NATIONAL CONSERVATION LANDS

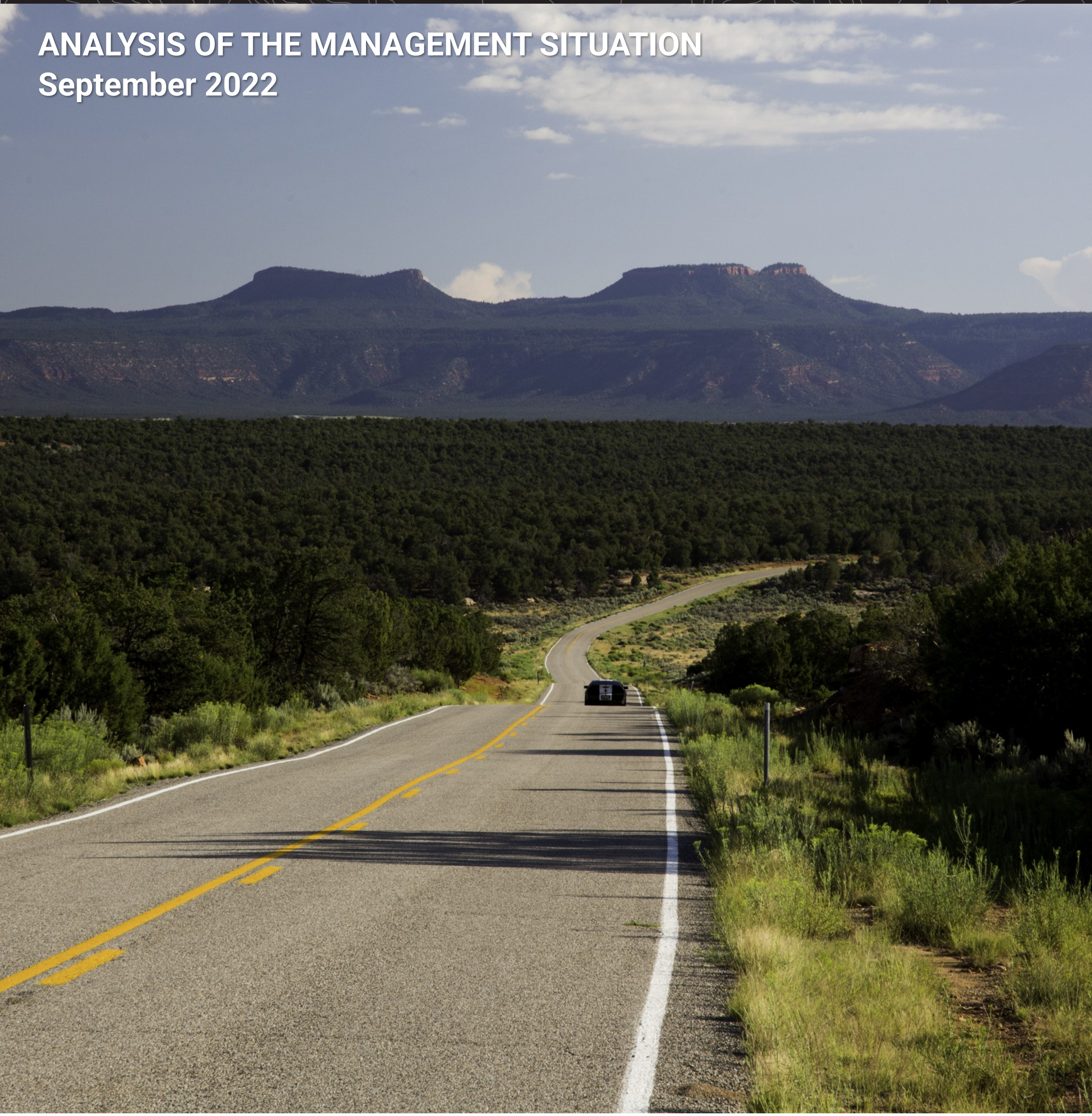
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

Bears Ears National Monument

Resource Management Plan and Environmental Impact Statement

ANALYSIS OF THE MANAGEMENT SITUATION
September 2022



U.S. DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

BLM Mission

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

U.S. DEPARTMENT OF AGRICULTURE

FOREST SERVICE

USDA Forest Service Mission

The mission of the USDA Forest Service is to sustain the health, diversity, and productivity of the Nation’s forests and grasslands to meet the needs of present and future generations.

NATIONAL CONSERVATION LANDS

Mission

Conserve, protect, and restore nationally significant landscapes that have outstanding cultural, ecological, and scientific values for the benefit of current and future generations.

Photo by Bob Wick, View of Bears Ears from State Route 261
Bears Ears National Monument

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ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
μeq/L	micro-equivalents per liter
ACEC	area of critical environmental concern
ADT	average daily traffic
AF	acre-feet
AIM	Assessment, Inventory, and Modeling
AMS	analysis of the management situation
ARPA	Archaeological Resources Protection Act
ATV	all-terrain vehicle
AUM	animal unit month
BAER	Burned Area Emergency Response
BEC	Bears Ears Commission
BEITC	Bears Ears Inter-Tribal Coalition
BENM	Bears Ears National Monument
BIL	Bipartisan Infrastructure Law
BLM	Bureau of Land Management
BMPs	best management practices
BSC	biological soil crust
CAA	Clean Air Act
CASTNET	Clean Air Status and Trends Network
CCC	Civilian Conservation Corps
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO_2e	carbon dioxide equivalent

CWA	Clean Water Act
DFC	desired future conditions
DOI	U.S. Department of the Interior
EA	environmental assessment
EIS	environmental impact statement
EO	Executive Order
EPA	Environmental Protection Agency
ERMA	extensive recreation management area
ESA	Endangered Species Act
ESR	Emergency Stabilization and Rehabilitation
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FIA	Forest Inventory and Analysis
FLPMA	Federal Land Policy and Management Act
FMP	fire management plan
FMRS	Fire Management Reference System
FMU	Fire Management Unit
FO	Field Office
FRG	Fire Regime Groups
FSH	Forest Service Handbook
FSM	Forest Service Manual
GDE	groundwater-dependent ecosystem
GHG	greenhouse gas
GIS	geographic information system
GSENM	Grand Staircase-Escalante National Monument
HM	head month
IDT	interdisciplinary team

IMPROVE	Interagency Monitoring of Protected Visual Environments
IPCC	Intergovernmental Panel on Climate Change
IRA	inventoried roadless area
ISA	instant study area
kg/ha-yr	kilograms per hectare per year
KPLA	known potash leasing area
LMF	landscape monitoring framework
LMP	land management plan
LRMP	land and resource management plan
mg/L	milligrams per liter
MIFC	Moab Interagency Fire Center
mpsa	magnitudes per square arcsecond
NAAQS	National Ambient Air Quality Standards
NADP	National Atmospheric Deposition Program
NCLs	National Conservation Lands
NEP	non-essential experimental population
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NFMA	National Forest Management Act
NFS	National Forest System
NGO	nongovernmental organization
NLCS	National Landscape Conservation System
NOI	notice of intent
NOx	nitrogen oxides
NPS	National Park Service
NRA	National Recreation Area
NRCS	Natural Resources Conservation Service

NRHP	National Register of Historic Places
NVUM	National Visitor Use Monitoring
OHV	off-highway vehicle
ONRR	Office of Natural Resources Revenue
ORVs	outstandingly remarkable values
PFC	proper functioning condition
PFYC	Potential Fossil Yield Classification
PILT	payments in lieu of taxes
PL	Public Law
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PM_{10}	particulate matter less than 10 microns in diameter
ppb	parts per billion
ppm	parts per million
PRPA	Paleontological Resources Preservation Act of 2009
PSD	Prevention of Significant Deterioration
PWRs	public water reserves
RMIS	Recreation Management Information System
RMP	resource management plan
RMZ	recreation management zone
RNA	Research Natural Area
ROS	Recreation Opportunity Spectrum
ROW	right-of-way
RV	recreational vehicle
SCC	species of conservation concern
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Office
SIO	Scenic Integrity Objective (USDA Forest Service)

SITLA	School and Institutional Trust Lands Administration
SMS	Scenery Management System (USDA Forest Service)
SPF	Spatial Fire Planning
SQRU	Scenic Quality Ratings Unit
SR	State Route
SRMA	special recreation management area
SRP	Special Recreation Permit
SSI	Springs Stewardship Institute
SSURGO	Soil Survey Geographic Database
SUP	special use permit
SWCP	soil and water conservation practices
SWReGAP	Southwest Regional Gap Analysis Project
T&E	threatened and endangered
TMDL	total maximum daily load
TMP	travel management plan
UDAQ	Utah Division of Air Quality
UDWQ	Utah Division of Water Quality
UDWR	Utah Division of Wildlife Resources
UGS	Utah Geological Survey
U.S.	United States
USC	United States Code
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
UTSO	Utah State Office
UWRI	Utah Watershed Restoration Initiative
VCC	Vegetation Condition Class
VCMQ	Vegetation Classification, Mapping, and Quantitative Inventory

VDEP	vegetation departure
VMS	Visual Management System (USDA Forest Service)
VOCs	volatile organic compounds
VQO	Visual Quality Objective (USDA Forest Service)
VRI	Visual Resource Inventory (BLM)
VRM	Visual Resource Management (BLM)
WFDSS	Wildland Fire Decision Support System
WPA	Works Progress Administration
WSA	wilderness study area
WSR	wild and scenic river
WUI	wildland-urban interface

CHAPTER 1. INTRODUCTION

The Bureau of Land Management (BLM) Utah State Office (UTSO), BLM Monticello Field Office (FO), BLM Moab FO, and U.S. Department of Agriculture Forest Service (USDA Forest Service) Manti-La Sal Ranger District, in coordination with the Bears Ears Commission (BEC), has now prepared this analysis of the management situation (AMS) in response to updates to the Planning Area boundary and management conditions for Bears Ears National Monument (BENM) brought about by Presidential Proclamation 10285. While the USDA Forest Service has its own set of land use planning and administrative review processes to ensure compliance with relevant laws and regulations, throughout this process, the BLM and USDA Forest Service have agreed that the USDA Forest Service will adopt the BLM's land use planning and administrative review processes (BLM and USDA Forest Service 2022). As such, BLM regulations and direction are cited throughout this document and apply to both agencies. In accordance with Proclamation 10285 and the intergovernmental cooperative agreement between the Tribal Nations, whose representatives comprise the BEC, the BLM, and the USDA Forest Service, the BEC is providing guidance and recommendations on the "development and implementation of management plans" for BENM, and as such, it will be an integral partner with the agencies throughout this planning process. The BEC developed a Tribal land management plan (BEITC LMP), *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2020), aspects of which are included throughout this document and discussed in greater detail in Chapter 7.

1.1 WHAT IS AN ANALYSIS OF THE MANAGEMENT SITUATION?

Prior to preparing a resource management plan (RMP), the BLM must analyze available inventory data and other information to characterize the resource area profile, portray the existing management situation, and identify management opportunities to respond to identified issues. The analysis, which is called the AMS, provides the basis for formulating reasonable alternatives (per 43 Code of Federal Regulations [CFR] 1610.4.-4 and BLM *Land Use Planning Handbook* H-1601-1, as amended).

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 RMP. 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.

1.2 WHAT ARE PLANNING CRITERIA?

Planning criteria lay the groundwork guiding the effects analysis by identifying issues and their analytical frameworks. BLM land use planning regulations state that the "estimation of effects shall be guided by the planning criteria and procedures implementing the National Environmental Policy Act" of 1969 (NEPA) (43 CFR 1610.4-6). As such, the planning criteria provide the opportunity to describe the framework the BLM will use to analyze issues in the NEPA document.

1.3 PLANNING PROCESS AND SCHEDULE

The BLM planning process, explained in 43 CFR Part 1600 and the BLM's *Land Use Planning Handbook* (H-1601-1), falls within the framework of the NEPA environmental analysis and decision-making process described in the Council on Environmental Quality (CEQ) regulations of 40 CFR 1500–

1508, the U.S. Department of the Interior (DOI) NEPA Departmental Manual (516 DM 1-7) and 43 CFR Part 46, and the BLM's NEPA Handbook (H-1790-1). Table 1.3-1 shows an initial schedule of milestones as part of the BLM's NEPA planning process, starting with the publication of the notice of intent (NOI).

Table 1.3-1. Milestone Schedule

Milestone	Tentative Date
Publication of the NOI	August 30, 2022
Publication of the AMS	September 29, 2022
Public Scoping and Alternatives Development	Fall 2022
Cooperator Coordination and Development of Draft RMP/EIS	Fall/Winter 2022 – Winter 2023
Publication of Draft RMP/EIS and Public Comment Period	Spring 2023
Proposed RMP/Final EIS	Summer 2023 – Winter 2024
Protest Resolution Period	Spring 2024
Approved RMP and Records of Decision	Spring 2024

CHAPTER 2. PLANNING AREA AND EXISTING MANAGEMENT

2.1 HISTORY OF BEARS EARS NATIONAL MONUMENT

BENM represented the culmination of more than a century of efforts to protect the ancestral homeland of five Tribal Nations that all refer to the area by the same name—*Hoon'Naqvut* (Hopi), *Shash Jáa* (Navajo), *Kwiyagatu Nukavachi* (Ute), and *Ansh An Lashokdiwe* (Zuni): Bears Ears. Preserving the sacred landscape and unique cultural resources in the Bears Ears region was an impetus for passage of the Antiquities Act in 1906. As early as 1904, advocates for the protection of cultural landscapes described for the United States (U.S.) Congress the tragedy of the destruction of objects of historic and scientific interest across the American Southwest and identified the Bears Ears region as one of seven areas in need of immediate protection. Nevertheless, for more than 100 years, indigenous people, historians, conservationists, scientists, archaeologists, and other groups advocated unsuccessfully for protection of the Bears Ears landscape.

On December 28, 2016, President Barack Obama signed Presidential Proclamation 9558 after the Hopi Tribe, Navajo Nation, Ute Indian Tribe of the Uintah and Ouray Reservation, Ute Mountain Ute Tribe, and Pueblo of Zuni united in a common vision to protect these sacred lands and requested permanent protection of the area. Presidential Proclamation 9558 established the Monument and emphasized the compelling need to protect one of the most extraordinary cultural landscapes in the United States. The Proclamation describes the landscape's unique density of significant cultural, historical, and archaeological artifacts that reflect human history spanning thousands of years as well as its unique geology, biology, ecology, paleontology, and topography.

On December 4, 2017, President Donald Trump signed Presidential Proclamation 9681, which reduced the Monument boundaries by more than 1.1 million acres. In doing so, this Proclamation removed protection from objects of historic and scientific interest across the Bears Ears landscape, including some objects that Presidential Proclamation 9558 specifically identified by name for protection. Multiple parties challenged Presidential Proclamation 9681 in federal court, asserting that it exceeds the president's authority under the Antiquities Act.

