSENM	% KEPA	% Glen Canyon NRA Lands
Varney Griffin (Unallocated)	16,715	0	100	0
Vermilion	44,322	64	36	0
Wagon Box Mesa(1)	29,157	21	77	2
Wahweap	17,222	80	20	0
White Rock	1,390	100	0	0
White Sage	2,142	30	70	0
Wide Hollow	3907	0	100	0
Willow Gulch	12,214	99	1	0
Wiregrass(1)	35,012	3	37	60

[1] Designates allotments that also include Glen Canyon NRA lands.
[2] Included with Deer Creek allotment acreages.
GSENM – Grand Staircase-Escalante National Monument, KEPA – Kanab-Escalante Planning Area, NRA – National Recreation Area

Eighteen of the 96 allotments in the Decision Area, totaling 139,400 acres, are wholly or partially closed to livestock grazing. This includes 88,600 acres in Glen Canyon. An additional 32,943 acres are unallotted for livestock grazing, including 1,600 acres in Glen Canyon. Table 28 displays the allotments or the portions of allotments that have no active grazing use.

Table 28. Allotments Unallotted or Closed to Livestock Grazing

Allotment (Pasture)	Acres
Unallotted Allotments	
Antone Flat	15,041
Long Canyon Stock Driveway	1,043
Varney Griffin	15,251
Unallotted (NPS)	1,608
Total	32,943
Closed Allotments	
Big Bowns Bench (River pasture(1) and a portion of Horse Canyon pasture)	1,729
Deer Creek (Cottonwood and River pastures)	5,170
Dry Hollow	1,276
Escalante River(1)	59,292
Flag Point	322
Harvey's Fear(1)	4,293
Long Neck	225
McGath Point	3,132
Muley Twist	2,247
Navajo Bench(1)	12,935
No Man's Mesa	1,464
Phipps (River Pasture)	3,066
Rattlesnake Bench	3,564

Allotment (Pasture)	Acres
Rock Creek-Mudholes (Dry Rock Creek and Middle Rock Creek pastures)(1)	11,895
Saltwater Creek	12,055
Spencer Bench(1)	8,544
Steep Creek	7,550
Willow Gulch (Lower Calf Creek Falls pasture)	673
Total	139,432

Source: BLM allotment summaries; BLM GIS 2014b
[1] Allotment partially or wholly in Glen Canyon.
NPS – National Park Service

2.3.3.2 Forecast

BLM forecasts that the demand for livestock forage and livestock permits will continue and will likely increase. Kane and Garfield Counties have indicated they would like to see improved land health and increased grazing levels. Local ranchers have stressed the importance of the area to their ranching operations and the importance of ranching to their families. While the demand for grazing on public lands to help make local operations viable will likely increase in the future, demands for other uses of the public lands will also increase.

2.3.3.3 Key Features

Proper riparian management and improvement continues to be a high priority. Riparian areas make up only a small fraction of the total BLM-administered acreage, but receive a disproportionate amount of use while providing key habitat for wildlife. Allotments not meeting rangeland health standards due to livestock grazing in 2006 are listed in Appendix 9, Table 2.

Development of more water sources has the potential to shift grazing from the areas that have a history of heavy use to areas that were previously ungrazed or lightly grazed. In addition, water developments provide for the development of grazing management systems, which improve resource conditions. Riding and salting can be employed to improve livestock distribution.

Existing and planned vegetative manipulation treatments provide quality habitat for wildlife and livestock. Vegetative treatments also require rest from grazing for two growing seasons or more for the establishment of seeded species.

There is direct competition for forage and water between livestock and wildlife in some areas. Where there are competition issues, wildlife use might be emphasized over livestock in the Decision Area. An overall increase in visitation to the Decision Area has resulted in livestock grazing/recreation use conflicts. In areas where conflict is recognized as frequently occurring, mitigation strategies will need to be instituted.

2.3.4 Minerals

BLM minerals management policy falls into three categories: leasable minerals, locatable minerals, and salable minerals. Leasable minerals include oil and gas and coal, along with a host of other energy and non-energy minerals. Locatable minerals include commodities such as uranium-vanadium, copper, gypsum, and limestone. Salable minerals (also referred to as mineral materials) include sand and gravel, stone, and clay. A mineral potential report was

prepared by the Utah Geological Survey (UGS) for the entire Planning Area in 2005 and an updated report was prepared for the KEPA in 2018 (UGS 2018). Some information from this report has been included below. More specific information regarding past and potential development is included in the *Mineral Potential Report*, available on the project website.

As the GSENM portion of the Planning Area is not open to mineral leasing, location, or entry, the discussions on mineral development potential below is only applicable to the KEPA portion of the Planning Area. The only VER currently remaining in the GSENM portion of the Planning Area are suspended oil and gas leases, which are subject to the current GSENM MMP VER decisions. While the KEPA is no longer closed to mineral leasing, prior to leasing lands in this area BLM is required to identify which lands, if any, will be available for leasing through the planning process. Because the existing GSENM MMP does not identify any lands as open to the issuance of new mineral leases, no new mineral leasing can presently occur on lands now outside the boundaries of GSENM.

2.3.4.1 Oil and Gas

Current Use

Oil and gas leasing is not authorized in GSENM. However, there are 34 suspended oil and gas leases in the Circle Cliffs area, with one pending hydrocarbon lease application that covers the 34 leases (Appendix 1, Map 24). Some of these leases are in the Escalante Canyons Unit and part are in the KEPA. A total of 48 exploratory oil and gas wells have been drilled within the Planning Area, 26 of which are in the KEPA. All have been plugged and abandoned. The Upper Valley field, located in the KEPA, was discovered in 1964 (BLM 2005a) and is the only producing oil field in the Planning Area.

Forecast

According to UGS, given the extreme high exploration risk, remoteness of the region, lack of pipelines and infrastructure, depressed prices, and other factors, it is unlikely that much, if any, drilling activity will take place in the Planning Area in the foreseeable future. Most companies exploring in Utah will continue to focus their efforts in the Uinta and Paradox basins where there are high rates of drilling success, well-established infrastructure, and major exploitable oil and gas reserves.

Tar sand deposits occur in the Circle Cliffs in the KEPA. The occurrence potential for tar sand is rated as high in known prospects and occurrences. Development of the tar sand deposits, however, is unlikely given minimal past development of Utah tar sands and lack of specific past interest in the Circle Cliffs deposit.

Key Features

Key features include areas of high potential for oil and gas development that may be open to fluid mineral leasing. This would include the Upper Valley field, located in the KEPA. No other areas would be open to leasing and have a high potential for oil and gas development.

2.3.4.2 Coal

Current Use

Kane County and Garfield County contain 54 percent and 22 percent of Utah's coal resources, respectively. The coals are primarily found in the Dakota Formation (Alton coalfield) and the Straight Cliffs Formation (Kaiparowits Plateau coalfield). Local lenses and stringers of coal can be found in Triassic Chinle Formation in the Planning Area, but none are thick enough for commercial development. There are presently no coal leases within the Planning Area.

Forecast

There is coal development potential in the KEPA. The KEPA contains part of the Alton coalfield as well as parts of the Kaiparowits Plateau coalfield (Appendix 1, Map 25).

The Alton coalfield within the KEPA contains coal beds that are greater than 4 feet thick and are under less than 3,000 feet of cover, including a small area under less than 200 feet of cover potentially suitable for surface mining. However, this area as been declared by BLM as unsuitable for surface mining (and surface disturbance related to underground mining) due to its proximity to Bryce Canyon National Park. Unless this determination is changed in the current planning effort, the potential for coal mining in the reasonably foreseeable future is low.

Up to 9 billion tons of potentially recoverable coal (not all in the KEPA), with beds thicker than 4 feet and under less than 3,000 feet of cover, are located in the Kaiparowits Plateau coalfield. This area includes several small historic mines that have produced minor amounts of coal in the early 1900s, and a large underground mine (Smoky Hollow) was in the planning/permitting stages when GSENM was declared. Therefore, the coal resources of the Kaiparowits Plateau within the KEPA are rated high for development potential, except within WSAs, where the development potential is rated low.

Key Features

Key features for coal development include the Alton and Kaiparowits coalfields.

2.3.4.3 Locatable Minerals

Current Use

There is no ongoing exploration or development work for locatable minerals within the GSENM portion of the Planning Area, as all mining claims with any VER that pre-dated its creation have been extinguished for failing to make timely annual filing requirements. The only locatable mining activity carried out since the original GSENM was created in 1996 was the small-scale extraction of sculpting-grade alabaster.

Since the opening of the KEPA to mineral location in February 2018, only a single claim has been located on a known alabaster deposit that was developed prior to the creation of the former GSENM.

Forecast

While a variety of locatable minerals are known to occur in the KEPA portion of the Planning Area, only those deposits of sculpting-grade alabaster could be expected to see development in the foreseeable future. Limited exploration may be expected to occur on known locatable

mineral occurrences within the KEPA, but it is unlikely that any development of these resources would occur due to the limited size or quality of the resources, their remoteness to potential markets, and various constraints posed by competing surface resource management.

Key Features

Small-scale mining of sculpting-grade alabaster could be expected in Butler Valley within the KEPA.

2.3.4.4 Salable Minerals

Several salable mineral commodities occur in the KEPA portion of the Planning Area. The salable mineral deposits of significance are sand and gravel, stone, and clay. Certain collectable commodities such as petrified wood, septarian concretions, agate, jasper, and fossils also occur, but their removal would occur mainly as incidental activities that would not involve significant disturbance of the land surface.

Current Use

The only current use being made of salable minerals in the Planning Area is the removal of sand and gravel under Material Site ROW authorizations that pre-dated the creation of the original GSENM boundary.

Forecast

While the salable mineral commodities of sand and gravel, crushed stone, building stone, clay, and humates occur within the KEPA portion of the Planning Area, only sand and gravel are likely to be developed. This development would likely take the form of free-use permits issued to county road departments to serve as maintenance materials for unpaved roads in the Planning Area. The location of these sites would coincide with unconsolidated alluvium deposits and pediment gravels on knolls, ridges, and benches.

The other salable mineral commodities that are known to exist are unlikely to see any significant development due to remoteness to markets and the existence of equal- or better-quality sources already in production.

Key Features

A modest number of sites could be expected to be developed for road maintenance and surfacing materials by either county road departments or the Utah Department of Transportation (UDOT). These sites can be expected to be located where suitable quality materials coincide with or are adjacent to existing main travelways.

2.3.5 Recreation

2.3.5.1 General Recreation

Recreation is very important to local economies. More than half of all private jobs in Garfield County (54 percent) were tourism related in 2016, with similarly high percentages in Kane County (42 percent) (*Kem C. Gardner Policy Institute*). Recreation-focused campaigns have contributed to the economy by creating jobs and affecting local economies in gateway communities and surrounding areas. GSENM lies directly in the middle of the Mighty Five

National Parks (see Appendix 10) and can be expected to contribute to increased economic opportunities and visitation to the region.

Colorado Mesa University conducted a 5-year study starting in 2013 to establish a recreation experience baseline for GSENM. The study identified the top recreation activities in the resource area as hiking, walking, running, backpacking, photography, scenic driving, car camping, and canyoneering/rock climbing. Respondents identified the special qualities for the region as wild, unspoiled, and natural; scenic values; remote and rugged; a sense of solitude and privacy; and lack of developments and sense of discovery. The study's respondents identified vandalism, graffiti, and litter as diminishing the area's specialness. Other contributors that diminished specialness, according to the study's respondents, were overcrowding, lack of solitude, damage to soils and vegetation, and increased traffic (Casey 2014). The study demonstrates that respondents expect a strong sense of solitude and a desire for a natural landscape.

Pennsylvania State University currently is conducting research to monitor and record backcountry use impacts, including a qualitative examination of visitor use and experience on GSENM. In 2017, the research team collected recreational impact data in the Escalante River and Boulder Mail Trail, Upper and Lower Calf Creek Recreation Area, Spencer Flat, and along the entire Hole-in-the-Rock Road (HITRR). Just over 50 percent of the campsites in the monitoring area were considered to have low levels of visitor impacts. At the Harris Wash, Cedar Wash, Dry Fork, HITRR South, SR-12 proximal, Lower Calf Creek, and Egypt zones, 40 percent or more of the sites had moderate impacts. Upper Calf Creek, HITRR north, and SR-12 proximal areas had the highest percentage of heavy impacts. Visitor impacts include litter, tree and shrub damage, user-created trails, trampling of cryptobiotic soils, multiple fire rings, and improper disposal of human effluence. The Dry Fork area was found to contain over 100 counts of human waste.

Surveys identified that respondents were influenced to visit GSENM by media/promotion, family and friends, desire to experience parks and protected areas, displacement from other parks, and political reasons. A common theme to visit the area was the lack of other visitors compared to other parks respondents had experienced. Others respondents noted the fairly high density of other visitors in certain areas, such as the Lower Calf Creek and Peekaboo and Spooky (Dry Fork) areas of GSENM. The majority of respondents noted being extremely pleased with their experiences in GSENM. The study identified BLM management still has the opportunity to shape visitor expectations, and associated behaviors, in a manner that aligns with management objectives for the area.

Current Use

Recreation use is increasing throughout southwestern Utah. Visitation numbers at Zion National Park have more than doubled from 2,679,181 to 4,317,028 since 2007; visitor numbers at Bryce Canyon National Park have increased from 1,012,563 in 2007 to 2,571,684 in 2017, an increase of approximately 153 percent (NPS 2011). In Capitol Reef National Park, just to the east of the Planning Area, visitation numbers have increased by 107 percent in the same period. Although actual visitor numbers are expected to be lower on public land, the percentage of increase in recreation use is expected to be comparable.

BLM reports recreation visitation estimates using the Recreation Management Information System (RMIS), an internal database. The RMIS estimates participation in 65 types of recreation activities recorded at BLM sites and areas, based on registrations, permit records,

observations, and professional judgment. Visitation is estimated by the number of participants/visitors and visitor-days. Visitors are the actual number of people who take part in a recreational activity. A visitor-day is a common recreation unit of measure used among Federal agencies and represents an aggregate of 12 visitor-hours at a single site or area. Table 29 lists the RMIS data from 2013 through 2017. Appendix 1, Map 26 shows these areas.

Table 29. Visitation in the Planning Area from 2013 through 2017

GSENM SRMA/ERMA	2013	2014	2015	2016	2017
Escalante Canyons SRMA	174,046	212,597	227,016	290,572	291,130
Fiftymile Mountain SRMA	4,483	819	1118	24	35
SR-12 Corridor SRMA	277,997	310,610	308,555	230,908	275,502
US 89 Corridor SRMA	149,223	156,703	138,296	123,914	172,265
Monument ERMA	35,080	14,105	29,710	12,487	8,014
Paria Canyons and Plateaus SRMA	124	49,269	47,593	81,200	37,011
Paria-Hackberry SRMA	156,329	173,216	159,766	187,130	199,036
Total Visitation	797,282	917,319	912,054	926,235	982,993
Escalante Unit	299,361	321,453	254,736	236,792	260,346
Kaiparowits Unit	75,074	112,966	104,534	119,628	139,495
Grand Staircase Unit	73,347	32,520	30,124	39,938	39,893
Lands Excluded	220,814	315,935	308,678	339,326	353,507

GSENM – Grand Staircase-Escalante National Monument, SRMA – Special Recreation Management Area, ERMA – Extensive Recreation Management Area, SR – State Route, US – U.S. Highway

Recreation levels in the Planning Area have been monitored for many years; however, visitor numbers are not representative of the current level of recreation use. This can be attributed to multiple access points, lack of permit compliance, and the agencies' inability to count visitation in every location. Many areas lack direct visitation monitoring facilities such as traffic counters or visitor registers. Direct monitoring by BLM personnel is focused on areas of highest use or conflict. Discrepancies in actual use are also a result of the remote nature of much of the Decision Area that does not receive frequent monitoring. In addition, many of the popular use areas/trails are not designated, and there is currently no way to accurately determine the actual amount of recreational use these areas receive.

Known types of recreation use in the area include hiking, camping, backpacking, OHVs, automobile touring, equestrian activities, canyoneering, rock climbing, wildlife viewing, photography, and hunting. OHV use has become one of the fastest-growing recreational activities, and is one of the most controversial. Trails, routes, and roads used by OHVs are discussed in Section 2.3.5.4, *OHV Use*, and Section 2.3.7, *Transportation and Access*, of this document.

Forecast

Recreation use in the Planning Area and the Decision Area is expected to increase due to a combination of social and environmental conditions in Utah and neighboring States and the overall growing trend of people seeking public lands and the opportunities they provide. Without active management, natural resource conditions and the quality of the recreation experience would decline with increased recreation use.

Estimates have recreation use in the Decision Area increasing 38 percent from 2007 to 2017. A number of factors contribute to the anticipated increase in use, including the following:

- Marketing of travel and tourism to southern Utah
- Displacement from National Parks due to overcrowding
- Increasing leisure time and disposable income for the working population
- Increasingly active retired population with more disposable income
- An increase in the population of Utah
- Rapidly evolving forms of recreation and new vehicles and gear for pursuing recreation activities
- A focus on the importance of natural resource-based recreation due to the population becoming increasingly urbanized
- Increasing importance of recreation as a component of the local and regional economic base, surpassing traditional industries in many areas
- Increasing popularity of outdoor recreation as a family-oriented activity

Key Features

Public lands adjacent to GSENM, KEPA, and other communities throughout the Planning Area receive regular use from residents and tourists. Demand for a variety of recreational opportunities in these areas is high, as evidenced by hiking and backpacking use in the Escalante and Paria canyons area, HITRR, OHV use in the Nephi Pasture region, and automobile touring along the Burr Trail, Cottonwood Canyon Road, Skutumpah Road, and SR-12 and US 89.

HITRR in the KEPA unit receives the highest visitation of all interior access roads, with 95,361 visitors in 2017. HITRR provides the primary access to Devils Rock Garden, Dry Fork Slot Canyons, Dance Hall Rock Historic site, and the Hole-in-the-Rock site, including trailheads to multiple locations within Glen Canyon NRA. BLM roads and trailheads directly support visitors accessing the lower Escalante Canyons within Glen Canyon NRA.

2.3.5.2 Recreation Management Areas

Current Use

Recreation management areas are BLM's primary means for managing recreational use of the public lands. Public lands are identified either as a Special Recreation Management Area (SRMA) or an Extensive Recreation Management Area (ERMA). SRMAs are areas that require a recreation investment, where more intensive recreation management is needed, and where recreation is a principal management objective. These areas often have high levels of recreation activity or are valuable natural resources. ERMAs constitute all public lands outside SRMAs and other special designation areas. ERMAs are areas where recreation is not specialized, is dispersed, and does not require intensive management. Recreation might not be the primary management objective in these areas, and recreational activities are subject to few restrictions. Currently, BLM manages six SRMAs in the Planning Area (BLM 2000). These areas are described in Appendix 10 and shown in Appendix 1, Map 27.

- Escalante Canyons
- Paria/Hackberry
- Paria Canyon and Plateaus

- Fiftymile Mountain
- SR-12 Corridor
- US 89 Corridor

There are four management zones within GSENM. These zones reflect the location, type of recreational setting, and subsequent opportunities likely to be available to users within GSENM. Each zone's geographic boundary is defined by factors such as the accessibility to and movement within the area via existing roads or trails, sensitive habitats, terrain, and special management area designation boundaries. The four management zones are listed below, described in Appendix 10, and shown in Appendix 1, Map 28:

- Frontcountry Zone
- Passage Zone
- Outback Zone
- Primitive Zone

Forecast

SRMAs, ERMAs, and Recreation Management Zones will be reevaluated based on the new boundary units. In some regions, SRMAs may change to ERMAs and vice versa. However, in some regions of the Planning Area, BLM may consider retaining the current SRMA boundaries supporting future management needs in areas such as HITRR, which provides primary access to the Escalante Canyons. New planning units associated with recreation are listed below and described in Appendix 10.

- Grand Staircase
- Kaiparowits
- Escalante Canyons
- Escalante Canyons (GSENM) and KEPA Units (common to both units)
- KEPA Unit

Key Features

Developed recreation sites are areas that incorporate visitor use with infrastructure such as roads, parking areas, and facilities that protect the resource and support recreation users in their pursuit of activities, experiences, and benefits. Visitor-use infrastructure is a management tool that can minimize impacts on resources, concentrate use, and reduce visitor conflicts. Developed recreation sites help accomplish these goals. Key features include all areas of the four planning units.

Table 30. Current Day Use Sites and Trailheads by Unit

Unit	Day Use Site or Contact Station	Campground	Trailhead	Point of Interest
Grand Staircase	Paria Movie Set Parking Area		Nephi Pasture Willis Creek	
Kaiparowits	Devils Garden Grosvenor Arch		Cottonwood Narrows North Cottonwood Narrows South Lower Hackberry Sheep Creek	Dance Hall Rock National Historic Site Paria townsite The Blues SR-12 Overlook

Unit	Day Use Site or Contact Station	Campground	Trailhead	Point of Interest
Escalante Canyons		Calf Creek Deer Creek	Twentyfivemile Wash Deer Creek Escalante River Harris Wash Horse Canyon Little Death Hollow Lower Calf Creek The Gulch Upper Calf Creek Wolverine	Boynton SR-12 Overlook Head of the Rocks SR-12 Overlook
Kanab-Escalante Planning Area	Paria Contact Station Great Western Trail Parking Nephi Pasture Parking Area	State Line White House	Fortymile Trailhead Boulder Mail Trail Buckskin Gulch Trailhead Bull Valley Gorge Trailhead Dry Fork Trailhead Early Weed Trailhead Egypt Trailhead Henderson Canyon Trailhead Hurricane Wash Trailhead Lick Wash Trailhead Paria Box Trailhead Round Valley Draw Trailhead The Toadstools Trailhead Wire Pass Trailhead	Eagle Sink US 89 Paria Information Kiosk

SR – State Route, US – U.S. Highway

2.3.5.3 Commercial, Competitive, and Organized Group Recreation

Current Use

As authorized by the Land and Water Conservation Fund Act, there are five types of uses for which SRPs are required—commercial, competitive, vending, individual or group use in special areas, and organized group activity and event use. SRPs are issued to outfitters, guides, vendors, recreation clubs, and commercial competitive event organizers that provide recreation opportunities or services without using permanent facilities. SRPs are also issued for competitive and organized group events. SRPs may be issued for 10 years or fewer, with annual renewal. The permits are issued to manage visitor use, protect natural and cultural resources, and accommodate commercial recreational uses. Demand for SRPs has been increasing in the Decision Area; in 2017, BLM issued 121 permits for activities that include hiking, backpacking, vehicle and OHV tours, shuttle services, horseback rides, pack stock services, canyoneering, historical and educational programs, photography workshops, bicycle tours, hunting outfitters, therapeutic youth programs, and vending services.

BLM also issues SRPs for non-commercial use in certain special areas where a permit system for individual use would achieve management objectives. Large non-commercial group activities outside developed campgrounds could require an SRP, if necessary to meet planned resource management objectives or resource conditions. If the group or activity does not

warrant an SRP, a letter of agreement (a less formal approach) is often used (e.g., for Boy Scout groups). Some of the recreation use can be estimated through recreation activities requiring special permits. Figure 2 lists the numbers and types of SRPs (from RMIS data).

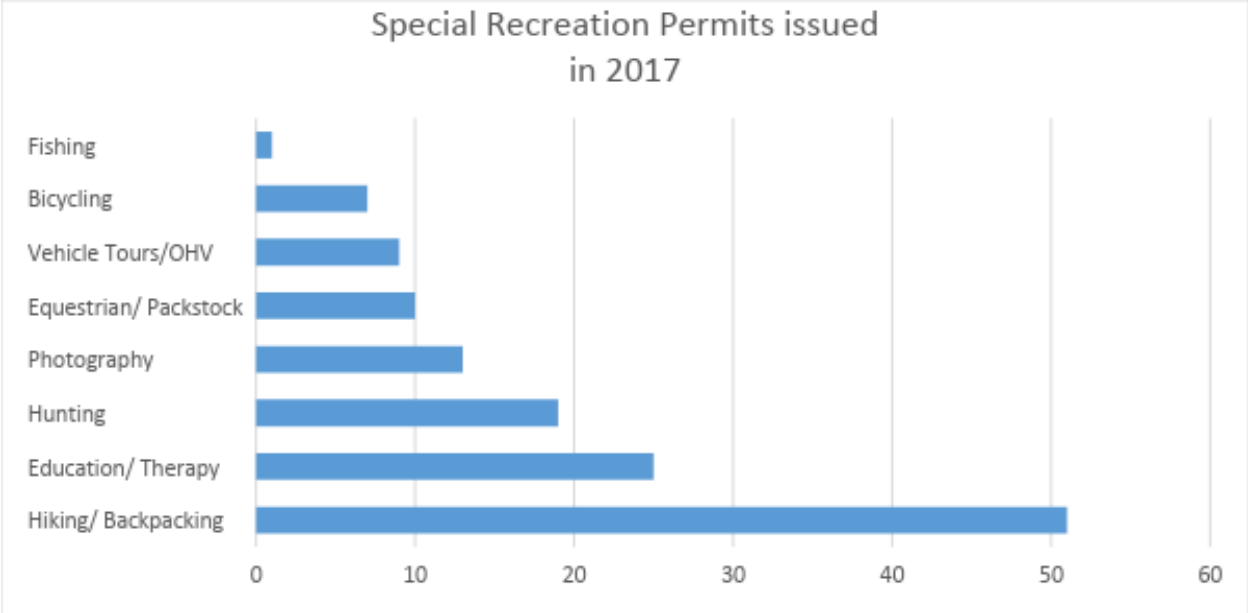


Figure 3. Special Recreation Permits

Forecast

The demand for SRPs to conduct commercial services on public lands has increased 227 percent over the past 17 years; these activities are anticipated to increase in the future as the public continues to spend more time on public lands. The SRP activities often offer a specialized opportunity for the recreating public to experience activities that they themselves do not have the skills, equipment, or resource knowledge to perform independently.

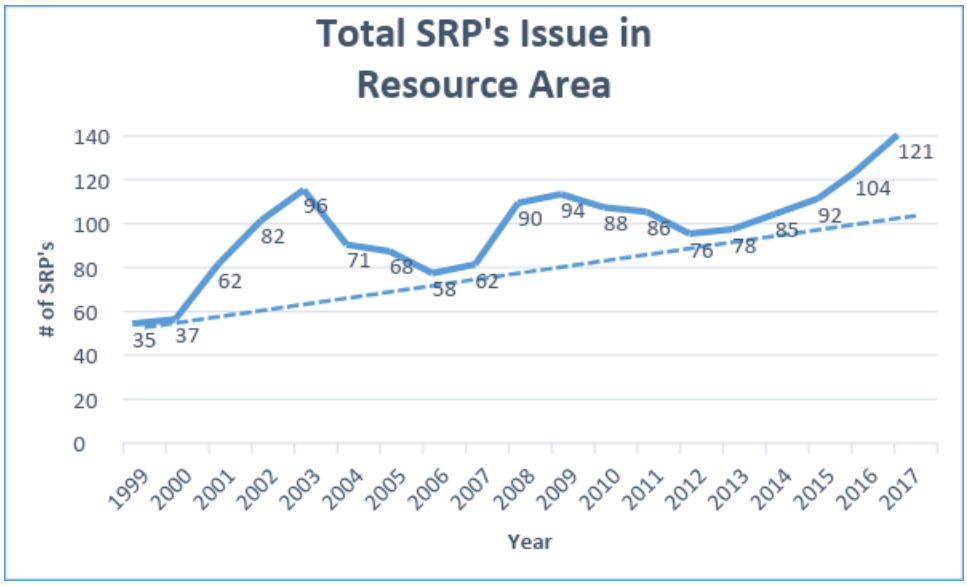


Figure 4. Special Recreation Permit Trend

In the Decision Area, an example of the growth in tourism and recreation is the request for SRPs for commercial services and events. In the last few years, BLM has received SRP applications to authorize bike tours and races, photography workshops, running races, OHV events, and historical and cultural events. BLM will likely receive more permit applications for similar and other identified activities in the future. These events generally receive region-wide publicity, with event organizers seeking out-of-area distribution and participation. BLM offices in the Planning Area will continue to be responsive and should coordinate efforts to authorize commercial and organized activities across unit boundaries.

Key Features

In the Frontcountry zones it can be expected to see more special event promotion along SR-12 and US 89. Tour of Utah, Top of Zion, Rockwell Relay, and other events have occurred over the last 5 years and are expected to continue. In the Passage and Outback zones, it can be expected that SRP applications for special events may be received to hold events along roadways. In recent years, the Grand-to-Grand foot race and Escalante Marathon have shown interest in operating in these areas. The Primitive zones encompass the most remote areas in the Planning Area, which include WSAs. BLM would manage activities in these areas to retain the wilderness characteristics, naturalness, and sense of solitude. Within WSAs, BLM will allow SRPs if the use and related facilities satisfy the non-impairments criteria.

Requests for OHV events are expected to grow in the Nephi Pasture region, requiring more management prescriptions to support resource protection while also providing for the desired recreational experience.

2.3.5.4 OHV Use

Current Use

OHV use has become a significant use due to the increase in the number of users who participate in this recreation opportunity and increased commercial availability (purchase and

rental opportunities) and marketing of multi-passenger OHVs (utility task vehicles, or UTVs). Increased use of OHVs causes concern related to the potential resource degradation resulting from high levels of unmanaged use in sensitive areas. Over the past 20 years, OHV use has become one of the fastest-growing recreation activities in southwestern Utah, drawing thousands of visitors each year. Visitors are drawn to these areas to experience the numerous roads and trails available for OHV use, the diverse backcountry opportunities and spectacular scenery the area provides, and the challenging OHV opportunities the landscape and terrain provide. This trend is expected to continue.

When the existing LUPs were completed, the level of OHV use in the Decision Area was designated as limited to designated roads and trails to meet resource management objectives. The area surrounding resources is becoming increasing popular with the OHV community as a location for both sanctioned and unsanctioned events. OHV management in some areas no longer adequately addresses the issues that have arisen as a result of increased OHV use, which has resulted in some conflicts.

Motorized travel in the Decision Area is currently limited to roads; however, some locations receive unmanaged intensive OHV use based on landscape characteristics and accessibility to local communities. One such area is Little Desert, south of Escalante. Intensive use in and around Little Desert has resulted in resource damage over the past 10 years. Designating some areas for OHV trails and open areas would address such impacts. There are other mandated travel restrictions in WSAs and in greater sage-grouse brood-rearing habitat surrounding the Planning Area.

Forecast

OHV use is expected to intensify in high-demand areas and adjacent to communities. In addition, the direct relationship of this activity to an overall improvement in technology to aid navigation and exploration (GIS, global positioning system [GPS], and geocaching) has brought more user groups into dispersed areas. Dispersed areas would be necessary to provide the semi-primitive road travel experience and the desired challenge and risk to user groups. Future OHV designations may be considered for open areas. Open designations are used for intensive OHV use areas where there are no special restrictions or where there are no compelling resource protection needs, user conflicts, or public safety issues to warrant limiting cross-country travel (43 CFR 8340.05).

Key Features

Most recreational activities in the Decision Area occur primarily during spring, summer, and fall. However, there has been a steady increase in winter recreation, particularly in Nephi Pasture, where local communities are utilizing OHVs. OHV use has become one of the fastest-growing recreational activities. Consequently, existing management efforts and processes, which were developed to address OHV use levels 20 years ago, are often inadequate.

There are many parts of the Planning Area that provide good opportunities for the mountain biker to enjoy the scenic and rugged landscapes. Numerous possible biking routes provide a wide range of difficulty, from gentle, long grades to steep, undulating grades with switchbacks. Most of the routes are suitable for and traveled by four-wheeled vehicles. None of the routes in the area are formally developed or signed for mountain biking.

2.3.6 Renewable Energy

BLM and the Department of Energy's National Renewable Energy Laboratory conducted an assessment of renewable energy resources on BLM-administered surface land in the western United States. The results of the assessment were published in *Assessing the Potential for Renewable Energy on Public Lands (*BLM and Department of Energy 2003*)*. The primary goal of the assessment was to identify BLM planning units in the western United States with the highest potential for development of renewable energy.

Wind and solar energy development on public lands in the Planning Area was further evaluated in the *Final Programmatic Environmental Impact Statement (PEIS) on Wind Energy Development on BLM-Administered Lands in the Western United States* (BLM 2005b), and the *Final PEIS for Solar Energy Development in Six Southwestern States* (BLM 2012). These PEIS efforts amended the existing RMPs in the Planning Area to establish a comprehensive renewable energy program that allows the permitting of future renewable energy development projects on public lands to proceed in a more efficient, standardized, and environmentally responsible manner. The PEISs prescribe BMPs and define appropriate locations for renewable energy development within the Planning Area. Much of the Planning Area is currently restricted from renewable energy development for various reasons including, but not limited to, special designations, visual resources, critical habitat, and technical feasibility.

2.3.6.1 Current Use

There are currently no renewable energy facilities in the Decision Area. However, SITLA has issued solar development leases on over 5,700 acres adjacent to BLM-administered surface land within the Planning Area near Big Water, Utah. That solar energy project is currently in planning and development.

Few low-temperature thermal springs occur within the Planning Area. Although some springs are in areas with geothermal indicators, such as young volcanic rocks and recent faulting, there are no identified geothermal temperature systems in the Planning Area.

Bioenergy, or biomass power, is the use of biomass (primarily wood and wood residues) to generate electricity. Biomass is also used in other energy applications such as heating. In the Planning Area, woody biomass is primarily composed of the wood residues of forest restoration projects. See Section 2.3.1, *Forestry and Woodland Products*, for more information.

2.3.6.2 Forecast

Solar power potential is considered high throughout the Decision Area (5 to 6 kilowatt-hours per square meter per day), with particularly high concentrations in the eastern portion (7 kilowatt-hours per square meter per day). Wind energy as high as Power Class 6 is present in some areas. The raw potential for solar, wind, and biomass energy is quite high in some portions of the Decision Area; however, the potential for development of these resources declines considerably when current management proscriptions are applied. This indicates that solar and wind resources are present, but various factors would reduce the concentration, production, and transmission of this energy. Solar energy likely has the highest potential for future development within the Planning Area if management proscriptions are lifted and transmission capacity is available. There is no forecasted geothermal development in the Planning Area.

2.3.6.3 Key Features

Key features would include areas with high potential for wind and solar development and few management proscriptions along with access to available transmission on the electrical grid.

2.3.7 Transportation and Access

2.3.7.1 Current Use

Current transportation and access routes into and through the Planning Area consist of Federal and State highways; BLM roads, primitive roads, and trails; county road systems; and private roads. The transportation system encompasses 908 miles of routes designated as open in the Frontcountry, Passage, and Outback zones and includes SR-12 and US 89. Non-street-legal ATVs and dirt bikes are allowed on approximately 553 miles of the 908 miles of routes designated open to street-legal vehicles in these zones. Most of the State- and county-maintained roads have either a BLM ROW or are claimed as Revised Statute 2477 roads by the counties. Primary and secondary roads have historically been maintained by the counties.

In addition to arterial and collector routes, there are numerous smaller routes that connect more remote locations to the larger roads. These routes are used for recreational purposes, access to range improvements, and inholdings not managed by BLM. The majority of these roads and routes are not paved and most are unimproved with dirt or gravel surfaces. The Planning Area has a few abandoned backcountry airstrips on public land in the area, some of which are within WSAs. The Boulder Airstrip is the only airstrip maintained and identified in the current MMP.

Within the planning units, there are currently 30 developed trailheads; however, there is only one developed trail located along the lower Calf Creek Canyon. Travel routes are the primary means of travel, as many so-called “trails” change over time due to flooding, a lack of use, or simply because the route crosses slick rock or sand dunes and is not easily identifiable. In some cases, trail cairns are used to mark the travel routes. Many public land users have developed a dependence on electronic technology. Reliance on technology has created a loss of basic map and compass skills needed to travel through this landscape. In many cases, route braiding occurs or a proliferation of rock cairns are created, diminishing the sense of discovery and overall preparedness to enter the backcountry.

Although most of the use on existing roads, primitive roads, and trails on BLM-administered surface land in the Planning Area is defined as casual use, other travel considerations associated with administrative use and authorized actions, such as livestock grazing, and emergency purposes may be considered during the planning process. Mining claims and mineral lease access roads may be considered on KEPA lands withdrawn from former GSENM lands. Administrative access and authorized uses are exempt from the regulations dealing with management of OHVs; however, these kinds of uses will be considered when determining the purpose and need of routes individually and as a network.

OHVs are used in the area for recreational and non-recreational purposes. Much of the non-recreational OHV use, or administrative use, involves OHVs driven by local ranchers for administration of their grazing operations. Administrative OHV use occurs in association with permitted uses and is determined case by case. OHV use has become a popular method of recreation in itself, and a means of transportation while hunting, fishing, or camping. More information about OHV use is provided in Section 2.3.5, *Recreation*.

Scenic drives in the Planning Area include the following, along with special designations and numerous other roads that are used for scenic enjoyment but are not designated.

Table 31. Scenic Drives

GSENM – Escalante Canyons	GSENM – Grand Staircase	GSENM – Kaiparowits	Kanab-Escalante Planning Area
-	Cottonwood Canyon Road[1]	-	-
Burr Trail Road[1]	Johnson Canyon/Alton Road[1]	-	-
-	-	Left Hand Collet	Hole in the Rock Road[1]
-	Paria River Valley Road[1]	Smoky Mountain Road[1]	-
-	-	-	Paria River Valley Road[1]
-	-	-	Smoky Mountain Road[1]
Posey Lake Road[1]	-	-	-
Scenic Byway 12[2]	-	-	-
-	-	-	Wolverine Loop

[1] Utah State Scenic Backway
[2] National Scenic Byway: Utah's only All-American Road
GSENM – Grand Staircase-Escalante National Monument

2.3.7.2 Forecast

Visitation is increasing in Kane and Garfield Counties, which is expected to result in increased public demand on some routes within the existing transportation system. Increased travel across public lands by motorized and non-motorized equipment could increase the need to manage, maintain, and, in some cases, improve the current transportation system on some routes, although the undeveloped nature of the area is highly valued by certain publics and development and improvement would need to be carefully considered.

A Travel Management Plan (TMP) will be prepared after the completion of the new RMP. Additional opportunities for public input and comments on the road network will be taken during the TMP planning process. The current travel map is shown in Appendix 1, Map 29.

2.3.7.3 Key Features

The highways and main roads that allow access to public lands in the Planning Area receive the most use in the Decision Area. Secondary paved and unpaved roads used heavily by the public primarily include roads maintained by Kane and Garfield Counties. The combination of these road systems creates the access web for current uses and is expected to provide access for future use.

2.4 Special Designations

Special designation areas are designated to protect or preserve their unique values or uses. These areas therefore require different management than would be applied to the surrounding public lands. This section identifies the various special management areas within the Decision

Area and addresses the qualities or uses that have resulted in their designation. The types of special designation include ACECs, National Historic Trails, Wilderness, WSAs, WSRs, and scenic byways.

2.4.1 Areas of Critical Environmental Concern

ACECs are areas where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards. To be designated an ACEC, the area must meet criteria for both relevant and important values as defined in 43 CFR 1610.7.

During the development of the GSENM MMP, BLM analyzed multiple ACEC nominations (see *Proposed Management Plan/Final Environmental Impact Statement* [BLM 1999], Appendix 10). After evaluating the resources recognized in each of the nominations submitted for the MMP, BLM determined that their protection would be substantially equivalent under either monument authority or ACEC designation. Therefore, BLM concluded that no ACECs were necessary, and that no ACECs would be designated under the MMP (BLM 1999:2.52). Therefore, there are no existing ACECs within the Planning Area.

Specific locations that BLM determined to have met relevant and important criteria in the proposed MMP, but that were not designated as ACECs because BLM determined that the monument designation afforded substantially equivalent protection, include:

- Scenic access routes, including US 89; SR-12, SR-9, and SR-143; Cottonwood Wash Road from SR-12 to US 89; the road to Paria townsite from US 89; the Burr Trail from Boulder to Capitol Reef; and HITRR from SR-12 to Glen Canyon NRA: scenic access routes are historically relevant. SR-12, Cottonwood Wash Road, Old Paria townsite, Burr Trail, and HITRR have more than local significance.
- Fourmile Bench Old Tree Area: the Old Tree area is relevant as a natural system and is of more than local significance. It is also irreplaceable and vulnerable to adverse change.
- No Mans Mesa (about 30 miles northwest of Kanab): No Mans Mesa is a historically relevant natural system and relict plant community. It is also irreplaceable and vulnerable to adverse change. No Mans Mesa is designated as a Research Natural Area.

Grazing allotments were also evaluated for relevant and important criteria in the 2000 MMP. The BLM concluded that while grazing allotments may have historical relevance, they do not qualify under the criteria for importance. Evaluators concluded that grazing allotments did not need special management, and the nominee subsequently withdrew the nominations. Additionally, BLM analyzed lands proposed as wilderness in H.R. 1500, but determined that an ACEC designation will not be used as a substitute for wilderness suitability recommendations.

BLM called for ACEC nominations in the notice of intent for this planning effort, released on January 16, 2018. Nominations received during scoping will be included in the scoping report. BLM will use the criteria found at 43 CFR 1610.7-2 in considering designation of new ACECs.

Special management designations that existed prior to monument designation, and were retained after monument designation, include:

- Calf Creek Recreation Area
- Deer Creek Recreation Area

- Devils Garden Outstanding Natural Area
- Dance Hall Rock Historic Site
- Escalante Canyons Outstanding Natural Area (tracts 2, 3, and 4 are included in the North Escalante Canyon/The Gulch Instant Study Area (ISA) and tracts 1 and 5 are separate)
- North Escalante Canyon Outstanding Natural Area
- The Gulch Outstanding Natural Area
- Phipps-Death Hollow Outstanding Natural Area
- No Mans Mesa Research Natural Area
- Wolverine Petrified Wood Natural Environmental Area

Of these special management designations, a portion of Devils Garden Outstanding Natural Area, a portion of Dance Hall Rock Historic Site, Escalante Canyons Tract 5 ISA Complex, and portions of Wolverine Petrified Wood Natural Environmental Area are located on lands that have been excluded from GSENM per Proclamation 9682.

2.4.2 National Historic Trails

National historic trails are "extended trails which follow as closely as possible and practicable the original route or routes of travel of national historical significance" (NPS 2001a). The purpose of the national historic trails is "the identification and protection of the historic route and its historic remnants and artifacts for public use and enjoyment" (NPS 2001a).

The Old Spanish National Historic Trail (OSNHT), designated on December 4, 2002, by the Old Spanish Trail Recognition Act of 2002, is a 2,700-mile-long trade route extending from Santa Fe, New Mexico, to Los Angeles, California, passing through the States of Colorado, Utah, Arizona, and Nevada. The trail splits into three routes prior to entering Utah, and continues through the State of Utah within the Planning Area (Appendix 1, Map 3).

The Armijo Route found within the Planning Area enters Utah north of Page, Arizona, in an area that is now part of Glen Canyon NRA, and crosses the Colorado River at the Crossing of the Fathers. The Armijo Route re-enters Arizona along Kanab Creek near Fredonia, Arizona. The route then re-enters Utah just west of Colorado City and heads to the Virgin River, where it continues southwest into Arizona.

The OSNHT was designated by congressional act subsequent to the designation of GSENM by Presidential proclamation. In 2012, BLM released manuals 6250, National Historic Trails Administration, and 6280, Management of National Scenic and Historic Trails and Trails Under Study or Recommended as Suitable for Congressional Designation. In 2016, NPS and BLM as co-administrators published the *OSNHT Final Comprehensive Administrative Strategy* detailing procedures for this trail. There are no identified high potential sites or route segments in GSENM, but GSENM does contain Federal protection components primarily encompassed by relatively unaltered terrain and outstanding setting. Management of the OSNHT corridor would be warranted under administration by the KFO. Although the majority of the OSNHT corridor has been removed from GSENM, inclusion of national historic trails in national monuments has in the past justified management corridors, and is deemed appropriate here in view of its until-recent inclusion in GSENM. Approximately 2.9 miles (8 percent) of the OSNHT corridor is located on the Grand Staircase Unit, while the remaining 32.7 miles (92 percent) is located in the KEPA Unit.

2.4.3 National Monuments

GSENM was originally established by Proclamation 6920 of September 18, 1996, and included approximately 1.7 million acres of BLM-administered surface land at designation. On December 4, 2017, President Trump issued Proclamation 9682 modifying GSENM. The Antiquities Act of 1906 grants the President authority to designate national monuments to protect "objects of historic or scientific interest." Since 1906, Presidents and Congress have designated more than 125 national monuments, 27 of which are maintained by BLM. BLM's monuments are managed as part of the National Landscape Conservation System, whose mission is to conserve, protect, and restore nationally significant landscapes recognized by the President or Congress for their outstanding ecological, cultural, or scientific resources and values. According to BLM policy (Manual 6220) and Federal court precedent, the FLPMA mandate requiring BLM to manage public lands for multiple use and sustained yield includes managing specially designated public lands for the purposes for which they were designated.

BLM's objective in managing a national monument is to:

- Comply with the presidential proclamations by conserving, protecting, and restoring the objects and values for which the monument was designated for the benefit of present and future generations.
- Effectively manage VER and compatible uses within a monument.
- Manage discretionary uses within a monument to ensure the protection of the objects and values for which the monument was designated.
- Utilize science, local knowledge, partnerships, and volunteers to effectively manage a monument.
- Provide appropriate recreational opportunities, education, interpretation, and visitor services to enhance the public's understanding and enjoyment of a monument.

The Planning Area encompasses approximately 1.9 million acres of BLM-administered surface land, including lands originally designated under Proclamation 6920 and subsequent boundary adjustments through land exchanges. Several subsequent Federal laws passed that have affected the size of GSENM. These changes are described in Appendix 11, Monument Boundary Changes.

The modified boundaries of GSENM exclude from designation and reservation approximately 861,974 acres of land now known as KEPA lands. Lands that remain part of GSENM are included in three units, known as the Grand Staircase (209,993 acres), Kaiparowits (551,034 acres), and Escalante Canyons (242,836 acres) Units.

BLM is required to manage monuments for the proper care and management of the objects of historic and scientific interest for which they were designated. Identifying the specific objects in a proclamation is critical in order to properly manage a national monument and to determine the management actions necessary to implement the law and manage monuments for the purposes for which they were designated. While deference is always given to the specific text in the proclamations, BLM must clearly identify the objects in order for the agency to properly undertake land use planning or other analysis to ensure proper management of a national monument.

Land use planning decisions for National Landscape Conservation System units, such as GSENM, must be consistent with the purposes of the designating proclamation or act of

Congress (BLM Manual 6100:1-6). In addition, LUPs must clearly identify GSENM objects as described in the designating proclamation (BLM Manual 6220:1–12). When the 2000 MMP was written, BLM did not have the specific land use planning guidance for National Landscape Conservation System units that is now provided in BLM Manuals 6100 and 6220. The MMP does not specifically identify GSENM objects.

The Antiquities Act makes multiple references to "objects," which include "objects of antiquity" and "objects of historic or scientific interest." Objects are listed in the proclamation or enabling legislation and generally include cultural artifacts or features, historic structures, paleontological or geological features, specific plant or animal species or habitats, and other resources. BLM has generally interpreted objects as discrete physical items. A national monument may also have less-tangible values, such as provision of opportunities for research.

Courts have upheld that BLM has discretion to determine, to a certain degree and within reason, which items listed in a proclamation are the actual objects to be protected. BLM has not established a process or policy on identification of monument objects. In practice, interdisciplinary teams analyze the proclamation and determine the objects, usually as part of a land use planning process or in advance of an analysis under NEPA.

The text of Presidential Proclamations 6920 and 9682 describes numerous objects as well as supporting information about the values and opportunities within GSENM. BLM did identify objects and values in the *Grand Staircase-Escalante National Monument Livestock Grazing MMP-A/EIS Analysis of the Management Situation* (BLM 2015a:136-1–50). These objects and values are contained in Appendix 11, Objects and Values.

2.4.4 Scenic Routes

The following is a description of the seven byways that are either entirely or partially included within the Decision Area (Appendix 1, Map 30).

2.4.4.1 National Scenic Byways

The National Scenic Byways Program was established under the Intermodal Surface Transportation Efficiency Act of 1991, and reauthorized in 1998 under the Transportation Equity Act for the 21st Century. Under the program, the U.S. Secretary of Transportation recognizes certain roads as All-American Roads or National Scenic Byways based on their archaeological, cultural, historic, natural, recreational, and scenic qualities. All-American Roads must exhibit multiple intrinsic qualities. For a highway to be considered for inclusion within the National Scenic Byways Program, it must provide safe passage for passenger cars year-round, it must be designated a State Scenic Byway, and it must have a current corridor management plan in place. Installation of offsite outdoor advertising (billboards, etc.) is not allowed along byways. There is one All-American Road (SR-12) in Utah.

2.4.4.2 All-American Road – Scenic Byway 12 (State Route 12)

This 124-mile scenic byway was awarded the prestigious designation of All-American Road, the highest designation for any American road in the early 2000s. SR-12 is one of only 20 All-American Roads in the entire nation. From US 89 south of Panguitch, SR-12 winds east through some of the most varied scenery in Utah. Beginning in Red Canyon, SR-12 winds through the northern portion of Bryce Canyon National Park and the Dixie National Forest, past Kodachrome Basin State Park, through GSENM's Grand Staircase, Kaiparowits, and Escalante

Canyons Units, crossing over aspen-covered Boulder Mountain, and ends up in Torrey, just 5 miles west of Capitol Reef National Park. Throughout its length, SR-12 passes within the Planning Area several times. In addition, the byway's scenic viewshed includes portions of the Decision Area away from the roadway.

2.4.4.3 Mormon Pioneer National Heritage Area

The Mormon Pioneer National Heritage Area was established by Congress in 2006 to preserve "the rich heritage and tremendous achievements of the Mormon Pioneers." In 2010, a management plan was finalized and has been used to fund restoration and revitalization projects in the heritage area. The Boulder Loop is one of five districts in the area and follows SR-12 in the Planning Area.

2.4.4.4 Utah Scenic Backways

State Scenic Backways are roads that do not generally meet Federal safety standards for safe year-round travel by passenger cars that have been designated by official State declaration for their scenic, historic, and recreational qualities. Backways often require four-wheel drive, and road conditions can vary due to such factors as season and weather. There are seven Utah Scenic Backways within the Planning Area.

Table 32. Scenic Drives

GSENM – Escalante Canyons	GSENM – Grand Staircase	GSENM – Kaiparowits	Kanab-Escalante Planning Area
Burr Trail Road	Cottonwood Canyon Road	Smoky Mountain Road	Burr Trail Road
Posey Lake Road	Johnson Canyon/Alton Road	-	Hole in the Rock Road
-	Paria River Valley Road	-	Paria River Valley Road
-		-	Smoky Mountain Road

GSENM – Grand Staircase-Escalante National Monument

2.4.4.5 Burr Trail Road

The Burr Trail Scenic Backway is one of the most picturesque drives in Utah. A paved and graded, gravel and dirt road, it extends from Boulder to Bullfrog Marina, passing through GSENM, Capitol Reef National Park, and Glen Canyon NRA. The paved 30-mile segment crosses within GSENM and KEPA lands removed from GSENM. The Burr Trail also connects with the Notom Road in the Waterpocket Fold backcountry of Capitol Reef.

2.4.4.6 Cottonwood Canyon Road

The 47-mile Cottonwood Canyon Backway connects the All-American Road SR-12 in the north with US 89 on the south, passing by Kodachrome Basin State Park and numerous opportunities to get out and explore GSENM that range from short hikes to backpacking excursions. Popular destinations include Cottonwood Narrows on the south and Grosvenor Arch toward the north.

2.4.4.7 Johnson Canyon/Alton Amphitheater

This is a 32-mile scenic route in south-central Utah. It begins 9 miles east of Kanab on US 89 and heads north, where it rejoins US 89 at Glendale, Arizona. An alternate route extends north

to Alton, Arizona, 9 miles north of Glendale. The backway travels through much of the eastern part of the Decision Area, forming a portion of the boundary with GSENM.

Hole-in-the-Rock Road

This route is a 62-mile drive one way, and follows the general route of the pioneer Hole-in-the-Rock Expedition to search for a route across the river, what is now Lake Powell. Most of the road is in KEPA lands removed from GSENM and the last approximately 5 miles are within the boundaries of Glen Canyon NRA. Devils Garden, Dance Hall Rock, and Dry Fork Slot Canyons are popular day use destinations along this route. It also provides access to many popular overnight routes in the Escalante Canyons.

Paria River Valley Road

This short track descends from the junction with US 89 (milepost 31) into a valley with the remains of the Paria ghost town plus the site of a 1930s movie set, both surrounded by amazingly colorful rocks. The road is 6 miles long, and becomes rather steep and twisting near the end, as it crosses the undulating banded hills that cover this area. The cliffs at either side are equally layered and multi-colored, with alternating red, white, purple, and grayish-blue strata, part of the Petrified Forest Member of the Chinle Formation.

Posey Lake Road

This 40-mile backway heads north out of Escalante and climbs onto Escalante Mountain in Dixie National Forest. This backway provides access to Posey Lake and Campground as well as many forest roads ideal for exploring by ATV or mountain bike. It borders the Escalante Canyons Unit for the first approximately 8 miles out of Escalante.

Smoky Mountain Road

This backway winds for 78 remote miles connecting SR-12 and US 89, offering unparalleled views of Navajo Mountain and the Kaiparowits Plateau as it passes through stretches of GSENM and KEPA lands removed from GSENM. Travelers along the backway can occasionally see smoke smoldering from 100-year-old coal fires deep beneath Smoky Mountain—hence, the name.

2.4.4.8 BLM Back Country Byways

The Back Country Byway Program was developed by BLM to complement the National Scenic Byway Program. These byways highlight the spectacular nature of the western landscapes. Back Country Byways vary from narrow, graded roads, passable only during a few months of the year, to two-lane paved highways providing year-round access. There are no BLM backcountry byways or backways in the Decision Area.

2.4.5 Wild and Scenic Rivers

Congressional WSR designation is intended to protect a river's free-flowing condition, water quality, and outstandingly remarkable values such as cultural, geology, wildlife, scenic, or recreational. During planning efforts, BLM reviews all potentially eligible streams within its jurisdiction, and makes decisions on eligibility, suitability and tentative classification. The three types of tentative classification are wild, scenic, and recreational. The tentative classification is

based upon the degree of human development currently along an eligible river, and is used as a guide for future management activities.

Beginning in 1994, BLM interdisciplinary teams gathered information regarding all river segments and of watersheds in the Escalante and Kanab resource areas. In cooperation with the adjacent Federal agencies, the study area was expanded during the development of the 2000 MMP to include river segments that extended onto Dixie National Forest, Bryce Canyon National Park, and Glen Canyon NRA so that entire watersheds were evaluated. Potentially eligible river segments are described in the 1998 Wild and Scenic Eligibility Findings and the GSENM Draft EIS, Appendix 4. All streams that were determined to be eligible were then assessed for suitability in the 2000 MMP. In total, approximately 230.5 miles of the Escalante and Paria river systems within the current Planning Area were determined to be suitable for inclusion in the Wild and Scenic Rivers System. BLM is managing these river corridors (0.25 mile above mean high water mark on either side of the river) to prevent degradation of the identified outstandingly remarkable values and the tentative classification assigned to each segment (BLM 1999, Appendix 4). Tables 33 and 34 summarize the miles of river segments found to be eligible and suitable in the GSENM MMP. These segments are shown in Appendix 1, Map 31.

Table 33. Eligible River Segments[1] (Miles)

Eligible Wild & Scenic River Segments	Tentative Classification	Total	Grand Staircase Unit	Kaiparowits Unit	Escalante Canyons Unit	Kanab-Escalante Planning Area
Blackwater Canyon	Wild	0.6	0.0	0.0	0.6	0.0
Bull Valley Gorge	Wild	5.9	5.4	0.0	0.0	0.5
Cottonwood Canyon	Wild	4.4	0.0	0.0	4.4	0.0
Dry Hollow Creek	Wild	4.3	0.0	0.0	4.3	0.0
Harris Wash	Wild	8.9	0.0	0.0	8.9	0.0
Harris Wash	Scenic	2.9	0.0	0.0	1.0	1.9
Harris Wash	Recreational	2.8	0.0	0.0	2.8	0.0
Lamanite Arch Canyon	Wild	2.4	0.0	0.0	2.4	0.0
Little Death Hollow	Wild	13.5	0.0	0.0	8.7	4.8
Little Death Hollow	Recreational	1.3	0.0	0.0	0.3	1.0
Lower Horse Canyon	Wild	3.0	0.0	0.0	3.0	0.0
Phipps Wash & Tributaries	Wild	6.0	0.0	0.0	6.0	0.0
Steep Creek	Wild	2.6	0.0	0.0	2.6	0.0
Twentyfivemile Wash #2	Wild	2.3	0.0	0.0	0.0	2.3

Eligible Wild & Scenic River Segments	Tentative Classification	Total	Grand Staircase Unit	Kaiparowits Unit	Escalante Canyons Unit	Kanab-Escalante Planning Area
Unnamed Tributary of Calf Creek	Wild	2.6	0.0	0.0	2.6	0.0
Unnamed Washes (4)	Wild	2.1	0.0	0.0	0.0	2.1
Water Canyon	Wild	3.5	0.0	0.0	3.5	0.0
Wolverine Creek	Wild	8.4	0.0	0.0	5.8	2.5
Wolverine Creek	Recreational	1.3	0.0	0.0	0.6	0.7
	Total	78.7	5.4	0.0	57.5	15.9

[1] Eligible river segments listed above were determined to be non-suitable in the 2000 Monument Management Plan.

Table 34. Suitable River Segments (miles)

Suitable Wild & Scenic River Segments	Tentative Classification[(1)]	Total	Grand Staircase Unit	Kaiparowits Unit	Escalante Canyons Unit	Kanab-Escalante Planning Area
Calf Creek	Wild	3.5	0.0	0.0	3.5	0.0
Calf Creek	Scenic	3.0	0.0	0.0	3.0	0.0
Calf Creek	Recreational	1.5	0.0	0.0	1.5	0.0
Coyote Gulch #2	Wild	0.7	0.0	0.0	0.0	0.7
Death Hollow Creek	Wild	9.9	0.0	0.0	9.9	0.0
Deer Creek Canyon	Wild	5.2	3.6	0.0	0.0	1.5
Escalante River	Wild	33.0	0.0	0.0	33.0	0.0
Escalante River	Recreational	1.1	0.0	0.0	1.1	0.0
Hackberry Creek	Wild	20.1	0.0	18.6	0.0	3.4
Hackberry Creek	Recreational	2.9	0.0	1.6	0.0	1.3
Harris Wash	Wild	1.1	0.0	0.0	1.1	0.0
Hogeye Creek	Wild	6.3	0.0	6.3	0.0	0.0
Kitchen Canyon	Wild	1.3	1.3	0.0	0.0	0.0
Lower Boulder Creek	Wild	13.5	0.0	0.0	13.5	0.0
Lower Deer Creek	Wild	7.0	0.0	0.0	7.0	0.0
Lower Deer Creek	Recreational	3.7	0.0	0.0	3.7	0.0
Lower Paria River-1	Recreational	3.3	0.0	0.0	0.0	3.3
Lower Sand Creek	Wild	10.6	0.0	0.0	10.6	0.0
Mamie Creek & West Tributary	Wild	9.2	0.0	0.0	9.2	0.0

Suitable Wild & Scenic River Segments	Tentative Classification(1)	Total	Grand Staircase Unit	Kaiparowits Unit	Escalante Canyons Unit	Kanab-Escalante Planning Area
Upper Paria River-1	Wild	21.7	5.7	12.4	0.0	15.6
Upper Paria River-2	Recreational	16.9	3.9	0.9	0.0	12.1
Scorpion Gulch	Wild	0.8	0.0	0.0	0.0	0.8
Sheep Creek	Wild	1.5	0.2	0.1	0.0	1.2
Slickrock Canyon	Wild	2.8	0.0	0.0	2.8	0.0
Snake Creek	Wild	4.7	0.0	4.7	0.0	0.0
Starlight Canyon	Wild	4.9	4.9	0.0	0.0	0.0
Steep Creek	Wild	6.4	0.0	0.0	6.4	0.0
The Gulch	Wild	24.0	0.0	0.0	6.4	0.0
The Gulch	Recreational	0.6	0.0	0.0	0.6	0.0
Twentyfivemile Wash #2	Wild	6.8	0.0	0.0	0.0	6.8
Willow Patch Creek	Wild	2.6	0.0	0.0	2.6	0.0
	Total	230.5	19.6	44.6	115.9	46.8

2.4.6 Wilderness Study Areas

With the passage of FLPMA in 1976, Congress directed BLM to inventory, study, and recommend which public lands under its administration should be designated as wilderness. The *Utah Statewide Wilderness Study Report*, published in October of 1991, reported the results of the study in Utah and made recommendations to Congress about which areas should be designated as wilderness. The final recommendation for wilderness designation was forwarded to Congress on June 22, 1992. Congress has not yet acted on that recommendation.

Section 603(c) of FLPMA provides direction to BLM on the management of WSAs and states that, with some exceptions, "the Secretary shall continue to manage such lands according to his authority under this Act and other applicable law in a manner so as not to impair the suitability of such areas for preservation as wilderness." This language is referred to as the "non-impairment" mandate.

Sixteen WSAs were identified in the Planning Area. A description of wilderness characteristics and other resource values and uses found in each WSA can be found in the *Utah Statewide Wilderness Study Report* (BLM 1991b). These 16 WSAs account for approximately 880,857 acres (47 percent) of the Planning Area (Appendix 1, Map 32, and Table 35).

Table 35. Wilderness Study Areas

WSA Name	Total Acres[1]	Acres in Grand Staircase Unit[2]	Acres in Kaiparowits Unit[2]	Acres in Escalante Canyons Unit[2]	Acres in Kanab-Escalante Planning Area[2]
Burning Hills WSA	61,550	0	16,425	0	46,073
Carcass Canyon WSA	46,711	0	31,100	0	16,251
Death Ridge WSA	62,870	0	53,643	0	8,807
Devils Garden ISA	638	0	617	0	16
Escalante Canyons Tract 1 ISA	360	0	361	361	0
Escalante Canyons Tract 5 ISA	760	0	0	0	758
Fiftymile Mountain WSA	146,143	0	107,237	0	41,263
Mud Spring Canyon WSA	38,075	0	38,168	0	2
North Escalante Canyons/The Gulch ISA	119,752	0	0	119,776	41
Paria/Hackberry and Paria/Hackberry 202 WSA	135,822	74737	62,228	0	259
Phipps-Death Hollow ISA	42,731	0	0	42,640	89
Scorpion WSA	35,884	0	0	15	36,016
Steep Creek WSA	21,896	0	0	22,048	0
The Blues WSA	19,030	0	5,728	0	13.045
The Cockscomb WSA	10,080	2	0	0	9,919
Wahweap WSA	134,400	0	96,743	0	37,184
Totals	876,702	74,739	411,889	184,839	209,721

[1] WSA/ISA total acres are the total BLM acres from the *Utah Statewide Wilderness Study Report* (BLM 1991b). Acquired lands not managed as WSAs (including former SITLA sections) are not included in these numbers.
[2] Acres calculated for each planning unit were generated by a geographic information system and will vary slightly from the totals calculated in the 1991 report. Acquired lands not managed as WSAs (including former SITLA sections) are not included in these numbers.
WSA – Wilderness Study Area, ISA – Instant Study Area, BLM – Bureau of Land Management, SITLA – School and Institutional Trust Lands Administration

Pursuant to BLM's non-impairment mandate, BLM will manage WSAs so as not to impair the suitability of such areas for preservation as wilderness until Congress passes legislation to either designate them as part of the National Wilderness Preservation System or release them from further study or protection. In general, the only activities permissible within WSAs are temporary uses that do not create new surface disturbance or involve permanent placement of structures. Temporary, non-disturbing activities, as well as VER or activities that meet the exception to the non-impairment standard (described in Section 1.6.C.2 of Manual 6330), may generally continue in WSAs.

Boundaries of Section 202 WSAs that were submitted to Congress, including 402 acres of the Paria Hackberry WSA, cannot be altered through land use planning. The current status of WSAs will not change in this planning process; however, an understanding of the WSAs will give insight to current management procedures and issues that must be addressed during the planning process.

Most of the WSAs in the Planning Area also surround or abut lands that were formerly managed by SITLA and have since been acquired by BLM. IM UT-2005-053 contains clarification about BLM's management of acquired lands within WSAs. The Utah Schools and Lands Exchange Act of 1998 involves lands acquired and managed by GSENM. Because this was a legislative exchange, the FLPMA land exchange regulations at 43 CFR 2200.0-6(f) and (g) and 43 CFR 2201.9(b) do not apply. In addition, none of the lands acquired by the Utah Schools and Lands Exchange Act of 1998 fit any of the categories of land to which the *Utah v. Norton* settlement does not apply as provided in IM No. 2003-275 – Change 1. Although the Exchange Act of 1998 ratified an agreement between the Secretary of the Interior and the Governor to exchange lands, both the agreement and the act itself are silent regarding how lands acquired by BLM within existing WSAs are to be managed. Therefore, none of the lands acquired by the United States through the Exchange Act of 1998 are WSAs or managed as WSAs.

2.5 Social and Economic Features

The following sections include discussions of socioeconomic conditions, tribal religious concerns, and hazardous materials and public safety. The discussion of socioeconomic conditions includes a short summary of the *Socioeconomic Baseline Report for the Kanab Resource Management Plan and Environmental Impact Statement* (BLM 2005c). Tribal religious concerns are discussed in detail and include information on tribal interests in the Planning Area, noting features not described in the cultural resources section, such as treaty-based subsistence uses, traditional use areas, and rights of access. Hazardous materials and public safety are addressed by identifying hazardous materials or hazardous waste disposal facilities.

2.5.1 Environmental Justice

Environmental justice (EJ) is an initiative that culminated with President William J. Clinton's February 11, 1994, Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," and an accompanying Presidential memorandum. The EO requires that each Federal agency consider EJ to be part of its mission. Its intent is to promote fair treatment of people of all races and income levels, so no person or group of people bears a disproportionate share of the adverse effects from the country's domestic and foreign programs. Specific to the EIS process, the EO requires that proposed projects be evaluated for "disproportionately high adverse human health and environmental effects on minority populations and low income populations."

The EPA guidelines for evaluating the potential environmental effects of projects require specific identification of minority populations when either: (1) a minority population exceeds 50 percent of the population of the affected area; or (2) a minority population represents a meaningfully greater increment of the affected population than of the population of some other appropriate geographic unit, as a whole.

A low-income EJ population is present. Low-income EJ populations are not present in Garfield and Kane Counties in Utah. The percentage of the population classified as low income in Coconino County, Arizona, however, is more than 10 percentage points higher than that of the State of Utah. A low-income EJ population, therefore, is present for the purposes of this analysis.

A minority EJ population is also present. Minority EJ populations are not present in Garfield and Kane Counties in Utah. The percentage of the population identified as belonging to a minority group in Coconino County, Arizona, is more than 10 percentage points higher than that of the State of Utah. A minority EJ population, therefore, is present for the purposes of this analysis.

An American Indian EJ population is present, as well. American Indian EJ populations are not present in Garfield and Kane Counties in Utah. There is a concentrated population of American Indians living in Coconino County, Arizona. An American Indian EJ population, therefore, is present for the purposes of this analysis.

Table 36. Environmental Justice Populations in the Planning Area

Population	Low Income	Minority	American Indian
Garfield County, Utah	13.5%	10.0%	1.0%
Kane County, Utah	9.0%	8.3%	0.7%
Coconino County, Arizona	22.2%	45.4%	26.8%
State of Utah (reference population)	11.7%	20.7%	1.1%

Source: Headwaters Economics 2018

It is not possible at this point in the planning process to determine whether or not the existing EJ populations within the Planning Area might be disproportionately affected by any management actions that might be proposed under the current planning effort.

2.5.2 Hazardous Materials and Public Safety

No hazardous, toxic, or unapproved solid waste sites are known to occur on public lands in GSENM and KEPA. None of the actions, activities, and uses allowed in GSENM and KEPA require the handling, storage, or release of large quantities of these wastes in GSENM and KEPA.

2.5.3 Tribal Religious Concerns

BLM is responsible for ensuring meaningful consultation and coordination on a government-to-government basis with federally recognized tribes. Through the consultation process, BLM and tribes can identify issues and concerns about cultural resources, historic properties, sacred sites, traditional uses, and TCPs that need to be considered in land use or project plans. Because BLM manages lands in the historical and traditional use areas, it has a responsibility to consult with tribes to consider the continuation of traditional uses in areas of interest. Currently, tribal members may use public land resources for cultural purposes, although BLM might not know the specific locations of such resources.

Government-to-government consultations are required by several Federal laws, statutes, and EOs including but not limited to:

- American Indian Religious Freedom Act (16 U.S.C. 1996)

- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa-mm)
- NHPA (16 U.S.C. 470 et seq.)
- Native American Graves Protection and Repatriation Act (25 U.S.C. 3001, et seq.)
- EO 13175: Consultation and Coordination with Indian Tribal Governments (Nov. 6, 2000)
- EO 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (Feb. 11, 1994)

Additionally, the Federal government must consider Indian Sacred Sites under EO 13007 (May 24, 1996), while TCPs are considered under Section 106 of the NHPA.

Tribal consultation efforts have included the Paiute Indian Tribes of Utah, Kaibab Band of Southern Paiute Indians, Ute Indian Tribe of the Uintah and Ouray Reservation, Hopi, Zuni, and Navajo. The Pueblo of San Felipe has recently asked to be included. To date, only the Kaibab Band of Southern Paiute Indians has responded with comments. The Kaibab Paiute stress their connection to the lands of the Planning Area, and note that it should not be viewed in parts but as a whole. Specific mention was made of traditional use of the landscape, the importance of the plants and minerals, and the connection of the GSENM area to nearby locations such as the Colorado River, Canyonlands, Death Valley, Fish Lake, Monument Valley, and the San Francisco Peaks. The cultural importance of springs, lakes, and rivers is well documented for the Paiute (Kelly 1964) and for other GSENM area tribes, as well (Sabata 2018).

2.5.4 Socioeconomic Conditions

The basic demographic makeup within the study area varies between Garfield and Kane Counties in comparison with the State of Utah. In the period from 2000 to 2016, at 1.3 percent and 4.7 percent, respectively, population growth in Garfield and Kane Counties was lower than that in Utah, which experienced 11 percent growth during the same period. With 39.6 years and 43.4 years, respectively, in 2016, both Garfield and Kane Counties had older median ages than did Utah as a whole, at 30.3 years, although both counties saw their median ages slightly decrease between 2010 and 2016. In contrast, Utah's median age increased by 5.2 percent during the same period, increasing from 28.8 years to 30.3 years.

The counties in the study area have collectively experienced steady population growth since 1970. From 1970 to 2016, overall population in Garfield and Kane Counties grew by 120 percent, increasing from 5,599 to 12,320 people. Most of the region's population growth has been internal, through births exceeding deaths, rather than being due to in-migration from outside. Rather, net migration has been negative, indicating that more people are moving out of the study area than are moving in.

In comparison to the two-county study area in Utah, Coconino County, Arizona, has experienced both positive migration and a high number of births. From 2000 to 2016, the population of Coconino County grew by 21 percent.

Table 37. Basic Population Statistics

Basic Population Statistics	Garfield County, UT	Kane County, UT	Coconino County, AZ	Kane-Garfield Two-County Region	Utah
Population (2016)	4,986	7,334	134,011	12,320	3,051,217
Population (2000)	4,747	6,094	116,320	10,841	2,244,502

Basic Population Statistics	Garfield County, UT	Kane County, UT	Coconino County, AZ	Kane-Garfield Two-County Region	Utah
Population Percent Change (2000–2016)	5%	21%	15.2%	13.2%	36%
Median Age (2016)	39.6	43.4	30.9	N/A	30.3
Median Age (2010)	39.8	45.3	29.6	N/A	28.8

Source: U.S. Department of Commerce 2017
N/A – not available

Within counties in the study area, per capita, median, and mean income are reported as being lower than that of the State of Utah. Nominal retirement income is lower in Garfield County than in the other two counties in the study area.

Since 1960, total personal income in the study area has increased in real terms (adjusted for inflation) with a few decreases that largely correspond to national recessions. Garfield County's income growth was the slowest of the three counties in the study area, and Kane County's growth has been quite robust. All three counties experienced economic disruption during the 2007–2009 recession, but personal income in all three counties has returned to an upward trend since that time.

Table 38. Household Income

Household Income (2016)	Garfield County, UT	Kane County, UT	Coconino County, AZ	Kane-Garfield Two-County Region	Utah
Per Capita Income	$21,006	$24,488	$24,711	N/A	$25,600
Median Household Income	$45,221	$50,517	$51,106	N/A	$62,518
Mean Annual Household Income	$53,927	$60,030	$66,392	$57,444	$78,007

Source: U.S. Department of Commerce 2017
N/A – not available

Table 39. Components of Household Income

Components of Household Income (2016)	Garfield County, UT	Kane County, UT	Coconino County, AZ	Kane-Garfield Two-County Region	Utah
Labor earnings	77.4%	67.2%	83.0%	71.2%	84.3%
Social Security	41.2%	45.1%	22.3%	43.6%	24.1%
Retirement income	25.3%	27.1%	16.7%	26.4%	15.9%
Supplemental Security Income	2.4%	4.2%	4.3%	3.5%	3.7%
Cash public assistance income	1.7%	1.9%	2.1%	1.8%	1.9%
Food Stamp/ SNAP	5.4%	7.3%	12.4%	6.5%	8.3%

Source: U.S. Department of Commerce 2017

Poverty rates for different categories of the population vary widely both within the study area and in comparison with the United States. In general, poverty rates are lower in Garfield and Kane Counties than in the United States, while in Coconino County they are higher than in the United States as a whole. When evaluated by race and ethnicity, poverty rates within the study area are similarly complex and varied. No clear patterns emerge when compared with the United States, an indication that economic conditions in the study area do not uniformly mirror national trends or statistics. What can be stated is that poverty rates for certain categories within the study area are markedly higher than the State of Utah.

Table 40. Percentage of People in Poverty

Percentage of People Who Are Below the Poverty Line (2016)	Garfield County, UT	Kane County, UT	Coconino County, AZ	Kane-Garfield Two-County Region	Utah
People	13.5%	9.0%	22.2%	10.8%	11.7%
Families	8.5%	4.8%	14.5%	6.4%	8.4%
People under 18 years	16.8%	10.4%	25.8%	13.1%	13.4%
People 65 years and older	7.1%	7.4%	11.0%	7.3%	6.9%
Families with related children under 18 years	16.3%	6.7%	22.9%	10.7%	11.7%
Married couple families	6.1%	3.8%	8.3%	4.8%	5.3%
Married couple families with children under 18 years	11.5%	5.2%	13.4%	7.7%	6.9%
Female householder, no husband present	27.1%	20.0%	31.8%	24.1%	26.5%
Female householder, no husband present with children under 18 years	36.7%	25.9%	38.8%	32.6%	35.0%

Source: U.S. Department of Commerce 2017

For some economic sectors, trends in economic conditions within the study area have followed the national trend. An example is in the growth of the service sector as a leading source of employment. Service sector industries include, among others: utilities; wholesale trade; retail trade; transportation and warehousing; information technology and information services; finance and insurance; real estate, rental, and leasing services; professional and technical services; management of companies and enterprises; administrative and waste services; educational services; health care and social assistance; arts, entertainment, and recreation; accommodation and food services; and all other services except for public administration.

Throughout the United States, service sector jobs have become an increasingly important source of household income as manufacturing and extractive industries have declined over time at the national level, with the exception of oil and gas extraction. Arizona, Utah, and the overall study area are no exceptions, with service sector employment steadily increasing from 1970 up to the present. In contrast to those sectors in which the study area parallels trends for the United States as a whole, in some sectors there are marked differences. For example, in 2012, employment within the travel and tourism industry as a percentage of all employment in

the study area was more than double that of the United States. Travel and tourism play a larger role in the economies of the counties around GSENM than they do in the United States in general.

Out of the three counties within the study area, during the period from 1970 to 2016, Kane County experienced the highest rates of growth in population, employment, and personal income. In addition, Kane County had the lowest unemployment rate of the three counties, with unemployment sitting at 3.4 percent as of 2017. In contrast, unemployment in Garfield County was 7.6 percent for the same year.

Table 41. Selected Socioeconomic Statistics

Selected Socioeconomic Statistics	Garfield County, UT	Kane County, UT	Coconino County, AZ	Utah
Population % change, 1970–2016	58%	201%	187%	186%
Employment % change, 1970–2016	130%	360%	320%	324%
Personal income % change, 1970–2016	229%	471%	496%	436%
Unemployment rate, 2017	7.6%	3.4%	5.2%	3.2%
Average earnings per job (total earnings/total jobs), 2016 (2017 $)	$30,915	$34,836	$46,933	$50,516
Per capita income, 2016 (2017 $)	$35,922	$37,913	$42,941	$41,784
Non-labor % of total personal income, 2016	43.9%	43.5%	41.0%	32.4%
Services % of total private employment, 2016	72%	84%	84%	83%
Government % of total employment, 2016	19.6%	19.1%	22.5%	14.7%
Farms % of total employment, 2016	8.2%	3.7%	2.7%	1.1%
Mining (including fossil fuels) % of total employment, 2016	N/A	0.1%	0.2%	0.7%

N/A – not available

In the study area, the most important industries in the past decade, in terms of total employment, were arts, entertainment, recreation, accommodation, and food; education, health care, and social assistance; and retail trade. While farming provided more than 8 percent of all employment in Garfield County in recent years, this category of employment played a lesser role in Kane County's and Coconino County's economy as a percentage of all employment.

3 Current Management Direction

This chapter describes current management direction for public lands and resources within the Decision Area, based on the GSENM MMP (BLM 2000). This plan has been amended by:

Southern Utah Support Area Fire Management Plan (BLM 2005d)

https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1429&context=govdocs

Wind Energy Development PEIS (BLM 2005b)

http://windeis.anl.gov/documents/fpeis/index.cfm

Tropic to Hatch 138 kV Transmission Line Project EIS (U.S. Forest Service 2011)

https://www.fs.usda.gov/detailfull/dixie/landmanagement/projects/?cid=fseprd532040&width=full

Solar Energy Development in Six Western States PEIS (BLM 2012)

https://www.energy.gov/nepa/downloads/eis-0403-final-programmatic-environmental-impact-statement

BLM Utah Greater Sage Grouse Plan (BLM 2015b)

https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=99423

Livestock grazing in the Planning Area is governed by the GSENM MMP and four Management Framework Plans from the 1980s, as amended, which will be reevaluated in the new planning documents. These documents include:

- Escalante Management Framework Plan (BLM 1981a)
- Paria Management Framework Plan (BLM 1981b)
- Vermilion Management Framework Plan (BLM 1981c)
- Zion Management Framework Plan(BLM 1981d)
- Escalante Management Framework Plan Approved Amendment and Record of Decision (BLM 1999)
- Glen Canyon General Management Plan (NPS 1979)

The existing LUPs do not include decisions for every resource or use. In the absence of decisions in LUPs, applicable laws, rules, regulations, and policies are applied or an LUP amendment is undertaken. This chapter represents the current management of the BLM-administered surface land in the Planning Area and forms the basis for the No Action Alternative in the Draft RMP/EIS. This management direction represents what would continue into the future if new LUPs were not completed. Chapter 6 describes the specific mandates and authorities for managing these resources.

The following tables list the current management decisions in the GSENM MMP and determine if the decision is responsive to current issues. If management decisions may not be current, options for future decision options are noted. The management considerations may be used as a basis for alternatives in the LUP EIS.

3.1 Resources

3.1.1 Air Quality

Planning Decision – Air Quality	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
The Monument will continue to be managed as a Prevention of Significant Deterioration Class II area designated by the Clean Air Act. All BLM actions and use authorizations will be designed or stipulated so as to protect air quality within the Monument and the Class I areas on surrounding Federal lands.	AIR-1	Yes	Yes
Site specific project proposals affecting BLM and adjacent lands will be reviewed for compliance with existing air quality laws and policies. Mitigation will be incorporated into project proposals to reduce air quality degradation. Projects will be designed to minimize further degradation of existing air quality. New emission sources will be required to apply control measures to reduce emissions.	AIR-2	Yes	Yes
Management ignited fires will comply with the State of Utah Interagency Memorandum of Understanding requirements to minimize air quality impacts from resulting particulates (smoke). This procedure requires obtaining an open burning permit from the State prior to conducting a management ignited fire.	AIR-3	Yes	Yes

GSENM – Grand Staircase-Escalante National Monument, BLM – Bureau of Land Management

3.1.2 Climate Change

Planning Decision – Climate Change	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
No decisions specific to climate change were included. Air quality decisions would apply.	Air 1-3	Yes	Yes

GSENM – Grand Staircase-Escalante National Monument

3.1.3 Cultural Resources

Planning Decision – Cultural Resources	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
The BLM will continue to inventory and conduct project compliance for archaeological resources....	ARCH-1	Yes	Yes
Public education and interpretation will be emphasized to improve visitor understanding of archaeological resources and to prevent damage....	ARCH-2	Yes	Yes

Planning Decision – Cultural Resources	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Traditional Cultural Properties are those sites recognized by contemporary Native American Indians as important to their cultural continuity. These sites will be identified, respected, preserved, and managed for continued recognized traditional uses. Consultation with appropriate Native American Indian communities will be a priority. Archaeological sites and Traditional Cultural Properties will be managed and protected from site degradation in accordance with appropriate laws and regulations.	ARCH-3	Yes	Yes
…inventory the Monument to identify historic resources and to evaluate their potential for conservation, research, or interpretation.	HIST-1	Yes	Yes Reword
All proposed projects will be required to include a site inventory for historic resources, and appropriate strategies will be used to protect sensitive sites….	HIST-1	Yes	Yes
The BLM will establish continuing collaborative programs with local communities, organizations, local and State agencies, Native American Indian communities, outfitters and guides, volunteers, and other interested parties….	HIST-1	Yes	Yes
These management decisions focus on the research opportunities in the Monument.	SCI-1-9	Yes	No
Management Considerations: The KEPA land use plan can consider research priorities.			

GSENM – Grand Staircase-Escalante National Monument, BLM – Bureau of Land Management, KEPA – Kanab-Escalante Planning Area

3.1.4 Fire and Fuels

Planning Decision – Fire and Fuels	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
The objective of the fire management program will be to allow fire to play its natural role in the ecosystem. Management ignited fires may be initiated in areas where fire suppression has disrupted natural fire regimes. Specific objectives for management ignited fire will be developed prior to its use and with recommendations from the GSENM Advisory Committee.	FIRE-1	No	No
Management Considerations: The GSENM Advisory Committee is not functional. Tier decisions to Southern Utah Support Area Fire Management Plan (UT-040-04-054). November 2005. Utilize currently available data in determining fire/non fire use/occurrence (Landfire, VTRT, etc.).			
For all fire activities, the Monument is part of the Color Country Interagency Fire Management Area…. All changes in zones and activities will be coordinated with the Color Country Fire Management Area staff following established processes.	FIRE-2	Yes	Yes Reword
Heavy equipment use is allowed through authorization of the Monument Manager.	FIRE-3	Yes	Yes Reword
A designated fire resource advisor familiar with WSA issues will be consulted on all fires within the Monument that involves WSAs	FIRE-4	Yes	Yes Reword

GSENM – Grand Staircase-Escalante National Monument, WSA – Wilderness Study Area

3.1.5 Fish and Wildlife

Planning Decision – Fish and Wildlife	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
BLM will manage habitats for the recovery or reestablishment of native populations through collaborative planning with local, State and Federal agencies, user groups, and interested organizations.	FW-1	Yes	No
Management Considerations: Established in policy. Not needed as a separate management decision. The directive to manage for native species only may not apply to KEPA lands outside of GSENM.			
The BLM will work with the UDWR to meet the requirements of Executive Order 11312 on Invasive Species.	FW-2	Yes	Yes
Management Considerations: See if Executive Order is still in effect.			
The BLM will continue to work with the UDWR to meet the goals described in adopted species management plans.	FW-3	Yes	Yes
The BLM will place a priority on protecting riparian and water resources as they relate to fish and wildlife, and will work cooperatively with the U.S. Forest Service to coordinate maintenance of fisheries and flows.	FW-4	No	No
Management Considerations: The BLM has no control over how much flow the U.S. Forest Service allows to enter BLM riparian areas. This would be a water rights issue.			
The BLM will preserve the integrity of wildlife corridors, migration routes and access to key forage, nesting, and spawning areas by limiting adverse impacts from development in the Monument.	FW-5	Yes	No
All proposed projects will be required to include a site assessment for impacts to fish and wildlife species. Appropriate strategies will be used to avoid sensitive habitat (i.e., construct barriers). Seasonal restrictions on visitor use could be implemented to protect crucial habitat and migration corridors.	FW-6	No	No
Management Considerations: This is standard practice required by NEPA. There is no need for a duplicate decision stating something that is already required.			
Water developments may be constructed for wildlife purposes if consistent with the overall objectives for fish and wildlife and with the water development policy discussed in the Water section.	FW-7	Yes	Yes
The BLM will continue to coordinate with UDWR and other organizations to inventory for wildlife and to evaluate needs for habitat protection. Inventory and research efforts will be targeted to fill information gaps on habitat needs. Such research will be coordinated as part of a adaptive management framework.	FW-8	Yes	Yes
Public education and interpretation will be emphasized to improve visitor understanding of fish and wildlife species. Collaborative partnerships with volunteers and universities will be pursued to monitor and study biological resources consistent with the overall objective of protecting such resources.	FW-9	Yes	Yes

GSENM – Grand Staircase-Escalante National Monument, BLM – Bureau of Land Management, KEPA – Kanab-Escalante Planning Area, NEPA – National Environmental Policy Act, UDWR – Utah Division of Wildlife Resources

3.1.6 Geology

Planning Decision – Geology	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Efforts to inventory and assess the potential for geologic hazards as they might relate to visitor safety, visitor facilities, rights-of-way, communication sites, and transportation routes will continue.	GEO-1	Yes	Yes
Visitor activities could be restricted in high-hazard areas or in areas where damage to sensitive geomorphologic features may occur. Examples include restrictions on camping in known flood channels, debris basins, or sensitive soil areas.	GEO-2	Yes	Yes
The design or placement of designated primitive camping areas, trailheads, or communication structures may be affected by geologic hazards. Prior to construction of any of these facilities, surveys will be conducted to assess impacts to geologic resources in the Monument.	GEO-3	No	No
Management Considerations: This decision could be changed to read "…surveys MAY be conducted to assess impacts…" This allows flexibility on a case-by-case basis as projects are proposed instead of mandating surveys where they are not necessary.			

GSENM – Grand Staircase-Escalante National Monument

3.1.7 Lands with Wilderness Characteristics

Planning Decision – Lands with Wilderness Characteristics	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Because the 1999 Utah Wilderness Inventory results were not available until February 1999, the BLM was not able to consider the inventory in the development of the MMP. To date, BLM has not made specific land use planning decisions for lands with wilderness characteristics within this Planning Area.	N/A	No	No
Management Considerations: The land use plans will need to consider how lands with wilderness characteristics will be managed in each unit.			

GSENM – Grand Staircase-Escalante National Monument, BLM – Bureau of Land Management, N/A – not applicable

3.1.8 Paleontology

Planning Decision – Paleontology	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
The BLM will continue to inventory the Monument for paleontological resources and evaluate their potential for protection, conservation, research, or interpretation….	PAL-1	Yes	Yes

Planning Decision – Paleontology	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
A monitoring program will be used to assess management needs of sensitive sites and areas. All proposed projects will be required to include a paleontological site inventory, and appropriate strategies will be used to avoid sensitive sites, restrict access to the sensitive resource (i.e., construct barriers), or as a last resort, excavate and curate the resource.	PAL-2	Yes	Yes
Public education and interpretation will be emphasized to improve visitor understanding of paleontological resources and to prevent damage. Collaborative partnerships with volunteers, universities, and other research institutions will be pursued to document, preserve, monitor or interpret sites consistent with the overall objective of protecting paleontological resources.	PAL-3	Yes	Yes
These management decisions focus on the research opportunities in the Monument.	SCI-1-9	Yes	No
Management Considerations: The KEPA Plan may consider different research priorities.			

GSENM – Grand Staircase-Escalante National Monument, BLM – Bureau of Land Management, KEPA – Kanab-Escalante Planning Area

3.1.9 Soil Resources

Planning Decision – Soils	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
The BLM will apply procedures to protect soils from accelerated or unnatural erosion in any ground-disturbing activity.	SOIL-1	Yes	Yes
Prior to any ground disturbing activity, the potential effects on biological soil crusts will be considered and steps will be taken to avoid impacts on their function, health, and distribution.	SOIL-2	Yes	Yes
Long-term research toward preservation and restoration of soils will be part of the adaptive management framework described in Chapter 3 [of the MMP]. Further research will be conducted on these crusts, and the results interpreted for management and education purposes.	SOIL-2	Yes	No
Management Considerations: Research may not be included as a management decision.			

GSENM – Grand Staircase-Escalante National Monument, BLM – Bureau of Land Management, MMP – Monument Management Plan

3.1.10 Special Status Species

The Greater Sage-Grouse Land Use Plan Amendments of 2015 are incorporated by reference and are not subject to change during this planning effort. The goals and objectives of that plan will be carried forward in the Grand Staircase and KEPA Units where sage-grouse habitat exists.

Planning Decision – Special Status Species	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
The BLM will continue to ensure that authorized actions do not jeopardize the continued existence of any special status animal species or result in the destruction or adverse modification of critical habitats.	SSA-1	Yes	Yes
Consultation with the USFWS will occur when activities are proposed in areas with listed or candidate species. Coordination with the U.S. Forest Service, the UDWR, and the National Park Service will occur in areas where species cross jurisdictional lines. The BLM will work with these agencies to develop recovery plans, when needed, and to implement existing recovery plans for all listed species.	SSA-2	Yes	Yes
Surface disturbing research activities will generally not be allowed in threatened or endangered species habitat. All scientific research projects in close proximity to listed species populations or habitat will be evaluated by Monument biologists, the USFWS, and appropriate experts prior to initiation to determine impacts to these populations or habitat. Any research project that may have an effect on populations of listed species will be coordinated with the USFWS and appropriate permits and Section 7 consultation will be completed as determined necessary. Projects which provide new information and understanding of listed species, their populations, and/or their habitat, may be allowed after approval by the BLM and the review and issuance of permits by the USFWS. All projects will be evaluated on a case by case basis.	SSA-3	No	No
Management Considerations: Research may not be included as a management decision. This is discretionary and can be addressed in the individual plans and may or may not be carried forward.			
Fuelwood cutting is restricted to designated areas, none of which occur in known nesting or roosting habitat. These areas are small in size and are unlikely to affect foraging activities of raptors or other listed species. Future identification of fuelwood cutting areas will consider listed animal populations and habitats prior to designation.	SSA-4	No	No
Management Considerations: This is discretionary and can be addressed in the individual plans and may or may not be carried forward.			
Vegetation Restoration methods (as described in the Vegetation section) will not be allowed in areas where special status species roost or nest (unless consultation with USFWS indicates no effect or a beneficial effect to species).	SSA-5	No	No
Management Considerations: Vegetation restoration may need to occur in habitats used by special status species. BLM is not required to consult with USFWS on anything but threatened or endangered species. NEPA analysis should drive this, not a blanket restriction. Change wording to reflect that BLM will consult when necessary. NEPA analysis will drive the decisionmaking process.			

Planning Decision – Special Status Species	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
There will be an active noxious weed control program in the Monument (see the Noxious Weed Control section for related decisions). This program will focus on areas where habitat, including special status animal species habitat, is being lost due to changes in the water table and changes in vegetation structure and composition caused by noxious weeds. This weed control program will include the use of volunteer groups, BLM employees, county personnel, contractors, and adjacent agency personnel when appropriate. This program will target species in a prioritized manner. Priorities for weed control may include: invasiveness of the species, extent of invasion, sensitivity of the area being invaded, and accessibility. Special status animal species habitat jeopardized by noxious weed invasions will be a high priority for control efforts. BLM law enforcement personnel and increased field presence of BLM personnel will concentrate efforts in areas with special status species habitat in order to curb non-compliance activities. The BLM is pursuing cooperative agreements with each of the Sheriff departments in Kane and Garfield Counties to facilitate shared law enforcement and support for enforcing established closures.	SSA-6	No	No
Management Considerations: Noxious weed control will remain as a program but may not be prioritized in this manner. Opportunity to reevaluate in new planning effort.			
BLM law enforcement personnel and increased field presence of BLM personnel will concentrate efforts in areas with special status species habitat in order to curb non-compliance activities. The BLM is pursuing cooperative agreements with each of the Sheriff departments in Kane and Garfield Counties to facilitate shared law enforcement and support for enforcing established closures.	SSA-7	No	No
Management Considerations: Priorities for law enforcement should not be set by special status species habitat. Reevaluate in new planning effort. Statement not needed in this section.			
Livestock grazing allotments will be evaluated, and grazing as it relates to all endangered species will be addressed during this process. Evaluations will incorporate the latest research and information in the protection of species. Section 7 consultation will be conducted for all allotments that may affect listed species during the individual allotment evaluations. This process will provide protection for listed and sensitive species as the evaluation will be site specific for each of the allotments.	SSA-8	Yes	No
Management Considerations: This is a standard practice and would be covered at the NEPA analysis level. This does not need to be a decision in a planning document.			