On October 8, 2021, President Joseph Biden signed Presidential Proclamation 10285, which restored the Monument boundaries and conditions that existed prior to December 4, 2017, and retained approximately 11,200 acres that were added to the Monument by Proclamation 9681. Proclamation 10285 declares that the entire landscape reserved by the Proclamation is "an object of historic and scientific interest in need of protection" and that in the absence of reservation under the Antiquities Act, the objects identified within the full 1.36-million-acre boundary of BENM are not adequately protected. Presidential Proclamation 10285 specifies that BENM "consist[s] of those lands reserved as part of the Bears Ears National Monument as of December 3, 2017, and the approximately 11,200 acres added by Proclamation 9681, encompassing approximately 1.36 million acres" to ensure "the preservation, restoration, and protection of the objects of scientific and historic interest on the Bears Ears region, including the entire monument landscape." Furthermore, Presidential Proclamation 10285 re-establishes the BEC "in accordance with the terms, conditions, and obligations set forth in Proclamation 9558 to provide guidance and recommendations on the development and implementation of management plans and on management of the entire monument" to ensure that "management decisions affecting the monument reflect expertise and traditional and historical knowledge of Tribal Nations." Figure 2.1-1 depicts the changes in the Monument boundaries based on each of the aforementioned Proclamations.

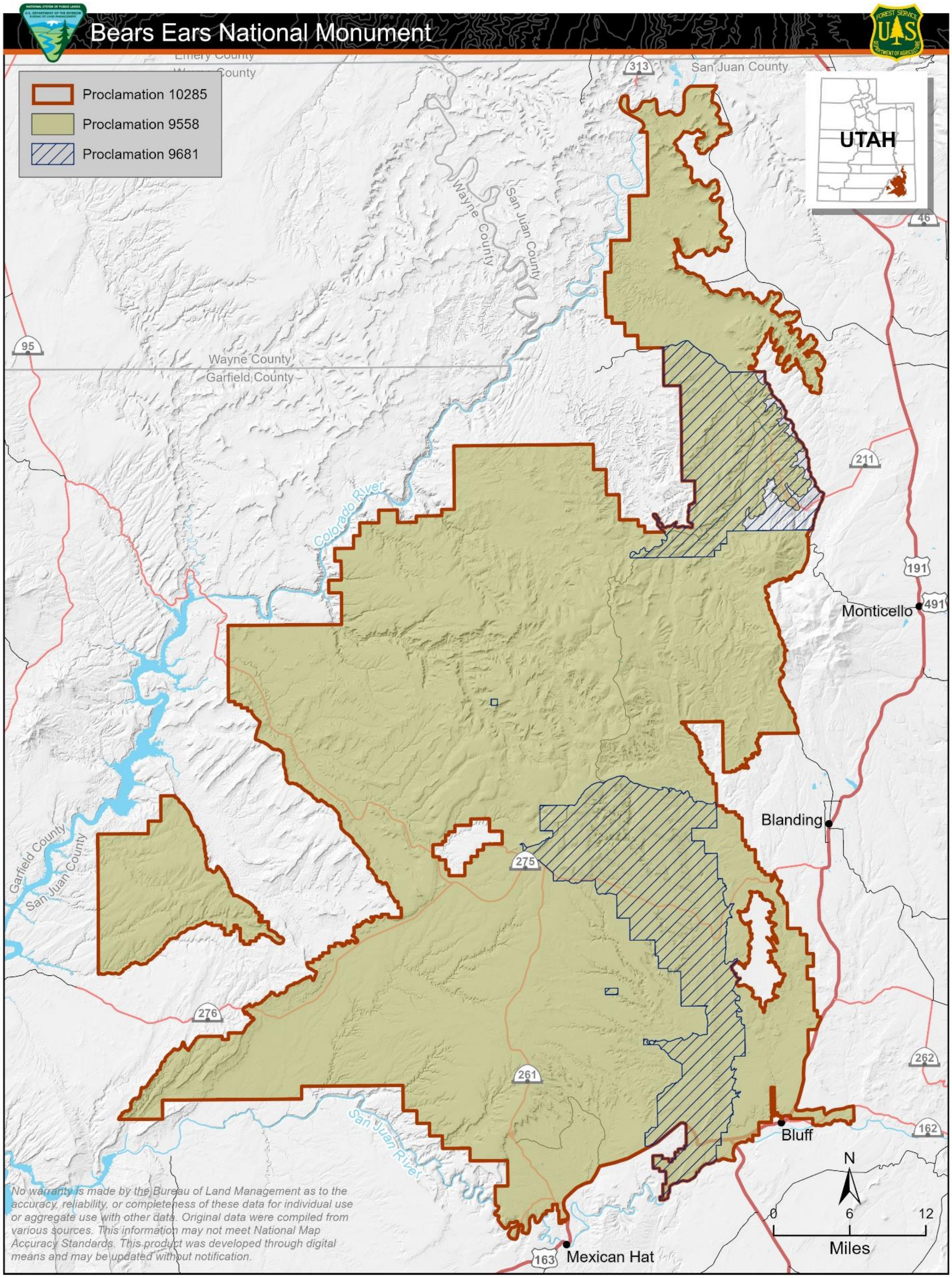

Figure 2.1-1. BENM boundary changes per Presidential Proclamations 9681, 9558, and 10285.

2.2 PLANNING AREA AND DECISION AREA

The Planning Area is the area the BLM and USDA Forest Service will cover in the planning effort for this RMP (Figure 2.2-1). The Planning Area boundary includes all lands regardless of jurisdiction. However, the direction in the RMP will only apply to the Decision Area, which includes the lands within the Planning Area that fall under BLM or USDA Forest Service jurisdiction, including subsurface minerals.

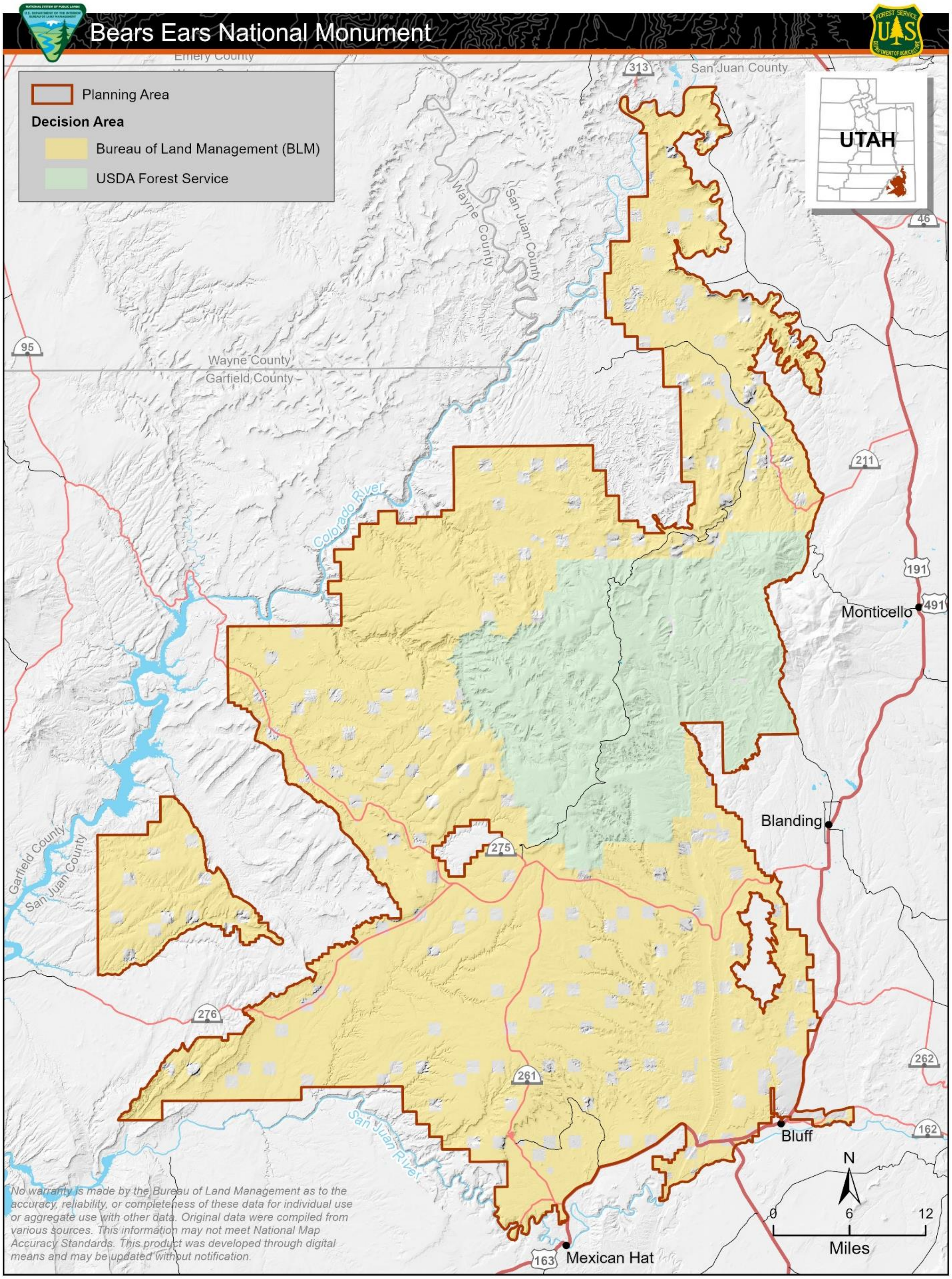

Figure 2.2-1. BENM Planning Area boundary.

Of the approximately 1.49 million acres of land within the exterior boundaries of the Planning Area, the RMP will codify decisions for approximately 1.36 million acres of public land administered by the BLM and USDA Forest Service (Table 2.2-1).

Table 2.2-1. Surface Ownership in the Planning Area

Jurisdiction	Acres*
BLM	1,075,000 acres
Private	13,000 acres
State	112,000 acres
USDA Forest Service	289,000 acres
Total	1,490,000 acres

* Acreages are approximate and for planning purposes only.
Source: BLM GIS 2022

The Planning Area is near or adjacent to other areas of national and international significance, including Canyonlands National Park, Arches National Park, Capitol Reef National Park, Mesa Verde National Park, Glen Canyon National Recreation Area (NRA), Natural Bridges National Monument, Grand Staircase-Escalante National Monument (GSENM), Canyons of the Ancients National Monument, Dead Horse Point State Park, and Goosenecks State Park.

2.3 EXISTING MANAGEMENT

The Planning Area is currently guided by the following existing land use plans and amendments:

- 2020 Bears Ears National Monument, Monument Management Plans (MMP)
- 2008 Moab RMP (as amended)
- 2008 Monticello RMP (as amended)
- 1986 Manti-La Sal National Forest Land and Resource Management Plan (LRMP) (as amended)

However, as articulated in a memorandum outlining interim management direction for the restored BENM land (BLM 2021), all uses and activities authorized in BENM must be consistent with Presidential Proclamation 10285. As such, prior to adopting a new RMP for BENM, the BLM may allow activities only if it determines that 1) the decision conforms with the applicable 2020 RMP or 2008 Monticello RMP and 2) the decision is consistent with the protection of BENM objects identified in Presidential Proclamation 10285.

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CHAPTER 3. REGULATORY AND PLANNING FRAMEWORK

The direction provided by the various laws, regulations, policies, and documents listed in this chapter 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 effectuated 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 the 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 Planning Area. Plans related to management of these resources are usually site specific or resource specific in nature. The lists below identify the RMPs, implementation plans, and other planning or policy documents, as well as selected NEPA documents, that pertain to the Planning Area. These documents were considered during the AMS process to ensure consistency and to include relevant information or guidance.

The collaborative LMP for BENM (BEITC LMP), ratified by resolutions of each of the five BEC Tribes in summer 2022, was provided to the BLM and USDA Forest Service by the BEITC on August 11, 2022. The BEITC LMP provides an overview of the historical and present-day connections between Hopi Tribe, Zuni Tribe, Navajo Nation, Ute Mountain Ute Tribe, Ute Indian Tribe, and Bears Ears National Monument, as well as traditional ecological knowledge of each Tribe. It is intended to ensure that management decisions affecting BENM reflect expertise and traditional and historical knowledge of Tribal Nations, in accordance with Proclamation 10285. The BEITC LMP also includes planning goals, management actions, and guidance for federal agencies regarding stewardship of Monument objects, values, and resources. This plan is discussed in greater detail in Chapter 7 of this document.

3.1 BLM AND USDA FOREST SERVICE PLANS, POLICIES, AND PROGRAMS

3.1.3 Resource Management Plans

- *Bears Ears National Monument Management Plans*, 2020
- *Monticello Resource Management Plan* (as amended), 2008
- *Moab Resource Management Plan* (as amended), 2008
- *Manti-La Sal National Forest Land and Resource Management Plan* (as amended), 1986
- *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument*, 2022

3.1.4 BLM and USDA Forest Service Manuals and Handbooks

- BLM Manual 1780 – *Tribal Relations*
- BLM Manual 6220 – *National Monuments, National Conservation Areas, and Similar Designations*

- BLM Manual 6320 – *Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process*
- BLM Manual 6330 – *Management of Wilderness Study Areas*
- BLM Manual 6400 – *Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, Planning, and Management (Public)*
- BLM Manual 8100 – *The Foundations for Managing Cultural Resources*
- BLM Supplement H-8110 – Utah – *Cultural Resource Fieldwork Guidelines and Standards*
- BLM Handbook H-1601-1 – *Land Use Planning Handbook*
- Forest Service Manual (FSM) 1500 – *External Relations*, Chapter 1560 – *State, Tribal, County, and Local Agencies; Public and Private Organizations*
- FSM 2300 – *Recreation, Wilderness, and Related Resource Management*
- Forest Service Handbook (FSH) 1909.12 – *Land Management Planning Handbook*
- FSM 1920 – *Land Management Planning*
- FSH 2309.12 – *Heritage Program Management Handbook*
- FSM 2800 – *Minerals and Geology*
- FSH 2809.15 – *Minerals and Geology Handbook*

3.1.5 Activity Plans

- *Southern Utah Support Area Fire Management Plan Environmental Assessment*, 2005

3.1.6 Existing Relevant Environmental Assessments and Environmental Impact Statements

- *Bears Ears National Monument: Record of Decision and Approved Monument Management Plans Indian Creek and Shash Jáa Units*, 2020
- *Record of Decision and Approved Plan Amendment for the Land and Resource Management Plan: Manti-La Sal National Forest Land Bears Ears National Monument Shash Jáa Unit*, 2020
- *Monticello Field Office Record of Decision and Approved Resource Management Plan*, 2008
- *Moab Field Office Record of Decision and Approved Resource Management Plan*, 2008
- *Record of Decision: Moab Master Leasing Plan/Approved Resource Management Plan Amendments for the Moab and Monticello Field Offices*, 2018
- *Utah BLM Statewide Wilderness Environmental Impact Statement*, 1990
- *Old Spanish National Historic Trail Comprehensive Administrative Strategy*, 2017
- *Record of Decision: Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement*, 2007
- *Record of Decision: Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement*

3.2 OTHER FEDERAL REGULATIONS AND PLANS

The foundations of public land management are in the mandates and authorities provided in statute as implemented through agency regulations. Executive orders (EOs), instruction memoranda (IMs), information bulletins, manuals, and handbooks, and other policy and guidance documents give direction to the agencies on the implementation and interpretation of the authorities provided under those laws and regulations. These statements of federal policy direct the BLM and USDA Forest Service concerning management of public lands and resources. The U.S. Congress has acknowledged that the appropriate use of these resources requires proper planning. The BLM's planning process is authorized and mandated through the Federal Land Policy and Management Act of 1976 (FLPMA) and NEPA. The regulations associated with these laws are provided at 43 CFR Part 1600 and 40 CFR 1500–1508, respectively.

FLPMA declares the policy of the United States concerning the management of federally owned land administered by the BLM. FLPMA provides that the BLM "shall manage the public lands under principles of multiple use and sustained yield . . . except that where a tract of such public land has been dedicated to specific uses according to any other provisions of law it shall be managed in accordance with such law" (43 United States Code [USC] 1732(a)). Proclamation 10285—in accordance with the Antiquities Act of 1906—dedicated the lands within BENM to specific uses by designating the Monument and reserving the entirety of the lands within the restored boundary of the Monument as the smallest area compatible with the protection of the Monument's objects and values. Further, BENM is a component of the National Landscape Conservation System (NLCS), which was established "to conserve, protect, and restore nationally significant landscapes that have outstanding cultural, ecological, and scientific values for the benefit of current and future generations," and therefore the BLM is required to manage BENM "in a manner that protects the values for which the components of the system were designated" (16 USC 7202). Therefore, the BLM cannot permit any discretionary uses in BENM that are not consistent with the protection of its objects and values. Additionally, any BLM decisions regarding discretionary uses in BENM must conform to the BLM's approved land use plan. The BLM develops and updates its land use plans through a planning and NEPA process that includes public involvement (43 USC 1712(a)). FLPMA also directs the BLM, when completing a planning process, to coordinate with other federal departments and agencies, state and local governments, and Tribal Nations to seek to promote consistency among land use plans across jurisdictions.

Similarly, the National Forest Management Act of 1976 (NFMA) requires the USDA Forest Service to "develop, maintain, and, as appropriate, revise land and resource management plans for units of the National Forest System" (16 USC 1604). A forest plan is the principal document that guides decisions about national forest land and resource management. Forest plans, which are intended to be applicable for 15 years, are required by NFMA.

In NEPA, Congress directs "all agencies of the Federal Government . . . [to] . . . utilize a systematic, interdisciplinary approach which will ensure 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 USC 4332(A)). The BLM and USDA Forest Service are preparing an EIS concurrent with an RMP that will examine a range of alternatives, including a No Action Alternative, to resolve the issues in question. Alternatives should represent complete but different means of satisfying the identified purpose and need of the action and resolving the issues. This RMP/EIS is being prepared using the best available information. Other federal laws, regulations, and policies, as well as applicable state, local, and other applicable regulatory frameworks, are identified below.

Further, the BLM and USDA Forest Service will work with the BEC and collaborate with other federal, state, and local governmental entities throughout the development of the RMP/EIS. Opportunities for coordination with other agencies will be sought throughout the process. Phases where state and local governments, other federal agencies, and Native American Tribal government involvement could prove most critical to ensuring consistency are scoping, alternatives development, impacts analysis, and public comment periods.

3.2.1 Federal Laws

In addition to the planning-specific federal laws listed above, BLM and USDA Forest Service planning decisions must comply with other laws, such as the Clean Air Act, as amended (42 USC 7418); the Clean Water Act (CWA), as amended (33 USC 23); and the Endangered Species Act of 1973, as amended (ESA) (16 USC 1531 et seq.). Other examples of such federal laws are listed below.

- American Indian Religious Freedom Act of 1978 (42 USC 1996 et seq.)

  Protects the rights of American Indians to exercise their traditional religions by ensuring access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites

- Agriculture Improvement Act of 2018 (Public Law [PL] No. 115-334)

  Omnibus, multiyear law that governs an array of agricultural and food programs and provides an opportunity for policymakers to address agricultural and food issues comprehensively and periodically; this bill typically is renewed about every 5 years

- Archaeological Resources Protection Act of 1979, as amended (ARPA) (16 USC 470aa et seq.)

  Governs the excavation of archeological sites on federal and American Indian lands in the United States and the removal and disposition of archeological collections from those sites

- Healthy Forests Restoration Act of 2003 (16 USC 6511 et seq.)

  Empowers the Secretaries of Agriculture and the Interior to expedite projects that are designed to reduce hazardous fuels buildups and restore healthy forest conditions on federal forest lands

- Migratory Bird Treaty Act of 1918 (16 USC 703–711)

  Implements four international conservation treaties that the United States entered into with Canada in 1916, Mexico in 1936, Japan in 1972, and Russia in 1976 to ensure the sustainability of populations of all protected migratory bird species

- John D. Dingell, Jr. Conservation, Management, and Recreation Act (PL 116-9)

  Addresses, among other matters, land conveyances, exchanges, acquisitions, withdrawals, and transfers; national parks, monuments, and memorials; wilderness areas; wild and scenic rivers (WSRs), historic and heritage sites, and other conservation and recreation areas; wildlife conservation; the release of certain federal reversionary land interests; boundary adjustments; the Denali National Park and Preserve natural gas pipeline; fees for medical services in National Park System units; funding for the Land and Water Conservation Fund; recreational activities on federal or nonfederal lands; and federal reclamation projects

- National Historic Preservation Act, as amended (54 USC 300101 et seq.)

  Intends to preserve U.S. historic and archeological sites and creates the National Register of Historic Places (NRHP), the list of National Historic Landmarks, and the State Historic Preservation Offices (SHPOs)

- Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001 et seq.)

  Enacted to outline a requirement and process for museums and federal agencies to return certain Native American cultural items (including human remains) to lineal descendants, culturally affiliated Tribal Nations, or Native Hawaiian organizations

- Omnibus Public Land Management Act of 2009 (16 USC 7201)

  Established the NLCS (now known as National Conservation Lands [NCLs]) to conserve, protect, and restore nationally significant landscapes that have outstanding cultural, ecological, and scientific values for the benefit of current and future generations, including national monuments like BENM and requires that the lands within NCL units shall be managed "in a manner that protects the values for which the [units] were designated"; BLM policy states that "BLM will use the best available science in managing NLCS units;" that "science and the scientific process will inform and guide management decisions concerning NLCS units."

- Taylor Grazing Act of 1934 (43 USC 315 et seq.)

  Provides for the regulation of grazing on public lands (excluding Alaska) to improve rangeland conditions and regulate their use

- Wild and Scenic Rivers Act, as amended (16 USC 1271 et seq.)

  Enacted to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations

- Wilderness Act of 1964, as amended (16 USC 1131 et seq.)

  Enacted to establish the National Wilderness Preservation System for the use and enjoyment of the American people in such manner as will leave the lands unimpaired for future use and enjoyment as wilderness.

3.2.2 Other Federal Plans

- *Canyonlands National Park Resource Management Plan*, 1996
- *Glen Canyon National Recreation Area, Utah/Arizona: Water Resources Management Plan and Environmental Assessment*, 1987
- *Natural Bridges National Monument Foundation Document,* 2013
- *Glen Canyon National Recreation Area Off-road Vehicle Management Plan/Final Environmental Impact Statement,* 2017

3.2.3 Species Recovery Plans and Conservation Agreements

- *Mexican Spotted Owl Recovery Plan, First Revision (*Strix occidentalis lucida*)*, 2012
- *Range-Wide Conservation Agreement and Strategy for Roundtail Chub, Bluehead Sucker, and Flannelmouth Sucker*, 2006
- *Pollinator-Friendly Best Management Practices for Federal Lands*, 2015
- *Bonytail (Gila elegans) Recovery Goals*, 2002
- *Colorado Pikeminnow (*Ptychocheilus lucius*) Recovery Goals*, 2002
- *Razorback Sucker (*Xyrauchen texanus*) Recovery Goals*, 2002
- *Humpback Chub (*Gila cypha*) Recovery Goals*, 2002

- *Conservation Agreement and Strategy for Colorado River Cutthroat Trout in the State of Utah*, 1997
- *Recovery Plan for the California Condor*, *Third Revision*, 1996
- *Final Recovery Plan of the Southwestern Willow Flycatcher (*Empidonax traillii extimus*)*, 2002
- *Final Recovery Plan for Jones Cycladenia (*Cycladenia humilis *var*. jonesii*)*, 2021
- *Navajo Sedge (*Carex specuicola*) Recovery Plan*, 1987
    - *Navajo Sedge (*Carex specuicola*) Recovery Plan*, 2019
- *Recovery Plan Amendments for Eleven Southwest Species*, 2019
- *Ute Ladies'-Tresses Draft Recovery Plan*, 1995
- *Recovery plan amendments for 20 southwestern species*, 2019

3.3 RELEVANT STATE AND LOCAL PLANS, POLICIES, AND PROGRAMS

3.3.1 State Plans

State of Utah plans, policies, and programs that may be germane to the planning process include the following:

- Utah Code, Title 63J-4, Part 4, Planning

  Describes the duties of the planning coordinator and office

- Utah Code, Title 63J-8, State of Utah Resource Management Plan for Federal Lands

  Establishes Utah Grazing Agricultural Commodity Zones, including the San Juan County Zone; the purpose of these grazing zones is to preserve and protect the agricultural livestock industry and its history, culture, customs, and economic value from ongoing threats; and to maximize 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

- *Utah's Outdoor Recreation Plan - 2019*, 2019

  Provides an overview of statewide recreation supply and needs based on a survey of recreational professionals throughout the State of Utah and a statewide residents' survey; information and guidance provided by the plan should enable entities to make more informed decisions regarding expenditure of scarce outdoor recreation acquisition and development dollars in Utah

- *Utah's Water Resources: Planning for the Future*, 2004

  Emphasizes the importance of careful planning and wise management in meeting future water needs; 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; guides water planners and managers to meet the many water challenges facing Utah

- *State of Utah Resource Management Plan*, 2018

  Highlights the State's goals, objectives, and policies for 30 resource areas within the State of Utah

- State watershed, wildlife, and wildfire plans
    - *Utah Statewide Nonpoint Source Pollution Management Plan*, 2013
    - *Utah Wildlife Action Plan: A plan for managing native wildlife species and their habitats to help prevent listings under the Endangered Species Act*, 2015
    - *Elk Herd Unit Management Plan, Elk Herd Unit #14, San Juan*, 2016
    - *Utah Bighorn Sheep Statewide Management Plan*, 2018
    - *Catastrophic Wildfire Reduction Strategy: Protecting the health and welfare of Utahns and our lands*, 2013
    - *Utah Division of Wildlife Resources/Utah Division of Oil, Gas and Mining Abandoned Mine Reclamation Program, Memorandum of Understanding for the Conservation and Management of Bats in Abandoned Mines in Utah*, 2015
    - *Utah Statewide Elk Management Plan*, 2015
    - *Utah Forest Action Plan*, 2016
    - *Utah Mule Deer Statewide Management Plan*, 2019
    - *Utah Pronghorn Statewide Management Plan*, 2009

3.3.2 County Plans

- *San Juan County, 2018 General Plan Update*, 2018
- *San Juan County, 2017 Resource Management Plan*, as amended in 2022

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CHAPTER 4. PURPOSE AND NEED

This RMP will provide a management framework, including goals, objectives, and management direction, to guide Monument management. Purposes and needs serve to frame issue identification, alternatives development, and effects analyses. The following purposes and desired outcomes are set forward explicitly in Presidential Proclamation 10285 or have been identified based on key present and historical BENM management challenges. Planning for these desired outcomes will be crucial for development of an RMP that provides direction for addressing critical management challenges. Associated needs and challenges that the RMP will address are also summarized.

1. Protect, restore, and enhance the Monument's objects and values in large, remote, rugged, and connected landscapes. This includes the entire landscape within the Monument and the objects and values for which the Monument was established to protect.

Needs and challenges: BENM is a place that holds deep cultural and spiritual connections for many communities. BENM includes a diversity of ecotypes, geological and paleontological resources, vegetation, and wildlife. During the last century, uranium mining activities and livestock grazing have been common activities in this part of Southeast Utah. Mining activity within BENM is rare today, but livestock grazing remains an important local economic use of the landscape. Recreational visitation is an important driver of the local economy, with the Indian Creek area becoming world famous for rock climbing and the increased popularity of off-highway vehicle (OHV) use, cultural tourism, and other forms of recreation. The increased demand on BENM's resources, and subsequently, the Monument's objects and values, poses a challenge to balance the wide variety of uses of the landscape with the protection of the Monument's objects and values. Planning decisions can define resource uses and land designations to help resolve conflicts between various uses and resource protection.

2. Protect and/or restore the historical and cultural significance of this landscape. This includes objects identified in Proclamation 10285 such as numerous archaeological sites, modern Tribal uses, other traditional descendant community uses, historic routes and trails, historic inscriptions, and historic sites.

Needs and challenges: Public visitation, permitted activities, and climate change have the potential to impact cultural resources. Traditional knowledge, interpretation, and management guidance to help inform the public and protect various cultural resources and traditional uses are needed. Planning decisions can help provide management direction to protect cultural resources and traditional uses and to provide direction for a lasting and effective partnership with Tribal Nations and the BEC.

3. Protect and/or restore the unique and varied natural and scientific resources of these lands. This includes objects identified in Proclamation 10285 such as biological resources, including various plant communities, relic and endemic plants, diverse wildlife including unique species, and habitat for ESA listed species.

Needs and challenges: Increasing uses of the landscape such as rock climbing, OHV use, and cultural tourism, whether through an organized or commercial event with a Special Recreation Permit (SRP) or by the public in general, can impact various plant and wildlife communities and habitats. Planning decisions can help re-evaluate and balance the trade-offs for the desired uses of the landscape with the need to protect the Monument's biological resources identified as objects.

4. Protect and/or restore scenic qualities, including night skies; natural soundscapes; diverse, visible geology; and unique areas and features.

Needs and challenges: BENM is surrounded by various NPS and Utah State Park units designated as Dark Sky Parks, and the region is recognized for its uniquely dark night sky. Additionally, the remoteness of the region provides the opportunity for a quiet, natural soundscape and the varied geologic features provide incredibly unique scenic qualities. Planning decisions should reflect the need to protect these visual and scenic qualities identified as objects and values for BENM.