Planning Decision – Special Status Species	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
The Colorado pikeminnow (Ptychocheilus lucius) and razorback sucker (Xyrauchen texanu) are found in the Colorado River system and were more prevalent prior to the construction of Glen Canyon Dam. There are no known records of these two fish within the boundaries of the Monument, and recent surveys have not located these species in the Escalante River. Activity level environmental assessments will be required before the use of any chemical substances that may reach Lake Powell through the Escalante River.	SSA-10	Yes	No
Management Considerations: This applies only to the Escalante River found in the Escalante Canyons Unit of GSENM. Does not pertain to KEPA lands or other GSENM units.			
If recreation activities (e.g., hiking, camping, backpacking) are determined to impact known roost sites (bald eagle), allocations and/or group size restrictions or other measures will be implemented to reduce disturbance. If allocations and group size limits are implemented, they will be developed in accordance with the Group Size and Recreation Allocation provisions of this Plan.	SSA-11	No	No
Management Considerations: Bald eagle is no longer a threatened and endangered species. Additionally, there are no known roost sites (that are officially documented) on these lands.			
Trail construction will generally be limited to the Frontcountry and Passage Zones. Project level assessments and consultation with the USFWS will be completed before construction of any trails that are in close proximity to eagle roost sites. Designated primitive camping areas, picnic areas, and trailheads will not be located in areas of known roost sites for bald eagles. Every effort will be made to protect potential roosting areas in the Monument from human disturbance activities.	SSA-12	No	No
Management Considerations: This may not apply to the new areas. The concept of zones may not apply; furthermore, bald eagle is no longer a listed species.			
The use of poisons for Wildlife Services (Animal Damage Control) purposes will not be permitted in the Monument due to safety concerns and potential conflicts with Monument resources including bald eagles. All control will be coordinated with Wildlife Services, as described in the Wildlife Services section of this chapter. Control actions by the State of Utah, or actions taken under State law by private citizens, are not affected by this provision.	SSA-13	No	No
Management Considerations: Adapt to new plan direction.			
If recreation activities (e.g., hiking, camping, backpacking) are determined to impact known nest sites, allocations and/or group size restrictions or other measures will be implemented to reduce disturbance. If allocations and group size limits are implemented, they will be developed in accordance with the Group Size and Recreation Allocation provisions of this Plan.	SSA-14	No	No
Management Considerations: There is an opportunity here to provide meaningful protections to all special status species; however, not all species merit their own specific management actions.			

Planning Decision – Special Status Species	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Trail construction will generally be limited to the Frontcountry and Passage Zones. Project level assessments and consultation with the USFWS will be completed before construction of any trails within 1 mile of falcon nest sites. Designated primitive camping areas, picnic areas, and trailheads will not be located within 1 mile of known falcon nests, unless consultation with USFWS determines that impacts to nesting birds will not occur. This 1 mile buffer is recommended in the "Utah Field Guide for Raptor Protection from Human and Land Use Disturbances" (USFWS, 1999).	SSA-15	No	No
Management Considerations: The concept of zones may not apply to the new Planning Areas. Opportunity to evaluate trail construction and disclose impacts on peregrine falcon could be done at the NEPA level.			
Criteria for designation of climbing areas will be established for the Monument. These criteria will not allow climbing areas to be designated in known peregrine falcon nest sites. If new sites are identified as occupied for nesting in areas designated for climbing, seasonal closures will be established in those areas to assure that disturbance of nesting activities does not occur.	SSA-16	No	No
Management Considerations: This is not based on policy. Peregrine falcon is no longer a listed species. Opportunity to evaluate impacts from climbing could be done at the NEPA level.			
Fires have played only a small role in the recent history of vegetation in the Monument. Thus, the potential for large fires, which will remove foraging habitat for the owl, are minimal. Fire suppression activities may have a greater impact than allowing fire to burn in an area. With this in mind, suppression activities will be evaluated by fire resource advisors prior to implementation to provide appropriate protection measures in spotted owl habitat.	SSA-17	No	No
Management Considerations: Fire Management Plans for the area have been prepared since the MMP and may conflict with this language. Protection measures for Mexican spotted owl may or may not include this measure. Evaluate the need within the new plans.			
If recreation activities (e.g., hiking, camping, backpacking) are determined to impact known nest sites, allocations and/or group size restrictions or other measures will be implemented to reduce disturbance. If allocations and group size limits are implemented, they will be developed in accordance with the Group Size and Recreation Allocation provisions in this Plan.	SSA-18	No	No
Management Considerations: Not policy. May or may not apply to new Planning Areas based on need.			
Trail construction will generally be limited to the Frontcountry and Passage Zones. Project level assessments and consultation with the USFWS will be completed before construction of any trails that are in close proximity to owl nest sites. Designated primitive camping areas, picnic areas, and trailheads will not be located within 1/2 mile of known spotted owl nesting, unless consultation with USFWS determines that impacts to nesting birds will not occur. This 1/2 mile buffer is recommended in the "Utah Field Guide for Raptor Protection from Human and Land Use Disturbances" (USFWS 1999).	SSA-19	No	No

Planning Decision – Special Status Species	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Management Considerations: The concept of zones may not apply to the new Planning Areas. Address this in the new plans if there is a need.			
Criteria for designation of climbing areas will be established for the Monument. These criteria will not allow climbing areas to be designated in known Mexican spotted owl nest sites. If new nest sites are identified in areas designated for climbing, seasonal closures will be established in those areas to assure that disturbance of nesting activities does not occur.	SSA-20	No	No
Management Considerations: This is not based on policy. Peregrine falcon is no longer a listed species. Opportunity to evaluate impacts from climbing could be done at a NEPA level.			
A comprehensive inventory for spotted owls in the Monument was begun in 1999. This is a multi-year project that will look at occurrence of owls, current habitat, and potential habitat (i.e., habitat that is potential if modifications were made to that habitat). After the surveys are completed, the BLM will designate protected activity centers in accordance with the recovery plan. Activities such as recreational use in these protected areas may be limited (as described in SSA-18) to help protect this species.	SSA-21	No	No
Management Considerations: This has been completed in the Planning Area. There are seven PACs. New PACs may be established as needed but this does not need to be a decision.			
A comprehensive inventory for southwestern willow flycatcher populations in the Monument was begun in 1999. This is a multi-year project that will look at occurrence of southwestern willow flycatchers, current habitat, and habitat that is potential if modifications are made. This inventory will help to identify some of the impacts that are occurring in the area, which will help the BLM determine when and where limits on activities (such as recreational use) need to be implemented to protect the southwestern willow flycatcher.	SSA-22	No	No
Management Considerations: This is not a decision but merely a statement of what is being done. This should have never been in the current plan as a decision.			
Although Section 7 consultation is not required for this Species (condor), the USFWS and the BLM agree that it is appropriate and desirable to discuss this species. Efforts will be made to protect potential habitat for this species and to limit activities which may be detrimental to their existence in cooperation with the counties and the USFWS.	SSA-23	No	No
Management Considerations: This may not need to be carried forward. There is no habitat designated and therefore it is difficult to know what to protect and how. Evaluate this in the new plans if necessary.			
Actions will be taken to improve identified habitat as consistent with the recovery plan objectives. Actions may include assuring flows in appropriate streams and seeps by removing non-native plants affecting the water table and reducing impacts from visitors and/or livestock. Surveys will also identify current habitat and habitat that is potential if modifications are made.	SSA-24	No	No
Management Considerations: The Kanab ambersnail is not found within the Planning Area. No need to carry forward.			

Planning Decision – Special Status Species	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
The BLM will continue to consult with the USFWS to ensure that actions authorized by the BLM do not jeopardize the continued existence of any Federally listed plant species or result in the destruction or adverse modification of critical habitats. Coordination with the U.S. Forest Service, the Utah Division of Wildlife Resources' Natural Heritage Program, and the National Park Service will also occur in areas where plant species cross jurisdictional lines. The BLM will work with these agencies to develop recovery plans, when needed, and to implement existing recovery plans for all listed species.	SSP-1	Yes	Yes
No exceptions for cross-country vehicular travel will be made in known habitat or locations of sensitive plant species.	SSP-2	No	No
Management Considerations: Primarily a transportation planning decision; cross-country travel is not currently authorized. Exceptions may be considered.			
Surface disturbing research activities will generally not be allowed in threatened or endangered plant species habitat. All scientific research projects in close proximity to listed species populations or habitat will be evaluated by Monument biologists, the USFWS, and appropriate experts prior to initiation to determine impacts to these populations or habitat. Any research project which may have an effect on populations of listed species will be coordinated with the USFWS and appropriate permits and Section 7 consultation will be completed as determined necessary. Projects which provide new information and understanding of listed species, their populations and/or their habitat, may be allowed after approval by the BLM and the review and issuance of permits by the USFWS. All projects will be evaluated on a case-by-case basis.	SSP-3	Yes	Yes
The allotment evaluation process will address the protection of endangered species, including the incorporation of the latest research and information in the protection of these species, consistent with the BLM-wide grazing permit review process. Section 7 consultation will be conducted for all allotments that may affect listed species.	SSP-4	Yes	Yes
Future fuelwood cutting areas will not be designated in listed plant populations (see the Forestry Products section for related decisions).	SSP-5	Yes	Yes
Areas with threatened or endangered plants will be targeted for noxious weed control activities as a first priority. BLM employees or contractors with appropriate certification will be responsible for use of chemicals in noxious weed Chapter 2 Management Plan 2 3 removal efforts, and will take precautions to prevent possible effects to non-target species.	SSP-6	Yes	Yes
Public education about protection of these species will be an integral part of projects and will be provided in interpretive displays and handouts at project sites and visitor centers around the Monument. Information will also be included on the Monument website.	SSP-7	No	No
Management Considerations: Consider on a case-by-case basis.			

Planning Decision – Special Status Species	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
BLM law enforcement personnel and increased field presence of BLM personnel will concentrate efforts in areas with special status species habitat in order to curb non-compliance activities. The BLM is pursuing cooperative agreements with each of the Sheriff departments in Kane and Garfield Counties to facilitate shared law enforcement and support for enforcing established closures.	SSP-8	No	No
Management Considerations: Consider if necessary.			
Communication sites, utility rights-of-way, and road rights-of-way will not be permitted in known special status species populations. As permits are granted for these sites and rights-of-way, surveys will be completed to determine the presence of special status species in the area. If they are found, these activities will be moved to another location.	SSP-9	Yes	Yes
Reseeding or surface disturbing restoration after fires will not be allowed in areas with special status plant species. Natural diversity and vegetation structure will provide adequate regeneration. Management ignited fires will also not be allowed in these areas unless consultation with the USFWS indicates that fire is necessary for the protection and/or recovery of listed species	SSP-10	Yes	Yes
There are oil and gas leases in the area where Jones' Cycladenia grows, some of which have been suspended. These leases expire by the year 2003 if no action is taken to develop them....	SSP-11	No	No
Management Considerations: No longer applies.			
Inventories to locate new populations of this species will be conducted to provide more accurate information on distribution and to facilitate protection and recovery.	SSP-12	Yes	Yes
Management Considerations: Primarily a transportation planning decision; cross-country travel is not currently authorized. Exceptions may be considered.			
As described in the Transportation and Access section, cross-country vehicle travel is prohibited. There is one route open in the Kodachrome bladderpod area. This route will be open to street legal vehicles only.	SSP-13	Yes	No
Management Considerations: Reevaluate in the KEPA.			
Physical barriers as well as "closed" signs may be placed in strategic locations to prevent access into areas where the Kodachrome bladderpod grows. Restoration in closed areas may occur to eliminate impacts and return the area to pre-disturbance condition. Monitoring will continue in order to determine effects of closures and to measure the resilience of the population.	SSP-14	Yes	No
Management Considerations: Reevaluate in the KEPA.			

Planning Decision – Special Status Species	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Additional monitoring sites will be developed in strategic locations to measure impacts to the population, following established protocols. If, through monitoring, impacts to the population from visitors are identified, visitor allocations or other measures will be imposed to eliminate any further impacts from increased visitation and use. Group size and numbers of groups allowed in the area, as well as the types of activities allowed, could be limited.	SSP-15	Yes	No
Management Considerations: Not applicable in the KEPA.			
Trails, parking areas, or other recreations facilities will not be allowed in the Kodachrome bladderpod population.	SSP-16	Yes	No
Management Considerations: Not applicable in the KEPA.			
Camping, overnight stays, and campfires will not be allowed in the Kodachrome bladderpod population.	SSP-17	Yes	Yes
Management Considerations: Not applicable in the KEPA.			
The information in the Water section describes a strategy for assuring water availability. Under that strategy, priority will be to maintain natural flows and flood events. In addition, the maintenance of instream flows will provide adequate water for natural structure and function of riparian vegetation. Ute ladies'-tresses relies on these natural flood events to colonize new areas and maintain healthy and viable populations.	SSP-18	Yes	No
Management Considerations: Not applicable in the KEPA.			
Surveys for this species were initiated the 1999 growing season and results of this survey will be used to determine any further actions.	SSP-19	Yes	Yes
Management Considerations: Not applicable in the KEPA.			
Appropriate actions will be taken to prevent trampling of the plants by visitors in high-use areas. These actions may include replanting native vegetation or construction of barriers.	SSP-20	No	Yes
Management Considerations: Reevaluate in new plans.			
Areas may be closed if necessary to protect these plants. Barriers will be constructed and restoration work initiated to stabilize the soil and banks and provide the best possible habitat for this plant.	SSP-21	Yes	No
Management Considerations: Consider in the KEPA.			
No expansion of current or new facilities will be permitted where this plant grows.	SSP-22	No	No
Management Considerations: Reevaluate in new plans.			
Existing trails in areas where this plant grows will be relocated away from the plants and potential habitat when possible. These protection measures apply to current as well as future potential habitat areas for this species	SSP-23	Yes	Yes
Interpretive materials will be developed to educate the public about Ute ladies'-tresses and the actions being implemented to protect it.	SSP-24	No	No
Management Considerations: Reevaluate in new plans.			

Planning Decision – Special Status Species	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Restoration of the current social trails in known populations will be initiated, including obliteration of the trail by planting native species, and moving soil to return the area to its natural grade. Group size restrictions, allocations, or other measures will be initiated if continued monitoring indicates that visitor use in the area is causing impacts.	SSP-25	No	No
Management Considerations: Reevaluate in new plans.			

GSENM – Grand Staircase-Escalante National Monument, BLM – Bureau of Land Management, USFWS – U.S. Fish and Wildlife Service, UDWR – Utah Division of Wildlife Resources, NEPA – National Environmental Policy Act, KEPA – Kanab-Escalante Planning Area, MMP – Monument Management Plan, PAC – protected activity center

3.1.11 Vegetation –Upland Vegetation

Planning Decision – Upland Vegetation	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
The BLM will place a priority on the control of noxious weed species and prevent the introduction of new invasive species in conjunction with Kane and Garfield Counties and the adjacent U.S. Forest Service and National Park Service units. Further, in keeping with the overall vegetation objectives and Presidential Executive Order 11312, native plants will be used as a priority for all projects in the Monument (see the Noxious Weed Control section for related decisions).	VEG-1	No	No
Management Consideration: Reevaluate in new land use plans.			
The BLM will place a priority on the control of noxious weed species and prevent the introduction of new invasive species in conjunction with Kane and Garfield Counties and the adjacent U.S. Forest Service and National Park Service units. Further, in keeping with the overall vegetation objectives and Presidential Executive Order 11312, native plants will be used as a priority for all projects in the Monument (see the Noxious Weed Control section for related decisions).	VEG-2	Yes	No
Management Consideration: Reevaluate use of natives in the KEPA.			
All proposed developments or surface disturbing activities will be required to include a site assessment for impacts to vegetation. Appropriate strategies will be used to avoid sensitive vegetation associations, and restoration provisions will be included in projects (see the Restoration and Revegetation section for related decisions).	VEG-3	Yes	Yes
Relict Plant Communities and Hanging Gardens	RHG 1-9	Yes	No
Management Consideration: Reevaluate in new land use plans.			
Mechanical methods, including manual pulling and the use of hand tools (e.g., chainsaws, machetes, pruners) may be allowed throughout the Monument.	RM-1	Yes	No

Planning Decision – Upland Vegetation	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Management Consideration: Reevaluate in the KEPA.			
The use of machinery (e.g., roller chopping, chaining, plowing, discing) may be allowed in all zones except the Primitive Zone. Chaining has been used in the past to remove pinyon and juniper prior to reseeding with perennial grasses....	RM-2	No	No
Management Consideration: Reevaluate in all land use plans.			
Livestock grazing after native seedings are established will be modified to ensure the survival of the native plants. The livestock exclusion period required to allow full establishment of seeded native species and recovery of surviving native plants after a wildfire may be more than two years. Site evaluation will be required to determine when the native seedings should be grazed again and the effectiveness of the current or new grazing system on the persistence of native plants.	RM-3	No	No
Management Consideration: Grazing standards already apply and non-monument lands would not be a native seeding. Reevaluate in the KEPA.			
Chemical methods will generally be restricted to the control of noxious weed species, and are discussed in that section. The use of chemicals may also be allowed in conjunction with research projects and must lead to the achievement of the overall vegetation objectives. These activities will be approved as determined appropriate through consultation with the GSENM Advisory Committee.	RM-4	No	No
Management Consideration: Consider adding invasive species in GSENM. Reevaluate in the KEPA.			
Biological control will be used exclusively for control of noxious or exotic weed species.	RM-5	Yes	No
Management Consideration: Evaluate which species in GSENM. Reevaluate for the KEPA.			
Ignited fire is the vegetation restoration method most likely to be used in the Monument. This method will be used when fire has been documented to historically occur in an area, and where various factors have prevented natural fire cycles from occurring. In these circumstances, management ignited fires may be used, and will attempt to simulate natural fire intensity and timing. Specific objectives for all management ignited fires will be developed prior to its use in the Monument. All fire activities will be conducted and coordinated with appropriate fire management personnel, as provided for in the Color Country Interagency Fire Management Area annual operating plan	RM-6	No	No
With all of the methods described above, vegetation monitoring plots will be established to determine the effectiveness of the treatments in achieving management objectives and to provide baseline data of overall change....	RM-7	Yes	Yes
Use of native species.	NAT-1-6	No	No
Management Consideration: The Presidential Executive Order refers to invasive species, not native and nonnative species. Reevaluate in the KEPA.			

Planning Decision – Upland Vegetation	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
When deciding whether to reseed after fires, there are many factors that should be considered. The overriding consideration is the vegetation management objective and priority to use native plants....	SEED-1	Yes	Yes
The use of aircraft in reseeding operations may be allowed in areas as appropriate. In areas with raptor species, timing will be appropriate to eliminate impacts to these species.	SEED-2	No	No
Management Consideration: Determined by NEPA. Reevaluate for the KEPA.			
Many factors will be considered when deciding to implement a revegetation or restoration strategy. Each project and area to be treated will be evaluated to determine the appropriate strategy....	REV-1	No	No
Management Consideration: Reevaluate for the KEPA.			

GSENM – Grand Staircase-Escalante National Monument, BLM – Bureau of Land Management, NEPA – National Environmental Policy Act, KEPA – Kanab-Escalante Planning Area

3.1.12 Vegetation – Riparian Vegetation

Planning Decision – Riparian Vegetation	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Special status species habitat and ecological processes will be evaluated in all future riparian assessments.	RIPA-1	Yes	Yes
All segments of riparian habitat previously inventoried will be reassessed as part of the grazing allotment assessments. Furthermore, riparian areas that have not been previously evaluated will be scheduled for assessment within three years commencing on the first July 1 following approval of the Plan, as part of the grazing evaluation schedule.	RIPA-2	No	No
Management Considerations: Completed.			
Monitoring of riparian resource conditions will be established to determine when actions should be taken to ensure movement towards proper functioning condition on all riparian stream segments in the Monument.	RIPA-3	Yes	Yes
Communication sites, and utility rights-of-way will avoid riparian areas whenever possible.	RIPA-4	Yes	Yes
Vegetation restoration methods (described in the Vegetation section of this chapter) will not be allowed in these areas, unless needed for removal of noxious weed species or restoration of disturbed sites. In these circumstances, consultation with the GSENM Advisory Committee will be used to determine the most appropriate control and restoration methods to ensure proper protection.	RIPA-5	Yes	No
Management Considerations: Reevaluate in new planning effort because not all units need to consult with GSENM advisory committee.			

Planning Decision – Riparian Vegetation	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
The noxious weed control program will target invasive species such as tamarisk and Russian olive, which will improve riparian functioning condition.	RIPA-6	Yes	Yes
New recreation facilities will be prohibited in riparian areas, except for small signs for resource protection.	RIPA-7	Yes	Yes
Trails will be kept out of riparian areas wherever possible. Where this is not possible, trails will be designed to minimize impacts by placing trails away from streams, using soil stabilization structures to prevent erosion, and planting native plants in areas where vegetation has been removed.	RIPA-8	Yes	No
Management Considerations: Reevaluate in new planning effort because not all units need to consult with GSENM advisory committee.			
Group size limits, beyond the restrictions provided in the various zones, may be imposed in these areas.	RIPA-9	Yes	No
Management Considerations: Reevaluate in the KEPA.			

GSENM – Grand Staircase-Escalante National Monument, KEPA – Kanab-Escalante Planning Area

3.1.13 Vegetation – Noxious Weeds and Nonnative Invasive Plants

Planning Decision – Noxious Wees and Nonnative Invasive Plants	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
The BLM will control noxious weeds in accordance with National and State policies and directives. Control of noxious weeds is also a priority to achieve the overall vegetation objectives stated above.	NW-1	Yes	Yes
Projects will be designed in conjunction with Kane and Garfield Counties and adjacent U.S. Forest Service and National Park Service staffs. With this strategy the BLM hopes to control noxious weed species and prevent introduction of new invasive species into the Monument and surrounding ecosystems.	NW-2	Yes	Yes
An array of methods will be used as appropriate for the control of specific noxious weed species. These methods include: the use of chemicals (aerial spraying, hand spraying, and painting), hand cutting, biological control agents, and manual pulling. Each of these methods has a place in the control of these invasive species and will be evaluated for their effectiveness as eradication projects are designed.	NW-3	Yes	Yes
BLM employees or contractors with appropriate certification will be responsible for use of these chemicals and will take precautions to prevent possible effects to non-target plant species.	NW-4	Yes	Yes

Planning Decision – Noxious Wees and Nonnative Invasive Plants	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Aerial chemical applications may only be used in limited circumstances where: • accessibility is so restricted that no other alternative means is available, • it can be demonstrated that non-target sensitive species or other Monument resources will not be detrimentally affected, and • noxious weeds are presenting a significant threat to Monument resources. The GSENM Advisory Committee will be consulted before the aerial application of chemicals is permitted.	NW-5	No	No
Management Consideration: Reevaluate in new land use plans.			
The noxious weed control program will target species in a prioritized manner. Priorities for weed control may include: invasiveness of the species, extent of invasion, sensitivity of the area being invaded, and accessibility. Areas with special status species habitat will have a high priority for weed removal. Project level environmental assessments or other NEPA analysis will be completed prior to noxious weed removal project initiation.	NW-6	Yes	Yes
In addition to strategies for control of established noxious weeds, it is also imperative to reduce the introduction of noxious weed species as stated in Presidential Executive Order (EO 11312) on invasive species. Cooperative programs established for control of these species will also help identify potential new invasions before area-wide establishment has occurred. There are two policies which will help to reduce potential noxious weed introduction. • First, the BLM requires that all hay used on BLM lands be certified weed free....	NW-7	Yes	No
Management Consideration: Weed-free hay is required, but cleaning prior to arrival on monument lands would not be applicable to the KEPA.			
For major removal projects, monitoring plots will be established in key areas to determine effectiveness of methods and presence of noxious weed species. All projects will contain restoration and/or revegetation protocols to minimize re-colonization of treated areas by noxious weed species. Monitoring in these areas will be part of the adaptive management framework.	NW-8	No	No
Management Consideration: Reevaluate in new land use plans.			

GSENM – Grand Staircase-Escalante National Monument, BLM – Bureau of Land Management, KEPA – Kanab-Escalante Planning Area, NEPA – National Environmental Policy Act,

3.1.14 Visual Resources

Planning Decision – Visual Resources	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
All facilities and parking areas will be designed to be unobtrusive and to meet the visual resource objectives.	FAC-6	Yes	Yes

Planning Decision – Visual Resources	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Fences…will be designed and constructed in accordance with visual resource management objectives.	FENCE-1	Yes	Yes
In the Front-country and Passage Zones, communication sites and utility rights-of-way will be allowed, but will have to meet visual resource objectives.	LAND-5	Yes	Yes Reword
In the Outback Zone, communication sites and utility rights-of-way will be allowed within the constraints of the zone, where no other reasonable location exists, and will meet the visual resource objectives.	LAND-6	Yes	Yes Reword
Utilizing the results of the visual resource inventory and other resource allocation considerations, 68 percent of the lands within the Monument will be assigned to VRM Class II and 32 percent of the lands within the Monument will be assigned to VRM Class III.	VRM-1	No	No
Management Considerations: VRM Classes may shift to more or less protective classes based on land use priorities and updated inventory. Policy clarification will result in all WSAs being classified VRM Class I.			
All proposed actions must consider the importance of visual values and must minimize the impacts the project may have on these values. While performing an environmental analysis for projects, the visual resource contrast rating system will be utilized as a guide to analyze potential visual impacts of the proposal. Projects will be designed to mitigate impacts and conform to the assigned VRM Class objective and other objectives including: (1) using natural or natural appearing material as a priority, (2) meeting restoration/revegetation objectives, and (3) complying with the Monument Facilities Master Plan.	VRM-2	Mostly	Mostly
Management Considerations: Prepare a facilities master plan.			
Some types of projects such as valid existing rights, or ingress to private land may be allowed on a case-by-case basis in Class II or III areas. Visual resource impacts in these instances will be minimized by such measures as screening, painting, project design, relocation, or restoration.	VRM-3	Yes	Yes
The Monument Manager may allow temporary projects, such as research projects, to exceed VRM standards in Class II and III areas, if the project terminates within two years of initiation. Rehabilitation will begin at the end of the two year period. During the temporary project, the Manager may require phased mitigation to better conform with prescribed VRM standards.	VRM-4	Yes	Yes Reword
Management Considerations: Address research projects in VRM Class I areas.			
The VRM classes acknowledge existing visual contrasts. Existing facilities or visual contrasts will be brought into VRM class conformance to the extent practicable when the need or opportunity arises (i.e., rights-of-way renewals, mineral material site closures, abandoned mine rehabilitation).	VRM-5	Yes	Yes
If areas are designated as Wilderness or designated a wild section of a National Wild and Scenic River, they will be reassigned to VRM Class I.	VRM-6	No	No

Planning Decision – Visual Resources	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Management Considerations: Policy clarification after MMP was finalized makes this irrelevant. Follow current policy guidance.			
All proposed actions must consider the importance of the visual values and must minimize the impacts the project may have on these values. All projects must be designed to be unobtrusive and follow these procedures: • The visual resource contrast rating system will be used as a guide to analyze potential visual impacts of all proposed actions. Projects must be designed to mitigate impacts and conform to the assigned Visual Resource Management (VRM) class. • Natural or natural appearing materials will be used as a priority • Restoration and revegetation objectives must be met. • The Monument manager may allow temporary projects, such as research projects, to exceed VRM standards if the project terminates within two years of initiation. Phased mitigation may be required during the project to better conform with prescribed VRM standards.	Appendix 2: Standard Procedures for Surface Disturbing Projects and Proposals (p. 87)	Yes	Yes

GSENM – Grand Staircase-Escalante National Monument, VRM – Visual Resource Management, WSA – Wilderness Study Area, MMP – Monument Management Plan

3.1.14.1 Dark Night Sky Resources

Planning Decision – Dark Night Sky Resources	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Strobe lights will not be allowed at any communication site. Other methods will be used to meet aircraft safety requirements.	LAND-08	Yes	Yes
The BLM will seek to prevent light pollution within the Monument. No actions will be proposed within the Monument that will contribute to light pollution. The BLM will also work closely with the surrounding communities to minimize light pollution.	NS-01	Yes	Yes
Management Considerations: Consider IDA dark sky designation. Develop dark sky management plans.			

GSENM – Grand Staircase-Escalante National Monument, BLM – Bureau of Land Management, IDA – International Dark Sky Association

3.1.15 Water Resources

Planning Decision – Water Resources	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Ensure that land management policies protect water resources.	WAT-1	Yes	No
Management Considerations: Additional water uses may be considered in the KEPA.			
Pursue other options for assuring water availability, if needed.	WAT-3	Yes	Yes

Planning Decision – Water Resources	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Water quality monitoring will be implemented when ground disturbance or other factors could adversely affect water quality. Mitigation will be required if adverse effects are detected.	WAT-6	Yes	Yes

GSENM – Grand Staircase-Escalante National Monument, KEPA – Kanab-Escalante Planning Area

3.1.16 Wild Horses

Planning Decision – Wild Horses	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
There are no management actions pertaining to management of wild horses.	None	No	No
Management Considerations: Determine if management decisions are necessary to protect wild horses.			

GSENM – Grand Staircase-Escalante National Monument

3.2 Resource Uses

3.2.1 Forestry and Woodland Products

Planning Decision – Forestry and Woodland Products	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Fuelwood harvesting, post cutting, and Christmas tree cutting will be allowed by permit only within designated areas. Commercial fuelwood cutting will be limited and authorized in designated areas only. There are currently two forestry product areas located in the Monument: Rock Springs Bench area and Buckskin Mountain area.	FP-1	No	No
Management Considerations: There is a need to have additional areas open to forestry product removal in all units in the Planning Area. The two current forestry product areas do not meet the local need, especially in the Page, Arizona, and Cannonville, Escalante, Kanab, and Boulder, Utah, areas. Consider opening all areas to forestry product removal except WSAs in at least one alternative. Commercial fuelwood cutting should be considered in all areas open to fuelwood harvesting to meet Desired Plant Community objectives. Consider allowing fuelwood, posts, and Christmas harvesting to occur in existing and new restoration areas of the units prior and after treatments.			
Additional areas may be designated to meet the overall vegetation management objectives, but will not be allowed outside already disturbed areas. All cutting areas will be designated under a permit system, with maps provided to assure compliance.	FP-2	No	No
Management Considerations: In order to meet the need for forestry products and achieved Desired Plant Community objectives, consider community-use forestry product removal through commercial cutting, stewardship contracting, green wood cutting areas, and dead and down fuelwood areas.			

Planning Decision – Forestry and Woodland Products	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
In general, the off-highway vehicle restrictions discussed in the Transportation and Access sections will apply to forestry product areas (i.e., travel will be allowed only on designated routes and vehicles will be permitted to pull no more than 50 feet off designated routes in the Outback Zone). However, because forestry product collection activities are controlled by a permit and permits are issued to further overall management objectives, the BLM could authorize access on administrative routes and, in some cases, in areas more than 50 feet away from routes. These areas/provisions will be delineated in the permit prior to its issuance.	FP-3	Partially	Partially
Management Considerations: Consider deleting the first sentence in GSENM. In the KEPA, consider specifying in the forestry product permit the areas that the permit holder would be allowed to access with a vehicle in order to remove forestry products.			
No commercial timber harvesting is authorized within the Monument.	FP-4	No	No
Management Considerations: Consider allowing commercial timber harvesting in GSENM. In the KEPA, consider making commercial wood products available where the removal of biomass, sawlogs, and the like can help promote specific project objectives and contribute to local economies, both through the products themselves and through the employment generated in the harvesting, transportation, processing, and utilization of commercial products.			

GSENM – Grand Staircase-Escalante National Monument, KEPA – Kanab-Escalante Planning Area, WSA – Wilderness Study Area

3.2.2 Lands and Realty

Planning Decision – Lands and Realty	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Filming may be approved in all zones if the activity complies with the zone requirements and Plan provisions. Permits for commercial filming will be required and the preparation of a project-level NEPA document (BLM Manual 2920) may be required.	FILM-1	Yes	Yes
Management Considerations: Reword for the KEPA. Because large areas of both GSENM and KEPA are with WSAs, management may wish to consider updating the Programmatic EA for Commercial Filming in Utah within GSENM and WSAs.			
The BLM will work with local communities and utility providers to identify short and long-term community needs for infrastructure which could affect Monument lands and resources.	LAND-1	Yes	Yes
Community projects which require public lands access or use will be subject to necessary project level NEPA analysis.	LAND-2	Yes	No
Management Considerations: Reevaluate in the KEPA to include potential avoidance and exclusion zones.			

Planning Decision – Lands and Realty	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
The BLM will work with the sponsor of a project to meet Monument Plan objectives for protecting resources. Alternative locations for projects will be identified when unavoidable conflicts arise. In order to protect Monument resources, such projects will be focused in appropriate zones as discussed below.	LAND-3	Yes	No
Management Considerations: Reevaluate for the KEPA to consider standard requirements for utilities, such as burying new and reconstructed lines, using non-reflective wire, etc. See LAND-8 below.			
In general, proposals for diverting water out of the Monument will not be permitted. Exceptions could be made as discussed previously in WAT-2 of the Water section in this chapter.	LAND-4	Yes	No
Management Considerations. Reevaluate for the KEPA.			
In the Primitive Zone, utility rights-of-way will not be permitted. In cases of extreme need for local (not regional) needs and where other alternatives are not available, a plan amendment could be considered for these facilities in the Primitive Zone. Communication sites will only be allowed in the Primitive Zone for safety purposes and where no other alternative exists.	LAND-7	Yes	No
Management Considerations: Reevaluate for the KEPA to determine parameters for consideration of new communication sites and rights-of-way exclusion and avoidance zones.			
The following criteria and/or stipulations apply to the management of all rights-of-way in the Monument where they are allowed: 1. Bury new and reconstructed utility lines (including powerlines up to 34.5 kilovolts) unless: visual quality objectives can be met without burying; geologic conditions make burying infeasible; or burying will produce greater long-term site disturbance. 2. All reconstructed and future powerlines must meet non-electrocution standards for raptors. If problems with existing powerlines occur, corrective measures will be taken. 3. Construct all powerlines using non-reflective wire. Steel towers will be constructed using galvanized steel. Powerlines will not be high-lined unless no other location exists. 4. Strobe lights will not be allowed at any communication site. Other methods will be used to meet aircraft safety requirements. 5. Communication site plans will be prepared for all existing or new sites before any new uses or changes in use occur. 6. A Monument-wide feasibility study will be prepared to determine the most appropriate location for new communication sites.	LAND-8	Yes	Yes
Management Considerations: Reword and update for the KEPA.			
Per Public Law 105-355, signed by President Clinton on October 31, 1998, a utility corridor was designated along Highway 89 in Kane County, including that portion of Highway 89 within the Monument. The utility corridor extends 240 feet north from the center line of the highway, and 500 feet south from the center line of the highway. Location of the proposed Lake Powell to Sand Hollow water pipeline within this utility corridor is a possibility. Subsequent NEPA analysis will be required.	LAND-9	No	Yes

Planning Decision – Lands and Realty	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Management Considerations: Public land portions of this corridor are now exclusively within the the KEPA management area.			
The BLM will authorize only one access route to private land parcels unless public safety or local ordinances warrant additional routes. Private land owners will be required to coordinate the development of access routes across public lands in order to prevent a proliferation of routes. Rights-of-way may be allowed when necessary to exercise valid existing rights.	LAND-10	Yes	Yes
Owners of non-Federal land surrounded by public land managed under FLPMA are entitled to reasonable access to their land. Reasonable access is defined as access that the Secretary of the Interior deems adequate to secure the owner reasonable use and enjoyment of the non-Federal land. Such access is subject to rules and regulations governing the administration of public land. In determining reasonable access, the BLM has discretion to evaluate and will consider such things as proposed construction methods and location, reasonable alternatives, and reasonable terms and conditions as are necessary to protect the public interest and Monument resources.	VER-5	Yes	Yes
Management Considerations: Reword for the KEPA.			
The BLM will consider land exchanges and acquisitions so long as the current owner is a willing participant and so long as the action is in the public interest, and is in accordance with other management goals and objectives of this Plan. The action must also result in a net gain of objects and values within the Monument, such as wildlife habitat, cultural sites, riparian areas, live water, threatened or endangered species habitat, or areas key to the maintenance of productive ecosystems. The action may also meet one or more of the following criteria: • ensures the accessibility of public lands in areas where access is needed and cannot otherwise be obtained; • is essential to allow effective management of public lands; • results in the acquisition of lands which serve a National priority as identified in National policy directives. All land exchanges and acquisitions will be subject to VERs as determined by the BLM.	VER-6	Yes	Yes
Management Considerations: Reword for the KEPA.			

Planning Decision – Lands and Realty	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
The BLM will be acting in place of the State in administering all valid existing authorizations for the remainder of the applicable term in accordance with State laws and regulations. As part of such administration, BLM decisions will be subject to those Federal laws which are ordinarily attached to Federal decisions (e.g., the National Environmental Policy Act, Endangered Species Act, National Historic Preservation Act). Renewal of any lease, permit, or contract will occur if provided for under the terms of the lease, permit, or contract. Upon expiration of any grazing lease or permit, the holder shall be entitled to a Chapter 2 Management Plan 54 preference right to renew such lease or permit to the extent provided by Federal law. This provides a priority to the holder of the expiring lease or permit against other applicants, but does not guarantee that a renewal will occur. [Public Lands Council v. Babbitt, 158 F.3rd 1160, 1171 (10th Cir 1998)]	VER-9	Yes	No
Management Considerations: Reevaluate in the KEPA.			
Culinary Water for Henrieville Town: The Utility Rights-of Way and Water provisions in the Plan were modified with regard to the Town of Henrieville's culinary water supply, because the Town accesses upstream lands within the Monument for its culinary water. There is an existing smallscale diversion of groundwater out of the Monument for domestic water supply for Henrieville. The Plan does not prohibit the continuation of this diversion (which currently serves a population of approximately 160), nor its expansion, if necessary, to meet the municipal needs of population growth in Henrieville. Any proposed new groundwater diversion to meet Henrieville's municipal needs could be approved consistent with the Plan if the BLM and the State water engineer complete a joint analysis to determine that such development would not adversely impact springs or other water resources within the Monument, and the BLM completes the required NEPA analysis. Exceptions could be considered for other local community culinary needs if the applicant could demonstrate that the diversion of water will not damage water resources within the Monument or conflict with the objectives outlined in the Plan.		Yes	No
Management Considerations: Consider a joint analysis and exceptions.			

GSENM – Grand Staircase-Escalante National Monument, NEPA – National Environmental Policy Act, BLM – Bureau of Land Management, WSA – Wilderness Study Area, EA – Environmental Assessment, FLPMA – Federal Land Policy and Management Act, KEPA – Kanab-Escalante Planning Area, VER – valid existing rights

3.2.3 Livestock Grazing

Decisions in this section are applicable to administration of livestock grazing in Glen Canyon to the extent that they conform to the Glen Canyon enabling legislation, the Organic Act, the Glen Canyon General Management Plan, and other NPS regulations and policies. Implementation actions are subject to review by the Glen Canyon Superintendent to determine effects on the values and purposes.

Planning Decision – Livestock Grazing	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Management Framework Plans	All	No	No
Management Considerations: All decisions in the existing Management Framework Plans will be reevaluated in the new land use plans.			
The following process will be followed so that grazing management conforms with the grazing regulations and Utah's Standards and Guidelines. In this process, each grazing allotment will be assessed, and new allotment management plans will be developed, consistent with the BLM-wide grazing permit renewal process: assessment, rangeland health evaluation, develop AMPs. (Summary)	GRAZ-1	Partially	Partially
Management Considerations: Steps 1 and 2 were completed in 2006 when BLM issued rangeland health determinations. Consider using the standard permit renewal process. LUPs will show lands open and closed to livestock grazing. Update schedule.			
Livestock grazing allotments will be evaluated, and grazing as it relates to all endangered species will be addressed during this process. Evaluations will incorporate the latest research and information in the protection of species.	SSA-8	Yes	Yes
Actions will be taken to improve identified habitat [for Kanab Ambersnail Oxyloma hadeni kanabensis] as consistent with the recovery plan objectives....	SSA-24	No Not listed	No Not listed
Grazing permits or leases convey no right, title, or interest in the land or resources used....	VER-8	Yes	Yes
Water developments can be used as a management tool throughout the Monument for the following purposes: better distribution of livestock when deemed to have an overall beneficial effect on monument resources, including water sources or riparian areas, or to restore or manage native species or populations....	WDEV-1	No	No Reword
Management Considerations: Consider how to allow new structures and how to integrate livestock grazing.			
Wildlife Services (formerly Animal Damage Control) activities within the Monument will be limited to the taking of individual coyotes within the immediate vicinity after verified livestock kills, where reasonable livestock management measures to prevent predation had been taken and had failed....	WS-1	Yes	Yes reword
Fences may be used in certain circumstances to protect Monument resources, to manage visitor use, and to manage livestock, consistent with the Proclamation. They will be designed and constructed in accordance with visual resource management objectives and the Monument Facilities Master Plan....	FENCE-1	Yes	Yes reword
In developing allocation plans for areas, efforts will be made to coordinate with other resource planning efforts (e.g., research, grazing allotment management plans)....	ALLO-8	Yes	Yes
The BLM will be responsible for administrative routes that will be limited to authorized users....	TRAN-15	Yes	Yes

Planning Decision – Livestock Grazing	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Beyond the routes shown on Map 2 [of the MMP], the BLM will work with any individual operating within the Monument under existing permits or authorizations to document where access must continue in order to allow operation of a current permit or authorization. Routes that go only to BLM range monitoring and study areas will not be maintained, but periodic vehicular access to these sites will be granted for required range monitoring uses.	TRAN-16	No	No
Management Considerations: Subject to new travel management plan.			

GSENM – Grand Staircase-Escalante National Monument, BLM – Bureau of Land Management, AMP – Allotment Management Plan, LUP – Land Use Plan, MMP – Monument Management Plan

3.2.3.1 Current Management for Livestock Grazing in Glen Canyon

Decision – Livestock Grazing	Planning Decision Number	Source
Special Status Species		
To protect healthy populations of special status species, including federally listed threatened and endangered species, federal candidate C1 and former C2 species, and state heritage ranked rare and sensitive species (NPS/USFWS). Appendix D [of the GzMP] lists 18 special status species that occur within Glen Canyon. Of the three federally protected species, one (*Pediocactus bradyi*) occurs in an area not currently grazed, but the second (*Cycladenia jonesii*) occurs in an active allotment. However, this latter species prefers habitats that are largely inaccessible to livestock, and the species appears to currently sustain little or no impact through grazing activities. A biological assessment of the potential impacts of grazing on *C. jonesii* has not been completed. Of the former federal C2 candidates (now NPS sensitive), four occur in or near hanging gardens *(Erigeron kachinensis, E. zothecinus, Habenaria zothecina,* and *Perityle specuicola)*, two are found on or near the Tropic Shale in the Warm Creek area *(Camissonia atwoodii* and *Cymopterus higginsii)*, and two occur in sandy and rocky desert shrublands in the middle part of the recreation area. *(Dalea flavescens* var. *epica* and *Psorothamnus thompsonae* var. *whitingii)*. Finally, seven proposed Utah state sensitive species are included. All but one of these species occurs in riparian zones and hanging gardens (Viguiera soliceps occurs on Tropic Shale badlands). Two species (*Imperata brevifolia* and *Aralia racemosa*) are known from only one locality each within Glen Canyon. *Desirable conditions.* Special status species will not be subject to grazing if studies show that impacts occur. Determine population biology and ecology of species to assess if grazing causes significant impacts to populations. Consult with US Fish and Wildlife Service through Section 7 compliance procedures. If impacts are discovered and the species or populations require protection, determine the best method, including but not limited to fencing, changes in grazing seasons or pasture rotations, or removal of grazing. 3. If impacts are discovered and the species or populations require protection, determine the best method, including but not limited to fencing, changes in grazing seasons or pasture rotations, or removal of grazing.	Objective 2	GzMP
Recreation/Livestock Conflicts – Livestock Grazing		
Protect recreation resources and the visitor experience (enjoyment and use) by reducing or mitigating recreation/livestock conflicts.	Goal	GzMP
Prevent or reduce livestock/recreation conflicts so that recreational use and enjoyment of the recreation area is not impaired. (NPS/BLM)	Objective 1	GzMP
Range Improvements and Management		

Decision – Livestock Grazing	Planning Decision Number	Source
All livestock use facilities (constructed after May 10, 1993) will be authorized only with a BLM cooperative agreement, as provided for under 43 CFR Part 4100.	N/A	Interagency Agreement
Nonstructural range improvements, land treatments, and new line shacks are not appropriate in Glen Canyon.	N/A	Interagency Agreement
When grazing permits are canceled or modified for other than public purposes, existing range improvements will be evaluated for abandonment or removal. Removal may be completed by the benefitting party, owner, or agency.	N/A	Interagency Agreement
The use of supplemental feed, including salt, may be authorized for improved livestock and rangeland management. Maintenance feeding of harvested feed (hay and grain not in block form or otherwise regulated by salt) are not appropriate in Glen Canyon, except in emergencies with NPS concurrence.	N/A	Interagency Agreement

GSENM – Grand Staircase-Escalante National Monument, NPS – National Park Service, USFWS – U.S. Fish and Wildlife Service, GzMP – Grazing Management Plan, CFR – Code of Federal Regulations

3.2.4 Minerals

Planning Decision – Minerals	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
All Federal lands and interests in lands within the boundaries of this monument are hereby appropriated and withdrawn from entry, location, selection, sale, leasing....	Proclamation 6920	Yes	No
Management Considerations: Determine mineral development availability in the KEPA area.			
These authorizations, where they are valid and existed when the Monument was established, will be recognized in the Monument and their uses will be allowed subject to the terms and conditions of the authorizing document. Where these uses conflict with the protection of Monument resources, and where legally possible, leases, permits, or easements will be adjusted to eliminate or minimize adverse impacts.	VER-2	Yes	Yes
The Materials Act of 1947 specifically excludes the disposal of mineral materials from National Monuments. As a result, free use permits or contracts for mineral materials authorized under this Act will not be renewed.	VER-3	Yes	Yes

Planning Decision – Minerals	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Some mineral material sites are authorized under Title 23 U.S.C. Section 107 (1998), which provides for the appropriation of lands or interests in lands for highway purposes. Unlike free use permits or contracts for sale of mineral materials that are issued for a fixed term, Title 23 rights-of-way continue indefinitely. The BLM does not resume jurisdiction over the land covered by the rights-of-way until the lands are returned to the BLM upon a determination by the Federal Highway Administration (FHA) that the need for the material no longer exists. Existing Title 23 rights-of-way within the Monument are inconsistent with the protection of Monument resources. The BLM will request closure of those sites from the FHA and will work with the FHA to find suitable replacement sources of mineral material.	VER-4	No	No
Management Considerations: Requesting closure of FHA rights-of-way is inconsistent with the recognition of VER. Considering allowing VER to continue until they expire.			

BLM – Bureau of Land Management, GSENM – Grand Staircase-Escalante National Monument, FHA – Federal Highway Administration, KEPA – Kanab-Escalante Planning Area, U.S.C. – U.S. Code, VER – valid existing right

3.2.5 Recreation

Planning Decision – Recreation	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Camping in developed campgrounds or in designated primitive camping areas will be allowed in the Frontcountry and Passage Zones. Dispersed primitive camping will not be allowed in these zones.	CAMP-1	Yes	Yes
Dispersed primitive camping will be allowed in the Outback and Primitive Zones, but primitive camping could be limited to certain designated areas in these zones if resource damage occurs.	CAMP-2	Yes	Yes
Permits will be required for overnight use in all zones.	CAMP-3	Yes	No
Management Considerations: Reevaluate for the KEPA. Permits are not required on KFO lands with the exception of Special Use Areas. Overnight permits may be required in high use areas.			
Designated primitive camping areas are places where the BLM has identified and designated areas for camping use. These areas will not have any developments, other than a small sign or barriers to delineate the site.	CAMP-4	Yes	Yes
Motorized or mechanized vehicles may pull off designated routes no more than 50 feet for direct access to dispersed camping areas in the Outback Zone, except in WSAs, threatened and endangered plant areas, relict plant areas, riparian areas, or other areas identified....	CAMP-5	Yes	Yes

Planning Decision – Recreation	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Campfires will not be allowed in the Escalante and Paria/Hackberry Canyons, No Mans Mesa, and other relict plant areas as they are identified. Campfires will also be prohibited in archaeological sites, rock shelters, or alcoves Monument-wide.	CAMP-6	Yes	No
Management Considerations: Escalante and Paria/hackberry canyons are not within KFO lands. Relict plant communities are unknown. Current for fires, rock shelters, and alcoves.			
Campfires will be allowed only in designated fire grates, designated fire pits, or mandatory fire pans in the Frontcountry and Passage Zones, and wood collection for campfires will not be permitted. In the Outback and Primitive Zones, fire pans will be encouraged and dead and down wood may be collected in areas where campfires are allowed.	CAMP-7	Yes	No
Management Considerations: The KEPA will need to identify designated camp areas along Hole-in-the-Rock Road.			
Climbing will not be allowed in archaeological sites, on natural bridges or arches, or within identified threatened and endangered species nesting areas.	CLMB-1	Yes	Yes
Climbing areas may be seasonally closed to assure that disturbance to raptor nesting activities does not occur.	CLMB-2	Yes	Yes
The BLM will work with the public to identify climbing areas and develop specific management plans for them. Criteria for designation of climbing areas will be established for the Monument.	CLMB-3	Yes	Yes
Climbing will be subject to zone and other specific management restrictions.	CLMB-4	Yes	Yes
Collection of Monument resources, objects, rocks, petrified wood, fossils, plants, parts of plants, animals, fish, insects or other invertebrate animals, bones, waste, or other products from animals, or of other items from within the Monument will be prohibited. Exceptions could include….	COL-1	Yes	No
Management Considerations: Reevaluate exceptions in the KEPA.			
Special events may be approved, under permit, if the event meets other zone requirements and Plan provisions.	EVENT-1	Yes	Yes
Special events will be permitted in accordance with the requirements of the most restrictive zone that the event encounters.	EVENT-2	Yes	Yes
No competitive events will be allowed.	EVENT-3	No	No
Management Considerations: Competitive events may be considered along paved roads, i.e., SR-12, primary and secondary dirt roads. Current for Wilderness, WSAs, WSRs, and riparian zones.			
In emergency circumstances, vehicles may pull immediately off designated routes (see Transportation and Access for related decisions).	EMERG-1	Yes	Yes
Limited exceptions to the general management provisions may be granted by the Monument Manager….	EMERG-2	Yes	Yes

Planning Decision – Recreation	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
In an effort to protect Monument resources and provide economic opportunities in the local communities, major facilities and the services associated with them will be located in these communities, outside the Monument....	FAC-1	Yes	Yes
All facilities and signs will be consistent with the Monument Interpretive Plan, the Monument Facilities Master Plan, and the Monument Architectural and Landscape Theme (all in the process of development).	FAC-2	Yes	No
Management Considerations: Consistency needs to be considered to support the public need in the KEPA.			
The Monument Facilities Master Plan will address and be consistent with the Americans with Disabilities Act of 1973, the Rehabilitation Act of 1973, and the Architectural Barriers Act of 1968.	FAC-3	Yes	Yes
All projects causing surface disturbance will be subject to NEPA analysis and the standard stipulations described in Appendix 2.	FAC-4	Yes	Yes
No projects or activities that result in permanent fills or diversions in, or placement of permanent facilities on special flood hazard areas (as designated by the Federal Emergency Management Agency), will occur within the Monument.	FAC-5	Yes	Yes
All facilities and parking areas will be designed to be unobtrusive and to meet the visual resource objectives (see the Visual Resource Management section for related decisions).	FAC-6	Yes	Yes
The development of water may be provided in limited circumstances, where necessary for visitor safety or resource protection, in the Frontcountry or Passage Zones. The provision of water at sites within the Monument will be very limited because the only facilities provided will be modest pullouts, parking areas, trailheads, picnic sites, toilets, and primitive camping areas. These sites do not require water, including most toilets which could use other technologies.	FAC-7	Yes	Yes
As the focal point for visitation, visitor day-use facilities and signs will be added as necessary for visitor use, safety, and the protection of sensitive resources, in addition to existing facilities. These facilities could include pullouts, parking areas, trailheads, trails, toilets, fences, and picnic areas....	FAC-8	Yes	Yes
Scenic overlooks and other sites that have been developed along Highway 12 will be maintained....	FAC-9	No	No
Management Considerations: Updates to the language may need to be updated, i.e., number of public sites. May be redundant to FAC-8.			
Calf Creek and Whitehouse Campgrounds are the only developed campgrounds in the Frontcountry Zone. Dispersed primitive camping will not be allowed in this zone, although up to 10 designated primitive camping areas (without amenities) may be identified for individuals or groups.	FAC-10	No	No
Management Considerations: New frontcountry campgrounds may be warranted.			

Planning Decision – Recreation	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
The condition of routes and distance from communities in the Passage Zone makes it a secondary zone for visitation.	FAC-11	No	No
Management Considerations: Many areas in the passage zone are now de facto frontcountry zones and are not manageable under the current conditions.			
Existing parking areas may be better delineated with barriers to prevent further expansion. Parking areas could accommodate up to 30 vehicles, but most will be designed for fewer than 10 cars. Construction of small spur routes or trails may be allowed to access parking areas or other facilities. Trails and parking areas will not be paved.	FAC-12	No	No
Management Considerations: Reevaluate in new land use plans.			
Existing destinations such as Devils Garden and Dance Hall Rock will be maintained. A better delineated parking area and toilets could be considered for Dance Hall Rock. A fully accessible trail that blends in with the terrain could be considered for Devils Garden.	FAC-13	Yes	N/A
Up to 17 parking areas or pullouts (scenic overlooks) could be designated in this zone. These are generally areas that are already used for parking, and delineating them with natural barriers or fences will prevent further resource damage. Interpretive kiosks or signs could be provided at these sites as discussed above.	FAC-14	No	No
Management Considerations: Reevaluate in new land use plans.			
The existing Deer Creek Campground will be the only developed campground in this zone.	FAC-15	No	No
Management Considerations: Reevaluate in new land use plans.			
Small signs to educate the public about a particular resource or safety hazard may be installed at limited sites, but these sites will not be promoted in literature. Facilities such as designated parking areas, toilets, or fences could be allowed for protection of resources in limited cases, only where other tools to protect resources are ineffective.	FAC-16	No	No
Management Considerations: Reevaluate in new land use plans.			
Trails could be delineated if necessary to prevent widespread impacts from multiple trails.	FAC-17	Yes	Yes
Dispersed primitive camping will be allowed in this zone, but certain areas could be closed and certain areas could be designated for camping if resource damage is occurring.	FAC-18	Yes	Yes
Limited signs could be allowed for resource protection or public safety. Small directional signs may be needed, but these will be kept to an absolute minimum and will be rare.	FAC-19	Yes	Yes
Trails could be delineated only if necessary to prevent widespread impacts from multiple trails.	FAC-20	Yes	Yes
No water, toilets, or other visitor amenities or facilities will be provided.	FAC-21	Yes	Yes

Planning Decision – Recreation	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Dispersed primitive camping will be allowed in this zone, but certain areas could be closed and certain areas could be designated for camping if resource damage is occurring.	FAC-22	Yes	Yes
Fences may be used in certain circumstances to protect Monument resources, to manage visitor use, and to manage livestock, consistent with the Proclamation. They will be designed and constructed in accordance with visual resource management objectives and the Monument Facilities Master Plan.	FENCE-1	Yes	Yes
There will be no limit on group size in the Frontcountry Zone.	GROUP-1	Yes	Yes
Group size will be limited to 25 people in the Passage and Outback Zones.	GROUP-2	Yes	Yes
Permits for groups over 25 people will be considered in the Passage and Outback Zones, if the number of people and the activities proposed are consistent with the protection of Monument resources. Appropriate NEPA analysis will be prepared on areas where permits could be authorized. These permits will require that adequate sanitation and trash collection are provided, and that activities take place in areas where resources will not be damaged.	GROUP-3	Yes	Yes
In the Primitive Zone, group size will be limited to 12 people and 12 pack animals. Within the Paria River corridor in the Primitive Zone, permits could be approved for groups over 12 people up to a maximum of 25 people.	GROUP-4	Yes	Yes
n order to protect Monument resources, it may become necessary to place limits on the overall numbers of people and/or pack animals allowed, or to further restrict group sizes in areas where resource damage is occurring.	GROUP-1	Yes	Yes

BLM – Bureau of Land Management, GSENM – Grand Staircase-Escalante National Monument, KEPA – Kanab-Escalante Planning Area, KFO – Kanab Field Office, NEPA – National Environmental Policy Act, SR – State Route, WSA – Wilderness Study Area, WSR – Wild and Scenic River

3.2.6 Renewable Energy

Planning Decision – Renewable Energy	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
The Solar PEIS land use plan amendment of the GSENM plan included the identification of exclusion areas for utility scale solar energy ROWs, priority areas for utility-scale solar energy ROWs (i.e., SEZs), and areas potentially available for utility-scale solar energy development outside of exclusion areas and SEZs (i.e., variance areas). Various screens were applied to identify exclusion and variance areas for utility scale solar development, including identifying all National Monument lands as exclusion area for solar development.	Solar PEIS ROD A.1 & A.2	No	No

Planning Decision – Renewable Energy	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Management Considerations: With the National Monument designation lifted in portions of the Planning Area, and other designations such as VRM under consideration in this planning effort, there is a need for the screening criteria to be applied to the current situation to identify areas that may be appropriate for commercial-scale solar energy development. It is likely that lands suitable for commercial-scale solar energy development will be limited, but there do appear to be some potential areas along the US 89 corridor between Johnson Canyon and the Cockscomb.			
The BLM will not issue ROW authorizations for wind energy development on lands on which wind energy development is incompatible with specific resource values. Lands that will be excluded from wind energy site monitoring and testing and development include designated areas that are part of the National Landscape Conservation System (NLCS) (e.g., Wilderness Areas, Wilderness Study Areas, National Monuments, NCAs, Wild and Scenic Rivers, and National Historic and Scenic Trails) and Areas of Critical Environmental Concern (ACECs). Additional areas of land may be excluded from wind energy development on the basis of findings of resource impacts that cannot be mitigated and/or conflict with existing and planned multiple-use activities or land use plans.	Wind PEIS ROD A.1	No	No
Management Considerations: With the National Monument designation lifted in portions of the Planning Area, and other designations such as VRM under consideration in this planning effort, there is a need for the screening criteria to be applied to the current situation to identify areas that may be appropriate for commercial-scale wind energy development. However, it is anticipated that areas suited for commercial-scale wind energy development will still likely be limited in the Planning Area.			

BLM – Bureau of Land Management, GSENM – Grand Staircase-Escalante National Monument, NCA – National Conservation Area, PEIS – Programmatic Environmental Impact Report, ROD – Record of Decision, ROW – right-of-way, SEZ – solar energy zone, US – U.S. Highway, VRM – Visual Resource Management

3.2.7 Transportation and Access

Planning Decision – Transportation and Access	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Transportation Plan	TRANS-1	No	No
Management Considerations: New travel management plans will be developed after completion of the new land use plans.			
Cross-country motorized travel will be prohibited in accordance with 43 CFR 8340 Off-Road Vehicle	TRANS-2	Yes	No
Management Considerations: Reevaluate in the KEPA.			
Use of bicycles is limited to designated routes and cross-country travel is not allowed.	TRANS-3	Yes	No
Management Considerations: Reevaluate in the KEPA.			

Planning Decision – Transportation and Access	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Street legal motorized vehicles, including four-wheeldrive and mechanized vehicles (including bicycles), will be allowed on approximately 908 miles of routes designated open in the Frontcountry, Passage, and Outback Zones. In order to display all open routes, this mileage number includes sections of Highways 12 and 89 within the Monument. No routes will be designated open in the Primitive Zone.	TRANS-4	No	No
Management Considerations. Update mileage. Consider open play areas in the KEPA.			
Non-street legal all-terrain vehicles (ATVs) and dirt bikes will be restricted to those routes designated as open for their use. Non-street legal ATVs and dirt bikes will be allowed on approximately 553 miles of the 908 miles of routes designated open to street legal vehicles in the Frontcountry, Passage, and Outback Zones; no routes will be designated open to these vehicles in the Primitive Zone.	TRANS-5	No	No
Management Considerations: Update road mileage. Consider open play areas in the KEPA.			
All zones will allow hikers, horses, and pack animals, except where noted elsewhere to protect resources.	TRANS-6	Yes	Yes
With the exception of those segments listed below, open routes may be maintained within the disturbed travel surface area as of the date of this Plan; no widening, passing lanes, or other travel surface upgrades could occur. Deviations from the current maintenance levels will be allowed as follows....	TRANS-7	No	No
Management Considerations: Reevaluate in new land use plans.			
In the event that Title 5 rights-of-way are issued, or in the event of legal decisions on RS 2477 assertions, maintenance activities will be governed under the terms of those actions.	TRANS-8	Yes	Yes
The BLM will continue to work with the Utah Department of Transportation (UDOT) on issues related to route maintenance for Highways 12 and 89. This will cover maintenance and safety work activities. Any new ground disturbance will require site-specific environmental analysis.	TRANS-9	Yes	Yes
In the Frontcountry Zone, a full range of trails could be developed and maintained in order to provide opportunities for visitors.	TRANS-10	Yes	Yes
In the Passage Zone, trails could be developed and maintained where needed for protection of Monument resources or for public safety.	TRANS-11	Yes	Yes
Trails may only be developed or maintained in the Outback and Primitive Zones where necessary to protect Monument resources.	TRANS-12	Yes	Yes
The BLM will work with UDOT to explore the possibility of developing bicycle lanes or parallel bicycle routes along Highways 12 and 89.	TRANS-13	Yes	Yes

Planning Decision – Transportation and Access	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
The Great Western Trail is proposed to traverse the Monument in the Grand Staircase section. The BLM is currently working with adjacent agencies to select an appropriate route through the Monument that is consistent with the objectives in this Plan. The route currently identified will be on existing routes designated open to ATVs in this Plan. This process may require further NEPA analysis.	TRANS-14	Yes	Yes
The BLM will be responsible for administrative routes which will be limited to authorized users. These are existing routes that lead to developments which have an administrative purpose, where the BLM or some permitted user must have access for regular maintenance or operation….	TRANS-15	Yes	Yes
Beyond the routes shown on Map 2, the BLM will work with any individual operating within the Monument under existing permits or authorizations to document where access must continue in order to allow operation of a current permit or authorization. Routes that go only to BLM range monitoring and study areas will not be maintained, but periodic vehicular access to these sites will be granted for required range monitoring uses.	TRANS-16	No	No
Management Considerations: Undocumented roads need to be identified in a new TMP process as administrative roads.			
The BLM's strategy for restoring routes that will no longer be available for public or administrative motorized use in the Monument will be phased over a period of years….	TRANS-17	No	No
Management Considerations: Road restoration will be addressed in the TMP planning process following the completion of the land use plans.			
The BLM's strategy to keep vehicles on designated travelways will be to hire additional staff including law enforcement personnel to patrol by foot, horse, and vehicle.	TRANS-18	Yes	Yes
Maps and signs will be used to help educate the public about routes that are open and closed. The information will be on the Monument website, at the visitor centers/contact stations, and sent to the media.	TRANS-19	Yes	Yes
The BLM is pursuing cooperative agreements with the Sheriff departments in Kane and Garfield Counties to facilitate shared law enforcement and support for enforcing established closures.	TRANS-20	Yes	Yes
he BLM will continue to work with the counties, the State, the communities, and others to communicate correct information about the transportation network to the visiting public and to residents.	TRANS-21	Yes	Yes
A volunteer program that will assist in educating visitors about access and other issues will also be developed.	TRANS-22	Yes	Yes
Monument staff will be scheduled to patrol on a regular basis throughout the year. Additional patrols will be added for intense use periods.	TRANS-23	Yes	Yes

Planning Decision – Transportation and Access	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
The Department of Defense operates two Military Training Routes across the Monument. The BLM will work with the Department of Defense to ensure that military training routes are appropriate to Monument management.	TRANS-24	Yes	Yes
The BLM will work cooperatively with aircraft operators, adjacent land managing agencies, and the FAA to direct overflights to appropriate management zones.	TRANS-25	Yes	Yes
The only active airstrip inside the Monument is the New Home Bench airstrip near Boulder, which is located partially on U.S. Forest Service and partially on BLM lands. No other airstrip would be permitted in the Monument.	TRANS-26	No	No
Management Considerations: Reevaluate in new land use plans.			
A number of entities holding rights-of-way or permits, State agencies, and the BLM use aircraft for patrolling, monitoring, maintenance, and repair functions. Necessary aircraft operations for rights-of-way holders, permittees, and other agencies will be documented in the appropriate permit, authorization or a Memorandum of Agreement. Landing of aircraft for these purposes will be limited to the minimum necessary to meet the required maintenance or repair function.	TRANS-27	Yes	Yes
Natural ambient sound is an important component of the resource and visitor experience. Studies on the effects of noise utilizing both visitor surveys and sound measuring instruments will be completed to determine what the noise baseline is for various areas within the Monument. Studies will be coordinated for areas that border adjacent National Parks.	TRANS-28	Yes	Yes

ATV – all-terrain vehicle, BLM – Bureau of Land Management, CFR – Code of Federal Regulations, GSENM – Grand Staircase-Escalante National Monument, KEPA – Kanab-Escalante Planning Area, NEPA – National Environmental Policy Act, TMP – Travel Management Plan, FAA – Federal Aviation Administration, UDOT – Utah Department of Transportation

3.3 Special Designations

Planning Decision – Special Designations	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
ACECs No Areas of Critical Environmental Concern are designated in the Monument Management Plan. After careful evaluation of the resources recognized in ACEC nominations, it was determined that their protection will be substantially equivalent under either Monument authority or ACEC designation.	ACEC-1	Yes	No
Management Considerations: Consider ACECs in the KEPA.			

Planning Decision – Special Designations	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
National Historic Trails *The OSNHT was designated in 2002, after the completion of the existing land use plan. Therefore, OSNHT management was not addressed in the 2000 MMP. The National Trail System Act, 2001 Feasibility Study, 2017 Comprehensive Administrative Strategy, and BLM 6250 and 6280 manuals will apply.*	None	No	No
Management Considerations: Consider management protections for OSNHT.			
National Monuments	Proclama-tions 6920 and 9682	No	No
Management Considerations: Reevaluate with new Proclamation objects and values.			
Scenic Routes *There are no decisions in the GSENM MMP for scenic routes. It is not expected than any new scenic routes will be considered in the new LUPs.*	None	Yes	Yes
Wild and Scenic Rivers			
Approximately 230.5 miles of river segments within the planning area have been determined suitable and will be recommended for Congressional designation into the National Wild and Scenic River System (NWSRS).	WSR-1	Yes	Yes
Those streams found suitable will be managed for protection of the resources associated with the stream. Such action will not entail any additional state water rights and will not result in a Federal reserved water right unless Congress acts to officially designate the stream or stream segment as part of the NWSRS. Upon such designation, if any, the Federal reserved water right thus established would, by law, be established with the priority date of the designation and would be junior to all preexisting water rights, in accordance with the existing state priority system. Senior rights in any stream designated would be unaffected.	WSR-2	Yes	Yes
River segments determined non-suitable will be managed under the direction and prescriptions of this Plan.	WSR-3	Yes	Yes
Wilderness Study Areas			
Existing WSAs in the Monument will be managed under the BLM's Interim Management Policy (IMP) and Guidelines for Lands Under Wilderness Review (BLM Manual H-8550-1) [superseded by Manual 6330] until legislation takes effect to change their status. The major objective of the IMP is to manage lands under wilderness review in a manner that does not impair their suitability for designation as wilderness. In general, the only activities permissible under the IMP are temporary uses that create no new surface disturbance nor involve permanent placement of structures. Temporary, non-disturbing activities, as well as activities governed by valid existing rights, may generally continue in WSAs.	WSA-1	Yes	Yes

Planning Decision – Special Designations	Decision Source	Current GSENM	Current Kanab-Escalante Planning Area
Actions allowed under the IMP will also be subject to other BLM laws and policies that govern the use of public land, including management prescriptions or other restrictions developed in this Plan (where they are consistent with the IMP). It is important to note that some uses and activities described in this Plan may not be achievable under the IMP. Where conflicts occur between the zone prescriptions and IMP, IMP will take precedence until action is taken by Congress to either designate the WSAs as Wilderness or release them from further protection. This Plan and zone prescriptions will apply to all public land within the Monument if Congress releases them from WSA status.	WSA-2	Yes	Yes

ACEC – Area of Critical Environmental Concern, BLM – Bureau of Land Management, GSENM – Grand Staircase-Escalante National Monument, IMP – Interim Management Policy, KEPA – Kanab-Escalante Planning Area, LUP – Land Use Plan, MMP – Monument Management Plan, NWSRS – National Wild and Scenic River System, OSNHT – Old Spanish National Historic Trail, WSA – Wilderness Study Area

4 Management Opportunities

This chapter analyzes the ability of current management direction to achieve desired conditions and address resource demands. Based on the current condition and trends of the resources present in the Decision Area and the current demands on those resources, an analysis is provided for each resource and resource use. Additionally, options for changing existing management are provided in cases where current management decisions do not adequately respond to current issues, changes in circumstances, or new information.

Analyzing the adequacy of current management direction and identifying management opportunities is a process of considering changes in management to respond to information gathered in the area profile (Chapter 2) and issues and concerns elevated through scoping. The information provided in this chapter will serve as a starting point for alternative formulation by providing a list of possible management opportunities, which later will be refined into a framework of comprehensive alternatives.

4.1 Resources

4.1.1 Air Quality

- Use existing management decisions.

4.1.2 Climate Change

- Use existing air quality management decisions.

4.1.3 Cultural Resources

- Use existing management actions, except for priorities in the KEPA.

4.1.4 Fire and Fuels

- The GSENM Advisory Committee is not functional. The GSENM Advisory Committee is not applicable to the KEPA Unit; there is much more information and science available on fire occurrence in the planning units than when the MMP was developed.
- Tier decisions to Southern Utah Support Area FMP (UT-040-04-054) (November 2005). Utilize currently available data in determining fire/non fire use/occurrence (LANDFIRE, VTRT, etc.)

4.1.5 Fish and Wildlife

- Remove planning decisions that are no longer applicable.
- Continue to collaborate with other agencies.
- Continue to emphasize education and interpretation.

4.1.6 Geology

- Consider protection of unique geologic features.
- Consider conducting surveys for geologic hazards before the design or placement of designated primitive camping areas, trailheads, or communication structures.

4.1.7 Lands with Wilderness Characteristics

- Consider at least one alternative that would protect all identified lands with wilderness characteristics (about 481,113 acres) as a priority over managing these lands for other uses.
- Alternatives need to determine how to manage lands with wilderness characteristics as part of BLM's multiple-use mandate. This may include (1) emphasizing other multiple uses as a priority over protecting wilderness characteristics; (2) emphasizing other multiple uses while applying management restrictions (conditions of use, mitigation measures) to reduce impacts on wilderness characteristics; or (3) emphasizing the protection of wilderness characteristics as a priority over other multiple uses.
- Planning decisions for wilderness characteristics include identifying decisions to protect or preserve wilderness characteristics (naturalness, outstanding opportunities for solitude, and outstanding opportunities for primitive and unconfined recreation), including goals and objectives to protect the resource and management actions necessary to achieve these goals and objectives. For authorized activities, include conditions of use that would avoid or minimize impacts on wilderness characteristics.

4.1.8 Paleontological Resources

- Integrate the management of fossil resources within all four separate units of the Planning Area and those found on adjacent public lands.
- Address fossil hobby collection. Possibly designate collection areas. Designate closed areas where necessary.
- Continue inventory, research, and interpretation of paleontological resources.
- Address petrified wood collection.
- Address monitoring and protection of high-use areas.

4.1.9 Soil Resources

- The RMP and MMPs will need to address protection of soils to reflect the expected future uses and conditions of BLM-administered surface land, and some standards and objectives may need to be clarified or changed.
- Stipulations currently in place to reduce salinity or erosion impacts during some resource uses could be expanded to include all surface-disturbing activities.
- Specific emphasis could be placed on managing surface-disturbing actions on identified areas of fragile soils and areas susceptible to erosion.
- Fragile soils along with possible resulting use limitations would be identified throughout the Decision Area.

4.1.10 Special Status Species (Threatened, Endangered, and Sensitive)

- Protect special status species.
- Consult with USFWS.
- Remove planning decisions that are no longer applicable.

4.1.11 Vegetation

- Require site assessment before authorizing surface-disturbing activities.

- Protect relict communities and hanging gardens.
- Move riparian areas toward PFC.
- Protect riparian areas.
- Control noxious weeds.

4.1.12 Visual Resources

- New inventory data along with other resources that could be allowed in the KEPA lands could result in changes to the VRM Classes. Policy clarification after MMP was finalized directed BLM to classify WSAs as VRM Class I.
- VRM Classes may shift to more- or less-protective classes based on land use priorities and updated inventory. Policy clarification will result in all WSAs being classified as VRM Class I.
- Consider research projects in VRM Class I areas.

4.1.12.1 Dark Night Sky Resources

- Prevent light pollution in the Planning Area and work closely with surrounding communities to minimize light pollution.

4.1.13 Water Resources

- Consider additional water uses in the KEPA.
- Pursue options for ensuring water availability.
- Monitor water quality when necessary.

4.1.14 Wild Horses

- Consider conducting population surveys of wild horses within the HAs every 3 to 4 years.
- Consider removing any wild horses that move into areas conducive to or accessible for humane removal.

4.2 Resource Uses

4.2.1 Forestry and Woodland Products

4.2.1.1 Kanab-Escalante Planning Area

- Identify areas available or not available for harvesting of forestry and woodland products.
- Develop management decisions on how to manage the forest and woodland resources within the KEPA.
- Develop activity plans that identify areas where Desired Plant Community objectives are not being met and what kind of tools to use in order to reach Desired Plant Community objectives.
- Consider utilizing stewardship contracting and greenwood cutting areas to meet forestry objectives.
- Consider collection of dead and down trees to occur where appropriate across the unit.
- Consider fuelwood, post, and Christmas harvesting to occur in existing and new restoration areas of the unit prior to and after treatments.
- Consider making commercial wood products available where the removal of biomass, sawlogs, and the like can help promote specific project objectives and contribute to local

economies, both through the products themselves and through the employment generated by the harvesting, transportation, processing, and utilization of commercial products.

4.2.1.2 Kaiparowits Unit

- Identify areas available or not available for harvesting of forestry and woodland products.
- Develop and implement activity plans to improve and maintain the Ponderosa Pine groves located in this unit.
- Consider allowing commercial timber harvest if it would be the best tool to meet the Desired Plant Community objective for the specific area.
- Consider utilizing stewardship contracting and greenwood cutting areas to meet forestry objectives.
- Consider allowing fuelwood, post, and Christmas tree harvesting in existing and new restoration areas.
- Consider making commercial wood products available where the removal of biomass, sawlogs, and the like can help promote specific project objectives and contribute to local economies, both through the products themselves and through the employment generated by the harvesting, transportation, processing, and utilization of commercial products.
- Consider allowing the collection of dead and down trees where appropriate across the unit.

4.2.1.3 Grand Staircase Unit

- Identify areas available or not available for harvesting of forestry and woodland products.
- Consider utilization of forestry and woodland products to achieve Desired Plant Community objectives in existing range seedings and new restoration projects.
- Consider allowing personal-use products to be made available to the public.
- Consider making commercial wood products available where the removal of biomass, sawlogs, and the like can help promote specific project objectives and contribute to local economies, both through the products themselves and through the employment generated by the harvesting, transportation, processing, and utilization of commercial products.
- Consider utilizing stewardship contracting and greenwood cutting to meet forestry objectives.

4.2.1.4 Escalante Canyons

- Consider allowing the utilization of forestry products to achieve Desired Plant Community objectives.

4.2.2 Lands and Realty

- Address long-standing pending applications.
- Address long-standing trespass cases.
- Complete the New Commercial Film Permit Programmatic EA for the Decision Area.
- Identify potential FLPMA 203 Sales parcels and other potential disposal action parcels for authorities such as R&PP and desert land entry on a case-by-case basis.
- Identify potential renewable energy sites.
- Identify potential additional utility corridors needed for community growth and expansion.

- Review withdrawals on a case-by-case basis to determine if they should be continued, modified, or revoked, and identify potential new withdrawals for lands no longer under monument designation.
- Consider ROW avoidance and exclusion areas as needed for specific resource protection.

4.2.3 Livestock Grazing

- The permit renewal process commonly used by BLM since about 1999 yields a document that is the functional equivalent to an allotment management plan. This may be a more efficient process for many of GSENM's allotments. The allotment management plan process, as outlined, also substitutes the allotment management plan process into the LUP by relying on it to determine overall allocations in GSENM as well as the areas open and closed to livestock grazing. This is not consistent with BLM guidance for designating lands as open to livestock grazing use. The grazing regulations (43 CFR 4130.2(a)) indicate that grazing permits and leases shall be issued to authorize use on the public lands that are designated as open to livestock grazing through LUPs. These regulations (43 CFR 4100.0-8) also indicate that livestock grazing activities and management actions shall be conformance with the LUP. The BLM Land Use Planning Handbook (H-1601-1) indicates that LUP decisions should identify lands open or closed to livestock grazing. The handbook also indicates that for lands open to livestock grazing, BLM should identify on an area-wide basis both the amount of existing forage available for livestock and the future anticipated amount of forage available for livestock with full implementation of the LUP.
- The schedule for completing the grazing administration process needs to be updated. So far, none of the grazing permits in the Decision Area have been fully processed.
- May need to clarify, through education, how decisions to allow new structures would be made according to the existing management direction.
- Explore opportunities to update this decision to integrate livestock grazing.
- Better define parameters for developing water sources for livestock grazing. Site-specific NEPA analysis of all relevant resources, including water availability, should be the primary decisionmaking process when considering increasing livestock numbers.
- Decisions to consider:
  - Achieve an upward trend on areas that are in a static or have a downward trend.
  - Improve habitat condition and trend with vegetative treatments or prescription grazing management.
  - Revise and change livestock grazing systems to stabilize downward vegetation trends where applicable.
  - Adjust forage use for livestock during drought conditions.
  - Remove or decrease cattle during droughts longer than 1 year until drought conditions subside.
  - Reduce or eliminate rangeland resource problems on all allotments identified for I category management while maintaining a production goal of livestock forage over the long term.
  - Maintain or improve current resource conditions on all allotments identified for M category management while permitting livestock grazing use over the long term.
  - Continue current management on all allotments identified for C category management while preventing further resource deterioration.
  - Re-treat existing vegetative treatments that have been invaded by pinyon-juniper, sagebrush, and the like to provide forage for livestock and wildlife to ensure that

adequate forage is available, ecological diversity is promoted, and healthy vegetative communities are sustainable.

- Identify vegetative treatment areas that have been invaded by such species as pinyon-juniper, sagebrush, and cheatgrass for vegetative treatment to provide forage for livestock and wildlife to ensure that adequate forage is available, ecological diversity is promoted, and healthy vegetative communities are sustainable.
- Provide for fuels reduction treatments that reduce overstory fuels and canopy species, and establish and restore grass and forb components in the understory to the degree necessary to protect and restore sagebrush habitat, rangeland and watershed health, and wildlife habitat. Aim fuels treatment toward preventing large-scale, uncharacteristic fires, and promoting rangeland health by restoring ecosystem function.
- Create additional forage via vegetative treatments to reset the seral stage of crucial areas and reseed areas with favorable plant species.
- Rest allotments or pastures on grazing allotments for a minimum of 2 years after a vegetative treatment project is completed to provide for project success, which could disrupt livestock grazing operations.
- Rest allotments or pastures on grazing allotments for a minimum of 2 years following a wildfire and subsequent ESR efforts to provide for project success, which could disrupt livestock grazing operations.
- As needed to promote/attain the Rangeland Health Standards and Guidelines and other resource objectives, implement livestock management actions to change the seasons of use and grazing management systems, identify the kinds of livestock and grazing use levels through formal grazing agreements, and make grazing permit renewal decisions or development allotment management plans. These actions would be based on the collection and analysis of all available vegetative monitoring data.
- Allow for changes in kinds of livestock to eliminate resource conflicts or to provide for more effective livestock management.
- To facilitate livestock management and help improve forage condition in areas where burning has been designated as a method of land treatment, initiate a fire action modification plan incorporating modified fire suppression procedures.
- Support Garfield and Kane County ordinances in so far as they support livestock trailing by county-claimed roads that cross public lands. Incorporate trailing routes into grazing permits as terms and conditions.
- Allow a temporary change in kinds of livestock for bio-control of weeds, invasive species, and cheatgrass to meet management objectives.
- Allow study plot/restoration of disturbed areas (i.e., abandoned drill pads).
- Allow for fence modifications (design and specifications) to improve wildlife movement.
- Install wildlife escape ramps in all water troughs.
- Allow for the construction of reference area exclosures in undisturbed areas to provide the ability for long-term monitoring comparison.
- Allow for the construction of riparian exclosures or changes to seasons of use to limit hot-season grazing in riparian areas as needed.
- In the event USFWS lists additional species as threatened or endangered, provide for the implementation of guidelines/management actions on affected grazing allotments that would provide for recovery of the species.
- Allow for the increase of AUMs on grazing allotments where excess forage has become available as a result of successful ESR treatments, fuels treatments, vegetative enhancement projects, and the like where supported by vegetative monitoring data.
- Special status plants are typically isolated and located in small areas in the Planning Area. If it is determined that livestock are adversely affecting special status plants,

water hauling, and salting in the immediate area may be limited where the plant is present.
- Allow for Range Improvement Project design specifications and BMPs through survey and design to minimize impacts on wildlife.
- Identify threatened and endangered species habitat areas that might need restrictions to livestock use.
- Identify areas that could be suitable for the reintroduction of such species as bighorn sheep and greater sage-grouse, and implications to livestock grazing.
- Develop/update Memoranda of Understanding (MOUs) between GSENM, KFO, and Glen Canyon NRA as needed where there are overlapping administrative responsibilities.

4.2.4 Minerals

- Recognize VER.
- Consider where locatable, leasable, and mineral material sales will be allowed in the KEPA.
- Consider protections for hobby collecting.

4.2.5 Recreation

- Identify criteria for reducing conflicts between recreation users and other uses on public lands.
- Identify priority actions and recreation site improvements.
- Identify areas for using permits or R&PP leases to address recreation-related opportunities.
- Designate areas for specific recreation purposes throughout the Decision Area.
- Complete a Recreation Opportunity Spectrum inventory and develop objectives throughout the Decision Area. Recent application of other recreation management philosophies, such as a Benefits-Based Recreation framework, could be considered for application in the RMP/EIS alternatives.
- Determine areas appropriate for designation as SRMAs. Special areas (congressional or secretarial designation or areas that require special management), either in existing SRMAs or ERMAs, could also be designated through this planning effort.
- Determine areas appropriate for designation as ERMAs. To alleviate conflict between users, focus areas could be implemented. A focus area would concentrate on a single primary use while allowing other non-interfering uses.
- Develop management actions for lands not designated as SRMAs or ERMAs to address visitor health and safety; use and user conflicts; the type(s), activities, and locations where SRPs would be issued or not issued; and mitigation of recreation impacts on cultural and natural resources.
- For managing SRPs, areas could be allocated based on large-scale permitted activities including, but not limited to, competitive recreation activities and commercial guiding services. Activities authorized under an SRP would be consistent with objectives of the recreation program and recreation management plans.
- Collaborate with or maintain partnerships with interest groups, communities, and Federal, State, and local agencies to enhance or contribute to achieving desired recreation outcomes.
- Identify recreation needs along travel corridors and at developed sites.
- Identify locations where human waste disposal systems may be required by the public and commercial operators.

- Develop canyoneering management plans/policies for the resource units.
- Consider fire restriction criteria for resource protection.
- In response to increased visitor use, identify an adaptive framework to provide recreation facilities that reduce resource conflict, provide for recreation experience, and provide for the health and safety of public land users.
- Identify appropriate stipulations and criteria for commercial and organized recreation activities in conflict areas to reduce resource conflicts.

4.2.6 Renewable Energy

- Determine where and under what circumstances authorizations for use, occupancy, and development can be granted.
- Evaluate designated corridors and carry through the corridors that would be preferred for developing ROWs, and terms and conditions for these corridors that would minimize environmental impacts and limitations.
- Evaluate, and if necessary designate, areas for renewable energy projects.
- Designate ROW avoidance and exclusion areas.
- Determine if all areas not identified as avoidance or exclusion areas would be available for ROWs and subject to multiple use terms on a case-by-case basis.
- Determine where collection and use of woody species could be utilized for biomass energy production.

4.2.7 Transportation

- The new RMP would not address how motorized travel will be managed in the Decision Area.
- The RMP may identify open OHV areas in the Decision Area.
- The RMP will identify how travel will be managed in the Planning Area until an implementation-level TMP can be completed.

4.3 Special Designations

4.3.1 Areas of Critical Environmental Concern

- All areas nominated as ACECs that are found to have relevant and important values should be considered for designation in at least one alternative of the plan.

4.3.2 National Trails

- The planning process could identify a range of management opportunities to protect the historic values along the OSNHT. Potential management should be closely coordinated with NPS and other BLM offices through which the trail segments pass to standardize management.

4.3.3 Scenic Routes

- Consider new BLM Backways and Byways.

4.3.4 Wild and Scenic Rivers

- Suitability determinations from the 2000 MMP will be carried forward in this planning effort.

4.3.5 Wilderness Study Areas

- The RMP will address travel management area designation decisions for WSAs. Additionally, the RMP will need to address BLM guidance for visual resources, which requires that all WSAs be managed according to VRM Class I management objectives, which can only be established through the land use planning process.

4.4 Social and Economic Features

4.4.1 Environmental Justice

4.4.2 Hazardous Materials and Public Safety

- Consider guidelines to control hazardous materials.
- Tribal Religious Concerns:
  - Engage in proactive tribal consultation to ensure concerns are identified and considered early in the planning process.
  - Emphasize consistency of BLM plans and projects with tribal programs for the protection and enhancement of natural and cultural resources.
  - In consultation with tribes, identify TCPs and important cultural plant locations for management.

4.4.3 Socioeconomic Features

5 Consistency/Coordination with Other Plans

Section 202 of the FLPMA requires BLM to coordinate land use planning activities with other Federal agencies and State, local, and tribal governments (FLPMA Section 202(c)(9)). FLPMA states:

> [T]he Secretary shall, to the extent he finds practical, keep apprised of State, local, and tribal land use plans; assure that consideration is given to those State, local, and tribal land use plans that are germane in the development of land use plans for public lands; assist in resolving, to the extent practical, inconsistencies between Federal and non-Federal Government plans, and shall provide for meaningful public involvement of State and local government officials... (FLPMA Section 202(c)(9)).

FLPMA also states, "Land use plans of the Secretary under this section [202] shall be consistent with State and local plans to the maximum extent he finds consistent with Federal law and the purposes of this Act" (FLPMA Section 202(c)(9)). The BLM planning regulations further clarify that:

> Guidance and resource management plans and amendments to management framework plans shall be consistent with officially approved or adopted resource related plans, and the policies and programs contained therein, of other Federal agencies, State and local governments and Indian tribes, so long as the guidance and resource management plans are also consistent with the purposes, policies and programs of Federal laws and regulations applicable to public lands, including Federal and State pollution control laws as implemented by applicable Federal and State air, water, noise, and other pollution standards or implementation plans (43 CFR 1610.3-2(a)).

The planning regulations also indicate that where State and local government policies, plans, and programs differ, those of the higher authority will normally be followed (43 CFR 1610.3-2(d)). The multiple use definition in FLPMA (Section 103) means:

> "[T]he management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to pro-vide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and non-renewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output."

Prior to the approval of the proposed LUP decisions, the Utah State Director will submit to the Governors of Utah the proposed plans and will identify any known inconsistencies with the State or local plans, policies, or programs. The Governors have 60 days in which to identify inconsistencies and provide recommendations in writing to the Utah State Director.

If the Governors do not respond within the 60-day period, the LUPs are presumed to be consistent. If the Governors recommend changes in the proposed LUPs that were not raised during the public participation process, the Utah State Director will provide the public with an opportunity to comment on the recommendation(s).

If the Utah State Director does not accept the recommendation(s) of the Governors, the Utah State Director will notify the Governors, and the Governors will have 30 days in which to submit a written appeal to the BLM Director.

The BLM Director will accept the recommendation(s) of the Governors if the Director determines that they provide for a reasonable balance between the national interest and the States' interest. The BLM Director will communicate to the Governors in writing and publish in the *Federal Register* the reasons for the decision to accept or reject such Governors' recommendation(s) (43 CFR 1610.3-2(e)).

5.1 County Plans

The Planning Area encompasses approximately 1,880,873 acres located in portions of Kane and Garfield Counties. This includes Federal mineral estate and land administered by GSENM and KFO.

Garfield County General Management Plan (adopted November 8, 2007, revised in 2017). This plan establishes criteria, policies, and requirements to be met in the Federal land use planning process. It documents baseline conditions for analysis and states that, where quantified data are not available, professional judgment must defer to policies and objectives outlined in the Garfield County RMP. A 2013 amendment (Resolution 2013-2) addresses the cultural and historic value of grazing and places the Escalante Historic/ Cultural Grazing Region on the County Register of Cultural and Historic Resources. The Garfield County RMP was modified in 2018 to reflect the GSENM boundary modifications that were made by Presidential Proclamation 9682 on December 4, 2017.

Kane County General Plan (adopted 1998, amended 2014 and 2017). This plan addresses growth and development and partnerships with Federal agencies in Kane County. It was amended in August 2014 to adopt the Escalante Region Multiple Use/Multiple Functions Grazing Zone in response to public concerns on grazing of public lands versus private lands and agricultural pursuits. The grazing zone emphasizes the social, economic, historic, and cultural importance of grazing to Kane County and its residents.

Kane County RMP (adopted 1998, amended 2015, 2017, and 2018) and revised in July 2017). This document lays out a series of resource development goals, objectives, and policies that guide the efforts of the Resource Development Committee in coordination with the County Land Use Authority. Both advise the County Commission regarding planning and development issues in a coordinated fashion pertaining to Kane County resource management and this plan. This plan was also amended with adoption of the Escalante Region Multiple Use/Multiple Functions Grazing Zone. The 2017 revision was to reflect the GSENM boundary modifications that were made by Presidential Proclamation 9682 on February 14, 2018.

5.1.1 Scenic Byway 12 Corridor Management Plan

The Scenic Byway 12 Corridor Management Plan was prepared for Garfield County and Wayne County Commissions. Scenic Byway 12 traverses the northern part of the Decision Area.

Table 42. Scenic Byway 12 Corridor Management Plan

Component	Description
Date	December 2001
Purpose	"A corridor management plan (CMP) is a document that details the future strategies and actions for management of the byway. The plan is one that is compiled by the people of the local communities who have a vested interest in the protection and enhancement of the byway and its corridor. It is important to note that the CMP is not an instrument to regulate conditions, mandate change, or condemn private property. The plan identifies the special qualities of the corridor and addresses how to sustain the character of Scenic Byway 12" (p. 2).
Common, Dependent and Interdependent Resources	Approximately 95% of Scenic Byway 12 passes through Federal land (p. 13). Goals, strategies, and proposed actions are outlined in the plan for archaeological, cultural, historic, natural, recreational, and scenic resources (pp. 17–44).
Planning Implications	BLM should consider implications of the goals, strategies, and proposed actions from the CMP when developing management actions for the RMP.

Source: Five County Association of Governments 2001
CMP – corridor management plan, BLM – Bureau of Land Management, RMP – Resource Management Plan

5.2 State Plans

State of Utah regulations that affect the planning process include:

- Utah Code, Title 63J Chapter 4, Part 4, Planning. This part describes the duties of the planning coordinator and office.
- Utah Code, Title 63J, Chapter 8, State of Utah RMP for Federal Lands. Within this chapter, Section 105.8 established the Utah Grazing Agricultural Commodity Zones. The Escalante Region Grazing Zone is one of many grazing zones across Utah. The purpose of these grazing zones is as follows:
  - Preserving and protecting the agricultural livestock industry from ongoing threats
  - Preserving and protecting the history, culture, customs, and economic value of the agricultural livestock industry from ongoing threats
  - Maximizing efficient and responsible restoration, reclamation, preservation, enhancement, and development of forage and watering resources for grazing and wildlife practices and affected natural, historical, and cultural activities

The State of Utah Natural Resources Division of Parks and Outdoor Recreation Plan is described below.

Table 43. State Comprehensive Outdoor Recreation Plan 2003

Component	Description
Date	May 7, 2003

Component	Description
Purpose	"The purposes of the State Comprehensive Outdoor Recreation Plan (SCORP) include: Developing a strategic outdoor recreation reference document; Assisting outdoor recreation resource planning and management in Utah; Proposing an outline of desired actions and goals for statewide outdoor recreation for at least five years; Providing a citizen-input forum to suggest outdoor recreation needs, strategies and rationale for achieving goals—a useful Open Project Selection Process; Facilitating essential coordination for outdoor recreation development by multiple agencies and interests for a variety of outdoor recreation activities throughout the state; Assisting and guiding state, local and Federal decision-making regarding outdoor recreation in Utah; and Maintaining the 1965 LWCF Act requirements for eligibility to receive matching grant allocations from Congress through the auspices of NPS and the U.S. Department of the Interior (P.L. 88-578)" (p. 3).
Common, Dependent, and Interdependent Resources	"The major objective of the Utah SCORP is to provide information about high quality outdoor recreation opportunities through LWCF grants and other programs, to improve the quality of life and health in Utah while providing facts and recommendations to help guide and justify allocations of scarce matching grant dollars" (p. 3). The Utah SCORP assists entities in rational decisionmaking regarding policy and expenditure on outdoor recreation and development (p. 2).
Planning Implications	BLM should consider the Utah SCORP as a resource for planning.