5. Protect and/or restore important paleontological resources.

Needs and challenges: BENM is becoming an increasingly important region for the study of paleontological resources. Some sites containing paleontological resources also have ties to the stories and cultures of Tribal Nations. To protect these important resources, planning decisions should be made to support appropriate access, use, and protection of paleontological resources.

6. Ensure that management of these lands will incorporate traditional and historical knowledge related to the use and significance of the landscape.

Needs and challenges: Tribal Nations and descendant communities not only care about and learn from the cultural resources found in BENM, but many of them still use portions of the landscape for traditional cultural and spiritual needs as well as for necessary subsistence purposes. Any BLM or USDA Forest Service action has the potential to impact spiritual, traditional, or subsistence uses of the BENM landscape; therefore, it is critical that planning decisions reflect traditional knowledge and provide a framework to incorporate traditional knowledge into any future implementation activities. However, some traditional uses, such as the annual collection of firewood for personal use, may in some cases cause negative impacts to cultural resources, sensitive soils, and the woodland resource itself. Firewood collection is an important traditional use, and the planning decisions should consider how to address the potential negative impacts, while also balancing the positive aspects like fuel load reduction and subsistence needs.

7. Provide for a variety of uses on Monument lands, so long as those uses are consistent with the protection of BENM's identified objects and values.

Needs and challenges: Public land uses within BENM, such as livestock grazing and recreation, are important to the economic opportunities and quality of life of the local communities surrounding BENM. These two uses account for the majority of visitation to BENM. Although these two uses are not identified in Presidential Proclamation 10285 as objects or values, these are discussed as important land uses in the area. Planning decisions should consider how to protect Monument objects and values with consideration of other uses of the landscape, such as livestock grazing and recreation.

CHAPTER 5. ISSUES AND ANALYTICAL FRAMEWORK

The following sections outline preliminary issues for consideration in the development of the BENM RMP/EIS.

Many Tribal Nations, including those represented by the BEC, utilize the BENM landscape and its resources for both traditional and ceremonial uses. The BEC has suggested that the BENM RMP should include “a holistic approach to all resources that gives primacy to indigenous knowledge and perspectives on the stewardship of the Bear’s Ears landscape” (BEC 2022:i). As noted in Chapter 1, as part of ongoing coordination between the BLM and USDA Forest Service and the BEC, the Bears Ears Inter-Tribal Coalition (BEITC) submitted a plan that provides an overview of the historical and present-day connections between the Hopi Tribe, Zuni Tribe, Navajo Nation, Ute Mountain Ute Tribe, Ute Indian Tribe and BENM, as well as traditional ecological knowledge of each Tribe. The plan, which was ratified by Tribal resolutions in summer 2022, states, “The five Tribes of the Bears Ears Inter-Tribal Coalition (BEITC) – Hopi, Navajo (Diné), Ute Indian Tribe, Ute Mountain Ute, and Zuni – have deep traditional cultural beliefs that tie them to the land. The physical world is much more than just a natural realm to sustain the material needs of life. The origin of the canyons, cliffs, and landforms of the greater Bear’s Ears region have a place in traditional history. There are narratives that provide a continuity that link people, landscapes, and supernatural beings through time” (BEC 2022:i). The plan includes planning goals, management actions, and guidance for federal agencies regarding stewardship of Monument objects, values, and resources. The approach set forth in the plan submitted by the BEC may not be completely reflected in the formatting of this AMS; however, the agencies are committed to continuing to work with the BEC in the development of this RMP/EIS process to integrate this holistic approach and their traditional understanding and knowledge of the Bears Ears landscape.

5.1 PLANNING CRITERIA

During the planning process, the agencies have worked to identify primary management concerns involving resource management activities and/or land use, which will support the development of a range of alternatives. The preliminary management concerns categorized and discussed below are not exhaustive and may not address more specific concerns that may be included in the final RMP. The agencies will use an integrated management approach to address the interactions between Monument resources and to support the development of integrated management objectives.

The management concerns outlined below were developed in accordance with Presidential Proclamation 10285, BLM and USDA Forest Service guidance, BEC guidance, and management challenges associated with BENM since its official inception in 2016. Identification of the following management concerns ensures that the RMP is tailored to the associated issues identified by the agencies through public, agency, and Tribal Nation participation and will evolve based on additional data, ongoing internal scoping, and public engagement.

5.1.1 Terrestrial Habitat, and Vegetation Resilience and Conservation (large-scale and local ecotypes)

Vegetation and habitat management is a key foundation with effects on other resources, including wildlife, noxious and invasive vegetation management, rangeland management, recreational uses, and more. Consideration will be given to general vegetation, federal and state-listed species, and Utah Natural Heritage Program plants and plant communities.

- What factors (e.g., use of geographic areas) might serve to ensure an orchestrated, high-elevation view for Monument vegetation management?
- What management is necessary to maintain and improve diverse terrestrial habitats?
- How can traditional uses (e.g., wood cutting) be incorporated into vegetation management?
- What role should prescribed fire and/or other vegetation management play to preserve ecosystems? What additional or other management is needed for areas of high fuel loads?
- What management is needed to reduce potential for noxious and invasive species related to vegetation management, grazing, recreation, and other activities?

5.1.2 Noxious Weeds and Invasive Nonnative Plants

Management of noxious and invasive vegetation is central to ecosystem health, with effects on many resources.

- What treatment types should be allowed to reduce both introduction and spread of nonnative/invasive species?
- What criteria of location, geographic scale, land designations, and other conditions should determine treatment types?

5.1.3 Soils and Biological Soils Crusts

Biological soil crusts (BSCs) are a resource of interest to stakeholders. Although there are no known points of dispute regarding management of this resource, it is a fragile resource and will warrant clear consideration in the planning process.

- What parameters should be used to ensure proper consideration of BSCs in project-level planning?
- Should areas of relic BSC be identified for special management?

5.1.4 Rangeland Health and Livestock Grazing Management

Continued grazing within the Monument is allowed under the proclamation. There is a potential for a high level of controversy related to rangeland and grazing management in relation to the Monument's objects and values. Challenges and controversy are anticipated to be high in the upcoming planning effort. Nongovernmental organizations (NGOs) have consistently challenged grazing management and related proposals (e.g., for livestock-related water developments, seedings). Stakeholders hold a spectrum of views on grazing and allotment management topics, including access of ranchers to use of public lands for livestock grazing, retention and development of related infrastructure, and the relation of the above to rangeland health. Proclamation 10285 adds an additional factor, providing that if "grazing permits or leases be voluntarily relinquished by existing holders, the Secretary shall retire from livestock grazing the lands covered by such permits or leases" and forage will not be reallocated for livestock grazing unless it advances the purposes of the Proclamations. In addition to general provisions for rangeland health and grazing management, the following issues will be addressed:

- How will step-down planning be ensured? What level of specificity and sidebars will be provided within the grazing and rangeland management sections of the implementation plan (which is part of the RMP) to adequately direct and align subsequent allotment-level planning with RMP goals and objectives?

- How will the BLM and USDA Forest Service manage retirement of permits and leases, as provided for under Proclamation 10285?
- Should supplementary adaptive management tools for rangeland health and grazing management be adopted under conditions of drought?
- How will the BLM and USDA Forest Service address climate change and seasonal drought effects on long-term vegetative community changes and forage?
- How might the BLM and USDA Forest Service efficiently maintain long-standing range improvements (e.g., seedings and infrastructure) that occur within existing areas of disturbance?

5.1.5 Recreation Use and Visitor Services

Appropriate management of recreational use is a central concern to be addressed by the RMP. Continual and substantial increases in recreational use, mostly related to travel tourism throughout southern Utah (including across the Monument, and proximate USDA Forest Service and the national parks in southern Utah), pose challenges that cannot be addressed by simple dispersal of visitors. Recreation visitation has essentially doubled since 2016. In the Bears Ears landscape, high concentrations of fragile cultural resources, many of which have not been surveyed, are found in backcountry areas where dispersed recreation is growing in popularity. Increases in visitation have potential impacts on cultural sites and also potentially degrade quality of visitor experience. Increasing visitation also heightens demand for developed facilities (e.g., campgrounds, trailheads). There is a need for balanced management (e.g., use quotas, designated backcountry use areas and campsites, signage) and for providing opportunities for primitive recreation.

Within the context of Proclamation directives related to preserve a largely undeveloped landscape and fundamental Monument objects and values (e.g., cultural resources, soundscapes, dark skies, and solitude), there are substantial challenges in finding a balance between the level of preservation warranted by the Proclamation and the fast expansion of visitation levels. Backcountry permit systems with use quotas have been in place for certain areas since the 1990s. Continuation, expansion and improvements in those systems will be considered for certain areas. Strategies to concentrate visitor use in some frontcountry sites that have been prepared for sustainable visitor use will also be considered.

- Should recreation management areas be added, dropped, or reclassified based on recreation demands and issues, recreation setting characteristics, resolving use/user conflicts, and resource protection needs? What are the objectives, management actions, and allowable uses within each resource management area? Ensure that resource management area and resource management zone (RMZ) designation is consistent with existing recreation and visitor services policy.
- How can the RMP provide the most breadth and depth for recreation and visitor services management direction? Ensure prioritization of addressing these management needs throughout the planning process.
- How will step-down planning be ensured? What level of specificity and sidebars will be provided within the Recreation section of the implementation plan in order to adequately direct and align subsequent special recreation management area (SRMA), RMZ, etc.–level planning with RMP goals and objectives?
- How should SRPs be managed given increasing recreational use on BENM?
- How will opportunities for “world class outdoor recreation” be maintained?
- How will visitor education and interpretation incorporate the traditional and historical knowledge of Tribal Nations?

- How will visitor education and interpretation be incorporated in step-down recreation planning, and how will the story of historic nonnative connections to the landscape, and other objects and values protected within BENM be interpreted to the visiting public?

5.1.6 Travel, Transportation, and Access Management

The Monument proclamations specify that a separate travel management process will be undertaken by the BLM/USDA Forest Service. For the upcoming travel management process, the BLM/USDA Forest Service acknowledge that stakeholder positions on travel management span the spectrum, from those advocating for closures to those advocating for more or continued access. Current route designations for the BLM were established in the 2008 Monticello RMP and for the USDA Forest Service in the 1991 Manti-La Sal Travel Plan and subsequent NEPA decision and are shown on the Manti-La Sal National Forest Motor Vehicle Use Map. The Monument contains a scenic byways and backways as well as potential for future designations.

- Where should the BLM/USDA Forest Service now apply closed motorized use area designations across the Planning Area?
- How will the BLM/USDA Forest Service manage current and nominate potential future scenic routes?
- Where, and with what rationale, will travel management areas be assigned for future travel management planning?
- How will step-down travel management plans (TMPs) be developed? What level of specificity and sidebars will be provided within the Travel Management Planning section of the implementation plan to adequately direct subsequent TMPs?

5.1.7 Cultural Resource Management, Native American Religious Concerns, and Tribal Use

- What is an appropriate “Tribal collaboration framework”?
- How should the cultural resources and traditional cultural properties of the area be protected and restored while still allowing for appropriate information/education efforts and visitation?
- What criteria for determining cultural site mitigation measures such as site stabilization or hardening should be considered?
- What management measures are needed to ensure continuation of traditional use of sacred sites and/or properties of traditional religious or cultural importance to Tribal Nations?
- What management measures are needed to ensure continuation of traditional non-commercial vegetative uses, including ceremonial and medicinal plant gathering, and firewood collection?

5.1.8 Fuels, Wildfire and Prescribed Fire, and Forestry and Woodlands

Management of healthy woodlands has many indirect effects to other resources and values (e.g., wildlife, personal woodlands use). Currently, due to past management such as fire suppression, there are areas with high fuel loads. Remote landscapes pose unique management challenges in terms of method (e.g., prescribed fire) and outcomes (e.g., potential for noxious and invasive plant infestations) as well as management of human safety during wildfire response and/or vegetation management.

- How can wildfire management techniques be matched to conditions and locations to best protect both ecosystem function and resilience, as well as provide for human safety?
- What role should prescribed fire or other vegetative treatments play to preserve ecosystems and protect the objects and values of the Monument?
- What role should non-commercial fuelwood collection play to manage healthy woodlands and ensure traditional uses?

5.1.9 Wildlife and Fisheries

Consider wildlife and fisheries as one of the principal uses for the public lands by establishing desired resource objectives for priority species (including special status species) and their habitats that make up the biological objects identified in the Proclamations. Stakeholders have historically opposed habitat modification, especially treatments. Such resistance has historically been tied to concern that 1) wildlife management might inappropriately alter/increase forage and/or water supplies for livestock, and/or 2) vegetation management (intended for wildlife habitat improvement) might adversely alter lands with potential wilderness character (i.e., much of the Monument, not only land with formally recognized wilderness character [lands with wilderness characteristics] or WSA designations), which await congressional determination for potential Wilderness designation. Standard management directives for wildlife and fisheries are anticipated to be low controversy and include 1) General wildlife and fisheries, 2) Listed, unique, and special status species. The RMP, in conformance with current department and Bureau direction (BLM manuals 6500, 6840 and 1745), will consider and plan for wildlife and fisheries (aquatic) species and habitat connectivity corridors, including work with other jurisdictions. Utah Natural Heritage Program species and populations will be considered.

- What management actions are needed to meet the desired resource conditions for priority species and habitats to meet conservation goals? How will strategies ensure full consideration of wildlife and fisheries resources with the other principal resources?
- How should wildlife management be coordinated with vegetation management?
- How will other programs or land designations consider wildlife management objectives?

5.1.10 Hydrology (Groundwater, surface water, wetlands, riparian areas, floodplains, water quality)

Proper and resilient hydrologic function is foundational to biological resources as well as other resources with a nexus to hydrology (e.g., visual resources/scenery, recreational use [e.g., hunting, backpacking], wildlife).

- What hydrologic functional parameters and metrics should be used to ensure proper conservation of hydrologic functions, processes, and resilience of features such as (but not limited to) springs, riparian areas, subsurface flows, and floodplains when considering potential hydrologic effects upon resources, the design of project-level proposals, and/or monitoring effects?
- How will key hydrological nexuses be identified, considered, analyzed, and/or monitored for effects related to large-scale vegetation management projects so that diverse landscape values and interconnected ecological factors are properly managed?
- What types of proposals warrant specific consideration of hydrologic effects, including effects on subsurface flows, and how will management ensure such consideration?

5.1.11 Minerals

Lands now within the Monument have a history of mining and minerals development. The status of potential for claims and activities has changed in the context of changing management plans and Monument boundaries. Prior to Monument designation most areas were open to mineral entry; controversy is continuing due to the mineral withdrawal. There are concerns about lack of access to critical rare earth minerals and concerns about loss of economic opportunity in local communities. White Mesa Mill has written directly to the president over this issue, and the U.S. Department of Energy is interested in continuing operations at the White Mesa Mill, with significant opposition from Tribes and NGOs. For coal, oil, and gas leasing, and sand and gravel sale, the BLM exercises more regulatory discretion. Abandoned mine lands (AMLs) are a concern and would be closed as they are identified and funding allows.