Source: Utah Division of Parks and Recreation 2003
SCORP – State Comprehensive Outdoor Recreation Plan, LWCF – Land and Water Conservation Fund, NPS – National Parks Service, P.L. – Public Law, BLM – Bureau of Land Management

The Utah State Water Plan estimates Utah's available water supply, makes projections of water need, explores how these needs will most efficiently be met, and discusses other important values, including water quality and the environment. The plan is intended to be a useful guide and reference to local water planners and managers as they strive to meet the many water challenges facing Utah.

Table 44. Utah's Water Resources: Planning for the Future

Component	Description
Date	May, 2001
Purpose	"The purpose of *Utah's Water Resources: Planning for the Future* is to describe the current status of Utah's water resources and evaluate the demands that will be placed upon them in the future. This involves quantifying available water supply, estimating current and future uses, and identifying ways to obtain new water supplies and manage existing supplies to satisfy future needs. This plan presents the state's position on water development, water conservation, environmental issues affecting water resources and water quality. A main goal of this document is to help water managers, planners, legislators and other parties formulate the management strategies and policies needed to direct their efforts into the new century. This document should also be a valuable resource for those in the general public interested in contributing to waterrelated decisions at all levels of government."

Component	Description
Common, Dependent, and Interdependent Resources	"The federal government, primarily the U.S. Forest Service and the Bureau of Land Management, administers about two-thirds of the land area in the state of Utah. More significantly, they own and manage the headwaters of almost all the watersheds from which the state's surface water supply is derived and the state's population is dependent. Utah is concerned about the ability of these lands to yield a high quality, nondeclining supply of water to its communities for agricultural, [municipal and industrial] and other uses" (p. 59). "Before designating streams and rivers as 'wild and scenic,' state, federal and local agencies should assure that all the potential water management and other resource impacts such designation would have far into the future are assessed. They must also ensure that designation is done in the spirit of the WSRA and not simply used as a tool to impede water and other important resource development" (p. 58). "…the 1990 *Utah State Water Plan…* was a comprehensive water plan and resource inventory for the state and provided a basis for more detailed planning at the hydrologic river basin level. Subsequent plans for each of the state's basin plan areas…have been completed. These river basin plans inventory basin water supplies, provide present and future water use information, and address problems and issues facing local water resources stakeholders. These plans are being used by local and statewide planners to make informed water resources decisions" (pp. 3–4)
Planning Implications	BLM should consider the Utah State Water Plan and its guidance, including subsequent Basin River Plans, in the RMP process.

Source: Utah Division of Water Resources 2001
WSRA – Wild and Scenic Rivers Act, BLM – Bureau of Land Management, RMP – Resource Management Plan

State watershed, wildfire, and wildlife plans include the following:

Paria River Watershed Water Quality Management Plan (Utah DEQ undated[a])
https://deq.utah.gov/legacy/programs/water-quality/watersheds/docs/2007/07Jul/Paria_River_WQMP.pdf

Escalante River Watershed Water Quality Management Plan (Utah DEQ undated[b])
https://deq.utah.gov/legacy/programs/water-quality/watersheds/docs/2007/07Jul/Escalante_River_WQMP.pdf

Southwest Utah Regional Wildfire Protection Plan (Five County Association of Governments 2007)
http://www.fivecounty.utah.gov/wildfire.html

Utah Division of Wildlife Resources Statewide Management Plan for Mule Deer (UDWR 2014)
https://wildlife.utah.gov/hunting/biggame/pdf/mule_deer_plan.pdf

Deer Unit Management Plans (UDWR 2010)
https://wildlife.utah.gov/learn-more/mule-deer/118-hunting/big-game/408-unit-deer-management-plans.html

Conservation Plan for Greater-Grouse in Utah (UDWR 2013b) (currently being revised)
https://wildlife.utah.gov/uplandgame/sage-grouse/pdf/greater_sage_grouse_plan.pdf

Utah Wildlife Action Plan (UDWR 2015b)
https://wildlife.utah.gov/wap/Utah_WAP.pdf

Elk Management Plan (UDWR 2015a)
https://wildlife.utah.gov/hunting/biggame/pdf/elk_plan.pdf

Elk Unit Management Plans (UDWR undated)
https://wildlife.utah.gov/hunting-in-utah/hunting-information/big-game/118-hunting/big-game/1965-unit-elk-management-plans.html

Pronghorn Management Plan (UDWR 2009)
https://wildlife.utah.gov/hunting/biggame/pdf/Statewide_prong_mgmt_2009.pdf

5.3 Other Federal Agency Plans

5.3.1 National Park Service, Utah

Zion National Park, Glen Canyon NRA, Capital Reef National Park, and Bryce Canyon National Park share boundaries with BLM public lands. A description of the NPS plans is provided below.

Table 45. Zion National Park General Management Plan

Component	Description
Date	August 2001
Purpose	"The purpose of this plan is to describe the general path NPS intends to follow in managing Zion National Park over the next 20 years. The plan will provide a framework for proactive decision making on such issues as visitor use, natural and cultural resource management, and park development, which allow park managers to effectively address future problems and opportunities" (p. iii).
Common, Dependent, and Interdependent Resources	The plan proposes two river segments that are contained within the park but have reaches within Decision Area. These river segments are East Fork of the Virgin River (in Parunuweap Canyon) and North Fork of the Virgin River (in Orderville Gulch), both of which are proposed for designation as wild rivers.
Planning Implications	The direction and proposals for adjacent land uses outlined in this general management plan should be considered in the RMP.

Source: NPS 2001b
NPS – National Park Service, RMP – Resource Management Plan

Table 46. Bryce Canyon National Park Fire Management Plan and Environmental Assessment

Component	Description
Date	November 2004
Purpose	"The purpose of fire management planning at Bryce Canyon National Park is to protect and conserve the natural and cultural resources of the park for the enjoyment of present and future generations. This includes perpetuation of the ecosystem in which these resources occur. Fire management is a tool used to maintain and/or restore ecological integrity. Fire management is also intended to protect human life and property, both public and private" (p. 1).
Common, Dependent, and Interdependent Resources	"The proposed action would allow for implementation of the full range of fire management activities, including wildland fire use and fuels management. Wildland fire activities would include suppression and use of wildland fire for resource benefit. Fuels management activities would include prescribed fire, and mechanized and herbicidal treatments. The main focus of these activities and treatments as currently emphasized by national policy is public and fire fighter safety, communities identified as at risk from wildland fires (wildland urban interface), historic fire regime, current condition class, and collaboration with other agencies and stakeholders" (p. ii).
Planning Implications	The FMP and activities described should be considered for any management actions that could affect resources or resource uses near the park.

Source: NPS 2004
FMP – Fire Management Plan

Glen Canyon General Management Plan

This plan (NPS 1979) specifically identified the following values and purposes for the park unit: vegetation, soils, wildlife, water quality, cultural resources (historic and prehistoric), scenic resources, recreation, and paleontology.

5.3.2 Neighboring Agency Consultation and Coordination

The KFO plans to collaborate with other Federal, State, and local agencies and governmental entities throughout the RMP process. Coordination was initiated with Kane and Garfield Counties, State of Utah, USFWS, and Native American tribes. To date, several cooperating agencies have been identified including Kane and Garfield Counties, State of Utah, USFWS, and Kaibab-Paiute Tribe. Additional opportunities for coordination with other agencies will be sought throughout the RMP and EIS development process. Project phases where State and local governments, other Federal agencies, and tribal government involvement could prove to be most critical to ensure consistency include scoping, alternatives development, impacts analysis, and public and agency comment periods.

6 Specific Mandates and Authorities

The foundations of public land management are located in the mandates and authorities provided in laws, regulations, and EOs. These statements of Federal policy direct BLM concerning management of public lands and resources. The U.S. Congress has acknowledged that the appropriate use of these resources requires proper planning. BLM's planning process (as described in 43 CFR 1600) is authorized and mandated through two important laws.

Federal Land Policy and Management Act of 1976 (FLPMA) states that BLM "shall, with public involvement…develop, maintain, and when appropriate, revise land use plans" (43 U.S.C. 35 Section 1712 (a)). In addition to Federal direction for planning, FLPMA declares the policy of the United States concerning the management of federally owned land administered by BLM. Key to this management policy is the direction that BLM "shall manage the public lands under principles of multiple use and sustained yield, in accordance with the [developed] land use plans" (43 U.S.C. 35 Section 1732(a)). The commitment to multiple-use will not mean that all land will be open for all uses. Some uses may be excluded on some land to protect specific resource values or uses, as directed by FLPMA (43 U.S.C. 35 Section 1712(c)(3)). Any such exclusion, however, will be based on laws or regulations or be determined through a planning process subject to public involvement. In writing and revising LUPs, FLPMA also directs BLM to coordinate land use activities with the planning and management of other Federal departments and agencies, State and local governments, and Indian tribes. This coordination, however, is limited "to the extent [the planning and management of other organizations remains] consistent with the laws governing the administration of the public lands" (43 U.S.C. 35 Section 1712(c)(9)).

In the **National Environmental Policy Act of 1969 (NEPA)**, Congress directs "all agencies of the Federal Government…[to]…utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision making which may have an impact on man's environment" (42 U.S.C. 55 Section 4332(2A)). Because the development of a new RMP may cause impacts on the environment, NEPA regulations require the analysis and disclosure of potential environmental impacts in the form of an EIS. The EIS will examine a range of alternatives, including a No Action Alternative, to resolve the issues in question. Alternatives should represent complete, but alternate means of satisfying the identified purpose and need of the EIS and of resolving the issues. The RMP/EIS is being prepared using the best available information.

6.1 Laws, Regulations, and Executive Orders

6.1.1 Federal Laws

- American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996)
- Antiquities Act of 1906 (16 U.S.C. 431–433)
- Appropriations Act of 1952, McCarran Amendment
- Archaeological Resources Protection Act of 1979, as amended (16 U.S.C. 470)
- Carlson-Foley Act (P.L. 90-583)
- Classification and Multiple Use Act of September 1964, in accordance with 43 CFR 2400
- Clean Air Act, as amended (42 U.S.C. 7418)

- Clean Water Act as amended (33 U.S.C. 23 Section 1151)
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (42 U.S.C. 9600)
- Color of Title Act, as amended (43 U.S.C. 1608 et seq.)
- Colorado River Basin Salinity Control Act of 1974
- Combined Hydrocarbon Leasing Act of 1981
- Data Quality Act of 2001 (P.L. 106–554)
- Desert Land Entry Act, as amended (43 U.S.C. 321 et seq.)
- Economy Act of 1932, as amended
- Emergency Wetlands Resources Act of 1986 (16 U.S.C 3900)
- Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)
- Energy Policy and Conservation Act (EPCA), as amended (42 U.S.C. 6201)
- Federal Cave Resources Protection Act of 1988 (16 U.S.C. 4301 et seq.)
- Federal Coal Leasing Amendments Act of 1976 (30 U.S.C. 201)
- Federal Noxious Weed Act of 1974 (7 U.S.C 2814)
- Federal Water Pollution Control Act (commonly referred to as the Clean Water Act), as amended (33 U.S.C. 1251–1387)
- Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.)
- General Mining Law of 1872, as amended (30 U.S.C. 21 et seq.)
- Healthy Forests Restoration Act of 2003
- Historic Sites Act of 1935 (16 U.S.C. 461)
- Homestead Act of 1862 (Although repealed in 1976, the effects of this act are visible and affect some management decisions.)
- International Migratory Bird Treaty Act of 1918 (16 U.S.C. 703–711)
- Migratory Bird Conservation Act of 1979 (16 U.S.C. 715)
- Mineral Leasing Act of 1920, as amended (30 U.S.C. 181 et seq.)
- Mining and Mineral Policy Act of 1970 (30 U.S.C. 21a)
- Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C 528–531)
- National Forest Management Act
- National Historic Preservation Act, as amended (16 U.S.C. 470)
- National Trails System Act, as amended (16 U.S.C. 1241)
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001)
- Omnibus Public Land Management Act of 2009 (16 U.S.C. 7202)
- Onshore Oil and Gas Leasing Reform Act of 1987 (30 U.S.C. 181 et seq.)
- Public Rangelands Improvement Act of 1978 (43 U.S.C. 1901)
- Recreation and Public Purposes Act, as amended (43 U.S.C. 869 et seq.)
- Regulatory Flexibility Act of 1980, as amended (5 U.S.C. 601 et seq.)
- Reservoir Salvage Act of 1960 (16 U.S.C. 469)
- Safe Drinking Water Act of 1974 (42 U.S.C. 201)
- Sikes Act (16 U.S.C. 670 et seq.)
- Soil and Water Resources Conservation Act of 1977 (16 U.S.C. 2001)
- Soil Conservation and Domestic Allotment Act of 1935, as amended
- Solid Waste Disposal Act, as amended (42 U.S.C. 6900)
- Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 et seq.)

- Taylor Grazing Act of 1934 (43 U.S.C. 315)
- Utah Schools and Lands Exchange Act of 1998 (P.L. 105-335)
- Utility Corridor Designation, U.S. Route 89, Kane County, Utah (from P.L. 105-355 Sec. 202)
- Water Resources Development Act of 1974
- Water Resources Planning Act of 1965, as amended
- Water Resources Research Act of 1954, as amended
- Watershed Protection and Flood Control Act of 1954
- Wild and Scenic Rivers Act, as amended (16 U.S.C. 1271 et seq.)
- Wilderness Act, as amended (16 U.S.C. 1131 et seq.)

6.1.2 Executive Orders

- EOs 10046, 10175, 10234, 10322, 10787, and 10890 (Authorize the transfer of certain lands from the USDA to the DOI for use, administration, or exchange under the Taylor Grazing Act of 1934)
- EO 11288 (Water quality management and pollution abatement plans)
- EO 11507 (Protect and enhance the quality of air and water resources)
- EO 11514 as amended by EO 11991 (Protecting and enhancing the quality of the Nation's environment to sustain and enrich human life)
- EO 11593 (Protection and Enhancement of the Cultural Environment)
- EO 11644 (Use of off-road vehicles on the Public Lands)
- EO 11738 (Enforce the Clean Air Act and the Clean Water Act in the procurement of goods, materials, and services)
- EO 11752 (Protect and enhance the quality of air, water, and land resources through compliance with applicable Federal, State, interstate, and local pollution standards)
- EO 11987 (Exotic Flora and Fauna)
- EO 11988 as amended by EO 12148 (Floodplain Management)
- EO 11989 (Off-road vehicles on Public Lands)
- EO 11990 (Protection of Wetlands)
- EO 12088 (Federal Compliance with Pollution Control Standards)
- EO 12322 (Requires that any report, proposal, or plan relating to a Federal or federally assisted water and related land resources project or program must be submitted to the Director, Office of Management and Budget, before submission to the Congress)
- EO 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations)
- EO 13007 (Indian Sacred Sites)
- EO 13084 (Consultation and Coordination with Indian Tribal Governments)
- EO 13112 (Invasive Species)
- EO 13175 (Tribal Status in NEPA)
- EO 13186 (Federal Agency Responsibilities Under the Migratory Bird Treaty Act)
- EO 13287 (Preserve America: Cultural Resources Management)

6.1.3 Other

- President's Letter of May 26, 1974 (Creates the Interagency Committee on Water Resources and establishes interagency participation in river basin planning)

- Secretarial Order 3175 (Incorporated into the Departmental Manual at 512 DM 2)
- Secretarial Order 3206 (American Indian Tribal Rights, Federal–Tribal Trust Responsibilities, and the Endangered Species Act)
- Secretarial Decision 79:001 (Protects Bryce Canyon National Park scenic vistas on areas outside the park boundaries)
- Regional Haze Regulation (64 FR 35714, July 1, 1999)
- 43 CFR 2 Parts 1000–9999 (Federal Regulations for BLM)
- 36 CFR 62 (Addresses procedures to identify, designate, and recognize National Natural Landmarks)
- The U.S. Water Resource Council published Floodplain Guidelines on February 10, 1978, after being directed to establish guidelines for floodplain management and preservation
- The Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management (65 FR 62566, October 18, 2000)
- National Ambient Air Quality Standards (40 CFR 50.4–50.12)
- New Source Review (40 CFR 51.307)
- Regional Haze Rule (40 CFR 51)
- "Treatment as a State" Regulation (40 CFR 71)
- National Emission Standards for Hazardous Air Pollutants (40 CFR 61)
- Order of Withdrawal, Public Water Reserve No. 10, Utah No. 5, 1913
- Order of Withdrawal, Public Water Reserve No. 107, 1926

6.2 Instruction Memoranda, Information Bulletins, Manuals, and Handbooks

- IM 78-410 (Protection of Wetlands and Riparian Areas)
- IM 78-523 (Compliance with BLM Interim Floodplain Management Procedures)
- IM-UT-83-144 (Visual Resource Mitigation to Oil and Gas Facilities)
- IM 87-261 (Implementation of the Riparian Area Management Policy)
- IM 99-085 (Federal Multi-Agency Source Water Agreement)
- IM 99-123 (Reporting to the Colorado River Salinity Control Forum)
- IM 2000-096 (Use of VRM Class I Designation in WSAs)
- IM 2000-179 (Funding of Water-Related Restoration and Cleanup Projects on Private and Other Non-BLM Lands)
- IM-UT-2001-034 (Utah Planning Strategy for Municipal Watershed and Other Water Source Protection Plans)
- IM-UT-2001-090 (Implementation of Utah Recreation Guidelines)
- IM 2002-164 (Guidance to Address Environmental Justice in Land Use Plans and Related NEPA Documents)
- IM 2002-167 (Social and Economic Analysis for Land Use Planning)
- IM 2002-174 (Oil and Gas Leasing Stipulations)
- IM 2002-196 (ROW Management in Land Use Planning)
- IM-UT-2003-027 (BLM Sensitive Plant Species List for Utah, August 2002)
- IM 2003-035 (Implementing the President's Healthy Forests Initiative)
- IM 2003-137 (Integration of the EPCA Inventory Results into Land Use Planning and Energy Use Authorizations)

- IM 2003-158 (MOU between BLM and the Animal and Plant Health Inspection Service Addressing the Management of Grasshoppers and Mormon Crickets)
- IM 2003-169 (Use of the Economic Profile System in Planning and Collaboration)
- IM 2003-182 (Geocaching Activities on BLM Public Lands)
- IM 2003-195 (Rescission of National Level Policy Guidance on Wilderness Review and Land Use Planning)
- IM 2003-197 (ROW management, Interstate Natural Gas Pipeline)
- IM 2003-233 (Integration of the EPCA Inventory Results into the Land Use Planning Process)
- IM 2003-234 (Integration of the EPCA Inventory Results into Oil and Gas Exploration and Development Use Authorizations)
- IM 2003-238 (Guidance for Data Management in Land Use Planning)
- IM 2003-274 (BLM Implementation of the Settlement of Utah v. Norton Regarding Wilderness Study)
- IM 2003-275, Change 1 (Consideration of Wilderness Characteristics in Land Use Planning [Excluding Alaska])
- IM 2004-005 (Clarification of OHV Designations and Travel Management in the BLM Land Use Planning Process)
- IM-UT-2004-061 (Designating OHV Routes in the Land Use Planning Process)
- IM 2004-089 (Policy for Reasonably Foreseeable Development Scenario for Oil and Gas)
- IM 2004-196 (Clarification of Policy in the BLM Manual Section 8351, Wild and Scenic Rivers, with Respect to Eligibility Criteria and Protective Management)
- IM 2005-003 (Cultural Resources and Tribal Consultation for Fluid Minerals Leasing)
- IM 2005-006 (Solar Energy Development Policy)
- IM 2005-008 (Black-tailed, White-tailed, and Gunnison Prairie Dog Conservation Update)
- IM 2005-024 (National Sage-Grouse Habitat Conservation Strategy)
- IM 2005-110 (Meeting Healthy Forests Restoration Act Old-Growth Management and National Historic Preservation Act Requirements)
- IM UT-2015-019 (Livestock Water Rights)
- Information Bulletin (IB) 98-116 (Clean Water Action)
- IB 98-135 (VRM Policy Restatement)
- IB 2003-113 (The Manager's Role in the Land Use Planning Process)
- BLM Manual 7100 (Soil Resource Management)
- BLM Manual 7240 (Water Quality)
- BLM Manual 7250 (Water Rights)
- BLM Manual 8400 (Visual Resource Management)
- BLM-H-1601 (Land Use Planning)
- BLM-H-1613 (Areas of Critical Environmental Concern)
- BLM-H-8410-1 (Visual Resource Inventory)
- BLM National Management Strategy for Motorized OHV Use on Public Lands (2001)

6.2.1 Applicable Utah State Laws, Regulations, and Plans

- Utah Code, Title 19, Chapter 2 (Air Conservation Act)
- Utah Air Conservation Rule R307-204 (Smoke Management)

- Utah Air Conservation Rule R307-406 (Visibility)
- Utah Air Conservation Rule R307-401-6 (Conditions for Ordering and Approval Order)
- Utah Air Conservation Rule R307-405-4 (PSD Increments and Ceilings)
- Utah Air Conservation Rule R307-405-6 (PSD Areas – New Sources and Modifications)
- Utah Air Conservation Rule R307-410-3 (Modeling of Criteria Pollutants in Attainment Areas)
- Utah Air Conservation Rule R307-410-4 (Documentation of Ambient Air Impacts for Hazardous Air Pollutants)
- Utah Air Conservation Rule R307-205-3 (Emission Standards for Fugitive Dust)
- Utah Air Conservation Rule R307-205-4 (Emission Standards for Roads)
- Utah Code, Title 73 (Water and Irrigation)
- Utah Administrative Rule R309-605 (Drinking Water Source Protection for Ground-Water Sources)
- Utah Administrative Rule R317-2 (Standards of Quality for Waters of the State)
- Utah Administrative Rule R317-6 (Ground Water Quality Protection)
- Utah Administrative Rule R317-8 (Utah Pollution Discharge Elimination System)
- Utah Nonpoint Source Management Plan (October 2000)
- Utah Nonpoint Source Management Plan for Hydrologic Modifications (March 1995)
- Utah Nonpoint Source Management Plan for Silviculture Activities (July 1998)
- Utah State Law 63-38d-401 (State Land Use Management Plans Amendments)
- Utah State Comprehensive Outdoor Recreation Plan (2014)
- Utah Code Sections 63-38d-401 (establishes State planning policies in relation to management of Federal land)
- State Comprehensive Outdoor Recreation Plan (2003)
- Strategic Management Plan for Sage-Grouse (2002)
- The Utah Noxious Weed Act
- Utah Seed Act (Utah Code Annotated, Title 4, Chapter 16)
- Utah Strategic Riparian Plan

6.2.2 Memoranda and Agreements

- Master MOU with USFWS, December 1986
- The rangeland programmatic Memorandum of Agreement (MOA) among BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers (SHPOs)
- The Federal coal management programmatic MOA among BLM, Office of Surface Mining, DOI, USGS, and the Advisory Council on Historic Preservation
- State Protocol Agreement Between the Utah State Director of BLM and the Utah SHPO and the Programmatic Agreement Among BLM, the Advisory Council on Historic Preservation, and the National Conference of SHPOs
- Interagency MOU between the DOI-BLM and the USDA in 1995 (60F26045-48, May 16, 1995)
- Supplement No. 1 to an MOU between the Utah State Offices of NPS and BLM dated September 26, 1973

- MOU Concerning WSR Studies in Utah Among the State of Utah and Intermountain Region U.S. Forest Service and Utah BLM and Intermountain Region NPS (1997)
- Memorandum, dated April 8, 2004, from Director, National Landscape Conservation System to Utah State Director regarding "Clarification of Policy in the BLM Manual Section 8351 Related to Eligibility of River Segments Evaluated Pursuant to Section 5(d)(1) of the Wild and Scenic Rivers Act and Their Protection Afforded under the National Environmental Policy Act and Section 202 and 302 of the Federal Land Policy and Management Act"

6.2.3 Planning Documents Applicable to the Decision Area

The direction provided by the various laws, regulations, policies, and documents listed above is applied to specific resources and areas by developing RMPs. These plans apply Federal law, regulation, and policy at a landscape level by identifying desired outcomes and allowable uses and management actions anticipated to achieve desired outcomes.

Upon approval of the RMP, subsequent implementation decisions are put into effect by developing implementation (activity-level or project-specific) plans. An activity-level plan typically describes multiple projects in detail that will lead to on-the-ground action. Implementation decisions generally constitute BLM's final approval allowing on-the-ground actions to proceed. These types of decisions require appropriate site-specific planning and NEPA analysis.

Other State and Federal agencies are responsible for managing or providing support for resource management within the Decision Area. Plans related to management of these resources are usually site-specific or resource-specific in nature. The following lists identify the LUPs, implementation plans, and other planning or policy documents, as well as selected NEPA documents, that pertain to the Decision Area.

6.2.4 Activity Plans

- Paria Canyon–Vermilion Cliffs Wilderness, Wilderness Management Plan, 1986
- Scenic Byway 12 Corridor Management Plan, 2001
- FMP, 2005
- Communication Site Plan: TV Hill, 2002
- Kanab/Escalante Rangeland Program Summary, 1981
- Kanab/Escalante Rangeland Program Summary Update, 1984
- Kanab/Escalante Rangeland Program Summary Update, 1987

6.2.5 Wildlife/Habitat Plans

- Bonneville Cutthroat Trout Conservation Agreement and Strategy for the State of Utah
- Deer Herd Unit #24 (Mount Dutton) Management Plan, 1998
- Deer Herd Unit #27 (Paunsaugunt) Management Plan, 1998
- Deer Herd Unit #28 (Panguitch Lake) Management Plan, 1998
- Deer Herd Unit #29 (Zion) Management Plan, 2001
- Deer Herd Management Plan, Deer Herd Unit 60-A, 1983
- Elk Herd Unit #24 (Mount Dutton) Management Plan, 1998
- Elk Herd Unit #27 (Paunsaugunt) Management Plan, 1998
- Elk Herd Unit #28 (Panguitch Lake) Management Plan, 1998

- Elk Herd Unit #29 (Zion) Management Plan, 1998
- Pronghorn Herd Unit #24/27 (Mount Dutton/Paunsaugunt) Management Plan, Year Unknown
- Utah Cougar Management Plan (Draft) (UDWR 1999c)
- Utah Black Bear Management Plan (UDWR 2000b)
- Strategic Management Plan for Chukar Partridge, 2003
- Paria Habitat Area Habitat Management Plan (HMP), BLM, Year Unknown
- East Zion HMP, 1982
- Marysvale-Circleville Habitat Area HMP, 1978
- Garfield HMP, 1985
- Paunsaugunt HMP, 1982

6.2.6 Endangered Species Recovery Plans and Conservation Agreements

- https://www.fws.gov/endangered/esa-library/index.html#hcp
- Mexican Spotted Owl Recovery Plan, 1995
- Northern States Bald Eagle Recovery Plan, 1983
- American Peregrine Falcon Recovery Plan, 1984
- Utah Prairie Dog Recovery Plan, 1991
- Utah Prairie Dog Interim Conservation Strategy, 1997
- Welsh's Milkweed Recovery Plan, 1992
- Siler Pincushion Cactus Recovery Plan, 1986
- Autumn Buttercup Recovery Plan, 1991
- Conservation Agreement and Strategy for the Coral Pink Sand Dunes Tiger Beetle – March 31, 1997
- Range-Wide Conservation Agreement for Roundtail Chub, Bluehead Sucker, and Flannelmouth Sucker, 2004
- Recovery Plan for the California Condor, 1996
- Final Recovery Plan for Southwestern Willow Flycatcher, 2002
- Interim Conservation Plan for Ambersnails of the Southwestern United States (Draft), Year Unknown

6.2.7 Watershed Plans

- Upper Sevier Watershed Management Plan, 2004

6.2.8 Existing Environmental Assessments and Impact Statements

- Oil and Gas Leasing Program Kanab District EA, 1976
- Supplemental Oil and Gas Leasing EA, Cedar City District, 1988
- Kanab/Escalante Grazing Management EIS, 1980
- Utah Combined Hydrocarbon Leasing Regional EIS, 1984
- Utah BLM Statewide Wilderness EIS, 1990
- National Historic Trail Feasibility Study and EA, Old Spanish Trail, 2001
- Southwest Utah Support Area Fire Management Plan, 2005
- Wind Energy Development PEIS, 2005

- Tropic to Hatch 138 kV Transmission Line Project EIS, 2011
- Solar Energy Development in Six Western States PEIS, 2012
- BLM Utah Greater Sage Grouse Plan, 2015

6.3 Other Policy and Guiding Direction

- Federal Wildland Fire Policy
- Utah Riparian Management Policy, 2005
- BLM, Riparian Area Management Policy, January 1987
- Utah BLM's Weed-Free Forage Policy: Use of Certified Noxious Weed Free Hay, Straw or Mulch
- Utah Partners in Flight Avian Conservation Strategy, 2002
- Coordinated Implementation Plan for Bird Conservation in Utah, 2005
- Final Guidelines – Areas of Critical Environmental Concern; Policy and Procedures (45 FR 57318, August 27, 1980)
- Colorado River Basin Compact
- BLM Wildlife 2000
- Birds of Conservation Concern, 2002
- Riparian-Wetlands Initiative for the 1990s
- Waterfowl Habitat Management on Public Lands: A Strategy for the Future, 1989
- Utah Standards and Guidelines for Rangeland Health, 1997
- National Management Strategy for Motorized OHV Use on Public Lands, 2001
- Utah BLM Management Strategy for Motorized OHV Use on Public Lands, 2000
- National Mountain Bicycling Strategic Action Plan, 2002
- Natural Resource Conservation Council Statewide OHV Trail Signing Standards, 2001.
- Utah Wildlife Services Program State of Utah, USDA, Animal and Plant Health Inspection Service – WS; United States Department of Agriculture and Food and the Utah Agricultural and Wildlife Damage Prevention Board Annual Management Plan, 2005

7 Summary of Scoping

The following is a summary of the scoping process for the project. For more detailed information, see the Scoping Report posted on the project's ePlanning site at https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=141292.

7.1 Scoping Process

The intent of the scoping process is to obtain public input when identifying issues to be addressed in the RMPs/EIS. The BLM formally initiated the external scoping process for the RMPs and EIS on January 16, 2018, with publication of a notice of intent in the *Federal Register* (83 FR 2179). The public scoping period closed on April 13, 2018, 15 days after the last public meeting was held on March 29, 2018, for a total scoping period of 107 days.

In addition to the notice of intent, outreach methods included (1) a January 16, 2018, media release identifying the start of the public scoping period and methods by which interested parties could comment; (2) a March 9, 2018, media release announcing meeting dates and locations; and (3) scoping notification letters sent to the BLM's interested party list.

7.2 Scoping Meetings

The BLM hosted two public scoping meetings in March 2018 (Table 4-1). These meetings gave the public the opportunity to learn about the RMPs/EIS and identify additional planning issues.

Table 7-1. Scoping Meetings and Attendance

Date and Time	Location	Approximate Number of Attendees
March 28, 2018	Kanab, Utah	191
March 29, 2018	Escalante, Utah	211

Source: BLM 2018a

Refer to Section 2.2, Opportunities for Public Comment (page 2), in the Scoping Report for more information on methods and opportunities for public comment.

7.3 Scoping Results

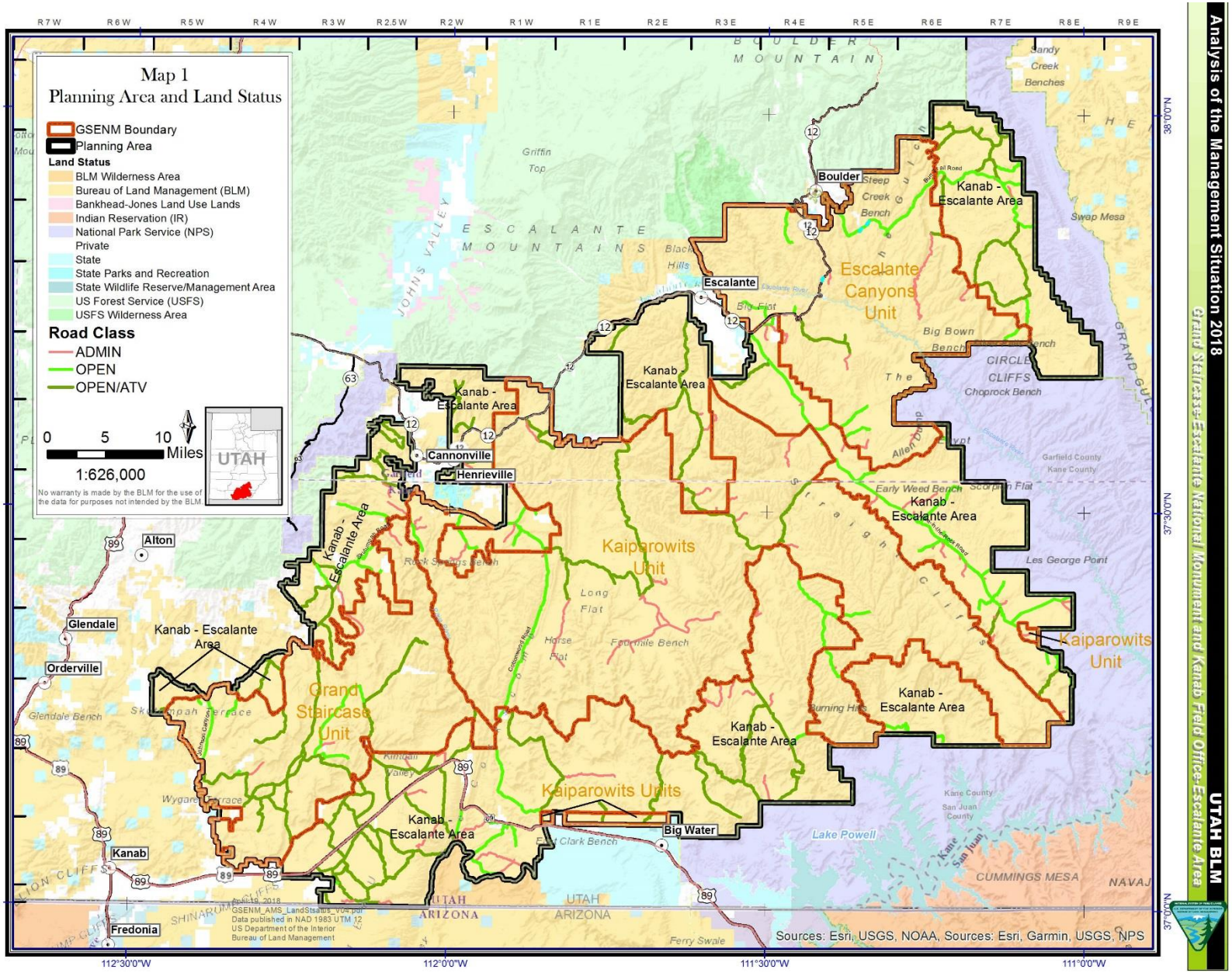
The BLM received 120,061 submissions from the public during and after the official public scoping period. Comments received were coded according to issue categories. The issue categories that were identified most frequently were: (1) opposition to monument modifications; (2) process; (3) public involvement; (4) trails and travel management; (5) recreation and visitor services; (6) minerals management; (7) livestock grazing; (8) cultural resources; and (9) Native American concerns. Refer to Section 7, Summary of Public Concerns and Issues (pages 140 through 143), in the Scoping Report for a summary of public comments.

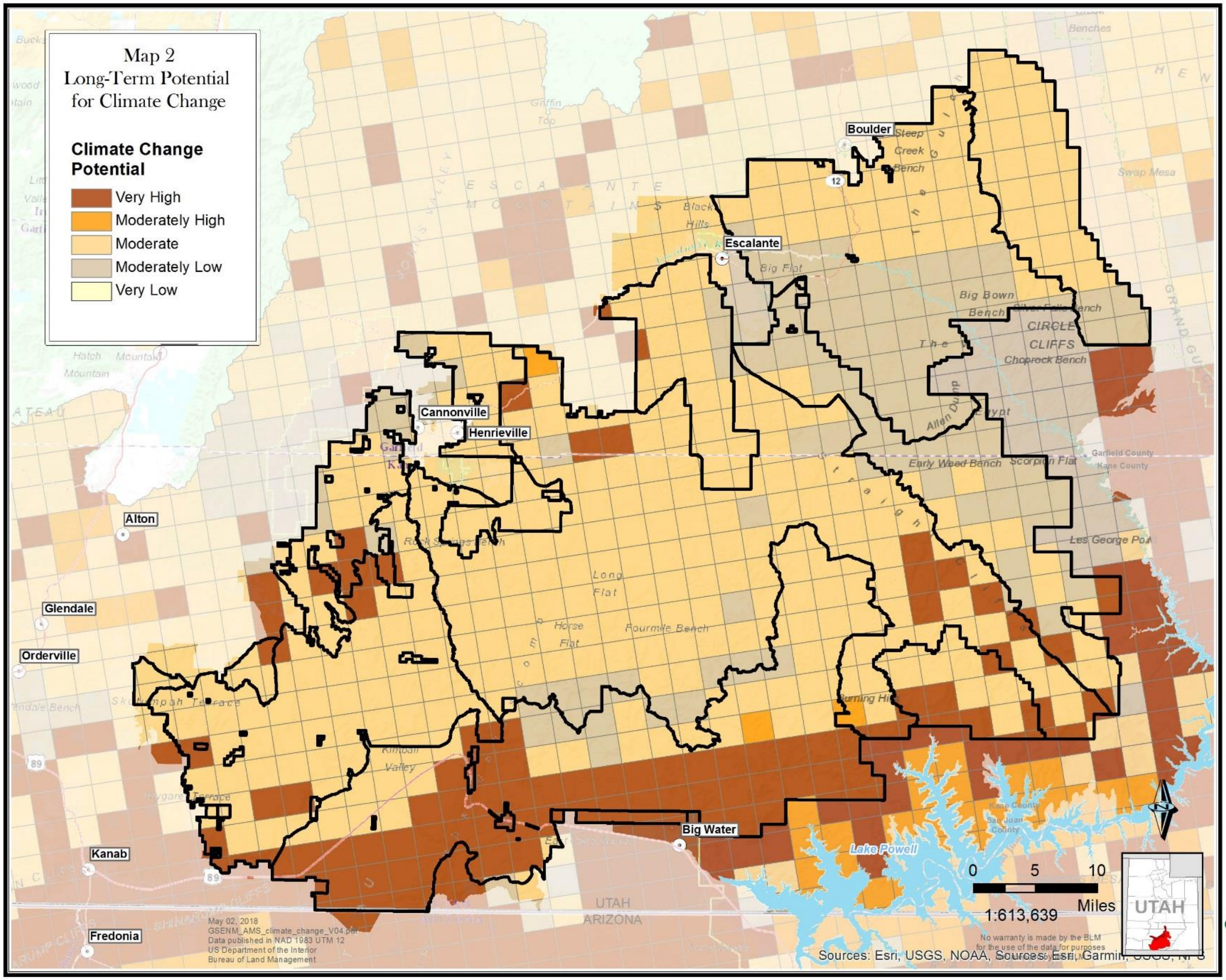
8 List of Preparers

Name	Education	Title	Resources
Bureau of Land Management			
Amstutz, Brian	B.S. Political Science	Park Ranger	Recreation, RMIS Data
Angus, Allysia	B.A. Communications MLA Landscape Architecture and Environmental Planning	Visual Resource Specialist	Visual Resources
Backer, Dana	B.S. Human Nutrition and Food M.S. Environmental Biology	Science Program Administrator, Planning and Compliance (acting)	Planning
Bate, William (Allan)	B.S. Range Science	Rangeland Management Specialist	Livestock Grazing, Forestry and Woodland Products
Beal, Jabe	B.S. Liberal Arts M.A. Recreation Management	Outdoor Recreation Planner	Recreation and Transportation
Betenson, Matt	B.S. Anthropology	Associate Monument Manager	Cooperating Agency Consultation
Brinkerhoff, Raymond	B.S. Biology/Botany	Botanist	Noxious and Invasive Species, Threatened and Endangered or Candidate Plant Species, Vegetation and Riparian
Bybee, Jason	B.S. Science	Rangeland Management Specialist	Livestock Grazing, Rangeland Health Standards
Cruchfield, Larry	High School	Public Affairs Officer	Public Involvement
Hunter, Chad	B.S. Rangeland Management	Wild Horse Specialist	Wild Horse and Burros
Bradshaw, James (Ken)	B.S. Agriculture M.S. Agronomy PhD. Crop and Soil Sciences	Soil Scientist	Soils, Water Resources, Water Quality and Biological Soil Crusts
Church, Lisa	B.S. Wildlife and Fisheries Ecology	Wildlife Biologist	Fish and Wildlife, Special Status Wildlife Species
Foley, Mark	B.A. International Relations	Lands and Realty Specialist	Lands and Realty
Ginn, Allison	B.S. Geosciences M.S. Natural Resources	Natural Resource Specialist	Wilderness Characteristics, Special Designations, Recreation
Ginouves, Gina	B.S. Geology	NEPA and Planning Specialist	General Document Coordination and Review

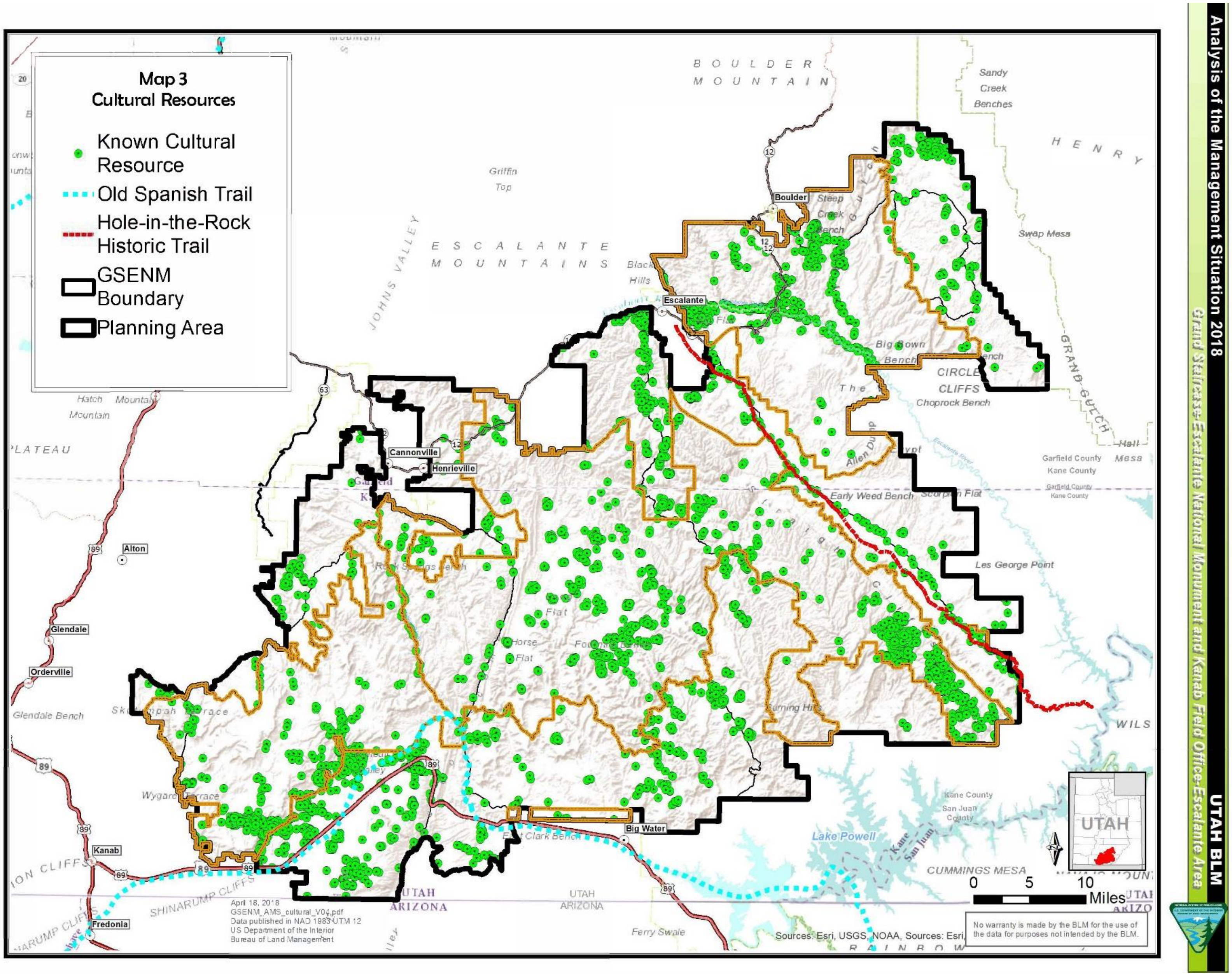
Name	Education	Title	Resources
Gunn, Daniel	B.S. Forestry	Outdoor Recreation Planner	Recreation
Holland, James	B.S. Geology	Geologist	Geology and Minerals
Johnson, Brandon	B.S. Geology	Realty Specialist/ Renewable Energy Program Coordinator	Renewable Energy
Leatherbury, Paul	B.S. Anthropology	GIS Specialist	GIS Support and Maps
McQuivey, Cameron	B.S. Zoology	Wildlife Biologist	Fish and Wildlife, Special Status Wildlife Species
Peterson, Shawn	B.S. Rangeland Resources	Fuels Program Manager	Fire and Fuels
Reese, John	B.S. Rangeland Resources	Rangeland Management Specialist	Livestock Grazing
Shakespear, Paula	Bryce High School	Resource Assistant	Livestock Grazing, Rangeland Health Standards
Stewart, Sean	B.S. Botany	Lead Range Management Specialist	Livestock Grazing, Rangeland Health Standards
Suhr-Pierce, Julie	B.A. Music M.S. Economics Ph.D. Economics	Economist	Socio-Economics and Environmental Justice
Tittus, Alan	B. S. Geology M. S. Geology PhD Geology	Paleontologist	Paleontology
Tolbert, Terry	B.S. Biology	Wildlife Biologist	Fish and Wildlife, Special Status Wildlife Species
Tyler, Vicki	B.S. Zoology B.S. Public Affairs B.S. Journalism	Assistance Kanab Field Office Manager (acting)	Wildland Fire and Fuels
Vernon, Eric	B.S. Meteorology M.S. Meteorology	Physical Scientist (Air Quality)	Air Quality, Climate Change, Greenhouse Gases
Zweifel, Matthew	B.S. Anthropology M.A. Archaeology	Archaeologist	Cultural Resources

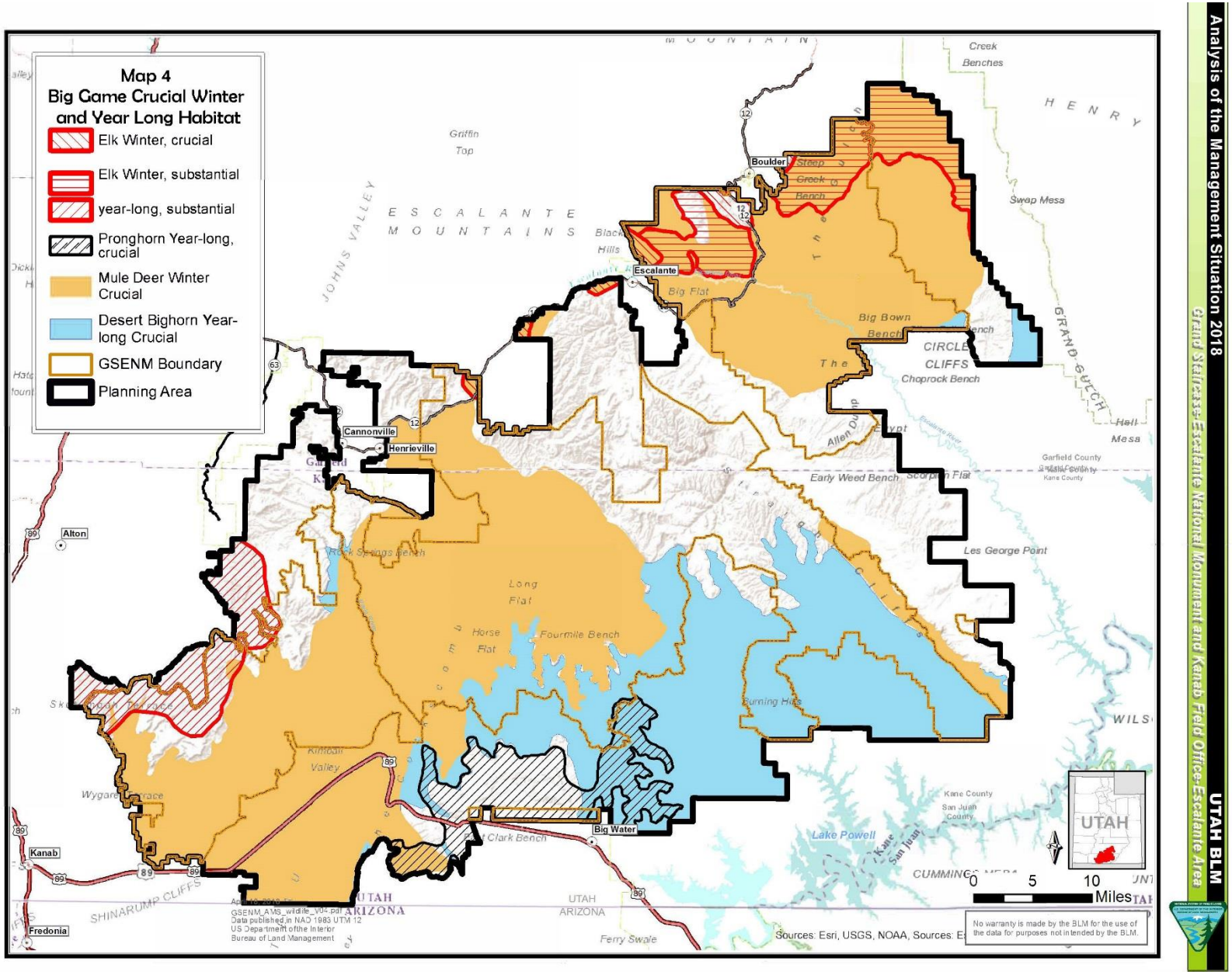
Appendix 1. Maps


Map 1
Planning Area and Land Status
GSENM Boundary
Planning Area
Land Status
BLM Wilderness Area
Bureau of Land Management (BLM)
Bankhead-Jones Land Use Lands
Indian Reservation (IR)
National Park Service (NPS)
Private
State
State Parks and Recreation
State Wildlife Reserve/Management Area
US Forest Service (USFS)
USFS Wilderness Area
Road Class
ADMIN
OPEN
OPEN/ATV
0 5 10 Miles
1:626,000
No warranty is made by the BLM for the use of the data for purposes not intended by the BLM
UTAH
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
UTAH BLM
Boulder
Escalante
Cannonville
Henrieville
Alton
Glendale
Orderville
Kanab
Fredonia
Big Water
Kanab - Escalante Area
Escalante Canyons Unit
Kaiparowits Unit
Kaiparowits Units
Grand Staircase Unit
Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, NPS



Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
UTAH BLM


Map 3
Cultural Resources
Known Cultural Resource
Old Spanish Trail
Hole-in-the-Rock Historic Trail
GSENM Boundary
Planning Area
BOULDER MOUNTAIN
ESCALANTE MOUNTAINS
Sandy Creek Benches
HENRY
Swap Mesa
Griffin Top
JOHNS VALLEY
Black Hills
Boulder
Escalante
Steep Creek Bench
Big Bown Bench
CIRCLE CLIFFS
Choprock Bench
GRAND GULCH
Garfield County
Kane County
Hall Mesa
Early Weed Bench
Les George Point
Cannonville
Henrieville
Alton
Glendale
Orderville
Glendale Bench
Kanab
Fredonia
Big Water
Lake Powell
CUMMINGS MESA
WILS
UTAH
ARIZONA
SHINARUMP CLIFFS
Ferry Swale
Wygaret Terrace
Horse Flat
0 5 10 Miles
April 18, 2018
GSENM_AMS_cultural_V04.pdf
Data published in NAD 1983 UTM 12
US Department of the Interior
Bureau of Land Management
No warranty is made by the BLM for the use of the data for purposes not intended by the BLM.
Sources: Esri, USGS, NOAA, Sources: Esri,
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
UTAH BLM


Map 4
Big Game Crucial Winter and Year Long Habitat
Elk Winter, crucial
Elk Winter, substantial
year-long, substantial
Pronghorn Year-long, crucial
Mule Deer Winter Crucial
Desert Bighorn Year-long Crucial
GSENM Boundary
Planning Area
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
UTAH BLM
Boulder
Escalante
Cannonville
Henrieville
Alton
Kanab
Fredonia
Big Water
Griffin Top
Steep Creek Bench
Swap Mess
Big Flat
Big Bown Bench
CIRCLE CLIFFS
Choprock Bench
Hell Mesa
Early Weed Bench
Scorpion Flat
Les George Point
Long Flat
Horse Flat
Fourmile Bench
Burning Hills
Kimball Valley
Clark Bench
Lake Powell
Ferry Swale
SHINARUMP CLIFFS
UTAH
ARIZONA
Miles
0 5 10
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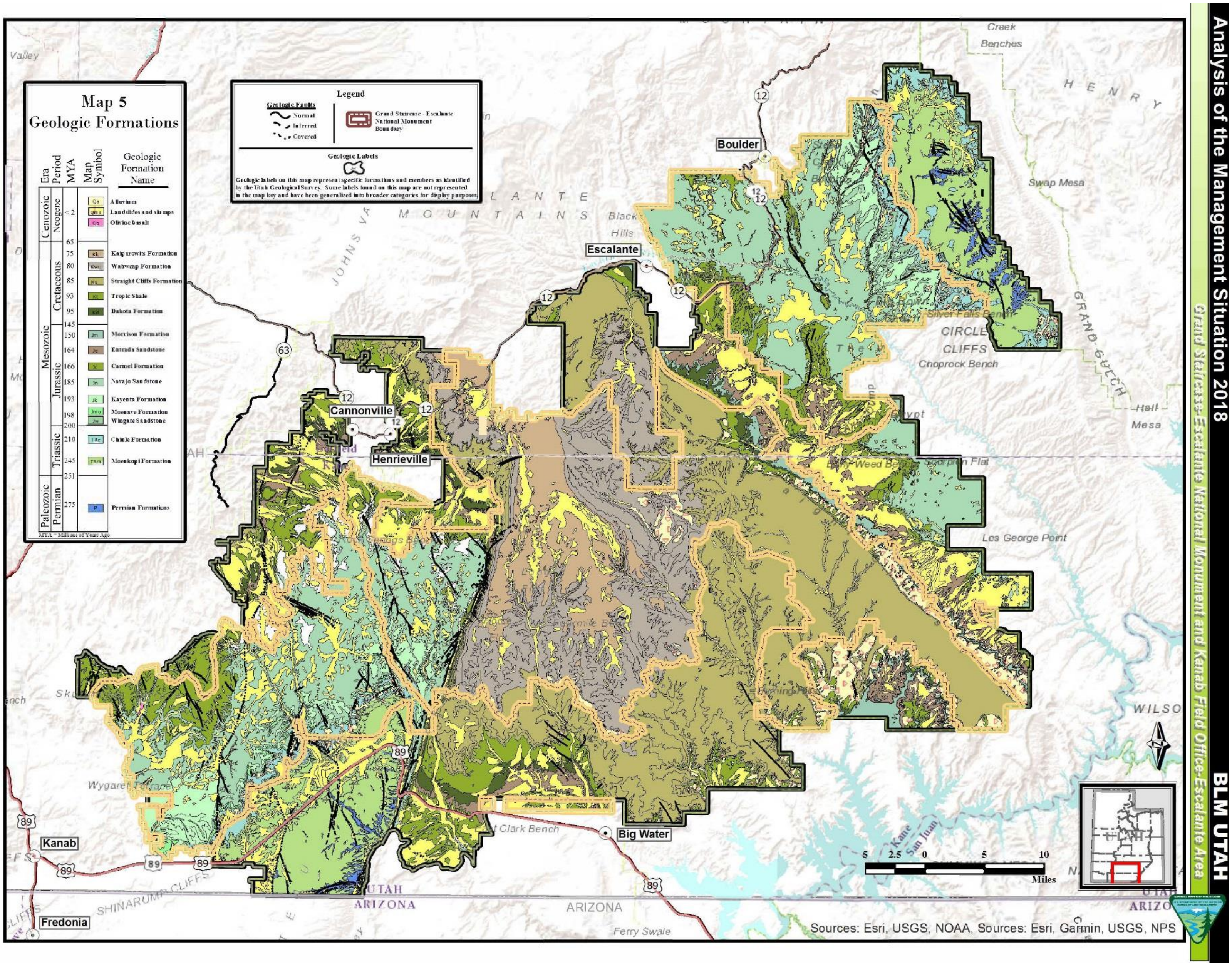
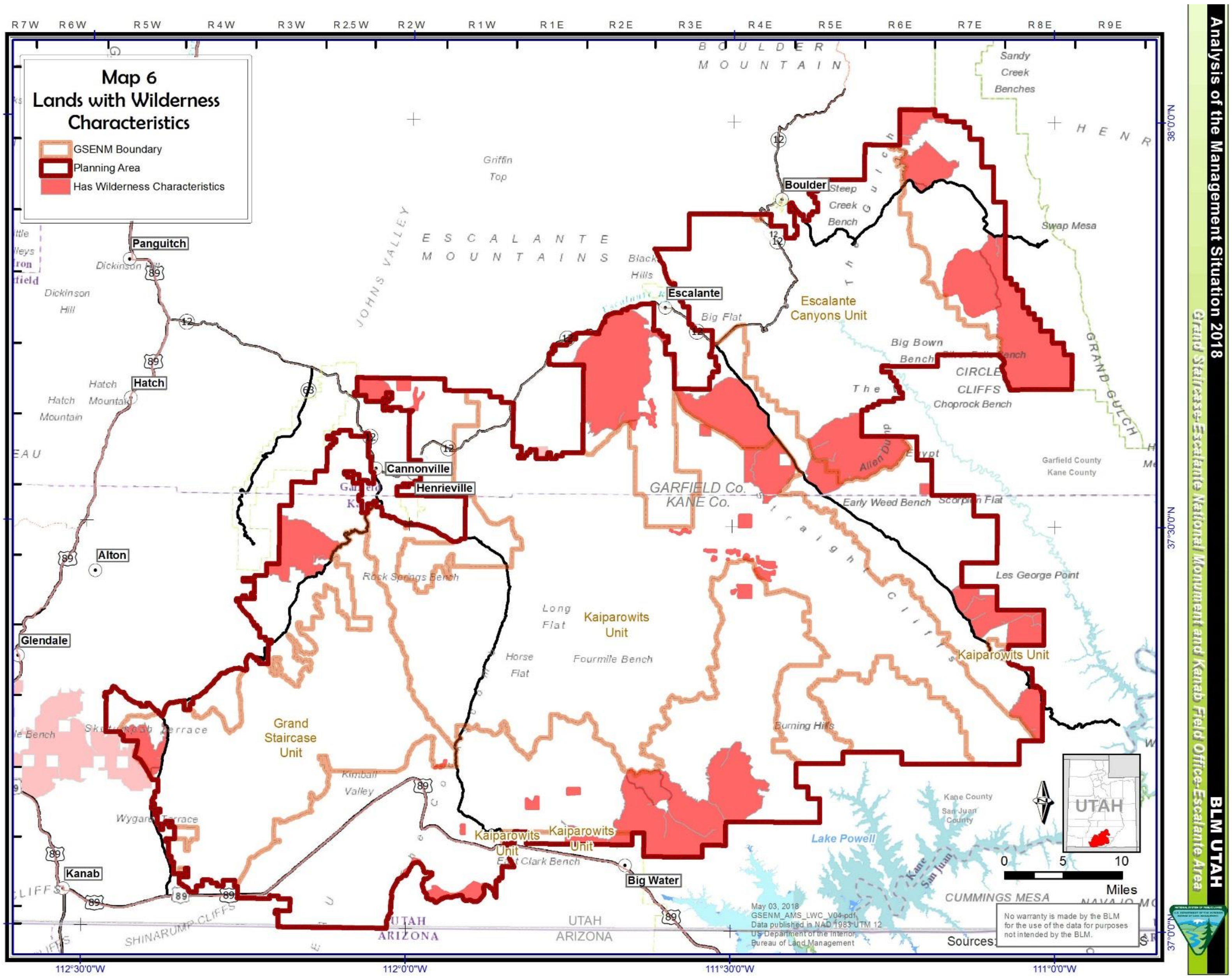
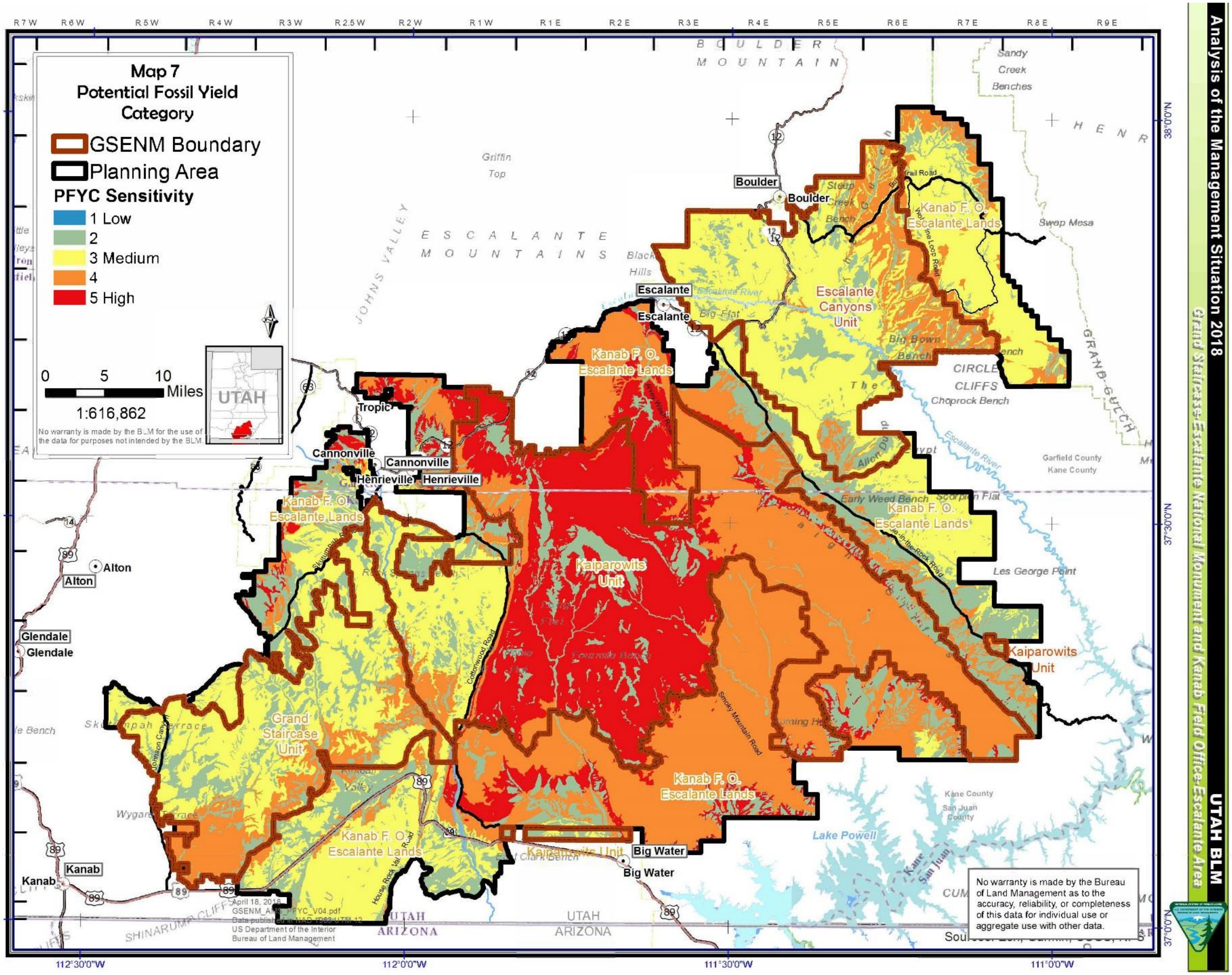
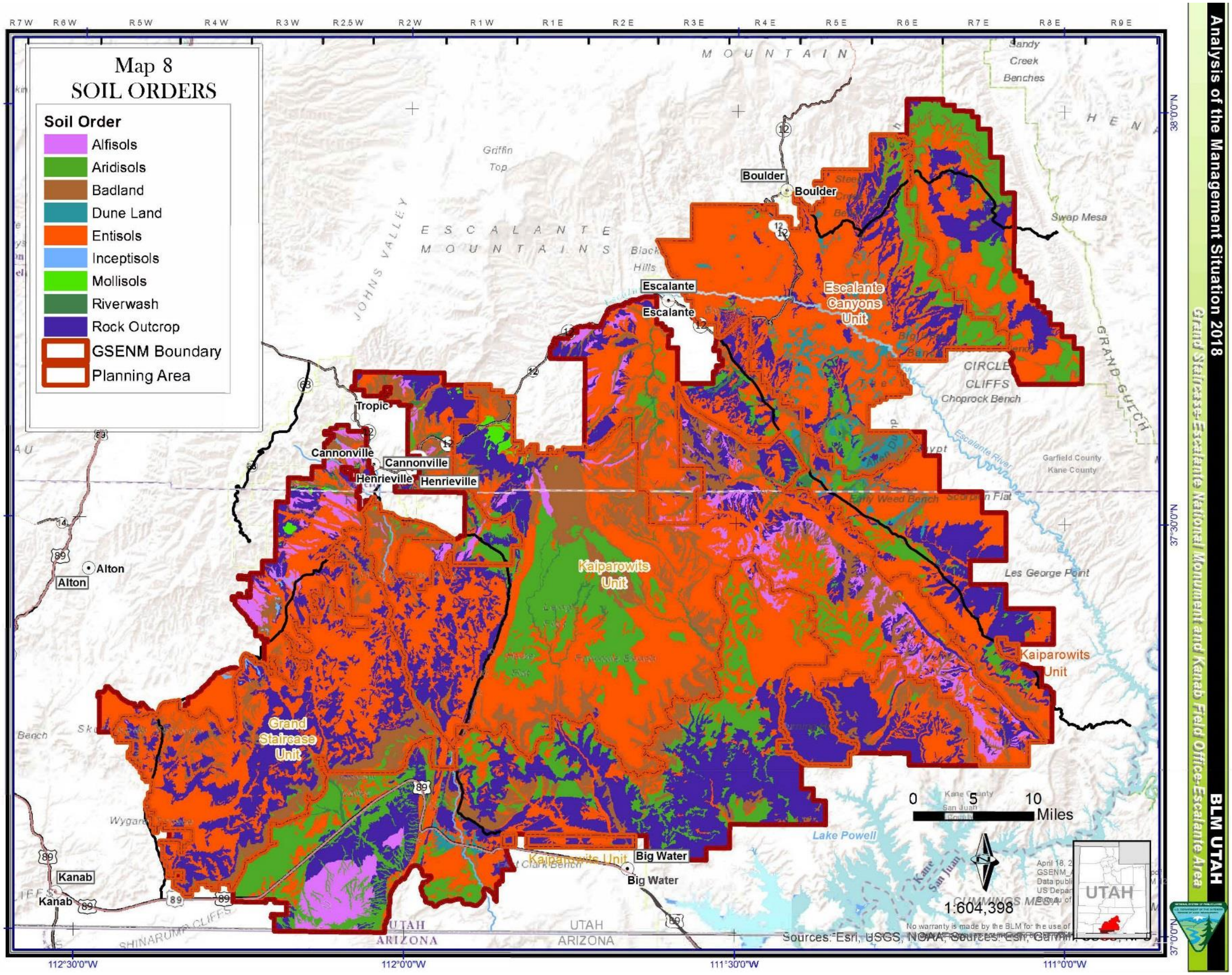
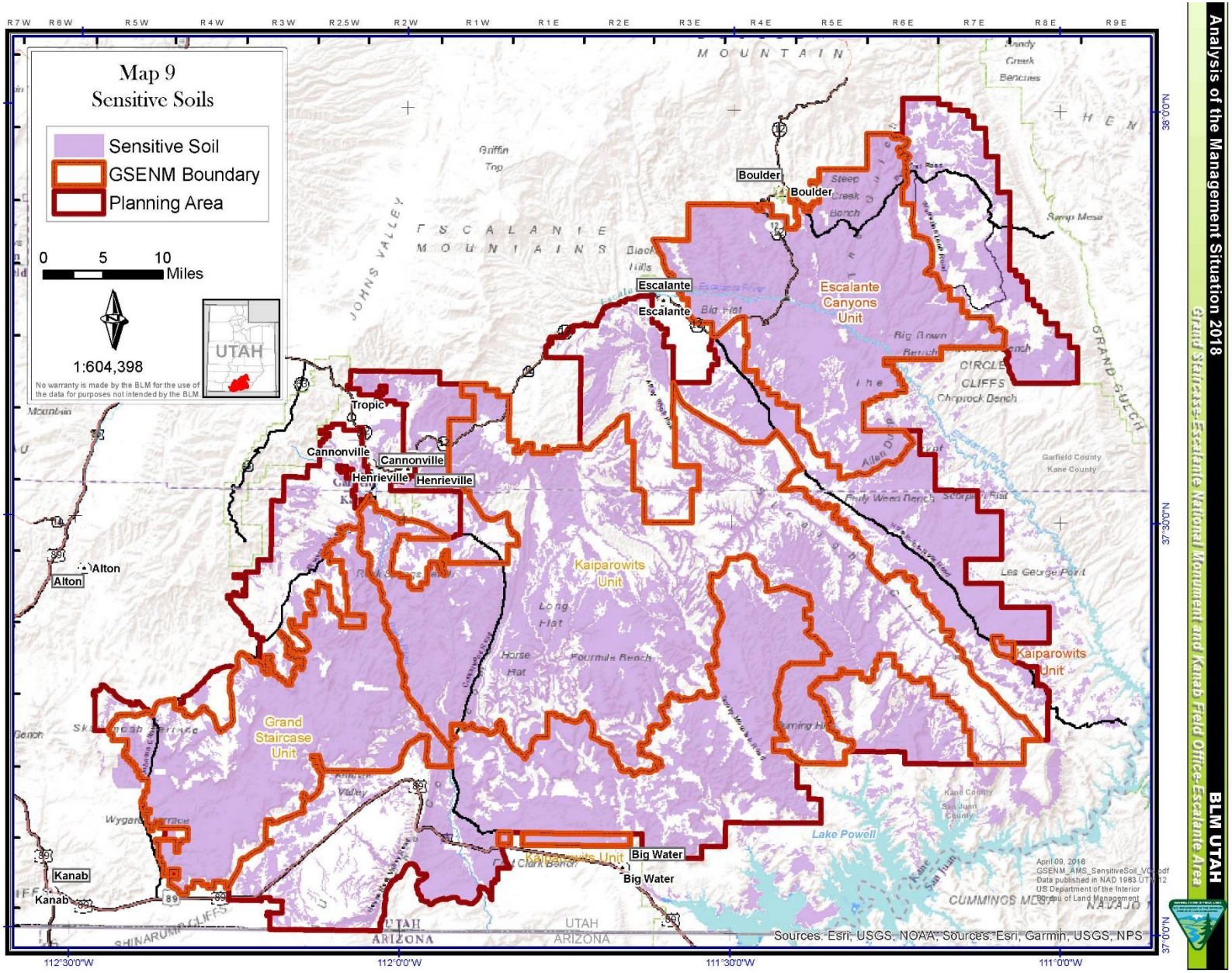
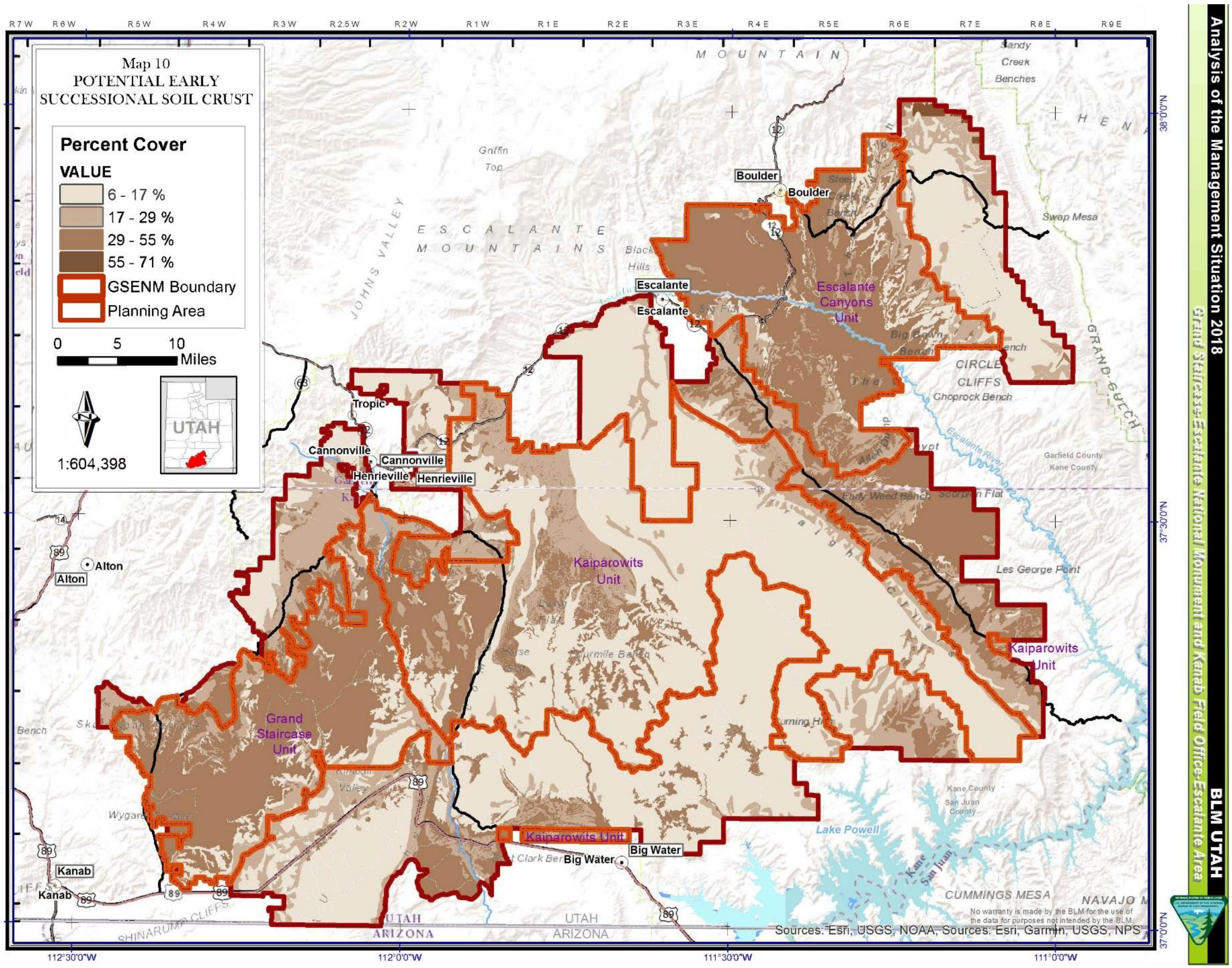

Map 5
Geologic Formations
Era
Period
MYA
Map Symbol
Geologic Formation Name
Cenozoic
Neogene
< 2
Qa Alluvium
Qms Landslides and slumps
Qb Olivine basalt
65
Mesozoic
Cretaceous
75 Kk Kaiparowits Formation
80 Kw Wahweap Formation
85 Ks Straight Cliffs Formation
93 Kt Tropic Shale
95 Kd Dakota Formation
145
Jurassic
150 Jm Morrison Formation
164 Je Entrada Sandstone
166 Jc Carmel Formation
185 Jn Navajo Sandstone
193 Jk Kayenta Formation
198 Jmo Moenave Formation
Jw Wingate Sandstone
200
Triassic
210 TRc Chinle Formation
245 TRm Moenkopi Formation
251
Paleozoic
Permian
275 P Permian Formations
MYA = Millions of Years Ago
Legend
Geologic Faults
Normal
Inferred
Covered
Grand Staircase - Escalante National Monument Boundary
Geologic Labels
Geologic labels on this map represent specific formations and members as identified by the Utah Geological Survey. Some labels found on this map are not represented in the map key and have been generalized into broader categories for display purposes.
Boulder
Escalante
Cannonville
Henrieville
Kanab
Fredonia
Big Water
CIRCLE CLIFFS
Choprock Bench
Swap Mesa
Les George Point
Clark Bench
UTAH
ARIZONA
Miles
Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, NPS
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
BLM UTAH

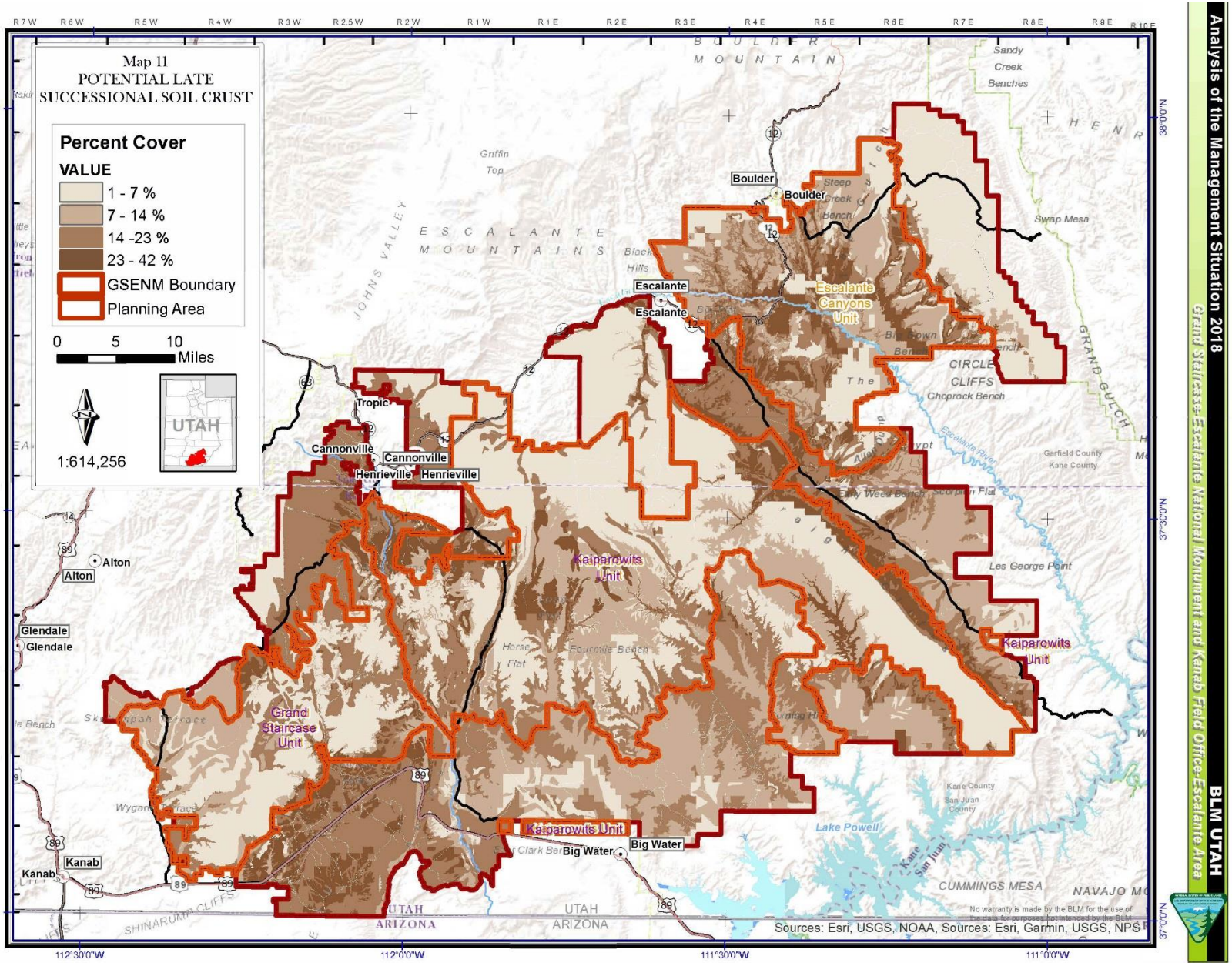

Map 6
Lands with Wilderness Characteristics
GSENM Boundary
Planning Area
Has Wilderness Characteristics
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
BLM UTAH
Escalante Canyons Unit
Kaiparowits Unit
Grand Staircase Unit
Boulder
Escalante
Panguitch
Hatch
Cannonville
Henrieville
Alton
Glendale
Kanab
Big Water
GARFIELD Co.
KANE Co.
UTAH
ARIZONA
Lake Powell
UTAH
0 5 10
Miles
May 03, 2018
GSENM_AMS_LWC_V04.pdf
Data published in NAD 1983 UTM 12
US Department of the Interior, Bureau of Land Management
No warranty is made by the BLM for the use of the data for purposes not intended by the BLM.
Sources:
112°30'0"W
112°0'0"W
111°30'0"W
111°0'0"W
38°0'0"N
37°30'0"N
37°0'0"N

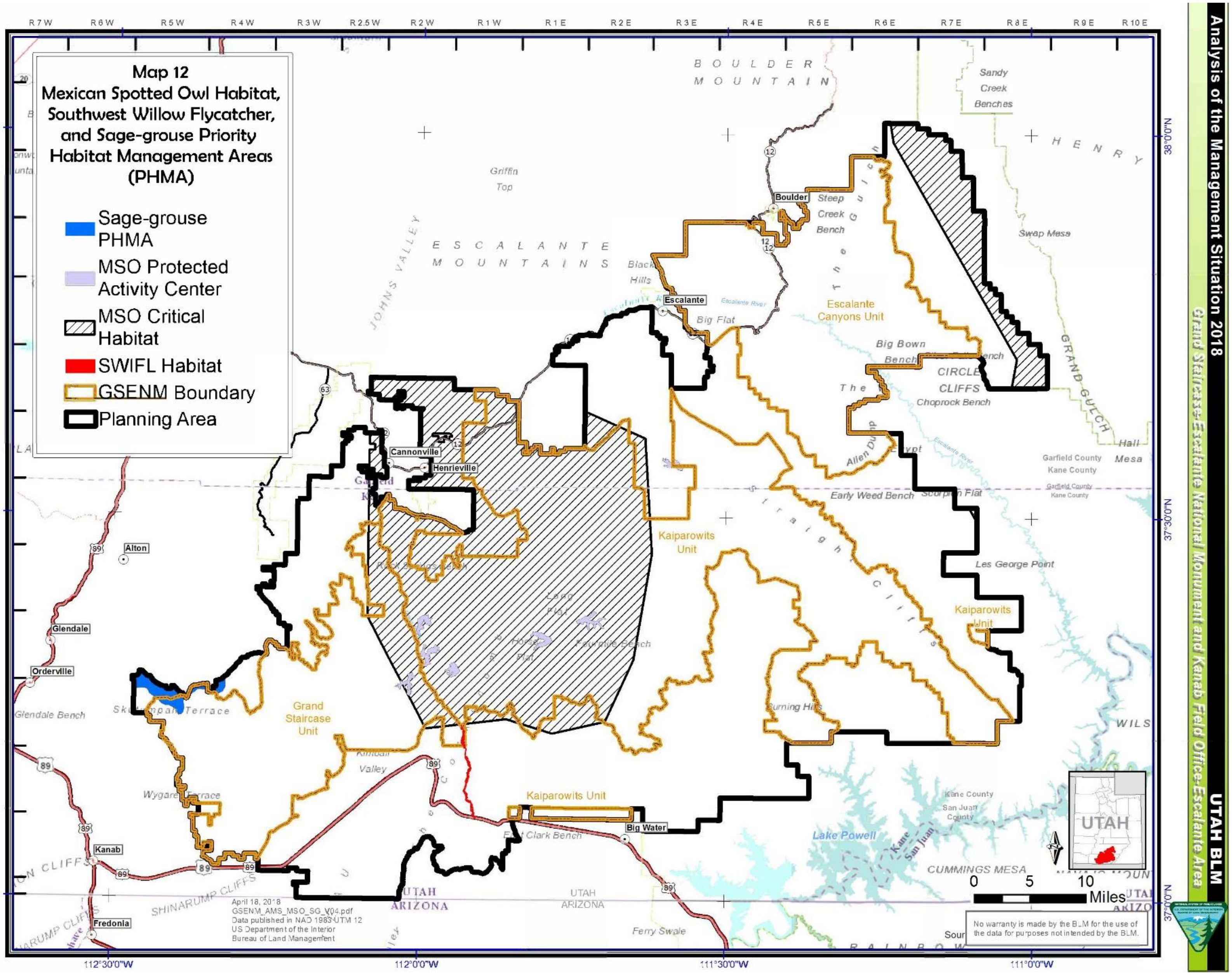

Map 7
Potential Fossil Yield Category
GSENM Boundary
Planning Area
PFYC Sensitivity
1 Low
2
3 Medium
4
5 High
0 5 10 Miles
1:616,862
No warranty is made by the BLM for the use of the data for purposes not intended by the BLM.
UTAH
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
UTAH BLM
Kanab F. O. Escalante Lands
Escalante Canyons Unit
Kaiparowits Unit
Grand Staircase Unit
Boulder
Escalante
Tropic
Cannonville
Henrieville
Alton
Glendale
Kanab
Big Water
Lake Powell
Garfield County
Kane County
San Juan County
UTAH
ARIZONA
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of this data for individual use or aggregate use with other data.
April 18, 2018
US Department of the Interior
Bureau of Land Management
112°30'0"W
112°0'0"W
111°30'0"W
111°0'0"W
38°0'0"N
37°30'0"N
37°0'0"N


Map 8
SOIL ORDERS
Soil Order
Alfisols
Aridisols
Badland
Dune Land
Entisols
Inceptisols
Mollisols
Riverwash
Rock Outcrop
GSENM Boundary
Planning Area
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
BLM UTAH
Escalante Canyons Unit
Kaiparowits Unit
Grand Staircase Unit
Boulder
Escalante
Tropic
Cannonville
Henrieville
Alton
Kanab
Big Water
Lake Powell
0 5 10 Miles
1:604,398
UTAH
ARIZONA
112°30'0"W
112°0'0"W
111°30'0"W
111°0'0"W
38°0'0"N
37°30'0"N
37°0'0"N


Map 9
Sensitive Soils
Sensitive Soil
GSENM Boundary
Planning Area
0 5 10
Miles
1:604,398
No warranty is made by the BLM for the use of the data for purposes not intended by the BLM.
UTAH
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
BLM UTAH
Escalante Canyons Unit
Kaiparowits Unit
Grand Staircase Unit
Boulder
Escalante
Tropic
Cannonville
Henrieville
Alton
Kanab
Big Water
Lake Powell
Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, NPS


Map 10
POTENTIAL EARLY SUCCESSIONAL SOIL CRUST
Percent Cover
VALUE
6 - 17 %
17 - 29 %
29 - 55 %
55 - 71 %
GSENM Boundary
Planning Area
0 5 10 Miles
1:604,398
UTAH
Grand Staircase Unit
Kaiparowits Unit
Escalante Canyons Unit
Boulder
Escalante
Tropic
Cannonville
Henrieville
Alton
Kanab
Big Water
Lake Powell
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
BLM UTAH
No warranty is made by the BLM for the use of the data for purposes not intended by the BLM.
Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, NPS


Map 11
POTENTIAL LATE
SUCCESSIONAL SOIL CRUST
Percent Cover
VALUE
1 - 7 %
7 - 14 %
14 -23 %
23 - 42 %
GSENM Boundary
Planning Area
0 5 10
Miles
1:614,256
UTAH
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
BLM UTAH
Boulder
Escalante
Tropic
Cannonville
Henrieville
Alton
Glendale
Kanab
Big Water
Escalante Canyons Unit
Kaiparowits Unit
Grand Staircase Unit
Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, NPS


Map 12
Mexican Spotted Owl Habitat, Southwest Willow Flycatcher, and Sage-grouse Priority Habitat Management Areas (PHMA)
Sage-grouse PHMA
MSO Protected Activity Center
MSO Critical Habitat
SWIFL Habitat
GSENM Boundary
Planning Area
R 7 W
R 6 W
R 5 W
R 4 W
R 3 W
R 2.5 W
R 2 W
R 1 W
R 1 E
R 2 E
R 3 E
R 4 E
R 5 E
R 6 E
R 7 E
R 8 E
R 9 E
R 10 E
BOULDER MOUNTAIN
ESCALANTE MOUNTAINS
Griffin Top
Boulder
Escalante
Cannonville
Henrieville
Alton
Glendale
Orderville
Kanab
Fredonia
Big Water
Escalante Canyons Unit
Kaiparowits Unit
Grand Staircase Unit
Big Flat
Big Bown Bench
CIRCLE CLIFFS
Choprock Bench
Early Weed Bench
Les George Point
Sandy Creek Benches
Swap Mesa
HENRY
GRAND GULCH
Hall Mesa
Garfield County
Kane County
Glendale Bench
Skutumpah Terrace
Wygaret Terrace
Kimball Valley
Clark Bench
Burning Hills
Lake Powell
CUMMINGS MESA
SHINARUMP CLIFFS
UTAH
ARIZONA
Ferry Swale
Kane
San Juan
0 5 10 Miles
38°0'0"N
37°30'0"N
37°0'0"N
112°30'0"W
112°0'0"W
111°30'0"W
111°0'0"W
April 18, 2018
GSENM_AMS_MSO_SG_V04.pdf
Data published in NAD 1983 UTM 12
US Department of the Interior
Bureau of Land Management
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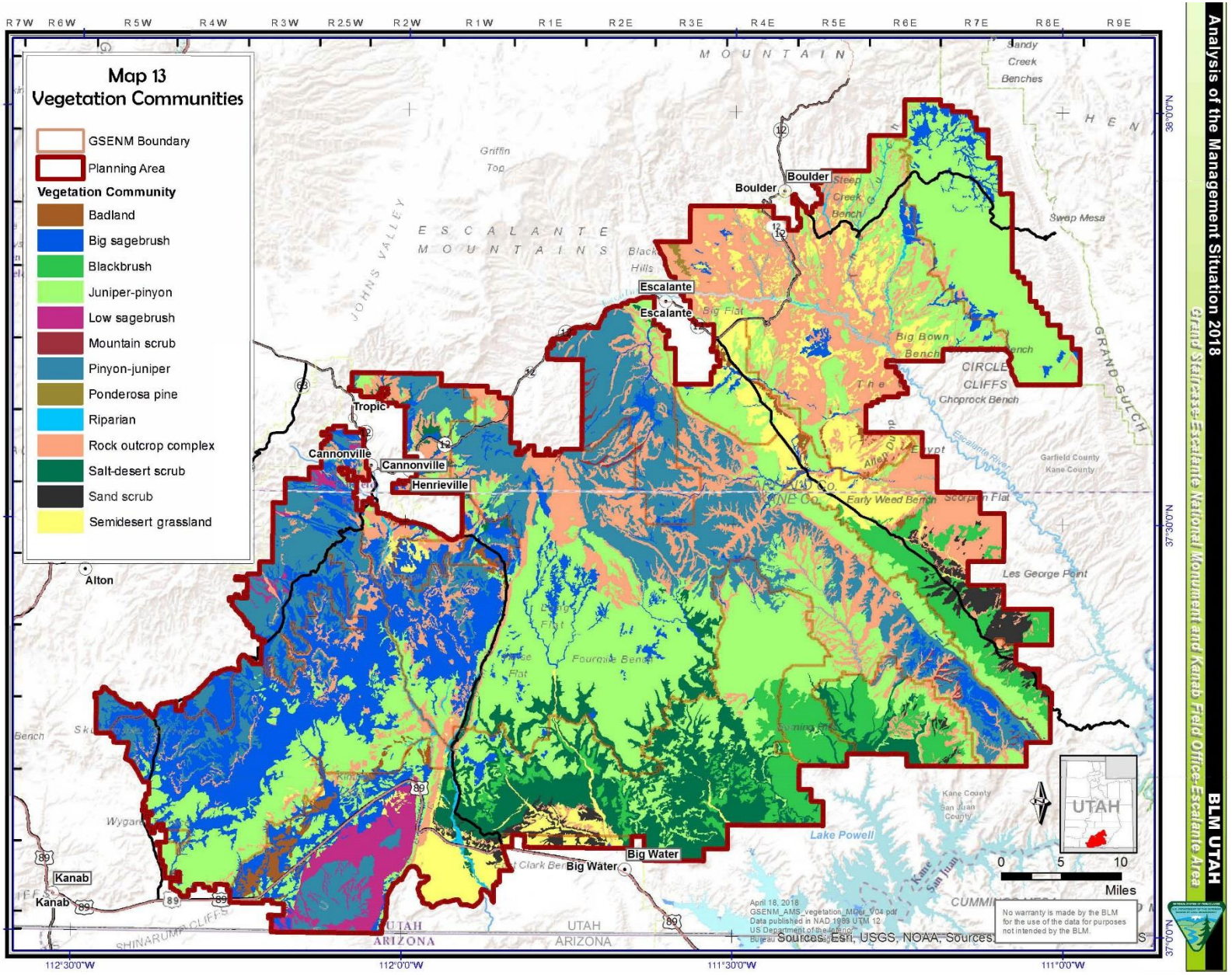
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
UTAH BLM


Map 13
Vegetation Communities
GSENM Boundary
Planning Area
Vegetation Community
Badland
Big sagebrush
Blackbrush
Juniper-pinyon
Low sagebrush
Mountain scrub
Pinyon-juniper
Ponderosa pine
Riparian
Rock outcrop complex
Salt-desert scrub
Sand scrub
Semidesert grassland
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
BLM UTAH
Boulder
Escalante
Tropic
Cannonville
Henrieville
Alton
Kanab
Big Water
Lake Powell
UTAH
ARIZONA
Miles
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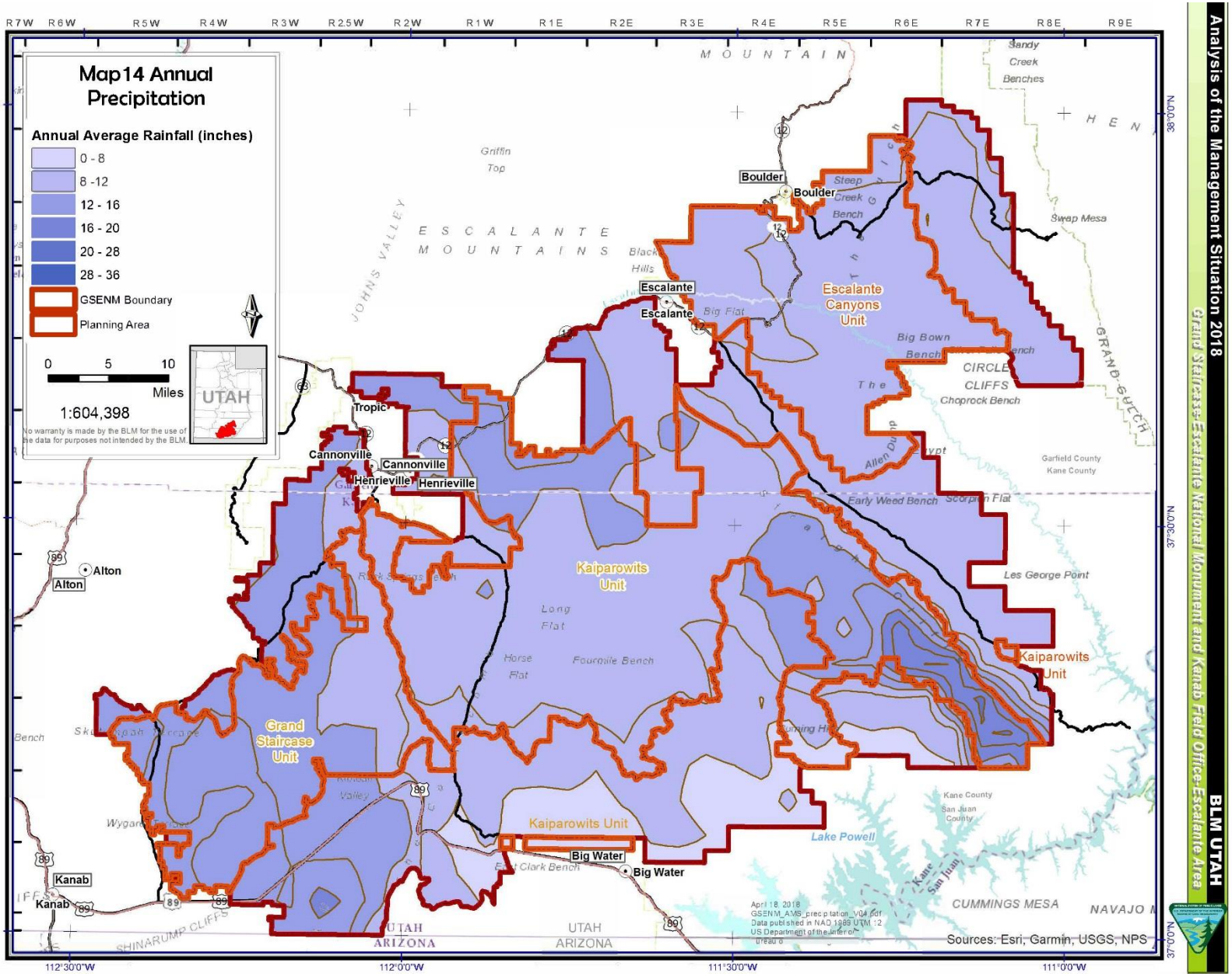
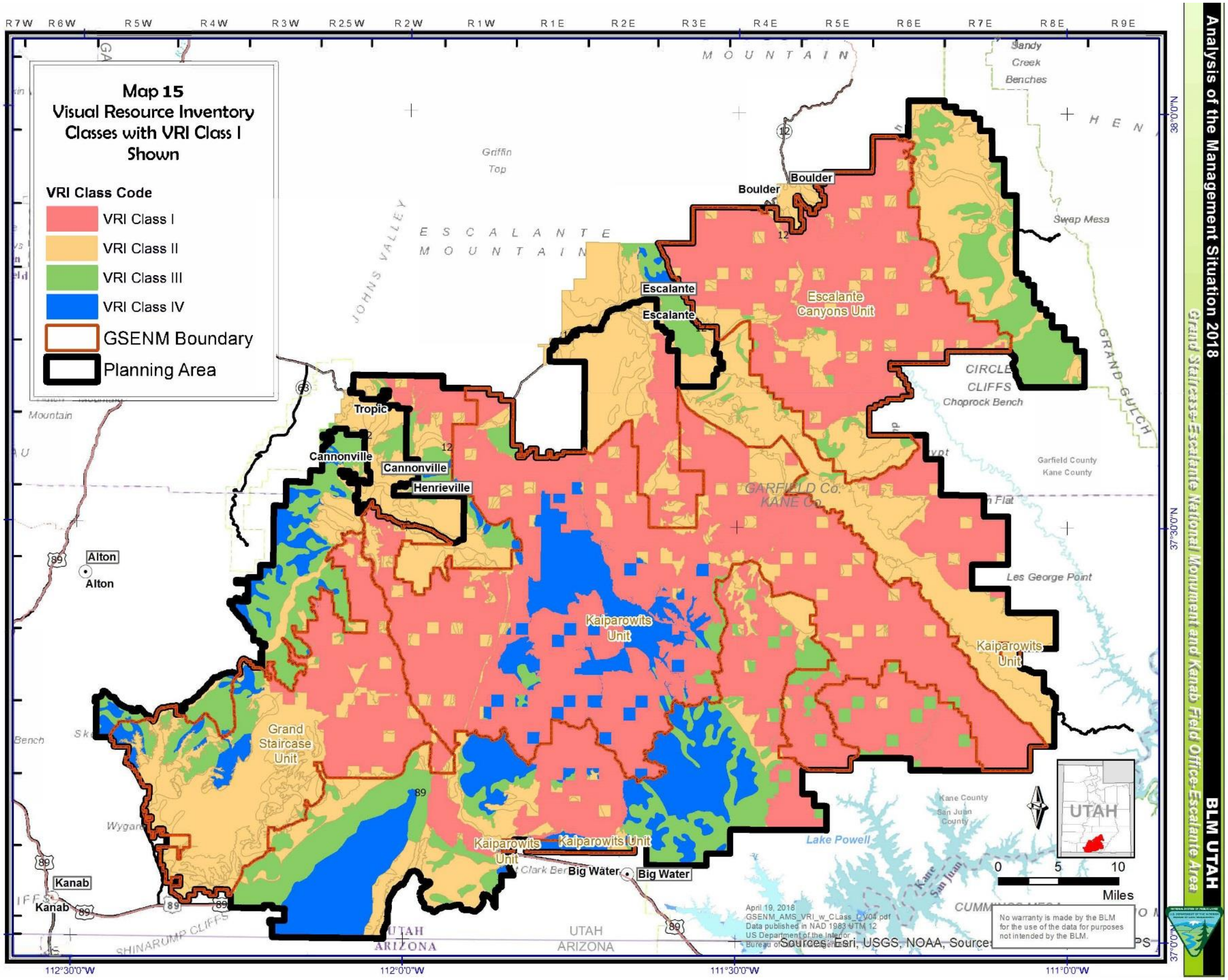
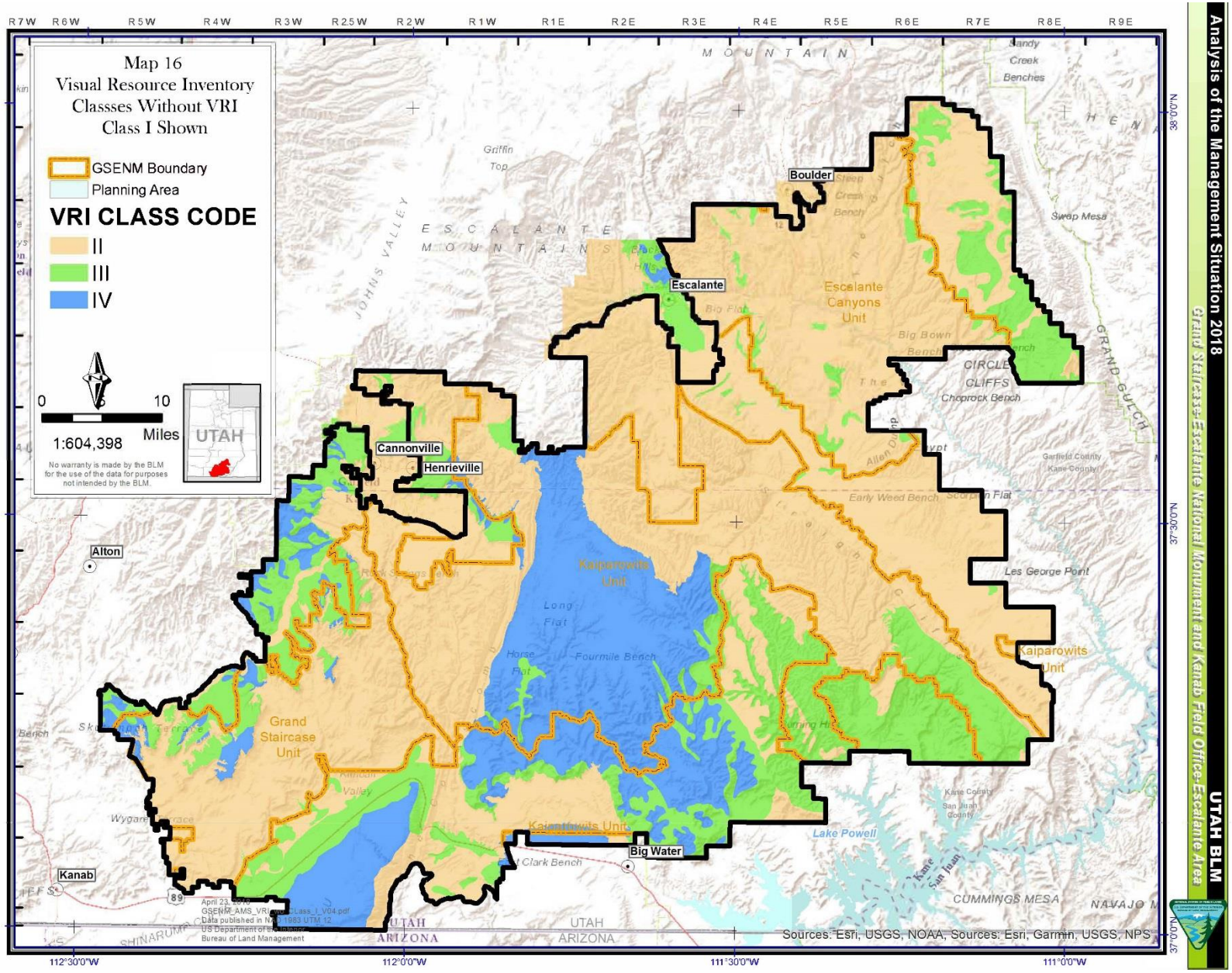
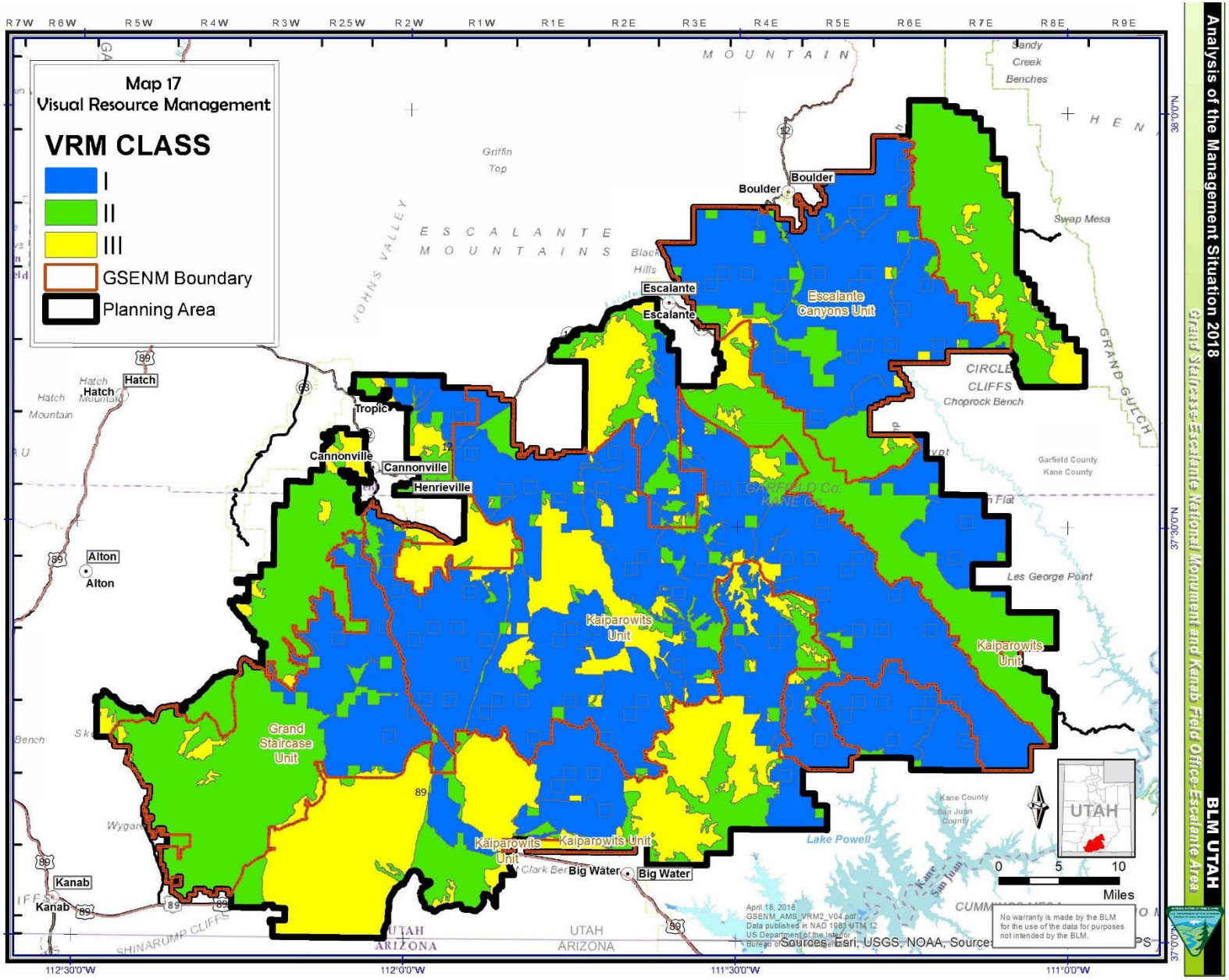
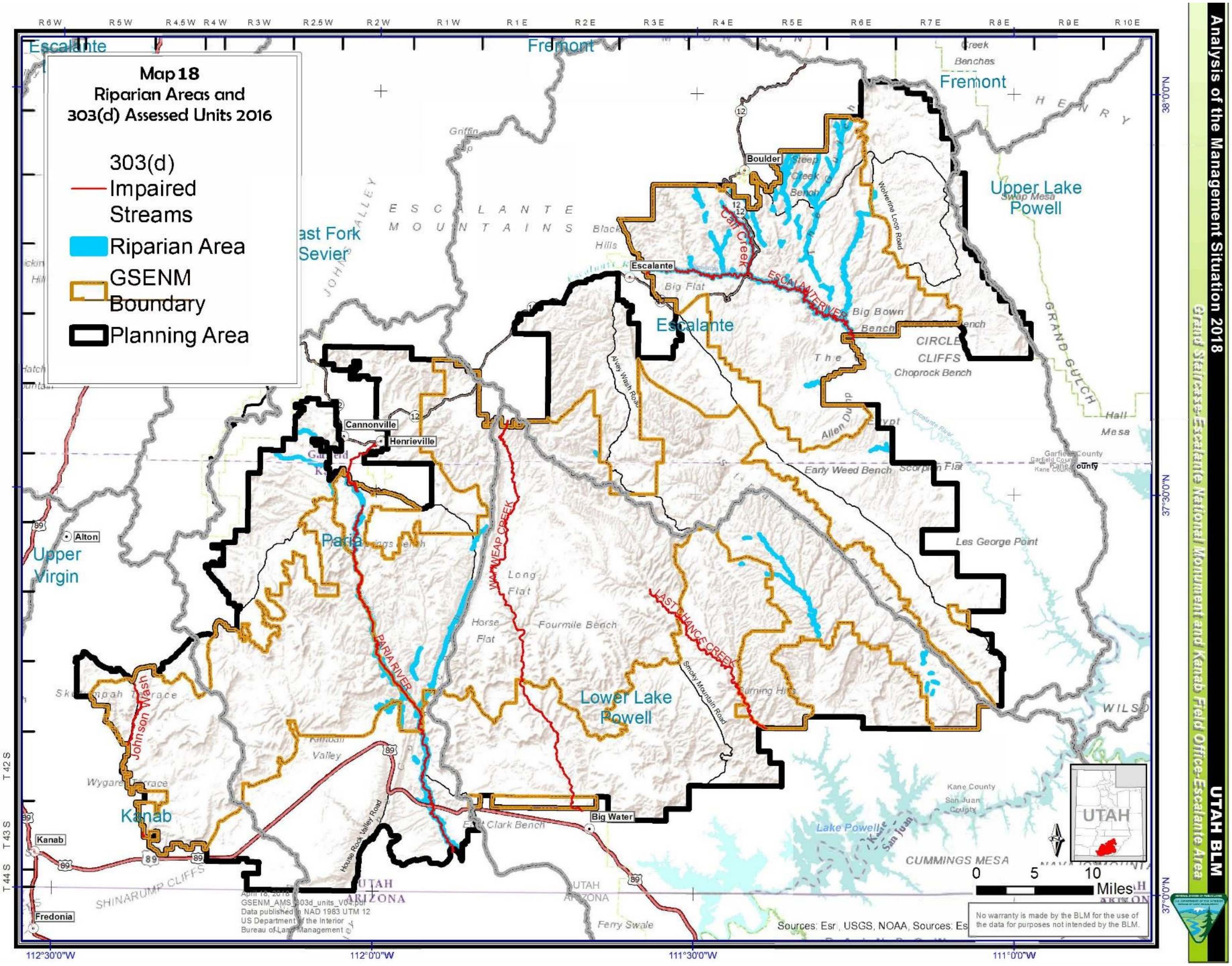
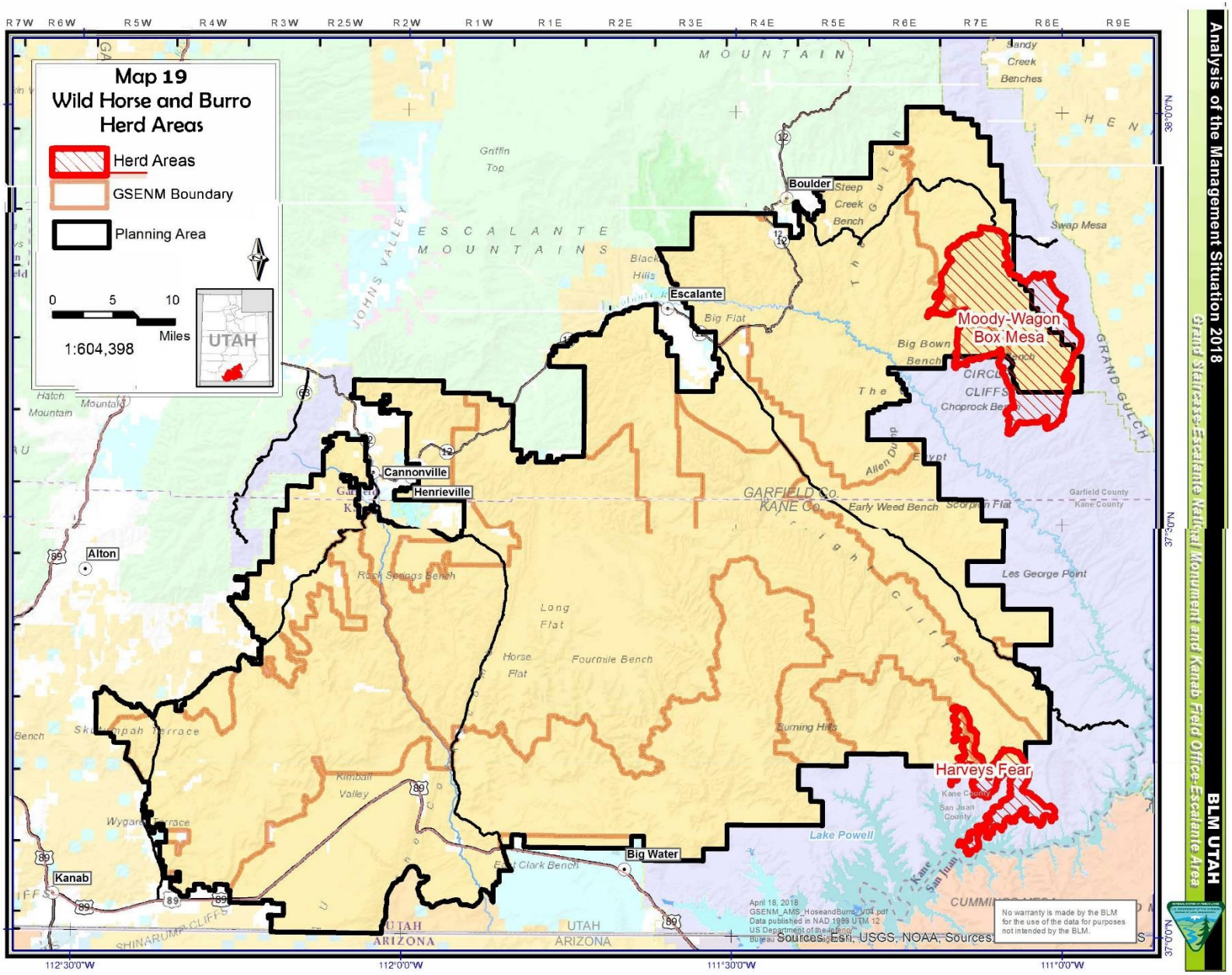

Map14 Annual Precipitation
Annual Average Rainfall (inches)
0 - 8
8 -12
12 - 16
16 - 20
20 - 28
28 - 36
GSENM Boundary
Planning Area
0 5 10
Miles
1:604,398
UTAH
No warranty is made by the BLM for the use of the data for purposes not intended by the BLM.
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
BLM UTAH
Boulder
Escalante
Escalante Canyons Unit
Tropic
Cannonville
Henrieville
Alton
Kaiparowits Unit
Grand Staircase Unit
Big Water
Kanab
Lake Powell
CUMMINGS MESA
NAVAJO
CIRCLE CLIFFS
Sources: Esri, Garmin, USGS, NPS

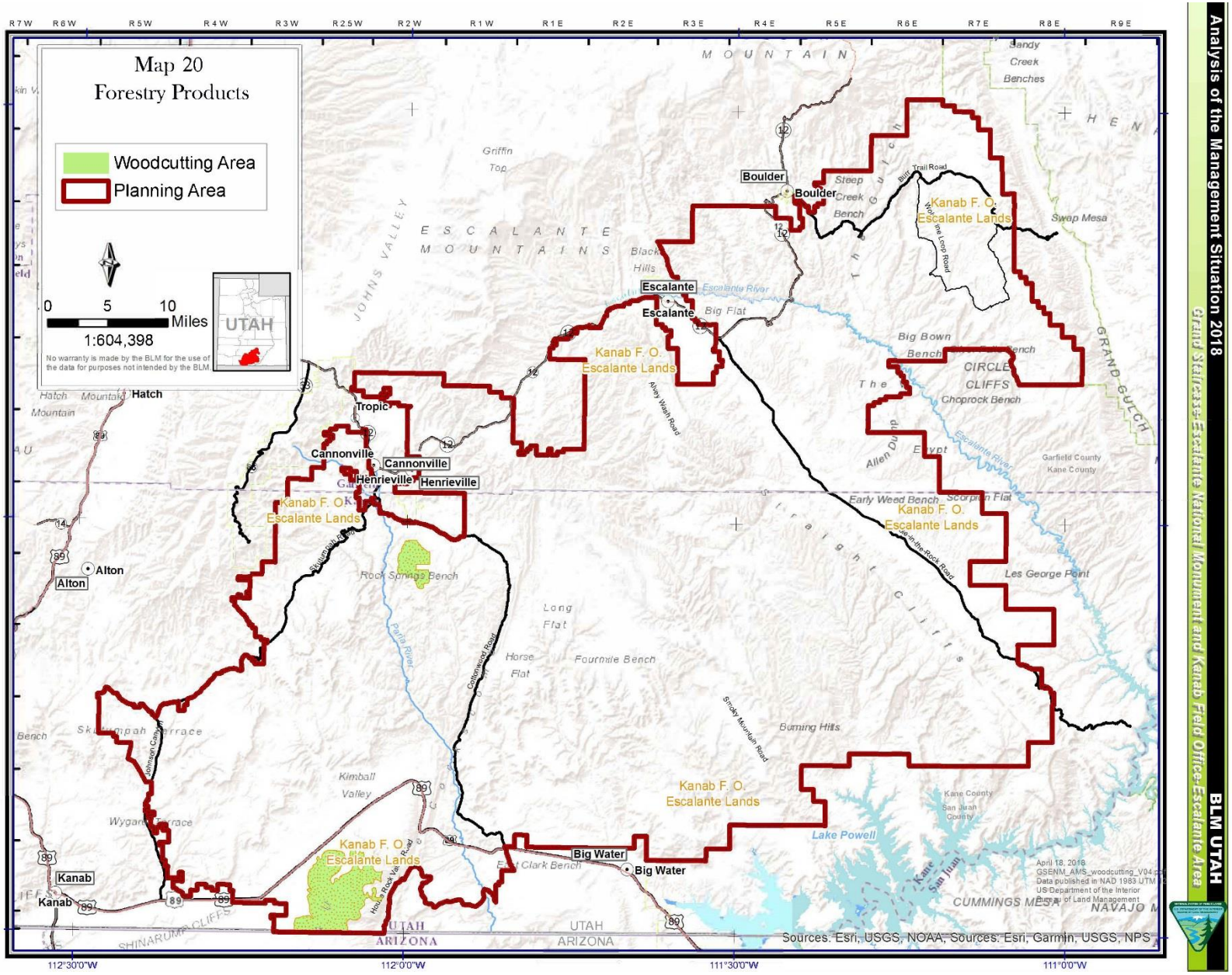

Map 15
Visual Resource Inventory Classes with VRI Class I Shown
VRI Class Code
VRI Class I
VRI Class II
VRI Class III
VRI Class IV
GSENM Boundary
Planning Area
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
BLM UTAH
Escalante Canyons Unit
Kaiparowits Unit
Grand Staircase Unit
Boulder
Escalante
Tropic
Cannonville
Henrieville
Alton
Kanab
Big Water
Lake Powell
GARFIELD Co.
KANE Co.
UTAH
ARIZONA
Miles
0
5
10
No warranty is made by the BLM for the use of the data for purposes not intended by the BLM.
Sources: Esri, USGS, NOAA
112°30'0"W
112°0'0"W
111°30'0"W
111°0'0"W

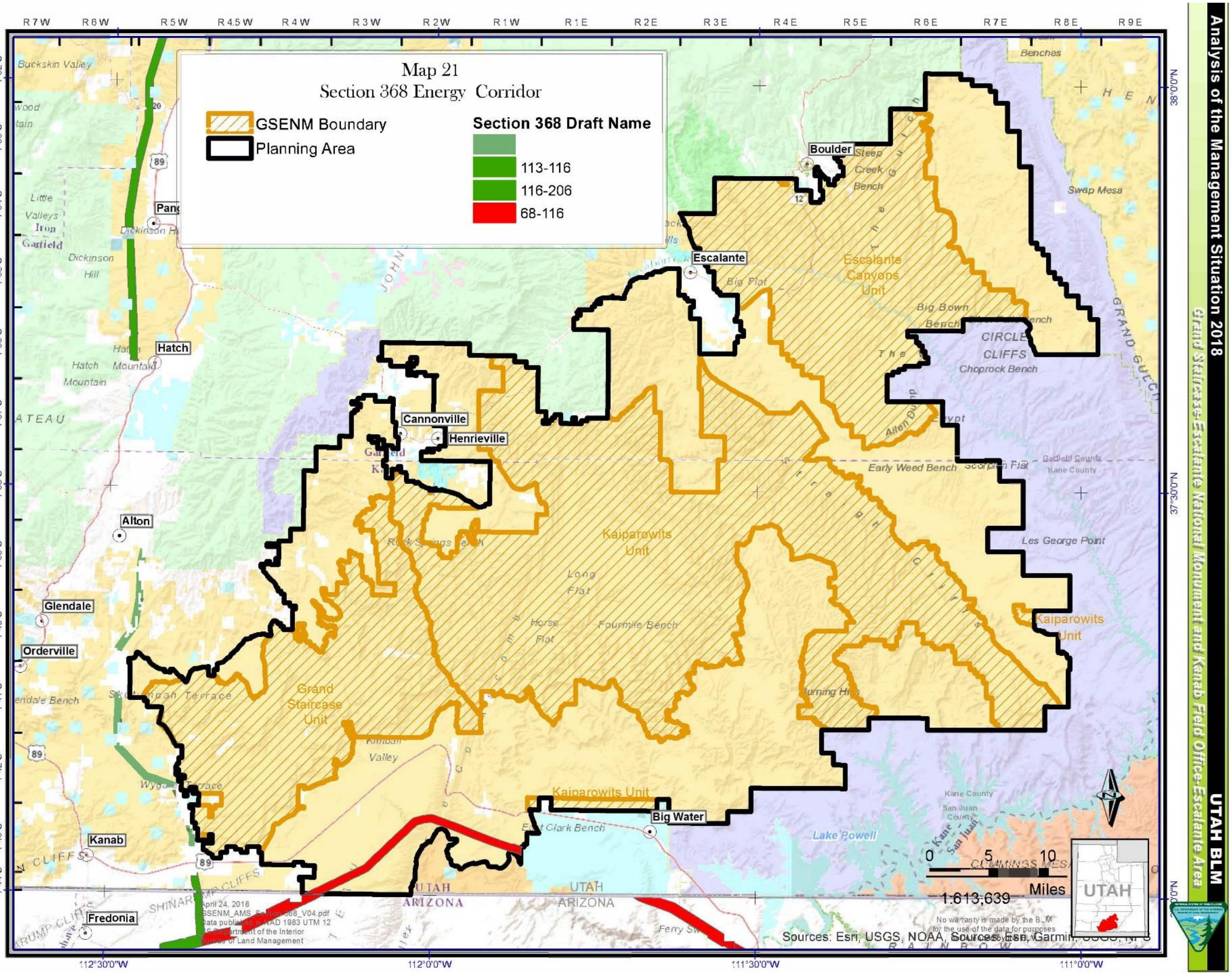

Map 16
Visual Resource Inventory
Classses Without VRI
Class I Shown
GSENM Boundary
Planning Area
VRI CLASS CODE
II
III
IV
0
5
10
Miles
1:604,398
UTAH
No warranty is made by the BLM for the use of the data for purposes not intended by the BLM.
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
UTAH BLM
Boulder
Escalante
Cannonville
Henrieville
Alton
Kanab
Big Water
Escalante Canyons Unit
Kaiparowits Unit
Grand Staircase Unit
CIRCLE CLIFFS
Lake Powell
CUMMINGS MESA
Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, NPS

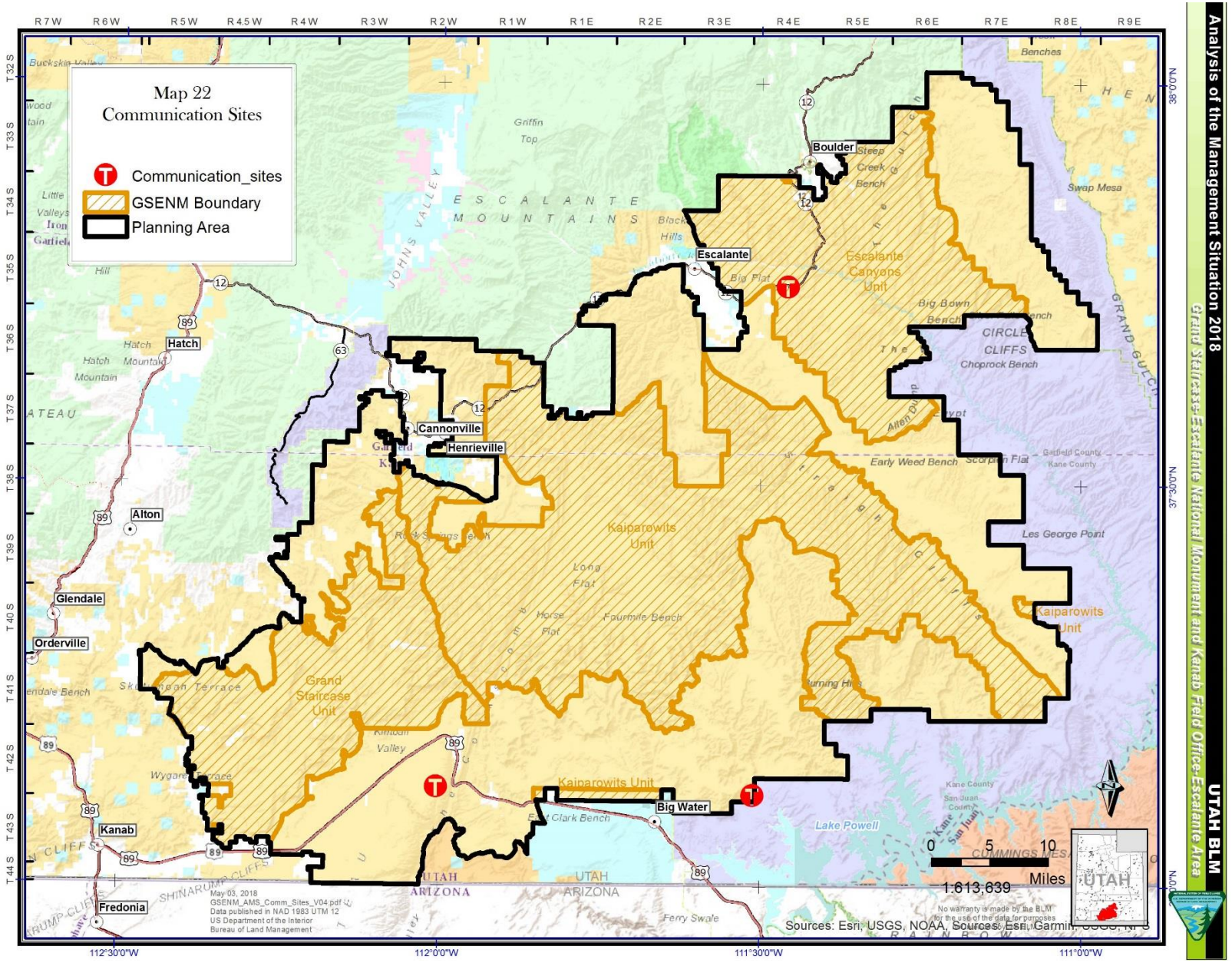

Map 17
Visual Resource Management
VRM CLASS
I
II
III
GSENM Boundary
Planning Area
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
BLM UTAH
Boulder
Escalante
Escalante Canyons Unit
Tropic
Cannonville
Henrieville
Hatch
Alton
Kaiparowits Unit
Grand Staircase Unit
Big Water
Kanab
Lake Powell
Swap Mesa
Les George Point
CIRCLE CLIFFS
Choprock Bench
Garfield County
Kane County
UTAH
ARIZONA
0 5 10
Miles
No warranty is made by the BLM for the use of the data for purposes not intended by the BLM.
Sources: Esri, USGS, NOAA, Source:

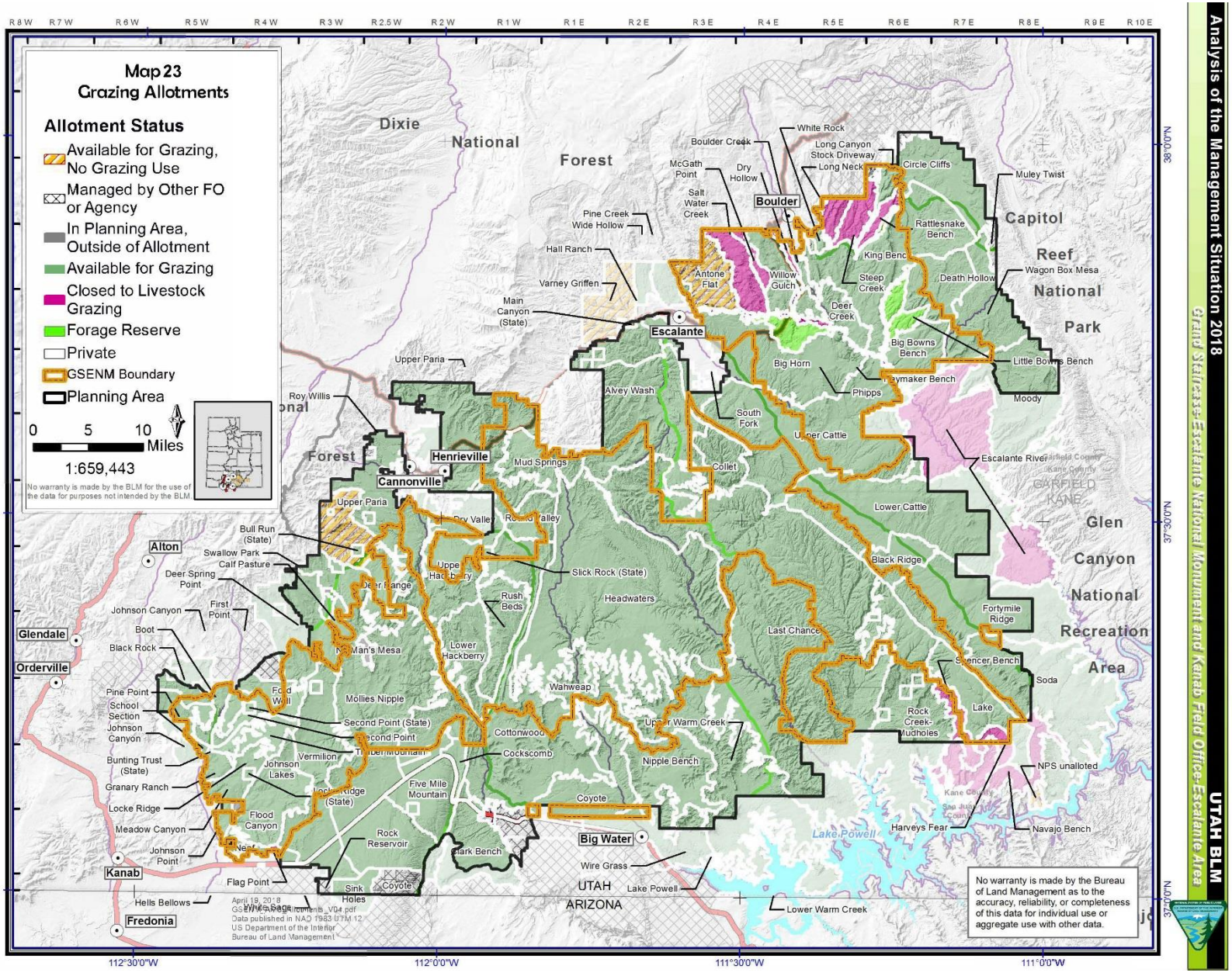

Map 18
Riparian Areas and
303(d) Assessed Units 2016
303(d)
Impaired
Streams
Riparian Area
GSENM
Boundary
Planning Area
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
UTAH BLM
Escalante
Fremont
Upper Lake
Powell
East Fork
Sevier
Upper
Virgin
Paria
Lower Lake
Powell
Kanab
Boulder
Escalante
Cannonville
Henrieville
Alton
Kanab
Fredonia
Big Water
ESCALANTE MOUNTAINS
Calf Creek
ESCALANTE RIVER
PARIA RIVER
WAHWEAP CREEK
LAST CHANCE CREEK
Johnson Wash
Big Flat
Big Bown Bench
CIRCLE CLIFFS
Choprock Bench
Early Weed Bench
Les George Point
Long Flat
Horse Flat
Fourmile Bench
Smoky Mountain Road
Skutumpah Terrace
Wygaret Terrace
Kimball Valley
House Rock Valley Road
Clark Bench
SHINARUMP CLIFFS
Lake Powell
CUMMINGS MESA
Kane County
San Juan County
Garfield County
UTAH
ARIZONA
Ferry Swale
0 5 10
Miles
Sources: Esri, USGS, NOAA
No warranty is made by the BLM for the use of the data for purposes not intended by the BLM.
112°30'0"W
112°0'0"W
111°30'0"W
111°0'0"W
38°0'0"N
37°30'0"N
37°0'0"N
T 42 S
T 43 S
T 44 S
R 6 W
R 5 W
R 4.5 W
R 4 W
R 3 W
R 2.5 W
R 2 W
R 1 W
R 1 E
R 2 E
R 3 E
R 4 E
R 5 E
R 6 E
R 7 E
R 8 E
R 9 E
R 10 E
GSENM_AMS_303d_units_V02.pdf
Data published in NAD 1983 UTM 12
US Department of the Interior
Bureau of Land Management


Map 19
Wild Horse and Burro Herd Areas
Herd Areas
GSENM Boundary
Planning Area
0 5 10
Miles
1:604,398
UTAH
Moody-Wagon Box Mesa
Harveys Fear
Boulder
Escalante
Cannonville
Henrieville
Alton
Kanab
Big Water
GARFIELD Co.
KANE Co.
UTAH
ARIZONA
Lake Powell
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
BLM UTAH


Map 20
Forestry Products
Woodcutting Area
Planning Area
0 5 10 Miles
1:604,398
No warranty is made by the BLM for the use of the data for purposes not intended by the BLM.
UTAH
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
BLM UTAH
Boulder
Escalante
Tropic
Cannonville
Henrieville
Hatch
Alton
Kanab
Big Water
Kanab F. O. Escalante Lands
Lake Powell
Sources: Esri, USGS, NOAA; Sources: Esri, Garmin, USGS, NPS
112°30'0"W
112°0'0"W
111°30'0"W
111°0'0"W


Map 21
Section 368 Energy Corridor
GSENM Boundary
Planning Area
Section 368 Draft Name
113-116
116-206
68-116
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
UTAH BLM
Boulder
Escalante
Cannonville
Henrieville
Hatch
Alton
Glendale
Orderville
Kanab
Fredonia
Big Water
Escalante Canyons Unit
Kaiparowits Unit
Grand Staircase Unit
CIRCLE CLIFFS
Lake Powell
UTAH
ARIZONA
1:613,639
0 5 10
Miles
Sources: Esri, USGS, NOAA
112°30'0"W
112°0'0"W
111°30'0"W
111°0'0"W
38°0'0"N
37°30'0"N
37°0'0"N


Map 22
Communication Sites
Communication_sites
GSENM Boundary
Planning Area
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
UTAH BLM
Boulder
Escalante
Hatch
Cannonville
Henrieville
Alton
Glendale
Orderville
Kanab
Fredonia
Big Water
Kaiparowits Unit
Grand Staircase Unit
Escalante Canyons Unit
ESCALANTE MOUNTAINS
CIRCLE CLIFFS
Lake Powell
UTAH
ARIZONA
0 5 10
Miles
1:613,639
May 03, 2018
GSENM_AMS_Comm_Sites_V04.pdf
Data published in NAD 1983 UTM 12
US Department of the Interior
Bureau of Land Management
Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, N


Map 23
Grazing Allotments
Allotment Status
Available for Grazing, No Grazing Use
Managed by Other FO or Agency
In Planning Area, Outside of Allotment
Available for Grazing
Closed to Livestock Grazing
Forage Reserve
Private
GSENM Boundary
Planning Area
0 5 10 Miles
1:659,443
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Dixie National Forest
Escalante
Boulder
Henrieville
Cannonville
Alton
Glendale
Orderville
Kanab
Fredonia
Big Water
Capitol Reef National Park
Glen Canyon National Recreation Area
Lake Powell
UTAH
ARIZONA
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
UTAH BLM
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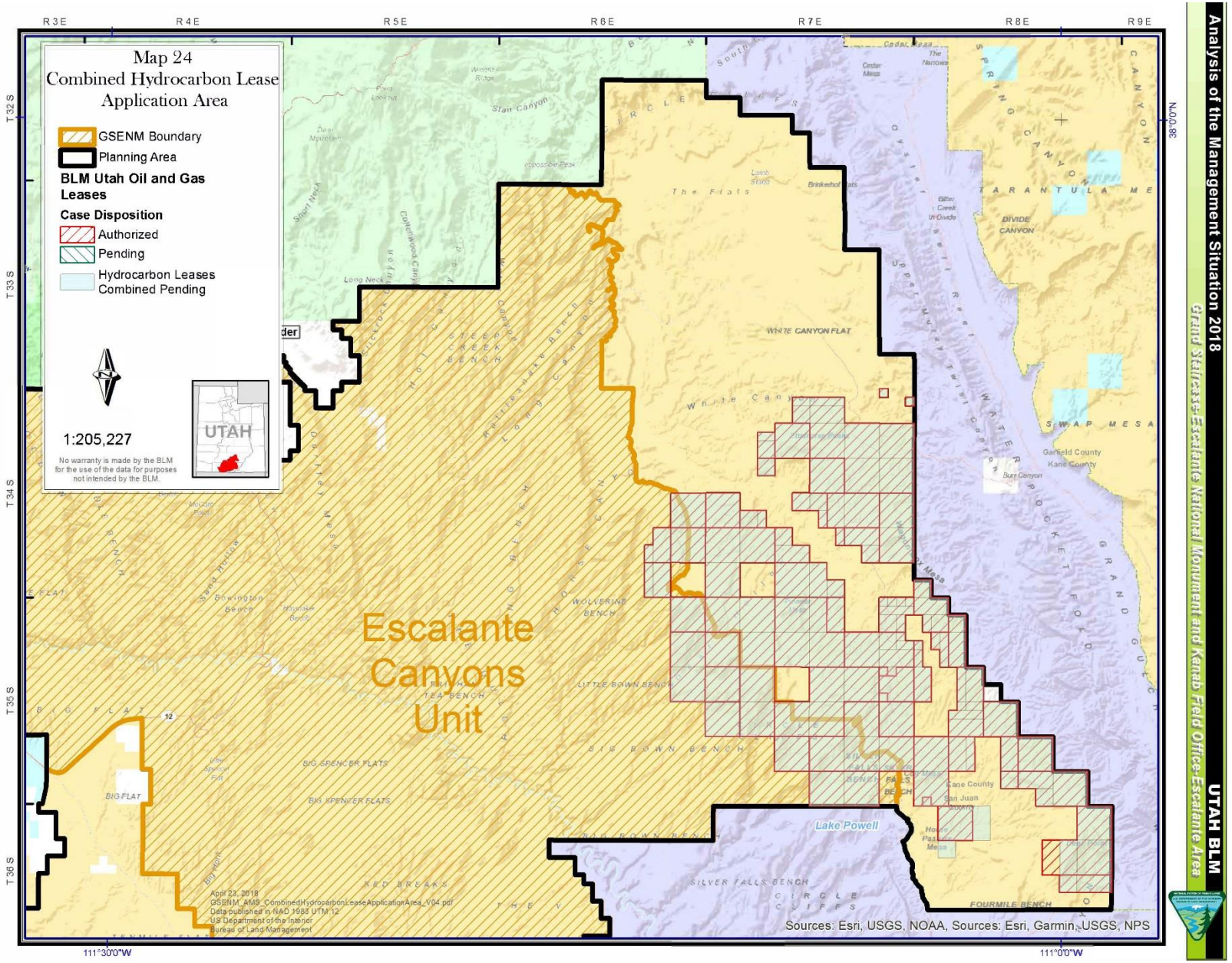
Map 24
Combined Hydrocarbon Lease Application Area
GSENM Boundary
Planning Area
BLM Utah Oil and Gas Leases
Case Disposition
Authorized
Pending
Hydrocarbon Leases Combined Pending
1:205,227
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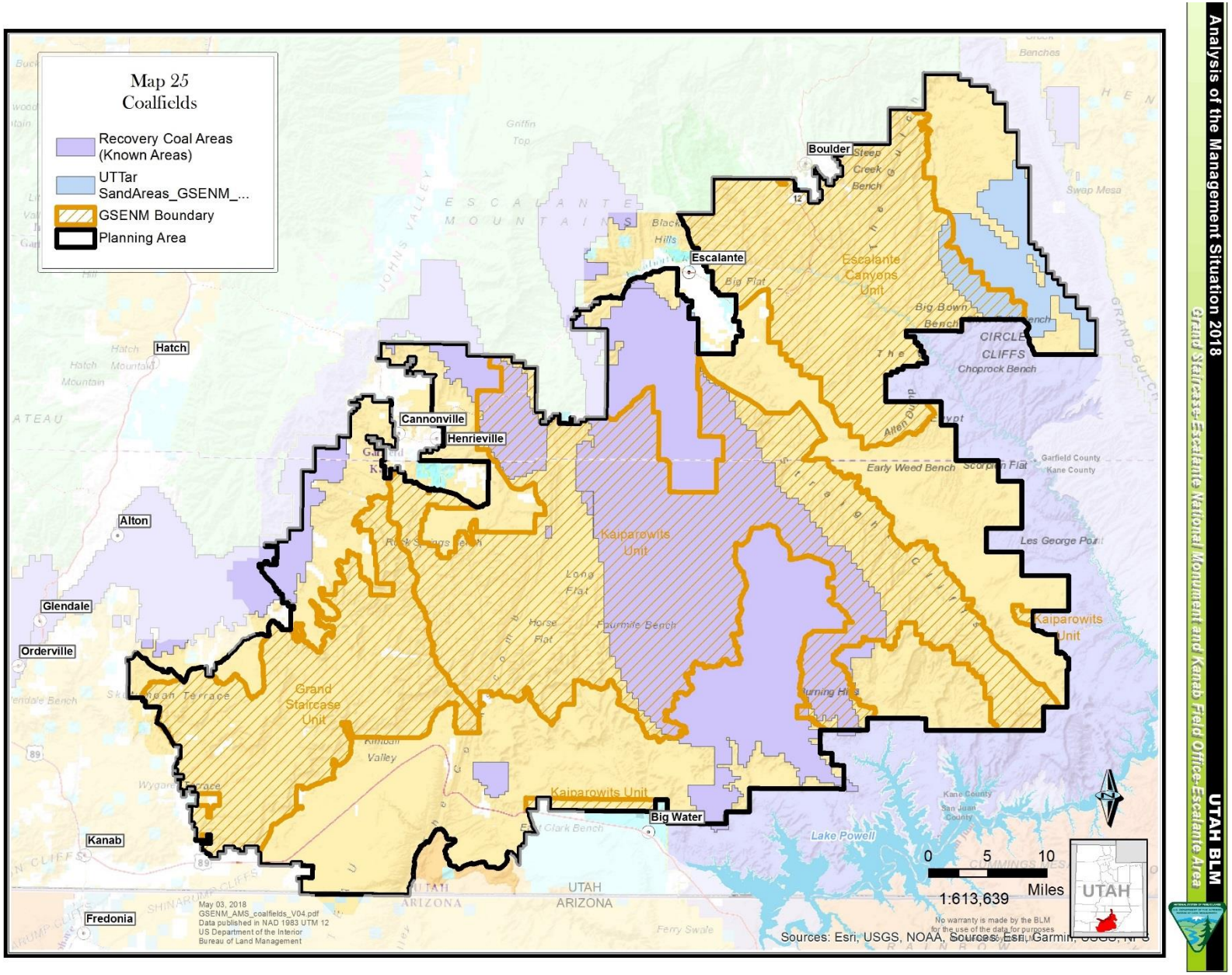
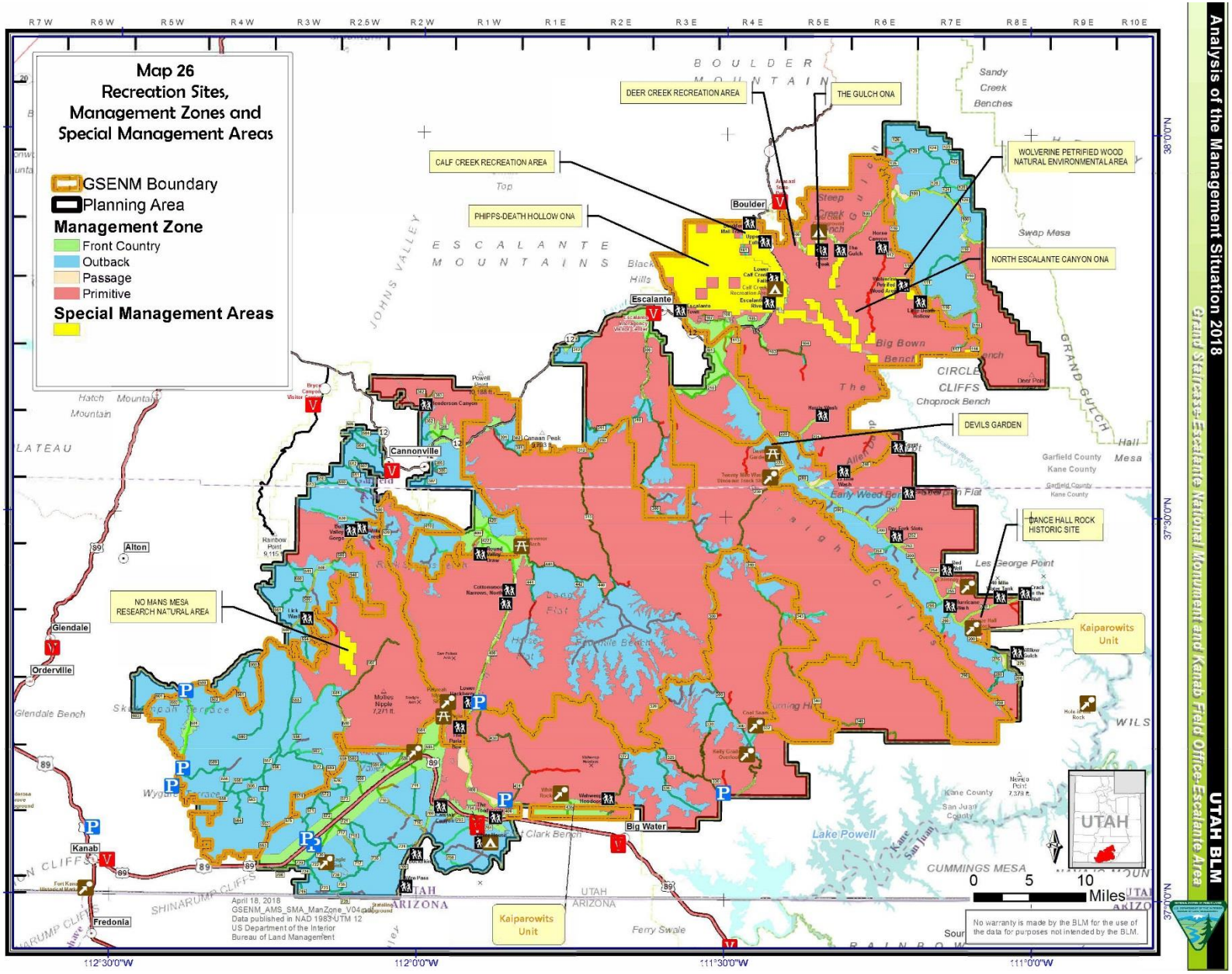
UTAH
Escalante Canyons Unit
Lake Powell
WHITE CANYON FLAT
DIVIDE CANYON
SWAP MESA
WOLVERINE BENCH
LITTLE BOWN BENCH
BIG BOWN BENCH
BIG SPENCER FLATS
SILVER FALLS BENCH
FOURMILE BENCH
Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, NPS
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
UTAH BLM


Map 25
Coalfields
Recovery Coal Areas (Known Areas)
UTTar SandAreas_GSENM_...
GSENM Boundary
Planning Area
Boulder
Escalante
Hatch
Cannonville
Henrieville
Alton
Glendale
Orderville
Kanab
Fredonia
Big Water
Kaiparowits Unit
Grand Staircase Unit
Escalante Canyons Unit
CIRCLE CLIFFS
Choprock Bench
Early Weed Bench
Scorpion Flat
Les George Point
Lake Powell
UTAH
ARIZONA
May 03, 2018
GSENM_AMS_coalfields_V04.pdf
Data published in NAD 1983 UTM 12
US Department of the Interior
Bureau of Land Management
0 5 10
Miles
1:613,639
Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, NPS
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
UTAH BLM


Map 26
Recreation Sites, Management Zones and Special Management Areas
GSENM Boundary
Planning Area
Management Zone
Front Country
Outback
Passage
Primitive
Special Management Areas
DEER CREEK RECREATION AREA
THE GULCH ONA
CALF CREEK RECREATION AREA
WOLVERINE PETRIFIED WOOD NATURAL ENVIRONMENTAL AREA
PHIPPS-DEATH HOLLOW ONA
NORTH ESCALANTE CANYON ONA
DEVILS GARDEN
DANCE HALL ROCK HISTORIC SITE
NO MANS MESA RESEARCH NATURAL AREA
Kaiparowits Unit
Boulder
Escalante
Cannonville
Alton
Glendale
Orderville
Kanab
Fredonia
Big Water
Kaiparowits Unit
UTAH
Miles
0 5 10
April 18, 2018
GSENM_AMS_SMA_ManZone_V04.pdf
Data published in NAD 1983 UTM 12
US Department of the Interior
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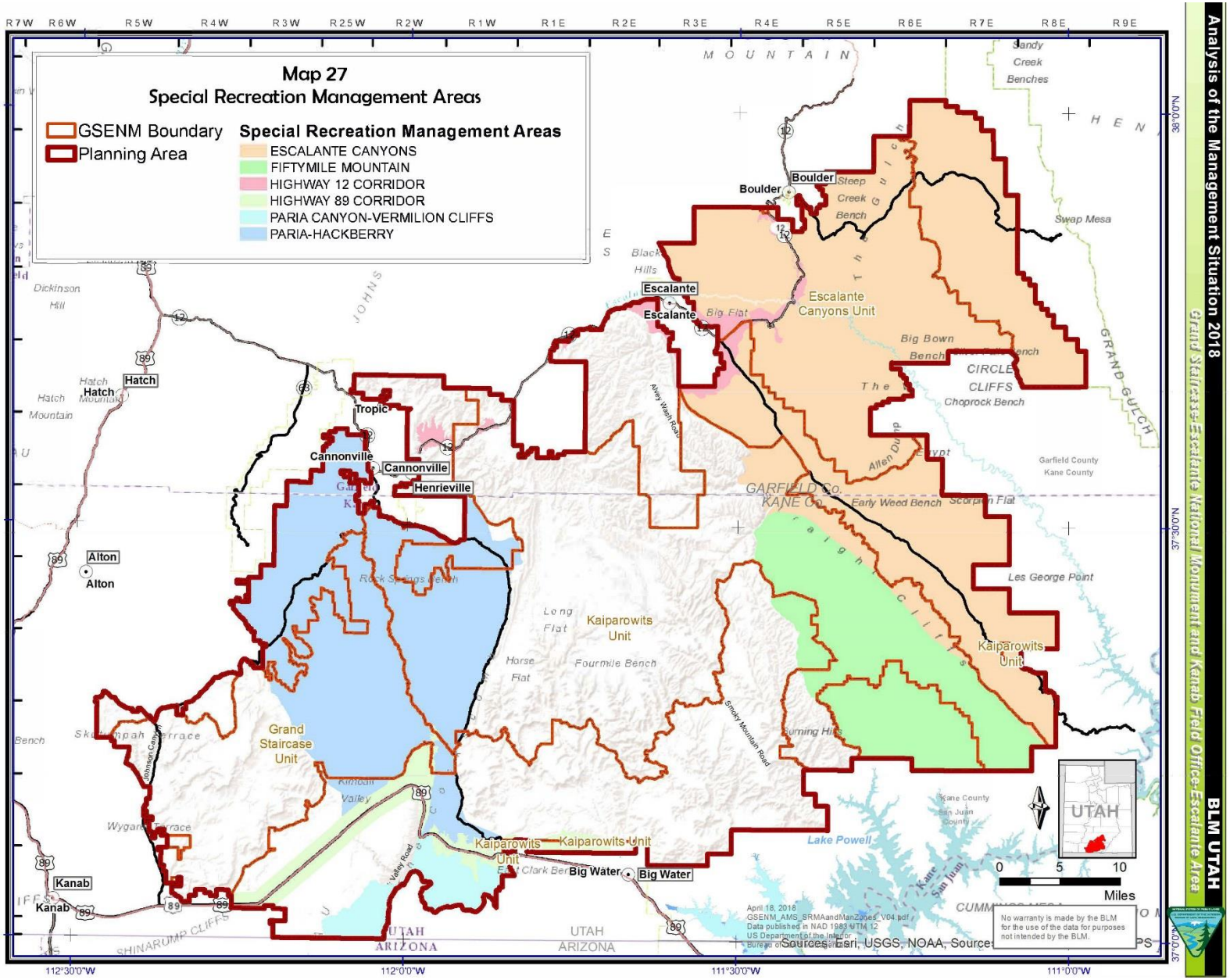
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office, Escalante Area
UTAH BLM


Map 27
Special Recreation Management Areas
GSENM Boundary
Planning Area
Special Recreation Management Areas
ESCALANTE CANYONS
FIFTYMILE MOUNTAIN
HIGHWAY 12 CORRIDOR
HIGHWAY 89 CORRIDOR
PARIA CANYON-VERMILION CLIFFS
PARIA-HACKBERRY
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
BLM UTAH
Escalante Canyons Unit
Kaiparowits Unit
Grand Staircase Unit
Boulder
Escalante
Tropic
Cannonville
Henrieville
Hatch
Alton
Kanab
Big Water
Lake Powell
GARFIELD CO.
KANE CO.
UTAH
ARIZONA
Miles
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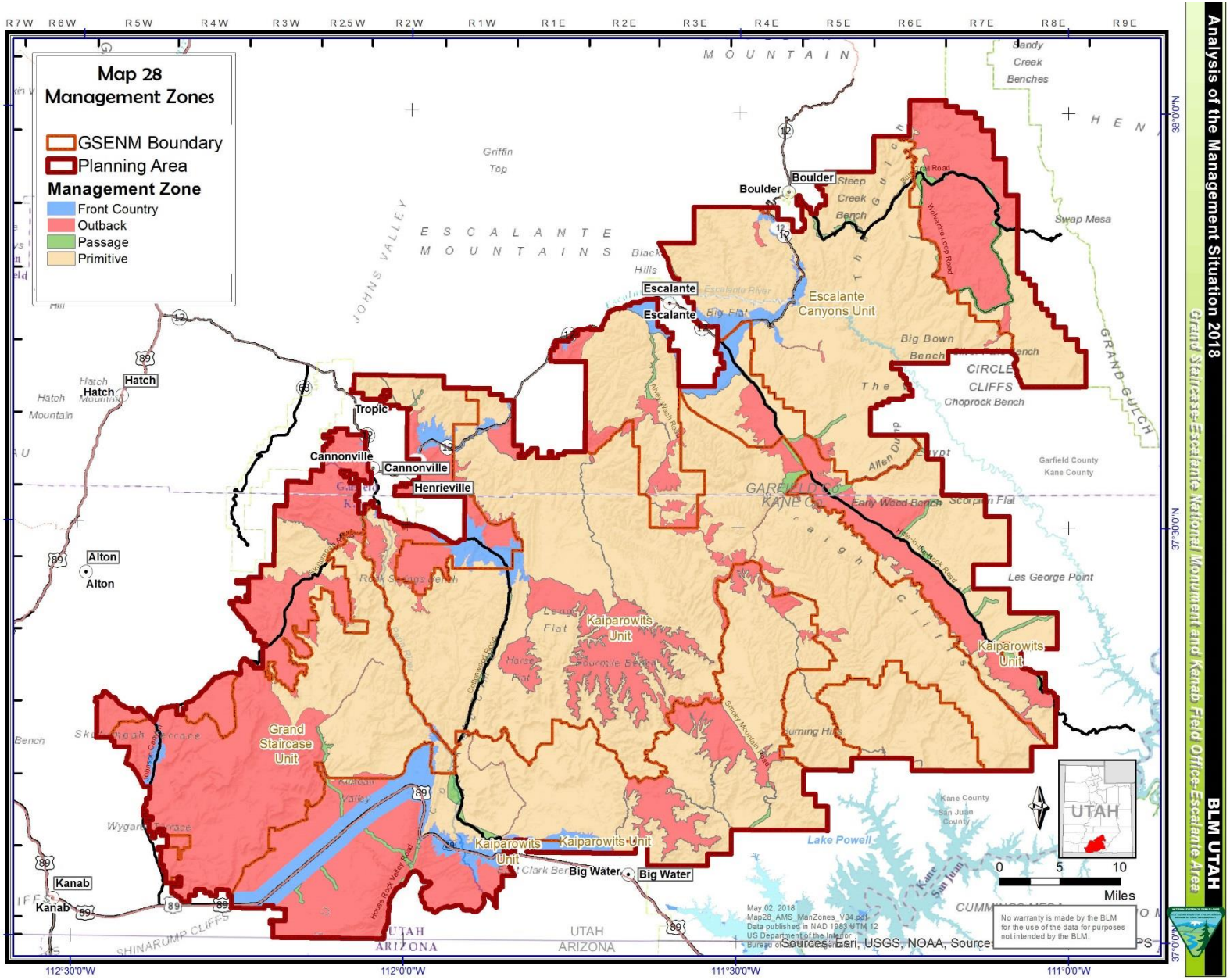
Sources: Esri, USGS, NOAA


Map 28
Management Zones
GSENM Boundary
Planning Area
Management Zone
Front Country
Outback
Passage
Primitive
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
BLM UTAH
Boulder
Escalante
Escalante Canyons Unit
Hatch
Tropic
Cannonville
Henrieville
Alton
Kanab
Grand Staircase Unit
Kaiparowits Unit
Big Water
Lake Powell
UTAH
ARIZONA
0 5 10
Miles
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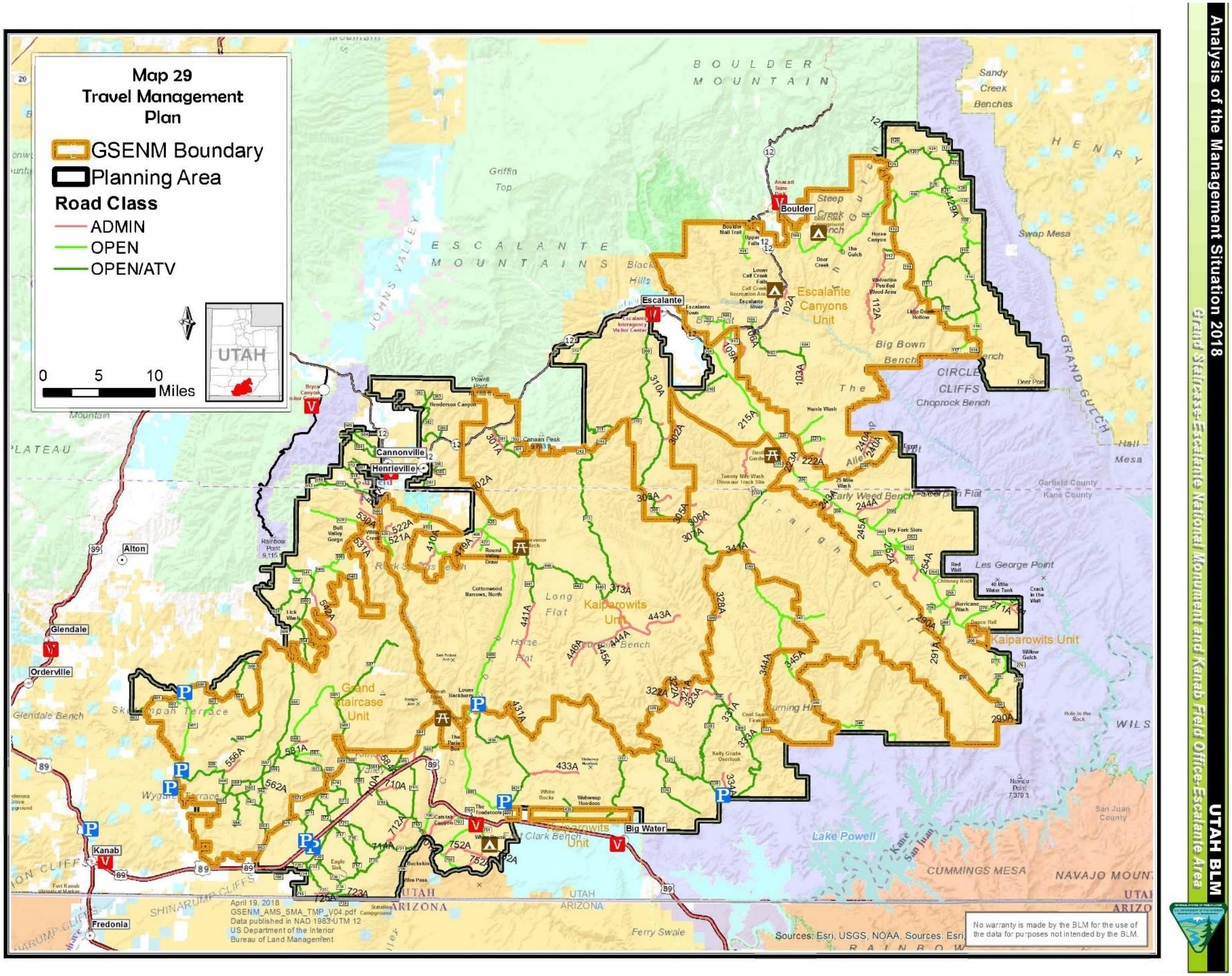
May 02, 2018
Map28_AMS_ManZones_V04.pdf
Data published in NAD 1983 UTM 12
US Department of the Interior
Bureau of Land Management
Sources: Esri, USGS, NOAA, Source:


Map 29
Travel Management Plan
GSENM Boundary
Planning Area
Road Class
ADMIN
OPEN
OPEN/ATV
0 5 10 Miles
UTAH
Escalante Canyons Unit
Kaiparowits Unit
Grand Staircase Unit
Escalante
Boulder
Cannonville
Henrieville
Big Water
Kanab
Glendale
Orderville
Alton
Fredonia
Lake Powell
April 19, 2018
GSENM_AMS_SMA_TMP_V04.pdf
Data published in NAD 1983 UTM 12
US Department of the Interior
Bureau of Land Management
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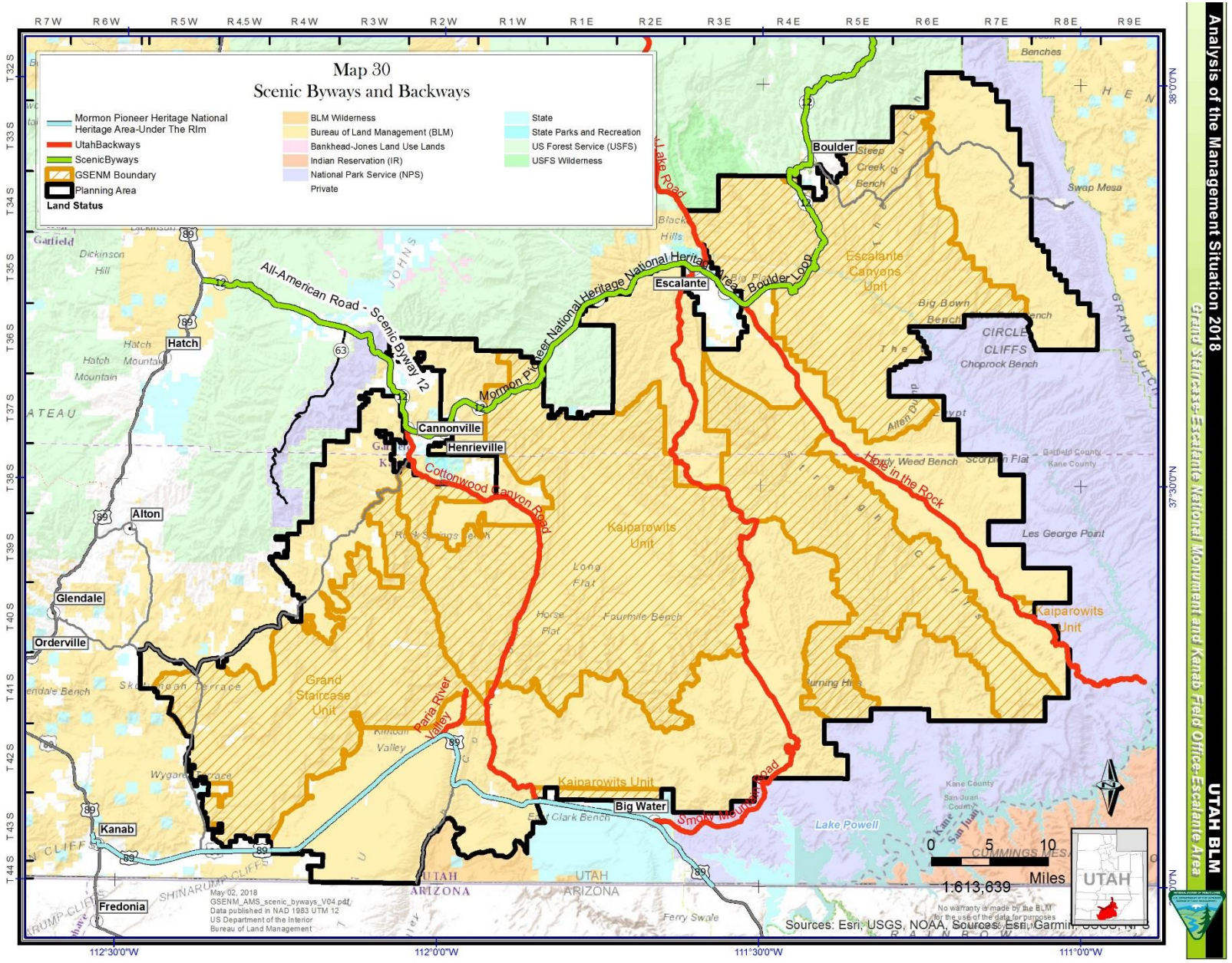
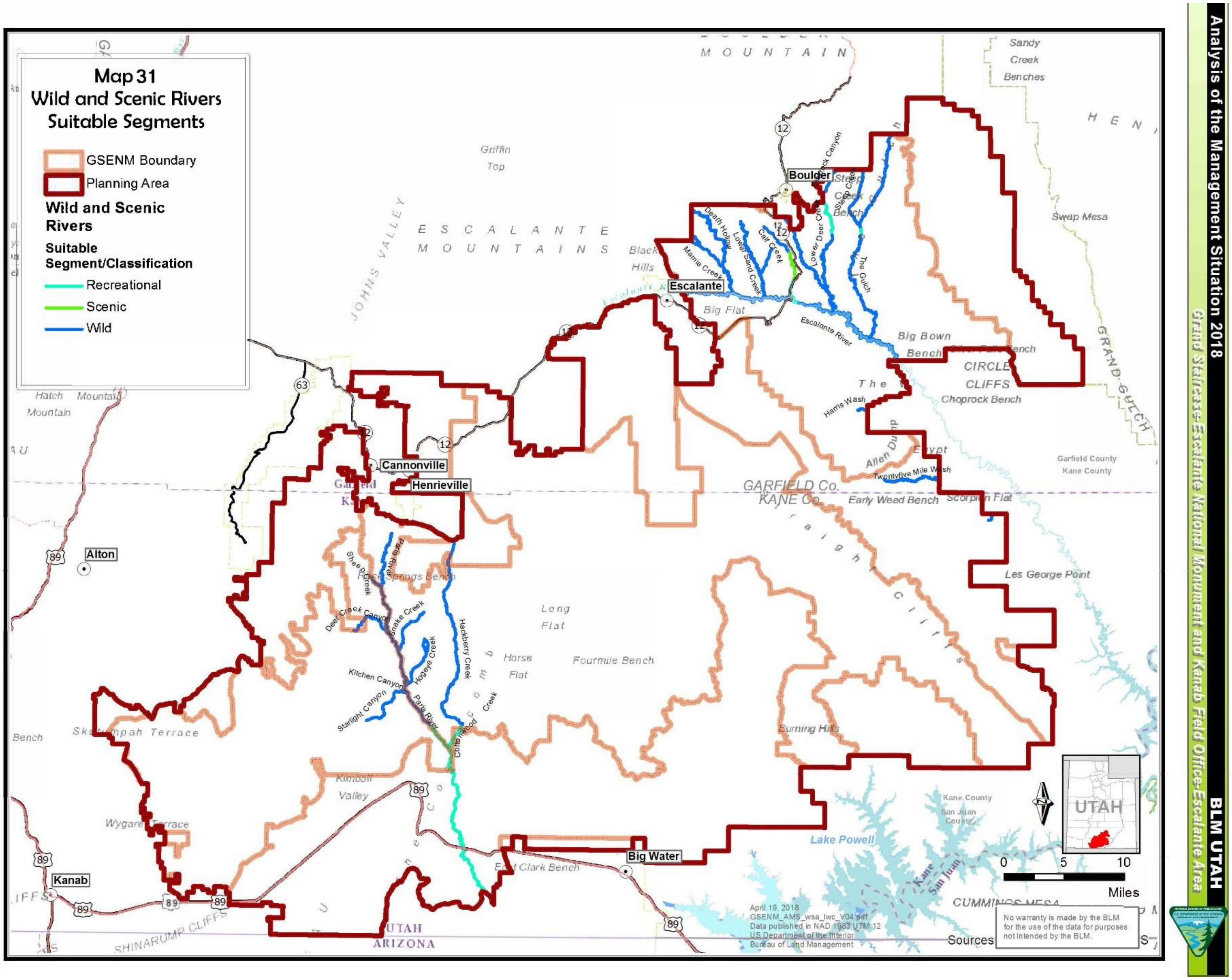
Sources: Esri, USGS, NOAA, Sources: Esri
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
UTAH BLM


Map 30
Scenic Byways and Backways
Land Status
Mormon Pioneer Heritage National Heritage Area-Under The Rim
UtahBackways
ScenicByways
GSENM Boundary
Planning Area
BLM Wilderness
Bureau of Land Management (BLM)
Bankhead-Jones Land Use Lands
Indian Reservation (IR)
National Park Service (NPS)
Private
State
State Parks and Recreation
US Forest Service (USFS)
USFS Wilderness
All-American Road - Scenic Byway 12
Mormon Pioneer National Heritage National Heritage Area
Boulder Loop
Lake Road
Boulder
Escalante
Escalante Canyons Unit
Big Bown Bench
CIRCLE CLIFFS
Choprock Bench
Hole in the Rock
Cannonville
Henrieville
Cottonwood Canyon Road
Kaiparowits Unit
Les George Point
Alton
Hatch
Glendale
Orderville
Grand Staircase Unit
Para River Valley
Kanab
Fredonia
Big Water
Smoky Mountain Road
Lake Powell
UTAH
ARIZONA
0 5 10
1:613,639
Miles
Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, N
May 02, 2018
GSENM_AMS_scenic_byways_V04.pdf
Data published in NAD 1983 UTM 12
US Department of the Interior
Bureau of Land Management
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
UTAH BLM


Map 31
Wild and Scenic Rivers
Suitable Segments
GSENM Boundary
Planning Area
Wild and Scenic Rivers
Suitable Segment/Classification
Recreational
Scenic
Wild
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
BLM UTAH
Boulder
Escalante
Cannonville
Henrieville
Alton
Kanab
Big Water
ESCALANTE MOUNTAINS
Escalante River
The Gulch
Calf Creek
Death Hollow
Mamie Creek
Lower Sand Creek
Big Flat
Big Bown Bench
CIRCLE CLIFFS
Choprock Bench
Harris Wash
Twentyfive Mile Wash
Early Weed Bench
Scorpion Flat
GARFIELD Co.
KANE Co.
Les George Point
Long Flat
Horse Flat
Fourmile Bench
Hackberry Creek
Paria River
Kitchen Canyon
Starlight Canyon
Hogeye Creek
Snake Creek
Deer Creek Canyon
Sheep Creek
Cottonwood Creek
Burning Hills
Skutumpah Terrace
Kimball Valley
Wygaram Terrace
East Clark Bench
Lake Powell
UTAH
ARIZONA
Griffin Top
Swap Mesa
Sandy Creek Benches
Garfield County
Kane County
0
5
10
Miles
April 19, 2018
GSENM_AMS_wsa_lwc_V04.pdf
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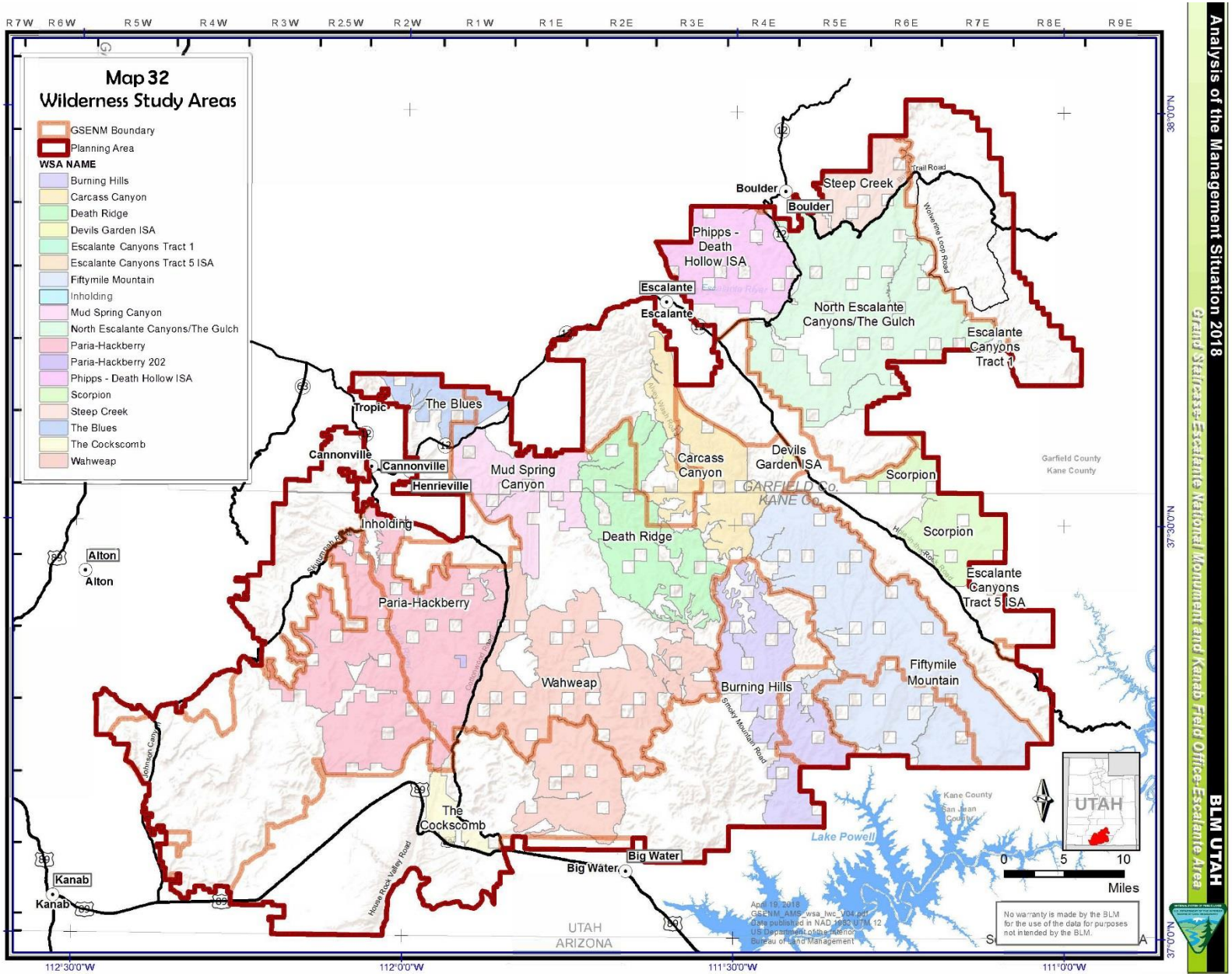
Map 32
Wilderness Study Areas
GSENM Boundary
Planning Area
WSA NAME
Burning Hills
Carcass Canyon
Death Ridge
Devils Garden ISA
Escalante Canyons Tract 1
Escalante Canyons Tract 5 ISA
Fiftymile Mountain
Inholding
Mud Spring Canyon
North Escalante Canyons/The Gulch
Paria-Hackberry
Paria-Hackberry 202
Phipps - Death Hollow ISA
Scorpion
Steep Creek
The Blues
The Cockscomb
Wahweap
Analysis of the Management Situation 2018
Grand Staircase-Escalante National Monument and Kanab Field Office-Escalante Area
BLM UTAH
Boulder
Steep Creek
Phipps - Death Hollow ISA
Escalante
North Escalante Canyons/The Gulch
Escalante Canyons Tract 1
Tropic
The Blues
Cannonville
Henrieville
Mud Spring Canyon
Carcass Canyon
Devils Garden ISA
Scorpion
Inholding
Death Ridge
Alton
Paria-Hackberry
Escalante Canyons Tract 5 ISA
Wahweap
Burning Hills
Fiftymile Mountain
The Cockscomb
Big Water
Kanab
Lake Powell
UTAH
ARIZONA
Garfield County
Kane County
GARFIELD Co.
KANE Co.
0 5 10
Miles
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R7W R6W R5W R4W R3W R2.5W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E R9E
38°0'0"N
37°30'0"N
37°0'0"N
112°30'0"W
112°0'0"W
111°30'0"W
111°0'0"W

Appendix 2. Cultural Resources

Examples of cultural resources are prehistoric and historic archaeological sites; artifacts; residential and commercial buildings; structures, such as bridges, roads, railroads, irrigation ditches, and historic trails; objects, such as roadside markers, monuments, signs, and sculptures; and historic districts, which may encompass one of more of these resource types in a concentrated, geographically definable area. Cultural resources can be significant in the context of national, regional, or local history, architecture, archaeology, engineering, or culture. They may also include sacred sites and natural features significant to extant communities or peoples.

The NPS provides additional cultural resource categories in its *National Park Service NPS-28 Cultural Resource Management Guidelines* (NPS 1998), including archaeological resources, cultural landscapes, structures, museum objects, and ethnographic resources. These NPS guidelines also acknowledge the primacy of the NHPA and NRHP in meeting its Federal obligations. "Cultural resources" may be used as a broad term, irrespective of their NRHP listing or eligibility; nevertheless, "historic properties," as defined in the NHPA (36 CFR 60) is used when discussing cultural resources that have been determined as eligible to the NRHP. Furthermore, when comparable classes of cultural resources are discussed, both terms—NHPA/NRHP and NPS definitions—are used together. The BLM and other Federal agencies generally use the definitions for historic properties and NRHP eligibility (36 CFR 60 and 800) when considering cultural resources on the lands they manage.

The 1996 proclamation establishing GSENM noted various cultural resources and historic properties in the new monument. One such example is prehistoric Anasazi and Fremont (also known as Ancestral Puebloan) culture archaeological sites, such as rock art panels, campsites, and granaries. Other examples are the Dance Hall Rock National Historic Site, which continues in its importance to local ranchers and Mormons to this day, and the route and associated sites from the John Wesley Powell Expedition. Additionally, the proclamation notes the significance of the "early Mormon pioneers [who] left many historic [remains], including trails, inscriptions, ghost towns such as the Old Paria townsite, rock houses, and cowboy line camps, and built and traversed the renowned Hole-in-the-Rock Trail as part of their epic colonization efforts" (Proclamation 6920, GSENM).

This essentially recognizes the role of GSENM as a steward in preserving a record of more than 10,000 years of human presence, adaptation, and exploration in GSENM, as exemplified by archaeological and historic sites, cultural landscapes, and potential TCPs. These cultural resources illustrate the connection of people with the landscape of the GSENM region and remain significant places for many descendent communities. They provide opportunities for people to connect with cultural values and associations that are both ancient and contemporary.

The BLM must consider the impacts of its actions, in accordance with the criteria of adverse effects; these are defined as "direct or indirect alteration of the characteristics that qualify a [historic] property for inclusion in the NRHP in a manner that diminishes integrity of location, design, setting, materials, workmanship, feeling, or association" (36 CFR 800.5(a)(1)). The BLM follows the guidance of the NHPA, as detailed in BLM Handbook Series 8100, and evaluates cultural resources using the NRHP criteria.

To firmly establish trends, a comprehensive monitoring program is needed to examine, on some sort of repeated basis, the conditions of historic properties and other cultural resources. Absent that, trends must be identified by persons with a long-term knowledge of the area and its resources. GSENM has always had a site monitoring component in its Cultural Resource program, and has also, for the past 7 years, had a Site Steward program. GSENM (and what was to become GSENM) has also been lucky in that it has had only two permanent archaeologists over the past 45 years, giving it some depth of "institutional knowledge." The general finding of these monitoring activities and long-term association is that the majority of cultural resource sites are in a stable condition, or as stable as natural erosion conditions permit (see above). Large-scale looting of sites is becoming very rare, and has not been reported in the GSENM area for many years. Smaller scale looting, such as exploratory shovel pits, are sometimes encountered, but are limited to only a few such discoveries per year. Casual artifact collection has always been, and probably will continue to be, a problem that is very hard to address. Educational and interpretive programs offered by the BLM have made a noticeable difference in local perceptions of archaeological sites, and vandalism at present seems to be largely a problem with out-of-town and out-of-state visitors.

Archaeological Characteristics of the Three Physiographic Provinces

GSENM is composed of three separate but adjacent physiographic provinces. From west to east these are the Grand Staircase, the Kaiparowits Plateau, and the Escalante Canyons and Benches. Each has its own geology and geomorphology, and, to an extent, flora and fauna. Each province is also host to numerous cultural archaeological and historical sites, with distinct differences between them as well as many similarities. Archaic and Late Prehistoric archaeological sites are found scattered across the landscape in all three areas, as are historic grazing-related sites. However, Formative sites, and historic sites of certain types, are much more restricted in their distribution. For example, Formative residential and farming sites, where the residents were dependent on agriculture, are restricted by certain environmental parameters such as elevation and temperature. Likewise, historic uranium mining sites are restricted to certain geologic formations. In the previous sections of this overview, discussion covered what would be considered "common to all" areas in a general sense. In the following sections we highlight the cultural resource differences between these three provinces and the reasons for those differences.

Grand Staircase Physiographic Province

Originally referred to as the Great Stairway by Clarence Dutton, the Grand Staircase is a series of cliffs that start along the Utah/Arizona border and climb from less than 5,000 feet elevation to over 7,900 feet at Bryce Canyon National Park. Starting in the south and climbing to the north, the Staircase includes the Shinarump Cliffs (a.k.a. the Chocolate Cliffs), the Vermilion Cliffs, the White Cliffs, the Gray Cliffs, and finally terminates with the Pink Cliffs on the edge of the Paunsaugunt Plateau. Archaeological sites and historic properties are found across the landscape, but with certain types dominant in certain areas.

Very early sites are rare. No Paleolithic (Paleoindian or Paleoarchaic) sites are known, but projectile points such as Clovis points and Folsom points are found rarely. One such Clovis point was recently found on private lands near Kanab, and others have been reported (but not documented), as well. An apparent Folsom point was also recently documented at a site below

the Vermilion Cliffs east of Kanab. Large, stemmed, lanceolate points attributed to the Paleo and very early Archaic timespan are also found on occasion. These may indicate a Paleoindian and/or Paleoarchaic presence, although any of these early points may have been curated by later peoples and brought to the GSENM area. However, in light of the *Paleoarchaic/ Paleoindian Period* discussion above, it is thought that these likely represent the actual presence of these culture-bearers. Unfortunately, nothing substantial can be said about such presence of these presumed megafauna hunters in the GSENM area, although the presence of mammoth in the terminal Pleistocene has been established on the Grand Staircase (Museum of Northern Arizona 2004).

An Archaic presence on the Grand Staircase is clearly evident through numerous site documentations, and Archaic artifacts (primarily projectile points) found across the area. Projectile points from the Early Archaic and Middle Archaic are well represented, but points such as Elko series and Gypsum points from the Late Archaic are by far the most common types found across the area. Archaic point types far outnumber earlier and later types together (assuming specimens of the long-lived Elko series points are indeed Archaic), and are found in all parts of the Grand Staircase regardless of elevation or micro-setting. This is not surprising, considering the long time depth of the Archaic and the environmental changes that took place over the course of several thousand years. Archaic points are especially common in some locations. In the Buckskin Mountain and Fivemile Mountain areas, below the Vermilion Cliffs, the dense concentration of Archaic points indicates that this location was a prime hunting area. This is still a prime area for mule deer that attracts modern hunters as the deer migrate seasonally between the Paunsaugunt Plateau to the north and the Kaibab Plateau to the south, and it has apparently been such for thousands of years. An Archaic pit structure, probably a late Archaic pithouse, has been identified in Kitchen Canyon and dated to 1800 BC (McFadden 2000, 2012). Hunter-gatherer sites, be they Archaic or Late Prehistoric, are more readily visible across portions of the Grand Staircase in areas not hosting Formative sites. Where Formative sites are found in abundance (see below), they tend to mask earlier and later sites by their sheer numbers. To borrow a quote attributed to the late Dr. Richard Thompson, “You can’t see the Archaic sites because they’re all buried under Anasazi sites.”