- What valid and existing claims exist within the Monument and how could ongoing and potential activities impact Monument objects and values?
- What criteria should be used to prioritize AML restoration work, in conformance with BLM Manual 3720-1 – *Abandoned Mine Land Program Policy Handbook*?
- How will access to abandoned mines for environmental investigation and cleanup be facilitated?

5.1.12 Paleontological Resources and Geology

BENM contains exceptional paleontological resources, with ongoing related science that involves excavations and discoveries. Monetary benefits from such fossils can be substantial. As a result, local stakeholders have interest in gaining rights and financial interests related to these resources.

- How should paleontological resources be protected, curated, and otherwise managed and transacted?

5.1.13 Climate Change

BENM's large landscape and diverse resources and objects at play have potential both to be affected by climate change and affect climate change.

- Broadly, how would BLM and USDA Forest Service management address effects of climate change on Monument objects and values? What approaches to Monument management have potential for meaningful effects on climate change?
- What management is necessary to ensure landscape resiliency in the face of prolonged and intensifying drought conditions and climate change? Specifically, how can climate change, drought, and novel weather patterns be accounted for within diverse project-level planning?
- How might RMP-level decisions affect project-level planning, which may interplay with natural events such as wildfire and flooding?
- How might Monument management and associated scientific studies meaningfully contribute to scientific understanding (e.g., through studies related to the effects of project-level management after completion of the present RMP planning effort)?
- How might climate variability impact the land-based livelihoods (e.g., livestock grazing) and traditional subsistence practices within the Planning Area?
- Which communities or interest groups are most likely to be impacted by climate change and how might management actions exacerbate or mitigate those impacts?

5.1.14 Environmental Justice and Social and Economic Values

There is often a direct connection between planning criteria for resource decisions associated with the Proclamation's objects and values and socioeconomic values. Planning decisions related to a variety of resources, including, but not limited to, recreation and tourism, cultural and paleontological, grazing, dark skies, and land exchanges, among others, can impact socioeconomic resources and potentially affected communities.

- What socioeconomic values will be affected by which resource management actions?
- Which communities or interest groups associated with the Monument are most likely to be impacted by climate change and how might Monument management actions exacerbate or mitigate those impacts?
- What management considerations might meaningfully affect environmental justice populations?

5.1.15 Lands and Realty

The RMP would review and identify all lands and/or interests in lands for retention, disposal, and/or interests for acquisition, as well as certain right-of-way (ROW) considerations. Some specific questions include

- How should acquisition of private inholdings in the Monument be addressed?
- What criteria and/or guidelines are needed to identify access priorities and address the need for additional public access and enhancing existing access through signing and cooperation with other agencies?
- What areas in the Monument should be designated as ROW exclusion and avoidance areas?
- How should existing ROWs that are in conflict the Monument objects and values be considered?

5.1.16 Landscape Characteristics including Visual Resources, Scenery, Night Skies, Natural Soundscapes, and Air Quality

The large remote, isolated, and rugged/primitive character of the Monument landscape is foundational to the Monument's designation and the associated Monument objects and values. Associated qualities such as soundscapes and air quality and the "star-filled . . . black night sky" are an integral part of the Monument objects and values.

- To what extent should the BLM provide specific management to maintain, restore, or improve resources conditions related to values such as remoteness, solitude, and primitive character?
- What are the characteristics of this remote and rugged landscape itself that should be explicitly managed for (e.g., natural soundscapes, air quality)?
- What metrics and thresholds should be used relative to these characteristics of the landscape to ensure retention of (and avoid incremental degradation to) the Monument's character (e.g., how will visual resources, scenery, night skies, natural soundscapes, and air quality be managed)?

5.1.17 Special Land Designations for Conservation and Protection

As with the presidential designation of "National Monument," the Planning Area has a history of high controversy around special land designations related to conservation and preservation. In considering how to protect the Monument's objects and values:

- Are special land designation assignments consistent with the proclamations and other legal mandates?
- Are special land designations compatible with certain key management challenges, including fuels management and recreation use management?

Wilderness Study Areas (WSAs)

- Are the proclamation and other legal mandates and decisions consistent with WSA designations?
- Are solutions to key management challenges, including fuels, travel, and recreation management, compatible with WSA designations?
- How should SITLA lands within WSAs be managed to ensure consistency with proclamation and WSA conservation intents?

Wilderness Areas

- Are the proclamation and other legal mandates consistent with wilderness designations?
- Are solutions to key management challenges, including fuels, travel, and recreation management, compatible with wilderness designations?

Area of Critical Environmental Concern (ACECs)

The Monticello RMP includes ACECs that are now part of the Monument. As part of the planning process, ACECs (43CFR 1601.0-5[a]) will be identified, considered, and if appropriate, be designated based on relevance and importance.

- ACECs (43CFR 1601.0-5[a]) will be identified, considered, and designated based on relevance and importance and special management attention (43 CFR 1610.7-2; BLM Manual 1613). It is expected that stakeholders will have a high level of interest and controversy in any ACEC designation.
- How would alternatives affect the relevant and important resource values proposed ACECs?

Wild and Scenic Rivers (WSRs)

WSRs are managed to protect and enhance rivers' values, including free-flow, water quality, and outstandingly remarkable values. There are river segments within the Monument that have been evaluated for WSR characteristics and determined to be suitable.

- Should WSR eligible segments be considered for designation in the RMP?
- How should WSR values be protected while balancing for the demand of increased recreation and other uses?
- How should rivers' values (i.e., free-flow, water quality, outstandingly remarkable values) be enhanced and protected?

5.1.18 Historic Communities, Historic Resources

The Monument has a rich history of human habitation and unique natural landscapes related to Monument objects and values.

- What level of management should the BLM and USDA Forest Service apply to restore and enhance post-contact historical resources?
- To what extent should the BLM and USDA Forest Service seek to enhance the condition of historical properties as opposed to maintaining their current condition?
- To what extent should site stabilization be used to mitigate visitor or other resource impacts to historic cultural sites?
- How will the Hole-in-The-Rock Trail be managed?

5.1.19 Science

The Proclamation emphasizes the importance of objects of historic and scientific interest within the Monument and presents an opportunity for the study of diverse resources. However, clarification and optimization of this purpose is needed.

- How will traditional knowledge be used to inform scientific study and science-based management decisions (e.g., fuels, vegetation management, wildlife management, and management of cultural resources) within the Monument?
- What scientific opportunities are unique within the Monument (e.g., as opposed to other locations on the substantial adjoining landscapes)? How can these landscape-specific opportunities be emphasized in the science-related activities of the Monument?
- How can external parties (e.g., universities, State of Utah, citizen science groups) be engaged to conduct applied science studies of resource management that improve ongoing and/or future management and decisions (e.g., studies of effects, risks, capacities; or monitoring to assess conditions, identify trends, inform adaptive management)?
- How should science be appropriately supported within the scope of Monument management?
- How should the RMP provide for reasonable ease of access (procedurally and on the ground) for scientific study on remote landscapes within the Monument, including consideration of factors such as permitting, travel routes, human safety, etc.?

5.1.20 Other

In addition to the above preliminary resource management concerns and associated issues, the following programs and resources will be analyzed in the RMP (BLM *Land Use Planning Handbook* H-1601-1:Appendix C), in order to establish goals, objectives, and management actions:

- Renewable energy
- Visual resources

5.2 TERRESTRIAL HABITAT, VEGETATION RESILIENCE AND CONSERVATION (LARGE-SCALE AND LOCAL ECOTYPES)

5.2.1 How would existing and proposed land use allocations (such as livestock grazing, recreation, and lands and realty actions) and discretionary uses affect terrestrial vegetation, including special status plant species?

Geographic and Temporal Scale of Analysis

The geographic scale of analysis is the Planning Area. The temporal scale of analysis is the lifetime of the plan.

Relevant Assumptions

- None identified at this time.

Analysis Methodology and Techniques

- Qualitatively discuss the effects of livestock grazing/recreation on the extent, health, and ecological function of vegetation communities.
- Quantitatively discuss the effects of livestock grazing/recreation on the extent, health, and ecological function of vegetation communities, if data available.
- Compare how alternatives would impact vegetation communities based on acres available and unavailable for livestock grazing, or open or closed to recreation.

Units of Measure

- Acres available for livestock grazing in each alternative
- Acres open/closed to recreational use in each alternative
- Acres available for livestock grazing overlaid with vegetation types and/or ecological site groups in each alternative Land use allocations for various types of recreation for each alternative in the RMP/EIS

Relevant Data and Information to Be Used

- Acres of vegetation types (LANDFIRE Existing Vegetation Types and/or ecological site groups)
- LANDFIRE Vegetation Condition Classes (VCCs) across the Planning Area
- List and location of special status plant species in the Planning Area
- Vegetation Classification, Mapping, and Quantitative Inventory (VCMQ) data in the Planning Area
- USFWS habitat data for special status plants
- Traditional Indigenous Knowledge regarding culturally important plants
- The Plants and Woodland Resources section and other relevant sections of the BEITC LMP

- USDA Forest Service data on dispersed camping locations

Analytical Conclusions to Be Answered

- Compare the likely impact of each alternative on vegetation trends and communities in the Planning Area, including special status species. Draw conclusions about which alternatives would likely result in impacts to trends and vegetation communities within BENM.

Analysis Display

- Table of acres available for livestock grazing overlaid within different vegetation types in each alternative
- Table of acres available/unavailable for certain recreation uses overlaid with different vegetation types in each alternative

5.2.2 How would existing and proposed vegetation management affect terrestrial vegetation and special status plant species?

Geographic and Temporal Scale of Analysis

The geographic scale of analysis is the Planning Area. The temporal scale of analysis is the life of the plan.

Relevant Assumptions

- Specific treatments would be designed and applied during RMP implementation; this analysis considers only the estimated acreage of treatments that would be applied but not specifically where, how, or when they would occur.
- Proposed management effects on the presence of invasive plant species are addressed under analytical issues in Section 5.2.
- As identified in *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022), "ongoing engagement would allow traditionalists that are part of the BEITC Tribal Nations to identify any conflicts with natural resources without necessarily needing to share specific culturally sensitive information with land management agencies."

Analysis Methodology and Techniques

- Quantitatively compare acres of estimated vegetation management under each alternative.
- Describe the impacts of vegetation management types that would occur under each alternative, including short-term negative and positive impacts.
- Summarize the effects of each alternatives impact across vegetation types.

Units of Measure

- Acres of vegetation types
- Acres of vegetation management

Relevant Data and Information to Be Used

- Acres of vegetation types (LANDFIRE Existing Vegetation Types and/or ecological site groups)
- LANDFIRE Vegetation Condition Classes across the Planning Area
- List of special status plant species in the Planning Area
- Types of vegetation management in each alternative
- Traditional Indigenous Knowledge regarding culturally important plants
- The Plants and Woodland Resources section and other relevant sections of the BEITC LMP

Analytical Conclusions to Be Answered

- Provide major vegetation communities with a +, -, or = grade (meaning they cause an improvement, decline, or no impact, respectively) under each alternative with a brief qualitative summary.
- Briefly compare the likely condition of each major vegetation community under each alternative incorporating Traditional Indigenous Knowledge where available.
- Briefly compare the likely condition of each major vegetation community under each alternative.
- Qualitatively discuss how each alternative would contribute to trends in the extent of vegetation communities in the Planning Area.
- Compare estimated acres of vegetation management under each alternative.

Analysis Display

- Tables and maps with estimated acres of different vegetation management that would occur over the life of the RMP under each alternative

5.3 NOXIOUS WEEDS AND INVASIVE NONNATIVE PLANTS

5.3.1 How would existing and proposed land use allocation decisions about grazing, recreation, lands and realty actions, and discretionary uses affect noxious weeds and invasive nonnative plants?

Geographic and Temporal Scale of Analysis

The geographic scale of analysis is the Planning Area since this is where management decisions that affect noxious weeds and invasive nonnative plants will apply. The temporal scale of analysis is the lifetime of the plan.

Relevant Assumptions

- Invasive nonnative plant species are more likely to become established and spread in areas where the ground surface has been recently disturbed.
- Natural (e.g., wind, water, and wildlife) and human (e.g., recreationists, motor vehicles, and livestock) sources will continue to introduce invasive nonnative plant species to the Planning Area.
- Invasive nonnative plant species tend to become established along developed roads, trails, waterways, and ROWs, at recreational destinations, at livestock developments, and in other congregation areas.
- Recreation demand will continue to increase, in southeastern Utah.

Analysis Methodology and Techniques

- Qualitatively discuss the effects of livestock grazing on noxious weeds and invasive nonnative plant species' establishment and spread.
- Quantitatively discuss the effects of livestock grazing on noxious weeds and invasive nonnative plant species' establishment and spread if data available.
- Compare which alternatives would have the greatest impacts on noxious weeds and invasive nonnative plant species' establishment and spread based on acres available and unavailable for livestock grazing.
- Qualitatively discuss the effects of recreation on noxious weeds and invasive nonnative plant species' establishment and spread.
- Compare which alternatives would have the greatest impacts on noxious weeds and invasive nonnative plant species' establishment and spread based on acres or miles of trails open or closed to recreation and areas available, limited, and not available for certain types of recreation.

Units of Measure

- Counts of noxious weeds and invasive nonnative plant species' observations
- Acres available and unavailable for livestock grazing
- Acres and miles of trails open and closed to recreation and areas available, limited, and not available for certain types of recreation

- Frequency of occurrence of noxious weeds and invasive plants

Relevant Data and Information to Be Used

- BLM terrestrial Assessment, Inventory, and Monitoring (AIM) Strategy data for monitoring plots in the Planning Area
- Any other data on current conditions, trends, and forecasts
- Areas available or unavailable for livestock grazing
- Areas open or closed to recreation
- BLM/USDA Forest Service spatial data for noxious weeds and invasive nonnative plant species
- BLM rangeland monitoring and trend data

Analytical Conclusions to Be Answered

- Compare the likely impact of each alternative on the establishment and spread of invasive plant species. Draw conclusions about how the alternatives would impact invasive plant species' establishment and spread within BENM.

Analysis Display

- No analysis display will be included.

5.3.2 How could existing and proposed vegetation management affect noxious weeds and invasive nonnative plants?

Geographic and Temporal Scale of Analysis

The geographic scale of analysis is the Planning Area since this is where management decisions that affect noxious weeds and invasive nonnative plants will apply. The temporal scale of analysis is the lifetime of the plan.