Formative sites of the Basketmakers and Virgin Anasazi are concentrated in a very specific zone delineated by soils and elevation. These sites tend to be found between elevations of about 4,700 feet to 6,400 feet. Virgin Anasazi territory is usually defined as running from southeast Nevada, in the Muddy River area, to the Cockscomb geologic formation at the eastern extent of the Grand Staircase physiographic province that separates this from the adjacent Kaiparowits Plateau. The eastern Virgin Anasazi might be referred to as the “upland Virgin” in that the elevations and associated environments were very different from that of the Virgin Anasazi locales from the Muddy River up through the St. George Basin. The eastern Virgin Anasazi inhabited the high desert of the Colorado Plateau as opposed to the much lower and warmer Mojave Desert of the western Virgin Anasazi.

Sites in this category are particularly dense along the Vermilion Cliff front. Basketmaker II sites, covering the transition from hunting and gathering to a horticultural lifeway (see above), are found primarily along the base of the cliffs in alluvial outwash and sub-irrigated settings. However, later Basketmaker II sites also appear in the uplands above such water sources, indicating that the all-important move to dry-land farming had been accomplished prior to Basketmaker III times and the advent of common ceramic use and development. The move to dry-land farming, based on maize varieties that could survive on monsoon rainfall and without

the need for direct water sources, allowed for population expansion into large areas that had been previously unavailable for farming.

Formative development proceeded from the Basketmaker II transition into farmers, through the Basketmaker III Period (AD 400–700) and the adoption of ceramics, and on through the Pueblo I Period (AD 700–900), the Early Pueblo II Period (AD 900–1050), the Late Pueblo II Period (AD 1050–1150), and into the Pueblo III Period (AD 1150 to about 1250 in the GSENM area).

Some of the most important Basketmaker II sites in southern Utah are within this physiographic province. Although some sites are located on private lands, sites such as Cave DuPont (Judd 1926) were some of the very first sites to be scientifically excavated and examined in the GSENM area. Cave DuPont has become the type site for the western Basketmaker II populations. A recent excavation within Kanab has exposed an open-setting Basketmaker II site as well, showing that by 50 BC, local Basketmaker II populations had fully adopted a horticultural lifeway, with all the advantages and disadvantages of such a farming existence (Zweifel et al. 2006). More recent and larger excavations in association with development of a reservoir immediately south of Kanab are promising to reveal significant information on very early agriculture and settlement patterns. It is safe to say that an entire record of the development, rise, and fall of prehistoric agriculture on the northern Colorado Plateau is present in the Grand Staircase.

Formative sites are common in a wide variety of settings. The greatest site densities, up to 70 or more sites per square mile, are found along the base of the Vermilion Cliffs and extending to the tops of the lower Shinarump Cliffs. Below the Shinarump Cliffs, the sites expand into the flat valley bottoms for some distance, but there is a significant gap between these sites and related sites around the base of the Kaibab Plateau to the south due to low elevation and lack of water. Where springs are present, these sites can extend into the flat valley bottoms for impressive distances. Similar sites are also very common atop the Vermilion Cliffs, and can extend almost to the base of the White Cliffs along major drainages such as Johnson Canyon and Kitchen Canyon. Cottonwood Canyon (outside GSENM but within the Grand Staircase province) has some of the only known examples of Virgin Anasazi cliff dwellings and kivas.

There are no indications that the local Virgin Anasazi practiced any form of water control. Features such as check dams and terraces are common in House Rock Valley, between the Kaibab Plateau and the Colorado River, where sites show a mixture of both Kayenta and Virgin Anasazi traits. The technology was clearly available to the Grand Staircase Virgin Anasazi, but their careful selection of site locations and soil types, and reliance on seasonal monsoons, made such water control practices unnecessary.

The Virgin Anasazi practiced a pattern of residential mobility, where farmsteads locations would change frequently in response to changing conditions, such as short- or long-term drought, arroyo cutting, insect infestations, or firewood and other resource availability. Sites were commonly occupied, abandoned, re-occupied, modified, and abandoned, and re-occupied on a rotating basis over the course of many years. It is not uncommon to find Basketmaker III and earlier Basketmaker II sites with later sites superimposed on them. Some sites show a continuous pottery scatter covering almost 800 years. What appear to be “village” sites are often revealed to be a series of sequential occupations, with later pithouses being constructed next to earlier, abandoned structures. The resulting pattern is a form of accretional architecture (McFadden 1996) and may resemble a village site where all structures would have been

occupied at the same time. The Virgin Anasazi were full-time farmers, who were likely born, lived, and died on a farmstead, as opposed to the Fremont, who practiced a form of seasonal mobility between winter residential locations and summer farming locations (see also *The Escalante Canyons Physiographic Province*, below).

Cultural development within the Virgin Anasazi region appears to have been largely through internal processes from the Basketmaker II through Early Pueblo II Periods. Ceramic designs and architecture follow patterns of progressive change, with later examples bearing similarities to earlier forms indicating a common background from one to the next. However, around AD 1050, there is a rather sudden change in painted ceramic designs and the appearance of corrugated pottery, along with architectural changes reflecting influence from the adjacent Kayenta Anasazi area to the south and east of the Colorado River. This "Pueblo II expansion" has been noted across the four corners area, and in the Virgin area marks the onset of the Late Pueblo II Period. Such radical and sudden changes may well represent actual population movements rather than just the diffusion of ideas. Pre-planned, L-shaped pueblo structures appear for the first time in the Virgin area, pottery designs change to reflect those in the Kayenta area, and a few potential kivas also make an appearance. Whether these were ever kivas in the traditional sense or simply deep, masonry-lined, pit structures is in question.

AD 1150 is typically used as the end of the Late Pueblo II Period, and has been pinned to certain ceramic types common to Late Pueblo II but not found in Pueblo III times. In the Grand Staircase Virgin Anasazi area, dates returned from what appear to be Late Pueblo II sites sometimes come back ranging between 1150 and the early 1200s, indicating a substantial population presence during Pueblo III times but a lack of diagnostic Pueblo III characteristics. This is a very interesting development from an archaeological perspective, and from a cultural perspective as well. The sudden appearance of a Late Pueblo II presence followed by of a "silent Pueblo III" would seem to suggest an intentional disconnect between the Virgin Anasazi and Kayenta homelands. As summarized by McFadden (2016:159), "The interpretation of this situation as a 'return to normalcy' is tempting: After a brief period of intense external influence beginning around AD 1100 or just before, lasting only a few generations, the Virgin population assimilated the exotic traits and continued on their original adaptive path established hundreds of years before." An example of this pattern can be seen in the presence of three different redware ceramics. In Pueblo I and Early Pueblo II times, San Juan redware was imported or traded into the Virgin Anasazi area, where no Virgin Anasazi redwares existed. In Pueblo II times, the Virgin Anasazi were acquiring Tsegi orange ware, again from the far side of the Colorado River. However, in Late Pueblo II, times a locally produced redware, Shinarump redware, had been developed, and by AD 1150 it had completely replaced the imported varieties.

The "silent Pueblo III" Period seems to have ended by the mid to late AD 1200s. No dates as to the actual cessation of Pueblo occupation are available, but midden accumulations at the Arroyo Site (McFadden 2012) and other late sites indicate occupation beyond an AD 1250 date of a corn kernel from the Arroyo site. A return to a hunting-gathering lifeway, supplemented by agriculture on an opportunistic basis, followed shortly thereafter.

The Hopi still have strong cultural connections to the GSENM area. Rock art sites (the preferred Native American term is "rock writing" sites) dating to the Formative Period are very common in the Grand Staircase. At one such site in the Vermilion Cliffs, a Hopi informant looking at the rock writing exclaimed, "Hey, that's my clan symbol—that's my clan!" This demonstrates the

long-lived Formative tie to the area, and the direct connection many of today's Native Americans have with the GSENM area. It is impressive that a modern human can still find and identify direct familial ties to archaeological sites more than 800 years old.

The Late Prehistoric, or Neo-archaic, is clearly visible by the AD 1500s and possibly as early as the 1300s. The Paiute were the local Native Americans at the time of Euro-American contact and were by all indications the cultural group that immediately followed the Ancestral Puebloans in the GSENM area. The cessation of the Formative Period has been generally attributed to overpopulation and an extreme downturn in local conditions (associated with the "great drought" of the late 1200s), but pressure from encroaching hunter-gatherers has also been suggested. Within the GSENM area, there is no evidence of conflict between the ancestral Paiute and the Virgin Anasazi, and indeed no indication that they interacted. The Numic speakers may have moved into the area following abandonment by the formative peoples or helped spur them to move on. However, it is unlikely that the picture is so clear cut; in all likelihood, there was interaction, and possibly intermarriage and exchange of culture. The Southern Paiute see a direct connection between themselves and the earlier Formative cultures. Limited Paiute horticulture, involving beans and maize, has been well documented ethnographically and has also been demonstrated archaeologically within the Grand Staircase (D'Andrea 2015). Kelly (1964) documented traditional Paiute use of the GSENM area, and the Kaibab Paiute have tentatively identified TCPs in the Grand Staircase. BLM-administered surface lands in and around the GSENM area are still used by the modern Kaibab Paiute for traditional purposes.

Historic sites in the Grand Staircase are largely associated with settlement and grazing. Most pioneer sites are not found on BLM-administered surface lands, but on the private lands surrounding GSENM. Only one pioneer burial site is known on the Grand Staircase, that of Elijah Averett, killed by Paiutes during the Black Hawk wars in 1866 (Newell and Talbot 1998:70). Historic sites are dominated by grazing-related sites, such as trails, fence lines, and range improvements. Only one historic line shack is known, in Hackberry Canyon, and was reportedly constructed by Frank Watson in the late 1890s. Built first as a homestead, the creek proved to be too unstable and prone to flooding for successful agriculture and the cabin was abandoned. Following that it was used as a line shack for livestock operations. A little-known and rarely used livestock trail climbs the steep canyon walls east of the cabin location, with historic inscriptions from sheepherders in the early 1900s scratched into the cliff face along the trail. The Civilian Conservation Corps operations in this area left corrals, water control features, and one storehouse constructed of native stone—this may be the type of "rock house" referred to in the original GSENM Proclamation (Proclamation 6920). One historic exploratory oil well has been documented in the Rush Beds vicinity, south of the modern community of Cannonville, but this well apparently never produced anything and was shut down after a short time. After only a few months of operation in 1929 and 1930, work was halted after drilling 4,400 feet and coming up dry (Zweifel 2008b). The Paria river canyon (spelled Pahreah at the time) was a well-established travel corridor between the Paria (Pahreah) townsite and the Tropic Valley to the north; historic signatures dating from the 1890s and through the early 1900s are common along the route (Spangler and Zweifel 2012).

Kaiparowits Plateau Physiographic Province

The Kaiparowits Plateau is a very large and relatively isolated formation that sits atop—and pushes the earlier rocks of the Grand Staircase and Escalante area below—this prominent landform. Isabel Kelly described the Kaiparowits Plateau as "an arid, barren, deeply dissected district where subsistence for even a small nonagricultural population must have been an acute problem" (Kelly 1934:551). In 2 years of fieldwork, Geib and the crew of the Navajo Nation Archaeology Department saw the extremes in the Kaiparowits Plateau environment, noting that in 1999 there was an abundance of resources available and that Kelly's assessment seemed far off the mark. In 2000, however, conditions were far worse than described by Kelly, leaving the researchers to wonder about the wealth of archaeology evident on the Kaiparowits Plateau and the wide variety of conditions the inhabitants must have faced over the millennia (Geib et al. 2001:361).

Archaeological sites of all ages are found here with the exception of Paleolithic sites; although a Paleo presence is a certainty, such sites are extremely rare and none have yet been documented on the Kaiparowits Plateau. Instead, the vast majority of the Kaiparowits Plateau is home to substantial numbers of Archaic sites. Most Kaiparowits Plateau archaeological sites consist of lithic scatters and artifacts, but the majority of these sites do not have temporally diagnostic artifacts and cannot be accurately dated at present. However, these can usually be assigned to the hunter-gatherer occupations, be they Archaic or Late Prehistoric. Sites in this category can be found in densities of 20 to 30 sites per square mile, although lesser and greater densities are common. Broken Arrow Cave, on the southern edge of the Kaiparowits Plateau, has extensive cultural deposits dating to more than 8,000 BP (Talbot et al. 1999).

In certain areas Formative sites are very common and tend to mask earlier and later sites, similar to that noted above in the Grand Staircase province. Along the western margins of the Kaiparowits Plateau, along the Paria River and Cottonwood Creek, formative sites of the Virgin Anasazi spill over from the adjacent Grand Staircase. Residential sites and farmsteads are found along both the Paria River and Cottonwood Creek, and granaries are found along the high cliffs overlooking these drainages. Some impressive Formative shelter sites are found farther to the east, moving toward the interior of the Kaiparowits Plateau, but Formative sites fade away fairly quickly as one progresses to the east. This was the apparent edge of the upland Virgin Anasazi occupation area for well into the Formative Period. The very marginal farming conditions in this area, including less sandy soils derived from different parent rock than to the immediate west, a dearth of springs, and repeated riverine flooding that limited historic settlement at communities such as Pahreah, Rock House, and Adairville, seemed to have also placed limits on prehistoric farming, as well.

A few Formative sites are found along the southern margins of the Kaiparowits Plateau, as well. Much of the Clark Bench area is dominated by Archaic and Late Prehistoric sites, but along Buckskin Gulch there are pottery scatters and rock art sites attributed to the Virgin Anasazi. At one such site in an area known as "the Dive," Hopi yellow ware ceramics indicative of the Pueblo IV Period have been documented. Although there are no Pueblo IV sites, per se, within the GSENM area, Hopi yellow wear at a location such as this most likely indicates continued pilgrimage use of the GSENM area following Formative abandonment (McFadden 2003).

The eastern edge of the Kaiparowits Plateau is delineated by the sharp contrast of the Straight Cliffs rising some 2,800 feet above the Escalante benches below. Along this margin, Formative

sites again become plentiful. Early occupations are attributed to the Fremont culture (see *Formative Period*, above), with substantial numbers of Anasazi (or at least Anasazi cultural traits) moving into the area in the AD 1000s. The Fremont practiced a form of seasonal movement between summer farming areas and winter residential locations, and inhabited the area around the same time as the Anasazi inhabited the Grand Staircase.

Rather than being divided into Basketmaker and Pueblo subdivisions, as was Anasazi development, the Fremont development is somewhat simpler and consists of the Escalante Phase, the Wide Hollow Phase, and the Late Formative Period (McFadden 2016).

The Escalante Phase is roughly temporally equivalent to the Basketmaker II Period of the Virgin Anasazi. It is during this time that the Fremont adopted farming, with probable residential moves between summer farming and winter residential locations. A similar strategy has been proposed for Anasazi Basketmaker II populations. Considering the long prehistory of maize farming and the adoption of the bow and arrow by the Fremont prior to such adoption by the Basketmakers, it would appear that the Fremont adopted agriculture through diffusion rather than through in-migration of an agricultural peoples. Following the Escalante Phase, the Wide Hollow Phase begins about AD 500 with the introduction of Fremont ceramics. This stable phase persisted for almost 600 years, and the introduction of ceramics seemed to make little overall impression on the overall lifeway, although it certainly made such tasks as cooking and food storage easier. The Wide Hollow Phase ends at about AD 1050 with the advent of the Late Formative Period and the presence of Anasazi cultural materials.

The Late Formative Period, from about AD 1050 to 1200, shows a mixture of Anasazi and Fremont cultural traits at various sites. It is unclear if these two cultures were actually in contact, or if the Anasazi moved into what was Fremont territory after Fremont abandonment. McFadden (2016) suggests three alternatives: (1) Fremont material culture was replaced by Anasazi material culture through a process of enculturation; (2) Fremont populations were replaced by Anasazi immigrants, or were simply succeeded by the Anasazi after a short hiatus; or (3) Fremont and Kayenta populations co-existed in the Kaiparowits-Escalante region. After a thorough review of all available information, it seems that the Fremont-Anasazi blend in the first suggestion is the most likely scenario. Geib has identified the source of the Anasazi immigrants as Virgin, albeit with evidence of Kayenta contacts, as well (Geib et al. 2001).

The Late Formative Period is largely temporally equivalent with the Anasazi Fiftymile Mountain Phase. As mentioned above, in the late AD 1000s and early 1100s there was an influx of Anasazi traits into the Fremont world. These traits were likely carried by Anasazi populations migrating into the area rather than through diffusion. While earlier work in the 1950s and 1960s considered these Anasazi populations to be of Kayenta origin, recent research has suggested that the Virgin Anasazi are a more likely source. The Fiftymile Mountain Phase, in turn, temporally coincides with the Virgin Anasazi Late Pueblo II Period and the early part of the Pueblo III Period, but stands apart from these in terms of architecture and locale. This was a short-lived phase characterized by an Anasazi/Fremont presence on the southeastern corner of the Kaiparowits Plateau that ran from about AD 1100 or perhaps 1150 to about AD 1200. The "blended" hypothesis seems particularly evident here, with a mixture of Anasazi and Fremont pottery at many sites; architectural forms that do not correspond to those in the Fremont, Virgin Anasazi, or Kayenta Anasazi areas; and an apparent adoption of a more mobile Fremont lifeway that still retained the Anasazi dry-farming agricultural practice. An extensive drought in the mid- to late-1100s may have been the "push-pull" factor that brought Virgin Anasazi

peoples from the Staircase to Fiftymile Mountain and the eastern Kaiparowits. Fiftymile Mountain is about 1,000 feet higher in elevation than arable lands of the Grand Staircase, and would have probably had more effective precipitation. Consequently, in times of cooler, damper conditions, the higher elevations of Fiftymile Mountain may have precluded prehistoric agriculture.

Areas on Fiftymile Mountain have some of the highest site densities recorded in the GSENM area. Recent surveys have shown that 80 sites per square mile are to be expected, the vast majority of which are associated with Anasazi and Fremont occupation. While the Fremont occupation extends back into the Wide Hollow Phase, most of the documented Formative sites are a result of the Late Formative Period mixed Anasazi/Fremont use of the landscape. Residential sites, field houses, and storage structures are very common, but Archaic and Late Prehistoric sites are found frequently, as well. Fiftymile Mountain has concentrations of cliff-side structures with densities that rival anywhere in Southern Utah. The vast majority of these represent storage structures or "granaries," with cliff-side residential structures being relatively rare. Due to access difficulties and a general lack of water that might allow for more recreational use of the area, these sites have retained a degree of preservation not seen elsewhere in GSENM, or over much of the southwestern United States.

If areas such as Fiftymile Mountain represent residential and farming locations, lower land forms such as Grand Bench, on the southern edge of the Kaiparowits Plateau, may well represent the "off season" land use locations. On Grand Bench, archaeological sites of all ages are again common, including sites from the Formative Period. However, there is an apparent lack of structural residential Formative sites. Limited use sites, such as camps and processing locations, but bearing substantial amounts of ceramics, are scattered across the landscape. These likely represent use of the landscape in the spring or early summer, prior to the start of the farming season and the availability of fresh produce. They are likely oriented toward the collection and processing of grass seeds and other plant materials that would make a welcome break from the long months of stored foods. Similar site displays are found in the Grand Staircase and the Escalante Canyons and Benches, providing information on a wider use of resources than what was available through horticultural practices and providing a more complete picture of seasonal landscape use by Formative populations.

Late Prehistoric sites, again based on a hunter-gathering strategy, are found across the Kaiparowits Plateau. Ethnographically these are attributed to the Kaiparowits Band of Southern Paiute, and can include temporary camp locations, resource collection and processing areas, hunting and/or kill sites, and likely winter camps, as well. Diagnostic Paiute artifacts, such as desert side-notched arrow points and Numic brownware ceramics, are certain indicators of Paiute use of the landscape. While Archaic sites are probably much more numerous, many of the small lithic scatters and plant processing locations may well be of Paiute origin. The Navajo have indicated the Kaiparowits Plateau as a TCP, but there has been no effort by the Navajo to pursue documentation as such.

Historic sites on the Kaiparowits Plateau are by and large related to the grazing history outlined above. A complex system of trails evolved between the late 1800s and early 1900s, but many of these have disappeared due to non-use. The communities of Rock House and Adairville were located on the western margin of the Kaiparowits Plateau, along the Paria River. Both communities were established in the 1860s, but did not last very long due to seasonal and storm-generated flooding of the Paria River. A few small, "Mom-and-Pop" coal mines have been

noted in the southern Kaiparowits Plateau, but these never attained any substantial size, productivity, or complexity.

The Escalante Canyons Physiographic Province

Based on the same geology as the Grand Staircase, this province is oriented around the Escalante River and its many tributary canyons and associated benches rather than the stair-step geomorphology seen to the west of the Kaiparowits Plateau. Again, sites of all ages and many types can be expected in this area. Similar to the Grand Staircase and the Kaiparowits Plateau, no Clovis sites are known, but a Clovis point was found in the Long Canyon area east of the community of Boulder. Archaeological testing of the site did not reveal a Clovis occupation, but it did document a long history of use dating at least to the Middle Archaic (Zweifel 2010). Excavations at the North Creek Shelter, located on private lands adjacent to BLM-administered surface land, have revealed almost continuous use of this shelter for the past 11,000 years or more, with large, stemmed points of both Paleoarchaic and Paleoindian affiliation at the lower levels (Janetski et al. 2012). Two rock art sites in tributary canyons along the lower Escalante River may depict what appear to be mammoths or mastodons, although this has been the subject of some debate.

Similar to the other provinces discussed earlier, Archaic sites, Late Prehistoric sites, and Historic sites can be found scattered across the entire physiographic province. The Escalante province has an extraordinary series of rock art ("rock writing") sites, with dense concentrations along the main canyon of the Escalante River and spilling into the side tributary canyons. Although dominated by Fremont pictographs and petroglyphs and lesser numbers of sites attributed to the Anasazi, there are also several Archaic rock art sites that are considered rare across the GSENM area as a whole. Found just above the confluence of Calf Creek and the Escalante River, the Hundred Hands rock art site is located in a shallow overhang high above the river. Well over 100 prehistoric hand prints cover the back wall; while hand prints are a common rock writing element not only in North America but across the globe, nowhere else on GSENM is there such a concentration of similar prints in one location. This is the only rock art site on GSENM that all consulted tribes consider important enough in a cultural context that they requested BLM to not use its image in publications or promotional material, and to not allow it to be permitted for visitation under the SRP system.

Rock shelters and alcoves are very common in the canyons and outcrops within this area, and these were favorite locations for use in all time periods as rock art locations, temporary shelters, and storage locations. Storage features such as granaries are common, with rarer, early, bell-shaped excavated storage cists occasionally found, as well. Shelter sites such as north Creek Shelter and the Alvey Site have shown to be particularly important in understanding the long-term archaeological record.

Fremont occupation of this province is long-lived and well documented. Sites include rock art, residential locations and structural features, ceramic and lithic scatters, and associated sites. Probably the most recognizable and readily apparent sites are cliff-side granaries, many of which are accessible and clearly visible, while others are well hidden in tributary canyons and small alcoves. Pithouses and residential sites are not often found in the canyons, but instead tend to be in upland locations or in more open agricultural settings. They can be found individually or in clusters. As noted earlier (see *Formative Period*, above), the Fremont used a system of residential mobility, with summer farming locations along watered streams and

seeps and winter residential locations with better access to solar exposure, firewood, and large game. In upland locations above the river corridor, such as Big Flat, just east of the community of Escalante, sites can be found in densities of more than 60 sites per square mile. The bulk of these are residential sites, with nearby associated work areas and food-processing sites including slab-lined hearths and roasting features.

Fremont occupation ended, or at least became mixed with the Anasazi culture, around AD 1000 at the end of the Wide Hollow Phase. In the following Late formative Period, the association between the Fremont and Anasazi becomes somewhat blurred (see the Late Formative discussion in *Kaiparowits Plateau Physiographic Province*, above), but there seems to have been a blending of Anasazi and Fremont cultures beginning in the early 1000s. Sites often appear with both Fremont and Anasazi ceramics, and local architecture takes on Anasazi characteristics, but the inhabitants seem to continue with a Fremont land use pattern of seasonal mobility and a lack of onsite food storage. Upstream from the community of Escalante, Anasazi sites disappear quickly and sites are again primarily Fremont. Recent surveys within the river canyon itself show a general lack of Anasazi sites (Harris 2009), at least in the Wide Hollow Phase. Almost all rock art within the canyon and across this Escalante area is of Fremont origin or design.

All identified Anasazi related sites in this area appear to be associated with the Late Pueblo II "expansion." The Coombs site, in the modern community of Boulder, is the largest known Formative site in the GSENM area, at more than 100 rooms. Although some Fremont pottery is found here, the structures and all other ceramics are of Anasazi origin, much of the clearly identifiable local Coombs variety. Parts of the site appear to have been constructed in typical Kayenta fashion, with pre-planned storage and residential room blocks. Farther to the east, Formative structures and sites in the Circle Cliffs area again appear to be of Anasazi origin, although again a few stray sherds of Fremont ceramics and an early date from a granary corncob indicate earlier occupations. The Coombs site dates to between AD 1129 and 1169, or coeval with the significant drought of the mid-1100s, while the Lampstand (Circle Cliffs) sites appear to date from the same period based on the large percentages of Coombs ceramics found there. Assuming the dates are correct, this would place the Coombs site and the Lampstand sites in the same time period as the Fiftymile Mountain Phase, and the reasons for Anasazi expansion into these areas may be related to pressures from the Virgin homeland to the west in the Grand Staircase. Geib et al. (2001) have suggested that the Fiftymile Mountain, Collet Top, Coombs, and Circle Cliffs sites and Anasazi sites in the lower Escalante and Glen Canyon systems could represent seasonal uses of these upland and lowland locations by many of the same peoples.

Late Prehistoric use is indicated by diagnostic desert side-notched arrow points, a hallmark of the Paiute people. In addition to Paiute use, probable Hopi visitation is suggested by the presence of Hopi yellow ware ceramics found occasionally at sites along the Escalante River. Although the yellow ware could possibly be the result of Paiute-Hopi trade, it is thought that the presence of the yellow ware indicates Hopi travel back to this area for spiritual reasons (pilgrimages and visiting shrines in ancestral territory) in the centuries following Ancestral Puebloan abandonment. Similar to an occurrence noted in the Grand Staircase section (above), a certain rock writing element also found along the Escalante River was recognized by a modern Hopi clan member as specific to his clan.

Escalante was settled in the 1870s and Boulder a few years later, and early historic transportation-related sites are well represented. Pioneered by settlers in 1879, the well-known Hole-in-the-Rock Trail runs south from Escalante, descends to the Colorado River at the Hole-in-the-Rock itself, and then climbs back out on the east side of the river and continues its torturous way to Bluff, Utah. This was the route used initially by the pioneers responding to an LDS Church calling to settle the Bluff area, but was used in later years by ranchers, miners, and others needing access across the river. Associated sites such as Dance Hall Rock and Fortymile Spring are also considered important related sites for their use as long-term camps and gathering locations during the several months it took to construct the passage down through the cliffs to the Colorado River. The Hole-in-the-Rock Trail is listed on the NRHP, and is currently under consideration as a Mormon TCP.

Other well-preserved historic roads include the Cream Cellar Route and Boulder Mail Trail, both of which connected the communities of Escalante and Boulder, and the Boynton Road that accessed the country south of Escalante and Boulder. These roads, primarily pack train and wagon routes, include some very impressive sections ascending and descending precipitous bedrock exposures. Boulder was the last community in the contiguous 48 states to receive year-round mail service when the Civilian Conservation Corps completed the first all-weather road from Escalante in 1940, and is said to have been the last community to have mail service via mule pack train.

Other historic sites are generally grazing-related, and consist of trails, range improvements, watering troughs and pipelines, rare line shacks, and historic inscriptions. Some of these inscription sites are complex, and date to the early settlement and initial grazing period. These offer a “who’s who” list of family names, many of whom are still located in the Escalante area.

Mining-related sites are not common except in the Circle Cliffs area, east of Boulder and accessed by the Burr Trail (an updated and paved version of another historic route). Following World War II, there was a uranium mining boom across parts of the southwestern United States, and several mines were opened in the Circle Cliffs area and operated into the early 1960s. Ore was not processed locally, but had to be transported to several milling sites, probably in the Moab and Blanding area.

Appendix 3. Fire and Fuels

Table 1.. Fire Regimes

Historic Fire Regime	Fire Frequency	High severity, stand replacement fire
I	0 to 35 years	High severity, stand replacement fire
II	0 to 35 years	High severity, stand replacement fire
III	35 to 200 years	High severity, stand replacement fire
IV	35 to 200 years	High severity, stand replacement fire
V	200 or more years	High severity, stand replacement fire

Table 2. FRCC Descriptions

FRCC	Condition Class Description
FRCC 1	Fire regimes are within or near an historical range. The risk of losing key ecosystem components is low. Fire frequencies have departed from historical frequencies by no more than one return interval. Vegetation attributes (species composition and structure) are intact and functioning within an historical range. Fire regimes are within historic time frames, and the loss of key ecosystem components from the occurrence of fire is low. Areas are considered to be healthy and functioning adequately.
FRCC 2	Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components has increased to moderate. Fire frequencies have departed (either increased or decreased) from historical frequencies by more than one return interval. This results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. Vegetation attributes have been moderately altered from their historical range.
FRCC 3	Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. Vegetation attributes have been significantly altered from their historical range.

Source: BLM 2005d

Fire Interaction with Vegetation

Pinyon and Juniper Woodland

The area covered in this vegetative type is in part due to past overgrazing and historic fire suppression, primarily in grasslands and sagebrush communities. It is estimated that pinyon-juniper woodlands have increased tenfold over that last 130 years throughout the Intermountain West (Miller and Tausch 2001). Old-growth pinyon and juniper woodland is estimated to be less than 10 percent of the current area classified as pinyon and juniper woodland (Miller and Tausch 2001). These old-growth areas are often restricted to fire-safe habitats such as steep, rocky terrain on thin substrates along ridges.

Most of the area where pinyon and juniper woodland currently dominate was historically characterized by fires burning every 15 to 50 years (Fire Regime II) (Kitchen 2004; Miller and Tausch 2001). These areas in the Decision Area are described by FRCC 2 (greater than 7,000 feet in elevation) or FRCC 3 (less than 7,000 feet in elevation). Areas of FRCC 3 are dense

stands of pinyon and juniper with scarce understory and high potential for cheatgrass invasion following fire. FRCC 2 has areas of encroached pinyon and juniper, but less dense than FRCC 3, and is at less risk of cheatgrass invasion following fire.

Because it is a non-sprouter and is thin-barked when young, fire has been the major historical cause of mortality for young juniper trees. However, adult juniper trees in mature stands are difficult to burn because the understory is usually sparse (older trees succumb to fire when 60 percent of the crown is scorched). Pure juniper stands need 35-mile-per-hour winds or greater to carry fire through the canopy (Winward et al. 1997). Fire is known to have been the most important natural disturbance that affected the distribution of juniper and/or pinyon-juniper woodlands before the introduction of livestock in the nineteenth century (Miller and Rose 1999). Burkhardt and Tisdale (1976) and Tirmenstein (1999) concluded that fire frequencies of 30 to 40 years would help keep juniper from expanding into Wyoming mountain big sagebrush communities.

Sagebrush

Pre-settlement, stand-replacing fire frequencies for low-elevation sagebrush are estimated to vary from 60 to 110 years (Fire Regime II) (Whisenant 1990; Peters and Bunting 1994; Miller et al. 2001). Because of the high risk of losing key ecosystem components following fire due to cheatgrass invasion, 100 percent of the sagebrush type is in a FRCC 3 condition.

Wyoming and basin big sagebrush do not re-sprout after fire, and low- to high-intensity fires kill most plants. Generally, the herbaceous understory composition does not determine the intensity and severity of wildland fires—sagebrush itself is the primary carrier. Although sagebrush does not re-sprout after fire, it is a prolific seeder, and if a seed source is present, reestablishment is quite rapid and dominance would occur within 20 years (Winward et al. 1997).

In the absence of fire, sage canopy increases. According to Winward (2004) the maximum canopy cover for sagebrush is 30 percent; any time canopy cover reaches more than 15 percent, the sagebrush individuals compete with each other. Because sagebrush is a relatively short-lived species (approximately 60 years), in the absence of disturbance, there is no recruitment of younger individuals. Consequently, the stand has the tendency to become old and decadent.

Salt Desert Shrub

Fire frequency for salt desert shrub has been estimated at 35 to more than 300 years and is historically classified as Fire Regime V. Most species of this type are not fire adapted and are considered climax. The exception is threadleaf rabbitbrush, which is sensitive to competition when growing with other species, but can dominate a post-burn site. Because rabbitbrush easily establishes from seed after fire, it is considered fire adaptable. Due to the risk of losing key ecosystem components and greatly increased fire regimes as invasive annual grasses dominate, salt desert shrub is typically classified as FRCC 2 or FRCC 3, depending on the relative departure from its historic fire regime.

A lack of continuous cover (fuels) made fire rare to nonexistent in salt desert shrub communities. Historically, these types did not burn often enough or in large enough patches to support dominance of fire-adapted plants. Most salt desert shrub species do not readily

regenerate following fire. Further expansion of invasive species following fire is a major concern for salt desert shrub communities.

Grasslands

Perennial grasses respond vigorously to fires of various intensities by re-sprouting following fire. Fast, high-intensity fires have lower severity that seldom causes substantial mortality to native perennial bunchgrasses. Slow-backing fires have a greater severity; mortality to native perennial bunchgrasses can be high under these conditions. With most natural ignitions, the predominant fire spread would be as a fast-moving head fire.

Mountain Shrub

Stand-replacing fire frequency ranges from 25 to 100 years in mountain shrub (Gruell and Loope 1974), although return intervals can vary widely with changes in elevation, aspect, site moisture, and the associated forest or woodland type. Mountain shrubs are classified as Fire Regimes I (e.g., Gambel oak), II (e.g., mixed mountain shrub or maple), and IV (e.g., mountain mahogany), depending on the dominant species and the site. The FRCC also varies depending on the dominant species and the understory. Mountain shrub communities at lower elevations (less than 6,500 feet) are classified as FRCC 3 due to the high risk of cheatgrass invasion following fire. In the Southern Utah Support Area Planning Area, 3 percent of the mountain shrub vegetative type is in FRCC 1, whereas 97 percent is in FRCC 2. Some species, like oak, readily re-sprout after fire because they reproduce vegetatively. Others, like Ceanothus, have specialized seed, which enable them to readily invade burns (Knight 1994), while some are intolerant of fire (e.g., curl-leaf mountain mahogany, mountain big sagebrush, and bitterbrush). This can cause a temporary shift in the species composition; however, most mountain shrub communities generally recover rapidly following wildland fire and are considered to be fire tolerant. In general, fire suppression in this vegetative type has shifted the seral balances toward greater representations of climax vegetation and older age classes, with a corresponding loss of early seral vegetation and younger age classes. Overall, wildlife quality has declined, while acreage of decadent stands and the attendant fuel loadings have increased.

Ponderosa Pine

Ponderosa pines have thick bark, which protects them from serious damage from surface fires. However, in the absence of fire (and an increase in grazing), ponderosa pines increase in density, or other woody species like juniper or shade-tolerant firs encroach in the understory, resulting in an increased risk of crown fire. Also, increased density of shade-tolerant species can place greater stress on larger old trees, mostly due to competition from other species, resulting in increased susceptibility to insects and disease.

Fire frequency for ponderosa pine communities ranges from 10 to 40 years, with low- to mixed-severity fires. These forests have typically missed between 5 and 10 fire cycles in the years of fire suppression, and as result can have a higher composition of woody vegetation in the understory.

Riparian Vegetation

Historically, fire in riparian communities would have been infrequent and varied from small size, with highly mosaic burn patterns as a result of the higher moisture content generally present in riparian areas/species, to stand-replacing burns likely to have occurred only in

extreme drought periods. Willow species typically sprout vigorously following a fast-moving fire because slow-moving fires are generally more damaging, presumably due to greater heat transfer to root crowns. The riparian vegetative type is classified as FRCC 3, mainly as a result of tamarisk invasion. Because of its high water and salt content and extensive root system, fire is ineffective in the control of tamarisk and can actually encourage its growth. Light (low temperature) fire encourages tamarisk to re-sprout and become even denser, whereas hot fire would sterilize the surrounding soil so that desirable shrubs and herbaceous species are unable to get established.

Mixed Conifer

Fire frequencies in mixed conifer range from 100 to 300 years. These forests are characterized by a combination of understory and complete-stand-replacement fire regimes (Arno 2000). Mixed conifer is classified as Fire Regime III or IV, depending on the elevation and related dominant species. Fire Regime III would characterize conifer-shrub communities at lower elevations that have pure conifer stands. Due to the longer historic fire return intervals and well-functioning vegetation attributes, mixed conifer is classified as FRCC 1 when associated with Fire Regime IV, and FRCC 2 when associated with Fire Regime III.

In recent years prolonged drought has predisposed species like Douglas-fir to insects (bark beetles), resulting in an increased fuel load. Dead woody fuels are accumulating, either standing and on the ground often in a haphazard manner; with the greatest fuel loadings occurring on the most productive sites, which are predominantly stand-replacement fire regimes. This mixed-severity fire regime often results in a mosaic pattern of stand structure and fuels. Past stand burn mosaics tend to increase the probability that subsequent fires will also burn in a mixed pattern (Arno 2000). When fires do occur, they tend to be intense and often sterilize the ground, with some 30-year-old fire scars showing very little vegetation returning.

Aspen

Fire frequencies for aspen stands range between 25 to 100 years, with mixed severity (Gruell and Loope 1974). Because of their high water content, aspen stands do not easily burn and often act as natural fuel breaks during wildland fires. Fire regimes and vegetative structure have been moderately altered from historical conditions, mostly as a result of conifer encroachment. Because they are thin barked, aspen-dominated sites are particularly susceptible to mortality of aboveground stems from fire of low intensity, even though aspen is well adapted to regeneration by sprouting after fire (Jones and DeByle 1985; Mutch 1970). Fires in young aspen stands tend to be low-intensity surface fires unless there is a great deal of understory fuel. In older stands, during the warmest and/or driest months of the year, abundant fuel can lead to higher-intensity fires.

Decadent aspen stands and other areas with thin, acidic soils can be less vigorous at regenerating via suckering, and can tend to support conifers even after fire.

Table 3. Fire Occurrence By Year (Number and Acres)

	Grand Staircase[1]						Kaiparowits Plateau						Escalante Canyons						Kanab-Escalante Planning Area						Total All Planning Units			
	Lightning		Human		Total		Lightning		Human		Total		Lightning		Human		Total		Lightning		Human		Total		Lightning		Human	
Year	#	Ac	#	Ac	#	Ac	#	Ac	#	Ac	#	Ac	#	Ac	#	Ac	#	Ac	#	Ac	#	Ac	#	Ac	#	Ac	#	Ac
2000	N/A	N/A	N/A	N/A	0	N/A	1	723	0	0	1	723	N/A	N/A	N/A	N/A	0	N/A	N/A[2]	12	N/A	N/A	0	12	1	735	0	0
2001	2	0.2	0	0	2	0.2	4	0.4	0	0	4	0.4	6	0.6	0	0	6	0.6	12	7.5	2	0.2	14	7.7	24	8.7	2	0.2
2002	1	0.1	0	0	1	0.1	4	0.4	1	5	5	5.4	3	0.3	0	0	3	0.3	17	12.9	2	2.3	19	15.2	25	13.7	3	7.3
2003	3	0.3	0	0	3	0.3	2	1.6	0	0	2	1.6	9	0.9	0	0	9	0.9	24	2.6	0	0	24	2.6	38	5.4	0	0
2004	14	1223	0	0	14	1223	5	1204	0	0	5	1204	4	0.4	0	0	4	0.4	30	3.2	0	0	30	3.2	53	2431	0	0
2005	3	0.5	0	0	3	0.5	4	0.6	0	0	4	0.6	4	0.4	0	0	4	0.4	15	2.4	3	6.4	18	8.8	26	3.9	3	6.4
2006	9	89.1	1	0.1	10	89.2	10	2.9	0	0	10	2.9	6	4.7	0	0	6	4.7	28	149	3	0.3	31	1491	53	1587	4	0.4
2007	3	0.4	1	0.1	4	0.5	2	0.2	0	0	2	0.2	4	0.4	0	0	4	0.4	18	2.6	0	0	18	2.6	27	3.6	1	0.1
2008	2	0.4	0	0	2	0.4	5	0.5	0	0	5	0.5	2	0.2	0	0	2	0.2	23	4	0	0	23	4	32	5.1	0	0
2009	8	1.1	0	0	8	1.1	3	0.7	0	0	3	0.7	2	0.4	0	0	2	0.4	26	2.8	4	0.8	30	3.6	39	5	4	0.8
2010	6	0.6	0	0	6	0.6	3	0.3	0	0	3	0.3	0	0	1	0.1	1	0.1	21	3.7	0	0	21	3.7	30	4.6	1	0.1
2011	2	0.2	0	0	2	0.2	4	0.4	0	0	4	0.4	2	0.2	0	0	2	0.2	21	2.5	2	15	23	17.2	29	3.3	2	15
2012	8	0.8	0	0	8	0.8	12	1.2	0	0	12	1.2	7	0.7	0	0	7	0.7	18	1.8	0	0	18	1.8	45	4.5	0	0
2013	3	0.6	0	0	3	0.6	10	1	0	0	10	1	2	0.2	0	0	2	0.2	12	1.4	3	0.3	15	1.7	27	3.2	3	0.3
2014	3	0.3	0	0	3	0.3	0	0	0	0	0	0	0	0	0	0	0	0	5	17.4	0	0	5	17.4	8	17.7	0	0
2015	3	0.3	0	0	3	0.3	1	0.1	0	0	1	0.1	1	0.1	0	0	1	0.1	12	4.78	3	0.3	15	0.1	17	5.28	3	0.3
2016	0	0	0	0	0	0	3	0.3	0	0	3	0.3	1	0.1	0	0	1	0.1	7	2.51	0	0	7	2.51	11	2.91	0	0
2017	5	0.9	0	0	5	0.9	2	0.2	0	0	2	0.2	1	0.1	0	0	1	0.1	5	1.4	2	0.8	7	2.2	13	2.6	2	0.8
Total	75	1319	2	0.2	77	1319	75	1938	1	5	76	1943	54	10	1	0.1	55	10	294	1576	24	267	318	1597	498	4842	28	31

[1] 1995, 1997 – Three large fires burned 970 acres.
[2] Fire start occurrence data not available, but 12 acres burned.
Ac - acres

Table 4. Acres of Fuels Treatment 1997–2018

Year	Seeding		Mastication		Broadcast Burn		Lop & Scatter		Dixie Harrow		Chaining		Total	
	GS	K-E	GS	K-E	GS	K-E	GS	K-E	GS	K-E	GS	K-E	GS	K-E
N/A	79	0	79	0	0	462	0	0	0	0	0	0	158	462
1997	-	0	-	0	-	418	-	0	-	0	0	0	0	418
1998	0	1,438	0	0	393	0	0	263	0	0	0	0	393	1,701
2006	0	2,240	0	78	0	0	106	641	0	0	0	0	106	2,959
2007	0	337	294	337	0	0	0	504	0	0	0	0	294	1,178
2008	-	3,472	-	1,677	-	0	-	0	-	4,194	0	0	0	9,343
2009	158	3,451	0	0	0	0	0	2	159	36	0	0	317	3,489
2010	159	1,144	0	0	0	0	0	984	295	0	0	1,144	454	3,272
2011	0	1,118	0	0	0	0	797	1,056	0	0	0	1,118	797	3,292
2012	1,269	630	0	0.4	0	0	2,664	0	0	0	0	0	3,933	630.4
2013	0	0.4	0	0.4	0	0	0.6	0	0	0	0	0	0.6	0.8
2014	0.6	0.3	0.6	0	0	0	0	0.5	0	0	0	0	1.2	0.8
2016	0	0	0	0	0	0	283	1,580	0	0	0	0	283	1,580
2017	812	1,322	16	0	0	0	0	0	0	0	0	0	828	1,322
2018	0	0	0	0	0	0	0	0	797	718	0	0	797	718
Total	2,478	15,153	330	2,093	393	880	3,851	5,030	1,251	4,948	0	2,262	8,362	30,366

There is no treatment history for Kaiparowitz or Escalante Canyons.
GS – Grand Staircase, K-E – Kanab-Escalante Planning Area

Appendix 4. Fish and Wildlife

Bird Species of Conservation Concern

Species	Habitat	Likelihood of Occurrence
Bald eagle *Haliaeetus leucocephalus*	Roosts in large trees, often near water	Known to occur, uncommon winter resident
Ferruginous hawk *Buteo regalis*	Cliffs, buttes, creek banks for nesting; farmlands, grassland, and shrub steppe for foraging	Known to occur, uncommon permanent resident
Golden eagle *Aquila chrysaetos*	Nests on cliffs near open country.	Known to occur, common permanent resident
Peregrine falcon *Falco peregrinus*	Cliffs and rock outcrops for nesting, often near pinyon-juniper and ponderosa pine	Known to occur, common permanent resident near cliff habitat
Prairie falcon *F. mexicanus*	Cliffs and rock outcrops for nesting; grassland and shrub steppe for foraging	Known to occur but rare and localized
Flammulated owl *Psiloscops flammeolus*	Old-growth or mature ponderosa pine forest, open mixed-conifer and aspen forests	Known to occur, common summer resident
Burrowing owl *Athene cunicularia*	Associated with prairie dog towns and ground squirrel populations, which provide burrows	Known to occur, uncommon summer resident
Lewis's woodpecker *Melanerpes lewis*	Open, park-like ponderosa pine forests; prefers oak woodlands in winter	Known to occur, but uncommon
Willow flycatcher *Empidonax traillii*	Riparian areas, primarily willow	Known to occur, uncommon summer migrant
Gray vireo *Vireo vicinior*	Relatively open pinyon-juniper, juniper, or oak woodlands	Known to occur, common summer resident in pinyon-juniper habitat
Pinyon jay *Gymnorhinus cyanocephalus*	Pinyon-juniper woodlands and ponderosa pine forests	Known to occur, common permanent resident
Juniper titmouse *Baeolophus ridgwayi*	Pinyon-juniper woodlands	Known to occur, common permanent resident
Bendire's thrasher *Toxostoma bendirei*	Desert habitats, juniper woodland, agricultural areas, and arid grassland	Known to occur, rare summer resident
Brewer's sparrow *Spizella breweri*	Shrub-steppe, high desert scrub, sagebrush	Known to occur, common summer resident
Cassin's finch *Carpodacus cassinii*	High and mid elevation forests, such as ponderosa pine	Known to occur, common permanent resident

Sources: Sutter et al. 2005; Utah Conservation Data Center 2015; Jensen et al. undated

Big Game and Other Wildlife Species

Desert Bighorn Sheep

In partnership with local conservation groups, the UDWR has reintroduced and supplemented populations of bighorn sheep in Utah since 1973. Since that time, over 850 desert bighorn sheep have been released in areas of historical habitat (UDWR 2013a:5, 20, 21).

Year-long crucial habitat for desert bighorn sheep is found in all units within the Planning Area with the KEPA Unit and the Kaiparowits having by far the most habitat. A small portion of year-long substantial habitat is located in the extreme northeastern corner of the KEPA Unit in Garfield County. The Planning Area is home to two bighorn sheep populations: Kaiparowits East/West, and Kaiparowits Escalante. In 2014–2015, the combined population estimate for these populations was 730 sheep. Desert bighorn sheep, which are considered to be year-long residents of their range, do not have seasonal ranges as do mule deer and elk (Appendix 1, Map 4). Bighorn sheep prefer very open vegetation types such as low shrub, grassland, and other treeless types typically associated with steep talus and rubble slopes. Bighorn diets consist of a variety of shrubs forbs and grasses. Bighorn sheep lambing occurs on steep talus slopes typically within 1 to 2 miles of reliable water sources.

Bighorn sheep are extremely vulnerable to a variety of viral and bacterial diseases carried by livestock, principally domestic sheep. In some reported cases, bighorn sheep exposure to these diseases has resulted in the decimation of entire populations. These diseases are transmitted in numerous ways, including nose-to-nose contact, and wet soils associated with areas of concentrated use such as stock watering ponds. Management of bighorn sheep is guided by the following BLM documents: Utah BLM Statewide Desert Bighorn Sheep Management Plan (*Revised Guidelines for Domestic Sheep and Goat Management in Native Wild Sheep Habitats* [BLM 1998], *Utah Bighorn Sheep Statewide Management Plan* [UDWR 1999b]), and corresponding UDWR Herd Management Plans.

Desert Bighorn Sheep Habitat	Acres in Each Planning Unit			
	Kanab Escalante Planning Area	Grand Staircase	Kaiparowits	Escalante Canyons
Year-long crucial	257,907	36,629	227,411	26,365
Year-long substantial	8,603	0	0	0

Pronghorn

Year-long crucial habitat for pronghorn is located within the Planning Area in the Kaiparowits and KEPA Unit in Kane County. Although not in mapped habitat, there is a small population of pronghorn in the Paria Breaks and Telegraph Flat area of the KEPA Unit. Pronghorn use shrub-steppe habitat, characterized by large expanses of open, low rolling or flat terrain (UDWR 2009:4). Lactating females rely on succulent forbs in the spring and early summer and need high quality browse above the snow level in winter (UDWR 2009:4).

Pronghorn fawning occurs throughout the range of this species (Appendix 1, Map 4). Pronghorn diets consist of a variety of forbs, shrubs, and grasses. Forbs are of particular importance during spring and summer, whereas shrubs are more important during the winter.

Pronghorn Habitat	Acres In Each Planning Unit			
	Kanab-Escalante Planning Area	Grand Staircase	Kaiparowits	Escalante Canyons
Year-long crucial	75,628	0	7,398	0

Mule Deer

Mule deer habitat is found in suitable locations throughout the Planning Area, with each unit containing at least some suitable habitat. Mule deer use a variety of habitats, usually areas in the early stages of plant succession, where they browse on forbs and grasses (UDWR 2014:6–7). In winter in the Planning Area, they use pinyon-juniper, sagebrush, and mixed vegetation cover types, and in the summer they use sagebrush, bitterbrush, and rabbitbrush (Messmer and Klimack 1999:14–16). They rely especially on shrubs for forage during critical winter months.

A major challenge to mule deer management in Utah is that many of the UDWR-designated crucial deer ranges are in late successional plant community stages. These areas are dominated by mature stands of pinion-juniper or other conifer trees and old even-aged stands of shrubs, such as sagebrush. This makes them less favorable to mule deer (UDWR 2014:6–7).

Mule deer are migratory, moving seasonally between summer and winter ranges. Mule deer usually summer at high elevations and winter at low elevations. Studies have shown that some mule deer on the Paunsaugunt plateau migrate south into Arizona for winter (Messmer and Klimack 1999:27). An estimated 6,500 mule deer migrate from higher elevations of the Paunsaugunt Plateau and travel up to 30 miles to winter habitats at lower elevation on Buckskin Mountain (KEPA Unit).

Mule deer have a high degree of fidelity to specific winter ranges where high population densities concentrate on relatively small areas. Mule deer are vulnerable to stress caused by human activity in winter range areas, and are displaced an average of 600 feet from areas of human activity (Hiat and Baker 1981).

Mule Deer Habitat	Acres In Each Planning Unit			
	Kanab-Escalante Planning Area	Grand Staircase	Kaiparowits	Escalante Canyons
Winter crucial	258,613	146,071	250,231	206,630
Winter substantial	143,550	65,617	18,218	46
Year-long substantial	2,540	0	15,921	0
Summer crucial	28,257	0	92,087	6,222
Summer substantial	13,555	127	0	5,330

Elk

Habitat for elk exists in all units within the Planning Area at mid to high elevations. Elk are habitat generalists and have a varied diet consisting of grasses, forbs, and shrubs. This flexible diet allows elk to live in a variety of habitat types, including all of Utah's mountains and some of the low deserts. Many elk in the Planning Area are migratory, moving seasonally between

summer and winter ranges. Elk generally spend their summers at high elevations in aspen and conifer forests, and winters at mid- to low-elevation habitats that contain mountain shrub and sagebrush communities (UDWR 2015a). There are also established year-round residents in the Circle Cliffs and Skutumpah Terrace. Human activity in elk winter range adds additional stress to the natural stress of winter survival.

Elk Habitat	Acres in Each Planning Unit			
	Kanab-Escalante Planning Area	Grand Staircase	Kaiparowits	Escalante Canyons
Winter crucial	2,845	0	1,411	9,160
Winter substantial	30,696	0	0	49,567
Year-long substantial	34,223	29,215	0	0
Summer crucial	0	0	0	0
Summer substantial	3,880	0	6,969	0

Black Bear

Black bear is currently the only species of bear inhabiting Utah. Black bears are native to and fairly common in Utah although not very common within the Planning Area. Both year-long crucial and year-long substantial habitat is located within the Planning Area. Black bears in Garfield and Kane Counties are primarily in large forested areas. Black bear are seldom seen within the Planning Area due to low numbers and their nocturnal nature.

Cougar

Cougar, or mountain lions, are found statewide in Utah, occupying habitat types ranging from rugged desert areas to above timberline. Crucial value habitat is found throughout Garfield and Kane Counties. The species is fairly common throughout Utah, but individuals are rarely seen because of their secretive nature. Seasonally, their movements follow their main prey—mule deer. Cougar will also feed on rabbits, elk, or other animals, but about 80 percent of their diet consists of deer. Cougars are active year-round, during day and night, although most activity occurs at dawn and dusk.

Furbearers

Several furbearer species occur in the Planning Area and are managed according to Utah Furbearers Regulations. Furbearers as defined by UDWR include bobcats, raccoons, badgers, weasels, and beavers. Bobcats are fairly common in Utah but are rarely seen because of their secretive nature.

Upland Game Birds

UDWR manages upland game bird harvest. The most common upland game bird inhabiting the Planning Area is chukar. They are found on rocky, grassy, or brushy slopes as well as in canyons and drainages. Chukar are most common within the Kaiparowits Plateau Formation.

Turkeys are somewhat less common and are found in a variety of habitats, including woodlands, oak brush, pine groves, canyons, and riparian areas. Turkeys are concentrated in the Escalante Valley, near Tropic, Henrieville, Cannonville, and Johnson Canyon. Gambel's quail

and greater sage-grouse are also present in the Planning Area in low numbers. These birds feed on a variety of seeds, forbs, insects, fruits, nuts, and acorns. Access to water sources is critical. Additionally, turkeys need roost trees, such as large ponderosa pines or cottonwoods next to foraging areas.

The habitat for these species varies and depends upon season of use, as well as availability of food and shelter.

Major Habitat Types

Desert Shrub

Desert shrub includes numerous upland vegetation communities with a shrubland component and a variable understory of grass and forbs. Herbaceous plants are vital to the majority of all wildlife species, providing food, cover, and structure. The thermal relief provided by shrub cover helps wildlife to survive the rigors of summer heat and winter cold. It supplies browse, seeds, and cover for birds and small and large mammals. Intermingled areas of desert grasslands add diversity to vegetation and habitat structure in desert shrub communities.

Sagebrush/Grassland Steppe

Sagebrush habitat is prevalent in pockets throughout the Decision Area. At mid to lower elevations, big sagebrush is the dominant habitat type that provides important winter habitat for certain wildlife species (e.g., mule deer, pronghorn, and greater sage-grouse), and localized yearlong habitat by sagebrush-obligate species. Sagebrush also provides crucially important breeding, nesting, and brood-rearing habitat for these species. Intermingled occurrences of grasslands and several low sages add to the diversity of vegetation and habitat structure. Because of regional losses of sagebrush communities, and the number of sagebrush obligate wildlife, maintenance and improvement of existing sagebrush habitat has become crucial for community structure and diversity and for providing crucial habitat for obligate species.

Pinyon-Juniper Woodlands

Pinyon-juniper woodlands are widely dispersed and have expanded into sagebrush and other vegetation communities. Pinyon-juniper woodlands provide some wildlife habitat and can be important for thermal cover in big game wintering areas. Although understory vegetation is reduced beneath pinyon-juniper stands, they provide greater structural diversity than desert shrub or sagebrush steppe habitats.

Riparian/Wetland

Riparian/wetland habitats are crucial components in the landscape as they provide various life-cycle requirements such as foraging, bird nesting, roosting, and hiding cover, as well as travel corridors for numerous species. The riparian vegetation is often a corridor for animal migration and travel. A high degree of plant diversity typically occurs along the riparian corridors, exhibiting variable density and composition of plants that lead to diversity of openness and groundcover. Invasive species such as tamarisk and Russian olive are a management concern due to their prolific seed production and high evapotranspiration rates. Tamarisk can quickly overtake a riparian area upon introduction into that area, due to the tremendous amounts of seeds they produce. These species then reduce the amount of available surface water and affect the health of riparian systems.

Riparian vegetation moderates water temperatures and provides bank structure that reduces erosion and provides overhead vegetation cover for fish. Intact riparian communities also serve to slow overland flow, capture sediments, and provide a filter that enhances water quality. Water quality, especially in regard to such factors as sediment, temperature, and dissolved oxygen, also greatly affects fisheries habitat.

Aspen

Multi-seral stages of aspen and associated understory provide multiple benefits to many wildlife species. Many raptor species are adapted to aspen forest and the adjacent open brush, meadows, and grasslands that provide a vast array of prey species. Aspen also provides suitable vegetation for breeding and feeding areas. Small aspen stands are found on Fiftymile Mountain and along Henrieville Creek in the Kaiparowits Unit.

Non-Vegetated (Rock Outcrop)

Cliffs and outcrops are faces of vertical exposed rock that sometimes have a talus slope at their base. Several raptor species and birds use cliffs for nesting and brood rearing habitat. Peregrine falcons and golden eagles generally nest on rock outcrops and cliffs that range from 30 to 400 feet high. Canyon and rock wrens nest in the fractured talus slope below cliff faces, particularly in areas that are interspersed with a diversity of habitats.

Ponderosa Pine

Ponderosa pine forests provide habitats for various wildlife species. Snags in the mature pine forest provide a large number of species with nesting and roosting sites. Big game, such as deer and elk, also use the pine forests for food and shelter (Howard 2003). Ponderosa stands within the Planning Area are usually limited to small, isolated pockets along cliff edges and on points of the White Cliffs. The largest stand occurs in the Mud Springs area of the Kaiparowits Unit.

Oak/Mountain Shrub

There are two types of mountain shrub communities within the Planning Area: mountain big sagebrush and mixed mountain shrub. These areas provide food and cover for mule deer, elk, black bear, and wild turkey.

Appendix 5. Paleontology

Formation Summaries and Potential Fossil Yield Classification

Permian System

Permian strata are regionally exposed only in the central portion of the Circle Cliffs and on the Buckskin Mountain-Fivemile Mountain areas of the northern Kaibab Anticline, within KEPA lands. No Permian strata occur in the three GSENM units. In the Circle Cliffs only the Kaibab Limestone is exposed, while in the Buckskin-Fivemile area Doelling and Davis (1989) recognized equivalents of the Hermit, Coconino, Toroweap, and Kaibab Formations exposed in the deeply incised Buckskin Gulch. Buckskin Gulch used to be called Kaibab Gulch and is the original type section for this important formation (Gregory and Moore 1931), made famous by virtue of it forming the rim of much of the Grand Canyon. The fossil content of these formations reflect their shallow marine, tidal, and onshore coastal origins approximately 270 to-280 million years ago (mya). Fossils are abundant locally, and consist mostly of typical Late Paleozoic shallow, warm water marine invertebrates (mollusks, brachiopods, echinoderms, coelenterates, and poriferans) (Foster et al. 2001). Such fossils are widespread in Arizona, Nevada, Idaho, and Utah, wherever the Kaibab Formation is exposed; therefore, the southern Utah specimens have no particular known significance beyond those found elsewhere. No unusual invertebrate faunal elements are known from the Kane and Garfield County area, and vertebrates are virtually unknown. Important nautiloid and ammonoid cephalopod fossils (e.g., *Pseudogastrioceras mckeei* in Miller and Furnish 1958) are known from near Navajo Bridge in Arizona (Miller and Furnish 1958), but have never been reported from GSENM. Collectively the Permian units in the Planning Area would rate a Potential Fossil Yield Classification (PFYC) of 3A.

Triassic System

The Triassic System in Kane and Garfield Counties consists of the Moenkopi and Chinle Formations, and lower portions of the Dinosaur Canyon Member of the Moenave Formation and Wingate Sandstone. The Moenkopi occurs mostly on KEPA lands, while the Chinle occurs in all four Planning Areas. Outcrops of the Moenave Formation are limited to the Grand Staircase and Kaiparowits Units, as well as KEPA lands around the Vermilion Cliffs, while surface exposures of the Wingate Formation are largely confined to the Escalante Unit and KEPA lands in the Circle Cliffs area.

Moenkopi Formation—The Early Triassic Moenkopi Formation (240–249 mya) records extremely hot climatic conditions in a subequatorial setting during an especially chaotic and hot period of biological history, in the wake of the Permo-Triassic Boundary Extinction Event. Unlike the end-Cretaceous event and others, there appears to be no unequivocal evidence for an extraterrestrial impact associated with the end-Permian event. Regardless of its cause, the effects were devastating to the Earth's ecosystems. This massive biological catastrophe is recorded in the Moenkopi Formation, whose monotonous red nature and dearth of fossils records the ecologically bleak conditions that pervaded the low latitudes at the time. In general, fossils are uncommon in the Moenkopi Formation in the GSENM region. Notable exceptions include the portion of the Timpoweap Member that is subtidal marine and the distal tongue of the Virgin Limestone Member, which locally contains abundant mollusks, including nautiloids

and ammonites (Foster et al. 2001). The tidal and terrestrial portions of the siliciclastic portions of the Moenkopi section yield sparse reptilian track fossils, mostly concentrated into single bedding horizons. Lacertoid (lizard-like), and chirotheroid (large feeding or swimming scrapes) type tracks are known from the GSENM area, but are not common and confined to below the Virgin Limestone. The Moenkopi Formation rates throughout the Planning Area in the PFYC system as a 3A.

Chinle Formation—The Chinle Formation dates to the Late Triassic (Norian and Rhaetian stages, 220–204 mya). It was deposited in north/northwest flowing rivers after the first major pulse of mountain building started in the western Cordillera. While the underlying Moenkopi Formation was deposited in a largely arid coastal setting, the Chinle Formation was deposited in an isolated continental interior with much higher rainfall. The wetter climate allowed dense stands of conifers (flowering plants had not evolved yet) to cover the landscape and animals to flourish. The Chinle Formation is justifiably famous for its vertebrate fossil content and petrified wood, but it also locally contains important plant and invertebrate fossils, as well as trace fossils including trackways. Within the Planning Area, the most common vertebrate fossils in the Chinle Formation are isolated bones, armored plates, and teeth of large, crocodile-like animals called phytosaurs, as well as metoposaurs (giant salamander-like amphibians), both of which dwelt more or less permanently in water. An isolated find of a fully articulated *Poposaurus* (a land-dwelling crocodile like predator) in the Circle Cliffs area represents the potential of the formation to yield truly world-class, scientifically significant fossils. North America's oldest dinosaur fossils are also known from the Chinle, but not specifically from the Planning Area.

As elsewhere the Chinle in the Planning Area contains an abundance of petrified wood. In fact, the Circle Cliffs has been claimed to contain the second largest Triassic age petrified forest (concentrations of fossil logs) in North America, second only to Petrified Forest National Park (Ash 2003). Spectacular, intact logs occur throughout the Circle Cliffs and Vermilion Cliffs areas, but are much more difficult to find in the latter because of poor exposures, and historic commercial scale collecting has taken many specimens. Overall the Chinle Formation in the Planning Area would rank in the PFYC system as a 4 or 4.5.

Moenave/Wingate Formations—The Moenave and Wingate Formations are essentially time equivalent to each other; simply representing changes in environments that occurred from west to east. The Moenave is a largely riverine and lake deposited system in a tropical semi-arid interior climate, while the Wingate Formation (or Sandstone) was deposited as sand dunes to the east of the Moenave floodplain. In general, aridification of a landscape lowers fossil potential, and the Moenave and Wingate reflect that. In the western portion of the Planning Area (west of the Cockscomb along the Vermilion Cliffs), the Dinosaur Canyon Member (the thickest unit), has not yielded anything but occasional fish remains, fossil trackways, and microfossils. The overlying Whitmore Point Member, which occurs up in the cliffs west of Flag Point, is much more fossiliferous than the Dinosaur Canyon Member and contains an abundance of fish and other vertebrate remains and also mollusk and other invertebrates and stromatolites. Potentially the Whitmore Point could yield important vertebrate fossils, but it is difficult to inventory and collect because of its position in the cliffs and limited area of outcrop. Nearby in St. George, at the Dinosaur Discovery Site at Johnson Farm, tracks, bones, and teeth of several different kinds of animals have been collected from the Whitmore Point. Collectively the Moenave in the Planning Area (only occurs west of the Cockscomb) would rate a PFYC of 4

because of the potential for tracks and body fossils (especially in the Whitmore Point Member or its equivalents between Seaman Wash and the Paria River).

Jurassic System

Kayenta Formation—The Kayenta Formation is Early Jurassic in age (195–200 mya) and was deposited on the western margin of northern Pangea, during its initial breakup. The climate at the time was tropical and semi-arid to arid, with most of the depositional environments representing seasonally wet rivers and lakes, similar to the modern Okavango River Basin in Africa. Three different members are present in the Planning Area, the Springdale Sandstone (occurs in the Grand Staircase, Kaiparowits, and KEPA lands in the Vermilion Cliffs area), the main body of the Formation (throughout the Planning Area), and the Tenney Canyon Member (only found in the Vermilion Cliffs areas in Grand Staircase, Kaiparowits, and KEPA lands). The formation is famous for its vertebrate fossils in Arizona and has yielded one of the most diverse Early Jurassic vertebrate faunas in North America. At least seven species of dinosaurs, three mammal-like reptiles, a pterosaur, protosuchids, a frog, and a turtle are all known. While the unit should, in theory, have potential to produce such significant fossils, no remains of tetrapods identifiable to genus have been identified within the Planning Area. Bone fragments, or even whole elements do occur sporadically in the Springdale Sandstone Member and main body units (especially in intraclastic lags preserved in channel bottoms), but almost nothing of scientific significance has been found. By volume, the most important fossils are tracks and traces, which appear to have readily preserved in the rapidly alternating wet and dry cycles of the early Jurassic. Dinosaur tracks are locally abundant throughout the formation, although its ledge-forming nature frequently makes it difficult to see them. One particularly famous dinosaur track site in the Kayenta is northeast of Flag Point, where tracks co-occur with a tribal pictograph panel that appears to depict tracks associated with bird figures. Petrified wood occurs commonly in the Springdale Sandstone Member, less so in the main body. About two-thirds of the wood in the Springdale is silicified and an attractive olive green in color, while the remainder is preserved by a mixture of carbonate and iron minerals that do not preserve the original structure quite as faithfully. Because of its fossil vertebrate footprint content, the Kayenta locally rates as a PFYC 4.

Navajo Formation (Sandstone)—The Navajo Formation was deposited more or less continuously with the underlying Kayenta Formation, recording a progressive drying out of the interior of North America heading into the later Early Jurassic between 180 and 195 mya. The unit is widespread through all four planning units, underpinning some of the most spectacular scenery the region has to offer. By volume, most of the formation consists of windblown sand (dune) that accumulated in the largest erg system that ever existed on earth. Unfortunately for the paleontologist, this geological superlative translates into very poor conditions for preserving body fossils. Bones are almost unknown in the Navajo Formation in the Planning Area, although a fish locality in the Paria Box has recently been documented (Frederickson and Davis 2017). Outside the Planning Area, rare, but spectacularly preserved specimens of dinosaur body fossils (*Seitaad, Segisaurus*), and tritylodont cynodonts do occur. By volume, the most important fossils in the formation are fossil tracks and traces, which preferentially preserved in moist inter-dune oases or playa lakes. Fairly high diversity footprint assemblages are known from a number of locations, most of which are adjacent to the Planning Area (Moccasin Mountain, Lake Powell area), but the potential for such sites is equally high inside it. Collectively, and largely because of the very low density of significant sites, the Navajo has a PFYC rating of 3A.

Carmel Formation—The Carmel Formation is Middle Jurassic in age (170–180 mya) and was deposited in a succession of shallow marine and coastal plain environments during an especially hot and arid time in southern Utah's history (Doelling and Davis 1989). It is present in all four of the planning units providing a beautiful palate of color on top of the Navajo Formation. In western Kane County and Iron and Washington Counties the lower portion of the formation has normal marine limestones and shales with a diverse marine invertebrate fauna. In the Planning Area, which was on the eastern and southern margins of this seaway, the water was shallow, and tended frequently toward hypersaline, which was toxic to most normal marine animals. These conditions resulted in a series of sandstones, shales, bedded and diffuse gypsum, and occasional thin limestones with a very low diversity and abundance of fossils. In fact, the conditions were so poor for normal life that stromatolites, normally unable to compete in healthy marine ecosystems, made a comeback in the hot, salty waters. Conditions on land seem to have been little better, as trace fossils are largely limited to invertebrate traces. Fossil vertebrate tracks are virtually unknown. Because of this, the Carmel Formation rates in the PFYC as a 2 in the Planning Area. Its rating would be higher to the west.

Entrada Formation (Including Associated Sub-Morrison Units: the Romana Sandstone, Henrieville Sandstone, and Summerville Formation)—The upper portion of the upper-most Middle Jurassic and early Late Jurassic succession in southern Utah is a complex of alternating shallow marine, coastal plain, and fluvial deposits that change character dramatically as you go from west to east or north to south. The climatic conditions were still hot, but the region started getting more rainfall as it transitioned to the semi-arid climate of the Morrison Formation. A regional sub-Cretaceous angular unconformity eliminates all of these units west of Skutumpah Creek, along the Skutumpah Terrace, but they are present everywhere else. Generally speaking, the lower portion of the Entrada Formation (Gunsight Butte Member) consists of dune deposits. Fossils are rare in this interval. It is in the upper portion of the succession that fossils become more common. While body fossils are almost unknown, vertebrate trackways and traces are relatively common and widespread, occurring in the Romana Sandstone and Escalante Sandstone units over much of the southern margin of the Kaiparowits Plateau region and also west of HITRR, at the base of the Straight Cliffs escarpment. Root casts, colonial insect nests, and other invertebrate traces are also known. For its vertebrate track record, the upper units in the Entrada complex would rate a PFYC of 4.

Morrison Formation—The Late Jurassic age Morrison Formation is one of the most important dinosaur-bearing formations in the world (Foster 2007). It was deposited between 147 and 157 mya in semi-arid to semi-humid environments in an interior basin, with rivers generally flowing north/northeast. It is only present on and around Escalante, on the east side of the Kaiparowits Plateau, and along the southern margin of the Kaiparowits Plateau as far west as Wiregrass Canyon. It appears that in the vicinity of Escalante the Morrison is a truncated section that only preserves the lower portion of the Brushy Basin Member equivalents. The upper portion, along with any diagnostic Early Cretaceous age Cedar Mountain Formation is conspicuously absent in the Planning Area. Although no extensive bonebeds such as the nearby Burpee Quarry in the Henry Basin have been recorded from the local Morrison, dinosaur and other bone does occur, particularly around the Salt Wash-Brushy Basin contact. However, virtually no inventory has been done in the unit in the vicinity of GSENM, and no genus- or species-level diagnostic vertebrate material has been collected so far. It is certain the area has high potential for important vertebrate fossils. The region's Morrison Formation is actually more famous for its gem-grade red jasper petrified wood, which occurs in the Escalante area. This resource is the

basis for the Escalante Petrified Forest State Park, which has an interpretive trail and large numbers of logs preserved. While wood is fairly widespread in the Morrison Unit around the eastern portion of the Planning Area, much of it is black to gray. High quality red jasper appears to be localized in the Escalante area. Regionally the Morrison Formation would rank in the PFYC as a 4.5, mostly because locally its potential is truly undetermined. Elsewhere in Utah it would rank as a PFYC of 5.

Late Cretaceous System

Overview

Vertebrate fossils from Late Cretaceous strata constitute one of the truly globally unique resources within the Planning Area. Many species have been found nowhere else or are rare, or incompletely known elsewhere. This is because the Cretaceous climate and geography came together to create the perfect wet, sediment-loaded conditions that preserve body fossils. Unlike the entire Jurassic, during the Cretaceous the region was a humid tropical forest thriving with life large and small. Collectively the region's Cretaceous fossils paint one of the most complete pictures of terrestrial vertebrate evolution through the end of the age of dinosaurs in the world. This unique resource was the primary basis for the inclusion of the Kaiparowits Unit in GSENM, and fossil preservation in the upper portion of the Late Cretaceous is truly exceptional. It is not unusual to find one or two sites a year that exhibit soft tissue. Thirteen new dinosaurs have been named from the Kaiparowits Plateau region in as many years, and it is still one of the most scientifically productive Cretaceous fossil areas in North America. Since 2000, BLM has been actively managing these resources through partnerships with museums and its own in house paleontology program as result of previous management plan decisions SCI-1, SCI-7, PAL-1, and PAL-3. The in house program manages the only working paleontology preparation and research lab in the Bureau and a dedicated group of about two dozen volunteers.

Within the Planning Area, Cretaceous beds are restricted to the Grand Staircase and Kaiparowits Units (the majority of rocks in this unit in fact), as well as KEPA lands in those areas. The most expansive and best exposed outcrops occur in and around the Kaiparowits Plateau. As a generalization, the southern Utah Cretaceous section is mostly terrestrial in the western half, and to the east, mixed marine-terrestrial in the lower half and dominantly terrestrial in the upper half. Because of the potential for vertebrate fossils, none of the Cretaceous units in the Planning Area rate less than 4 on the PFYC, with some units ranking at 5.

The most recent summary of available faunal data resulting from this and other work is found in the 2013 Indiana University Press volume *At the Top of the Grand Staircase-The Late Cretaceous of Southern Utah* (Titus and Loewen 2013), and also in Titus et al. (2017), which are the basis for the faunal list at the end of this section. Because of the potential for vertebrate fossils, none of the Cretaceous units in the Planning Area rate less than 4 on the PFYC. However, individual units, discussed separately below, do rate higher.

Cedar Mountain/Naturita Formations—The oldest Cretaceous unit in the Planning Area is the Cedar Mountain Formation, which, in the Kaiparowits region, is mostly limited to the pebbly conglomerate facies. The smectitic gray mudstone facies is absent, and even the pebbly unit is locally absent in the Planning Area, being discontinuous over much of the Kaiparowits region. It does thicken to the west and is more consistently present in the Skutumpah Terrace area. Thin,

gravelly facies at the bottom of the Naturita in this region are probably reworked Cedar Mountain sediments. Most of the fossil material recovered from the Cedar Mountain Formation equivalents (Mussentuchit Member) consists of reworked bone and petrified wood from the underlying Morrison Formation or older Cedar Mountain units that are no longer present.

The overlying Naturita Formation (formerly called the Dakota Formation) is relatively thin, averaging only 30–35 meters in thickness in the Planning Area. The majority of its exposures are now outside any monument designation, with only the Cottonwood Canyon corridor and smaller exposures near the Croton road and along the Straight Cliffs still in the Kaiparowits Unit. With the exception of shark and fish remains, vertebrate fossils are largely confined to the lower member, occurring in river and lake deposits, which also host spectacular plant fossils and rare lagerstatte preservation of insects. Large vertebrate remains are generally uncommon and usually occur as isolated elements, but 0.3-meter-diameter turtle shells can be locally abundant, particularly in the southwestern portion of the Kaiparowits Basin. The Bulldog Bench area near Tropic is one of the only places where larger vertebrates besides turtles have been found in any quantity and the Rim Rocks area along the Paria River (east of the Cockscomb) consistently produces small bonebeds with turtle, fish, crocodilian, and rare dinosaur remains. These are some of the only Cenomanian-age terrestrial vertebrate fossil sites known in North America, and their scientific significance is very high. Dinosaur trackways also occur sparingly in the middle unit (Titus et al. 2013). Petrified wood is rare but does occur as logs and even in situ stumps in the middle part of the formation. The marine upper portion of the Naturita is extremely fossiliferous with invertebrates (mostly mollusk shells). The western, northern, and southern exposures are famous for the up to 6-foot-thick “oyster reef” deposit of shells at the top of the formation. Other beds packed with brackish water and marine species of oysters, mussels, pen shells, and small clams, along with rare ammonites, occur throughout the region. The marine portion also yields occasional sharks teeth and non-diagnostic bone, probably of marine reptiles. Because of the rarity of Cenomanian terrestrial vertebrates in North America and its consistent production of sites, the Naturita rates as a PFYC of 5 in the western portion of the Kaiparowits Unit, and as a 4 in the eastern half, where vertebrate fossils are much less common.

Tropic Shale—The overlying Tropic Shale is up to 300 meters thick (Doelling and Davis 1989), entirely marine in origin, and spans late Cenomanian to middle Turonian time. The formation is dominantly gray weathering mudstone, but calcisiltites and calcarenites also occur throughout the formation, and numerous sandstone beds fill the upper part. Like the Naturita Formation, exposures of Tropic Shale in the Planning Area are now mostly on KEPA lands along the margin of the Kaiparowits Plateau and around the Skutumpah Terrace, Henrieville, Cannonville, and Tropic. The only significant exposures still inside GSENM are on the Kaiparowits Unit along Cottonwood Canyon. Invertebrate fossils are abundant throughout the Tropic Shale, but are best preserved in zones where early concretion formation preserves the more delicate shells in three dimensions. The concretion zones yield spectacular, pristinely preserved ammonite and other fossils. Vertebrate remains, mostly sharks teeth and fish remains, are only locally common, usually collecting in wind-formed erosional blowouts. Non-fish vertebrates are uncommon to rare, but long-term collecting over the last 16 years has revealed a highly diverse assemblage that includes five species of plesiosaurs, turtles, the earliest mosasaurs from North America, and rare dinosaur remains. Three significant trends/events in vertebrate evolution appear to be recorded in the Tropic: the demise of the archaic pliosaurids, the diversification of

the polycotylid plesiosaurs, and the rise of true mosasaurs in North America. Collectively the Tropic Shale ranks as a PFYC of 5 because of its outstanding vertebrate record.

Straight Cliffs Formation—The Straight Cliffs Formation is a highly heterogeneous, 1,600-foot-thick unit that probably exhibits the most lateral variation of any formation in the Kaiparowits Basin. Spanning much of the later Turonian, as well as the entire Coniacian and Santonian, it also represents the longest time span (~9 Ma, between 92 and 83 million years) of any Cretaceous formation in the Planning Area. It is extensively exposed in the Kaiparowits Unit and on KEPA lands around the Kaiparowits Unit. In general, marine and marginal marine facies dominate the eastern outcrops, with shoreface, beach complex, estuarine, and deltaic beds interleaved with coastal mire and distributary fluvial units (Allen and Johnson 2010), while western outcrops are composed mostly of river and floodplain deposits. The typically ledge and cliff forming habit of the formation makes survey work difficult. In spite of this, in the Kaiparowits Basin, all four members of the Straight Cliffs (Tibbett Canyon, Smoky Hollow, John Henry, and Drip Tank) have documented vertebrate fossil sites. Abundant microvertebrate remains are known mostly from the Smoky Hollow and John Henry Units in the western half. Macrovertebrate and mesovertebrate sites are actually somewhat rare. The highest densities of such sites occur in the southwest portion of the Kaiparowits Plateau where alluvial plain facies dominate, and again are known mostly from the Smoky Hollow and John Henry members. Multiple sites yielding associated dinosaur material, including a multi-individual ornithopod bone bed, have been found, but these are much less common in the Kaiparowits region than they are in the same units on the Paunsaugunt Plateau. Locally, the Drip Tank Member produces larger isolated elements in stream channel lags, but material diagnostic to even family level has so far been elusive. Marine vertebrate tooth and bone lags (usually dominated by sharks teeth) are known to occur in the lower beds on the eastern half of the Kaiparowits Plateau. Dinosaur trackways are locally known, particularly in coal seams, but bone is quite rare in the eastern half of the plateau, leading to the conclusion that either the depositional rates or soil conditions were unfavorable to preservation of large bone. Spectacular plant fossils and both freshwater and marine invertebrate shell beds (unionids, inoceramids, oysters, ammonites, etc.) occur throughout the plateau in the lower three members. Locally, the Tibbett Canyon Member carries large petrified logs, at least one of which formed a now collapsed natural bridge (east of the Paria River). The Straight Cliffs collectively would rate as a PFYC 4 in the western half of the Kaiparowits and as a PFYC of 3 to 3.5 in the eastern half.

Wahweap Formation—In the Middle Campanian (81 to 77 mya), as the Late Cretaceous seaway retreated east into the Moab area, it left the Planning Area in a more upland, tropical wet lower alluvial plain setting that was more conducive to preserving bone. The resulting deposits of the Wahweap Formation, over 1,600 feet thick, are locally rich with bone, both large and small. The Wahweap Formation occurs widely in a broad U-shaped band across the western, southern, and eastern portions of the Kaiparowits Plateau both in GSENM and on KEPA land, and also around Henrieville Canyon on KEPA land. The formation is fossiliferous throughout the Planning Area with everything from petrified wood to large dinosaur skeletons, and it is the second most productive formation, behind the overlying Kaiparowits Formation, for vertebrate fossils in the entire Planning Areas. The types of seven new kinds of dinosaurs and numerous smaller vertebrates are known from the formation. Until GSENM was established, nearly all of the scientific collecting was of smaller vertebrates such as mammals, lizards, fish, etc. In 2000, crews supported by the BLM-GSENM began intensive survey of the unit along the southern edge of the Kaiparowits Plateau, from Nipple Bench to Head of the Creeks, and into the Last Chance

Canyon area for larger animal remains such as dinosaurs. Results were immediate, with several horned dinosaur skull and hadrosaur sites being found. Subsequent work west of Nipple Spring, on Brigham Plain, south of Alvey Wash, and along the Smoky Mountain Road has produced additional dinosaur sites including the type specimens of *Lythronax*, *Machairoceratops*, and an unnamed nodosaurid ankylosaur. At least two different species of large alligatoroids and a pholidosaur-like crocodylian have also been recovered, but await description. Dinosaur tracksites also commonly occur near the contact of the lower and middle members in thin bedded sandstone deposits of crevasse splay origin. Invertebrate fossils including large terrestrial crab remains, mollusk shells, and traces are locally abundant. Spectacular plant fossils, including substantial deposits of petrified wood, especially in the lower member, also occur widely. The Wahweap Formation has yielded so many important fossils that it ranks throughout the Planning Area as a PFYC of 5.

Kaiparowits Formation—At its type section, the Kaiparowits Formation is approximately 860 meters thick. Because of its higher clay content, the unit typically weathers into less cliffy topography than most formations. Dating of ash fall tuffs has demonstrated the Kaiparowits Formation spans at least the lower half (76.6 Ma to 74.5 Ma) of the late Campanian (Roberts et al. 2013), but may range in age as young as 73 mya. The Kaiparowits Formation is by far the richest vertebrate fossil-producing unit in the entire region, and the preservation of individual Kaiparowits vertebrate specimens is sometimes spectacular. Complete or partial articulation and preservation of softer elements such as epidermis and the keratinous portions of beaks and claws is not rare, particularly in fluvial channel facies. The turtles *Adocus* (Knell et al. 2011) and *Basilemys* have both been found preserved with clutches of eggs. Unusual paleobiological information has also been gained from rare specimens showing predatory or behavioral traits (e.g., Boyd et al. 2013). The distribution of fossils is irregular throughout the formation although the lower and middle portions of the middle member are by far the most fossiliferous.

The most common large dinosaur remains in the Kaiparowits are lambeosaurine (crested) and saurolophine (non-crested) dinosaurs. Ceratopsids are found in lesser numbers but are still clearly a significant part of the ecosystem, displaying exceptionally high diversity. Most other dinosaur taxa are uncommon to rare, some being represented by a single specimen (e.g., *Hagryphus*). The only larger elements of the fauna besides dinosaurs are two taxa of crocodylians, a pholidosaur very similar to *Denazinasuchus* and *Deinosuchus*. Ongoing reconnaissance efforts in the Kaiparowits Formation continue to add to its diverse vertebrate fauna and have rapidly enhanced the macrovertebrate assemblages documented in previous published summaries. As of now, the Kaiparowits Formation holds the record for most diverse Late Campanian assemblages of turtles, mammals, squamates, and crocodylians in North America and is rapidly closing the gap with the diverse dinosaur assemblages known from the Dinosaur Park Formation. New discoveries continue to add fossil materials to previously documented macrovertebrate taxa, permitting more thorough comparison and phylogenetic evaluation, and add new forms to the overall assemblage. This includes many new, exquisitely preserved crocodyliform specimens that expand the documented diversity and completeness of the group; several associated pterosaur specimens that radically enhance the non-marine record of pterosaurs; and new dinosaur materials that include several specimens of a new chasmosaurine ceratopsian and a possible small lambeosaurine hadrosaurid. These new finds, coupled with ongoing efforts to document the microverterate record, the plant macrofossil record, the invertebrate fossil record, and the geological record of the Kaiparowits Formation, promise to make it among the best-documented and understood terrestrial ecosystems in the

Mesozoic. Comparison of the Kaiparowits vertebrate assemblage to contemporaneous faunas from southern Alberta (e.g., Dinosaur Park Formation) have documented significant differences in vertebrate taxa (e.g., Sampson et al. 2010; Gates et al. 2010), attributed to possible physiographic barriers (Gates et al. 2012) or climatic/floral differences (e.g., Nydam et al. 2013; Miller et al. 2013). The Kaiparowits Formation rates a PFYC of 5 throughout the Planning Area.

Late Cretaceous Vertebrate Faunal Lists for Southern Utah

The following faunal list is taken from Titus et al. (2017). Although the total number of taxa is known to be higher in every single Cretaceous formation of southern Utah, these faunal lists were generated only from published papers that documented specific specimens from specific localities with certain taxonomic assignments.

Cretaceous Vertebrate Faunas of the Paunsaugunt Plateau

Naturita Formation, Cenomanian (Locality: UMNH VP 123/MNA 939)

- Anura
  - Family, gen. and sp. indet. (in Roček and Wuttke 2010)
- Multituberculata
  - Cimolodontidae
    - Gen. and sp. indet. (in Eaton 1995)
  - Family incertae sedis – *Paracimexomys* group
    - *Paracimexomys* sp. cf. *P. robisoni* (in Eaton 1995)
    - *Paracimexomys* sp. (in Eaton 1995)
    - cf. *Paracimexomys* sp. (in Eaton 1995)
    - *Dakotamys malcolmi* (in Eaton 1995)
- Theria
  - Family, gen. and sp. indet. (in Eaton 1993b)
- Marsupialia
  - "Alphadontidae"
    - *Eoalphadon lillegraveni* (in Eaton 1993b as "Alphadon" lillegraveni)
    - *Eoalphadon* sp. (in Eaton 1993b as "*Alpahdon*" sp.)
  - Family incertae sedis
    - *Pariadens kirklandi* (in Eaton 1993b)

John Henry Member (basal, Coniacian), Straight Cliffs Formation (Localities: UMNH VP 417, 823, 856, 1064)

- Elasmobranchii
  - Hybodontidae
    - *Hybodus* sp. (in Kirkland et al. 2013)
  - Lonchidiidae
    - *Lonchidion* sp. (in Kirkland et al. 2013)
- Anura
  - Family incertae sedis
    - Gen. and sp. indet. (in Roček and Wuttke 2010)
- Dinosauria
  - Ornithopoda
    - Iguanodontia gen. and sp. indet. (in Gates et al. 2013)

- Multituberculata
  - Cimolodontidae
    - *Mesodma* sp. cf. *M. minor* (in Eaton 2013)

John Henry Member (Santonian), Straight Cliffs Formation (Localities: UMNH VP 419, 420, 424, 426, 427, 569, 781, 799, 821, 843, 1144, 1156)

- Elasmobranchii
  - Hybodontidae
    - *Hybodus* sp. (in Kirkland et al. 2013)
- Neopterygii
  - Lepisostidae
- *Lepisosteus* sp. indet. (in Brinkman et al. 2013)
- Neopterygii
  - Semionotidae
    - *Lepidotes* sp. indet. (in Brinkman et al. 2013)
  - Pycnodontidae
    - *Micropycnodon* sp. (in Brinkman et al. 2013)
  - Amiidae
    - Gen. and sp. indet. (in Brinkman et al. 2013)
- Teleostii
  - Hiodontidae
    - Gen. and sp. indet. (in Brinkman et al. 2013)
  - Elopiformes family indet.
- Gen. and sp. indet. (in Brinkman et al. 2013)
  - Sorbinichthyidae
    - *Diplomystus* sp. (in Brinkman et al. 2013)
  - Otophysi order and family indet.
    - Gen. and sp. indet. (in Brinkman et al. 2013)
  - Euteleostei order and family indet.
    - Gen. and sp. indet. U-4 (in Brinkman et al. 2013)
  - Acanthomorpha order and family indet.
    - Gen. and sp. indet. (in Brinkman et al. 2013)
- Allocaudata
  - Albanerpetontidae
- Gen. and sp. indet. (in Gardner and Demar 2013)
- cf. *Albanerpeton nexuosum* (Gardner and Demar 2013)
- Urodela
  - Scapherpetontidae
    - *Scapherpeton* sp. (in Gardner and Demar 2013)
  - Batracosauroididae
    - *Opistotriton* sp. (in Gardner and Demar 2013)
    - Gen. and sp. indet. (in Gardner and Demar 2013)
  - Sirenidae
    - *Habrosaurus* sp. (in Gardner and Demar 2013)
  - Family incertae sedis
    - Gen. and sp. nov. (in Gardner and Demar 2013)
- Anura
  - Family incertae sedis

        - *Scotiophryne pustulosa* (in Roček and Wuttke 2010, Gardner and Demar 2013)
        - Gen. and sp. indet. (in Roček and Wuttke 2010)
- Scincomorpha
    - Paramacellodid/Cordylid grade
        - Monocnemodon syphakos (in Nydam 2013)
- Anguimorpha
    - Family incertae sedis
        - cf. *Colpodontosaurus* sp. (in Nydam 2013)
- Platynota
    - Family incertae sedis
        - Morphotype B (in Nydam 2013)
        - Morphotype C (in Nydam 2013)
- Autarchoglossa
    - Family incertae sedis
        - Morphotype D (in Nydam 2013)
- Scincomorpha
    - Family incertae sedis
- Gen. and sp. indet. (in Nydam 2013)
- Serpentes
    - Family incertae sedis
        - *Coniophis* sp. (in Nydam 2013)
- Dinosauria
    - Nodosauridae
        - Gen and sp. indet. (in Loewen et al. 2013a)
- Triconodonta
    - Triconodontidae
        - Gen. and sp. indet. (in Eaton 2013)
        - cf. *Alticonodon* sp. (in Eaton 2013)
- Multituberculata
    - Family incertae sedis – *Paracimexomys* group
        - Dakotamys shakespeari (in Eaton 2013)
        - *Cedaromys* sp. cf. *C. hutchisoni* (in Eaton 2013)
    - Neoplagiaulacidae
        - *Mesodma* sp. cf. *M. minor* (in Eaton 2013)
- *Mesodma* sp. (in Eaton 2013)
        - ?*Mesodma* sp. (in Eaton 2013)
    - Cimolodontidae
        - *Cimolodon* sp. cf. *C. foxi* (in Eaton 2013)
        - *Cimolodon similis* (in Eaton 2013)
        - *Cimolodon* sp. cf. *C. similis* (in Eaton 2013)
        - ?*Cimolodon* sp. (in Eaton 2013)
    - Cimolomyidae
        - *Cimolomys* sp. A (in Eaton 2013)
        - *Cimolomys* sp. B (in Eaton 2013)
        - ?*Cimolomys* sp. A (in Eaton 2013)
        - ?*Cimolomys* sp. B (in Eaton 2013)
- Trechnotheria
    - Spalacotheriidae

        - ?*Spalacotheridium* sp. (in Eaton 2013)
        - *Symmetrodontoides* sp. (in Eaton 2013)
- Marsupialia
    - "Didelphomorpha" – Family incertae sedis
        - Gen. and sp. indet. (in Eaton 2013)
        - *Apistodon* sp. cf. *A. exiguous* (in Eaton 2013)
        - cf. "*Anchistodelphys*" sp. (in Eaton 2013)
    - "Alphadontidae"
        - ?*Varalphadon* sp. (in Eaton 2013)
    - Stagodontidae
        - *Eodelphis* sp. (in Eaton 2013)
    - Pediomyidae
        - Gen. and sp. indet. (in Eaton 2013)
        - ?*Leptalestes* sp. (in Eaton 2013)

Wahweap Formation, Campanian (Localities: UMNH VP 61, 77, 78, 80, 83, 807, 792, 1073, 1074; MNA 1073, 1074)

- Neoselachii
    - Hemiscyllidae
        - *Chiloscyllium missouriense* (in Kirkland et al. 2013)
- Batomorphii
    - Rhinobatoidea - Family incertae sedis
        - *Cristomylus cifellii* (Kirkland et al. 2013)
- Sclerorhynchiformes
    - Sclerorhynchiidae
        - *Columbusia deblieuxi* (Kirkland et al. 2013)
- Neopterygii
    - Lepisostidae
- *Lepisosteus* sp. indet. (in Brinkman et al. 2013)
    - Semionotidae
        - *Lepidotes* sp. indet. (in Brinkman et al. 2013)
    - Pycnodontidae
        - *Micropycodon* sp. (in Brinkman et al. 2013)
- Actinopterygii
    - Albulidae
        - *Parabula* sp. (in Brinkman et al. 2013)
    - Otophysi order and family indet.
        - Gen. and sp. indet. (in Brinkman et al. 2013)
    - Acanthomorpha Order and family indet.
        - Gen. and sp. indet. (in Brinkman et al. 2013)
- Allocaudata
    - Albanerpetontidae
- Gen. and sp. indet. (in Gardner and Demar 2013)
- Urodela
    - Scapherpetontidae
        - *Scapherpeton tectum* in Gardner and Demar 2013)
    - Batracosauroididae
        - *Opistotriton kayi* (in Gardner and Demar 2013)

    - Family incertae sedis
        - *Nezpercius dodsoni* (in Gardner and Demar 2013)
        - Gen. and sp. nov. (in Gardner and Demar 2013)
- Anura
    - Family incertae sedis
        - *Scotiophryne pustolosa* (in Roček and Wuttke 2010)
        - Gen. and sp. indet. (in Roček and Wuttke 2010)
- Multituberculata
    - Family incertae sedis – *Paracimexomys* group
        - *Paracimexomys* sp. (in Eaton 1993b)
        - ?*Paracimexomys* sp. (in Eaton 2013)
        - *Cedaromys* sp. cf. *C. hutchisoni* (in Eaton 2013)
        - ?*Cimexomys gregoryi* (in Eaton 1993b)
        - Gen. and sp. indet. (in Eaton 2002)
    - Neoplagiaulacidae
        - *Mesodma* sp. cf. *M. minor* (in Eaton 2013)
        - *Mesodma* sp. cf. *M. archibaldi* (in Eaton 2002, 2013)
        - *Mesodma* sp. cf. *M. formosa* (in Eaton 1993b, 2013)
        - *Mesodma* sp. cf. *M. hensleighi* (in Eaton 1993b)
        - *Mesodma* sp. (in Eaton 1993b)
    - Cimolodontidae
        - *Cimolodon similis* (in Eaton 2002)
        - Cimolodon sp. cf. C. nitidus (in Eaton 1993b)
        - *Cimolodon* sp. cf. *C. foxi* (in Eaton 2013)
        - ?*Cimolodon* sp. (Eaton 1993b)
    - Cimolomyidae
        - Cimolomys milliensis (in Eaton 1993b)
        - *Cimolomys* sp. (in Eaton 2013)
        - ?*Cimolomys* sp. (in Eaton 2013)
        - ?*Cimolomys* sp. B (in Eaton 2002)
        - *Meniscoessus* sp. (in Eaton 2013)
- Trechnotheria
    - Spalacotheriidae
        - Symmetrodontoides foxi (in Eaton 1993b)
- Marsupialia
    - Order and family incertae sedis
        - cf. *Iugomortiferum* sp. (in Eaton 2013)
        - Gen. and sp. indet. A (in Eaton 2013)
        - Gen. and sp. indet. B (in Eaton 2013)
        - cf. *Apistodon* sp. (in Eaton 2013)
    - "Alphadontidae"
        - *Alphadon* sp. cf. *A. wilsoni* (in Eaton 1993b)
        - *Alphadon* sp. cf. *A. attaragos* (in Eaton 1993b)
- *Turgidodon* sp. cf. *T. russelli* (Alphadon sp. cf. *A. russelli* in Eaton 1993b)
- *Turgidodon* sp. (in Eaton 1993b)
        - *Varalphadon* sp. cf. *V. creber* (in Eaton 2013)
        - cf. *Varalphadon* sp. (in Eaton 2013)
    - Pediomyidae
        - Gen. and sp. indet. (in Eaton 2013)

Cretaceous Vertebrate Faunas of the Kaiparowits Plateau

Naturita Formation, Cenomanian (Localities: UMNH VP 27/MNA 1067/OMNH V808; UMNH VP 804)

- Batomorphii
  - Rhinobatoidea family incertae sedis
    - *Cristomylus bulldogensis* (Kirkland et al. 2013)
    - *Pseudomyledaphus* sp. (in Kirkland et al. 2013)
- Elasmobranchii
  - Hybonontidae
    - *Hybodus* sp. (in Kirkland et al. 2013)
  - Lonchidiidae
    - *Lonchidion* sp. (in Kirkland et al. 2013)
- Neopterygii
  - Semionotidae
    - *Lepidotes* sp. (in Brinkman et al. 2013)
  - Pycnodontidae
    - *Coelodus* sp. (in Brinkman et al. 2013)
  - Amiidae
    - Gen. and sp. indet. (in Brinkman et al. 2013)
- Teleostei
  - Osteoglossomorpha family indet.
    - *Coriops* sp. (in Brinkman et al. 2013)
  - Hiodontidae
    - Gen. and sp. indet. (in Brinkman et al. 2013)
  - Elopiformes family indet.
- Gen. and sp. indet. (in Brinkman et al. 2013)
  - Ellimmichthyiformes family indet.
    - Gen. and sp. indet. type LvD (in Brinkman et al. 2013)
    - Gen. and sp. indet. type U-7 (in Brinkman et al. 2013)
  - Sorbinichthyidae
    - *Diplomystus* sp. (in Brinkman et al. 2013)
  - Euteleostei order and family indet.
    - Gen. and sp. indet. U-4 (in Brinkman et al. 2013)
- Sarcopterygii
  - Ceratodontiformes
    - Ceratodus gustasoni (Kirkland 1987)
- Allocaudata
  - Albanerpetontidae
- cf. *Albanerpeton nexuosa* (in Gardner and Demar 2013)
- Urodela
  - Scapherpetontidae
- Gen and sp. indet. (in Gardner and Demar 2013)
  - Batracosauroididae
    - Gen. and sp. nov. (in Gardner and Demar 2013)
- Anura
  - Family incertae sedis
    - Gen. and sp. indet. (in Roček and Wuttke 2010)

- Squamata
  - Boreoteiioidea
    - *Bicuspidon smikros* (in Nydam 2013)
- Scincomorpha
  - Paramacellodid/Cordylid grade
    - Dakotasaurus gillettorum (in Nydam 2013)
    - Morphotype C (in Nydam 2013)
    - Webbsaurus lofgreni (in Nydam 2013)
  - Family indet.
    - Morphotype D (in Nydam 2013)
- ?Scincomorpha
  - Family incertae sedis
- Gen. and sp. indet. (in Nydam 2013)
- Anguimorpha
  - aff. Xenosauridae
    - Cnodontosaurus suchockii (in Nydam 2013)
- Platynota
  - Family indet.
    - Morphotype E (in Nydam 2013)
- Anguimorpha
  - Family incertae sedis
    - Gen. and sp. indet. (in Nydam 2013)
  - Serpentes
  - Family incertae sedis
    - *Coniophis* sp. (in Nydam 2013)
- Multituberculata
  - Family incertae sedis – *Paracimexomys* group
    - *Paracimexomys* sp. cf. *P. robisoni* (in Eaton 1995)
    - *Paracimexomys* sp. (in Eaton 1995)
- cf. *Paracimexomys* sp. (in Eaton 1995)
- *Dakotamys malcolmi* (in Eaton 1995)
- ?*Dakotamys* sp. (in Eaton 1995)
- Gen. and sp. indet. A (in Eaton 1995)
- Gen. and sp. indet. B (in Eaton 1995)
  - Cimolodontidae
    - *Cimolodon* sp. cf. *C. similis* (in Eaton 1995)
    - Gen. and sp. indet. (in Eaton 1995)
- ?Boreosphenida
  - Order and family incertae sedis
    - Gen. and sp. indet. (in Eaton 1993a)
    - *Dakotadens morrowi* (in Eaton 1993a)
    - *Dakotadens* sp. (in Eaton 1993a)
- Marsupialia
  - Family "Alphadontidae"
    - *Eoalphadon clemensi* (in Eaton 1993a as "*Alphadon" clemensi*)
    - *Eoalphadon lillegraveni* (in Eaton 1993a as *"Alphadon" lillegraveni*)
    - *Eoalphadon* sp. (in Eaton 1993a as "*Alphadon"* sp.)
    - *Protalphadon* sp. (in Eaton 1993a)

        - Gen. and sp. indet. (in Eaton 1993a)
    - Family indet.
        - *Pariadens kirklandi* (Cifelli and Eaton 1987)
- Tropic Shale (Late Cenomanian-Middle Turonian)
- Elasmobranchii
    - Mitsukurinidae
        - *Scapanorhyncus raphiodon* (in Albright et al. 2013)
    - Anacoracidae
        - *Squalicorax curvatus* (in Albright et al. 2013)
    - Cretoxyrhinidae
        - *Cretoxyrhina mantelli* (in Albright et al. 2013)
        - *Cretolamna appendiculata* (in Albright et al. 2013)
    - Sclerorhynocoidei
        - cf. *Ptychotrygon* sp. (in Albright et al. 2013)
    - Ptychodontidae
        - *Ptychodus decurrens* (in Albright et al. 2013)
        - *Ptychodus* cf. *P. mammillaris* (in Albright et al. 2013)
        - *Ptychodus whipplei* (in Albright et al. 2013)
        - *Ptychodus occidentalis* (in Albright et al. 2013)
        - *Ptychodus anonymus* (in Albright et al. 2013)
        - *Ptychodus* sp. indet. (in Albright et al. 2013)
- Neopterygii
    - Pycnodontidae
        - Gen. and sp. indet. (in Albright et al. 2013)
- Actinopterygii
    - Ichthyodectidae
        - *Gillicus arcuatus* (in Albright et al. 2013)
        - *Ichthyodectes ctenodon* (in Albright et al. 2013)
        - *Ichthyodectes* cf. *I. ctenodon* (in Albright et al. 2013)
        - *Xiphactinus* cf. *X. audax* (in Albright et al. 2013)
- Testudinata
    - Protostegidae
        - *Desmatochelys lowi* (in Albright et al. 2013)
        - Gen. and sp. indet. (in Albright et al. 2013)
    - Family incertae sedis
        - *Naomichelys* sp. (in Albright et al. 2013)
- Sauropterygia
    - Pliosauridae
        - *Brachauchenius lucasi* (Albright et al. 2007a)
    - Polycotylidae
        - *Eopolycotylus rankini* (Albright et al. 2007b)
        - *Dolichorhyncops tropicensis* (Schmeisser McKean 2012)
        - *Palmulasaurus quadratus* (Albright et al. 2007b)
        - *Trinacromerum* cf. *T. bentonianum* (in Albright et al. 2013)
- Dinosauria
    - Therizinosauridae
        - *Nothronychus graffami* (Zanno et al. 2009)

Smoky Hollow Member (Turonian), Straight Cliffs Formation (Localities: UMNH VP 129/MNA 995/OMNH V843; OMNH V4, 60, 1404)

- Batomorphii
  - Rhinobatoidea (family incertae sedis)
    - *Cristomylus* sp. cf. *C. bulldogensis* (in Kirkland et al. 2013)
- Osteichthyes-Neopterygii
  - Lepisostidae
- *Lepisosteus* sp. (in Brinkman et al. 2013)
  - Semionotidae
    - *Lepidotes* sp. (in Brinkman et al. 2013)
  - Pycnodontidae
    - *Coelodus* sp. (in Brinkman et al. 2013)
  - Amiidae
    - Gen. and sp. indet. (in Brinkman et al. 2013)
    - ?*Melvius* sp. (in Brinkman et al. 2013)
- Teleostii
  - Hiodontidae
    - Gen. and sp. indet. (in Brinkman et al. 2013)
  - Elopiformes family incertae sedis
- Gen. and sp. indet. (in Brinkman et al. 2013)
  - Ellimmichthyiformes family incertae sedis.
    - Gen. and sp. indet. type U-7 (in Brinkman et al. 2013)
  - Otophysi order and family incertae sedis
    - Gen. and sp. indet. (in Brinkman et al. 2013)
  - Euteleostei order and family incertae sedis
    - Gen. and sp. indet. U-4 (in Brinkman et al. 2013)
  - Order and family incertae sedis
    - Gen. and sp. indet. type HvB (in Brinkman et al. 2013)
- Allocaudata
  - Albanerpetontidae
  - *Albanerpeton cifellii* (in Gardner 1999)
- cf. *Albanerpeton nexuosum* (in Gardner and Demar 2013)
- Gen. and sp. indet. (in Gardner and Demar 2013)
- Urodela
  - Batracosauroididae
    - Gen. and sp. nov. (in Gardner and Demar 2013)
  - Family incertae sedis
    - Gen. and sp. nov. (in Gardner and Demar 2013)
    - Gen. and sp. indet. (in Gardner and Demar 2013)
- Anura
  - Family incertae sedis
    - Gen. and sp. indet. (in Roček and Wuttke 2010)
- Scinocomorpha
  - Polyglyphanodontini
    - *Dicothodon cifellii* (in Nydam and Voci 2007)
    - *Chamops* sp. cf. *C. signus* (in Nydam 2013)
  - Contogeniidae
    - *Utahgenys evansi* (in Nydam 2013)
  - Paramacellodid/Cordylid grade
    - Morphotype A-H (in Nydam 2013)

    - Anguimorpha
    - Anguidae
        - aff. *Odaxosaurus* sp. (in Nydam 2013)
    - aff. Xenosaurida
        - *Cnodontosaurus* sp. (in Nydam 2013)
- Platynota
    - Family incertae sedis
        - Morphotype I-J (in Nydam 2013)
- Anguimorpha
    - Family incertae sedis
- Gen. and sp. indet. (in Nydam 2013)
- Serpentes
    - Family incertae sedis
        - *Coniophis* sp. (in Nydam 2013)
- Dinosauria
    - Ornithopoda
        - Iguanodontia gen. and sp. indet. (in Gates et al. 2013)
- Multituberculata
    - ?Taeniolabidoidea family incertae sedis
        - Gen. and sp. indet. (in Eaton 1995)
    - Suborder and family incertae sedis - *Paracimexomys* group
        - *Paracimexomys* sp. cf. *P. robisoni* (in Eaton 1995)
        - *Bryceomys fumosus* (in Eaton 1995)
        - *Bryceomys* sp. cf. *B. fumosus* (in Eaton 1995)
        - *Bryceomys hadrosus* (in Eaton 1995)
        - *Bryceomys* sp. (in Eaton 1995)
- Symmetrodonta
    - Family incertae sedis
        - Gen. and sp. indet. (in Cifelli and Gordon 1999)
    - Spalacotheriidae
        - *Symmetrodontoides oligodontos* (in Cifelli and Gordon 1999)
        - *Spalacotheridium mckennai* (in Cifelli and Gordon 1999)
- Aegialodontia
    - Deltatheridiidae
        - Gen. and sp. indet. (in Cifelli 1990a)
    - Family incertae sedis
        - Gen. and sp. indet. (in Cifelli 1990a)
- Marsupialia
    - Family incertae sedis
        - ?*Varalphadon delicates* (in Cifelli 1990a)
    - ?Stagodontidae
        - Gen. and sp. indet. (in Cifelli 1990a)

John Henry Member (basal - Coniacian), Straight Cliffs Formation (Localities: OMNH V856; UMNH VP 663)

- Batomorphii
    - Rhinobatoidea family incertae sedis
        - *Pseudomyledaphus madseni* (Kirkland et al. 2013)

- Allocaudata
  - Albanerpetontidae
- Gen. and sp. indet. (in Gardner and Demar 2013)
- Urodela
  - Scapherpetontidae
    - *Scapherpeton tectum* (in Gardner and Demar 2013)
    - Gen. and sp. indet. (in Gardner and Demar 2013)

John Henry Member (Santonian), Straight Cliffs Formation (Localities: UMNH VP 98, 99, 567; OMNH V27; MNA 706)

- Neoselachii
  - Ginglymostomatidae
    - *Cantioscyllium markaguntensis* (Kirkland et al. 2013)
- Batomorphii
  - Rhinobatoidea family incertae sedis
    - *Pseudomyledaphus madseni* (Kirkland et al. 2013)
- Allocaudata
  - Albanerpetontidae
- Gen. and sp. indet. (in Gardner and Demar 2013)
- Urodela
  - Batracosauroididae
    - *Opistotriton kayi* (in Gardner and Demar 2013)
    - Gen. and sp. indet. (in Gardner and Demar 2013)
- Anura
  - Family incertae sedis
- Gen. and sp. indet. (in Roček and Wuttke 2010)
- Scincomorpha
  - Paramacellodid/Cordylid grade
    - Monocnemodon syphakos (in Nydam 2013)
    - Morphotype A (in Nydam 2013)
- Multituberculata
  - Family incertae sedis – *Paracimexomys* group
    - *Cedaromys* sp. cf. *C. hutchisoni* (in Eaton 2006)
    - *Cedaromys* sp. (in Eaton 2006)
  - Family incertae sedis
    - Gen. and sp. indet. (in Eaton 2006)
  - Neoplagiaulacidae
    - *Mesodma* sp. cf. *M. minor* (in Eaton 2006)
  - Cimolodontidae
    - *Cimolodon foxi* (in Eaton 2006)
    - *Cimolodon* sp. (in Eaton 2006)
- ?*Cimolodon* sp. (in Eaton 2006)
  - Cimolomyidae
    - ?*Cimolomys* sp. (in Eaton 2006)
- Theria
  - Spalacotheriidae
    - *Spalacotherium* sp. (in Eaton 2006)
    - *Symmetrodontoides* sp. cf. *S. oligodontos* (in Cifelli and Gordon 1999)

    - Family incertae sedis
        - *Potamotelses* sp. (in Eaton 2006)
        - *Picopsis* sp. (in Eaton 2006)
- Marsupialia
    - "Alphadontidae"
- *Alphadon* sp. cf. *A. halleyi* (in Eaton 2006)
- *Varalphadon* sp. (in Eaton 2006)
    - ?Stagodontidae
        - Gen. and sp. indet. (in Eaton 2006)
    - Family incertae sedis
        - ?*Anchistodelphys* sp. (in Eaton 2006)
        - Gen. and sp. indet. (in Eaton 2006)

Wahweap Formation, Middle Campanian (Localities: OMNH V2, 8, 11, 16; UMNH VP 82, 130; MNA 455, 456, 702, 705, 707, 1015, 1294)

- Elasmobranchii
    - Hybodontidae
        - *Hybodus* sp. (in Kirkland et al. 2013)
    - Lonchidiidae
        - *Lonchidion* sp. (in Kirkland et al. 2013)
- Neoselachii
    - Ginglymostomatidae
        - *Cantioscyllium estesi* (in Kirkland et al. 2013)
    - Hemiscyllidae
        - *Chiloscyllium missouriense* (in Kirkland et al. 2013)
- Batomorphii
    - Rhinobatoidea family incertae sedis
        - *Cristomylus cifellii* (Kirkland et al. 2013)
- Sclerorhynchiformes
    - Sclerorhynchiidae
        - *Columbusia deblieuxi* (Kirkland et al. 2013)
        - *Texatrygon brycensis* (Kirkland et al. 2013)
- Osteichthyes-Neopterygii
    - Amiidae
- *Melvius* cf. *M. chauliodous* (in Holroyd and Hutchison 2016)
    - Lepisostidae
- Gen. and sp. indet. (in Holroyd and Hutchison 2016)
- Actinopterygii
    - Polydontidae
        - Gen. and sp. indet. (in Brinkman et al. 2013)
- Urodela
    - Batracosauroididae
        - *Opistotriton kayi* (in Gardner and Demar 2013)
    - Family incertae sedis
        - *Nezpercius dodsoni* (in Gardner and Demar 2013)
- Anura
    - Family incertae sedis
        - *Scotiophryne pustulosa* (in Roček and Wuttke 2010)

        - Gen. and sp. indet. (in Roček and Wuttke 2010)
- Testudines
    - Baenidae
        - *Arvinochelys* sp. (in Holroyd and Hutchison 2016)
        - *Denazinamys nodosa* (in Holroyd and Hutchison 2016)
        - *Neurankylus* sp. (in Holroyd and Hutchison 2016)
    - Nanhsiungchelyidae
        - *Basilemys* sp. (in Holroyd and Hutchison 2016)
    - Trionychidae
        - Gen. and sp. indet. (in Holroyd and Hutchison 2016)
- Squamata
- cf. Anguimorpha indet. (in Nydam 2013)
    - Serpentes
    - Family incertae sedis
        - *Coniophis* sp. (in Nydam 2013)
    - cf. Scincomorpha – family incertae sedis
        - Morphotype A (in Nydam 2013)
        - Gen, and sp. indet. (in Nydam 2013)
- Dinosauria-Saurischia
    - Theropoda-Tyrannosauridae
- *Lythronax argestes* (Loewen et al. 2013c).
- Dinosauria-Ornithischia
    - Ornithopoda-Hadrosauridae
    - Saurolophinae
        - *Acristavus* sp. (in Gates et al. 2013)
        - c.f. *Brachylophosaurus* sp. (in Gates et al. 2013)
    - Lambeosaurinae (crested hadrosaurs)
- *Adelolophus hutchisoni* (Gates et al. 2014)
    - Ceratopsidae
    - Centrosaurinae
- *Diabloceratops eatoni* (Kirkland and DeBlieux 2010)
- *Machairoceratops cronusi* (Lund et al. 2016)
- "Wahweap centrosaurine C" (in Loewen et al. 2013b)
    - Pachcephalosauridae
        - Gen. and sp. indet. (in Evans et al. 2013)
- Multituberculata
    - Family incertae sedis – *Paracimexomys* group
        - Gen. and sp. indet. (in Eaton 2002)
        - ?*Paracimexomys* sp. (in Eaton 2002)
        - cf. *Paracimexomys* sp. A (in Eaton 2002)
        - cf. *Paracimexomys* sp. B (in Eaton 2002)
        - *Bryceomys* sp. cf. *B. fumosus* (in Eaton 2002)
        - *Cedaromys* sp. (in Eaton 2002)
        - cf. *Cedaromys* sp. (in Eaton 2002)
        - ?*Cimexomys* sp. cf. *C. antiguus* (in Eaton 2002)
    - Neoplagiaulacidae
        - *Mesodma* sp. cf. *M. formosa* (in Eaton 2002)
        - *Mesodma* sp. cf. *M. minor* (in Eaton 2002)

        - *Mesodma* sp. cf. *M. archibaldi* (in Eaton 2002)
    - Cimolodontidae
        - *Cimolodon electus* (in Eaton 2002)
        - *Cimolodon similis* (in Eaton 2002)
        - *Cimolodon* sp. cf. *C. nitidus* (in Eaton 2002)
        - *Cimolodon* sp. cf. *C. foxi* (in Eaton 2002)
        - *Cimolodon* sp. (small) (in Eaton 2002)
    - Cimolomyidae
        - *Cimolomys* sp. cf. *C. trochuus* (in Eaton 2002)
        - ?*Cimolomys* sp. A (in Eaton 2002)
        - ?*Cimolomys* sp. B (in Eaton 2002)
        - ?*Cimolomys* sp. C (large) (in Eaton 2002)
        - *Meniscoessus* sp. cf. *M. intermedius* (in Eaton 2002)
- Symmetrodonta
    - Family incertae sedis
        - Gen. and sp. indet. (in Cifelli and Gordon 1999)
    - Spalacotheriidae
        - *Symmetrodontoides foxi* (in Cifelli and Madsen 1986; Cifelli and Gordon 1999)
    - Order and family incertae sedis
        - Zygiocuspis goldingi (in Cifelli 1990c)
- Marsupialia
    - "Alphadontidae"
        - Varalphadon crebreforme (in Cifelli 1990b)
        - Varalphadon wahweapensis (in Cifelli 1990b)
        - Gen. and sp. indet. (in Cifelli 1990b)
- ?Marsupialia
    - Family incertae sedis
        - Iugomortiferum thoringtoni (in Cifelli 1990b)
        - cf. *Iugomortiferum* sp. (in Cifelli 1990b)
- Insectivora
    - ?Nyctitheriidae
        - *Paranyctoides* sp. (in Cifelli 1990e)

Kaiparowits Formation, Upper Campanian (Localities: OMNH V5, 6, 9, 61; UMNH VP 24, 25, 51, 54, 56, 108, 1078, 1268; MNA 453, 454, 458, 697, 704, 1004, 1310; UCM 83240; 83258; for turtle bearing localities see Hutchison et al. 2013)

- Neoselachii
    - Hemiscyllidae
        - *Chiloscyllium missouriense* (in Kirkland et al. 2013)
- Batomorphii
    - Rhinobatoidea family incertae sedis
        - *Myledaphus bipartitus* (Kirkland et al. 2013)
- Sclerorhynchiformes
    - Sclerorhynchiidae
        - *Columbusia deblieuxi* (Kirkland et al. 2013)
- Osteichthyes-Neopterygii
    - Semionotidae
        - *Lepidotes* sp. indet. (in Brinkman et al. 2013)
    - Amiidae

        - Gen. and sp. indet. (in Brinkman et al. 2013)
    - Lepisostidae
- *Lepisosteus* sp. indet. (in Brinkman et al. 2013)
- Teleostei
    - Osteoglossomorpha family incertae sedis
        - *Coriops* sp. (in Brinkman et al. 2013)
    - Hiodontidae
        - Gen. and sp. indet. (in Brinkman et al. 2013)
    - Albulidae
        - *Parabula* sp. (in Brinkman et al. 2013)
    - Clupeiformes family incertae sedis
        - Gen. and sp. indet. type G (in Brinkman et al. 2013)
    - Otophysi order and family incertae sedis
        - Gen. and sp. indet. (in Brinkman et al. 2013)
    - Characiformes family incertae sedis
    - Gen. and sp. indet. (in Brinkman et al. 2013)
    - Euteleostei order and family incertae sedis
        - Gen. and sp. indet. U-4 (in Brinkman et al. 2013)
    - Esocoidea family incertae sedis
        - *Estesesox foxi* (in Brinkman et al. 2013)
        - *Estesesox* sp. (in Brinkman et al. 2013)
    - Order and family incertae sedis
- Gen. and sp. indet. type BvE (in Brinkman et al. 2013)
    - Acanthomorpha order and family incertae sedis
        - Gen. and sp. indet. (in Brinkman et al. 2013)
- Allocaudata
    - Albanerpetontidae
        - *Albanerpeton galaktion* (in Gardner and Demar 2013)
        - *Albanerpeton gracile* (in Gardner and Demar 2013)
        - *Albanerpeton nexuosum* (in Gardner and Demar 2013)
- Urodela
    - Scapherpetontidae
        - *Scapherpeton tectum* (in Gardner and Demar 2013)
        - *Lisserpeton bairdi* (in Gardner and Demar 2013)
    - Batracosauroididae
        - *Opistotriton kayi* (in Gardner and Demar 2013)
        - *Prodesmondon copei* (in Gardner and Demar 2013)
    - Sirenidae
        - *Habrosaurus* sp. (in Gardner and Demar 2013)
- Anura
    - Family incertae sedis
- *Scotiophryne pustulosa* (in Gardner and Demar 2013)
- *Theatonius* sp. (in Gardner and Demar 2013)
- cf. *Eopelobates* sp. (in Gardner and Demar 2013)
- Gen. and sp. indet. (in Roček and Wuttke 2010; Roček et al. 2013)
- Scincomorpha
    - Borioteiioidea
        - *Peneteius saueri* (in Nydam 2013)

        - Meniscognathus molybrochorus (Nydam and Voci 2007)
        - *Chamops* sp. cf. *C. segnis* (in Nydam 2013)
        - cf. *Leptochamops* sp. (in Nydam and Voci 2007)
        - *Tripennaculus eatoni* (in Nydam and Voci 2007)
    - Contogeniidae
        - *Palaeoscincosaurus pharkidodon* (Nydam and Fitzpatrick 2009)
    - Paramacellodid/Cordylid Grade
        - Morphotype A-G (in Nydam 2013)
- Anguimorpha
    - Anguidae
        - Odaxosaurus roosevelti (in Nydam 2013)
    - Xenosauridae
        - ?*Exostinus* sp. (in Nydam 2013)
- Platynota
    - Family incertae sedis
        - Parasaniwa cynochoros (Nydam 2013)
        - Morphotypes H-J (in Nydam 2013)
- Serpentes
    - Family incertae sedis
        - *Coniophis* sp. (in Nydam 2013)
- Testudines
    - Pleurosternidae
        - *Compsemys victa* (in Hutchison et al. 2013)
    - Baenidae
        - *Neurankylus hutchisoni* (Lively 2015b; new sp. A in Hutchison et al. 2013)
        - *Neurankylus utahensis* (Lively 2015b; new sp. B in Hutchison et al. 2013)
        - Arvinachelys goldeni (Lively 2015a)
        - *Denazinemys nodosa* (in Hutchison et al. 2013; Lively 2015b)
        - *Boremys grandis* (in Hutchison et al. 2013; Lively 2015b)
        - *Plesiobaena* sp. (in Hutchison et al. 2013)
        - *Thescelus* sp. (Lively 2015b)
    - Chelydridae
        - Gen. and sp. indet. (in Hutchison et al. 2013)
    - Kinosternidae
        - Gen. and sp. indet. (in Hutchison et al. 2013)
    - Adocidae
        - *Adocus* sp. (in Hutchison et al. 2013)
    - Nanhsiungchelyidae
        - *Basilemys nobilis* (in Hutchison et al. 2013)
    - Trionychidae
        - *Helopanoplia* sp. (in Hutchison et al. 2013)
        - *Aspideretoides* sp. (in Hutchison et al. 2013)
        - *Derrisemys* sp. (in Hutchison et al. 2013)
        - *Plastomenoides* sp. (in Hutchison et al. 2013)
        - Gen. and sp. indet. (in Hutchison et al. 2013)
- Crocodylia
    - Neosuchia
        - cf. *Denazinasuchus* sp.
    - Alligatoroidea family incertae sedis

        - cf. *Leidyosuchus* sp. (in Farke et al. 2014)
        - *Deinosuchus hatcheri* (in Irmis et al. 2013)
        - *Brachychampsa* sp. (in Irmis et al. 2013)
    - ?Pterosauria
        - Gen. and sp. indet (in Farke et al. 2014)
- Dinosauria-Saurischia
    - Theropoda-Ornithomimidae
        - *Ornithomimus* sp. indet. (in Claessens and Loewen 2015)
    - Oviraptoridae
- *Hagryphus giganteus* (Zanno and Sampson 2005)
    - Dromaeosauridae
        - Morphotype A (cf. *Dromaeosaurus*) (in Zanno et al. 2013)
        - Morphotype B (cf. *Saurornitholestes*) (in Zanno et al. 2013)
    - Troodontidae
- *Talos sampsoni* (Zanno et al. 2011)
    - Aviales
        - *Avisaurus* sp. (in Zanno et al. 2013)
    - Tyrannosauridae
- *Teratophoneus curriei* (Carr et al. 2011)
- Dinosauria-Ornithischia
    - Hypsilophodontidae
        - Gen and sp. nov. (Boyd 2015)
    - Hadrosauridae-Saurolophinae
        - *Gryposaurus* cf. *G. notabilis* (in Gates et al. 2013)
        - *Gryposaurus monumentensis* (Gates and Sampson 2007)
    - Hadrosauridae-Lambeosaurinae
- *Parasaurolophus* sp. (in Gates et al. 2013)
    - Ceratopsidae-Chasmosaurinae
        - *Utahceratops gettyi* (Sampson et al. 2010)
        - *Kosmoceratops richardsoni* (Sampson et al. 2010)
    - Ceratopsidae-Centrosaurinae
- *Nasutoceratops titusi* (Sampson et al. 2013)
- "Centrosaurine B" (in Loewen et al. 2013b)
    - Pachycephalosauridae (dome-headed dinosaurs)
        - Gen. and sp. indet. (in Evans et al. 2013)
    - Nodosauridae (spike-tailed armored dinosaurs)
        - Gen. and sp. indet. (in Loewen et al. 2013a)
    - Ankylosauridae
- New genus and species A (in Wiersma 2016)
- New genus and species B (in Wiersma 2016)
- Mammalia-Multituberculata
    - Family incertae sedis
        - *Cimexomys* sp. cf. *C. judithae* (in Eaton 2002)
        - *Cimexomys* or *Mesodma* sp. (in Eaton 2002)
    - Family incertae sedis – *Paracimexomys* group
        - Cedaromys hutchisoni (in Eaton 2002)
        - *Cedaromys* sp. (in Eaton 2002)
        - *Dakotamys magnus* (in Eaton 2002)

- Neoplagiaulacidae
  - *Mesodma archibaldi* (in Eaton 2002)
  - *Mesodma* sp. cf. *M. archibaldi* (in Eaton 2002)
  - *Mesodma minor* (in Eaton 2002)
  - *Mesodma* sp. (large) (in Eaton 2002)
- Cimolodontidae
  - *Cimolodon foxi* (in Eaton 2002)
  - *Cimolodon* sp. cf. *C. nitidus* (in Eaton 2002)
  - *Cimolodon* sp. cf. *C. similis* (in Eaton 2002)
- ?Cimolodontidae
  - Kaiparomys cifellii (in Eaton 2002)
- Cimolomyidae
  - *Meniscoessus* sp. cf. M. intermedius (in Eaton 2002)
  - *Meniscoessus* sp. cf. *M. major* (in Eaton 2002)
  - *Cimolomys* sp. A cf. *C. clarki* (in Eaton 2002)
  - *Cimolomys* sp. B cf. *C. clarki* (in Eaton 2002)
- ?Cimolomyidae
  - ?*Cimolomys butleria* (in Eaton 2002)

- Marsupialia
  - Family incertae sedis
    - *Aenigmadelphys archeri* (in Cifelli 1990d; Cifelli and Johanson 1994)
  - "Alphadontidae"
    - *Varalphadon wahweapensis* (in Cifelli 1990d)
    - *Turgidodon lillegraveni* (in Cifelli 1990d)
    - *Turgidodon* sp. cf. *T. lillegraveni* (in Cifelli 1990d)
    - *Turgidodon madseni* (in Cifelli 1990d)
    - *Turgidodon* sp. (in Cifelli 1990d)
    - *Alphadon halleyi* (in Cifelli 1990d)
    - *"Alphadon attaragos"* (in Cifelli 1990d)
- Insectivora
  - Leptictidae
    - *Gypsonictops* sp. (in Cifelli 1990e)
  - ?Nyctitheriidae
    - *Paranyctoides* sp. (in Cifelli 1990e)
- Order and family incertae sedis
    - Avitotherium utahensis (in Cifelli 1990e)

Neogene System

Unconsolidated alluvial sediments in floodplains and channels, as well as the colluvial floors of rock shelters provide the context for Neogene (mostly Pleistocene) fossil resources, including occurrences of megafauna, which are documented in several places just outside the Planning Area (Glen Canyon NRA, KFO, Utah State Institutional Trust Lands). No megafaunal sites have been documented inside the Planning Area, but this is almost certainly a function of a lack of inventory for such resources and not a lack of resource. The recent finding of a site preserving multiple mammoth skeletons near Big Water, less than a mile outside the Planning Area, confirms the certainty that such sites do occur in the Planning Area. Their rarity warrants the Neogene collectively to be assigned a PFYC of 3A.

Paleontological Management Opportunities

The paleontological resources in the Planning Area are some of the most intensively managed within the BLM. Programs for pro-active inventory, specimen preservation, research, and curation are all warranted given the extremely important nature of the fossils found there. However, there are opportunities to manage these resources more effectively without adding significant costs to the program. The first and foremost opportunity is to integrate the management of the fossil resources within all four separate units of the Planning Area and those found on adjacent public lands. This is especially true for the Late Cretaceous formations and fossils, which do not end at the western boundary of the Planning Area, but continue west into the KFO and Dixie National Forest. Key areas around the southern Paunsaugunt Plateau are known to contain Late Cretaceous vertebrate fossils, including dinosaurs, but have not been pursued with the same integrated support as they have within the Planning Area because of jurisdictional issues and differing priorities within the management units. Expanding the areal scope of more intensive management of the paleontological resources to adjacent lands could further heighten their importance to the scientific community and the public, as well as document and protect important Turonian, Coniacian, and Santonian vertebrate fossil sites that currently receive little attention. Additional challenges and opportunities throughout the Planning Area are listed by formation below.

Permian System

Research Potential

The Toroweap and Kaibab Formations of GSENM area offer insights into shallow marine invertebrate community structure and ecology, and evolution of organisms and environments on the western tropical shore of Pangaea during the middle Permian. This is not limited to the fossils, but also the contextual data that accompanies them, including sedimentology and various forms of stratigraphy (chemical, isotopic, paleomagnetic, cyclic). While each rock outcrop records the story of a unique place and events, there is probably very little that can be learned from these formations in the Planning Area that cannot be learned elsewhere. Because there is no continuous record across the defining Permo-Triassic Boundary extinction event in the region (or anywhere in the Continental United States), the local geological record has little to say about the details of extinction, which drives the bulk of current research on this interval. However, the early Triassic rocks discussed below do give insight into its aftermath. The fact that the Kaibab Gulch is the established type section for the Kaibab Formation does give it elevated significance in the scientific community, as it is a reference with which all other sections should be compared. This being the case, it is foreseeable that the Buckskin Permian section could attract a fair amount of research attention in the future. Because geological studies on such sections generally involve drilling and removing cores, bulk sampling of rocks, and other potentially surface-disturbing activities, it is recommended that such methods be allowed for research purposes regardless of the administrative status of the type section.

Public/Hobby Potential

Smaller fossils of invertebrates such as brachiopods, corals, sponges, and clams from this unit are a frequent target of casual collecting by hobbyists or other interested avocationals. Most of this collecting is limited to picking up loose specimens preserved in nodular chert bodies. A significant number of specimens are also collected randomly by other recreationists as they recognize the obvious shapes of shells in the rocks. There are no known cases of high impact

casual collecting on these formations in the Planning Area. Setting aside designated areas for hobby collecting could increase public enjoyment of fossil resources as well as fulfill BLM's mandate for multiple use.

Management Issues

Because their fossil content lacks elevated scientific significance for the specific region around GSENM, no special management issues have been identified. Hobby collecting could potentially become a management concern if it starts to involve quarrying specimens. In this case, specially designated collecting areas could mitigate conflicts with other resources.

Triassic System

Moenkopi Formation

Research Potential

The Moenkopi Formation is not particularly fossiliferous, but does contain a fairly continuous record of events on the margin of Panthalassia (ancient global ocean) and the western edge of Pangaea (ancient supercontinent) during a particularly fascinating time, the wake of the largest extinction our planet has ever faced. Stromatolitic mounds found in the Timpoweap Member indicate that shallow waters in the tidal and subtidal environment were too hot for normal grazing gastropods to inhabit, allowing these relics of the early Precambrian to thrive briefly once again. Diversity in the terrestrial sediments is also low, presumably due to the hostile post-extinction low latitude climate. While most of the these features can be observed outside the GSENM region, the outcrops near the Paria River Box and Circle Cliffs areas are expansive and inviting to researchers. It is probable that many stratigraphic, sedimentological, geochemical, and isotopic studies will be conducted in those areas in the future.

Public/Hobby Potential

Concentrations of invertebrates in the Timpoweap and Virgin Limestone Units could become the targets of hobby collecting, especially if well-preserved ammonite fossils are present. Vertebrate trackways and other vertebrate trace fossils are protected under the Paleontological Resources Preservation Act and not open to collection without a research grade permit.

Management Issues

Knowledge of the occurrence of scientifically important fossil concentrations is poor. Thorough inventories should be conducted on the lower three members (Timpoweap, Lower Red, and Virgin Limestone) for occurrences of cephalopods or other unusual invertebrates and vertebrate trackways throughout the Planning Area in order to locate these resources and provide for their protection or promotion to researchers. Weighed against the inventory priorities of other formations in the region, these can be conducted on an as-needed basis for compliance projects or as time and funding permit. A brief literature survey should also be conducted to bring the nomenclature and faunal data for the units up-to-date.

Chinle Formation

Research Potential

Inventory of the Chinle Formation has been highly selective and cursory. Yale University spent four short field seasons (2002–2005) surveying in both the Circle Cliffs and Vermilion Cliffs areas, finding numerous important sites, including the *Poposaurus* mentioned above. However, the Yale team was only looking for vertebrates, and covered less than 10 percent of the total

outcrop area. The evolution and ecology of early Mesozoic (Triassic) ecosystems continues to be a very hot research topic, and it is anticipated that research interest in this unit, particularly because it represents an understudied area and is generally older than units to the east, could increase significantly, especially if concentrations of identifiable vertebrate remains are found. No unit type sections for the formation exist in the area; however, the stratigraphy in the GSENM area has been recently revised by Martz et al. (2017). In that paper, three informal subunits were used, and at is conceivable that eventually type sections for these units could be established in the Vermilion Cliffs area were the outcrops are especially good. Paleobotanists have historically also been interested in the unit, and the exposures near the Paria River ghost town contain some of the only known Triassic coal deposits in the western United States. While the coal is not economic grade, the associated shales contain well-preserved plant fossils (particularly Zamites). Excellent opportunities for paleobotanical, ichnological, and invertebrate studies (primarily on mollusks) within the context of a variety of topics (e.g., climate, evolution, ecology) also exist within the Planning Area.

Public/Hobby Potential

The silicified wood of the Chinle Formation has long been sought after by hobby and commercial collectors in the Planning Area. In general it does not display the brilliant colors (red, yellow, orange, blue) of the same age wood in Arizona or the Four Corners area, but logs sometimes contain amethyst or citrine filled vugs, a very desirable condition to collectors. However, even the rather plain, earth tone–colored logs in the Planning Area are sought after by hobbyists and commercial collectors as landscaping material, or accents to rock gardens.

Management Issues

The Chinle Formation needs a thorough inventory to assess its vertebrate fossil content and also the true extent and nature of the fossil wood resource. The potential scientific and interpretive significance of vertebrate and botanical specimens from the unit warrant making it a priority for such inventory when weighed against even the Cretaceous units, which are the most scientifically significant in the region. Active material support of outside institutions seeking to do research on the unit should be strongly considered. While vertebrate fossils will continue to be protected under the Paleontological Resources Preservation Act, the hobby collecting of petrified wood will almost certainly become an issue. Wholesale collection of wood in any area is probably not advisable, but setting aside smaller, specially designated areas for hobby collecting should be considered. However, given the demand and generally low renewal rate of this resource through erosion, designated collecting areas will be exhausted quickly. Illegal collecting of smaller vertebrate specimens (especially phytosaur teeth, which look like dinosaur teeth) in the Vermilion Cliffs area has occurred since the 1960s, but seems to have diminished in more recent years. Many undisturbed petrified wood areas exist in the Circle Cliffs areas, and special designation of these resources may be warranted because of their quality and quantity. There are also opportunities to expand field-based interpretation of the wood areas.

Moenave and Wingate Formations

Research Potential

Inventory of the Moenave and Wingate Formations is extremely difficult as both units present themselves in ledges or cliffy terrain with very little accessible surface area. However, both units record conditions of western Pangea across the Triassic-Jurassic Period Boundary and a

major extinction event responsible for the ascendancy of the dinosaurs in terrestrial ecosystems. This single fact will ensure the units will be of scientific interest in the future. In addition, the known fossil content of the Whitmore Point Member, which does include rare dinosaur and other tetrapod material, will continue to attract researchers interested in the rise of dinosaurs in the early Jurassic and the evolution of early Mesozoic terrestrial ecosystems. Any diagnostic tetrapod skeletal material from these units would be of very high scientific significance.

Public/Hobby Potential

Very little fossil resource in the Moenave or Wingate Formations has attracted legal hobby collecting. Cylindrical stromatolitic masses and root casts in the Whitmore Point Member are occasionally collected by rock hounds or hikers thinking they are dinosaur bones, but such activity has not become a management issue in the past.

Management Issues

The Moenave and Wingate Formations need thorough inventory to assess their vertebrate fossil content. Presumably this will be limited to mostly tracks and traces in the Wingate. However, this is not a priority compared to Cretaceous units, or even the Chinle Formation. While all vertebrate fossils in the Moenave and Wingate, including tracks and traces, are protected under the Paleontological Resources Preservation Act, the casual collecting of fish scales and small pieces of bone will almost certainly occur. The small nature of most Moenave bone and scales makes them almost invisible to an average hiker or outdoor recreationist, which may prevent such collecting from becoming a serious management issue.

Jurassic System

Kayenta Formation
Research Potential

Inventory of the Kayenta Formation is generally difficult as the unit, like the underlying Moenave and Wingate, is frequently expressed in ledges and cliffs. The lack of diagnostic body fossils in the unit within the Planning Area tends to limit its usefulness to researchers, and this is reflected in the largely desultory publication and project history. Notwithstanding, the potential for such sites to occur in the formation is definitely there. Should such sites be found, research interest will spike as any information on early Jurassic tetrapods and the evolution of early Mesozoic terrestrial ecosystems would be very important.

Public/Hobby Potential

The fossil dinosaur tracks in the Kayenta Formation generate a great deal of public interest in the public, who enjoy seeing the in-situ specimens, frequently in very scenic contexts. Sites in the Vermilion Cliffs area (e.g., Flag Point, Hackberry Canyon, Seaman Wash) have long attracted the public's attention. Other fossil resources in the Kayenta are unlikely to attract much collecting or visitation interest.

Management Issues

The Kayenta Formation needs thorough inventory to assess its regional potential for vertebrate body fossils and other fossil content. However, this is not a priority compared to Cretaceous units, or even the Chinle Formation. Visitation to dinosaur track sites in the formation can be substantial, creating management issues around preservation of the fossils, theft, vandalism,

unintentional damage, and litter. One of the highest impact activities is illegal/unauthorized molding and casting of footprints, which can accelerate erosion or leave residual plaster, release compounds, etc. in the rocks. Monitoring of high traffic areas on an annual or more frequent basis may be needed.

Navajo Formation

Research Potential

Inventory of the Navajo Formation is extremely difficult because it almost always occurs in ledge or cliff forming topography. The near lack of any body fossils in the unit within the Planning Area limits its usefulness to paleontologists other than track specialists (ichnologists).

Public/Hobby Potential

Fossil dinosaur track sites in the Navajo Formation, such as those at north Moccasin Mountain or North Coyote Buttes, can experience large numbers of visitors seeking to view such tangible fossil behavior preserved in stone. Other fossil resources in the Navajo Formation are unlikely to attract much collecting or visitation interest.

Management Issues

The fossil resources of the Navajo Formation in the Planning Area are low enough in volume that inventory efforts would not yield a worthwhile return for the investment of time and resources. It would probably be better to let sites be documented through reporting by the public or other incidental methods. Visitation to dinosaur track sites can be substantial, creating management issues around preservation of the fossils, theft, vandalism, unintentional damage, and litter. One of the highest impact activities is illegal/unauthorized molding and casting of footprints, which can accelerate erosion or leave residual plaster, release compounds, etc. in the rocks. Monitoring of high traffic areas on an annual or more frequent basis may be needed.

Carmel Formation

Research Potential

The dearth of paleontological resources in the Carmel Formation precludes it being the target of high profile research. In fact both Washington University (Jim Clark) and the Sam Noble Museum of Natural History (Brian Davis) spent two field seasons in the Carmel Formation looking for vertebrate fossils and found nothing. If terrestrial units in the upper portion of the formation (largely the Windsor Member) were ever to yield any body or trace fossils they would be of extreme significance because almost nothing is known about Middle Jurassic terrestrial vertebrates in North America. However, at present, there is little to suggest this unit will be of any interest to researchers in the foreseeable future.

Public/Hobby Potential

The lack of fossils in the Planning Area also precludes public interest or hobby collecting of fossils.

Management Issues

The lack of fossils also creates a lack of issues with the Carmel Formation. Inventory in the formation would be largely unproductive and not a wise use of resources.

Entrada Formation (Including Associated Sub-Morrison Units: the Romana Sandstone, Henrieville Sandstone, and Summerville Formation

Research Potential

The Escalante Sandstone Member and the Romana Sandstone Units have been the subject of several studies on megavertebrate trackways by several different groups (Matthews et al. 2006; Milan and Loope 2007; Lockley and Gierlinski 2014). It is likely that such moderate interest in the vertebrate fossil track record and invertebrate trace record will persist into the future. The lack of skeletal remains (or any plant or animal body fossils for that matter) throughout the Entrada limits its usefulness to paleontologists seeking to document more precisely the diversity of the time, which is still largely unknown.

Public Interest

Public interest in visiting Entrada tracksites like the Twentymile Wash tracksite west of HITRR is high. In such cases, large, spectacular tracks are abundant and accessible. The site is even featured on websites (e.g., https://www.thewave.info/Twentymile%20Tracksite%20Code/Map.html) and is promoted by GSENM as a tourist destination. Tracksites in the Romana Sandstone near Wiregrass Canyon, just outside the Planning Area in Glen Canyon NRA, have been visited by commercial tour operators.

Management Issues

Inventory should be conducted on the upper portion of the Entrada complex to assess more accurately the site's density, distribution, and significance. Tracksites that receive frequent visitation from the public should be prioritized for site management, monitoring, and interpretation. Monitoring can be cost effectively conducted through coordination with backcountry patrols or using volunteer site stewards. Twentymile Wash is currently on the list of annual monitoring for the in house paleontology program at GSENM, and as it remains inside the Kaiparowits Unit, will remain so.

Morrison Formation

Research Potential

The area's Morrison Formation could potentially yield diagnostic dinosaur and other vertebrate fossils. While the Morrison is one of the best studied Mesozoic Formations in the world (with over 100 years of intensive work), the Kaiparowits area represents a western portion of the basin that was more upland and potentially inhabited by different species than are found in the classically studied eastern outcrops. Any sign that this is the case, and that the animals preserved in the Planning Area are new or different, would spur intense scientific interest. Also, the diversity and ecology of the plants, including the petrified wood, has never been studied.

Public Interest

Morrison fossils have long fascinated the public. This is easily substantiated by the high numbers of tourists that visit famous Morrison sites like the Fruita Paleo area (Colorado), Cleveland Lloyd (Utah), and Dinosaur National Monument (Utah), and even the Escalante Petrified Forest State Park. The Morrison dinosaur fauna includes some of the largest animals to ever walk on dry land, which in and of itself is amazing to most of the public. Locally, there is a long tradition of hobby collecting Morrison fossil wood for landscaping and lapidary purposes, and Kaiparowits Unit wood sites are still featured in rockhound guides for Utah. There is also a

substantial local interest in visiting large logs that are still in the ground, particularly west of the town of Escalante.

Management Issues

The Morrison Formation in the Planning Area is known to contain fossils but, as stated above, has never been inventoried in more than a cursory way. The formation should be thoroughly inventoried to assess its overall fossil content and scientific significance both to stimulate research interest and also to establish a baseline for resource monitoring. Looting of Morrison bone and petrified wood for illegal commercial and hobby purposes is a longstanding systemic problem in Utah, and the Planning Area is no exception. Illegal hobby collecting of petrified wood around Escalante can be an almost daily occurrence during certain times of the year. In addition, known bone sites around Escalante show the highly desirable bluish and reddish hues in the bone that are highly sought after by illegal gem bone collectors. Similar bone in the nearby Henry Basin has been the subject of intense looting for decades.

Late Cretaceous System

Overview

Vertebrate fossils from Late Cretaceous strata constitute one of the truly globally unique resources within the Planning Area. Many species have been found nowhere else or are rare, or incompletely known elsewhere. This is because the Cretaceous climate and geography came together to create the perfect wet, sediment-loaded conditions that preserve body fossils. Unlike the entire Jurassic, during the Cretaceous the region was a humid tropical forest thriving with life large and small. Collectively the region's Cretaceous fossils paint one of the most complete pictures of terrestrial vertebrate evolution through the end of the age of dinosaurs in the world. This unique resource was the primary basis for the inclusion of the Kaiparowits Unit in GSENM, and fossil preservation in the upper portion of the Late Cretaceous is truly exceptional. It is not unusual to find one or two sites a year that exhibit soft tissue. Thirteen new dinosaurs have been named from the Kaiparowits Plateau region in as many years, and it is still one of the most scientifically productive Cretaceous fossil areas in North America. Since 2000, BLM has been actively managing these resources through partnerships with museums and its own in house paleontology program as result of previous management plan decisions SCI-1, SCI-7, PAL-1, and PAL-3. The in house program manages the only working paleontology preparation and research lab in the Bureau and a dedicated group of about two dozen volunteers.

Within the Planning Area, Cretaceous beds are restricted to the Grand Staircase and Kaiparowits Units (the majority of rocks in this unit in fact), as well as KEPA lands in those areas. The most expansive and best exposed outcrops occur in and around the Kaiparowits Plateau. As a generalization, the southern Utah Cretaceous section is mostly terrestrial in the western half, and to the east, mixed marine-terrestrial in the lower half and dominantly terrestrial in the upper half. Because of the potential for vertebrate fossils, none of the Cretaceous units in the Planning Area rate less than 4 on the PFYC, with some units ranking at 5.

The most recent summary of available faunal data resulting from this and other work is found in the 2013 Indiana University Press volume *At the Top of the Grand Staircase – The Late Cretaceous of Southern Utah* (Titus and Loewen 2013) and also in Titus et al. (2017), which are the basis for the faunal list presented above. Because of the potential for vertebrate fossils,

none of the Cretaceous units in the Planning Area rate less than 4 on the PFYC. However, individual units, discussed separately below, do rate higher.

Cedar Mountain/Naturita Formations

Research Potential

The Cedar Mountain Formation in the area has only yielded reworked fossils from older formations, which are useful to the stratigrapher trying to work out the geologic history of the area, but not so much to the paleontologist as they lack a primary context.

The Naturita Formation has yielded some of the oldest placental and marsupial mammal fossils in North America. Study of these fossils has led some researchers to hypothesize that marsupials may have actually originated in North America during the Cretaceous. The turtles, crocodylians, and dinosaurs remain little studied, even though good specimens or new sites are now known. The discovery of any larger skeletal remains in the formation would be hugely important.

Public Interest

The main public interest in the Naturita Formation is fossil collecting. The abundant invertebrates of the upper portion are well known to hobbyists and are easy and fun to collect. The plant fossils of the middle and lower units are also locally spectacular and targeted by hobby collectors. The public also enjoy visiting in situ fossil sites in the field such as are featured in a local road log for the Cottonwood Canyon road (Gillespie and Sadler 2012).

Management Issues

The vertebrate fossils in the lower portion of the Naturita are a rare resource globally, and particularly rare in North America. Additional inventory is warranted to establish the exact extent of the significant vertebrate fossil resources. Commercial or illegal bulk collecting of invertebrates in the upper formation is a potential problem in the Cottonwood Canyon and Escalante areas, especially if the collecting sites are visible from well-traveled roadways. Most of the significant vertebrate fossil-producing areas are now outside of special designation. Additional protective measures or designations could be sought for the highest value concentrations of sites near the Paria River, along the Skutumpah Bench, and around Cannonville and Tropic.

Tropic Shale

Research Interest

The vertebrate fossil record from the Tropic Shale includes some of the most significant Cenomanian and Turonian Cretaceous marine fossil specimens collected in North America. This includes the new species of plesiosaurs; the oldest and most primitive mosasaurs from North America; the most complete therizinosaur dinosaur ever collected from the Late Cretaceous of North America; and numerous complete or partially complete turtles, fish, sharks (including one that preserved soft tissue), and spectacular invertebrates including large and small ammonites. These fossils provide numerous opportunities for researchers to test ideas about evolution, ecology, and marine biospheric response to one of the hottest periods in our planet's history. A minor mass extinction is also recorded in the Tropic Shale, and this has been the subject of numerous papers. Because of the significance of this extinction and the superior nature of the Tropic Shale's stratigraphic and fossil record, it will probably continue to be an important target of research for the foreseeable future.

Public Interest

Because they are abundant and obvious to most visitors, the larger invertebrate fossils are the target of frequent hobby collecting. In particular the ammonite and oyster fossils are featured in rock hounding guides. The shark teeth, where locally common, also attract a great deal of attention from collectors and fossil hounds. The public are also interested in the overall interpretative story such as is presented at the Big Water Visitor Center, and also in seeing field sites such as the oyster reefs.

Management Issues

Large areas of Tropic Shale, especially along the Cockscomb, around the Croton Road and Little Valley, and along the Straight Cliffs have not been extensively inventoried for vertebrates. In addition to the inventory, as in the past, BLM has an opportunity to pursue a proactive program of partnership and research on this unit to promote its scientific utilization. The area along the southern margin of the Kaiparowits Plateau between the Paria River and Last Chance Canyon have been inventoried to some degree over the last 17 years. Managing both illegal and legal collecting in and out of GSENM will probably present itself as one of the biggest challenges in the future. Most of the vertebrate fossil-producing areas in the Tropic Shale are now outside of special designation.

Straight Cliffs Formation

Research Interest

The Straight Cliffs Formation has an international reputation for being a showcase of coastal and coastal plain geology. The fossils, on the other hand, have not gained quite the international reputation, largely due to the rarity of macroskeletal sites. In the Planning Area, a handful of actual dinosaur bonebeds and associated individual specimens are known from the west side of the Kaiparowits area, both near the Paria River and around the town of Tropic. None of these have yielded diagnostic cranial material that will facilitate scientific naming of the specimens. Such sites are probably much more common on the Paunsaugunt and Markagunt plateaus, farther from the coastal facies, but remain elusive because of more extensive vegetative cover in those areas. As a result, most paleontological interest to date has been on the microvertebrate fossils and invertebrates, both of which were used mostly for biostratigraphic purposes (dating of rock layers). Many of the microvertebrate species were described in detail in Titus and Loewen (2013). In spite of their small size, the microvertebrate record of the Straight Cliffs still remains one of the most complete, best documented Turonian-Santonian aged successions in the world (Titus et al. 2017). The discovery of any macroskeletal site with diagnostic cranial or other material would immediately elevate interest in this unit and trigger a small “bone rush,” as these would all be animals that are new to science. Very little is known about larger animals in Straight Cliffs time, and yet the evolution of key dinosaur and other groups (e.g., tyrannosaurids, hadrosaurids, and ceratopsids) must have occurred at that time.

Public Interest

Public interest in Straight Cliffs fossils has largely been confined to hobby collecting of shark teeth from the lower portion, as well occasional collecting of invertebrates and leaf fossils from the John Henry Member.

Management Issues

The actual fossil content of the formation is still largely unknown over much of the Planning Area. Inventory should be conducted in all four members, with an emphasis on the western portion of the Kaiparowits Plateau where macroskeletal remains are already known. It would be efficient to support a joint inventory effort between the Planning Area and KFO lands along the Skutumpah Terrace and Glendale Bench areas, where the probability of macroskeletal remains is higher, to gain a comprehensive understanding of Straight Cliffs fossil resource in the entire region. Hobby collecting has been intermittent and low impact, but does include the looting of shark teeth and other smaller vertebrate remains from shoreface lags in the lower portion of the formation around Tropic and Escalante (now outside GSENM in the KEPA). These are now protected under the Paleontological Resources Preservation Act. Vertebrate remains and petrified wood occur in densities below the thresholds that generally trigger illegal commercial collecting. Most of the scientifically significant vertebrate fossil-producing areas are now outside of special designation.

Wahweap Formation

Research Interest

Because the Wahweap Formation has yielded numerous diagnostic skeletons of larger vertebrates, there is fairly high interest in it among the research community. In addition, the fossils date to a time that puts them as just older than most other classically studied faunas in North America. Because the formation spans at least three different potential faunal zones (two in the middle Campanian and lower-most upper Campanian) and has such high potential to produce sites through its entire thickness, the probability of finding animals new to science is very high. This payout potential vs. investment in the field ratio will keep researchers interested in the formation for the foreseeable future. The paleobotany and invertebrate paleontology have never been adequately studied and are a glaring piece of the knowledge gap.

Public Interest

The public has shown intense interest in the dinosaur and larger fossil animal species from the Wahweap Formation, such as the giant alligator, Deinosuchus, of which two species are known. Plastic figurines of the horned dinosaur Diabloceratops, are now made by major toy makers. Lythronax, as the oldest Tyrannosaurus rex–like animal ever found, has also generated widespread interest. Historically, large petrified logs in the lower member at Head of the Creeks have been the target of collecting (including illegal poaching) by locals in the Big Water-Church Wells-Page area. Because the wood is not gem grade, this has largely been for landscaping and structural/ornamental use in walls.

Management Issues

The Wahweap Formation's fossils are of such elevated global significance that support for all aspects of their inventory and research would reap great benefits to the resource. Large areas, particularly away from main travel routes, have never been inventoried and remain almost unknown as to their fossil potential. These areas should be prioritized for future inventory work. Interpretation of the formation should also be a high priority because of the high diversity and significance of its dinosaur fauna, which would foster public appreciation. Protection of particularly rich areas already inventoried should be priority. In KEPA areas, consideration of the rarity of Middle Campanian fossil wood deposits should be carefully weighed against its

collection by hobbyists. Unlike wood in the Chinle or Morrison Formations, wood of Wahweap age is relatively rare in the Colorado Plateau region.

Kaiparowits Formation

Research Interest

The Kaiparowits Formation (note: this is the geological formation, not the Kaiparowits Plateau landform) has attracted more research attention than any other formation in the Planning Area since 2000. It may actually be one of the most heavily studied formations on the entire Colorado Plateau. This is because the likelihood of a large payout (new species, new insight) is very high if a program invests in field time in the Kaiparowits. And for good reason. The Kaiparowits has the highest density of bone, the best preservation, and the highest diversity of any formation in the Planning Area.

Neogene System

Research Interest

The unpredictable and rare nature of Pleistocene fossil site occurrence has discouraged researchers from systematic investigation. Sites are mostly found incidentally to other work or by the public and, when found, are generally investigated intensely. This is not likely to change. There seems to be a current apathy among scientists toward Colorado Plateau Pleistocene fossil research.

Public Interest

The public is very interested in Pleistocene megafauna and the story of the Pleistocene in general. Mammoths, sabre-tooth tigers, camels, horses, and giant bison roaming the region thousands of years ago create a compelling story for interpretation. Non-vertebrate fossil resources are rare enough in the region that hobby collecting has not been documented.

Management Issues

Almost no systematic inventory for Pleistocene fossil resources has been undertaken in the Planning Area. Such inventory should be undertaken. Sites, particularly those with megafaunal remains, are extremely rare, much less predictable in occurrence, limited in areal extent, and frequently vulnerable to even light weathering or disturbance. The bones of such animals are generally not permineralized and are very brittle or soft. Bluff shelters can contain soft tissues or traces (e.g., dung) that have mummified in the desert climate. Curation of such specimens in museums can require elaborate climate control and other expensive measures. The small area of bluff shelters, combined with the tendency of illegal artifact hunters to dig in them for other reasons, makes these resources particularly vulnerable. The association of any megafaunal sites with Paleo Indian artifacts or traces would elevate a site's status possibly to world heritage level.

Appendix 6. Special Status Species

Plants

Welsh's milkweed (*Asclepias welshii*) was listed as threatened with critical habitat designated in 1987 (52 FR 41435–41441, October 28, 1987). The USFWS prepared a recovery plan in 1992 and began a 5-year review in 2011 (76 FR 35906–35908, June 20, 2011). No critical habitat for Welsh's milkweed has it been observed in the Planning Area.

Welsh's milkweed is an herbaceous plant in the milkweed family (Asclepiadaceae) that occurs on unconsolidated eolian sands. The known geographic distribution includes three populations in southern Utah (Kane County) and northern Arizona (Coconino County). Most individuals are on the Coral Pink Sand Dunes west of Kanab. (USFWS 1992:2.)

Suitable habitat may be present in the Planning Area. Welsh's milkweed is found just outside the Clark Bench Allotment on the Navajo Sand Dunes, but suitable habitats have not been found in the Clark Bench area on the Planning Area lands. Navajo Sand Dunes are found in the Cockscomb Allotment and may provide habitat for this species (BLM 2014).

Navajo Sedge (*Carex specuicola*) was listed as threatened, and critical habitat was designated in 1985 (50 FR 19370–19374, May 8, 1985). The USFWS prepared a recovery plan for Navajo sedge in 1987 (USFWS 1987) and completed a 5-year review for the species in 2014 (USFWS 2014a). Navajo sedge has not been observed in the Planning Area, but it occurs in Glen Canyon, next to the Planning Area, in hanging garden habitat in Slickhorn Canyon along the San Juan River (NPS 2014:125). No critical habitat for Navajo sedge is in the Planning Area.

Navajo sedge is a grass-like perennial in the sedge family (Cyperaceae). This slender plant reaches approximately 10 to 18 inches in height and has pale green leaves clustered near the base. It flowers and sets fruit from spring through summer, but most reproduction appears to be vegetative (USFWS 1987:3-4). Navajo sedge is an obligate of springs, typically in alcoves associated with often vertical sandstone cliffs at 1,280 to 2,300 feet in elevation (USFWS 2014a:6). It rarely occurs on level terrain. It coexists with other hanging garden species (USFWS 2014a:7), such as monkey flower (*Mimulus eastwoodiae*), giant helleborine (*Epipactis gigantea*), and Bluff City columbine (*Aquilegia micrantha*). Water is vital to the survival of Navajo sedge, so any change in the water table level could have an effect on this species.

Jones's cycladenia (*Cycladenia humilis* var. *jonesii*) was listed as threatened in 1986 (51 FR 16526–16530, May 5, 1986). The USFWS prepared a recovery outline in 2008 (USFWS 2008b), but it has prepared no recovery plan. No critical habitat has been designated for this species. Jones's cycladenia occurs in the Planning Area; ongoing monitoring activities for this species in the Planning Area are described below.

Jones's cycladenia is an herbaceous perennial forb in the dogbane family (Apocynaceae) that grows from 4 to 6 inches tall. It generally occurs between 4,390 and 6,000 feet in elevation in plant communities of mixed juniper and desert scrub or wild buckwheat-Mormon tea (USFWS 2008b:2). Jones's cycladenia is rhizomatous and produces pink or rose-colored, trumpet-shaped showers from mid-April to early June (USFWS 2008b:2). It grows only on alluvium of gypsiferous and saline soils on the Chinle, Cutler, and Summerville Formations (USFWS 2008b:2). Populations in the Planning Area grow on generally steep slopes (35 degrees or

more), which are generally inaccessible to livestock. Jones's cycladenia is known from about 20 populations in the Circle Cliffs region of the Planning Area (BLM GIS 2014a).

Kodachrome bladderpod (*Physaria tumulosa*) was listed as endangered in 1993 (58 FR 52027–52030, October 6, 1993). The USFWS prepared a recovery outline in 2009 (USFWS 2009), but no recovery plan has been prepared. No critical habitat has been designated for this species. Kodachrome bladderpod occurs in the Planning Area; ongoing monitoring activities in the Planning Area are described below.

Kodachrome bladderpod is a perennial herbaceous herb in the mustard family (Brassicaceae). It grows on xeric, white, bare shale knolls derived from the Winsor member of the Carmel geologic formation (Welsh and Reveal 1977), at about 5,700 feet elevation (USFWS 2009:2). Kodachrome bladderpod is an endemic plant limited to Kane County, Utah. The species is restricted to one population of scattered occurrences in the Kodachrome Flats area of the Paria River Drainage. Over 90 percent of the species' known range occurs on the Planning Area, with private landowners and the Kodachrome Basin State Park comprising the remainder (USFWS 2009:2). Approximately 50 acres of occupied habitat for Kodachrome bladderpod occurs in the Planning Area (BLM GIS 2014a).

The Utah Natural Heritage Program conducted the only large-scale survey for Kodachrome bladderpod in 1989 in the Kodachrome Basin, Little Dry Valley, and Rock Springs Creek areas. The survey documented 20,000 individuals, covering approximately 700 acres (USFWS 2009:3). From 1997 to 2001, monitoring at two study sites in the Planning Area indicated that the population declined during this 4-year period as mortality exceeded recruitment (USFWS 2009:3). Mortalities were primarily associated with drought and OHV use.

In 2007, 24 new plots were established in the Planning Area. Ten of these plots were monitored annually from 2008 to 2013 (Hughes 2008, 2009, 2010, 2012, 2013a, 2013b); observers have identified the numbers of adult, juvenile, and dead plants. The numbers of live plants fluctuated between 494 observed in 2010 and a high of 1,645 plants observed in 2013.

In 2010, the scientific name of the Kodachrome bladderpod was changed from *Lesquerella tumulosa* to *Physaria tumulosa*.

Siler pincushion cactus (*Pediocactus sileri*) was listed as endangered in 1979 (44 FR 61786–61788, October 26, 1979) and subsequently downlisted as threatened in 1993 (58 FR 68476–68480, December 23, 1993). The USFWS prepared a recovery plan in 1986 (USFWS 1986) and completed a 5-year review in 2008 (USFWS 2008c). No critical habitat has been designated for this species. Siler pincushion cactus has not been observed in the Planning Area, though its geographic range includes portions of southern Utah in Kane and Washington Counties (USFWS 2008c:8).

Siler pincushion cactus grows on gypsiferous clay and sandy soils derived from the Shnabkaib and Middle Red Members of the Moenkopi Formation, between elevations of 2,800 and 5,400 feet in Great Basin desert shrub communities (USFWS 2008c:8). Areas of suitable habitat may be present in the Planning Area.

Ute ladies'-tresses (Spiranthes diluvialis) was listed as threatened in 1992 (57 FR 2048–2050, January 17, 1992). The USFWS prepared a recovery plan in 1995 (USFWS 1995) and began a 5-year review in 2004 (69 FR 60605–60607, October 12, 2004), which it has not yet completed. No critical habitat has been designated for this species.

Ute ladies'-tresses is a perennial terrestrial orchid that typically grows in low elevation riparian, spring, and lakeside wetland meadows (USFWS 1999:2 in BLM 2000). A few populations in eastern Utah and Colorado are found in riparian woodlands, but the species seems generally intolerant of shade, preferring open grass, sedge, and forb-dominated sites (USFWS 1999:3 in BLM 2000). The Colorado River Basin populations of Ute ladies'-tresses occur almost exclusively in riparian meadows (USFWS 1999:2 in BLM 2000). Two populations of Ute ladies'-tresses are found in the Planning Area in Garfield County. One is in riparian meadows along Deer Creek (USFWS 1999:3 in BLM 2000), from the Deer Creek Campground south to the narrows of Deer Spring Canyon (BLM 2014), and the other is in riparian habitat in Henrieville Creek, near the confluence of Shurtz Bush Creek. It is not known to occur in Kane County (USFWS 2013).

Birds

Yellow-billed cuckoo (*Coccyzus americanus*) was listed as threatened in 2014 (79 FR 59991–60038, October 3, 2014). Critical habitat was proposed in 2014 (79 FR 48547–48652, August 15, 2014), but no final rule has been issued. No critical habitat is proposed in the Planning Area, and no recovery plan for this species has been prepared.

This medium-sized bird averages 12 inches long, with a slender, long-tailed profile and a fairly stout and slightly down-curved bill (74 FR 57823, November 9, 2009). Plumage is grayish brown above and white below (74 FR 57823, November 9, 2009). The yellow-billed cuckoo prefers open woodland, with clearings and low, dense, scrubby vegetation. In Utah and Arizona, this species prefers desert riparian woodlands composed of cottonwood, willows, and dense mesquite (*Prosopis* spp.). It typically nests in willows and uses cottonwoods extensively for foraging. In addition, dense understory foliage is an important foraging habitat for this bird (74 FR 57823, November 9, 2009). It nests on horizontal branches or vertical forks of small trees and large shrubs, averaging 3 to 19 feet above the ground.

Yellow-billed cuckoo has not been observed in the Planning Area, though suitable habitat may exist in riparian habitats.

California condor (*Gymnogyps californianus*) was reintroduced into northern Arizona/southern Utah on October 16, 1996. The USFWS designated this population as nonessential and experimental (BLM 2000:16; 61 FR 54043–54060, October 16, 1996). Section 7 consultation under the ESA was not required for this population of this species when the existing MMP was prepared; however, both the USFWS and BLM decided it was appropriate and desirable to discuss California condor (BLM 2000:17), so a discussion for California condor is also included in this analysis.

California condors are among the largest flying birds in the world; adults weigh approximately 22 pounds and have a wingspan of up to 9.5 feet (Kiff et al. 1996:1). This species requires suitable habitat for nesting, roosting, and foraging. It nests in cliff cavities, large rock outcrops, or large trees. A single egg is normally laid between late January and early April, and it hatches after approximately 56 days (Kiff et al. 1996:2). Roosting sites are often near feeding sites on cliffs or large trees, and foraging generally occurs in grasslands, in chaparral areas, or in oak savannahs (Kiff et al. 1996:6).

The captive-reared birds in the experimental population were released on the nearby Vermilion Cliffs, north of the Grand Canyon and south of the Planning Area. California condor have been sighted in the Planning Area although they are rare.

Southwestern willow flycatcher (*Empidonax traillii extimus*) was listed as endangered in 1995 (60 FR 10694–10715, February 27, 1995). The USFWS prepared a recovery plan in 2002 (USFWS 2002a) and completed the most recent 5-year review in 2014 (USFWS 2014b). In March 2016, the USFWS announced 90-day findings on several petitions to reclassify or delist the southwestern willow flycatcher; the agency determined that a status review is warranted (81 FR 14058–14072, March 16, 2016). Critical habitat was designated in early 2013 (78 FR 343–534, January 3, 2013); approximately 1,100 acres of critical habitat for this species exists within the Planning Area, along a portion of the Paria River, as depicted in Appendix 1, Map 12. The Planning Area is in the Upper Colorado Recovery Unit (USFWS 2014b:7).

The southwestern willow flycatcher is approximately 5.75 inches long and weighs about 0.42 ounce (USFWS 2002a:4). This small migratory species occupies thickets, scrubby and brushy areas, open second growth, swamps, and open woodland from near sea level to over 8,500 feet elevation; however, it is primarily found in lower-elevation riparian habitats (USFWS 2002a:7). The southwestern willow flycatcher breeds in dense growths of trees and shrubs in riparian ecosystems in the arid southwestern United States, and possibly extreme northwestern Mexico (USFWS 2002a:7). The birds typically arrive on breeding grounds between early May and early June, with the breeding season lasting approximately from mid-June to mid-July (USFWS 2002a:21).

Peterson and O'Neill (1997:12, 22) found southwestern willow flycatchers in both the Paria and Escalante Rivers riparian corridors but on only several rare occasions. Multiple year surveys have been completed within suitable or potentially suitable habitat throughout UDWR Southern Region, including on the Paria River (Day 2004:13). In addition, a habitat suitability model has been created and ground tested for potentially occupied habitat in the Planning Area (Callahan and White 2002). No nesting pairs have been detected through either the surveys or modeling (Peterson and O'Neill 1997:34; Day 2004:13).

Threats to this species are loss and modification of breeding habitat. Destruction and modification of native riparian habitats have been caused mainly by reducing or removing surface and subsurface water due to diversion and groundwater pumping, changes in flood and fire regimes due to dams and stream channelization, vegetation clearing, and changes in soil and water chemistry due to the disruption of natural hydrologic cycles (USFWS 2002a:33, 2014b).

Invasive species such as tamarisk (*Tamarix* spp.) have become established and spread due to surface and subsurface water loss in riparian areas in the region. When the USFWS listed the southwestern willow flycatcher, it identified tamarisk as a threat to the species (60 FR 10694–10715, February 27, 1995). By the time the recovery plan (USFWS 2002a) was completed, understanding the relationship between tamarisk, water management, and flycatcher use of tamarisk had improved; it is now understood that flycatcher extensively use tamarisk for nesting across their breeding range (USFWS 2014b). Therefore, tamarisk management that primarily removes tamarisk, without addressing the causes for the plant's persistence and reduction of native riparian species, is unlikely to sustain habitat improvement for flycatcher.

Tamarisk leaf beetle (*Diorhabda* spp.), introduced to control the invasive riparian shrub, have expanded into the southwestern willow flycatcher breeding range, including in southern Utah, and may further expand throughout the species' breeding range (USFWS 2014b:42). Beetle spread may result in additional habitat loss for southwestern willow flycatcher if native riparian vegetation is not restored in defoliated tamarisk stands. In addition, reductions in the density and diversity of bird communities, including willow flycatchers, have been associated with livestock grazing (Taylor 1986:257; USFWS 2014b:49) and recreation (Riffell et al. 1996:493; USFWS 2014b:55).

Southwestern Willow Flycatcher	Acres by Planning Unit			
	Kanab-Escalante Planning Area	Grand Staircase	Kaiparowits	Escalante Canyons
Critical Habitat	1,002	267	9	0

Mexican spotted owl (*Strix occidentalis lucida*) was federally listed as threatened in 1993 (58 FR 14248–14271, March 16, 1993), and critical habitat was designated in 2004 (69 FR 53182–53298, August 31, 2004), comprising approximately 8.6 million acres of Federal lands in Arizona, Colorado, New Mexico, and Utah. USFWS prepared a revised recovery plan for the Mexican spotted owl in 2012 (USFWS 2012) and completed a short-form summary 5-year review in 2013 (78 FR 8576, February 6, 2013). Approximately 524,100 acres of critical habitat for Mexican spotted owl occurs in the Planning Area, as depicted on Appendix 1, Map 12. Critical habitat in the Planning Area covers two sections of Unit CP-12, Kaiparowits Plateau.

The Planning Area is in the heart of Mexican spotted owl breeding habitat represented by the Colorado Plateau Recovery Unit (Willey 2007:2). Mexican spotted owls are widespread in arid canyonland habitats in much of southern Utah and northern Arizona. In the Planning Area, Mexican spotted owl is strongly associated with steep and complex sandstone canyons dominated by arid vegetation communities rather than mesic old growth forest (Willey 2007:4).

PACs are intended to sustain and enhance areas that are presently, recently, or historically occupied by breeding Mexican spotted owls (USFWS 2012:258). There are currently seven PACs in the Planning Area, as depicted on Appendix 1, Map 12. PACs in the Planning Area are established around known nesting or roosting sites and are intended to protect important activity centers used by owls rather than entire home ranges. They also are intended to protect the nest or primary roost areas and other resources to meet the life-history needs of the owl (USFWS 2012:258).

Surveys for Mexican spotted owl were conducted in the Planning Area from 2000 to 2006 at nine owl territories (Willey 2007:3). Willey found that owl site occupancy and productivity dropped dramatically during drought years but increased significantly during wetter years. Additional surveys by Willey and Willey (2010) in the Planning Area showed that, in drought years, small mammal species' richness and abundance and owl occupancy, number of pairs among sites, and production of young were was much lower than in wet years. Willey and Willey propose that wetter habitats (i.e., mesic sites with consistent springs and seeps) may experience less fluctuation in small mammal populations between wet and dry years; as a result, these habitats may experience less fluctuation in prey availability and owl occupancy (Willey and Willey 2010).

Hockenbary and Willey (2010:4) conducted occupancy-based population monitoring to estimate occupancy rates of historic territories used by Mexican spotted owl, including in the Planning Area. During the 2008 field season's occupancy surveys, the Planning Area had four of nine sites occupied, including three pairs of owls; in 2009, three sites were occupied, including two pairs, and in 2010 three sites were occupied, including one pair (Hockenbary and Willey 2010:9). Owlets were observed in 2008 and 2009 (Hockenbary and Willey 2010:9).

Mexican Spotted Owl	Acres By Planning Unit			
	Kanab-Escalante Planning Area	Grand Staircase	Kaiparowits	Escalante Canyons
Critical Habitat	128,374	28,311	285,968	0
	Number			
Protected Activity Center	1	1	6	0

Note: Although the Planning Area has a total of seven PACs, one occurs on portions of two units (Kanab-Escalante Planning Area and Kaiparowits) and is therefore recorded in both.

Fishes

Bonytail chub (*Gila elegans*) is listed as endangered under the ESA. A recovery plan was approved on September 4, 1990 (USFWS 1990a). The final rule for determination of critical habitat was published on March 21, 1994 (59 FR 13374, March 21, 1994), and the final designation became effective on April 20, 1994.

Little is known about the specific habitat requirements of bonytail because the species was extirpated from most of its historic range before extensive fishery surveys. The bonytail is adapted to main stem rivers, where it has been observed in pools and eddies. Similar to other closely related *Gila* species, bonytail in rivers probably spawn in the spring over rocky substrates. Spawning in reservoirs has been observed over rocky shoals and shorelines. Based on available distribution data, flooded bottomland habitats are likely important growth and conditioning areas for bonytail, particularly as nursery habitats for young (USFWS 2002d).

Until the 1950s, bonytail was historically common or abundant in warm-water reaches of large rivers, from Mexico to Wyoming. It was found far downstream in the main stem Colorado River near the Colorado-Utah border in the Black Rocks area (USFWS 2002d). The last known riverine area where bonytail were common was the Green River in Dinosaur National Monument. Here Holden and Stalnaker (1970) collected 91 specimens from 1962 to 1966. From 1977 to 1983, no bonytail were collected from the Colorado or Gunnison Rivers in Colorado or Utah. However, in 1984, a single bonytail was collected from Black Rocks on the Colorado River. Several suspected bonytail were captured in Cataract Canyon between 1985 and 1987. There are no known records in the Planning Area, and recent surveys have not located this species in the Escalante River (BLM 2000:14).

Humpback chub (*Gila cypha*) is listed as endangered under the ESA. It was included on the first List of Endangered Species issued by the Office of Endangered Species on March 11, 1967 (32 FR 4001, March 11, 1967), and it was considered endangered under provisions of the Endangered Species Conservation Act of 1969 (16 U.S.C. 668aa). The humpback chub recovery plan was approved on September 19, 1990 (USFWS 1990b). The final rule for determination of critical habitat was published on March 21, 1994 (59 FR 13374, March 21, 1994), and the final designation became effective on April 20, 1994.

The historical distribution of the humpback chub is not well known because it was not described as a species until 1946; however, its original distribution was presumably limited to swift deep-water areas in the main stem Colorado River Basin, downstream to below the Hoover Dam site. Today the largest populations of this species are in the Little Colorado and Colorado Rivers in the Grand Canyon and in the Black Rocks and Westwater Canyon in the upper Colorado River (USFWS 2002e). There are no known records in the Planning Area, and recent surveys have not located this species in the Escalante River (BLM 2000:14).

Colorado pikeminnow (*Ptychocheilus lucius*) is listed as endangered under the ESA. It was included on the first list of endangered species issued by the Office of Endangered Species on March 11, 1967 (32 FR 4001, March 11, 1967). The final rule for determining critical habitat was published on March 21, 1994 (59 FR 13374, March 21, 1994), and the final designation became effective on April 20, 1994. The current revised Colorado pikeminnow recovery plan was approved on August 1, 2002 (USFWS 2002b).

Colorado pikeminnow is restricted to the upper Colorado River Basin. It inhabits warm-water reaches of the Colorado, Green, San Juan, Yampa, and White Rivers and their associated tributaries. It requires uninterrupted stream passage for spawning migrations and young dispersal (USFWS 2002b). The species is adapted to a hydrologic cycle characterized by large spring peaks of snowmelt runoff and low, relatively stable base flows. Throughout most of the year, juvenile, subadult, and adult Colorado pikeminnow use relatively deep, low-velocity eddies, pools, and runs that occur in nearshore areas of main river channels. In the spring, Colorado pikeminnow adults use floodplain habitats, flooded tributary mouths, flooded side canyons, and eddies that are available only during high flows. River reaches of high habitat complexity appear to be preferred. Young pikeminnow feed on insects and plankton, and adults feed on other fishes (USFWS 2002b).

Colorado pikeminnow found in the Colorado River system were more prevalent before the construction of Glen Canyon Dam (BLM 2000:14). There are no known records in the Planning Area, and recent surveys have not located this species in the Escalante River (BLM 2000:14).

Razorback sucker (*Xyrauchen texanu*) is listed as endangered under the ESA, under a final rule published on October 23, 1991 (56 FR 54957, October 23, 1991). A recovery plan was approved on August 1, 2002 (USFWS 2002c); a previous recovery plan was dated December 23, 1998 (USFWS 1998). The final rule for determination of critical habitat was published on March 21, 1994 (59 FR 13374, March 21, 1994), and the final designation became effective on April 20, 1994.

Historically, razorback suckers were found in the main stem Colorado River and in its major tributaries in Arizona, California, Colorado, Nevada, New Mexico, Utah, Wyoming, and Mexico. In the upper Colorado River Basin, above Glen Canyon Dam, razorback suckers are found in limited numbers in both lentic (lake-like) and riverine environments. Adult razorback suckers occupy different habitats seasonally. Spring habitats required by adults in rivers are deep runs, eddies, backwaters, and flooded off-channel environments; summer habitats are runs and pools, often in shallow water associated with submerged sandbars; and winter habitats are low-velocity runs, pools, and eddies. The species spawns in rivers during spring runoff, over bars of cobble, gravel, and sand substrates. Razorback suckers breed in the spring, when flows in riverine environments are high typically. Their diet consists primarily of algae, plant debris, and aquatic insect larvae.

Razorback suckers found in the Colorado River system were more prevalent before the construction of Glen Canyon Dam (BLM 2000:14). There are no known records in the Planning Area, and recent surveys have not located this species in the Escalante River (BLM 2000:14).