Relevant Assumptions

- Noxious weeds and invasive nonnative plant species are more likely to become established and spread in areas where the ground surface has been recently disturbed.
- Natural (e.g., wind, water, and wildlife) and human (e.g., recreationists, motor vehicles, and livestock) sources will continue to introduce noxious weeds and invasive nonnative plant species to the Decision Area and overall Planning Area.
- Noxious weeds and invasive nonnative plant species tend to become established along developed roads, trails, waterways, and ROWs, at recreational destinations, at livestock developments, and in other congregation areas.

Analysis Methodology and Techniques

- Assess the likely establishment and spread of invasive plants by alternative based on estimated acres of affected surface and treatment type by alternative.
- Describe the likely effectiveness of treatments (e.g., herbicides or no herbicides) on controlling invasive plant species by alternative.

Units of Measure

- Counts of noxious weeds and invasive nonnative plant species observations
- Percentage of nonnative/noxious weed cover in monitoring plots
- Acres of anticipated vegetation management

Relevant Data and Information to Be Used

- BLM/USDA Forest Service spatial data for noxious weeds and invasive nonnative plant species
- BLM terrestrial AIM Strategy data for monitoring plots in the Planning Area
- Acres of affected surface by alternative from vegetation management, livestock grazing, recreation, and other activities
- Data and literature on the effectiveness of treating invasive plants with proposed treatment methods as well as incorporating Traditional Indigenous Knowledge regarding treatment methods or ways to coexist with some nonnative species
- Any other data on current conditions, trends, and forecasts
- BLM rangeland monitoring and trend data
- Acres of weed treatments (if available)
- Pesticide use reports

Analytical Conclusions to Be Answered

- Compare the likely impact of each alternative on the spread and treatment of invasive plant species. Draw conclusions about which alternatives would likely result in the greatest and least invasive plant species spread within BENM.

Analysis Display

- Table or map presenting past vegetation management areas
- Table of affected surface acreage by alternative, if available

5.4 SOILS AND BIOLOGICAL SOIL CRUSTS

5.4.1 How would existing and proposed land use allocations affect the structure, health, and function of soil resources (including biological soil crusts and other sensitive soils) across the landscape?

Geographic and Temporal Scale of Analysis

The analysis area for soils covers the Planning Area and would include all land not covered by a waterbody or exposed bedrock, since soils are generally ubiquitous. Analysis would include current conditions (where current data are available) or more recent available datasets. The temporal scale of analysis is the lifetime of the plan.

Relevant Assumptions

- Soils occur on all land within the Planning Area except those covered by a body of water or exposed bedrock.
- BSC conditions can be derived from plot data generated by agencies and extrapolated spatially (as appropriate).
- Sensitive soil types occur in approximately the locations where they can be mapped according to Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) data (Order 3 mapping) or other agency-generated datasets.

Analysis Methodology and Techniques

- Evaluate 1) potential changes to the management of land use activities and 2) trends in land use to assess the potential impact of those activities qualitatively and quantitatively to the structure, health, and function of soil resources (including BSCs and other sensitive soils)

Units of Measure

- Acres and locations of soil resources currently impacted by various land use activities
- Acres of soil resources that could be affected by modifying land use activities
- Acres meeting, not meeting, and/or making progress toward meeting Standard 1 (upland soils) for rangeland health

Relevant Data and Information to Be Used

- List of possible management practices or actions that could be modified (including possible modified land use activities)
- List of soil restorative activities that could mitigate deleterious impacts to soil resources
- Maps of soil types derived from NRCS SSURGO data or from USDA Forest Service soils data
- Agency monitoring plot data (BLM AIM, BLM long-term trend studies, USDA Forest Service Forest Inventory and Analysis [FIA], USDA Forest Service long-term trend studies, Utah Division of Wildlife Resources [UDWR] long-term range trend studies)

- Maps or reports of land use activity trends
- Current grazing data on allotments/pastures derived from annual/trend monitoring, allotment management plan, rangeland health determinations
- Traditional Indigenous Knowledge may have input on effective soil restorative activities

Analytical Conclusions to Be Answered

- Identify impacts to the structure, health, and function of soil resources (including BSCs and other sensitive soils), including in traditionally important areas, under the alternatives.

Analysis Display

- Maps delineating areas of sensitive soils and BSC types, current land uses, and areas requiring special attention for protection, or restoration and/or modified land use activities. Supplement with data showing current land use and areas of BSCs and other sensitive soil resources.

5.4.2 How is climate change expected to impact the health and function of soil resources (including biological soil crusts and other sensitive soil types)?

Geographic and Temporal Scale of Analysis

The analysis area for soils covers the Planning Area and would include all land not covered by a waterbody or exposed bedrock, since soils are generally ubiquitous. Analysis would include current conditions (where current data are available) or more recent available datasets. The temporal scale of analysis is the lifetime of the plan.

Relevant Assumptions

- Soils occur on all land within the management area except those covered by a body of water or exposed bedrock.
- Soil conditions (including BSCs and other sensitive soils) can be derived from plot data generated by agencies and extrapolated spatially (as appropriate).
- Generalizations about the impacts of climate change on soils resources can be derived from research.
- Generalizations about the impacts of various management practices can be derived from agency research or monitoring.

Analysis Methodology and Techniques

- Evaluate the potential impacts on soil health (including BSCs and other sensitive soils) in various future climate scenarios.
- Evaluate the possible management actions that could be implemented to limit climate impacts; qualitatively and quantitatively assess the magnitude of potential effects of management interventions on soils (including BSCs and other sensitive soils).
- Use relevant agency monitoring data to assess the efficacy of these management interventions, if applicable.

Units of Measure

- Identify specific types of practices that could be implemented for mitigating impacts to soil resources, and if those actions are specific to BSCs or sensitive soil types.
- Acres of impact and volume of soil resources (if applicable) that could be impacted from each practice (to be evaluated semi-quantitatively).

Relevant Data and Information to Be Used

- Scientific research and reports on the topic of climate impact on soil resources (including BSCs and other sensitive soils)
- List of possible management practices/actions to address climate change impacts on soil resources and the efficacy of these practices/actions
- Agency monitoring plot data that documents current soil conditions (BLM AIM, BLM long-term trend studies, USDA Forest Service FIA, USDA Forest Service long-term trend studies, UDWR long-term range trend studies)

Analytical Conclusions to Be Answered

- Likely impacts of climate change on soil resources (including BSCs and sensitive soil) and a list of land use allocations or vegetation management actions that may protect soil resources

Analysis Display

- Table summarizing expected impacts of climate change on soil resources, including any specific impacts for BSCs or other sensitive soils.
- Table summarizing possible management outcomes of management practices/actions and expected outcomes of implementing each practice/action.

5.4.3 How would the proposed management of recreational use within BENM impact soil resources (including biological soil crusts and other sensitive soils)?

Geographic and Temporal Scale of Analysis

The analysis area for soils covers the Planning Area and would include all land not covered by a waterbody or exposed bedrock, since soils are generally ubiquitous. Analysis would include current conditions (where current data are available) or more recent available datasets. The temporal scale of analysis is the lifetime of the plan. Information about the amount and nature of recreational disturbance can be drawn or generalized from relevant reports and spatial datasets.

Relevant Assumptions

- Soils occur on all land within the management area except those covered by a body of water or exposed bedrock.
- Soil conditions (including BSCs and other sensitive soils) can be derived from monitoring plot data generated by agencies and extrapolated spatially (as appropriate).

Analysis Methodology and Techniques

- Evaluate the trends in recreational activity and possible changes to management of recreation
- Qualitatively and quantitatively assess the potential impacts from current trends and possible changes to management on the condition of soil resources (including sensitive soils and BSCs)

Units of Measure

- Acres and locations of soil resources (including specific delineation of BSCs and other sensitive soils) currently impacted by recreation activities
- Acres of impact and/or volume of soil resources (if applicable) that could be affected by modified recreation management (likely to be assessed semi-quantitatively)

Relevant Data and Information to Be Used

- List of possible management practices/actions related to recreation management
- Possible management practices/actions related to recreation management suggested in the Recreation and Tourism section of the BEITC LMP
- Maps of soil types derived from NRCS SSURGO data or from USDA Forest Service soils data
- Agency plot data (BLM AIM, BLM long-term trend studies, USDA Forest Service FIA, USDA Forest Service long-term trend studies, UDWR long-term range trend studies)
- Maps or reports of recreational use or trends in BENM
- Reports on the impacts of recreation management interventions on soil resources

Analytical Conclusions to Be Answered

- Identify areas in need of special attention for protection of modified recreational management to maintain or improve the condition of soil resources (including BSCs and other sensitive soils) and possible management interventions for areas of concern.

Analysis Display

- Maps delineating areas of sensitive soils and BSC types, active recreation areas and areas in need of special attention for protection or modified recreational management to maintain or improve the condition of soil resources (including delineation specific to BSCs and other sensitive soils)
- Table summarizing the expected outcomes of those management activities

5.4.4 How would BENM management actions impact soils (e.g., degradation, erosion, preservation, etc.), including sensitive soils?

Geographic and Temporal Scale of Analysis

The analysis area for soils covers the Planning Area and would include all land not covered by a waterbody or exposed bedrock, since soils are generally ubiquitous. Analysis would include current conditions (where current data are available) or more recent available datasets. The temporal scale of analysis is the lifetime of the plan. Information about the amount and nature of land use activities can be drawn or generalized from relevant reports and spatial datasets. Generalizations about the impacts of best management practices (BMPs) and other management practices can be derived from agency research or monitoring (to speculate on the impact of various management interventions).

Relevant Assumptions

- Soils occur on all land within the Planning Area except those covered by a body of water or exposed bedrock.
- Sensitive soil types occur in approximately the locations where they can be mapped according to agency-generated datasets.

Analysis Methodology and Techniques

- Evaluate the possible BMPs, restrictions, or permitting requirements that could be implemented to limit soil-impacting activities; qualitatively and quantitatively assess the magnitude of potential impacts to soils (including sensitive soils and BSCs).
- Use relevant data to assess the efficacy of these BMPs or other management interventions, if applicable.

Units of Measure

- Identify specific types of practices that could be implemented for mitigating impacts to soil resources and if those actions are specific to sensitive soil types.
- Evaluate the acres of impact and volume of soil resources (if applicable) that could result from each practice.

Relevant Data and Information to Be Used

- Maps of soil types derived from agency data sources
- Maps or reports of existing land use activities/trends
- Reports on efficacy of various management practices/actions
- Use of AIM data if applicable
- Traditional Indigenous Knowledge of soil management and/or restoration may inform best practices

Analytical Conclusions to Be Answered

- Draw conclusions about soil-disturbing activities and their impacts to soils, including sensitive soils and BSCs, on soil degradation or erosion under the alternatives.

Analysis Display

- Table of practices, restrictions, or permit requirements and a summary of anticipated outcomes of implementing each

5.5 RANGELAND HEALTH AND LIVESTOCK GRAZING MANAGEMENT

5.5.1 How will proposed management of the Monument affect rangeland conditions and livestock grazing and forage, including range improvements?

The RMP will propose alternative approaches to management direction for resources and resource uses, including livestock grazing and rangeland health. Analysis of the RMP alternatives will be brought forward in the EIS using the indicators and assumptions identified below.

Geographic and Temporal Scale of Analysis

The analysis area includes all lands within the allotments in the Planning Area. The temporal scale is the life of the plan.

Relevant Assumptions

- There may be minor discrepancies between the actual acres of allotments within the Planning Area and the geographic information system (GIS) layers used to determine the extent of those allotments.
- Terms and conditions will be adhered to by permittees.

Analysis Methodology and Techniques

The analysis of effects of the alternatives on rangelands and livestock grazing are based on the following indicators:

- Change in acreage availability for grazing
- Change in forage availability
- Change to rangeland trend for grazing
- Change in available water resources
- Extent of vegetation management in BENM
- Extent of motorized and non-motorized recreational use in BENM; acres open to public, as well as the road and trail miles open to recreational use

Units of Measure

- Number and size (acres) of allotments that are administered by the BLM and USDA Forest Service within BENM
- Acres available and unavailable for grazing
- Total permitted animal unit months (AUMs) or head months (HMs)

Relevant Data and Information to Be Used

- Rangeland heath assessments, evaluations, and determinations from the agencies

- Rangeland trend and monitoring data from the agencies
- Allotment trend and evaluation reports

Analytical Conclusions to Be Answered

- Analyze how the alternatives would impact livestock grazing and rangeland health
- Analyze impacts on livestock grazing and rangeland health from management decisions in other resource areas
- Analyze impacts on rangeland health from vegetation management
- Analyze impacts on rangeland health from livestock grazing
- Analyze impacts on rangeland health from climate change

Analysis Display

- Tables and figures of allotment data and locations

5.5.2 How will the proposed management address climate change and seasonal drought effects on long-term vegetative community changes?

The RMP will propose alternative approaches to management direction for resources and resource uses, including drought and changes in vegetation. Analysis of the RMP alternatives will be brought forward in the EIS using the indicators and assumptions identified below. Climate change is incorporated as a trend in changing conditions and is part of the EIS analysis.

Geographic and Temporal Scale of Analysis

- Same as issue 5.4.1.

Relevant Assumptions

- Same as issue 5.4.1.

Analysis Methodology and Techniques

The analysis of effects of the alternatives on rangelands and livestock grazing are based on the following indicators:

- Change in acreage availability for grazing
- Change in forage availability
- Change to rangeland trend for grazing
- Change in available water resources

Units of Measure

- Same as issue 5.4.1.

Relevant Data and Information to Be Used

- Historical forage availability as it relates to increased temperature and decreased water availability
- Number of range improvements required to counteract the effects of climate change
- Existing range improvements (Rangeland Improvement Project System database)
- Traditional Indigenous Knowledge of best practices for managing or restoring forage
- Management suggestions provided in Appendix C of the BEITC LMP

Analytical Conclusions to Be Answered

- Same as issue 5.4.1.

Analysis Display

- Same as issue 5.4.1.

5.6 RECREATION USE AND VISITOR SERVICES

5.6.1 How would proposed management affect the agencies' ability to provide recreation opportunities, targeted recreation outcomes, and recreation setting characteristics?

Geographic and Temporal Scale of Analysis

The geographic scale of analysis is the Planning Area. The temporal scale of the analysis is the life of the plan. The BLM uses recreation management area designations as a tool to identify geographic areas (polygons) where specific recreational management is needed to achieve targeted outcomes. The USDA Forest Service has a variety of tools to identify specific geographic areas with recreation management needs, including wilderness and recommended wilderness, inventoried roadless areas (IRAs), and Recreation Opportunity Spectrum (ROS) classifications.