Appendix 7. Vegetation

Table 1.. PFC Assessment Results for Lentic Sites

ID	Riparian/Wetland Area	Year Assessed	Rating(1)	Trend
LE0001	Sand Spring	2000	FAR	DOWNWARD
		2013	PFC	
LE0002	Cole Spring	2000	NF	
		2013	PFC	
LE0003	Nephi Spring	2000	NF	
		2013	FAR	UPWARD
LE0004	Brown Spring	2000	FAR	NOT APPARENT
		2013	PFC	
LE0005	Unnamed Spring (on private)	2000		
LE0006	Fin Little Spring	2000	NF	
		2007	FAR	UPWARD
LE0007	Jenny Clay Hole Spring	2000	FAR	DOWNWARD
		2010	NF	
		2013	FAR	UPWARD
LE0008	Wildcat Spring	2001	FAR	DOWNWARD
		2013	PFC	
LE0009	Box Elder Canyon Spring	2001	NF	
		2010	FAR	UPWARD
		2014	FAR	UPWARD
LE0010	Kitchen Corral Spring	2001	FAR	DOWNWARD
		2007	PFC	
LE0011	Unnamed Spr. N of Kitchen Corral Spring	2001	NF	
		2007	FAR	NOT APPARENT
LE0012	Rockhouse Spring	2001	FAR	DOWNWARD
		2007	PFC	
LE0013	NE Spring	2001	NF	
		2010	FAR	NOT APPARENT
LE0014	Whitehouse Spring	2001	PFC	
LE0015	Calf Spring	2001	FAR	UPWARD
LE0017	Lake Cove Spring	2001	NF	
		2007	NF	
LE0018	Round Valley Seep	2001	NF	
		2007	PFC	
LE0019	Fourmile Water	2001	PFC	
LE0020	No Name Spring	2001	NF	
LE0021	Wiregrass Spring	2001	FAR	DOWNWARD

ID	Riparian/Wetland Area	Year Assessed	Rating[1]	Trend
LE0023	John Henry Spring	2002	PFC	
LE0024	Clints Canyon Spring	2002	PFC	
LE0025	Gunsight Spring	2002	PFC	
LE0026	Water Canyon Spring	2002	FAR	NOT APPARENT
LE0027	Warm Creek Spring	2002	PFC	
LE0028	Joe Perdence Spring	2002	FAR	NOT APPARENT
		2010	PFC	NOT APPARENT
LE0029	Harris Wash Corral Spring	2002	PFC	
LE0030	Upper Cattle	2002	PFC	
LE0031	Circle Spring	2002	FAR	NOT APPARENT
LE0032	Wild Rose Spring	2002	FAR	UPWARD
LE0033	Horse Spring	2002	PFC	
LE0034	Lower Trail Spring	2002	PFC	
LE0040	Slickrock Water	2002	PFC	
LE0041	Twentyfivemile Corral Spring	2002	PFC	
LE0042	Kent Spring	2002	FAR	NOT APPARENT
		2010	PFC	
LE0043	Lake	2002	PFC	
LE0044	Cougar Spring	2002	PFC	
LE0045	Quakie Spring	2002	PFC	
LE0046	Georgie Hollow Spring	2002	FAR	UPWARD
LE0047	Llewlyn Spring	2002	FAR	NOT APPARENT
		2004	FAR	DOWNWARD
		2007	FAR	UPWARD
LE0048	Mudholes Spring	2002	FAR	DOWNWARD
		2004	FAR	DOWNWARD
		2007	FAR	UPWARD
LE0049	Pocket Hollow Spring	2002	NF	
		2002	FAR	DOWNWARD
		2004	FAR	DOWNWARD
LE0050	Lower Coyote Spring	2001	NF	
		2007	PFC	
LE0051	Cane Bench Well	2002	PFC	
LE0052	Cliff Spring	2002	FAR	NOT APPARENT
LE0053	Emigrant Spring	2002	PFC	
LE0059	Center Knoll Spring	2003	PFC	
LE0500	Pump Canyon	2014	FAR	UPWARD

ID	Riparian/Wetland Area	Year Assessed	Rating(1)	Trend
LE0501	Gratuitous Spring	2001	FAR	DOWNWARD
		2007	FAR	NOT APPARENT
		2014	PFC	
LE0502	Pump House Spring	2001	PFC	
LE0503	Unnamed Spring	2001	PFC	
LE0504	Unnamed Spring	2001	FAR	NOT APPARENT
LE0505	Rock Springs	2001	FAR	DOWNWARD
LE0510	Tibbet Spring	2001	FAR	DOWNWARD
		2007	FAR	UPWARD
LE0511	Unnamed Spring	2001	FAR	DOWNWARD
		2007	FAR	UPWARD
LE0512	Unnamed Spring	2001	FAR	NOT APPARENT
LE0514	Unnamed Spring	2001	FAR	DOWNWARD
LE0515	Brinkerhoff Spring	2002	FAR	DOWNWARD
LE0516	Unnamed	2002	NF	DOWNWARD
LE0518	Unnamed	2002	FAR	DOWNWARD
LE0519	Unnamed	2002	FAR	DOWNWARD
LE0521	Calf Creek Headspring	2002	PFC	
LE0522	Unnamed	2002	FAR	DOWNWARD
LE0523	Calf Creek	2002	PFC	
LE0524	Lower Calf Creek	2002	PFC	
LE0525	Artesian Well	2002	PFC	
LE0527	Henrieville Spring	2002	PFC	
LE0529	Fortymile Spring	2002	FAR	DOWNWARD
		2007	FAR	NOT APPARENT
		2010	FAR	NOT APPARENT
		2014	FAR	UPWARD
LE0530	Willow Gulch Spring	2002	FAR	DOWNWARD
		2007	PFC	
LE0531	Unnamed Spring in Sooner Gulch	2002	NF	
		2007	FAR	DOWNWARD
		2010	PFC	NOT APPARENT
LE0532	Soda Spring	2002	FAR	DOWNWARD
		2007	NF	
		2010	FAR	DOWNWARD
		2014	FAR	DOWNWARD

ID	Riparian/Wetland Area	Year Assessed	Rating[1]	Trend
LE0533	East Fiftymile Spring	2002	NF	NOT APPARENT
		2007	NF	
		2010	FAR	UPWARD
		2014	FAR	UPWARD
LE0536	Upper Hurricane # 1	2002	FAR	NOT APPARENT
		2007	PFC	
LE0537	Upper Hurricane II	2002	FAR	DOWNWARD
		2010	PFC	
		2014	PFC	
		2007	FAR	NOT APPARENT
LE0538	Upper Hurricane III	2002	NF	
		2010	PFC	UPWARD
LE0540	Wilcox Spring	2002	NF	
		2007	FAR	NOT APPARENT
LE0545	Little Red Rock Spring	2002	FAR	DOWNWARD
		2002	FAR	DOWNWARD
		2010	PFC	NOT APPARENT
		2014	PFC	
LE0546	Little Red Rock Sp. II	2002	FAR	DOWNWARD
		2010	PFC	NOT APPARENT
		2014	PFC	
LE0550	Upper Reese Seep	2002	FAR	DOWNWARD
		2010	PFC	
LE0551	Cat Spring	2002	FAR	DOWNWARD
		2010	PFC	
LE0552	Glasseye Spring	2002	PFC	
LE0553	Neaf Spring	2002	FAR	DOWNWARD
LE0554	Unnamed (Varney-Griffin)	2002	PFC	
LE0556	Natural Tank		PFC	
LE0557	Sandstone Tank 1	2002	PFC	
LE0558	Sandstone Tank 2	2002	PFC	
LE0559	Sandstone Tank 3	2002	PFC	
LE0560	Calf Spring	2003	FAR	NOT APPARENT
LE0567	Below Harry Cowles Spring		FAR	NOT APPARENT
LE0604	West End Spring	2002	FAR	DOWNWARD
LE0605	West End Spring	2002	NF	
LE0900	Harry Cowles Spring	2002	FAR	DOWNWARD
LE0901	Trib. Spencer	2002	FAR	NOT APPARENT

ID	Riparian/Wetland Area	Year Assessed	Rating(1)	Trend
LE0903	Gates Spring	2002	NF	
		2004	NF	
LE0905	Releshen Seep	2002	NF	
		2010	FAR	
LE0906	Pocket Hollow Spring	2002	NF	
		2002	FAR	DOWNWARD
LE1000	Headquarters Spring	2009	FAR	DOWNWARD
LE1001	Headquarters Spring 2	2001	FAR	DOWNWARD
LE1002	Headquarters Spring 1	2001	FAR	DOWNWARD
LE1003	Spring below rock fall on Hackberry	2001	FAR	NOT APPARENT
LE1200	Sheep Creek Above Dam at Skutumpah Road crossing	2001	FAR	UPWARD
LE1201	Sheep Creek Below Dam	2001	PFC	
LE1202	Sheep Creek Below Dam	2001	FAR	DOWNWARD
LE1203	Glass Eye Canyon	2002	PFC	
LE1204	Salt Spring	2002	NF	
		2007	FAR	UPWARD
LE1205	Old Corral Spring	2002	FAR	DOWNWARD
		2007	FAR	No Apparent Trend
LE1206	First Point Spring	2002	FAR	DOWNWARD
		2007	FAR	UPWARD
LE1207	Adams Spring	2002	PFC	
		2012	PFC	
LE1208	Corral Draw Spring	2002	FAR	NOT APPARENT
		2012	FAR	
LE1210	Unnamed Spring	2002	PFC	
LE1250	Unnamed – West Moody	2003	PFC	
LE1251	Middle Moody Spring	2003	PFC	
LE1253	Beauty Spot	2003	PFC	
LE1254	Cottonwood Spring	2003	PFC	
LE1501	Rock Springs	2002	FAR	UPWARD
LE1502	Mossy Dell Spring	2002	FAR	DOWNWARD
LE1503	Cockscomb Spring	2002	PFC	
LE1504	Wire Spring	2002	FAR	DOWNWARD
		2007	FAR	UPWARD
LE1505	East End Spring	2002	FAR	DOWNWARD
		2007	FAR	UPWARD
LE1506	Unnamed Cliff Spring	2002	FAR	DOWNWARD

ID	Riparian/Wetland Area	Year Assessed	Rating[1]	Trend
		2007	PFC	
LE1507	Maple Spring	2002	NF	
		2007	FAR	NOT APPARENT
LE1508	Trail Hollow Seep	2002	FAR	DOWNWARD
		2007	FAR	NOT APPARENT
LE1509	Bull Ridge Cliff Spring	2002	FAR	DOWNWARD
LE1510	Burn Spring	2002	FAR	DOWNWARD
		2007	FAR	UPWARD
LE1511	Buck Ridge	2002	NF	
LE1512	Oak Springs	2002	PFC	
LE1513	Sooner Water	2002	FAR	NOT APPARENT
		2007	PFC	
LE1514	Upper Cottonwood Spring	2002	FAR	DOWNWARD
		2007	FAR	DOWNWARD
		2014	FAR	UPWARD
LE1515	Pole Well Spring	2002	FAR	DOWNWARD
		2007	FAR	NOT APPARENT
LE1516	Unnamed Seep	2002	PFC	
LE1518	Ford Well Spring	2002	FAR	DOWNWARD
LE1700	Llellyn Spring	2002	PFC	
LE1701	Grand Bench Spring	2002	NF	
LE1702	Cane Seep	2002	PFC	
LE1703	Seep/Hanging Garden	2002	PFC	
LE1704	Cave Spring	2002	PFC	
		2007	FAR	NOT APPARENT
		2014	PFC	
LE1710	Unnamed below Old Corral Spr	2007	FAR	NOT APPARENT
LE1711	Tang Spring	2007	PFC	
LE1712	Unnamed on Buck Ridge	2007	FAR	NOT APPARENT
LE1713	Unnamed Buck Ridge no.2	2007	FAR	UPWARD
LE1714	Lower Cottonwood Spring	2007	PFC	
LE1716	Willow Tank	2007	FAR	NOT APPARENT
LE2000	Buckskin Gulch Spring	2004	FAR	DOWNWARD
		2010	FAR	NOT APPARENT

Source: BLM GIS 2014a

[1] PFC – proper functioning condition, FAR – functioning at risk, NF – non-functional

Table 2. PFC Assessment Results for Lotic Sites

ID	Riparian/Wetland Area	Year Assessed	Rating[1]	Trend	Miles
LO0001	Harris	2001	FAR	NOT APPARENT	1.333
		2010	FAR	UPWARD	1.333
LO0002	Harris	2001	FAR	NOT APPARENT	5.732
LO0003	Harris	2001	PFC		4.707
LO0004	Twentyfivemile	2001	FAR	NOT APPARENT	0.574
		2010	FAR	UPWARD	0.574
LO0005	Twentyfivemile	2001	NF		3.031
LO0006	Twentyfivemile	2001	FAR	UPWARD	2.477
		2010	PFC		2.477
LO0007	Cottonwood	2001	FAR	NOT APPARENT	1.244
		2007	FAR	UPWARD	1.244
LO0008	Cottonwood	2001	FAR	DOWNWARD	1.259
		2007	FAR	UPWARD	1.259
LO0009	Cottonwood	2001	PFC		0.769
LO0009A	Upper Box Elder Spring	2014	PFC		0
LO0010	Cottonwood	2001	FAR	NOT APPARENT	1.635
		2014	PFC		1.635
LO0011	Cottonwood	2001	NF		1.299
LO0012	Cottonwood	2001	FAR	DOWNWARD	3.198
		2007	FAR	UPWARD	3.198
LO0013	Aspen Patch	2002	PFC		0.659
LO0014	Cottonwood	2001	FAR	UPWARD	2.91
LO0015	Paria	2001	FAR	DOWNWARD	1.934
LO0016	Paria	2001	FAR	UPWARD	1.518
		2012	PFC		1.518
LO0017	Paria	2001	FAR	UPWARD	2.53
		2012	FAR	UPWARD	2.53
LO0018	Paria	2001	FAR	NOT APPARENT	4.982
LO0019	Paria	2001	FAR	DOWNWARD	2.185
LO0020	Paria	2001	FAR	NOT APPARENT	4.827
LO0021	Paria	2001	FAR	UPWARD	4.374
LO0025	Alvey Wash	2001	FAR	UPWARD	4.832
LO0026	Willow Gulch	2001	FAR	DOWNWARD	0.602
		2010	PFC		0.602
LO0028	Twentyfivemile	2001	FAR	NOT APPARENT	10.68
LO0029	Phipps	2001	PFC		2.72

ID	Riparian/Wetland Area	Year Assessed	Rating[1]	Trend	Miles
LO0032	Left Hand Collet	2001	NOT RATED		0
		2010	PFC		0
LO0033	Horse Canyon	2001	FAR	UPWARD	3.681
LO0034	Horse Canyon	2001	FAR	NOT APPARENT	0.873
LO0035	Horse Canyon	2001	FAR	NOT APPARENT	0.898
LO0036	Dry Hollow	2001	PFC		5.747
LO0037	Harris	2001	FAR	UPWARD	2.804
LO0038	Harris	2001	PFC		8.675
LO0039	Paradise R-1 (E. Fork)	2001	NF		1.842
		2014	NF		1.842
LO0040	Paradise (Mainstem) R2	2001	FAR	DOWNWARD	1.15
LO0041	Paradise (Mainstem) R3	2001	FAR	DOWNWARD	4.087
		2014	PFC		4.087
LO0042	Last Chance (junction of Paradise with Escalante Canyons)	2001	FAR	DOWNWARD	4.592
		2014	NOT RATED		4.592
LO0043	Pine Creek	2002	PFC		2.685
LO0044	Pine Creek	2002	FAR	DOWNWARD	3.741
LO0045	Coyote Gulch	2002	PFC		7.812
LO0046	Coyote Gulch	2002	FAR	UPWARD	5.359
LO0047	Last Chance Reach 5	2002	FAR	DOWNWARD	4.998
		2010	FAR	UPWARD	4.998
		2014	PFC		4.998
LO0048	Last Chance Reach 6	2002	FAR	NOT APPARENT	18.759
		2014	PFC		18.759
LO0050	Boulder Draw	2002	PFC		0.954
LO0051	Spencer Canyon	2002	FAR	DOWNWARD	0.525
LO0052	Spencer Canyon	2002	FAR	UPWARD	0.273
LO0053	Harry Cowles	2002	FAR	DOWNWARD	0.322
LO0054	Indian Gordens	2002	FAR	DOWNWARD	0.64
LO0055	Spencer Canyon	2002	FAR	DOWNWARD	0.728
LO0056	Spencer Canyon	2002	FAR	UPWARD	1.286
LO0057	Pocket Hollow	2002	NF		0.924
LO0058	Gates Draw	2002	NF		0.38
LO0059	Little Valley Creek	2002	NF		1.28
LO0060	Upper Little Valley	2002	NF		0.646
LO0062	Drip Tank	2002	FAR	UPWARD	2.072
		2014	PFC		2.072
LO0063	Wesses	2002	FAR	UPWARD	1.963

ID	Riparian/Wetland Area	Year Assessed	Rating(1)	Trend	Miles
LO0064	John Henry	2002	FAR	DOWNWARD	1.682
LO0065	Clints Canyon	2002	FAR	UPWARD	1.251
LO0066	Clay Gorge	2002	FAR	DOWNWARD	0.499
LO0067	Allens Creek	2002	FAR	DOWNWARD	0.868
LO0068	North Creek	2002	PFC		5.784
LO0069	Davis Gulch	2002	PFC		3.156
LO0070	Llewellen Canyon	2002	PFC		1.395
LO0071	Varney Creek	2002	PFC		2.572
LO0072	Varney Creek	2002	PFC		2.87
LO0073	Scorpion Gulch	2002	PFC		0.595
LO0074	Scorpion Gulch	2002	PFC		1.975
LO0141	Gulch	2001	PFC		6.997
LO0142	Gulch	2001	FAR	NOT APPARENT	1.091
LO0143	Boulder Creek	2001	PFC		4.185
LO0144	Boulder Creek	2001	PFC		1.214
LO0145	Gulch	2001	PFC		1.13
LO0146	Unnamed	2001	PFC		0.45
LO0147	Gulch	2001	FAR	DOWNWARD	4.418
		2007	FAR	NOT APPARENT	4.418
		2012	NOT RATED		4.418
LO0148	Unnamed	2001	PFC		0.363
LO0149	Gulch	2001	PFC		1.236
LO0150	Water Canyon	2001	PFC		1.455
		2012	PFC		1.455
LO0151	Boulder Creek	2001	FAR	NOT APPARENT	5.869
LO0152	Gulch	2001	FAR	DOWNWARD	2.736
		2007	PFC		2.736
LO0153	Gulch	2001	FAR	NOT APPARENT	2.208
		2007	FAR	DOWNWARD	2.208
LO0154	Unnamed (Laminite Arch)	2001	FAR	NOT APPARENT	1.485
		2007	FAR	NOT APPARENT	1.485
LO0155	Deer Creek	2001	PFC		3.634
LO0157	Hot Canyon Reach 1	2002	PFC		0.648
LO0158	Hot Canyon	2002	FAR	NOT APPARENT	1.358
LO0159	Slickrock Canyon	2002	PFC		2.855
LO0160	Cottonwood	2002	PFC		4.429
LO0161	Deer Creek	2002	PFC		1.762

ID	Riparian/Wetland Area	Year Assessed	Rating(1)	Trend	Miles
L00162	Pleasant Grove	2002	FAR	DOWNWARD	0.453
		2007	FAR	UPWARD	0.453
L00163	S. tributary to Pleasant Grove	2002	PFC		0.239
L00164	Pinto Mare	2002	PFC		0.417
L00165	Glass Eye	2002	PFC		0.219
L00166	Seaman	2002	PFC		0.271
L00167	Seaman	2002	PFC		0.118
L00168	Seaman	2002	FAR	DOWNWARD	0.127
L00169	Steer	2002	FAR	UPWARD	0.934
L00170	Unnamed 1 (tributary to Blackburn Canyon)	2002	FAR	DOWNWARD	0.715
L00171	Unnamed	2002	PFC		0.231
L00173	Rock	2002	FAR	NOT APPARENT	0.147
L00174	Rock	2002	PFC		0.38
L00175	Boulder Creek	2002	PFC		4.175
L00176	Deer Creek	2002	FAR	NOT APPARENT	1.762
L00177	Boulder	2002	PFC		0.979
L00178	Snake	2002	FAR	NOT APPARENT	0.504
L00179	Snake	2002	PFC		0.544
L00180	Calf Creek	2002	PFC		2.912
L00181	Calf Creek	2002	PFC		1.019
L00182	Deer Creek	2002	PFC		2.412
L00183	Deer Creek	2002	PFC		3.342
L00184	Sand Hollow	2002	PFC		0.835
L00186	Hog Eye	2002	PFC		0.842
L00187	Kitchen Canyon	2002	FAR	NOT APPARENT	1.32
L00190	Lower Reese Canyon	2002	PFC		1.174
L00196		1997	PFC	NOT APPARENT	12.39
L00197	Escalante River	1997	PFC	NOT APPARENT	7.223
L00198	Escalante River	1997	PFC	NOT APPARENT	14.481
L00199	Escalante River	1997	PFC	NOT APPARENT	5.893
L00200	Escalante River	2003	PFC	NOT APPARENT	7.356
L00202	Death Hollow	2003	PFC	NOT APPARENT	13.913
L00203	Willow Patch	2003	PFC	NOT APPARENT	2.562
L00204	Escalante River	2003	PFC	NOT APPARENT	6.729
L00205	Sand Creek	2003	PFC	NOT APPARENT	13.103
L00206	Butler Valley Seeps	2003	PFC	NOT APPARENT	0.282
L00207	Upper Valley	2003	NF	NOT APPARENT	7.346

ID	Riparian/Wetland Area	Year Assessed	Rating[1]	Trend	Miles
LO0208	Upper Valley	2003	NF	NOT APPARENT	0.401
LO0210	Sweetwater	2003	PFC	NOT APPARENT	1.79
LO0211	Fortymile Gulch	2003	PFC	NOT APPARENT	1.048
LO0212	Fortymile Gulch	2003	PFC	NOT APPARENT	1.951
LO0213	Willow Gulch	2003	PFC	NOT APPARENT	1.454
LO0214	Willow Gulch	2003	PFC	NOT APPARENT	0.528
LO0215	Fiftymile Gulch	2003	PFC	NOT APPARENT	2.217
LO0404	Flood Canyon Mouth	1999	FAR	NOT APPARENT	0
		2007	FAR		0
LO0406	Lower Bullrush	1999	NF	NOT APPARENT	0
		2010	FAR	UPWARD	0
LO0407	Upper Bullrush Hollow	1999	NF	DOWNWARD	0
LO0408	Bullrush Hollow	1993	NF		1.198
LO0501	Stone Donkey	2001	FAR	UPWARD	0.12
LO0502	Stone Donkey	2001	PFC		0.106
LO0503	Rush Beds	2001	PFC		0.119
		2014	FAR	UPWARD	0.119
LO0504	Pump Canyon	2001	NF		0.095
		2014	FAR	UPWARD	0.095
LO0505	N/A	2001	FAR	NOT APPARENT	0.237
		2014	PFC		0.237
LO0506	N/A	2001	PFC		0.277
LO0507	Nipple Spring	2001	FAR	DOWNWARD	0.412
		2007	FAR	UPWARD	0.412
LO0508	Cottonwood Gulch	2002	PFC		0.862
LO0510	East Spencer Draw	2003	PFC		0.309
LO0511	Lake Draw	2003	PFC		0.746
LO0512	Rogers Canyon	2003	FAR	DOWNWARD	0.68
LO0513	Croton Canyon	2003	FAR	NOT APPARENT	0.503
LO1000	Lake	2002	PFC		0.52
LO1001	Lake	2002	PFC		0.601
LO1002	Long Valley Canyon	2001	FAR	NOT APPARENT	0.327
LO1003	Long Valley Canyon	2001	PFC		1.382
LO1004	Long Valley Canyon	2001	FAR	DOWNWARD	0.417
LO1005	Camp Spring/R. Hand Collet	2003	NF		0.789
		2012	FAR	NOT APPARENT	0.559
LO1006	Middle R. Hand Collet	2003	NF		0.463
		2012	NOT RATED		0.463

ID	Riparian/Wetland Area	Year Assessed	Rating(1)	Trend	Miles
LO1007	Sarah Anne	2001	NF		0.275
		2012	FAR	NOT APPARENT	0.275
LO1008	Lower R. Hand Collet	2003	FAR	NOT APPARENT	3.205
		2012	PFC		2.707
LO1009	Left Hand Collet	2003	FAR	NOT APPARENT	0.88

Source: BLM GIS 2014a

[1] PFC – proper functioning condition, FAR – functioning at risk, NF – non-functional

Appendix 8. Lands and Realty

Corridor 68-116

Corridor 68-116 (Figures 1–3) begins adjacent to the Glen Canyon NRA in Arizona, just south of the State border with Utah. The corridor extends northwest into Utah for 30 miles, then southwest for 20 miles, and ends at the intersection with Corridor 113-116 in Arizona. Federally designated portions of this corridor are entirely on BLM-administered surface land. The corridor is 5,280 feet wide within the Arizona Strip Field Office and is 3,500 feet wide within GSENM. Corridor 68-116 is designated as multi-modal and can therefore accommodate both electrical transmission and pipeline projects. The corridor spans 50.6 miles, with 37.7 miles designated on BLM-administered surface land. The designated area is 18,798.5 acres or 29.4 square miles. Corridor 68-116 is in Coconino County in Arizona and Kane County in Utah. The corridor is under the jurisdiction of the BLM Arizona Strip Field Office and GSENM.

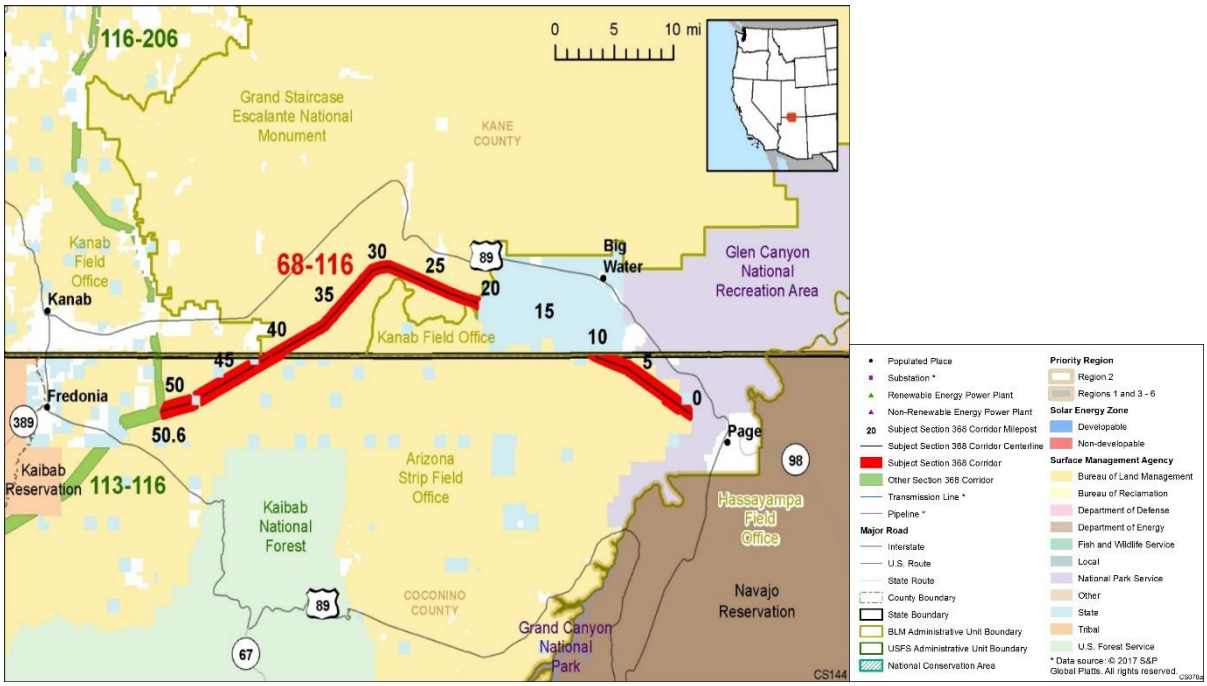

Figure 1. Corridor 68-116

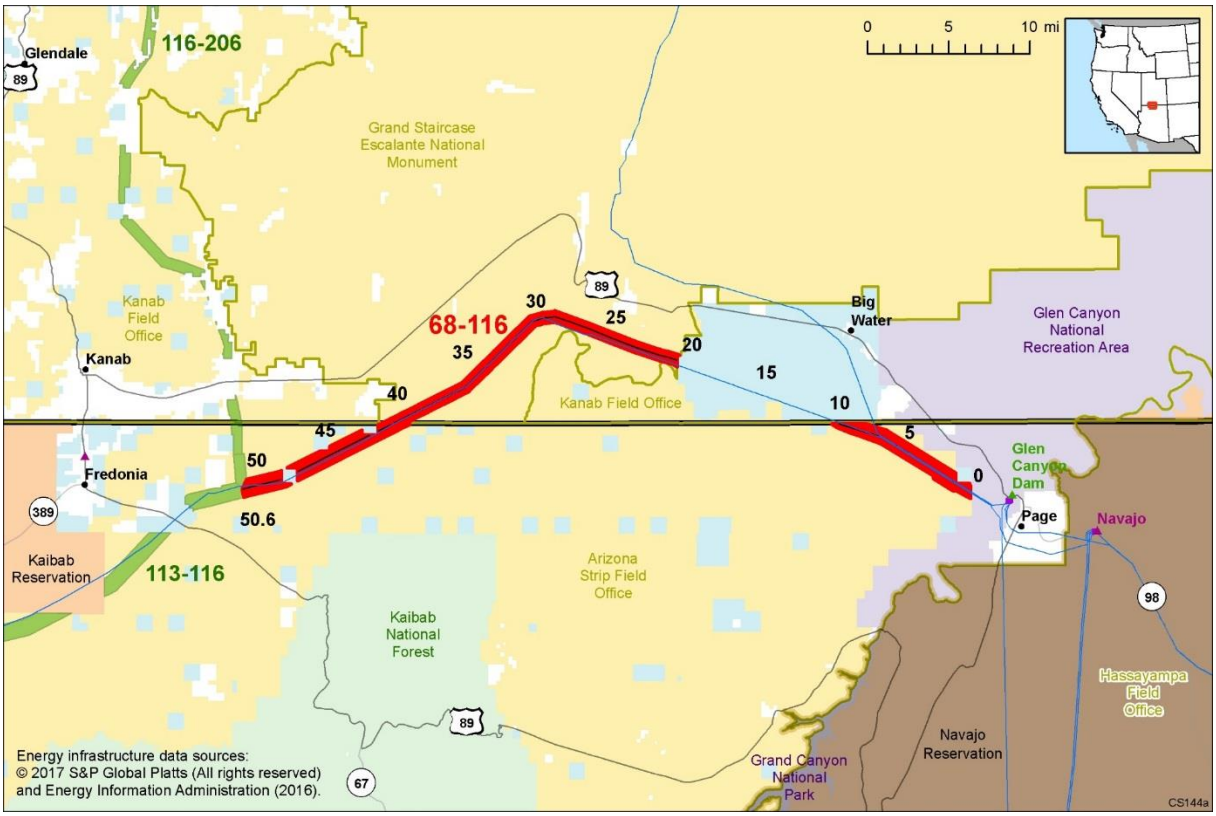

Figure 2. Corridor 68-116, Including Existing Energy Infrastructure

Corridor Rationale

Existing Infrastructure: The corridor follows a 500-kV electric transmission line operated by Los Angeles Department of Water & Power along the entire length of its centerline. The corridor also follows a 69-kV electric transmission line operated by PacifiCorp from milepost (MP) 0 to MP 27.4 and a 230-kV transmission line operated by PacifiCorp from MP 0 to MP 6.8.

Potential for Future Development: During interviews for the Corridor Study, agencies indicated that there are multiple ROW applications for small local projects within the corridor and an application for an upgrade to the existing transmission in GSENM. According to the Platts data, there is no planned infrastructure within the corridor.

Corridor of Concern Status

This corridor was identified in the Settlement Agreement as a corridor of concern. Concerns regarding access to coal, impacts on GSENM, WSR, and a scenic byway were identified in the Settlement Agreement. These issues are highlighted in yellow in the Corridor Analysis table below.

Conflict Map Analysis

The map depicted in Figure 3 uses conflict criteria to depict areas where the corridor intersects low, medium, and high conflict areas to help the agencies identify where a corridor intersects environmentally sensitive areas. The conflict criteria can be found on the West-wide Energy Corridor Information Center website at www.corridoreis.anl.gov. Corridor 68-116 follows high conflict areas from MP 0 to approximately MP 42 and follows medium conflict areas from MP

42 to MP 50.6. The area surrounding MP 0 to MP 42 is entirely within a high conflict area and does not provide opportunity to avoid those areas; however, there is existing infrastructure along the entire length of the corridor.

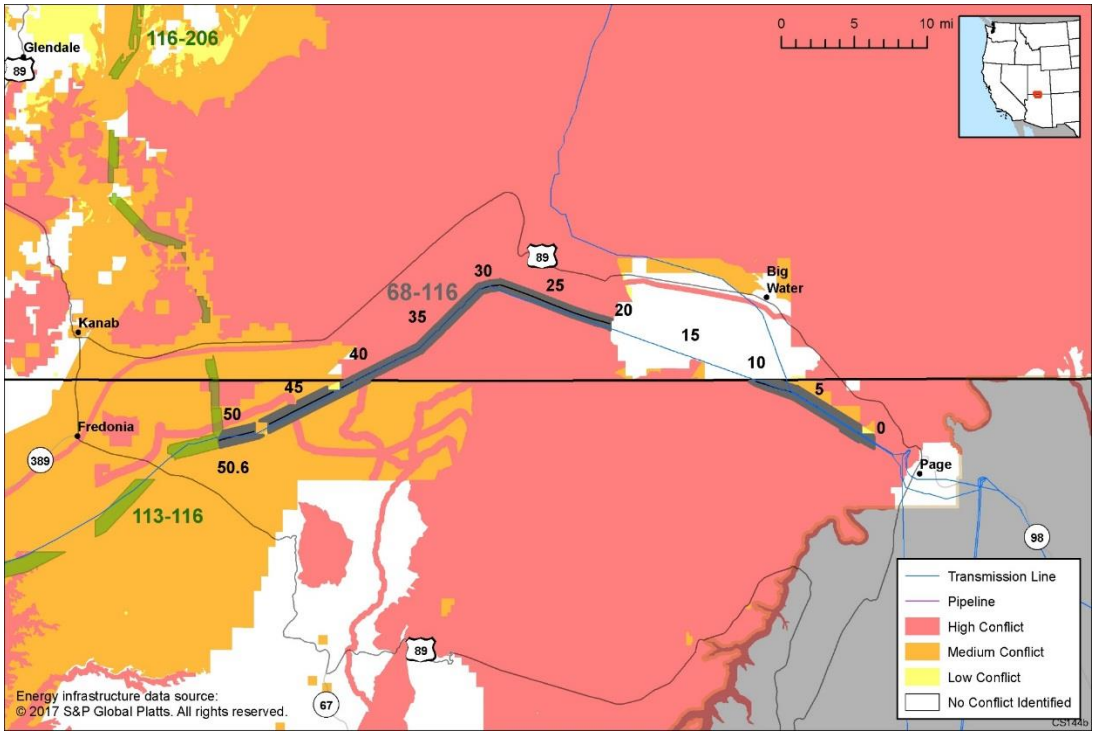

Figure 3. Mapping of Conflict Areas in Vicinity of Corridor 68-116

Land Use Authorizations

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Admin State: UT

Geo State: UT

Casetype: 210013 ACQ-FLPMA

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
210013	AUTHORIZED	UTU 039948	865	TITLE ACCEPTED BY I	03/03/1978	2.740
210013	AUTHORIZED	UTU 054579	865	TITLE ACCEPTED BY I	08/29/1985	2.141
210013	AUTHORIZED	UTU 063272	865	TITLE ACCEPTED BY I	04/18/1990	0.030
210013	AUTHORIZED	UTU 063293	865	TITLE ACCEPTED BY I	06/06/1996	1.420
210013	AUTHORIZED	UTU 069597	865	TITLE ACCEPTED BY I	03/25/1992	6074.560
210013	AUTHORIZED	UTU 074769	865	TITLE ACCEPTED BY I	04/28/1999	140.000
210013	AUTHORIZED	UTU 074770	865	TITLE ACCEPTED BY I	06/21/1999	22.500
210013	AUTHORIZED	UTU 078485	865	TITLE ACCEPTED BY I	02/15/2000	40.000
210013	AUTHORIZED	UTU 07848501	865	TITLE ACCEPTED BY I	05/02/2000	40.000
210013	AUTHORIZED	UTU 078909	865	TITLE ACCEPTED BY I	12/19/2000	19.980
210013	AUTHORIZED	UTU 078910	865	TITLE ACCEPTED BY I	12/19/2000	19.980
210013	AUTHORIZED	UTU 079708	865	TITLE ACCEPTED BY I	01/03/2002	100.000
210013	AUTHORIZED	UTU 088643	865	TITLE ACCEPTED BY I	12/20/2012	20.850
210013	AUTHORIZED	UTU 089337	865	TITLE ACCEPTED BY I	03/12/2013	10.490

Totals for Casetype 210013 **6,494.691 Acres**
14 Case(s)

Casetype: 210019 ACQ-CONSERVATION PURPOSE

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
210019	AUTHORIZED	UTU 079347	865	TITLE ACCEPTED BY I	01/25/2002	20.000

Totals for Casetype 210019 **20.000 Acres**
1 Case(s)

Casetype: 220100 EX-BLM SEC 206, FLPMA

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Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
220100	AUTHORIZED	UTU 076656FD	271	PATENT ISSUED	05/03/1999	50.000
220100	AUTHORIZED	UTU 076656PT	865	TITLE ACCEPTED BY I	02/11/1999	50.000
220100	AUTHORIZED	UTU 076746PB	865	TITLE ACCEPTED BY I	12/14/2000	80.000

Totals for Casetype 220100 — **180.000 Acres**, **3 Case(s)**

Casetype: 221001 EX-STATE, TAYLOR ACT

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
221001	AUTHORIZED	UTU 0149900PT	865	TITLE ACCEPTED BY I	03/07/1968	14729.000

Totals for Casetype 221001 — **14,729.000 Acres**, **1 Case(s)**

Casetype: 221005 EX-ST-SPECIAL ACTS

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
221005	AUTHORIZED	UTU 0772662P	865	TITLE ACCEPTED BY I	01/05/1999	17319.040
221005	AUTHORIZED	UTU 0772666P	865	TITLE ACCEPTED BY I	01/05/1999	65568.290
221005	AUTHORIZED	UTU 0772667P	865	TITLE ACCEPTED BY I	01/05/1999	135264.980
221005	AUTHORIZED	UTU 077266F2	271	PATENT ISSUED	07/05/2000	37859.937

Totals for Casetype 221005 — **256,012.247 Acres**, **4 Case(s)**

Casetype: 222001 EX- PRIVATE-TAYLOR ACT

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
222001	AUTHORIZED	UTU 021687PT	865	TITLE ACCEPTED BY I	06/05/1973	160.000

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Totals for Casetype 222001 — **160.000 Acres**, **1 Case(s)**

Casetype: 223000 EX-FS, GENERAL EX ACT

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
223000	AUTHORIZED	UTU 054962FD	271	PATENT ISSUED	12/02/1985	3929.360

Totals for Casetype 223000 — **3,929.360 Acres**, **1 Case(s)**

Casetype: 231104 WDL-PUBLIC WATER RESERVE

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
231104	AUTHORIZED	UTU 002446	705	ORDER ISSUED	03/01/1967	800.000
231104	AUTHORIZED	UTU 041574	705	ORDER ISSUED	04/11/1929	200.000
231104	AUTHORIZED	UTU 041577	705	ORDER ISSUED	01/28/1930	160.000
231104	AUTHORIZED	UTU 041582A	705	ORDER ISSUED	04/15/1931	904.310
231104	AUTHORIZED	UTU 041591	705	ORDER ISSUED	08/23/1933	40.000
231104	AUTHORIZED	UTU 041601	705	ORDER ISSUED	03/15/1937	40.000
231104	AUTHORIZED	UTU 041613	705	ORDER ISSUED	06/02/1950	40.000
231104	AUTHORIZED	UTU 041642	705	ORDER ISSUED	01/14/1960	240.000
231104	AUTHORIZED	UTU 041648	705	ORDER ISSUED	07/10/1961	240.000
231104	AUTHORIZED	UTU 052734	705	ORDER ISSUED	02/04/1983	13320.000
231104	AUTHORIZED	UTU 0136798	705	ORDER ISSUED	04/21/1913	1720.000

Totals for Casetype 231104 — **17,704.310 Acres**, **11 Case(s)**

Casetype: 231106 WDL-BLM WILDERNESS DESIG

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Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
231106	AUTHORIZED	UTU 088116	868	EFFECTIVE DATE	08/28/1984	110000.000
			Totals for Casetype	**231106**	**110,000.000**	**Acres**
					1	**Case(s)**

Casetype: 231113 WDL-BLM-NATL MONUMENT

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
231113	AUTHORIZED	UTU 076323	705	ORDER ISSUED	12/04/2017	1003864.000
231113	AUTHORIZED	UTU 07632301	868	EFFECTIVE DATE	09/18/1996	1688518.000
			Totals for Casetype	**231113**	**2,692,382.000**	**Acres**
					2	**Case(s)**

Casetype: 231270 WDL-RECLAMATION MISC

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
231270	AUTHORIZED	UTU 031071	705	ORDER ISSUED	07/02/1985	578366.100
			Totals for Casetype	**231270**	**578,366.100**	**Acres**
					1	**Case(s)**

Casetype: 234400 WDL-FERC

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
234400	AUTHORIZED	UTU 017633	705	ORDER ISSUED	03/27/1967	143.489
234400	AUTHORIZED	UTU 01763301	276	PMT-LIC ISSUED	11/18/1982	143.490
234400	AUTHORIZED	UTU 0044012	705	ORDER ISSUED	12/15/1953	201.970

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Totals for Casetype 234400 — **488.949 Acres**, **3 Case(s)**

Casetype: 240006 R&PP CLASS

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
240006	AUTHORIZED	UTU 0089038	868	EFFECTIVE DATE	05/14/1964	5.000
240006	AUTHORIZED	UTU 0101288	705	ORDER ISSUED	08/05/1964	200.210

Totals for Casetype 240006 — **205.210 Acres**, **2 Case(s)**

Casetype: 246100 CL-MULT USE MGT

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
246100	AUTHORIZED	UTU 0147560	705	ORDER ISSUED	10/18/1965	5701.020

Totals for Casetype 246100 — **5,701.020 Acres**, **1 Case(s)**

Casetype: 252000 DESERT LAND ACT

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
252000	AUTHORIZED	UTU 0140666	271	PATENT ISSUED	12/17/1969	281.860

Totals for Casetype 252000 — **281.860 Acres**, **1 Case(s)**

Casetype: 262100 INDEMNITY SELECTIONS

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Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
262100	AUTHORIZED	UTU 05387401	855	CLEAR LIST APPROVE	04/19/1989	7354.560

Totals for Casetype 262100 — **7,354.560 Acres**, **1 Case(s)**

Casetype: 270003 SALE-PUBLIC LANDS UTAH

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
270003	AUTHORIZED	UTU 087424	620	QCD-DISCLAIMER ISS	05/07/2010	25.000

Totals for Casetype 270003 — **25.000 Acres**, **1 Case(s)**

Casetype: 271000 SALE-PUBLIC LANDS-FLPMA

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
271000	AUTHORIZED	UTU 055636	271	PATENT ISSUED	01/29/1986	3.750

Totals for Casetype 271000 — **3.750 Acres**, **1 Case(s)**

Casetype: 274000 SALE- REC & PUB PURPOSES

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
274000	AUTHORIZED	UTU 07113701	271	PATENT ISSUED	05/04/1995	9.270
274000	AUTHORIZED	UTU 07113702	271	PATENT ISSUED	05/04/1995	10.000
274000	AUTHORIZED	UTU 07171401	271	PATENT ISSUED	08/28/1995	2.500

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Totals for Casetype 274000 **21.770 Acres**
3 Case(s)

Casetype: 281001 ROW-ROADS

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
281001	AUTHORIZED	UTU 045815	308	ROW RENEWED	08/12/2014	7.576
281001	AUTHORIZED	UTU 047370	308	ROW RENEWED	11/22/2013	0.137
281001	AUTHORIZED	UTU 051381	307	ROW GRANTED-ISSU	02/11/1983	2.295
281001	AUTHORIZED	UTU 052882	308	ROW RENEWED	12/02/2015	0.826
281001	AUTHORIZED	UTU 052890	308	ROW RENEWED	12/02/2015	21.818
281001	AUTHORIZED	UTU 054541	308	ROW RENEWED	12/16/2015	1.460
281001	AUTHORIZED	UTU 054544	308	ROW RENEWED	07/06/2015	0.092
281001	AUTHORIZED	UTU 054553	308	ROW RENEWED	08/18/2014	0.551
281001	AUTHORIZED	UTU 055664	308	ROW RENEWED	09/16/2016	46.400
281001	AUTHORIZED	UTU 058157	307	ROW GRANTED-ISSU	01/23/1986	1.212
281001	AUTHORIZED	UTU 061970	308	ROW RENEWED	12/10/2013	0.689
281001	AUTHORIZED	UTU 067039	304	AUTH AMENDED/MOD	09/12/1990	7.495
281001	AUTHORIZED	UTU 070031	307	ROW GRANTED-ISSU	11/16/1992	0.579
281001	AUTHORIZED	UTU 070038	307	ROW GRANTED-ISSU	11/16/1992	0.347
281001	AUTHORIZED	UTU 072245	307	ROW GRANTED-ISSU	02/13/1995	0.253
281001	AUTHORIZED	UTU 073372	304	AUTH AMENDED/MOD	04/28/2014	0.898
281001	AUTHORIZED	UTU 074751	307	ROW GRANTED-ISSU	06/17/1996	23.820
281001	AUTHORIZED	UTU 078483	307	ROW GRANTED-ISSU	01/19/2000	0.186
281001	AUTHORIZED	UTU 079349	307	ROW GRANTED-ISSU	05/01/2002	33.020
281001	AUTHORIZED	UTU 080278	307	ROW GRANTED-ISSU	02/12/2003	0.937
281001	AUTHORIZED	UTU 080509	307	ROW GRANTED-ISSU	03/24/2003	0.034
281001	AUTHORIZED	UTU 082997	307	ROW GRANTED-ISSU	03/09/2009	55.758
281001	AUTHORIZED	UTU 083032	307	ROW GRANTED-ISSU	04/25/2013	0.527
281001	AUTHORIZED	UTU 083080	307	ROW GRANTED-ISSU	08/11/2009	0.660
281001	AUTHORIZED	UTU 090181	307	ROW GRANTED-ISSU	07/21/2015	1.692

Totals for Casetype 281001 **209.262 Acres**
25 Case(s)

Casetype: 281007 ROW-ROADS FEDERAL FAC

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Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
281007	AUTHORIZED	UTU 078907	307	ROW GRANTED-ISSU	12/08/2000	0.200

Totals for Casetype 281007 — **0.200 Acres**, **1 Case(s)**

Casetype: 281008 ROW-ROADS FED 44LD513

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
281008	AUTHORIZED	UTU 024122	705	ORDER ISSUED	09/27/1973	271.150

Totals for Casetype 281008 — **271.150 Acres**, **1 Case(s)**

Casetype: 281011 ROW-ROAD RECONVEYED

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
281011	AUTHORIZED	UTU 089472	307	ROW GRANTED-ISSU	11/17/1995	0.126

Totals for Casetype 281011 — **0.126 Acres**, **1 Case(s)**

Casetype: 282103 FED AID HIGHWAY(SEC 317)

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
282103	AUTHORIZED	UTU 0034584	307	ROW GRANTED-ISSU	05/06/1959	138.599
282103	AUTHORIZED	UTU 0096468	307	ROW GRANTED-ISSU	01/21/1963	23.001
282103	AUTHORIZED	UTU 0110884	307	ROW GRANTED-ISSU	08/14/1963	110.787

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Totals for Casetype 282103 — **272.387 Acres**, **3 Case(s)**

Casetype: 282105 FED AID HIGHWAY(SEC 17)

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
282105	AUTHORIZED	UTSL 0068978	307	ROW GRANTED-ISSU	11/09/1950	59.230
282105	AUTHORIZED	UTU 0004245	307	ROW GRANTED-ISSU	07/19/1951	111.000
282105	AUTHORIZED	UTU 0011171	307	ROW GRANTED-ISSU	03/17/1954	69.631
282105	AUTHORIZED	UTU 0012626	307	ROW GRANTED-ISSU	08/05/1954	25.252
282105	AUTHORIZED	UTU 0020832	304	AUTH AMENDED/MOD	06/14/1960	78.237
282105	AUTHORIZED	UTU 0021509	304	AUTH AMENDED/MOD	06/14/1960	584.140
282105	AUTHORIZED	UTU 0021510	304	AUTH AMENDED/MOD	06/14/1960	58.640
282105	AUTHORIZED	UTU 0024425	304	AUTH AMENDED/MOD	06/14/1960	321.982
282105	AUTHORIZED	UTU 0025862	304	AUTH AMENDED/MOD	01/25/1960	255.700

Totals for Casetype 282105 — **1,563.812 Acres**, **9 Case(s)**

Casetype: 282106 MATERIAL SITES(SEC 17)

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
282106	AUTHORIZED	UTU 0011171A	307	ROW GRANTED-ISSU	03/17/1954	155.725
282106	AUTHORIZED	UTU 0021511	307	ROW GRANTED-ISSU	07/22/1957	200.000
282106	AUTHORIZED	UTU 0023613	307	ROW GRANTED-ISSU	06/06/1957	80.000

Totals for Casetype 282106 — **435.725 Acres**, **3 Case(s)**

Casetype: 282201 ROW-ROADS UNDER RS 2477

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
282201	AUTHORIZED	UTU 066242	307	ROW GRANTED-ISSU	05/12/1990	1.000

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Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
282201	AUTHORIZED	UTU 066242AA	307	ROW GRANTED-ISSU	12/15/1992	1.000
282201	AUTHORIZED	UTU 066242AD	307	ROW GRANTED-ISSU	06/09/1989	1.000

Totals for Casetype 282201 — **3.000 Acres**, **3 Case(s)**

Casetype: 285001 ROW-PWR FACILITIES

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
285001	AUTHORIZED	UTU 078587	307	ROW GRANTED-ISSU	05/16/2000	0.860

Totals for Casetype 285001 — **0.860 Acres**, **1 Case(s)**

Casetype: 285002 ROW-POWER TRAN LINE

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
285002	AUTHORIZED	UTU 005706	307	ROW GRANTED-ISSU	06/06/1968	29.930
285002	AUTHORIZED	UTU 011642	304	AUTH AMENDED/MOD	09/10/2003	2.290
285002	AUTHORIZED	UTU 012130	307	ROW GRANTED-ISSU	04/11/1972	3001.733
285002	AUTHORIZED	UTU 020991	307	ROW GRANTED-ISSU	12/21/1972	1.092
285002	AUTHORIZED	UTU 025415	307	ROW GRANTED-ISSU	07/24/1974	1.993
285002	AUTHORIZED	UTU 025930	307	ROW GRANTED-ISSU	08/05/1974	0.268
285002	AUTHORIZED	UTU 027727	307	ROW GRANTED-ISSU	07/15/1975	0.799
285002	AUTHORIZED	UTU 079742	307	ROW GRANTED-ISSU	07/10/2003	162.680
285002	AUTHORIZED	UTU 0013006	304	AUTH AMENDED/MOD	06/26/1968	120.101
285002	AUTHORIZED	UTU 003525201	307	ROW GRANTED-ISSU	09/25/2012	181.818
285002	AUTHORIZED	UTU 0036238	304	AUTH AMENDED/MOD	02/04/1966	98.667
285002	AUTHORIZED	UTU 0147915	304	AUTH AMENDED/MOD	05/05/2004	14.435

Totals for Casetype 285002 — **3,615.806 Acres**, **12 Case(s)**

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Casetype: 285003 ROW-POWER TRAN-FLPMA

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
285003	AUTHORIZED	UTU 02481901	307	ROW GRANTED-ISSU	10/01/2015	11.462
285003	AUTHORIZED	UTU 045818	308	ROW RENEWED	06/28/2013	0.350
285003	AUTHORIZED	UTU 045958	308	ROW RENEWED	06/28/2013	0.067
285003	AUTHORIZED	UTU 052880	304	AUTH AMENDED/MOD	05/27/2014	37.548
285003	AUTHORIZED	UTU 058155	308	ROW RENEWED	06/28/2013	0.910
285003	AUTHORIZED	UTU 058188	304	AUTH AMENDED/MOD	12/12/2016	76.514
285003	AUTHORIZED	UTU 061449	308	ROW RENEWED	07/06/2017	51.067
285003	AUTHORIZED	UTU 063386	307	ROW GRANTED-ISSU	08/23/1989	0.126
285003	AUTHORIZED	UTU 063392	307	ROW GRANTED-ISSU	08/01/1989	0.927
285003	AUTHORIZED	UTU 067803	307	ROW GRANTED-ISSU	10/30/1991	0.200
285003	AUTHORIZED	UTU 068866	307	ROW GRANTED-ISSU	09/08/1998	76.848
285003	AUTHORIZED	UTU 070751	308	ROW RENEWED	06/28/2013	0.106
285003	AUTHORIZED	UTU 080898	307	ROW GRANTED-ISSU	02/17/2004	143.490
285003	AUTHORIZED	UTU 082976	307	ROW GRANTED-ISSU	05/10/2007	0.230
285003	AUTHORIZED	UTU 082991	304	AUTH AMENDED/MOD	03/14/2014	91.194
285003	AUTHORIZED	UTU 08299101	307	ROW GRANTED-ISSU	12/13/2011	23.900
285003	AUTHORIZED	UTU 091226	307	ROW GRANTED-ISSU	11/22/2016	224.242
285003	AUTHORIZED	UTU 003503701	307	ROW GRANTED-ISSU	06/28/2013	40.650
285003	AUTHORIZED	UTU 010535601	307	ROW GRANTED-ISSU	05/21/2013	1284.430

Totals for Casetype 285003 **2,064.261 Acres**
19 Case(s)

Casetype: 286001 ROW-COMM SITE, FLPMA

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
286001	AUTHORIZED	UTU 072224	307	ROW GRANTED-ISSU	06/21/1995	1.009
286001	AUTHORIZED	UTU 082085	307	ROW GRANTED-ISSU	06/13/2005	0.025
286001	AUTHORIZED	UTU 089200	307	ROW GRANTED-ISSU	08/02/2012	0.100
286001	AUTHORIZED	UTU 090107	307	ROW GRANTED-ISSU	11/17/2015	0.500
286001	AUTHORIZED	UTU 091205	304	AUTH AMENDED/MOD	11/16/2015	0.200

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Totals for Casetype 286001 — **1.834 Acres**, **5 Case(s)**

Casetype: 286005 ROW-COMM SITE, 1911

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
286005	AUTHORIZED	UTU 023939	304	AUTH AMENDED/MOD	03/14/1975	7.980

Totals for Casetype 286005 — **7.980 Acres**, **1 Case(s)**

Casetype: 286007 ROW-COMM SITE FED FAC

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
286007	AUTHORIZED	UTU 083016	307	ROW GRANTED-ISSU	08/25/2009	0.140

Totals for Casetype 286007 — **0.140 Acres**, **1 Case(s)**

Casetype: 286008 ROW-COMM SITE 44LD513

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
286008	AUTHORIZED	UTU 032358	307	ROW GRANTED-ISSU	10/01/1976	10.000
286008	AUTHORIZED	UTU 0103150	307	ROW GRANTED-ISSU	02/12/1963	0.610

Totals for Casetype 286008 — **10.610 Acres**, **2 Case(s)**

Casetype: 286200 ROW-TELEPHONE-TELEGRAPH 4

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Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
286200	AUTHORIZED	UTU 026548	307	ROW GRANTED-ISSU	07/25/1974	1.891

Totals for Casetype 286200 — **1.891 Acres**, **1 Case(s)**

Casetype: 286203 ROW-TEL & TELEG,FLPMA

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
286203	AUTHORIZED	UTU 052881	304	AUTH AMENDED/MOD	07/03/2017	35.698
286203	AUTHORIZED	UTU 060050	304	AUTH AMENDED/MOD	03/02/2017	2.509
286203	AUTHORIZED	UTU 063389	304	AUTH AMENDED/MOD	08/01/2017	7.333
286203	AUTHORIZED	UTU 078908	307	ROW GRANTED-ISSU	07/20/2001	5.940
286203	AUTHORIZED	UTU 090110	307	ROW GRANTED-ISSU	10/06/2014	25.089
286203	AUTHORIZED	UTU 091221	307	ROW GRANTED-ISSU	09/07/2016	18.109
286203	AUTHORIZED	UTU 091590	307	ROW GRANTED-ISSU	06/09/2017	41.270
286203	AUTHORIZED	UTU 092366	307	ROW GRANTED-ISSU	04/10/2017	7.064
286203	AUTHORIZED	UTU 092387	307	ROW GRANTED-ISSU	04/18/2017	5.924
286203	AUTHORIZED	UTU 092787	307	ROW GRANTED-ISSU	01/23/2018	4.606
286203	AUTHORIZED	UTU 0010813	308	ROW RENEWED	02/02/2005	10.242

Totals for Casetype 286203 — **163.784 Acres**, **11 Case(s)**

Casetype: 287001 ROW-WATER FACILITY

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
287001	AUTHORIZED	UTU 026725	307	ROW GRANTED-ISSU	09/15/1980	1.596
287001	AUTHORIZED	UTU 047350	308	ROW RENEWED	09/16/2016	0.230
287001	AUTHORIZED	UTU 052874	307	ROW GRANTED-ISSU	03/19/1984	2.000
287001	AUTHORIZED	UTU 055677	868	EFFECTIVE DATE	10/16/2016	4.790
287001	AUTHORIZED	UTU 075795	304	AUTH AMENDED/MOD	04/03/2003	8.918
287001	AUTHORIZED	UTU 082138	307	ROW GRANTED-ISSU	08/11/2009	0.180
287001	AUTHORIZED	UTU 083081	307	ROW GRANTED-ISSU	08/11/2009	9.199

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Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
287001	AUTHORIZED	UTU 091957	307	ROW GRANTED-ISSU	12/12/2016	1.700
287001	AUTHORIZED	UTU 0143769	304	AUTH AMENDED/MOD	03/23/2017	13.634

Totals for Casetype 287001 — **42.247 Acres**, **9 Case(s)**

Casetype: 287011 ROW-WATER FAC RECONVEYED

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
287011	AUTHORIZED	UTU 089471	307	ROW GRANTED-ISSU	11/16/2011	0.250
287011	AUTHORIZED	UTU 08947101	307	ROW GRANTED-ISSU	03/15/2012	0.250
287011	AUTHORIZED	UTU 08947102	307	ROW GRANTED-ISSU	03/19/2012	0.250
287011	AUTHORIZED	UTU 08947103	307	ROW GRANTED-ISSU	03/28/2012	0.250
287011	AUTHORIZED	UTU 08947104	307	ROW GRANTED-ISSU	03/20/2012	0.250
287011	AUTHORIZED	UTU 08947105	307	ROW GRANTED-ISSU	03/13/2012	0.250

Totals for Casetype 287011 — **1.500 Acres**, **6 Case(s)**

Casetype: 287100 ROW-IRRIGATION FAC

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
287100	AUTHORIZED	UTU 009534	307	ROW GRANTED-ISSU	11/10/1970	2.330

Totals for Casetype 287100 — **2.330 Acres**, **1 Case(s)**

Casetype: 287300 ROW-WATER PLANTS

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
287300	AUTHORIZED	UTU 014373	304	AUTH AMENDED/MOD	05/15/1990	4.422

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Totals for Casetype 287300 — **4.422 Acres**, **1 Case(s)**

Casetype: 287400 D/C EXIST PRIOR TO FLPMA

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
287400	AUTHORIZED	UTU 078926	307	ROW GRANTED-ISSU	10/30/2006	0.654

Totals for Casetype 287400 — **0.654 Acres**, **1 Case(s)**

Casetype: 287500 D/C EXERCISE OF RIGHT

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
287500	AUTHORIZED	UTU 051939	868	EFFECTIVE DATE	07/26/1982	2.175

Totals for Casetype 287500 — **2.175 Acres**, **1 Case(s)**

Casetype: 288001 ROW-PIPELINE-OTHER

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
288001	AUTHORIZED	UTU 045386	308	ROW RENEWED	08/06/2013	17.000
288001	AUTHORIZED	UTU 046834	308	ROW RENEWED	07/13/2016	1.572
288001	AUTHORIZED	UTU 052885	307	ROW GRANTED-ISSU	06/15/1984	0.344
288001	AUTHORIZED	UTU 067520	304	AUTH AMENDED/MOD	07/15/2001	1.210
288001	AUTHORIZED	UTU 071700	307	ROW GRANTED-ISSU	07/12/1993	0.551
288001	AUTHORIZED	UTU 072223	307	ROW GRANTED-ISSU	09/01/1994	1.598
288001	AUTHORIZED	UTU 078482	307	ROW GRANTED-ISSU	10/03/2000	1.108
288001	AUTHORIZED	UTU 088593	307	ROW GRANTED-ISSU	04/20/2012	0.995

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Totals for Casetype 288001 — **24.378 Acres**, **8 Case(s)**

Casetype: 288100 ROW-O&G PIPELINES

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
288100	AUTHORIZED	UTU 020455	304	AUTH AMENDED/MOD	08/21/2003	16.763

Totals for Casetype 288100 — **16.763 Acres**, **1 Case(s)**

Casetype: 288101 ROW-O&G FACILITY SITES

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
288101	AUTHORIZED	UTU 078487ST	307	ROW GRANTED-ISSU	10/30/1998	5.010

Totals for Casetype 288101 — **5.010 Acres**, **1 Case(s)**

Casetype: 289001 ROW-OTHER-FLPMA

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
289001	AUTHORIZED	UTU 075772	307	ROW GRANTED-ISSU	08/15/1997	5.923
289001	AUTHORIZED	UTU 079238	307	ROW GRANTED-ISSU	05/17/2001	0.113

Totals for Casetype 289001 — **6.036 Acres**, **2 Case(s)**

Casetype: 289004 ROW-MISC & SPECIAL

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Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
289004	AUTHORIZED	UTU 071171	307	ROW GRANTED-ISSU	04/08/1993	5.000

Totals for Casetype 289004 — **5.000 Acres**, **1 Case(s)**

Casetype: 292009 PERMIT SEC 302 FLPMA-FILM

Casetype	Case Disp Txt	Serial Nr Full	Disp Act Cd	Disp Act Txt	Disp Dt	Case Acres
292009	AUTHORIZED	UTU 093083	868	EFFECTIVE DATE	01/14/2018	1000.000
292009	AUTHORIZED	UTU 093131	276	PMT-LIC ISSUED	04/05/2018	9.999

Totals for Casetype 292009 — **1,009.999 Acres**, **2 Case(s)**

Totals for Geo State UT — **3,703,803.169 Acres**, **186 Case(s)**

Totals for Admin State UT — **3,703,803.169 Acres**, **186 Case(s)**

Report Grand Totals — **3,703,803.169 Acres**, **186 Case(s)**

Appendix 9. Livestock Grazing

Table 1. Season of Use, Active AUMs, and Actual Use Averages

Allotment	Season of Use	Active AUMs	Actual Use Averages[1] (AUMs)					21-Year Average (1996–2016)
			1996–2000	2001–2005	2006–2010	2011–2013	2014–2016	
Alvey Wash	May 15–Sep 30	1,424	1,144	746	682	278	777	725
Big Bowns Bench[2]	Nov 1–Mar 31	750	857[3]	Nonuse	Nonuse	Nonuse	Nonuse	171
Big Horn	Nov 1–Jun 15	3,515	2,426	1,366	1,102[3]	2,298[3]	2140	1,866[3]
Black Ridge	Nov 1–May 31	903	438	390	315	309[3]	357	362
Black Rock	Jun 6–Oct 16	408	758	651[3]	153[3]	142[3]	615	464[3]
Black Rock (State)	Jun 6– Oct 16	64	(actual use averages are included in the Black Rock section)					
Boot	Aug 1–Oct 31	45	45	29[3]	42	45	45	41
Boulder Creek	Sep 1–Dec 31	80	48[3]	26[3]	8[3]	11[3]	41	27
Bull Run (State)	Jul 1–Feb 28	5	No use of the allotment since acquired by the BLM in 1998.					
Bunting Trust (State)	May 15–Nov 30	16	10[3]	11	17	13	27	16
Calf Pasture	Jun 10–Aug 10 (even years)	176	67	34	76	51	62	58
	Aug 10–Oct 15 (odd years)							
Circle Cliffs	Nov 1–Mar 31	1,050	842	43	402	831	962	616
Clark Bench	Nov 1–Apr 30	1,238	894	330	344	226	464	452
Cockscomb	Mar 1–May 31	36	14	18	8	16	27	17
Collet	Jun 16–Sep 15	97	95[3]	72	84	57	82	78[3]
Cottonwood	Nov 1–May 31	3,188	2,656	1,692	2,121	2,347[3]	2,841	2,331[3]
Coyote	Nov 1–May 31	2,044	1,594	650	1,331	889[3]	1221	1,137[3]
Death Hollow	Nov 1–Mar 31	1,057	607	210	541	557[3]	919	567[3]
	Apr 1–May 15							
Deer Creek	Nov 1–Feb 28	358	344	103	45	92	85	134
Deer Creek-Wolverine Pasture (Forage Reserve)[4]	Oct 1–Mar 31	148	0	0	0	117	0	23
Deer Range	Aug 1–Oct 15	231	194		42	122	31	78
Deer Spring Point	Jun 10–Oct 17	585	499	229	164	229	135	252
Dry Valley	Mar 1–Dec 31	699	672	449	576	621	713	606
	Mar 1–Jan 31							

Allotment	Season of Use	Active AUMS	Actual Use Averages[1] (AUMs)					21-Year Average (1996–2016)
			1996–2000	2001–2005	2006–2010	2011–2013	2014–2016	
	Jul 1–Oct 31							
First Point	Jun 1–Dec 31	410	132	69	41	Nonuse	115	71
Fivemile Mountain	Nov 1–Apr 30	385	380	51	13	Nonuse	58	100
Flood Canyon	Jul 1–Oct 31	148	63	22	30	48	87	50
Ford Well	Jun 10–Oct 9	300	256	242	44	254[3]	152	190[3]
Fortymile Ridge[2]	Oct 15–May 31	4,290	2,582	1,291	3,713	2,416[3]	2965	2,593[3]
Granary Ranch	Jul 1–Nov 30	70	7	41	30	45	33	31
Hall Ranch	Mar 1–Feb 28	12	Nonuse [3]	Nonuse	12[3]	6[3]	7	5[3]
Haymaker Bench	Nov 1–Feb 28	100	58	70	61	76[3]	74	68[3]
Headwaters	Nov 1–Mar 15	3,469	3,393	1,981	1,991	2,373	2,470	2,442
Hells Bellows	May 1–Oct 15	44	44	32	35	42[3]	44	39[3]
Johnson Canyon	Jun 1–Nov 15	274	165	111	67	142	83	114
Johnson Lakes	Jun 1–Nov 30	347	306	179	112	302	285	237
Johnson Point	Nov 1–Mar 31	135	Nonuse	10	Nonuse	Nonuse	Nonuse	2
King Bench	Nov 1–Mar 31	1,515	1,144	980	311	1,281[3]	1347	1,013[3]
Lake[2]	Jun 1–Sep 30	1,310	1,116	80	485	316	682	536
Lake Powell[2]	Oct 15–Mar 15	20	Nonuse					
Last Chance[2]	Mar 1–Feb 28	4,642	2,672	1,015	967	928	1210	1,358
Little Bowns Bench (Forage Reserve)	Oct 1–Mar 31	130	0	0	0	141	0	28
Locke Ridge	Dec 1–Apr 30	172	118	134	78[3]	91[3]	98	104[3]
Lower Cattle[2]	Oct 1–Ap 15	7,488	4,680	3,514	5,294	4,372[3]	5,080	4588[3]
Lower Hackberry	Oct 15–Mar 15	435	222	67	152	326	356	225
Lower Warm Creek[2]	Nov 1–Mar 31	225	80	100	Nonuse	13	163	71
Main Canyon	Jun 1–Sep 30	14	8[3]	10	53	5	7	17[3]
Meadow Canyon	Sep 1–Nov 30	144	135	103	79[3]	92	101	102[3]

Allotment	Season of Use	Active AUMS	Actual Use Averages[1] (AUMs)					21-Year Average (1996–2016)
			1996–2000	2001–2005	2006–2010	2011–2013	2014–2016	
Mollies Nipple	Mar 1–Feb 28	3,880	3,785	2,784	2,874	2,778[3]	2601	2,964[3]
Moody[2]	Nov 1–Mar 31	909	712	391	270	270[3]	606	450[3]
Mud Springs	Jul 15–Oct 15	277	214	200	79	99	96	138
Neaf	Mar 1–Nov 30	9	7	Nonuse	2	Nonuse	Nonuse	2
Nipple Bench[2]	Dec 1–Apr 30	1,042	349	311	361	376[3]	452	370[3]
Phipps (Phipps Pasture-Forage Reserve)	Oct 1–Mar 31	140	0	0	0	122	0	24
Pine Creek	Sep 16–Oct 31	144	60	78	7	158[3]	153	91[3]
Pine Creek (State)	Nov 1–Jan 31	27	(actual use averages are included in the Pine Creek section)					
Pine Point	Jun 16–Oct 15	365	245	169	108	171	151	169
Rock Creek-Mudholes[2]	Mar 1–Feb 28	2,173	1,381	Nonuse	954	1,159[3]	1,241	947[3]
Round Valley	Nov 1–Mar 31	522	419	253	316	254	440	336
Roy Willis	Nov 1–Mar 15	9	2	4	4	9	5	5
Rush Beds	Nov 1–Apr 30	252	38	126	76	124[3]	67	86[3]
School Section	May 1–Apr 30	102	24	37	9	Nonuse	20	18
Second Point	Aug 1–Sep 30	98	52	18	19[3]	12	35	27[3]
Sink Holes	Nov 1–Apr 1	154	110	Nonuse	8[3]	45[3]	155	64[3]
Slick Rock (State)	Jun 1–Jun 30	24	Insuf-ficient Data	Insuf-ficient Data	15	6	6	5
Soda[2]	Oct 1–May 31	2,798	1,744	642	2,230	514[3]	1,978	1,422[3]
South Fork	Mar 1–Feb 28	12	Nonuse	Nonuse	9	8	15	6
Swallow Park	May 1 – Oct 31	1,076	621	509	514	379	526	510
Timber Mountain	Jun 16– Oct 15	426	287	223	174	128	137	190
Upper Cattle[2]	Nov 1–Jun 15	8,158	5,606	4,774	7,276	4,220	4,917	5,359
Upper Hackberry	Nov 1–Mar 31	654	472	270	217	190	404	311
	Apr 16–Jun 15							
Upper Paria	May 1–Jun 10	2,833	2,277	738	1,282	1,429	1,498	1,445
	May 1–Sep 30							
Upper Warm Creek[2]	Nov 1–May 31	1,638	364	401	682	490[3]	946	577[3]

Allotment	Season of Use	Active AUMS	Actual Use Averages[1] (AUMs)					21-Year Average (1996–2016)
			1996–2000	2001–2005	2006–2010	2011–2013	2014–2016	
Vermilion	Feb 16–Feb 28	2,849	2,080	1,104	416	814[3]	1,111	1,105[3]
	Mar 1–May 15							
	Jun 1–Sep 15							
	Oct 1–Jan 15							
Wagon Box Mesa[2]	Nov 1–Mar 31	637	267	248	201	217[3]	335	254[3]
Wahweap	Dec 1–Apr 30	491	361	206	224	372	467	326
White Rock	Dec 1–Jan 31	60	55	47	23	Nonuse	Nonuse	25
White Sage	May 6–Jun 5	76	64	33	15	Nonuse	Nonuse	22
Wide Hollow	Oct 1–Dec 31	353	265[3]	118	354	295	264	259[3]
Willow Gulch	Nov 1–Mar 31	474	188	22	28	27[3]	32	59[3]
	Dec 1–Jan 31							
Wiregrass[2]	Nov 1–Mar 31	99	342	3	Nonuse	Nonuse	48	79

Sources: BLM GIS 2014b; BLM allotment summaries
[1] Actual use is supplemented with billed use where actual use data is not available.
[2] Allotment partially or wholly in Glen Canyon
[3] Period includes years with nonuse. Some data for 2013 not available and not included in the averages.
[4] Based on 8-year average.
[4] Wolverine Bench Forage reserve is a pasture of the Deer Creek allotment.

Table 2. Allotments Not Meeting Rangeland Health Standards Due to Livestock Grazing in 2006

Allotment	Standard not Met				Changes to Grazing Management[2]	Assessments Since 2006
	1	2	3	4		
Circle Cliffs	X	X	X		1. Restoration of the Lampstand, Onion Beds, and Prospect pasture seedings (2,500 acres) 2. Limited grazing use in the Gulch pasture no later than March 15	Riparian assessments 2007, 2012
Collet		X	X		1. Increased use supervision to control unauthorized livestock 2. Coordinated 28% voluntary nonuse to meet BLM resource objectives (2007–2013)	Riparian assessments 2012

Allotment	Standard not Met				Changes to Grazing Management[2]	Assessments Since 2006
	1	2	3	4		
Cottonwood		X		X[3]	1. Upgrade and maintenance of the Coyote well, pipeline, and associated infrastructure 2. Jack Riggs and Butler Valley water systems maintained 3. Voluntary nonuse to limit use of the riparian pasture to trailing and/or emergency use 4. Restoration of the Eightmile seeding and the associated nonuse agreements (2008–2009) 5. Solar pump installed on Butler Valley well (2012) 6. Two separate rotation systems implemented on an experimental basis	Riparian assessments 2007, 2010, 2014
Coyote	X		X	X[3]	1. Restoration of 2,634 acres (2009) 2. Upgrade and maintenance of the Coyote well, pipeline, and associated infrastructure	Restoration monitoring conducted annually for first 5 years after project completion
Death Hollow		X			1. 100% voluntary nonuse to meet BLM resource objectives (1 year 2006–2007). Voluntary nonuse during spring season (April 1–May 15) 2002–2006 and 2012. 2. Cleaned and reconstructed stock ponds between Wolverine and Horse Canyon (2008)	Riparian monitoring 2012
First Point		X			1. Fenced First Point Spring to exclude livestock from the spring (2007) 2. Maintained offsite water at First Point Spring	Riparian assessments 2007
Ford Well		X			1. Fenced Old Corral Spring and Ford Well Spring to exclude livestock from the spring 2. Provided offsite water at both springs improving distribution	Riparian assessments 2007

Allotment	Standard not Met				Changes to Grazing Management[2]	Assessments Since 2006
	1	2	3	4		
Fortymile Ridge[4]		X		X[3]	1. Coordinated 22% voluntary nonuse to meet BLM resource objectives (2006–2012) 2. Maintenance of spring protection fences (2008) 3. Maintenance of the Wilcox Spring protection fence 4. Returned a portion of the Wilcox Spring flow back to spring for recovery of riparian vegetation (2010) 5. Use of supplement to improve livestock distribution (2006–present)	Riparian assessments 2007, 2014 Upland assessments 2014
Headwaters		X		X[5]	1. Implemented invasive weed management starting in 2001 2. Changed season of use in 1984 (off on March 15) 3. Limited livestock use in the Wahweap "Box" riparian area	Riparian assessments 2010, 2014
Hells Bellows		X			1. Coordinated 100% voluntary nonuse in 2007	Riparian assessments 2007
Lake[4]		X	X		1. Removed more than 80 feral cattle 2. Pasture and spring protection fences maintained 3. Complete nonuse of the allotment from 2001–2003 and 2007	Riparian assessment 2007
Last Chance[4]		X		X[5]	1. Coordinated 76% voluntary nonuse to meet BLM resource objectives (2006–2012) 2. Removed feral cattle from the allotment (2003–present) 3. Maintained exclosure fence around Relishen Seep (2005)	Riparian assessments 2010, 2014
Lower Cattle[4]		X	X		1. Coordinated 33% voluntary nonuse to meet BLM resource objectives (2006–2012) 2. Implemented a voluntary water-controlled, deferred rest rotation grazing system to better manage livestock distribution (2007—present) 3. Maintained stock ponds to improve water availability and distribution. 4. Use of supplement to improve livestock distribution (2006–present). 5. Water based rotation/distribution	Riparian assessments 2007, 2014 Upland assessments 2014

Allotment	Standard not Met				Changes to Grazing Management[2]	Assessments Since 2006
	1	2	3	4		
Mollies Nipple	X	X	X		1. Restoration of three seeded pastures 2. Coordinated 27% voluntary nonuse to meet BLM objectives (2006–2012) 3. Adjustments to livestock use due to drought 4. Deferred rest rotation followed and administered 5. Maintenance of Seaman Wash pipeline (2007) 6. Fenced Wildcat Spring (2009). 7. Constructed water developments in the Buckskin pasture (Sink Hole and Buckskin catchments) 8. Maintained two stock ponds in Buckskin pasture 2007 9. Restoration work, fencing of springs	Riparian assessments 2010 Upland assessments 2014
Nipple Bench[4]		X		X[5]	Livestock grazing is not the causal factor for not meeting rangeland health standards. Road through riparian area is constricting ability to move toward meeting standards.	N/A
Rock Creek-Mudholes[4]		X		X	1. Removed more than 65 feral cattle (2006–2008) 2. Permittee removed more than 25 additional feral cattle (2009–present) 3. Maintained four spring fences 4. Maintained pasture fences 5. 100% nonuse to meet BLM resource objectives (2001–2006) 6. Coordinated partial voluntary nonuse (2007–present)	Riparian assessments 2015
School Section			X		1. 100% voluntary nonuse to meet BLM resources objectives (2007–2010). 2. Coordinated about 70% voluntary nonuse (2009–present)	Upland assessments 2013

Allotment	Standard not Met				Changes to Grazing Management[2]	Assessments Since 2006
	1	2	3	4		
Soda[4]	X	X			1. Removed more than 45 feral cattle (2003–2004) 2. Maintained Cottonwood Spring protection fence (2010) 3. Maintained stock ponds and catchments (2011) 4. Maintained/improved Hole-in-the-Rock well (2008) 5. 100% nonuse to meet BLM objectives (2002–2005) 6. Existing rotational grazing system avoids use after March 31 on consecutive years	Riparian assessments 2014 Upland assessments 2014
Swallow Park		X			1. Coordinated voluntary season-of-use restrictions deferring summer use and use during the critical spring growing season in the Bullrush Hollow pasture 2. Partial voluntary nonuse to meet BLM resource objectives (2001–2008)	Riparian assessments 2010
Upper Paria	X	X		X[3]	1. Repaired and maintained erosion control structures in the Mudholes pasture (2005) 2. Completed seeding restoration on 300 acres in the Mudholes and Upper Jim Hollow pastures (2005) 3. Coordinated 39% voluntary nonuse to meet BLM resource objectives (2003–2013) 4. Installed riparian spring protection fence at Between the Creeks Spring (2008) 5. Repaired and upgraded spring development and spring protection fence at Dick Ott Spring (2006) 6. Maintained and upgraded the Sheep Creek pipeline and cleaned Upper Jim stock ponds (2006) 7. Installed 1-acre monitoring exclosure in Mudholes seeding and frequency/cover studies.	Riparian assessments 2010

Allotment	Standard not Met				Changes to Grazing Management[2]	Assessments Since 2006
	1	2	3	4		
Vermilion	X	X	X	X	1. Maintained Sand, Cole, and Nephi spring protection fences; restored spring boxes (2007) 2. Completed Seeding Restoration in RCA 1, RCA 2, RCA 3, and Fossil Wash pastures (2006) 3. Coordinated 81% voluntary nonuse to meet BLM resource objectives (2006–2012) 4. Completed Sink Holes catchment in Government Reservoir pasture 5. Maintained Fossil Wash stock pond (2007)	Riparian assessments 2014 Upland assessments 2014

Source: BLM 2006

[1] Section 2.1 describes rangeland health standards.

[2] This list is not all-inclusive; it is intended to give the reader an indication of actions taken by the BLM and grazing permittees to make progress toward meeting rangeland health standards.

[3] Livestock grazing was determined not to be a cause in not meeting Standard 4.

[4] Allotment partially or wholly in Glen Canyon.

[5] Livestock grazing was determined to be a contributing factor in not meeting Standard 4.

Appendix 10. Recreation

Increased recreation use in the Decision Area can be largely attributed to the State of Utah's Travel and Tourism marketing campaign. The *Kem C. Gardner Policy Institute* at the University of Utah publishes an annual Travel and Tourism Industry report and identifies statewide tourism indicators that include employment, spending and wages, accommodations, tourism-related tax revenues, and statewide visitation counts. In 2013 Utah promoted the Mighty Five Campaign focused on marking the five national parks in Utah. From 2011 to 2015 visitation to Utah's National Place Recreation areas rose from 4.8 to 5.7 million visitors, an increase of 18.3 percent. In 2016, travel and tourism ranked eighth in Utah's major industries. More than half of all private jobs in Garfield County (54 percent) were tourism-related in 2016, with similarly high percentages in Kane (42 percent) County (*Kem C. Gardner Policy Institute*). The Mighty Five campaign has contributed to the economy by creating jobs and affecting local economies in gateway communities and surrounding areas. GSENM lies directly in the middle of the Mighty Five National Parks and can be expected to contribute to increased economic opportunities and visitation to the region.

Special Recreation Management Areas

Recreation management areas are the BLM's primary means for managing recreational use of the public lands. Public lands are identified either as a SRMA or an ERMA. SRMAs are areas that require a recreation investment, where more intensive recreation management is needed, and where recreation is a principal management objective. These areas often have high levels of recreation activity or are valuable natural resources. ERMAs constitute all public lands outside SRMAs and other special designation areas. ERMAs are areas where recreation is not specialized, is dispersed, and does not require intensive management. Recreation might not be the primary management objective in these areas, and recreational activities are subject to few restrictions. Currently BLM manages six SRMAs in the Planning Area (BLM 2000).

Escalante Canyons SRMA is 513,804 acres in size. The boundary of this SRMA will follow the geographical topography, including all the tributaries to the main Escalante Canyon. It will include trailheads for all the popular routes into the canyons. Activities in this SRMA include backpacking, canyoneering, non-motorized boating, and equestrian use. The overall recreation experience will continue to be primitive, uncrowded, and remote. Overall, social encounters will remain low compared to other southwest canyon hiking opportunities. However, a range of social encounters will be available. Potential permit systems could address general public, commercial, and administrative users.

Paria/Hackberry SRMA is 279,384 acres in size. This area is bordered on the west by Kitchen Canyon Road, on the east by Cottonwood Canyon Road corridor, on the south by the confluence of Hackberry/Cottonwood Creeks and the Paria River, and on the north by Dixie National Forest, excluding the Skutumpah corridor. Activities in this SRMA are backpacking, canyoneering, and equestrian use. The overall recreation experience will continue to be primitive, uncrowded, and remote. Equestrian opportunities will be emphasized in Paria Canyon, while backpacking opportunities will be emphasized in Hackberry Canyon. Potential permit systems could address general public use and commercial users.

Paria Canyon and Plateaus SRMA is 30,220 acres in size. This area encompasses Buckskin Mountain, West Clark Bench, and Cedar Mountain to connect to the BLM Arizona Strip's "Canyons and Plateaus of the Paria Resource Conservation Area." These areas are located south of US 89, with the GSENM boundary marking the east boundary. Activities in this SRMA include canyoneering, equestrian use, backpacking, hiking, hunting, and scenic touring along the House Rock Valley Road. The overall recreation experience will continue to be primitive, uncrowded, and remote. Overall social encounters will remain low compared to other southwest canyon hiking opportunities. However, a range of social encounters occur. Management of this SRMA will be in coordination with the Kanab and the Arizona Strip Field Offices.

Fiftymile Mountain SRMA is 157,610 acres in size. This area includes the geographical area called Fiftymile Mountain including trail access points. Activities in this SRMA include equestrian use, backpacking, and hunting. The recreation experience will be primitive, uncrowded, and remote. Visitors will not be encouraged to go to this area, and commercial outfitting will be extremely limited.

Highway 12 Corridor SRMA is 25,564 acres in size. This area encompasses the SR-12 corridor located in GSENM, including the Calf Creek Campground and Interpretive Trail. Activities in this SRMA include scenic driving, day-use hiking, camping, equestrian use, road bicycling, and scenic and interpretive viewing. The recreation experience will focus on learning about geology, history, archaeology, biology, and paleontology, in addition to scenic viewing. Short interpretive trails and scenic overlooks will be developed to encourage visitors to learn more about these monument resources. Opportunities will accommodate all visitors. Information stations in Boulder, Escalante, and Cannonville will disseminate educational materials to further education about these resources.

Highway 89 Corridor SRMA is 43,946 acres in size. This area encompasses the US 89 corridor within GSENM, including the Paria Movie Set, the old Paria townsite, and the Paria Contact Station. Activities in this SRMA include scenic driving, day-use hiking, camping, road and mountain bicycling, and scenic and interpretive viewing. The recreation experience will focus on learning about geology, history, archaeology, biology, and paleontology, in addition to scenic viewing. Short interpretive trails and scenic overlooks will be developed to encourage visitors to learn more about these monument resources. Opportunities will accommodate all visitors. This corridor will be coordinated with the Vermilion Cliffs Highway Project.

Within SRMAs, and to a lesser extent outside, BLM management seeks to minimize conflict with other uses and among different types of recreational users. In more remote areas in GSENM, user interactions are fewer as users disburse across the landscape. While interactions in these remote areas are fewer, the intensity of conflict can be higher. For example, if a backpacker seeking solitude encounters an OHV user, the intensity of the conflict (i.e., the disruption of the backpacker's desired setting and recreational experience) is greater than if the encounter occurred at the trailhead. In contrast, the OHV user may not perceive any conflict.

Similarly, the potential for conflict with other uses occurs when the recreation user's desired setting and experience is altered by an unwanted activity. Potential conflicts among recreational and non-recreational users become a management concern when the conflict occurs frequently or at a high intensity. Interactions can occur frequently with lower perceptions of conflict on the part of the users if the interaction is expected. The intensity of a perceived conflict is higher where the interaction is not typical for the area and is therefore not expected,

or where the interaction is expected, but higher than normal user volumes increase the proximity and frequency of the users' interactions, thereby resulting in a conflict.

Recreation Management Zones

There are four management zones within GSENM (see Appendix 1, Map 28). These zones reflect the location, type of recreational setting, and subsequent opportunities likely to be available to users within GSENM. Each zone's geographic boundary is defined by factors such as the accessibility to and movement within the area via existing roads or trails, sensitive habitats, terrain, and special management area designation boundaries. The four management zones in GSENM consist of the following:

The Frontcountry Zone (78,100 acres or 4 percent of GSENM) is intended to be the focal point for visitation by providing day-use opportunities close to adjacent communities and to SR-12 and US 89, which traverse GSENM. This zone will accommodate the primary interpretation sites, overlooks, trails, and associated facilities necessary to feature GSENM resources. The zone boundaries were developed by locating a corridor along SR-12 and US 89, Johnson Canyon Road, and the portion of Cottonwood Canyon Road leading to Grosvenor Arch. The zone was then expanded or constricted to coincide with the dominant terrain features, which provide identifiable boundaries on the ground. Existing destinations such as Grosvenor Arch, the Paria townsite, and the Calf Creek Recreation Area were included in order to provide for necessary improvements and to accommodate expected visitation. Lands close to the Town of Escalante were also included due to extensive visitor use. In delineating this zone, WSAs, threatened and endangered species habitat, relict plant areas, riparian areas, and other sensitive resources were avoided wherever possible. US 89, from the western boundary to The Cockscomb, lacks dominant terrain to delineate this zone. For this reason, a 1-mile buffer along each side of the highway was used.

The Passage Zone (39,000 acres, or 2 percent of GSENM) includes secondary travel routes that receive use as throughways and recreation destinations. While rudimentary facilities necessary for safety, visitor interpretation, and for the protection of resources will be allowed in this zone, the BLM will generally avoid directing or encouraging further increases in visitation due to the condition of routes and distance from communities. The primary criterion for developing the zone boundaries was again dominant terrain. The boundary does not constrict closer than 100 feet to designated roads, primitive roads, and trails, and encompasses most obvious imprints of human activities such as trailheads, transmission ROWs, and potential resource interpretation sites within 0.5 mile of the subject route. In many cases, dominant terrain was not available along route segments. In these cases, a 660-foot buffer was used. Again, WSAs, threatened and endangered species habitat, relict plant areas, riparian areas, and other sensitive resources were avoided wherever possible.

The Outback Zone (537,700 acres or 29 percent of GSENM) is intended to provide an undeveloped, primitive and self-directed visitor experience while accommodating motorized and mechanized access on designated roads, primitive roads, and trails. Facilities will be rare and provided only when essential for resource protection. The remaining public routes not in the Frontcountry or Passage Zones are included in the Outback Zone. Dominant terrain was again a primary criterion for the zone boundary. The boundary does not constrict closer than 100 feet to the routes. WSAs were avoided wherever possible.

The Primitive Zone (1,210,600 acres or 65 percent of GSENM) is intended to provide an undeveloped, primitive and self-directed visitor experience without motorized or mechanized access. Some administrative routes are included in this zone, which could allow very limited motorized access. Facilities will be nonexistent, except for limited signs for resource protection or public safety. The zone is intended to facilitate landscape-scale research and therefore connects each of the three major landscapes (Escalante Canyons, Kaiparowits Plateau, and Grand Staircase), as well as linking low elevation areas to higher elevations. This zone is also intended to connect primitive and undeveloped areas on surrounding lands managed by other Federal agencies (BLM 2000).

Recreation Management Units

Grand Staircase Unit

The unit is close to Kanab, Utah, and is boarded on the south by US 89, on the west by Johnson Canyon Road, on the North by Skutumpah Road and on the east by the Paria River. The unit is 211,983 acres in size and received an estimated 174,368 visitors in 2017 (BLM 2017:23C).

The unit accommodates many popular recreational uses including OHVs, outfitters and guides, backpackers, day hikers, hunting, auto touring, photographers, and commercial filming. The Nephi Pasture region is a popular destination for OHVs as the area ties into the KFO transportation system to the north and west offering extensive riding opportunities. The Eastern section of the unit encompasses part of the Paria, Hackberry WSA. The area is popular with day hikers, backpackers, equestrian users, and photographers seeking a remote and unconfined recreational experience.

The Grand Staircase Unit has one distinctive SRP operator conducting wilderness therapy programs for troubled teens and young adults. The company has been operating since 2008, and BLM is currently working to renew its SRP. The company has participated in social science research to document the impacts of therapeutic commercial operations on national conservation lands.

Overall the recreational visitation and demands are expected to increase within the unit. Recreational uses are expected to remain the same. It is expected that increased demands will create user conflicts in some areas of the unit.

Kaiparowits Unit

The unit lies within the center of GSENM and is the most remote and least visited of the GSENM management units. The unit lies between the Escalante Desert to the east, north of the Big Water region to the south, Paria River to the west and Canaan Peak and Little Valley Wash to the north. The unit is 551,117 acres in size and received an estimated 135,434 visits in 2017 (BLM 2017). This area includes the geographical area called Fiftymile Mountain including trail access points. Activities on the “Fifty” include equestrian use, backpacking, and hunting. The recreation experience is primitive, uncrowded, and remote.

The unit is largely undeveloped of recreation facilities with the exception of trailheads along Cottonwood Road and Grosvenor’s Arch on the west, and Devils Rock Garden and Dance Hall Rock on the east.

The unit has a transportation network that allows visitors to access trailheads to desirable recreational locations within the region, however; the majority of the unit is withdrawn as a

WSA providing for an unconfined recreational experience and self-discovery. Some areas such as Fiftymile Mountain only have hiking and equestrian trails for access as there are no roads.

The majority of the unit is currently withdrawn by congress as WSAs and will remain until a decision is made to designate wilderness areas or release the area from further study. WSA statues may be considered to limit access to areas within the unit; however, the area is very remote, requires planning and four-wheel drive vehicles, and offers, for all visitors, an overland trekking experience.

Escalante Canyons Unit

The unit lies on the northeast corner of GSENM and is the most visited of the three GSENM units. The unit lies between the Circle Cliffs and Glen Canyon NRA to the east, HITRR to the south and west, and Dixie National Forest to the north. The unit is 243,241 acres in size and received an estimated 566,632 visits in 2017 (BLM 2017:23C).

The Escalante Canyons are known for their unique geologic features, and specific locations such as Calf Creek Recreation Area have become destination locations. The unit has many such destination locations, including SR-12 and the scenic Hogs Back, Calf Creek Recreation Area, and the Burr Trail Scenic Backway. The area includes other high use recreational destinations that include Spencer Flat, The Gulch, The Phipps Death Hollow Instant Study Area, Deer Creek Recreation Area, and the Wolverine Petrified Wood Natural Area.

The majority of the unit is withdrawn by congress as WSAs and will remain until a decision is made to designate wilderness areas or release the area from further study. WSA statues may be considered, by some, to limit access to areas within the unit; however, the majority of the area is roadless with a few periphery roads on Spencer flat, SR-12, the Burr Trail, Harris Wash, and the Wolverine Loop.

Escalante Canyons (GSENM) and Kanab-Escalante Planning Area Units (common to both Units)

Highway 12 corridor – This area encompasses the SR-12 corridor in GSENM, and includes the Calf Creek Campground and Interpretive Trail. Activities in this SRMA include scenic driving, day-use hiking, camping, equestrian use, road bicycling, and scenic and interpretive viewing. The recreation experience will focus on learning about geology, history, archaeology, biology, and paleontology, in addition to scenic viewing. Short interpretive trails and scenic overlooks will be developed to encourage visitors to learn more about these monument resources. Opportunities will accommodate all visitors. Information stations in Boulder, Escalante, and Cannonville will disseminate educational materials to further information about these resources.

Recreational demands along SR-12 are expected to increase. New and existing recreational facilities will need to be considered to meet future public demands. Major facilities will be focused in the adjacent communities and minor facilities along the highway. BLM will work in coordination with UDOT to maintain current roadside developments as well as accommodate future public needs.

Kanab-Escalante Planning Area Unit

Circle Cliffs is to the east of the KEPA Unit and is accessed by the Burr Trail from Capitol Reef to the east and Boulder, Utah, from the west. In 1996, when GSENM was created, Circle Cliffs

were largely unknown. In 2017 the Burr Trail received 86,955 recreational visits (BLM 2017). Many visitors drive through the Circle Cliffs into Capitol Reef National Park to view the Water Pocket Fold and other features park accessed via Burr Trail. Circle Cliffs has become increasingly more popular with OHV users as the road system offers loop rides on the Wolverine Loop Road and access to the Lampstand region. Non-motorized users—which includes backpackers and hikers—use the Wolverine Loop Road to access trailheads such as Wolverine, Little Death Hollow, Silver Falls, and the Moody Canyons accessing Glen Canyon NRA.

Increased recreation activities have the potential to conflict with other land uses, such as ranching operations. It can be expected that Circle Cliffs will increase in recreational visitation in the next 5 to 10 years. Recreation facilities may be required to address user demands.

Hole-in-the-Rock Road (HITRR) corridor lies between the Escalante Canyons Unit to the northeast and the Kaiparowits Unit to the southwest. HITRR is historically known as the 1879–1880 wagon road from the San Juan Pioneer expedition to settle Fort Bluff in San Juan County.

Today HITRR is the highest traveled road in the region and provides primary access to the Escalante Canyons within the Escalante Canyons Unit (BLM) and Glen Canyon NRA (NPS). From 2000 to 2017 visitation increased from 35,160 to 95,361 equaling a 171 percent increase along the road. The road provides access to six trailheads going into Glen Canyon NRA, one Outstanding Natural Area and four historical sites, including Dance Hall Rock and the Hole-in-the-Rock site. In addition the road provides access to the popular Dry Fork slot canyons for day hikers and the Egypt canyons popular with technical canyoneers.

It can be expected that recreation visitation will increase along HITRR. BLM will need to consider a corridor management plan to support future recreation demands along the road. Facilities may include campgrounds, improved trailheads and parking areas, toilets, picnic areas, and educational and interpretive kiosks to support the historical uses and current uses on BLM managed lands. User conflicts are well documented with recreational use affecting ranching operations. Continued educational outreach will be required to reduce user conflicts.

Kanab – Escalante Region of the KEPA

This unit lies to the south and southwest of Escalante, Utah. Carcass Canyon and Death Ridge WSA make up a large portion of the region; however, the area does comprise a large area outside WSA that includes Mitchell, Coal Bed, and Horse Spring Canyons; the Little Desert; and Little Valley Wash. Presently there are informal uses occurring in the region with little management oversight. Resource impacts are documented, and it is expected additional impacts will occur without more attention given to recreational users.

Increased tourism to Escalante will likely create greater demands for mountain biking and OHV use. Mountain bikers have expressed a desire to develop trails around the town, including easily accessible trails outside of town. OHV use is growing in the region and it is expected that OHV trails should be considered for future development.

Highway 89 Corridor

This area encompasses the US 89 corridor within GSENM, including the Paria Movie Set, the old Paria townsite, and the Paria Contact Station. Activities in this SRMA include scenic driving, day-use hiking, camping, road and mountain bicycling, and scenic and interpretive viewing. The recreation experience will focus on learning about geology, history, archaeology, biology, and paleontology, in addition to scenic viewing. Short interpretive trails and scenic overlooks will be

developed to encourage visitors to learn more about these monument resources. Opportunities will accommodate all visitors. This corridor will be coordinated with the Vermilion Cliffs Highway Project.

Recreational demands along SR-12 are expected to increase. New and existing recreational facilities will need to be considered to meet future public demands. Major facilities will be focused in the adjacent communities and minor facilities along the highway. BLM will work in coordination with UDOT to maintain current roadside developments as well as accommodate future public needs.

Fiftymile Mountain

A portion of Fiftymile Mountain now lies within the KEPA Unit. The unit encompasses the Croton and Grand Bench Neck road as well as Navajo, Rogers, and Little Valley Canyons. The region receives limited visitation and lies mostly within the Fiftymile Mountain WSA.

Recreational demands in the Fiftymile Mountain area are expected to increase but to a lesser extent than other areas. Recreational facilities will need to be limited and developed only where needed to meet recreational demands. The visitor experience will be primitive, uncrowded, and remote.

Lower Cottonwood Road is in direct correlation to the Kaiparowitz Unit. In 2017 Cottonwood Road received 67,287 recreation visits. It is expected that visitation along the road will increase in the future. The sale of private land along Lower Cottonwood Road has the potential to dramatically increase user demands in the area.

Recreational demands along Cottonwood Road are expected to increase. New and existing recreational facilities will need to be considered to meet future public demands. Major facilities will be focused in the adjacent communities and minor facilities (i.e., trailheads and toilets) along the roadway. BLM will work in coordination with Kane County to maintain the roadway while accommodating future public needs.

Big Water Region

Smokey Mountain and Croton Bench Road need to consider future management in direct correlation to the Kaiparowitz Unit. Current use in the area is low; however, it is expected that visitation along the roadways will increase in the future but to a lesser extent than other areas in the region. The region provides a remote and uncrowded recreational experience and is well suited for remote overland expedition vehicle travel. User education will be important to minimize impacts to maintain the remote and unspoiled feeling of the region.

Appendix 11. National Monuments

Proclamation 6920—Establishment of the Grand Staircase-Escalante National Monument

September 18, 1996

By the President of the United States of America

A Proclamation

The Grand Staircase-Escalante National Monument's vast and austere landscape embraces a spectacular array of scientific and historic resources. This high, rugged, and remote region, where bold plateaus and multi-hued cliffs run for distances that defy human perspective, was the last place in the continental United States to be mapped. Even today, this unspoiled natural area remains a frontier, a quality that greatly enhances the monument's value for scientific study. The monument has a long and dignified human history: it is a place where one can see how nature shapes human endeavors in the American West, where distance and aridity have been pitted against our dreams and courage. The monument presents exemplary opportunities for geologists, paleontologists, archeologists, historians, and biologists.

The monument is a geologic treasure of clearly exposed stratigraphy and structures. The sedimentary rock layers are relatively undeformed and unobscured by vegetation, offering a clear view to understanding the processes of the earth's formation. A wide variety of formations, some in brilliant colors, have been exposed by millennia of erosion. The monument contains significant portions of a vast geologic stairway, named the Grand Staircase by pioneering geologist Clarance Dutton, which rises 5,500 feet to the rim of Bryce Canyon in an unbroken sequence of great cliffs and plateaus. The monument includes the rugged canyon country of the upper Paria Canyon system, major components of the White and Vermilion Cliffs and associated benches, and the Kaiparowits Plateau. That Plateau encompasses about 1,600 square miles of sedimentary rock and consists of successive south-to-north ascending plateaus or benches, deeply cut by steep-walled canyons. Naturally burning coal seams have scorched the tops of the Burning Hills brick-red. Another prominent geological feature of the plateau is the East Kaibab Monocline, known as the Cockscomb. The monument also includes the spectacular Circle Cliffs and part of the Waterpocket Fold, the inclusion of which completes the protection of this geologic feature begun with the establishment of Capitol Reef National Monument in 1938 (Proclamation No. 2246, 50 Stat. 1856). The monument holds many arches and natural bridges, including the 130-foot-high Escalante Natural Bridge, with a 100 foot span, and Grosvenor Arch, a rare "double arch." The upper Escalante Canyons, in the northeastern reaches of the monument, are distinctive: in addition to several major arches and natural bridges, vivid geological features are laid bare in narrow, serpentine canyons, where erosion has exposed sandstone and shale deposits in shades of red, maroon, chocolate, tan, gray, and white. Such diverse objects make the monument outstanding for purposes of geologic study.

The monument includes world class paleontological sites. The Circle Cliffs reveal remarkable specimens of petrified wood, such as large unbroken logs exceeding 30 feet in length. The thickness, continuity and broad temporal distribution of the Kaiparowits Plateau's stratigraphy provide significant opportunities to study the paleontology of the late Cretaceous Era. Extremely significant fossils, including marine and brackish water mollusks, turtles, crocodilians, lizards, dinosaurs, fishes, and mammals, have been recovered from the Dakota, Tropic Shale and Wahweap Formations, and the Tibbet Canyon, Smoky Hollow and John Henry members of the Straight Cliffs Formation. Within the monument, these formations have produced the only evidence in our hemisphere of terrestrial vertebrate fauna, including mammals, of the Cenomanian-Santonian ages. This sequence of rocks, including the overlaying Wahweap and Kaiparowits formations, contains one of the best and most continuous records of Late Cretaceous terrestrial life in the world.