Relevant Assumptions

- Recreation users will obey and comply with laws and regulations pertaining to recreation (e.g., trespass).
- Current trends in visitor use levels are the basis for projected demand, with the assumption that demand will increase over the life of the plan measured by the changes in use levels for recreational activities
- The potential for user interactions (for all user types) will rise with increasing use.
- The demand for most recreation activities will continue and likely increase, and technological advances may introduce new types of recreation.
- Demand for all types of recreation will increase, regardless of whether the activity is permitted or not.
- Revenue generated from permitted recreation activities will increase in the future.
- The Monument does not change the State of Utah's jurisdiction as it relates to hunting and fishing.
- The incidence of interactions (and potential conflicts) with non-motorized and motorized recreation use will rise with increasing recreation or natural resource use.
- In areas managed as available for grazing, the incidence of interactions between recreationists and livestock grazing operations will increase with rising recreation use.
- "Unmanaged and unregulated regulation and tourism is a major threat to the values held by the Tribal Nations of the BEITC."

Analysis Methodology and Techniques

- GIS analysis with quantitative discussion on total BLM and NFS areas designated as primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, rural, and urban as well as recreation management areas
- GIS analysis of BLM-administered lands will include recreation setting characteristics of the physical, social, and operational components

- Quantitative data, where available, on the loss or gain of recreational opportunities and experiences
- Qualitative discussion of change in user experience as indicated by type of allowable use
- Compare acres of recreation management areas to characterize recreation opportunities and types for the alternatives
- Development activities: Quantitatively and qualitatively compare existing disturbance acres (e.g., ROWs, grazing) to characterize recreation opportunities and types, as well as recreation enjoyment, for the alternatives
- Visitor health and safety: Qualitatively compare user conflicts for the alternatives
- Special designations and other management restrictions: Quantitatively and qualitatively compare existing disturbance acres (e.g., ACECs and Visual Resource Management [VRM]) to characterize recreation opportunities and types, as well as recreation enjoyment, for the alternatives.
- Collecting data through the following:
    - New documentation being produced in-house by the BLM and USDA Forest Service
    - Literature searches for publicly available data
    - Communications with the BLM, USDA Forest Service, and cooperating agencies to identify the specific recreational trends and current opportunities

Units of Measure

- Total miles of routes/trails open/closed to public non-motorized use
- Opportunities for public motorized access: Miles of routes open, limited, and closed for OHV travel
- Opportunities (miles/acres available) for non-motorized recreation
- Use level data from the BLM by number of participants, visitors, visitor use hours, and visitor days
- Use level data from the USDA Forest Service measuring visitation numbers
- Total acres of designated SRMAs
- Total acres of designated RMZs
- Total acres of management consistent with desired ROS classes
- Total acres of extensive recreation management areas (ERMAs)

Relevant Data and Information to Be Used

- GIS data regarding recreation use locations, trailheads, and areas (designated/developed/concentrated sites and proposed areas under each alternative)
- Road and trail networks for areas where designated travel for recreation use is currently occurring (mountain bikes, OHVs, etc.).
- Recreation and Tourism section of the BEITC LMP
- Recreation and visitor services suggestions provided in Appendix C of the BEITC LMP

- Surface ownership GIS layer
- List of current SRPs (for BLM) and special use permits (SUPs) (for USDA Forest Service) and required annual reporting of permit usage
- USDA Forest Service National Visitor Use Monitoring (NVUM) Program data for recreation sites within BENM
- Map of Monument objects and values
- BLM RMIS data for recreation sites within BENM
- USDA Forest Service visitation data
- Traditional Indigenous Knowledge
- BEITC LMP

Calculations needed per alternative include the following:

- RMA and RMZ acres broken down by landownership
- ERMA acres broken down by landownership
- ROS acres
- Total miles of routes/trails open to public non-motorized use broken down by type
- Opportunities for public motorized access: Miles limited to designated routes and closed for OHV travel

Analytical Conclusions to Be Answered

- Compare alternatives, discussing the effects on recreation management areas, permits, and types of recreation that would result from implementing the alternatives' management actions and allowable uses.
- Draw conclusions about which alternative would likely result in the greatest positive impact on achieving those goals within the Monument.

Analysis Display

- Tables and maps that show existing and proposed land use allocations (acres) for the Relevant Data and Information to Be Used listed above under each alternative

5.7 TRAVEL, TRANSPORTATION, AND ACCESS MANAGEMENT

5.7.1 How would proposed management of travel designations affect the travel and transportation system in BENM, including impacts to resources?

Geographic and Temporal Scale of Analysis

The geographic scale of the analysis is the Planning Area, and the temporal scale of analysis is the life of the plan.

Relevant Assumptions

- Travel management affects a variety of travel modes and opportunities for access to BLM-administered and National Forest System (NFS) lands. The alternatives will vary in providing motorized and non-motorized access.
- The demand for travel routes on BLM-administered and NFS lands is expected to grow, especially near communities.
- Travel area designations would not affect ROW holders, permitted uses, county or state roads, or access to valid existing rights. The agencies manage ROWs according to 43 CFR 2800, Rights-of-Way Under the Federal Land Policy and Management Act. Travel closures or limitations apply only to the use of off-road vehicles, as defined at 43 CFR 8340.0-5(a).
- Changing the size and distribution of land use designations for OHV use has a direct effect on motorized use patterns, which influence OHV use opportunities, public safety, and user conflicts.
- The agencies manage roads and motorized access under specific designations in accordance with relevant laws and regulations.
- If new roads and motorized trails are needed, they will be constructed to protect the objects and values in BENM and to protect public safety, per Proclamation 10285.
- As identified in *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022), new roads and trails created by recreationalists cause “damage to the land, ancestral sites, plants, and to sensitive soils,” as well as sometimes “overuse and misuse” of springs and other water sources.
- As identified in *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022), access and migration to the BENM area is important for the Tribal Nations of the BEITC, for “prayers, offerings, and gathering and renewing of resources” as well as “identity, purpose, connection, and grounding.”

Analysis Methodology and Techniques

- The analysis will use GIS data for the acres of travel designations and miles of designated routes to demonstrate current conditions. In addition, these data would provide a baseline for areas that could be affected by possible changes to designations.

Units of Measure

- Miles of existing roads and trails and their designations
- Acres of designations

Relevant Data and Information to Be Used

- Acres designated as open, limited, or closed
- Miles of road by authorized vehicle or mechanized use, including highways and county roads
- Acres of BLM travel management areas designated as open, limited, or closed
- Miles of NFS maintenance-level roads
- Acres of ROS classes
- Use level information/trends?
- Travel and transportation management identified in Appendix C of the BEITC LMP

Analytical Conclusions to Be Answered

- Alternatives will be compared with a discussion of the effects on travel, transportation, and access that would result from implementing management actions and allowable uses to meet resource and resource use objectives for the various programs while minimizing impacts to resources.

Analysis Display

- Tables and maps that show existing and proposed travel designations and routes

5.8 CULTURAL RESOURCE MANAGEMENT, NATIVE AMERICAN RELIGIOUS CONCERNS, AND TRIBAL USE

5.8.1 How will the proposed management ensure continued traditional uses of religious or cultural importance to Tribal Nations?

Geographic and Temporal Scale of Analysis

The geographic scale for analysis of impacts to traditional uses of religious or cultural importance to Tribal Nations and local communities is the Planning Area. Traditional use of specific resources (e.g., plants and animals) will each be analyzed within the geographic context of the full Planning Area. The temporal scale for analysis is the life of the plan and consists of current and reasonably foreseeable traditional uses of religious or cultural importance to Tribal Nations and local communities.

Relevant Assumptions

- Landscapes of religious or cultural importance to Tribal Nations are known, are identified in partnership with Tribal Nations, or can be inferred and can, where appropriate, be shown on a map in ways that protect the confidentiality of that information.

Analysis Methodology and Techniques

- Analysis will include overlay of land use allocations under the alternatives, with areas of known or inferred traditional use and will also include qualitative analysis of management actions with types of traditional uses.
- Analysis will include overlay of management actions under the alternatives with known or inferred landscapes of religious or cultural importance to Tribal Nations and local communities.

Units of Measure

- Traditional use areas of religious or cultural importance to Tribal Nations subject to impacts from management alternatives and qualitative analysis of types of traditional use subject to impacts from management alternatives
- Landscapes of religious or cultural importance to Tribal Nations and local communities subject to impacts from management alternatives

Relevant Data and Information to Be Used

- Relevant data include spatial extent of management action alternatives and traditional use areas and a list of types of traditional use.
- Traditional Indigenous Knowledge regarding traditional use resources and areas
- Data and information regarding cultural resources, as well as suggested management goals and objectives specific to cultural resources, in the BEITC LMP

Analytical Conclusions to Be Answered

- Analysis will show which management alternatives will impact traditional use areas of religious or cultural importance to Tribal Nations.

Analysis Display

- Known or inferred locations anticipated to be impacted by management alternatives will be described, as appropriate and in accordance with applicable law. Anticipated impacts to those locations of traditional use will then be described.
- Number of known locations anticipated to be impacted by management alternatives will be displayed in tabular format.

5.8.2 How will BENM management impact historic properties?

Geographic and Temporal Scale of Analysis

The geographic scale for analysis of impacts to historic properties is the Planning Area. The temporal scale for analysis is the life of the plan and consists of current and reasonably foreseeable impacts to historic properties.

Relevant Assumptions

- There are additional historic properties in the Monument which have not yet been identified.
- There are some cultural resources that were previously determined to be not eligible that through re-evaluation may be considered eligible.

Analysis Methodology and Techniques

- Where appropriate, analysis will include overlay of management prescriptions with locations of previously recorded cultural resources that are documented in the Utah Division of State History's database of documented archaeological and historic architectural locations.
- Locations of historic properties, archaeological sites, other resources of importance to Tribal Nations and consulting parties, and historic architectural locations are known or can be inferred and, in certain instances, can be shown on a map in ways that protect the confidentiality of that information. Efforts to locate and document unknown/undiscovered sites will be conducted prior to carrying out certain land use activities. Measures to avoid, minimize, or mitigate impacts to historic properties will be undertaken.

Units of Measure

- Counts of known historic properties, subject to impacts from management alternatives.

Relevant Data and Information to Be Used

- Relevant data include spatial extent of management action alternatives and locations of known historic properties, archaeological sites, and historic architectural locations.
- Data regarding historic properties that are significant to BEITC Tribes, reflected in the BEITC LMP

Analytical Conclusions to Be Answered

- Analysis will show how management alternatives will impact known historic properties.

Analysis Display

- The count of known historic properties, archaeological sites, and historic architectural locations impacted by management alternatives will be displayed in tabular format.

5.8.3 How will the BENM resource management plan protect cultural resources, including cultural landscapes, traditional uses, and historic properties?

Geographic and Temporal Scale of Analysis

The geographic scale for analysis of management alternatives to protect cultural resources, including cultural landscapes, traditional uses, and historic properties is the Planning Area. The temporal scale of analysis is the life of the plan and consists of those efforts to protect cultural resources occurring at the present time and those that are reasonably foreseeable in the future. Past and current types, scale, and relative distribution of efforts to protect cultural resources are well described. Due to expected changes in use, and by closely working with Tribal Nations, future efforts to protect cultural resources, in the broad sense, and use are expected to expand, and protection efforts will need to include new techniques.

Relevant Assumptions

- There are additional historic properties in the Monument which have not yet been identified.
- There are some cultural resources that were previously determined to be not eligible that through re-evaluation may be considered eligible.

Analysis Methodology and Techniques

- Qualitative analysis of cultural resources protection measures employed during past and current uses and subsequent projection of those measures for reasonably foreseeable efforts and use.

Units of Measure

- Qualitative assessment of protective measures designed to limit uses and protect resources at locations subject to impacts from management actions.

Relevant Data and Information to Be Used

- Relevant data include descriptions of past and current protection measures used to protect cultural resources and projections of reasonably foreseeable uses.
- Explanations of protective measures using traditional indigenous approaches, as reflected in the BEITC LMP

Analytical Conclusions to Be Answered

- Analysis will apply past and present measures to assess impacts to cultural resources during use under the proposed alternatives.

Analysis Display

- The results of the analysis will be described in text.

5.8.4 How will the BENM resource management plan provide information and education about cultural resources, including cultural landscapes, traditional uses, and historic properties, to the public?

Geographic and Temporal Scale of Analysis

The geographic scale for analysis of management alternatives to provide appropriate information and education about cultural resources, including cultural landscapes, traditional uses, and historic properties, to the public is the Planning Area. The temporal scale of analysis is the life of the plan and consists of those efforts and uses occurring at the present time and those that are reasonably foreseeable in the future. Past and current types, scale, and relative distribution of information and education efforts are well described. Due to expected changes in use and by closely working with Tribal Nations, future information and education efforts, in the broad sense, and use are expected to expand, and information and education efforts will need to include new techniques.

Relevant Assumptions

- None identified at this time.

Analysis Methodology and Techniques

- Qualitative analysis of cultural resources information and education efforts employed during past and current information and education efforts and use and subsequent projects on those measures for reasonably foreseeable efforts and use.

Units of Measure

- Qualitative assessment of information and education efforts.

Relevant Data and Information to Be Used

- Relevant data include descriptions of past and current information and education efforts and projections of reasonably foreseeable information and education efforts, including those identified in the BEITC LMP.
- Management suggested in Appendix C of the BEITC LMP

Analytical Conclusions to Be Answered

- Analysis will qualitatively evaluate past and present information and education efforts.

Analysis Display

- The results of analysis will be described in text.

5.8.5 How will the BENM resource management plan determine appropriate uses of cultural resources?

Geographic and Temporal Scale of Analysis

The geographic scale for analysis of appropriate uses of cultural resources is the Planning Area. The temporal scale of analysis is the life of the plan and consists of those uses occurring at the present time and those that are reasonably foreseeable in the future.

Relevant Assumptions

- Past and current types, scale, and relative distribution of use accurately reflect anticipated future use. Due to expected changes in use and by closely working with Tribal Nations, future uses, in the broad sense, are expected to expand, and efforts to determine appropriate uses will need to include new techniques.

Analysis Methodology and Techniques

- Qualitative analysis of measures used to determine appropriate uses of cultural resources and subsequent projects on those measures for reasonably foreseeable use, including those identified in the BEITC LMP.

Units of Measure

- Qualitative assessment of measures used to determine appropriate uses of cultural resources, including those identified in the BEITC LMP.

Relevant Data and Information to Be Used

- Relevant data include descriptions of past and current measures used to determine appropriate uses of cultural resources and projections of reasonably foreseeable use.
- Descriptions of past and current measures used to determine appropriate uses of cultural resources and projects of future uses in the BEITC LMP.

Analytical Conclusions to Be Answered

- Analysis will qualitatively evaluate measures used to determine appropriate uses of cultural resources.

Analysis Display

- The results of the analysis will be described in text.

5.9 FORESTRY AND WOODLANDS

5.9.1 How do existing and proposed vegetative treatments (e.g., prescribed fire, thinning) and harvesting affect the health and preservation of woodlands, the objects and values of the Monument related to forests, and traditional uses?