Archeological inventories carried out to date show extensive use of places within the monument by ancient Native American culture. The area was a contact point for the Anasazi and Fremont cultures, and the evidence of this mingling provides a significant opportunity for archeological study. The cultural resources discovered so far in the monument are outstanding in their variety of cultural affiliation, type and distribution. Hundreds of recorded sites include rock art panels, occupation sites, campsites and granaries. Many more undocumented sites that exist within the monument are of significant scientific and historic value worthy of preservation for future study.

The monument is rich in human history. In addition to occupations by the Anasazi and Fremont cultures, the area has been used by modern tribal groups, including the Southern Paiute and Navajo. John Wesley Powell's expedition

did initial mapping and scientific field work in the area in 1872. Early Mormon pioneers left many historic objects, including trails, inscriptions, ghost towns such as the Old Paria townsite, rock houses, and cowboy line camps, and built and traversed the renowned Hole-in-the-Rock Trail as part of their epic colonization efforts. Sixty miles of the Trail lie within the monument, as does Dance Hall Rock, used by intrepid Mormon pioneers and now a National Historic Site.

Spanning five life zones from low-lying desert to coniferous forest, with scarce and scattered water sources, the monument is an outstanding biological resource. Remoteness, limited travel corridors and low visitation have all helped to preserve intact the monument's important ecological values. The blending of warm and cold desert floras, along with the high number of endemic species, place this area in the heart of perhaps the richest floristic region in the Intermountain West. It contains an abundance of unique, isolated communities such as hanging gardens, tinajas, and rock crevice, canyon bottom, and dunal pocket communities, which have provided refugia for many ancient plant species for millennia. Geologic uplift with minimal deformation and subsequent downcutting by streams have exposed large expanses of a variety of geologic strata, each with unique physical and chemical characteristics. These strata are the parent material for a spectacular array of unusual and diverse soils that support many different vegetative communities and numerous types of endemic plants and their pollinators. This presents an extraordinary opportunity to study plant speciation and community dynamics independent of climatic variables. The monument contains an extraordinary number of areas of relict vegetation, many of which have existed since the Pleistocene, where natural processes continue unaltered by man. These include relict grasslands, of which No Mans Mesa is an outstanding example, and pinon-juniper communities containing trees up to 1,400 years old. As witnesses to the past, these relict areas establish a baseline against which to measure changes in community dynamics and biogeochemical cycles in areas impacted by human activity. Most of the ecological communities contained in the monument have low resistance to, and slow recovery from, disturbance. Fragile cryptobiotic crusts, themselves of significant biological interest, play a critical role throughout the monument, stabilizing the highly erodible desert soils and providing nutrients to plants. An abundance of pack rat middens provides insight into the vegetation and climate of the past 25,000 years and furnishes context for studies of evolution and climate change. The wildlife of the monument is characterized by a diversity of species. The monument varies greatly in elevation and topography and is in a climatic zone where northern and southern habitat species intermingle. Mountain lion, bear, and desert bighorn sheep roam the monument. Over 200 species of birds, including bald eagles and peregrine falcons, are found within the area. Wildlife, including neotropical birds, concentrate around the Paria and Escalante Rivers and other riparian corridors within the monument.

Section 2 of the Act of June 8, 1906 (34 Stat. 225, 16 U.S.C. 431) authorizes the President, in his discretion, to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States to be national monuments, and to reserve as a part thereof parcels of land, the limits of which in all cases shall be confined to the smallest area compatible with the proper care and management of the objects to be protected.

Now, Therefore, I, William J. Clinton, President of the United States of America, by the authority vested in me by section 2 of the Act of June 8, 1906 (34 Stat. 225, 16 U.S.C. 431), do proclaim that there are hereby set apart and reserved as the Grand Staircase-Escalante National Monument, for the purpose of protecting the objects identified above, all lands and interests in lands owned or controlled by the United States within the boundaries of the area described on the document entitled "Grand Staircase-Escalante National Monument" attached to and forming a part of this proclamation. The Federal land and interests in land reserved consist of approximately 1.7 million acres, which is the smallest area compatible with the proper care and management of the objects to be protected.

All Federal lands and interests in lands within the boundaries of this monument are hereby appropriated and withdrawn from entry, location, selection, sale, leasing, or other disposition under the public land laws, other than by exchange that furthers the protective purposes of the monument. Lands and interests in lands not owned by the United States shall be reserved as a part of the monument upon acquisition of title thereto by the United States.

The establishment of this monument is subject to valid existing rights.

Nothing in this proclamation shall be deemed to diminish the responsibility and authority of the State of Utah for management of fish and wildlife, including regulation of hunting and fishing, on Federal lands within the monument.

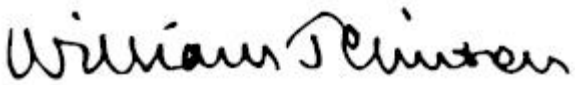
Nothing in this proclamation shall be deemed to affect existing permits or leases for, or levels of, livestock grazing on Federal lands within the monument; existing grazing uses shall continue to be governed by applicable laws and regulations other than this proclamation.

Nothing in this proclamation shall be deemed to revoke any existing withdrawal, reservation, or appropriation; however, the national monument shall be the dominant reservation.

The Secretary of the Interior shall manage the monument through the Bureau of Land Management, pursuant to applicable legal authorities, to implement the purposes of this proclamation. The Secretary of the Interior shall prepare, within 3 years of this date, a management plan for this monument, and shall promulgate such regulations for its management as he deems appropriate. This proclamation does not reserve water as a matter of Federal law. I direct the Secretary to address in the management plan the extent to which water is necessary for the proper care and management of the objects of this monument and the extent to which further action may be necessary pursuant to Federal or State law to assure the availability of water.

Warning is hereby given to all unauthorized persons not to appropriate, injure, destroy, or remove any feature of this monument and not to locate or settle upon any of the lands thereof.

In Witness Whereof, I have hereunto set my hand this eighteenth day of September, in the year of our Lord nineteen hundred and ninety-six, and of the Independence of the United States of America the two hundred and twenty-first.



WILLIAM J. CLINTON

Proclamation 9682 of December 4, 2017

Modifying the Grand Staircase-Escalante National Monument

By the President of the United States of America

A Proclamation

In Proclamation 6920 of September 18, 1996, and exercising his authority under the Act of June 8, 1906 (34 Stat. 225) (the ''Antiquities Act''), President William J. Clinton established the Grand Staircase-Escalante National Monument in the State of Utah, reserving approximately 1.7 million acres of Federal lands for the care and management of objects of historic and scientific interest identified therein. The monument is managed by the Department of the Interior's Bureau of Land Management (BLM). This proclamation makes certain modifications to the monument.

Proclamation 6920 identifies a long list of objects of historic or scientific interest within the boundaries of the monument. In the 20 years since the designation, the BLM and academic researchers have studied the monument to better understand the geology, paleontology, archeology, history, and biology of the area.

The Antiquities Act requires that any reservation of land as part of a monument be confined to the smallest area compatible with the proper care and management of the objects of historic or scientific interest to be protected. Determining the appropriate protective area involves examination of a number of factors, including the uniqueness and nature of the objects, the nature of the needed protection, and the protection provided by other laws.

Proclamation 6920 identifies the monument area as rich with paleontological sites and fossils, including marine and brackish water mollusks, turtles, crocodilians, lizards, dinosaurs, fishes, and mammals, as well as terrestrial vertebrate fauna, including mammals, of the Cenomanian-Santonian ages, and one of the most continuous records of Late Cretaceous terrestrial life in the world. Nearly 2 decades of intense study of the monument has provided a better understanding of the areas with the highest concentrations of fossil resources and the best opportunities to discover previously unknown species. While formations like the Wahweap and Kaiparowits occur only in southern Utah and provide an important record of Late Cretaceous fossils, others like the Chinle and Morrison formations occur throughout the Colorado Plateau. The modified monument boundaries take into account this new information and, as described in more detail below, retain the majority of the high-potential areas for locating new fossil resources that have been identified within the area reserved by Proclamation 6920.

Proclamation 6920 also identifies a number of unique geological formations and landscape features within the monument boundaries. These include the Grand Staircase, White Cliffs, Vermilion Cliffs, Kaiparowits Plateau, Upper Paria Canyon System, Upper Escalante Canyons, Burning Hills, Circle Cliffs, East Kaibab Monocline, Grosvenor Arch, and Escalante Natural Bridge, all of which are retained in whole or part within the revised monument boundaries. The Waterpocket Fold, however, is located mostly within the Capitol Reef National Park and the portions within the monument are not unique or particularly scientifically significant. Therefore, the boundaries of the monument may be modified to exclude the Waterpocket Fold without imperiling the proper care and management of that formation. The more general landscape features discussed in the proclamation, such as serpentine canyons, arches, and natural bridges, are common across the Colorado Plateau both within and outside of the modified boundaries of the monument described below.

Archeological and historic objects identified within the monument are more generally discussed in Proclamation 6920, which specifically identifies only the Hole-in-the-Rock Trail, the Paria Townsite, and Dance Hall Rock as objects of historic or scientific interest, all 3 of which will remain within the revised monument boundaries, although a portion of the Hole-in-the-Rock Trail will be excluded. Proclamation 6920 also describes Fremont and Ancestral Puebloan rock art panels, occupation sites, campsites, and granaries, as well as historic objects such as those left behind by Mormon pioneers, including trails, inscriptions, ghost towns, rock houses, and cowboy line camps. These are artifacts that are known to generally occur across the Four Corners region, particularly in southern Utah, and the examples found within the monument are not, as described, of any unique or distinctive scientific or historic significance. In light of the prevalence of similar objects throughout the region, the existing boundaries of the monument are not ''the smallest area compatible with the proper care'' of these objects, and they may be excluded from the monument's boundaries. Further, many of these objects or examples of these objects are retained within the modified boundaries described below.

Finally, with respect to the animal and plant species, Proclamation 6920 characterizes the area as one of the richest floristic regions in the Intermountain West, but it identifies only a few specific species as objects of scientific or

historic interest. The revised boundaries contain the majority of habitat types originally protected by Proclamation 6920.

Thus, many of the objects identified by Proclamation 6920 are not unique to the monument, and some of the particular examples of those objects within the monument are not of significant historic or scientific interest. Moreover, many of the objects identified by Proclamation 6920 are not under threat of damage or destruction such that they require a reservation of land to protect them; in fact, many are already subject to Federal protection under existing law and agency management designations. The BLM manages nearly 900,000 acres of lands within the existing monument as Wilderness Study Areas, which the BLM is already required by law to manage so as not to impair the suitability of such areas for future congressional designation as Wilderness.

A host of laws enacted after the Antiquities Act provide specific protection for archaeological, historic, cultural, paleontological, and plant and animal resources and give authority to the BLM to condition permitted activities on Federal lands, whether within or outside a monument. These laws include the Archaeological Resources Protection Act of 1979, 16 U.S.C. 470aa– 470mm, National Historic Preservation Act, 54 U.S.C. 300101 et seq., Bald and Golden Eagle Protection Act, 16 U.S.C. 668–668d, Endangered Species Act of 1973, 16 U.S.C. 1531 et seq., Federal Cave Resources Protection Act of 1988, 16 U.S.C. 4301 et seq., Federal Land Policy and Management Act of 1976, 43 U.S.C. 1701 et seq., Migratory Bird Treaty Act, 16 U.S.C. 703–712, Native American Graves Protection and Repatriation Act of 1976, 25 U.S.C. 3001 et seq., and Paleontological Resources Preservation Act, 16 U.S.C. 470aaa–470aaa–11. Of particular note, the Paleontological Resources Preservation Act, enacted in 2009, imposes criminal penalties for unauthorized excavation, removal, damage, alteration, or defacement of paleontological resources. Federal land management agencies can grant permits authorizing excavation or removal, but only when undertaken for the purpose of furthering paleontological knowledge. The Archaeological Resources Protection Act contains very similar provisions protecting archeological resources. And the Migratory Bird Treaty Act and Endangered Species Act protect migratory birds and listed endangered and threatened species and their habitats.

Especially in light of the research conducted since designation, I find that the current boundaries of the Grand Staircase-Escalante National Monument established by Proclamation 6920 are greater than the smallest area compatible with the protection of the objects for which lands were reserved and, therefore, that the boundaries of the monument should be reduced to 3 areas: Grand Staircase, Kaiparowits, and Escalante Canyons. These revisions will ensure that the monument is no larger than necessary for the proper care and management of the objects.

The Grand Staircase area is named for one of the iconic landscapes in the American West. An unbroken sequence of cliffs and plateaus, considered to be the most colorful exposed geologic section in the world, has inspired wonder in visitors since the days of early western explorers.

The White Cliffs that rise more than 1,500 feet from the desert floor are the hardened remains of the largest sand sea that ever existed. The deep red Vermilion Cliffs, once the eastern shore of the ancient Lake Dixie, contain a rich fossil record from the Late Triassic period to the early Jurassic period, including petrified wood, fish, dinosaur, and other reptilian bones. Fossil footprints are also common, including those at the Flag Point tracksite, which includes dinosaur fossil tracks adjacent to a Native American rock art panel depicting dinosaur tracks. This area also contains a number of relict vegetative communities occurring on isolated mesa tops, an example of which, No Mans Mesa, was identified in Proclamation 6920.

The archaeology of the Grand Staircase area is dominated by sites constructed by the Virgin Branch of the Ancestral Puebloans—ancient horticulturalists and farmers who subsisted largely on corn, beans, and squash, and occupied the area from nearly 2000 B.C.E. to about 1250 C.E. The landscape was also the home of some of the earliest corn-related agriculture in the Southwest, and it continues to hold remnants of these early farmsteads and small pueblos. The evidence of this history, including remnants of the beginning of agriculture, development of prehistoric farming systems, and the final abandonment of the area, is concentrated in the lower levels of the Grand Staircase. The higher cliffs, benches, and plateaus hold evidence of occupation by Archaic and Late Prehistoric people, including Clovis and other projectile points and residential pit structures that indicate occupation by hunter-gatherers starting about 13,000 years ago.

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Clovis and other projectile points and residential pit structures that indicate occupation by hunter-gatherers starting about 13,000 years ago.

The Kaiparowits area is dominated by a dissected mesa that rises thousands of feet above the surrounding terrain. These vast, rugged badlands are characterized by towering cliffs and escarpments that expose tiers of fossil-rich formations.

In addition to striking scenery, the area is world-renowned for rich fossil resources, including 16 species that have been found nowhere else. The plateau is considered one of the best, most continuous records of Late Cretaceous life in the world. It includes fossils of mollusks, reptiles, dinosaurs, fishes, and mammals, as well as the only evidence in our hemisphere of terrestrial vertebrate fauna from the Cenomanian through Santonian ages. Since 2000, nearly 4,000 new fossil sites have been documented on the plateau. The Dakota, Tropic Shale, Wahweap, and Kaiparowits formations in the area have been found to contain numerous important fossils, including those of early mammals and reptiles (Dakota); marine reptiles, including 5 species of plesiosaur and North America's oldest mosasaur (Tropic Shale); and multiple new species of dinosaurs (Wahweap and Kaiparowits), including the Diabloceratops eatoni, a relative of the Triceratops named for its devil-like horns, and the Lythronax argestes, whose name means ''Gore King of the Southwest.''

The Kaiparowits area also includes objects of geologic interest, which Proclamation 6920 identified. The rugged canyons and natural arches of the Upper Paria River expose the colorful and varied Carmel and Entrada formations that draw visitors to the area. One of the most famous arches, Grosvenor Arch, is a rare double arch that towers more than 150 feet above the desert floor. The area also contains ''hydrothermal-collapse'' pipes and dikes that have revealed to researchers a fascinating story of a geologic catastrophe triggered by either a massive earthquake or an asteroid impact.

The western side of the Kaiparowits area includes the majority of the East Kaibab Monocline, which features an erosional ''hogback'' known as the ''Cockscomb,'' as well as broad exposures of multicolored rocks and intricate canyons. It is considered one of the true scenic and geologic wonders of the area. On the east side of the plateau, the scorched earth of the Burning Hills is a geologic curiosity: a vast underground coal seam that some researchers believe has been burning for eons, sending acrid smoke up through vents in the ground and turning the hillsides brick red. Finally, along the eastern edge of the Kaiparowits Plateau is a series of oddly shaped arches and other rock formations known as the Devil's Garden.

The Kaiparowits area also contains a unique record of human history. The overall archaeology of the Kaiparowits Plateau is dominated by Archaic and Late Prehistoric era sites. There are, however, a few important sites that tell the story of occupation first by the Fremont, who came from an area to the east, and later by Virgin and Kayenta Ancestral Puebloans. These sites show new types of architecture and pottery that mixed traditional Fremont and Ancestral Puebloan styles. Prehistoric cliff structures in parts of the Kaiparowits Plateau are well preserved and provide researchers and visitors an opportunity to better understand the apparently peaceful mixture of 3 cultures starting in the early 1100s. In particular, the Fifty-Mile Mountain area contains hundreds of cultural resource sites, including Ancestral Puebloan habitations, granaries, and masonry structures.

Historical use of the Kaiparowits area plays a very important part in the rich ranching history of southern Utah, which is evidenced by a complex pattern of roads, stock trails, line shacks, attempted farmsteads, and small mining operations. Fifty-Mile Mountain, in particular, contains a number of historic cabins, as well as other evidence of pioneer living, including ruins, rip-gut fences, and historic trails. It is believed that Zane Grey used the Fifty-Mile Mountain area as a landscape reference point when he wrote ''Wild Horse Mesa.'' There are also a number of historic signature panels across the plateau that document continued grazing and ranching use of the landscape by multiple generations of the same families.

To the east of Fifty-Mile Mountain in the Escalante Desert, Dance Hall Rock stands out as an important landmark of Mormon pioneers. While the Hole-in-the-Rock Trail was under construction in 1879, Mormon pioneers camped in this area and held meetings and dances here. Similarly, as described above, the old Paria Townsite is an important ghost town within the Kaiparowits area, as it served as the only town and post office site within the area at the turn of the 20th century.

The Escalante Canyons area likewise contains objects of significance. The canyonlands of the area provide a fantastic display of geologic activities and erosional forces that, over millions of years, created a network of deep, narrow canyons, high plateaus, sheer cliffs, and beautiful sandstone arches and natural bridges, including the 130-foot-tall Escalante Natural Bridge. Additionally, this area boasts Calf Creek Canyon, a canyon of red alcoved walls with expanses of white slickrock that is named for its use as a natural cattle pen at the end of the 19th century.

To the east of the Canyonlands, Circle Cliffs is a breached anticline with spectacular painted-desert scenery, the result of exposed sedimentary rocks of the Triassic Chinle and Moenkopi formations. The Circle Cliffs area also contains large, unbroken petrified logs up to 30 feet in length. A nearly complete articulated skeleton of Poposauras—a rare bipedal crocodilian fossil—was also found here.

The Escalante Canyons area also contains a high density of Fremont prehistoric sites, including pithouses, villages, storage cysts, and rock art. The canyon of the Escalante River and its tributary canyons contain one of the highest densities of rock art sites in southwestern Utah outside of Capitol Reef National Park, with sites dating from the Archaic to the Historic periods. The Hundred Hands rock art panel is located in the river canyon, and is spiritually significant to all tribes that claim ancestry in the area.

There are also significant historic sites in this area related to grazing and ranching, along with the Boulder Mail Trail, which was used to ferry mail between the small desert outpost towns of Escalante and Boulder beginning in 1902. Today, much of the trail is still visible, and it has become popular with backpackers.

The areas described above are the smallest compatible with the proper care and management of the objects to be protected. The Grand StaircaseEscalante National Monument, as modified by this proclamation, will maintain and protect those objects and preserve the area's cultural, scientific, and historic legacy.

WHEREAS, Proclamation 6920 of September 18, 1996, established the Grand Staircase-Escalante National Monument in the State of Utah and reserved approximately 1.7 million acres of Federal lands for the care and management of the objects of historic and scientific interest identified therein; and

WHEREAS, many of the objects identified by Proclamation 6920 are otherwise protected by Federal law; and

WHEREAS, it is in the public interest to modify the boundary of the monument to exclude from its designation and reservation approximately 861,974 acres of land that I find are no longer necessary for the proper care and management of the objects to be protected within the monument; and

WHEREAS, the boundaries of the monument reservation should therefore be reduced to the smallest area compatible with the protection of the objects of scientific or historic interest, as described above in this proclamation;

NOW, THEREFORE, I, DONALD J. TRUMP, President of the United States of America, by the authority vested in me by section 320301 of title 54, United States Code, hereby proclaim that the boundary of the Grand StaircaseEscalante National Monument is hereby modified and reduced to those lands and interests in lands owned or controlled by the Federal Government within the boundaries described on the accompanying map, which is attached to and forms a part of this proclamation. I hereby further proclaim that the modified monument areas identified on the accompanying map shall be known as the Grand Staircase, Kaiparowits, and Escalante Canyons units of the monument. These reserved Federal lands and interests in lands cumulatively encompass approximately 1,003,863 acres. The boundaries described on the accompanying map are confined to the smallest area compatible with the proper care and management of the objects to be protected. Any lands reserved by Proclamation 6920 not within the boundaries identified on the accompanying map are hereby excluded from the monument. At 9:00 a.m., eastern standard time, on the date that is 60 days after the date of this proclamation, subject to valid existing rights, the provisions of existing withdrawals, and the requirements of applicable law, the public lands excluded from the monument reservation shall be open to:

(1) entry, location, selection, sale or other disposition under the public land laws;
(2) disposition under all laws relating to mineral and geothermal leasing; and
(3) location, entry, and patent under the mining laws.

Appropriation of lands under the mining laws before the date and time of restoration is unauthorized. Any such attempted appropriation, including attempted adverse possession under 30 U.S.C. 38, shall vest no rights against the United States. Acts required to establish a location and to initiate a right of possession are governed by State law where not in conflict with Federal law.

Nothing in this proclamation shall be construed to revoke, modify, or affect any withdrawal, reservation, or appropriation, other than the one created by Proclamation 6920.

Nothing in this proclamation shall change the management of the areas designated and reserved by Proclamation 6920 that remain part of the monument in accordance with the terms of this proclamation, except as provided by the following 5 paragraphs:

Paragraph 14 of Proclamation 6920 is updated and clarified to require that the Secretary of the Interior (Secretary) prepare and maintain a management plan for each of the 3 units of the monument with maximum public involvement including, but not limited to, consultation with federally recognized tribes and State and local governments. The Secretary, through the BLM, shall also consult with other Federal land management agencies in the local area in developing the management plans.

Proclamation 6920 is amended to provide that the Secretary shall maintain one or more advisory committees under the Federal Advisory Committee Act (5 U.S.C. App.) to provide information and advice regarding the development of the above-described management plans, and, as appropriate, management of the monument. Any advisory committee maintained shall consist of a fair and balanced representation of interested stakeholders, including State and local governments, tribes, recreational users, local business owners, and private landowners.

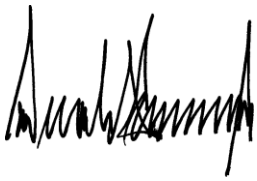
Proclamation 6920 is clarified to provide that, consistent with protection of the objects identified above and other applicable law, the Secretary may allow motorized and non-mechanized vehicle use on roads and trails existing immediately before the issuance of Proclamation 6920 and maintain roads and trails for such use.

Paragraph 12 of Proclamation 6920 governing livestock grazing in the monument is hereby modified to read as follows: ''Nothing in this proclamation shall be deemed to affect authorizations for livestock grazing, or administration thereof, on Federal lands within the monument. Livestock grazing within the monument shall continue to be governed by laws and regulations other than this proclamation.''

Proclamation 6920 is amended to clarify that, consistent with the care and management of the objects identified above, the Secretary may authorize ecological restoration and active vegetation management activities in the monument.

If any provision of this proclamation, including its application to a particular parcel of land, is held to be invalid, the remainder of this proclamation and its application to other parcels of land shall not be affected thereby.

IN WITNESS WHEREOF, I have hereunto set my hand this fourth day of December, in the year of our Lord two thousand seventeen, and of the Independence of the United States of America the two hundred and forty-second.



Grand Staircase-Escalante National Monument

The Antiquities Act of 1906 grants the President authority to designate national monuments to protect "objects of historic or scientific interest." Since 1906, Presidents and Congress have designated more than 125 national monuments, 27 of which are maintained by BLM. The Antiquities Act makes multiple references to "objects," which include "objects of antiquity" and "objects of historic or scientific interest." Objects are listed in the proclamation or enabling legislation and may include cultural artifacts or features, historic structures, paleontological or geological features, specific plant or animal species or habitats, and other resources. BLM has generally interpreted objects as discrete physical items. A national monument may also have less tangible values, such as provision of opportunities for research. BLM is required to manage monuments for the proper care and management of the objects of historic and scientific interest for which they were designated. Courts have upheld that BLM has discretion to determine, to a certain degree and within reason, which items listed in a proclamation are the actual objects to be protected. BLM has not established a process or policy on identification of monument objects. In practice, interdisciplinary teams analyze the proclamation and determine the objects, usually as part of a land use planning process or in advance of an analysis under NEPA.

On September 18, 1996, President William J. Clinton signed Presidential Proclamation 6920 establishing the 1.7-million-acre GSENM. On April 26, 2017, President Donald Trump signed Executive Order 13792, which directed the Secretary of the Interior to review certain National Monuments designated under the Antiquities Act, including GSENM, to ensure that certain monument designations were made in accordance with the requirements and original objectives of the Act and appropriately balance the protection of landmarks, structures, and objects against the use of Federal lands and the effects on surrounding lands and communities.

Following completion of the monument review process, on December 4, 2017, President Trump signed Proclamation 9682 modifying the boundaries of GSENM, creating three separate monument units, known as the Grand Staircase, Kaiparowits, and Escalante Canyons Units.

This document contains a summary of the scientific and historic objects within the Grand Staircase, Kaiparowits, and Escalante Canyons Units of GSENM.

Description of Monument Boundary Changes

In May 1998, Secretary of the Interior Babbitt and Utah Governor Leavitt negotiated a land exchange to transfer all SITLA lands within the original GSENM to the Federal government, as well as the trust lands in the National Forests, National Parks, and Indian Reservations in Utah. On October 31, 1998, President Clinton signed the Utah Schools and Lands Exchange Act (Public Law 105-335), which legislated this exchange. The Utah Schools and Lands Exchange Act resulted in the addition of 176,699 acres of SITLA lands and 24,000 acres of mineral interest to GSENM.

On October 31, 1998, President Clinton also signed Public Law 105-355. Section 201 of this law adjusted the boundary of GSENM by including certain lands (a 1-mile-wide strip north of Church Wells and Big Water) and excluding certain other lands around the communities of Henrieville, Cannonville, Tropic, and Boulder. This law resulted in the addition of approximately 5,546 acres to GSENM.

In 2009, Public Law 111-11, Section 2604 codified a boundary change and purchase for Turnabout Ranch, removing approximately 25 acres from GSENM.

On December 4, 2017, Proclamation 9682 modified GSENM, dividing it into three units and resulting in the exclusion of approximately 900,000 acres from the boundaries. The modified monument encompasses approximately 1,003,863 acres. The Grand Staircase, Kaiparowits, and Escalante Canyons Units are reserved for the care and management of the objects of historic and scientific interest.

BLM Policies for National Monuments

BLM's monuments are managed as part of the National Landscape Conservation System, whose mission is to conserve, protect, and restore nationally significant landscapes recognized by the president or congress for their outstanding ecological, cultural, or scientific resources and values.

According to BLM policy (Manual 6220) and Federal court precedent, FLPMA mandates BLM to manage public lands for multiple use and sustained yield includes managing specially-designated public lands for the purposes for which they were designated.

BLM's objective in managing a national monument is to:

A. Comply with the presidential proclamations by conserving, protecting, and restoring the objects and values for which the monument was designated for the benefit of present and future generations.

B. Effectively manage valid existing rights and compatible uses within a monument.

C. Manage discretionary uses within a monument to ensure the protection of the objects and values for which the monument was designated.

D. Utilize science, local knowledge, partnerships, and volunteers to effectively manage a monument.

E. Provide appropriate recreational opportunities, education, interpretation, and visitor services to enhance the public's understanding and enjoyment of a monument.

BLM is also required to inventory and monitor the objects and values for which a monument was designated. Identification of the location and extent of such objects and values is critically important, as BLM must ensure the compatibility of any uses within a monument with protection of objects and values.

Objects and Values

A summary of identified objects within the Grand Staircase, Kaiparowits, and Escalante Canyons Units of GSENM are provided below.

Grand Staircase Unit

The Grand Staircase Unit is named for one of the iconic landscapes in the American West. An unbroken sequence of cliffs and plateaus, considered to be the most colorful exposed geologic section in the world, has inspired wonder in visitors since the days of early western explorers

Archaeological, Historic, and Cultural Resources

Archaeological resources within Grand Staircase Unit encompass both prehistoric and historic sites. Prehistoric sites range in age from the Archaic period to the Late Prehistoric, but are dominated by sites associated with the Virgin Branch of Ancestral Puebloans. Among the variety of sites are abundant rock art panels, occupation sites, ceremonial sites, and countless other sites and artifacts. Historic sites include inscriptions, trails, townsites, and cowboy line shacks.

Objects
General objects
• Small pueblos
• Clovis and other projectile points
• Residential pit structures
• Historic trails and roads
• Cowboy line shacks
• Early farmsteads
• Rock houses
• Abandoned townsites
Specific cultural, archaeological, and historic objects
• Sites constructed by the Virgin Branch of the Ancestral Puebloans
• Native American rock art panel depicting dinosaur tracks
• Old Paria townsite and movie set

Geological Features and Landscapes

The geological features of Grand Staircase Unit are vast and austere, and include scenic panoramic views and the colorful "Grand Staircase," the high, rugged, and remote region where bold plateaus and multi-hued cliffs run for distances that defy human perspective.

Objects
Specific objects
• White Cliffs – high white or yellow cliffs of Navajo Sandstone, varying in height from 600 feet at Deer Springs Point bench to 1,200 feet at Deer Springs Point and the Sheep Creek-Bull Valley Gorge-Paria River confluence. Also a component of the famous ascending staircase, cliff, and terrace physiography.
• The Vermillion, White, and Pink Cliffs, which contain Triassic, Jurassic, and Cretaceous formations
• Numerous unnamed arches and natural bridges
• Upper Paria Watershed
○ Developed and undeveloped springs
○ Starlight Arch
• Petrified wood deposits
• Kaiparowits Plateau (portions that extend onto the Grand Staircase Unit)
○ Mollie's Nipple (erosional remnant)

Paleontological Resources

Many trace and skeletal fossils are found in the early Mesozoic formations of the area that record the early breakup of the supercontinent Pangea and the rise of the dinosaurs.

Objects
Specific objects • Flag Point dinosaur tracks • Late Triassic to Early Jurassic petrified wood, fish, dinosaur, and other reptilian bones and trackways preserved in the Moenave, Kayenta, and Navajo formations • Triassic vertebrate fossils in the Chinle Formation

Biological and Ecological Resources and Processes

The Grand Staircase Unit is home to two major riparian areas, the Paria River and Johnson's Creek. It is also home of the famous Paunsaugunt deer herd. The unit contains numerous relict and fragile plant communities and hosts threatened, endangered, and sensitive species.

Objects

General objects
• Diversity of unique vegetation communities
• Unique relict plant community of pinyon-juniper and sagebrush-grass park vegetation accessible
• High concentration of isolated communities: hanging gardens, tinajas, canyon bottom, dunal pockets, salt-pocket, and rock crevice communities
• Cryptobiotic soil crusts
• High abundance of packrat middens
Specific objects
• Contains sensitive and endemic plants
• Special status species and habitat including peregrine falcon (threatened) and bald eagles
• Paria River
  ○ Paria River riparian corridor and associated biotic resources including neo-tropical birds
  ○ Mexican spotted owl protected activity center
  ○ Designated critical habitat for the southwestern willow flycatcher (endangered)
• Johnson's Creek
  ○ Riparian corridor with elevational gradient connecting desert lowlands to the high country
• Upper Paria Watershed
  ○ No Man's Mesa and Little No Man's Mesa
  ○ Unique relict plant community of pinyon-juniper and sagebrush-grass park vegetation

Kaiparowits Unit

The Kaiparowits Unit is dominated by a dissected mesa that rises thousands of feet above the surrounding terrain. These vast, rugged badlands are characterized by towering cliffs and escarpments that expose tiers of fossil-rich formations. In addition to striking scenery, the area is world-renowned for rich fossil resources, including at least 16 species of dinosaurs that have been found nowhere else. The plateau is considered to hold one of the best, most continuous records of Late Cretaceous terrestrial life in the world.

Archaeological, Historic, and Cultural Resources

Archaeological resources within the Kaiparowits Unit encompass a wide range of sites, prehistoric and historic structures, rock art panels, ancient cliff dwellings, ceremonial sites, and countless other sites and artifacts. The overall archaeology of the Kaiparowits Unit is dominated by Archaic and Late Prehistoric era sites. The area was first occupied by the Fremont, followed by the Virgin and Kayenta Ancestral Puebloans. Hundreds of documented sites and over 8,000 years of prehistory are represented.

Objects
General objects
• Archaic era sites
• Late Prehistoric era sites
• Prehistoric cliff structures
• Cultural resource sites
• Ancestral Puebloan habitations
• Granaries
• Masonry structures
• Historic roads
• Stock trails
• Cowboy line shacks
• Attempted farmsteads
• Small mining operations
• Historic cabins
• Ruins
• Rip-gut fences
• Historic trails
• Historical signature panels
Specific cultural, archaeological, and historic objects
• Old Paria townsite and movie set
• Dance Hall Rock
• Fiftymile Mountain archaeological district area, containing Ancestral Puebloan habitations, granaries, and masonry structures as well as a number of historic cabins, ruins, rip-gut fences, and historic trails

Geological Features and Landscapes

The geological features of Kaiparowits Units are unique and widespread throughout the Kaiparowits Plateau, including the East Kaibab Monocline in addition to hoodoos, natural arches, and other sandstone formations.

Objects

General objects

- Gray Cliffs
- Kaiparowits Badlands (The Blues)
- Straight Cliffs escarpment
- Rugged canyons, arches, and natural bridges
- "Hydrothermal-collapse" pipes and dikes that reveal a geologic catastrophe triggered by either a massive earthquake or an asteroid impact
- Upper Paria River – Carmel and Entrada formations
- Twenty-four undeveloped springs and six developed springs

Specific objects

- Sam Pollock Arch, Window Wind Arch, and other arches and natural bridges
- Hackberry Canyon – petrified wood deposits, perennial water, geological features, and stunning scenery
- Dry Valley Creek Canyon – a waterfall blocks the entrance to Dry Valley Creek Canyon; consequently, the canyon remains in its natural condition. A perennial stream cuts through alluvial benches.
- The Cockscomb (erosional hogback) forms two parallel knife-edged ridges with a bisected V-shaped trough. Flatirons, small monoliths, and other colorful formations are present on the west ridge.
- Grosvenor Arch – a double arch towering over 150 feet
- Fiftymile Mountain is a complex of deep canyons, upwarps, monoclines, liogbacks, and a spectacular 42-mile-long Straight Cliffs wall, topping a 1,000-foot-high cliff line of the Summerville, Morrison, and Dakota formations.
- Devils Garden – oddly shaped arches and rock formations
- Right Hand Collet Canyon – ancient coal fires have left surface remains in the form of clinkers and deep red ash.
- Window Wind Arch – scenic value because of its location on the very edge of the Straight Cliffs
- Burning Hills -naturally occurring underground coal fires have turned steep and rugged exposed hilltops a distinctive red. The red coloration in the landscape is the result of geological changes attributed to the naturally occurring coal fires.
- Henrieville Creek Fold
- High scenic quality and intense coloration of Paria River Valley, Pilot Canyon, Starlight Canyon, Kirbys Point, upper Paradise Canyon, and Eight Mile Pass
- High scenic value includes the breaks of the Rush Beds and the west wall of Cottonwood Canyon, upper tributaries to Hackberry Canyon, Death Valley Draw, and the exceptional Navajo Sandstone domes and fin formations on either side of lower Hackberry Canyon.
- Sand-calcite crystals from the Morrison Formation

Paleontological Resources

The Kaiparowits Unit contains the richest fossil deposits in the entire region. It includes fossils of plants (including petrified wood), mollusks and other invertebrates, trace fossils, fishes, diverse reptiles, dinosaurs, and mammals, as well as some of the only evidence in our hemisphere of terrestrial vertebrate life from the Cenomanian through Santonian ages. The Kaiparowits Unit is of interest in understanding the evolution of dinosaurs, mammals and other terrestrial vertebrates. It contains unique evidence bearing on the early diversification of important mammalian groups of the Late Cretaceous. The thickness, continuity, and broad temporal distribution of the Kaiparowits sequence provides the opportunity to document

changes in terrestrial vertebrate assemblages over a wide span of Late Cretaceous time. The fossil resources of the region are of global significance to researchers.

Objects

- Gray Cliffs – a sequence of rocks that may contain one of the best and most continuous records of Late Cretaceous terrestrial life in the world
- Extremely significant fossils including marine and brackish water mollusks, turtles, crocodilians, lizards, dinosaurs, fishes, and mammals have been recovered from the Naturita (formerly Dakota) formation, Tropic Shale, Straight Cliffs Formation, Wahweap Formation, and Kaiparowits Formation.
  - Naturita Formation contains rare early fossil turtles, crocodiles, mammals and other reptiles, and mammals.
  - Tropic Shale contains marine reptiles, including five species of plesiosaur and North America's oldest mosasaur.
  - Straight Cliffs Formation contains rare mammal and reptile (including dinosaur) fossils.
  - Wahweap and Kaiparowits formations contain dozens of new and unique fossil species of dinosaurs, turtles, mammals, fish, lizards, and crocodilians, many of which are found in exceptionally preserved states that include soft tissue.

Biological and Ecological Resources and Processes

The elevation gradient and juxtaposition of different ecosystems and substrates supports a broad diversity of plants, animals, communities, and ecosystems. The unit contains the largest number of Mexican spotted owl protected activity centers and stands of ponderosa pines. There are several threatened, endangered, or sensitive species.

Objects

General objects

- Intact ecological values
- Diversity of unique vegetation communities
- Isolated relict vegetation communities
- Elevational gradients
- Hanging gardens, tinajas, canyon bottom, dunal pockets, salt-pocket, and rock crevice communities
- Cryptobiotic soil crusts

Specific objects

- Several Mexican spotted owl protected activity centers
- Kodachrome bladderpod (endangered) and Ute ladies tresses (threatened)
- Large number of sensitive and endemic plant species
- Peregrine falcon (endangered) and special status animal species
- Fourmile Bench Old Tree Area – a unique area of extremely old (1,400 years) pinyon and juniper trees
- Cockscomb hogback including high diversity of both general and endemic flora
- Dry Valley – relict plant community in the upper part
- Fiftymile Mountain – special status species and aspen groves
- Wahweap – special status species
- Mud Spring – relict plant communities, ponderosa pine stands, and special status species
- Burning Hills – high density of nesting raptors
- Upper Paria River – riparian corridor and associated biotic resources, including neo-tropical birds
- Carcass Canyon – exceptional raptor habitat

Escalante Canyons Unit

The Escalante Canyons Unit contains a variety of objects of significance. The canyonlands of the area provide a fantastic display of geologic activities and erosional forces that, over millions of years, created a network of deep, narrow canyons, high plateaus, sheer cliffs, and beautiful sandstone arches and natural bridges. The unit contains a high density of Fremont prehistoric sites, including pithouses, villages, storage cysts, and rock art panels. The unit also contains the largest amount of perennial water of the three units, providing for a wider diversity of plant and animal life.

Archaeological, Historic, and Cultural Resources

Archaeological resources within the Escalante Canyon Unit include numerous sites and several historic features. This unit contains artifacts from pioneer Mormon exploration, early homesteading, and use by the Virgin and Kayenta Ancestral Puebloans and Fremont cultures, as well as a Paleoarchaic and Late Prehistoric presence.

Objects
General objects
• Pithouses
• Villages
• Storage cysts
• Rock art
• Archaic period sites
• Historic sites
Specific objects
• Hundred Hands Rock Art Panel
• Boulder Mail Trail
• Escalante-Boulder telephone line
• Old Boulder Road
• Escalante River Canyon rock art sites
• North Escalante Canyons known and recorded cultural sites
• Phillips-Death Hollow known and recorded cultural sites

Geological Features and Landscapes

The geological features of the Escalante Canyons Unit are vast and rugged, including sheer cliffs, benches, entrenched canyons with perennial water, waterfalls, and significantly colorful features. These features are of outstanding scenic quality and attract large volumes of visitors.

Objects

General objects

- White Canyon cuts through the Kaibab Limestone to the Coconino Sandstone, the oldest stratum in the Upper Escalante drainage.
- Perennial streams enter entrenched canyons in white Navajo and deep-red Wingate Sandstone.
- Other deep narrow canyons, high plateaus, sheer cliffs, sandstone arches, and natural bridges

Specific objects

- Escalante Natural Bridge
- Lamanite Natural Bridge – actually a large arch with good symmetry and form
- Calf Creek Canyon is characterized by red alcoved walls, two waterfalls, and extensive expanses of white slickrock.
- Lower Calf Creek Falls drop 126 feet and Upper Calf Creek Falls drop 86 feet.
- Upper Gulch-Circle Cliffs – contains large, unbroken logs of petrified wood
    - Four Outstanding Natural Areas designated to preserve "unique scenic values and natural wonders":
        - North Escalante Canyon (5,800 acres)
        - The Gulch (3,430)
        - Escalante Canyons (480 acres)
        - Phipps-Death Hollow (34,288 acres)
- Iron concretions known as Moqui Marbles in the Spencer Flat area
- Outstanding scenic value and geologically complex nature of North Escalante Canyons,and Harris Wash
- Deer Creek, Steep Creek, and The Gulch have perennial flows of clear, cold water.
- North Escalante Canyon and The Gulch Instant Study Area contain a unique canyon and bench system and have outstanding scenery.
- Escalante River Canyon – an area of diverse geology represented by spectacular deep canyons. The canyon walls are rough and broken and the canyon is narrow and meanders. Pure white to golden sandstone has been eroded into expanses of slickrock. The extensive upper basin through which Mamie Creek flows is an extremely dissected area of canyons, tanks, other formations. Red layers of Carmel Formation cap high mesas and ledges of the exposed Kayenta Formation.
- Escalante River and its tributary canyons contain one of the highest densities of rock art sites.
- The Gulch – deeply entrenched, very sheer, red, straight-line Wingate Sandstone walls. High ridges and slickrock peaks. Ridges drop fairly abruptly to canyons below.
- Circle Cliffs –inward-facing walls of sandstone that rim an oval depression; a breached anticline with spectacular painted desert scenery. It also contains large, unbroken petrified logs.

Paleontological Resources

The Circle Cliffs area contains large exposures of the highly fossiliferous Chinle Formation, which contains an important Late Triassic Age terrestrial fossil record that includes plants, invertebrates, reptiles, and tracks.

Objects

General objects

- Terrestrial fossils in the Chinle Formation

Specific objects

- Poposaurus specimen from north of the Wolverine Trailhead area.

Biological and Ecological Resources and Processes

The Escalante Canyons Unit encompasses a large portion of the Escalante River watershed and supports native fish; threatened, endangered, and sensitive plant and animal species; and gallery cottonwood riparian corridors. The unit has premier visitor destinations, which have the potential to affect some of the biological and ecological resources and processes.

Objects
General objects
• Intact ecological values
• Diversity of unique and endemic vegetation communities
• Isolated relict vegetation communities
• Elevational gradients
• Hanging gardens, tinajas, canyon bottom, dunal pockets, salt-pocket, and rock crevice communities
• Cryptobiotic soil crusts
Specific objects
• Perennial streams enter entrenched canyons in white Navajo and deep-red Wingate Sandstone.
• Deer Creek, Steep Creek, and The Gulch have perennial flows of clear, cold water.
• Contains many different geologic substrates (and, therefore, soils with different physical and chemical attributes) in a small area. The majority of endemic species in Utah are found on these particular substrates; consequently, this area is expected to have a high concentration of endemic species.
• Jones cycladenia (threatened) and Ute ladies'-tresses (threatened)

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Glossary & Abbreviations-Acronyms

Glossary

A

Acquisition. BLM acquires land, easements, and other real property rights when it is in the public interest and consistent with approved land use plans. BLM's land acquisition program is designed to: (1) improve management of natural resources through consolidation of Federal, State and private lands; (2) increase recreational opportunities, preserve open space, and/or ensure accessibility of public lands; (3) secure key property necessary to protect habitat for threatened and endangered species, promote high-quality riparian areas, and promote biological diversity; (4) preserve archaeological and historical resources; and (5) implement specific acquisitions authorized by Acts of Congress.

Activity Plan. A type of implementation plan (see *Implementation Plan*); an activity plan usually describes multiple projects and applies best management practices to meet land use plan objectives. Examples of activity plans include interdisciplinary management plans, habitat management plans, recreation area management plans, and allotment management plans (from H-1601-1, BLM Land Use Planning Handbook).

Actual Use. The amount of animal unit months consumed by livestock based on the numbers of livestock and grazing dates submitted by the livestock operator and confirmed by periodic field checks by BLM.

Air Quality. A measure of the health-related and visual characteristics of the air, often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances. Refers to standards for various classes of land as designated by the Air Pollution Control Act of 1955, the Clean Air Act of 1963, as amended, and the Air Quality Act of 1967.

All-Terrain Vehicle (ATV). A wheeled or tracked vehicle, other than a snowmobile or work vehicle, designed primarily for recreational use or for the transportation of property or equipment exclusively on undeveloped roads, trails, marshland, open country, or other unprepared surfaces (from BLM National Management Strategy for OHV Use on Public Lands).

Allotment. An area of land designated and managed for livestock grazing (43 CFR 4100.0-5) (from H-4180-1, BLM Rangeland Health Standards Manual).

Allotment Management Plan. A document prepared in consultation with the grazing lessees or permittees involved, which applies to livestock operations on the public lands and which: (1) prescribes the manner in, and extent to, which livestock operations will be conducted in order to meet the multiple-use, sustained-yield, economic, and other needs and objectives as determined for the lands by the Secretary concerned; (2) describes the type, location, ownership, and general specifications for the range improvements to be installed and maintained on the lands to meet the livestock grazing and other objectives of land management; and (3) contains such other provisions relating to livestock grazing and other objectives found by the Secretary concerned to be consistent with the provisions of the Federal Land Policy and Management Act and other applicable law (from FLPMA, Title 43 Chapter 35 Subchapter I 1702(k)).

Analysis of the Management Situation (AMS). Assessment of the current management direction. It includes a consolidation of existing data needed to analyze and resolve identified issues, a description of current BLM management guidance, and a discussion of existing problems and opportunities for solving them.

Animal Unit Month (AUM). A standardized measurement of the amount of forage necessary for the sustenance of one cow unit or its equivalent for 1 month. About 800 pounds of useable air-dried forage.

Appropriate Management Response (AMR). The response to a wildland fire based on an evaluation of risks to firefighter and public safety, the circumstances under which the fire occurs, including weather and fuel conditions, natural and cultural resource management objectives, protection priorities, and values to be protected. The evaluation must also include an analysis of the context of the specific fire within the overall local, geographic area, or national wildland fire situation.

Areas of Critical Environmental Concern (ACECs). Areas 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 (from FLPMA, Title 43 Chapter 35 Subchapter I 1702(a)).

Assessment. The act of evaluating and interpreting data and information for a defined purpose (from H-1601-1, BLM Land Use Planning Handbook).

Authorized Officer. The Federal employee who has the delegated authority to make a specific decision.

Avoidance Area. Areas with sensitive resource values where rights-of-way and Section 302 permits, leases, and easements would be strongly discouraged. Authorizations made in avoidance areas would have to be compatible with the purpose for which the area was designated and not be otherwise feasible on lands outside the avoidance area.

B

Back Country Byways. Vehicle routes that traverse scenic corridors utilizing secondary or backcountry road systems. National Back Country Byways are designated by the type of road and vehicle needed to travel the byway.

Benefits-Based Recreation. A management framework, philosophy, or approach to providing recreation and trail resources, facilities, and programs that focuses on identifying the economic, environmental, and social benefits to target recreation users. This management approach builds upon existing activity, facility, or demographic group orientations, but focuses on the outcomes or changes in the target groups.

Best Management Practices (BMPs). A suite of techniques that guide, or may be applied to, management actions to aid in achieving desired outcomes. BMPs are often developed in conjunction with land use plans, but they are not considered a land use plan decision unless the land use plan specifies that they are mandatory. They may be updated or modified without a plan amendment if they are not mandatory (from H-1601-1, BLM Land Use Planning Handbook).

Big Game. Indigenous ungulate wildlife species that are hunted, such as elk, deer, bison, bighorn sheep, and pronghorn.

C

Candidate Species. Taxa for which the U.S. Fish and Wildlife Service has sufficient information on their status and threats to support proposing the species for listing as endangered or threatened under the Endangered Species Act but for which issuance of a proposed rule is currently precluded by higher-priority listing actions. Separate lists for plants, vertebrate animals, and invertebrate animals are published periodically in the *Federal Register* (from M-6840, Special Status Species Manual).

Closed. Generally denotes that an area is not available for a particular use or uses; refer to specific definitions found in law, regulations, or policy guidance for application to individual programs. For example, 43 Code of Federal Regulations (CFR) 8340.0-5 sets forth the specific meaning of "closed" as it relates to off-highway vehicle use, and 43 CFR 8364 defines "closed" as it relates to closure and restriction orders (from H-1601-1, BLM Land Use Planning Handbook).

Code of Federal Regulations (CFR). The official codification of the current, general, and permanent regulations of Federal government activities.

Collaboration. A cooperative process in which interested parties, often with widely varied interests, work together to seek solutions with broad support for managing public and other lands (from H-1601-1, BLM Land Use Planning Handbook).

Collaborative Partnerships or Collaborative Stewardship. Refers to people working together, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks (from H-1601-1, BLM Land Use Planning Handbook).

Conformance. Means that a proposed action shall be specifically provided for in the land use plan or, if not specifically mentioned, shall be clearly consistent with the goals, objectives, or standards of the approved land use plan (from H-1601-1, BLM Land Use Planning Handbook).

Conservation Agreement. A formal written document agreed to by the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service and another Federal agency, State agency, local government, or the private sector to achieve the conservation of candidate species or other special status species through voluntary cooperation. It documents the specific actions and responsibilities for which each party agrees to be accountable. The objective of a conservation agreement is to reduce threats to a special status species or its habitat. An effective conservation agreement may lower species' listing priority or eliminate the need for listing (from M-6840, Special Status Species Manual).

Conservation Strategy. A strategy outlining current activities or threats that are contributing to the decline of a species, along with the actions or strategies needed to reverse or eliminate such a decline or threats. Conservation strategies are generally developed for species of plants and animals that are designated as Bureau sensitive species or that have been determined by the U.S. Fish and Wildlife Service or National Oceanic and Atmospheric Administration Fisheries to be Federal candidates under the Endangered Species Act (from H-1601-1, BLM Land Use Planning Handbook).

Consistency. Means that the proposed land use plan does not conflict with officially approved plans, programs, and policies of tribes, other Federal agencies, and State and local governments (to the extent practical within Federal law, regulation, and policy) (from H-1601-1, BLM Land Use Planning Handbook).

Cooperating Agency. Assists the lead Federal agency in developing an environmental assessment or environmental impact statement. The Council on Environmental Quality regulations implementing the National Environmental Policy Act (NEPA) define a cooperating agency as any agency that has jurisdiction by law or special expertise for proposals covered by NEPA (40 Code of Federal Regulations 1501.6). Any Federal, State, or local government jurisdiction with such qualifications may become a cooperating agency by agreement with the lead agency (from H-1601-1, BLM Land Use Planning Handbook).

Council on Environmental Quality. An advisory council to the President of the United States established by the National Environmental Policy Act of 1969. It reviews Federal programs to analyze and interpret environmental trends and information.

Critical Habitat. (1) The specific areas within the geographical area currently occupied by a species, at the time it is listed in accordance with the Endangered Species Act, on which are found those physical or biological features (i) essential to the conservation of the species and (ii) that may require special management considerations or protection, and (2) specific areas outside the geographical area occupied by a species at the time it is listed upon determination by the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service that such areas are essential for the conservation of the species. Critical habitats are designated in 50 Code of Federal Regulations Parts 17 and 226. The constituent elements of critical habitat are those physical and biological features of designated or proposed critical habitat essential to the conservation of the species (from M-6840, Special Status Species Manual).

Crucial Value Habitat. Any particular range or habitat component that directly limits a community, population, or subpopulation to reproduce and maintain itself at a certain level over the long term. Those sensitive use areas that, because of limited abundance and/or unique qualities, constitute irreplaceable critical requirements for high-interest wildlife. This may also include highly sensitive habitats, including fragile soils that have little or no reclamation potential. Restoration or replacement of these habitats may not be possible. Examples include: the most crucial (critical) summer and/or winter range or concentration areas; critical movement corridors; breeding and rearing complexes; spawning areas; developed wetlands; Class 1 and 2 streams, lake, ponds or reservoirs; and riparian habitats critical to high-interest wildlife.

Crucial Winter Range. The portion of the winter range to which a wildlife species is confined during periods of heaviest snow cover.

Cryptobiotic Crust. Biological communities that form a surface layer or crust on some soils. These communities consist of cyanobacteria (blue-green bacteria), micro fungi, mosses, lichens, and green algae and perform many important functions, including fixing nitrogen and carbon, maintaining soil surface stability, and preventing erosion. Cryptobiotic crusts also influence the nutrient levels of soils and the status and germination of plants in the desert. These crusts are slow to recover after severe disturbance.

Cultural Resource or Cultural Property. A definite location of human activity, occupation, or use identifiable through field inventory (survey), historical documentation, or oral evidence. The

term includes archaeological, historic, or architectural sites, structures, or places with important public and scientific uses, and may include definite locations (sites or places) of traditional cultural or religious importance to specified social and/or cultural groups. Cultural resources are concrete, material places and things that are located, classified, ranked, and managed through the system of identifying, protecting, and utilizing for public benefit (from M-8100-1, BLM Cultural Resources Management).

Cultural Resource Inventory Classes. (See BLM Manual Section 8110.21.) Class I – existing data inventory. A study of published and unpublished documents, records, files, registers, and other sources resulting in analysis and synthesis of all reasonably available data. Class I inventories encompass prehistoric, historic, and ethnological/sociological elements, and are in large part chronicles of past land uses. They may have major relevance to current land use decisions. Class II – sampling field inventory. A statistically based sample survey designed to help characterize the probable density, diversity, and distribution of archaeological properties in a large area by interpreting the results of surveying limited and discontinuous portions of the target area. Class III – intensive field inventory. A continuous, intensive survey of an entire target area, aimed at locating and recording all archaeological properties that have surface indications, by walking close-interval parallel transects until the area has been thoroughly examined. Class III methods vary geographically, conforming to the prevailing standards for the region involved (from M-8100-1, BLM Cultural Resources Management).

Cultural Resource Management Plan. A plan designed to inventory, evaluate, protect, preserve, or make beneficial use of cultural resources and the natural resources that figured significantly in cultural systems. The objectives of such plans are the conservation, preservation, and protection of cultural values and the scientific study of those values.

Cumulative Effect. The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time (from H-1790-1, BLM NEPA Handbook).

D

Desert Land Entry. The Desert Land Act (March 3, 1877) was passed by Congress to encourage and promote the economic development of the arid and semiarid public lands of the western United States. Through the act, individuals may apply for a desert-land entry to reclaim, irrigate, and cultivate arid and semiarid public lands.

Designated Roads and Trails. Specific roads and trails identified by BLM (or other agencies) where some type of motorized vehicle use is appropriate and allowed either seasonally or year-long (from H-1601-1, BLM Land Use Planning Handbook).

Dispersed or Extensive Recreation. Recreation activities of an unstructured type that are not confined to specific locations or dependent on recreation sites. Examples of these activities may be hunting, fishing, off-road vehicle use, hiking, and sightseeing.

Disposal. Transfer of public land out of Federal ownership to another party through sale, exchange, Recreation and Public Purposes Act, Desert Land Entry, or other land law statutes.

E

Easement. An interest in land entitling the owner or holder, as a matter or right, to enter upon land owned by another party for a particular purpose.

Ecological Site Description. Description of the soils, uses, and potential of a kind of land with specific physical characteristics to produce distinctive kinds and amounts of vegetation.

Ecological Site Inventory. The basic inventory of present and potential vegetation on BLM rangelands. Ecological sites are differentiated on the basis of significant differences in kind, proportion, or amount of plant species in the plant community. Ecological site inventory uses soils, the existing plant community, and ecological site data to determine the appropriate ecological site for a specific area of rangeland and to assign the appropriate ecological status.

Ecological Succession. An ecosystem's gradual evolution to a stable state or climax. If through the ability of its populations and elements, an ecosystem can absorb changes, it tends to persist and become stable through time.

Eligibility. Qualification of a river for inclusion into the National Wild and Scenic Rivers System through the determination (professional judgment) that it is free flowing and, with its adjacent land area, possesses at least one river-related value considered to be outstandingly remarkable (from M-8351, BLM WSR Policy and Program).

Endangered Species. Any species that is in danger of extinction throughout all or a significant portion of its range (from M-6840, Special Status Species Manual).

Environmental Assessment (EA). (a) A concise public document for which a Federal agency is responsible that serves to: (1) briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact; (2) aid an agency's compliance with the National Environmental Policy Act when no environmental impact statement is necessary; (3) facilitate preparation of a statement when one is necessary. (b) Shall include brief discussions of the need for the proposal, of alternatives as required by section 102(2)(E), of the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted (from H-1790-1, BLM NEPA Handbook).

Environmental Impact Statement (EIS). A detailed statement prepared by the responsible official in which a major Federal action that would significantly affect the quality of the human environment is described, alternatives to the proposed action provided, and effects analyzed (from BLM National Management Strategy for OHV Use on Public Lands).

Ephemeral Stream. A stream that flows only in direct response to precipitation, and whose channel is at all times above the water table. Ephemeral streams generally do not flow continuously for more than 30 days and generally have more robust upland vegetation than found outside of the ephemeral riparian-wetland area (DOI 1998).

Executive Order (EO). An EO is a Presidential directive with the force of law. It does not need congressional approval. The Supreme Court has upheld EOs as valid either under the general constitutional grant of executive powers to the President or if authority for it was expressly granted to the President by Congress. Congress can repeal or modify an EO by passing a new law; however, it must be signed by the President or his veto overridden.

Extensive Recreation Management Area (ERMA). A public lands unit identified in land use plans containing all acreage not identified as a Special Recreation Management Area. Recreation management actions within an ERMA are limited to only those of a custodial nature.

F

Facies. A lateral or vertical variation in the lithologic or paleontologic characteristics of a geologic formation that differs as a group from that elsewhere in the same formation. It is caused by or reflects a change in the depositional environments (Stokes 1986; Skinner and Porter 1992).

Federal Lands. As used in this document, lands owned by the United States, without reference to how the lands were acquired or what Federal agency administers the lands. The term includes mineral estates or coal estates underlying private surface but excludes lands held by the United States in trust for Indians, Aleuts, or Eskimos (see also *Public Land*).

Federal Land Policy and Management Act (FLPMA) (of 1976). Public Law 94-579, October 21, 1976, often referred to as BLM's "Organic Act," which provides the majority of BLM's legislated authority, direction policy, and basic management guidance (from BLM National Management Strategy for OHV Use on Public Lands).

***Federal Register*.** A daily publication that reports Presidential and Federal agency documents (from BLM National Management Strategy for OHV Use on Public Lands).

Fire Management Plan (FMP). A strategic implementation-level plan that defines a program to manage wildland fire, fuel reduction, and fire rehabilitation based on an area's approved Resource Management Plan. FMPs must address a full range of fire management activities that support ecosystem sustainability, values to be protected, protection of firefighter and public safety, public health, and environmental issues. They must be consistent with resource management objectives and activities of the area.

Fluid Minerals. Oil, gas, coal bed natural gas, and geothermal resources.

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

Functioning at Risk (FAR). (1) Condition in which vegetation and soil are susceptible to losing their ability to sustain naturally functioning biotic communities. Human activities, past or present, may increase the risks. (2) Uplands or riparian-wetland areas that are properly functioning, but a soil, water, or vegetation attribute makes them susceptible to degradation and lessens their ability to sustain natural biotic communities. Uplands are particularly at risk if their soils are susceptible to degradation. Human activities, past or present, may increase the risks. See also *Properly Functioning Condition* (from H-4180-1, BLM Rangeland Health Standards Manual).

G

Geographic Information System (GIS). A system of computer hardware, software, data, people, and applications that capture, store, edit, analyze, and graphically display a potentially wide array of geospatial information (from H-1601-1, BLM Land Use Planning Handbook).

Goal. A broad statement of a desired outcome; usually not quantifiable and may not have established time frames for achievement (from H-1601-1, BLM Land Use Planning Handbook).

Guideline. A practice, method, or technique determined to be appropriate to ensure that standards can be met or that significant progress can be made toward meeting the standard. Guidelines are tools such as grazing systems, vegetative treatments, or improvement projects that help managers and permittees achieve standards. Guidelines may be adapted or modified when monitoring or other information indicates the guideline is not effective, or a better means of achieving the applicable standard becomes appropriate (from H-4180-1, BLM Rangeland Health Standards Manual).

H

Habitat. The place where an organism (plant or animal) lives. There are four major divisions of habitat, namely terrestrial, freshwater, estuarine, and marine (from M-6840, Special Status Species Manual).

Habitat Management Plan (HMP). An officially approved activity plan for a specific geographic area of public land. An HMP identifies wildlife habitat and related objectives, defines the sequence of actions to be implemented to achieve the objectives, and outlines procedures for evaluating accomplishments.

High-Value Habitat. Any particular habitat that sustains a community, population, or subpopulation. Intensive use areas that because of relatively wide distribution do not constitute crucial (Utah Division of Wildlife Resources critical) values but are highly important to high-interest wildlife. This may also include moderately sensitive habitats of high-interest species that have low reclamation potential. Includes Class 3 streams, lakes, ponds, or reservoirs. Reconstruction or enhancement of these areas may be possible, but should be avoided if not possible. Examples include: less crucial (critical) but more widely distributed summer and/or winter ranges; important feeding areas; areas of high wildlife diversity and/or density of high-interest species; natural wetlands; and all other riparian areas.

Hydrology. The science dealing with the properties, distribution, and circulation of water.

I

Impacts (or effects). Environmental consequences (the scientific and analytical basis for comparison of alternatives) as a result of a proposed action. Effects may be either direct, which are caused by the action and occur at the same time and place, or indirect, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable, or cumulative (from BLM National Management Strategy for OHV Use on Public Lands).

Implementation Decisions. Decisions that take action to implement land use plan decisions; generally appealable to the Interior Board of Land Appeals under 43 Code of Federal Regulations 4.410. (from H-1601-1, BLM Land Use Planning Handbook).

Implementation Plan. A sub-geographic or site-specific plan written to implement decisions made in a land use plan. Implementation plans include both activity plans and project plans (they are types of implementation plans) (from H-1601-1, BLM Land Use Planning Handbook).

Indian Tribe (or tribe). Any Indian group in the conterminous United States that the Secretary of the Interior recognizes as possessing tribal status (listed periodically in the *Federal Register*) (from H-1601-1, BLM Land Use Planning Handbook).

Indicators. Components of a system whose characteristics (presence or absence, quantity, distribution) are used as an index of an attribute (e.g., rangeland health attribute) that are too difficult, inconvenient, or expensive to measure (Interagency Technical Reference 1734-8, 2000) (from H-4180-1, BLM Rangeland Health Standards Manual).

Interdisciplinary Team. Staff specialists representing identified skill and knowledge needs working together to resolve issues and provide recommendations to an authorized officer (from H-4180-1, BLM Rangeland Health Standards Manual).

Interior Board of Land Appeals. The Department of the Interior, Office of Hearings and Appeals board that acts for the Secretary of the Interior in responding to appeals of decisions on the use and disposition of public lands and resources. Because the Interior Board of Land Appeals acts for and on behalf of the Secretary of the Interior, its decisions usually represent the Department of the Interior's final decision but are subject to the courts.

Intermittent or Seasonal Stream. A stream that flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow in mountainous areas. Generally, intermittent streams flow continuously for periods of at least 30 days and usually have visible vegetation or physical characteristics reflective of permanent water influences, such as the presence of cottonwoods (DOI 1998)

Interrupted Streams. Streams with discontinuities in surface flow along a streambed. These streams may have obligate wetland vegetation, hydric soils, and indicators of permanent water influences. Ephemeral streams generally lack obligate wetland vegetation and hydric soils.

L

Land Tenure Adjustments. Ownership or jurisdictional changes are referred as "Land Tenure Adjustments." To improve the manageability of BLM-administered surface land and improve their usefulness to the public, BLM has numerous authorities for "repositioning" lands into a more consolidated pattern, disposing of lands, acquiring lands, and entering into cooperative management agreements. These land pattern improvements are completed primarily through the use of land exchanges, but also through land sales, land acquisitions, jurisdictional transfers to other agencies, and the use of cooperative management agreements and leases.

Land Use Allocation. The identification in a land use plan of the activities and foreseeable development that are allowed, restricted, or excluded for all or part of the Decision Area, based on desired future conditions (from H-1601-1, BLM Land Use Planning Handbook).

Land Use Plan (LUP). A set of decisions that establish management direction for land within an administrative area, as prescribed under the planning provisions of the Federal Land Policy and Management Act; an assimilation of LUP-level decisions developed through the planning process outlined in 43 Code of Federal Regulations 1600, regardless of the scale at which the decisions were developed. The term includes both Resource Management Plans and Management Framework Plans (from H-1601-1, BLM Land Use Planning Handbook).

Land Use Plan Amendment. The process for considering or making changes in the terms, conditions, and decisions of approved Resource Management Plans or Management Framework Plans. Usually only one or two issues are considered that involve only a portion of the Decision Area (from H-1601-1, BLM Land Use Planning Handbook).

Land Use Plan Decision. Establishes desired outcomes and actions needed to achieve them. Decisions are reached using the planning process in 43 Code of Federal Regulations 1600. When they are presented to the public as proposed decisions, they can be protested to the BLM Director. They are not appealable to the Interior Board of Land Appeals (from H-1601-1, BLM Land Use Planning Handbook).

Lease. An authorization or contract by which one party conveys the use of property to another party in return for rental payments, Section 302 of the Federal Land Policy and Management Act of 1976 provides BLM's authority to issue leases for the use, occupancy, and development of the public lands. Leases are issued for purposes such as communication sites, parks, and other recreational facilities. The regulations establishing procedures for the processing of these leases are found in 43 Code of Federal Regulations 2920 and 2740.

Lease Stipulation. A modification of the terms and conditions on a lease form at the time of the lease sale.

Leasable Minerals. Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920, as amended. They include coal, phosphate, asphalt, sulfur, potassium, sodium minerals, oil, and gas.

Lek. An assembly area where birds, especially sage-grouse, carry on display and courtship behavior.

Limited. An area restricted at certain times, in certain areas, and/or to certain vehicular use. These restrictions may be of any type, but can generally be accommodated within the following type of categories: numbers of vehicles; types of vehicles; time or season of vehicle use; permitted or licensed use only; use on existing roads and trails; use on designated roads and trails; and other restrictions (from BLM National Management Strategy for OHV Use on Public Lands).

Limited Value Habitat. Habitat that is abundant and not essential to sustain a community, population, or subpopulation. Occasional use areas that are either sparsely populated or that show sporadic or unpredictable use by high-interest wildlife. These areas have limited reclamation potential. Wildlife may be displaced due to the common occurrence of these habitats. Examples include: year-long deer range of low habitat quality; Class 5 and 6 streams, lakes, ponds or reservoirs; and low-quality habitat in juxtaposition to areas of higher wildlife values.

Limits of Acceptable Change. A framework for establishing acceptable and appropriate resource and social conditions in recreation settings. A system of management planning.

Locatable Minerals. Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

Low-Value Habitat. Habitat that is abundant and not essential to sustain a community, population, or subpopulation.

M

Management Decision. A decision made by BLM to manage public lands. Management decisions include both land use plan decisions and implementation decisions (from H-1601-1, BLM Land Use Planning Handbook).

Management Opportunities. A component of the analysis of the management situation; actions or management directions that could be taken to resolve issues or management concerns.

Mineral. A naturally formed chemical element or compound having a definite chemical composition and, usually, a characteristic crystal form. A mineral is generally considered to be inorganic, though organic compounds are classified as minerals by some (American Geological Institute 1974). The term is also sometimes informally used to refer to resources such as oil, gas, coal, and stone that are derived from the Earth.

Mineral Entry. The filing of a claim on public land to obtain the right to any locatable minerals it may contain.

Mineral Materials. Materials such as sand and gravel and common varieties of stone, pumice, pumicite, and clay that are not obtainable under the mining or leasing laws, but that can be acquired under the Materials Act of 1947, as amended.

Mining Claim. A parcel of land that a miner takes and holds for mining purposes, having acquired the right of possession by complying with the Mining Law and local laws and rules. A mining claim may contain as many adjoining locations as the locator may make or buy. There are four categories of mining claims: lode, placer, millsite, and tunnel site.

Mitigation. A method or process by which impacts from actions may be made less injurious to the environment through appropriate protective measures. 40 Code of Federal Regulations 1508.20 further defines mitigation as: (1) avoiding the impact altogether by not taking a certain action or parts of an action; (2) minimizing an impact by limiting the degree or magnitude of the action and its implementation; (3) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (4) reducing or eliminating the impact over time by preservation and maintenance; and/or (5) compensating for the impact by replacing or providing substitute resources or environments.

Moderate Value Habitat. Any particular habitat that is common or of intermediate importance.

Monitoring (Plan Monitoring). The process of tracking the implementation of land use plan decisions and collecting and assessing data/information necessary to evaluate the effectiveness of land use planning decisions (from H-1601-1, BLM Land Use Planning Handbook).

Multiple Use. The management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific, and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output (from FLPMA, Title 43 Chapter 35 Subchapter I 1702(c)).

N

National Environmental Policy Act (NEPA) (of 1969). NEPA establishes policy, sets goals (section 101), and provides means (section 102) for carrying out the policy. Section 102(2) contains "action-forcing" provisions to make sure that Federal agencies act according to the letter and spirit of the act. The President, Federal agencies, and the courts share responsibility for enforcing the act so as to achieve the substantive requirements of section 101.

National Register of Historic Places (NRHP). The NRHP, expanded and maintained by the Secretary of the Interior, as authorized by section 2(b) of the Historic Sites Act and section 101(a)(1)(A) of the National Historic Preservation Act. The NRHP lists cultural properties found to qualify for inclusion because of their local, State, or national significance. Eligibility criteria and nomination procedures are found in 36 Code of Federal Regulations Part 60. The Secretary's administrative responsibility for the NRHP is delegated to the National Park Service (from M-8100-1, BLM Cultural Resources Management).

National Wild and Scenic River System. A system of nationally designated rivers and their immediate environments that have outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, and other similar values and are preserved in a free-flowing condition. The system consists of three types of streams: (1) recreation—rivers or sections of rivers that are readily accessible by road or railroad and that may have some development along their shorelines and may have undergone some impoundments or diversion in the past, (2) scenic—rivers or sections of rivers free of impoundments with shorelines or watersheds still largely undeveloped but accessible in places by roads, and (3) wild—rivers or sections of rivers free of impoundments and generally inaccessible except by trails, with watersheds or shorelines essentially primitive and waters unpolluted.

Naturalness. Lands and resources exhibit a high degree of naturalness when affected primarily by the forces of nature and where the imprint of human activity is substantially unnoticeable. BLM has authority to inventory, assess, and/or monitor the attributes of the lands and resources on public lands, which, taken together, are an indication of an area's naturalness. These attributes may include the presence or absence of roads and trails, fences, and other improvements; the nature and extent of landscape modifications; the presence of native vegetation communities; and the connectivity of habitats (from IM-2003-275, Change 1, Considerations of Wilderness Characteristics in LUP, Attachment 1).

No Surface Occupancy. A fluid minerals leasing constraint that prohibits occupancy or disturbance on all or part of the lease surface to protect special values or uses. Lessees may exploit the fluid mineral resources under the leases restricted by this constraint through use of directional drilling from sites outside the area.

Noxious Weed. A plant species designated by Federal or State law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or nonnative, new, or not common to the United States.

O

Objective. A description of a desired condition for a resource. Objectives can be quantified and measured and, where possible, have established time frames for achievement (from H-1601-1, BLM Land Use Planning Handbook).

Off-Highway Vehicle (OHV). Any motorized vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain, excluding: (1) any non-amphibious registered motorboat: (2) any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes; (3) any vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved; (4) vehicles in official use; and (5) any combat or combat support vehicle when used for national defense (from H-1601-1, BLM Land Use Planning Handbook).

Official Use. Use by an employee, agent, or designated representative of the Federal government or one of its contractors, in the course of his employment, agency, or representation (from BLM National Management Strategy for OHV Use on Public Lands).

Open. Generally denotes that an area is available for a particular use or uses. Refer to specific program definitions found in law, regulations, or policy guidance for application to individual programs. For example, 43 Code of Federal Regulations 8340.0-5 defines the specific meaning of "open" as it relates to off-highway vehicle use (from H-1601-1, BLM Land Use Planning Handbook).

Outstandingly Remarkable Values. Values among those listed in Section 1(b) of the Wild and Scenic Rivers Act: "scenic, recreational, geological, fish and wildlife, historical, cultural, or other similar values." Other similar values that may be considered include ecological, biological or botanical, paleontological, hydrological, scientific, or research values (from M-8351, BLM WSR Policy and Program).

P

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

Permit. A short-term, revocable authorization to use public lands for specific purposes, Section 302 of the Federal Land Policy and Management Act provides BLM's authority to issue permits for the use, occupancy, and development of the public lands. Permits are issued for purposes such as commercial or non-commercial filming, advertising displays, commercial or non-commercial croplands, apiaries, harvesting of native or introduced species, temporary or permanent facilities for commercial purposes (does not include mining claims), residential occupancy, construction equipment storage sites, assembly yards, oil rig stacking sites, mining claim occupancy if the residential structures are not incidental to the mining operation, and water pipelines and well pumps related to irrigation and non-irrigation facilities. The regulations establishing procedures for the processing of these permits are found in 43 Code of Federal Regulations 2920.

Permitted Use. The forage allocated by, or under the guidance of, an applicable land use plan for livestock grazing in an allotment under a permit or lease, expressed in animal unit months (43 Code of Federal Regulations 4100.0-5) (from H-4180-1, BLM Rangeland Health Standards Manual).

Plan of Development. A mandatory plan, developed by an applicant of a mining operation, rights-of-way, or construction project that specifies the techniques and measures to be used during construction and operation of all project facilities on public land. The plan is submitted for approval to the appropriate Federal agency before any construction begins.

Plan of Operations. A plan for mining exploration and development that an operation must submit to BLM for approval when more than 5 acres a year will be disturbed or when an operator plans to work in an area of critical environmental concern or a wilderness area. A Plan of Operations must be submitted for any new operation that began after January 20, 2001 and has production, regardless of acreage disturbed. A Plan of Operations must document in detail all actions that the operator plans to take from exploration through reclamation.

Planning Criteria. The standards, rules, and other factors developed by managers and interdisciplinary teams for their use in forming judgments about decisionmaking, analysis, and data collection during planning. Planning criteria streamline and simplify the resource management planning actions (from H-1601-1, BLM Land Use Planning Handbook).

Prescribed Fire. Any fire ignited by management action to meet specific objectives. A written approved prescribed fire plan must exist, and National Environmental Policy Act requirements must be met, prior to ignition (from H-9214-1, BLM Prescribed Fire Management Handbook).

Primitive and Unconfined Recreation. Visitors may have opportunities for primitive and unconfined types of recreation when the sights, sounds, and evidence of other people are rare or infrequent, where the use of the area is through non-motorized, non-mechanical means, and where no or minimal developed recreation facilities are encountered (from IM-2003-275, Change 1, Considerations of Wilderness Characteristics in LUP, Attachment 1).

Project Plan. A type of implementation plan (see *Implementation plan*). A project plan typically addresses individual projects or several related projects. Examples of project plans include prescribed burn plans, trail plans, and recreation site plans (from H-1601-1, BLM Land Use Planning Handbook).

Properly Functioning Condition (PFC). (1) An element of the Fundamentals of Rangeland Health for watersheds, and therefore a required element of State or regional standards and guidelines under 43 Code of Federal Regulations 4180.2(b). (2) Condition in which vegetation and ground cover maintain soil conditions that can sustain natural biotic communities. For riparian areas, the process of determining function is described in BLM Technical Reference TR 1737-9. (3) Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality; filter sediment, capture bed load, and aid floodplain development; improve floodwater retention and groundwater recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity. The functioning condition of riparian-wetland areas is influenced by geomorphic features, soil, water, and vegetation. (4) Uplands function properly when the existing vegetation and ground cover maintain soil conditions capable of sustaining natural biotic communities. The functioning condition of uplands is influenced by geomorphic features, soil, water, and vegetation. See also *Functioning at Risk* (from H-4180-1, BLM Rangeland Health Standards Manual).

Proposed Species. Species that have been officially proposed for listing as threatened or endangered by the Secretary of the Interior. A proposed rule has been published in the *Federal Register* (from M-6840, Special Status Species Manual).

Public Land. Land or interest in land owned by the United States and administered by the Secretary of the Interior through BLM without regard to how the United States acquired ownership, except lands located on the Outer Continental Shelf, and land held for the benefit of Indians, Aleuts, and Eskimos (from H-1601-1, BLM Land Use Planning Handbook).

R

Range Improvement. An authorized physical modification or treatment designed to improve production of forage; change vegetation composition; control patterns of use; provide water; stabilize soil and water conditions; and restore, protect, and improve the condition of rangeland ecosystems to benefit livestock, wild horses and burros, and fish and wildlife. The term includes, but is not limited to, structures, treatment projects, and use of mechanical devices or modifications achieved through mechanical means (43 CFR 4100.0-5) (from H-4180-1, BLM Rangeland Health Standards Manual).

Rangeland. A kind of land on which the native vegetation, climax, or natural potential consists predominantly of grasses, grass-like plants, forbs, or shrubs. Rangeland includes lands revegetated naturally or artificially to provide a non-crop plant cover that is managed like native vegetation. Rangeland may consist of natural grasslands, savannahs, shrublands, most deserts, tundra, alpine communities, coastal marshes, and wet meadows (from H-4180-1, BLM Rangeland Health Standards Manual).

Recreation and Public Purposes (R&PP) Act. The R&PP Act provided for the lease and sale of public lands determined valuable for public purposes. The objective of the R&PP Act is to meet the needs of State and local government agencies and non-profit organizations by leasing or conveying public land required for recreation and public purpose uses. Examples of uses made of R&PP lands are parks and greenbelts, sanitary landfills, schools, religious facilities, and camps for youth groups. The act provides substantial cost-benefits for land acquisition and provides for recreation facilities or historical monuments at no cost.

Recreation Opportunity Spectrum. A continuum used to characterize recreation opportunities in terms of setting, activity, and experience opportunities. The spectrum covers a range of recreation opportunities from primitive to urban. With respective to river management planning, Recreation Opportunity Spectrum represents one possible method for delineating management units or zones. See BLM Manual Section 8320 for more detailed discussion (from M-8351, BLM WSR Policy and Program).

Recreation River. Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

Relict Plant Community. A remnant or fragment of the vegetation of an area that remains from a former period when the vegetation was more widely distributed.

Research Natural Area. An area where natural processes predominate and that is preserved for research and education. Research Natural Areas must meet the relevant and important criteria of Areas of Critical Environmental Concern and are designated as Areas of Critical Environmental Concern.

Resource Advisory Council. A council established by the Secretary of the Interior to provide advice or recommendations to BLM management. In some States, provincial advisory councils

are functional equivalents of resource advisory councils (from H-1601-1, BLM Land Use Planning Handbook).

Resource Management Plan (RMP). A BLM planning document, prepared in accordance with Section 202 of the Federal Land Policy and Management Act, which presents systematic guidelines for making resource management decisions. An RMP is based on an analysis of an area's resources, its existing management, and its capability for alternative uses. RMPs are issue oriented and developed by an interdisciplinary team with public participation.

Resource Use Level. The level of use allowed within an area, based on the desired outcomes and land use allocations in the land use plan. Targets or goals for resource use levels are established on an area-wide or broad watershed level in the land use plan. Site-specific resource use levels are normally determined at the implementation level, based on site-specific resource conditions and needs as determined through resource monitoring and assessments (from H-1601-1, BLM Land Use Planning Handbook).

Right-of-Way (ROW). The public lands authorized to be used or occupied for the construction, operation, maintenance, and termination of a project, pursuant to a ROW authorization.

Riparian Area. A form of wetland transition between permanently saturated wetlands and upland areas. A riparian area is defined as an area of land directly influenced by permanent (surface or subsurface) water. Riparian areas exhibit vegetation or physical characteristics that reflect the influence of permanent surface or subsurface water. Typical riparian areas include lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels. Excluded are ephemeral streams or washes that lack vegetation and depend on free water in the soil.

S

Salable Minerals. Common variety minerals on the public lands, such as sand and gravel, which are used mainly for construction and are disposed of by sales or special permits.

Scenic Backways. Paved or unpaved routes that have roadsides or corridors of special aesthetic, cultural, or historic value in more remote, less-visited locations. The corridor may contain outstanding scenic vistas, unusual geologic features, or other intrinsic qualities such as cultural, historic, natural, recreational, and archaeological values. Scenic Backways can be designated at either the State level or by BLM during the land use planning process.

Scenic Byways. Highway routes that have roadsides or corridors of special aesthetic, cultural, or historic value. The corridor may contain outstanding scenic vistas, unusual geologic features, or other intrinsic qualities such as cultural, historic, natural, recreational, and archaeological values. Scenic Byways can be designated at either the State or the Federal level.

Scenic Quality. The relative worth of a landscape from a visual perception point of view.

Scenic River. A river or section of a river that is free of impoundments and whose shorelines are largely undeveloped but accessible in places by roads.

Scoping. An early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. This involves the participation of affected Federal, State, and local agencies, and any affected Indian tribe, the proponent of the

action, and other interested persons, unless there is a limited exception under 40 Code of Federal Regulations 1507.3I.

Section 7 Consultation. The requirement of Section 7 of the Endangered Species Act that all Federal agencies consult with the U.S. Fish and Wildlife Service or the National Marine Fisheries Service if a proposed action may affect a federally listed species or its critical habitat.

Section 106 Compliance. The requirement of Section 106 of the National Historic Preservation Act that any project funded, licensed, permitted, or assisted by the Federal government be reviewed for impacts on significant historic properties and that the State Historic Preservation Officer and the Advisory Council on Historic Preservation be allowed to comment on a project.

Sensitive Species. Those species designated by a State Director, usually in cooperation with the State agency responsible for managing the species and State natural heritage programs, as sensitive. They are those species that: (1) could become endangered in or extirpated from a State, or within a significant portion of its distribution; (2) are under status review by the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service; (3) are undergoing significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution; (4) are undergoing significant current or predicted downward trends in population or density such that federally listed, proposed, candidate, or State-listed status may become necessary; (5) typically have small and widely dispersed populations; (6) inhabit ecological refugia or other specialized or unique habitats; or (7) are State-listed but may be better conserved through application of Bureau sensitive species status (from M-6840, Special Status Species Manual).

Significant. An effect that is analyzed in the context of the proposed action to determine the degree or magnitude of importance of the effect, whether beneficial or adverse. The degree of significance can be related to other actions with individually insignificant but cumulatively significant impacts.

Spatial Management. As used in this document, intensive control of the location and level of surface disturbance that is allowed in a particular area.

Special Recreation Management Area (SRMA). A public lands unit identified in land use plans to direct recreation funding and personnel to fulfill commitments made to provide specific, structured recreation opportunities (i.e., activity, experience, and benefit opportunities). BLM recognizes three distinct types of SRMAs: destination, community, and undeveloped (from H-1601-1, BLM Land Use Planning Handbook).

Special Status Species. Includes proposed species, listed species, and candidate species under the Endangered Species Act; State-listed species; and BLM State director-designated sensitive species (see BLM Manual 6840, Special Status Species Policy) (from H-1601-1, BLM Land Use Planning Handbook).

Solitude. Visitors may have outstanding opportunities for solitude, or primitive and unconfined types of 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 (from IM-2003-275, Change 1, Considerations of Wilderness Characteristics in LUP, Attachment 1).

Standard. A description of the physical and biological conditions or degree of function required for healthy, sustainable lands (e.g., Land Health Standards). To be expressed as a desired outcome (goal) (from H-1601-1, BLM Land Use Planning Handbook).

State-Listed Species. Species listed by a State in a category implying but not limited to potential endangerment or extinction. Listing is either by legislation or regulation (from M-6840, Special Status Species Manual).

Strutting Ground. An area used by sage grouse in early spring for elaborate, ritualized courtship displays. See also *Lek*.

Substantial Value Habitats. Any particular habitat that is common or of intermediate importance. Existence areas used regularly by high-interest wildlife but have moderate levels with little or no concentrated use. These areas may also include moderately sensitive habitats of high-interest species with moderate reclamation potential. Wildlife uses may be displaced in response to development. Examples include: extensive summer and/or winter ranges receiving regular use well below carrying capacity having little potential for increase due to other limiting factors; Class 4 streams, lakes, ponds or reservoirs; and areas of moderate habitat quality.

Suppression. All the work of extinguishing or containing a fire, beginning with its discovery.

Surface Occupancy. Placement or construction on the land surface (either temporary or permanent) for more than 14 days requiring continual service or maintenance. Casual use is not included.

T

Take. Harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The term applies only to fish and wildlife (from M-6840, Special Status Species Manual).

Threatened Species. Any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (from M-6840, Special Status Species Manual).

Timing Limitation (Seasonal Restriction). A fluid minerals leasing constraint that prohibits surface use during specified time periods to protect identified resource values. The constraint does not apply to the operation and maintenance of production facilities unless analysis demonstrates that such constraints are needed and that less stringent, project-specific constraints would be insufficient.

Total Maximum Daily Load. An estimate of the total quantity of pollutants (from all sources: point, nonpoint, and natural) that may be allowed into waters without exceeding applicable water quality criteria (from H-1601-1, BLM Land Use Planning Handbook).

U

Unsuitability Criteria. Criteria of the Federal coal management program by which lands may be assessed as unsuitable for all or certain stipulated methods of coal mining.

User Day. Any calendar day, or portion thereof, for each individual accompanied or serviced by an operator or permittee on the public lands or related waters; synonymous with passenger day or participant day.

Utility. A service provided by a public utility, such as electricity, telephone, or water.

V

Valid Existing Rights (VER). Any authorization or right established. VER are established by various laws, leases, and filings made with BLM.

Visual Resources. The visible physical features of a landscape (topography, water, vegetation, animals, structures, and other features) that constitute the scenery of an area.

Visual Resource Management (VRM). The inventory and planning actions taken to identify visual values and to establish objectives for managing those values, and the management actions taken to achieve the visual management objectives.

Visual Resource Management (VRM) Classes. VRM classes define the degree of acceptable visual change within a characteristic landscape. A class is based on the physical and sociological characteristics of any given homogeneous area and serves as a management objective. There are four classes. Each class has an objective that prescribes the amount of change allowed in the characteristic landscape, as described below:

Class I: The objective for VRM Class I is to preserve the existing character of the landscape. This class provides for natural ecological changes; it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II: The objective for VRM Class II is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III: The objective for VRM Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Any changes should repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class IV: The objective for VRM Class IV is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Visual Sensitivity Levels. Measures of public concern (e.g., high, medium, low) for the maintenance of scenic quality.

W

Water Quality. The chemical, physical, and biological characteristics of water with respect to its suitability for a particular use.

Watershed. The fifth level of the hydrologic unit delineation system. A watershed is coded with 10 numerical digits, and watersheds range in size from 40,000 to 250,000 acres (from H-4180-1, BLM Rangeland Health Standards Manual).

Wild River. Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

Wilderness. A congressionally designated area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, that is protected and managed to preserve its natural conditions and that (1) generally appears to have been affected mainly by the forces of nature, with human imprints substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres or is large enough to make practical its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historic value.

Wilderness Characteristics. Features of the land associated with the concept of wilderness that specifically deal with naturalness and opportunities for solitude and primitive unconfined recreation. These characteristics may be considered in land use planning when BLM determines that those characteristics are reasonably present, of sufficient value (condition, uniqueness, relevance, importance) and need (trend, risk), and are practical to manage (from IM-2003-275, Change 1, Considerations of Wilderness Characteristics in LUP, Attachment 1).

Wilderness Study Area (WSA). Areas that have been inventoried and found to have wilderness characteristics as described in Section 603 of the Federal Land Policy and Management Act and Section 2(c) of the Wilderness Act of 1964. These areas are under study for possible inclusion as a Wilderness Area in the National Wilderness Preservation System.

Wildland Fire. Any fire, regardless of ignition source, that is burning outside of a prescribed fire and any fire burning on public lands or threatening public land resources, where no fire prescription standards have been prepared (from H-1742-1, BLM Emergency Fire Rehabilitation Handbook).

Wildland Fire Use. The management of naturally ignited wildland fires to accomplish specific pre-stated resource management objectives in pre-defined geographic areas outlined in fire management plans.

Wildland Urban Interface (WUI). The line, area, or zone in which structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

Withdrawal. Removal or withholding an area of Federal land from settlement, sale, location, or entry, under some or all of the general land laws, for the purpose of limiting activities under those laws in order to maintain other public values in the area or reserving the area for a particular public purpose or program; or transferring jurisdiction over an area of Federal land, other than "property" governed by the Federal Property and Administrative Services Act, as amended (40 United States Code 472) from one department, bureau, or agency to another department, bureau, or agency (from FLPMA, Title 43 Chapter 35 Subchapter I 1702(j)).

Woodland. A forest community occupied primarily by non-commercial species such as juniper, pinyon pine, mountain mahogany, or quaking aspen groves; all western juniper forestlands are considered woodlands, because juniper is classified as a non-commercial species.

Abbreviations-Acronyms

Term	Definition
°C	Degrees Celsius
°F	Degrees Fahrenheit
ACEC	Area of Critical Environmental Concern
AMR	Appropriate Management Response
AMS	Analysis of the Management Situation
ATV	All-terrain vehicle
AUM	Animal unit month
BLM	Bureau of Land Management
BMP	Best management practice
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DEQ	Utah Department of Environmental Quality
DOI	United States Department of the Interior
EA	Environmental Assessment
EIS	Environmental impact statement
EJ	Environmental justice
EO	Executive Order
EPA	Environmental Protection Agency
EPCA	Energy Policy and Conservation Act (of 1975)
ERMA	Extensive Recreation Management Area
ESA	Endangered Species Act (of 1973)
ESR	Emergency stabilization and rehabilitation
FAR	Functioning at risk
FLPMA	Federal Land Policy and Management Act (of 1976)
FMP	Fire Management Plan
FMU	Fire Management Unit
FRCC	Fire Regime Condition Class
GHG	Greenhouse gas
GPS	Global positioning system
GSENM	Grand Staircase-Escalante National Monument
GWP	Global warming potential
H_2S	Hydrogen sulfide
HAP	Hazardous air pollutant
HA	Herd Area
HITRR	Hole-in-the-Rock Road

Term	Definition
HMP	Habitat Management Plan
IB	Information Bulletin
IDA	International Dark Skies
IM	Instruction Memorandum
IMPROVE	Interagency Monitoring of Protected Visual Environments
IPCC	Intergovernmental Panel on Climate Change
ISA	Instant Study Area
KEPA	Kanab-Escalante Planning Area
KFO	Kanab Field Office
kV	Kilovolt
LUP	Land use plan
MMP	Monument Management Plan
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MP	Milepost
mya	Million years ago
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act (of 1969)
NH_4	Ammonium
NHPA	National Historic Preservation Act
NO_2	Nitrogen dioxide
NO_3	Nitrate
NOAA	National Oceanic and Atmospheric Administration
NO_X	Nitrogen oxides
NPS	National Park Service
NRA	National Recreation Area
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NVCS	National Vegetation Classification System
O_3	Ozone
OHV	Off-highway vehicle
OSNHT	Old Spanish National Historic Trail
PAC	Protected activity center
PEIS	Programmatic Environmental Impact Statement
PFC	Proper functioning condition (of riparian/wetland areas)
PFYC	Potential Fossil Yield Classification
PHMA	Priority Habitat Management Area
$PM_{2.5}$	Particulate matter less than 2.5 microns in diameter
PM_{10}	Particulate matter less than 10 microns in diameter

Term	Definition
PSD	Prevention of Significant Deterioration
R&PP	Recreation and Public Purposes
REA	Rapid Ecoregional Assessment
RMIS	Recreation Management Information System
RMP	Resource Management Plan (BLM land use plan under FLPMA)
ROW	Right-of-way
SHPO	State Historic Preservation Officer
SITLA	School and Institutional Trust Lands Administration
SMP	Smoke Management Plan
SO_2	Sulfur dioxide
SO_4	Sulfate
SO_X	Sulfur oxides
SR-	State Route
SRMA	Special Recreation Management Area
SRP	Special Recreation Permit
SWReGAP	Southwest Regional Gap Analysis Project
TCP	Traditional Cultural Property
TDS	Total dissolved solids
TMP	Travel Management Plan
U.S.C.	United States Code
UDAQ	Utah Division of Air Quality
UDOT	Utah Department of Transportation
UDWR	Utah Division of Wildlife Resources
UGS	Utah Geological Survey
US	United States Highway
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VER	Valid existing rights
VOC	Volatile organic compound
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WSA	Wilderness Study Area
WSR	Wild and Scenic River
WUI	Wildland Urban Interface