Geographic and Temporal Scale of Analysis

The geographic scale of analysis is BLM-administered and NFS lands in the Planning Area. The temporal scale of analysis is the life of the plan. As identified in *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022), plants and woodland resources are important sources of food, medicine, and spiritual identity for the Tribal Nations of the BEITC; for instance, "the Hopi Tribe believes that the harmony of trees, other vegetation, soil, water, and wildlife are necessary for the emotional and spiritual well-being of the Hopi people."

Relevant Assumptions

- Levels of demand for woodland products have risen in recent years, and this rise is expected to continue throughout the term of the plan.
- Woodland products available for harvest may be impacted by factors outside of BLM/USDA Forest Service management decisions.

Analysis Methodology and Techniques

- Describe the amount and type of woodlands in the Planning Area and indicate whether the woodland type and acreage is open or closed for woodland product harvest.
- Describe season, quantity, and demand for wood harvest by Tribal Nations.
- Summarize woodland types and acreages that have received past fuels or vegetation management.
- Discuss the results of those treatments if data are available and conduct a qualitative analysis if possible.
- Determine the planned acreage of fuels and vegetation management, and based on past management, qualitatively discuss the impacts of future management.
- Provide a qualitative analysis and discussion of planned forestry management and how it would impact woodlands.
- Discuss the impacts that woodlands open to OHV access would experience and quantify the acres that would be open.
- Discuss the impacts that seasonal wildlife restrictions would have on woodland harvest and quantify the acres of woodland types that would be affected.

Units of Measure

- Acres of woodland types in the Planning Area (Southwest Regional Gap Analysis Project [SWReGAP])
- Acres of woodland types that will be open/closed to woodland product harvest

- Acres of woodlands that have received fuels or vegetative treatments
- Acres of anticipated fuels or vegetation management in woodland types
- Acres of woodlands that are open/closed to OHV use
- Acres of the Planning Area with seasonal wildlife restrictions

Relevant Data and Information to Be Used

- SWReGAP data for woodland types
- Vegetation Classification, Mapping, and Quantitative Mapping Inventory (VCMQ) and Forest Inventory and Analysis Program data, using the following indicators for forest vegetative diversity and timber resources, if available:
    - Species composition (percent composition)
    - Stand density index (percent stocking by class)
    - Structural diversity (percent by class)
    - Productivity (hundred cubic feet)
    - Snags and wood down (trees per acre)
- Studies on forest health (USDA 2012, 2016])
- GIS data for areas open/closed for woodland product harvest
- Timber harvest areas in the Monticello FO RMP
- BLM/USDA Forest Service data for the number and value of wood permits sold for the past 5 fiscal years as available
- Acres of anticipated fuels or vegetation management in woodland types
- Areas open or closed to motorized access
- Acres of woodlands with seasonal wildlife restrictions
- Traditional Indigenous Knowledge regarding forest management and traditional Indigenous uses of certain woodland resources
- Management objectives and suggestions from the Woodlands and Forestry section of the BEITC LMP

Analytical Conclusions to Be Answered

- Discuss how vegetative management may impact woodlands.

Analysis Display

- Maps (e.g., woodland types, areas open and closed to woodland product harvest) and tables summarizing acreage data

5.10 WILDFIRE AND FUELS MANAGEMENT

5.10.1 How do current and proposed fire and fuels management techniques affect ecosystem function, fire regime, and health and human safety?

Geographic and Temporal Scale of Analysis

The geographic scale of analysis is the BLM-administered and NFS lands in the Planning Area. The temporal scale of analysis is the life of the plan.

Relevant Assumptions

- Generalized descriptions of the major plant communities (e.g., Fire Regime Groups [FRGs] and VCCs) are used to estimate the wildfire environment and potential fire risks.

Analysis Methodology and Techniques

- Existing baseline conditions will be measured with FRGs, VCCs, fire frequency/size, and fuel loading. These baseline conditions will be compared to potential projected future conditions. Assessment of both baseline and potential projected future conditions will include analyses from vegetation management (fire/other), restrictions on fire suppression, departure from historic fire regimes due to drought/warming conditions, and development and land use.

Units of Measure

- Acres of the Planning Areas within each FRG and VCC will be used to assess current fire regime conditions and current ecosystem function.
- Acres burned per year (2011–2021) by both natural and human-caused fires will be used to assess current fire regime conditions and current ecosystem function.
- Acres of fuels treatments per year (2013–2021) by fuels treatment method will be used to assess how fuels management is affecting fire regimes and ecosystem function.

Relevant Data and Information to Be Used

- VCCs and FRGs
- Historical fire frequency and size. Emphasize where fire has been infrequent but is projected to increase due to changing environmental conditions (e.g., drought/warming).
- Acres and locations of where vegetation management has been conducted and is needed. This is based on current and projected FRGs and VCCs and related data.
- Current and projected development/uses regarding risk and priorities for suppression and related data on affected resources.
- Integrating concepts and practices of Indigenous fire and fuels management to a achieve a more holistic and culturally sound approach to landscape-scale wildfire management, including management suggested in the Fire Management section of the BEITC LMP

Analytical Conclusions to Be Answered

- Qualitatively discuss potential impacts from vegetation management or fire management strategies across the Monument for each alternative.

Analysis Display

- Tables showing FRGs, VCCs, historical fire occurrence, fuels treatment, and fire management units across the Planning Area

5.11 WILDLIFE AND FISHERIES

5.11.1 How will proposed management of recreation and human access affect wildlife and fisheries habitat and populations?

5.11.2 How will the proposed management affect state wildlife agency habitat management goals and associated actions related to big game winter and summer range migration corridors and migration corridors for birds, insects, and fish?

Issues 5.11.1 and 5.11.2 have the same analytical framework, described below.

Geographic and Temporal Scale of Analysis

The geographic scale of analysis includes general wildlife habitat and special status species habitats that overlap the Planning Area. The temporal scale of analysis is the life of the plan.

Relevant Assumptions

- An increase in visitation and recreational use within areas of the Planning Area will increase risk of disturbance and/or avoidance (spatially and/or temporally) by wildlife species and increase the risk of human/wildlife conflict.

Analysis Methodology and Techniques

- Areas within the Planning Area experiencing an increase or a projected increase in visitor use or those that would be designated for certain uses and that overlap existing habitat for general wildlife and fish, sensitive species, federally listed species, or critical habitat would impact the existing quality and quantity of available habitat. For species with mapped habitat, the potential impact of recreation areas (and types of activities that would be allowed, limited, or prohibited) can be quantified. For species without mapped habitat, impacts will be qualitatively discussed.

METHODOLOGY

- Establish suitable habitat parameters for special status species if suitable habitat has not been mapped.
- Evaluate potential habitat for special status species based on a desktop analysis and relevant data sources, including scientific literature.
- Quantify and delineate areas of critical habitat, suitable habitat, and potentially suitable habitat for special status species or species groups, including big game.
- Quantify where habitat or species occurrences overlap with recreation areas and types of use (for example, OHV open areas or rock climbing areas).
- Qualitative discussion of potential effects to general wildlife and aquatic habitats, including big game and special status species and their use of seasonal habitats and migration corridors

Units of Measure

- Acres of special status species and big game habitat that overlap with recreational areas and types of recreation that may occur in each area
- Miles of suitable stream habitat that overlap surface-disturbing activities

DATA TO BE INCORPORATED

- Acres of habitat
- Latitudinal/Longitudinal direction from habitat or populations
- Species population and occurrence information

Relevant Data and Information to Be Used

- Critical habitat areas, occupied habitat areas, and areas of suitable habitat for wildlife and fish species. As available, projection of potential range shift due to climate change.
- As available, projection of potential range shift due to climate change

SPECIFIC DATA SETS TO BE USED, AS APPLICABLE

- SWReGAP land cover and vegetation community data
- SSURGO soils data
- USFWS critical habitat
- NHD and NWI aquatic resources data
- Utah Natural Heritage Program species occurrence data
- NatureServe data
- UDWR habitat data, population estimates, and migratory seasons and locations
- Wildlife movement and habitat connectivity information
- Relevant USDA Forest Service and BLM habitat and species occurrence and monitoring data and observations
- Springs Stewardship Institute (SSI) information
- Locations of recreational trails, camping, day use, and other areas
- Recreation management areas
- Traditional Indigenous Knowledge regarding best practices for wildlife management as well as traditional animal management and harvesting practices
- Management objectives and suggestions included in the Wildlife and Fisheries Resources section of the BEITC LMP

Analytical Conclusions to Be Answered

- How will designation of recreation areas or changes in intensity or type impact wildlife and fish habitats and populations?

- How will special status species, culturally important wildlife species as identified by Tribal partners, and big game habitats be impacted by designation of recreation areas or changes in intensity or type of use?
- How will designation of recreation areas or changes in intensity or type of use impact population trends for special status species and big game?

Analysis Display

- Maps and/or tables of habitat and designated recreation areas and/or allowed uses/activities.

5.11.3 How will BENM management non-recreation-based land use activities affect wildlife and fisheries habitat?

Geographic and Temporal Scale of Analysis

The geographic scale of analysis includes general wildlife habitat and species-specific habitats that overlap the Planning Area. The temporal scale of analysis is the life of the plan. Changes in resource management within the Planning Area may affect habitat for wildlife species and/or individuals (for example, vegetation management for invasive nonnative plants and/or noxious weeds may alter existing wildlife habitat; a change in areas available for fuelwood gathering may alter existing wildlife habitat; a change in water use may alter spring habitats, etc.). As identified in *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022), as surface disturbances occur, “natural habitat for wildlife is destroyed and their continued survival threatened,” and “the Hopi are concerned that ancestral sprits will ask why people are disturbing them in BENM.”

Relevant Assumptions

- Certain species are more vulnerable to human noise and activity disturbance than others.
- Certain species are more sensitive to disturbances at certain times of the year (e.g., breeding, nesting, rearing). For example:
    - Big game may be more sensitive to disturbance during fawning/calving or during winter.
    - Raptors and other birds may be more sensitive to disturbance during nesting.
    - Recreation in and around water sources may disturb amphibian breeding habitat or result in avoidance of terrestrial wildlife species.

Analysis Methodology and Techniques

Areas within the Planning Area where activities may be disruptive to wildlife and fish would be permitted, limited, or prohibited that overlap existing general habitat for wildlife and fish, special status species, federally listed species, or critical habitat and would impact the existing quality and quantity of available habitat. For species with mapped habitat, potential impacts can be quantified. For species without mapped habitat, impacts will be qualitatively discussed.

METHODOLOGY

- Establish suitable habitat parameters for special status species if suitable habitat has not been mapped.
- Evaluate potential habitat for special status species based on a desktop analysis and relevant data sources.

- Quantify and delineate areas of critical habitat, suitable habitat, and potentially suitable habitat for special status species or species groups.
- Quantify where habitat or species occurrences overlap with areas for which land use activities would be permitted, limited, or prohibited.
- Qualitative discussion of potential effects to general wildlife and aquatic habitats

Units of Measure

- Acres of special status species and big game habitat that overlap with areas for which land use activities would be permitted, limited, or prohibited
- Miles of suitable stream habitat that overlap land use activities

DATA TO BE INCORPORATED

- Acres of habitat
- Latitudinal/Longitudinal direction from habitat or populations
- Species population and occurrence information

Relevant Data and Information to Be Used

- Management strategy, critical habitat areas, occupied habitat areas, and areas of suitable habitat for wildlife and fish species
- As available, projection of potential range shift due to climate change

SPECIFIC DATA SETS TO BE USED, AS APPLICABLE

- SWReGAP land cover and vegetation community data
- SSURGO soils data
- USFWS critical habitat
- NHD and NWI aquatic resource data
- Utah Natural Heritage Program species occurrence data
- NatureServe data
- UDWR habitat data, population estimates, and migratory seasons and locations
- Wildlife movement and habitat connectivity information
- Relevant USDA Forest Service and BLM habitat and species occurrence and monitoring data and observations
- SSI information
- Locations of recreational trails, camping, day use, and other areas
- Areas for which land use activities would be permitted, limited, or prohibited
- Management suggestions from the Wildlife and Fisheries Resources section of the BEITC LMP

Analytical Conclusions to Be Answered

- How will management of resources for which land use activities that may be disruptive to wildlife and fish would be permitted, limited, or prohibited impact wildlife and fish habitat and populations, and would impact the existing quality and quantity of available habitat?
- How will special status species, culturally important wildlife species as identified by Tribal partners, and big game species habitat be impacted by a change in resource management?
- How will a change in resource management impact population trends for special status species, culturally important wildlife species as identified by Tribal partners, and big game species?

Analysis Display

- Maps and/or tables of habitat and resource management areas and types of activities

5.12 HYDROLOGY (groundwater, surface water, wetlands, riparian areas, floodplains, and water quality)

5.12.1 How would BENM management affect surface water hydrology and water quality?

Geographic and Temporal Scale of Analysis

The analysis area is the watershed (Hydrological Unit Code [HUC] 10) watersheds that intersect the Planning Area. The temporal scale of analysis is the life of the plan.

Relevant Assumptions

- Current drought trends will continue.
- Current trends in demand for water use will continue.

Analysis Methodology and Techniques

- Quantify acres of floodplain and riparian areas by management action under the alternatives.
- Quantify current surface water diversions used for resource uses.
- Quantify acres of floodplain and riparian areas by management action under the alternatives that are adjacent to impaired streams, lakes, reservoirs, and ponds, as defined by the Utah Division of Water Quality (UDWQ) and are listed as part of CWA Section 303(d) and 303(b) requirements. These lists are included in the *Final 2022 Integrated Report on Water Quality* (Integrated Report) (UDWQ 2022).
- Quantify acres of management action under the alternatives in watersheds with impaired assessment units (AUs),
- Identify all impaired rivers, reservoirs, lakes, ponds, and streams, as defined by UDWQ and listed in the most recent Integrated Report (UDWQ 2022), specifically within Utah's 303(d) and 303(b) lists in the Planning Area and analysis area and quantify miles of rivers and streams and acres of lakes, reservoirs, and ponds, as defined by UDWQ, in the Planning Area for each analysis area.
- Identify potential watershed improvement projects by analysis area.
- Quantify and locate livestock watering locations by allotment within each analysis area (watershed).
- Evaluate water quality throughout the analysis area using the 303(d) list of impaired waters.
- Identify and quantify Watershed Condition Framework ratings of USDA Forest Service HUC 6 watersheds.
- Identify water resources value to Tribal Nations' culture and history, including risks of their absence as present-day cultural and historical resources of Tribal Nations.
- The effects of proposed management on surface water hydrology and water quantity will be limited to subwatersheds at the HUC 6 boundary scale.
- SWReGAP and other relevant data sets from BLM and USDA Forest Service databases displaying riparian areas.

- The newly established groundwater wells within the School and Institutional Trust Lands Administration (SITLA) land exchange boundaries will be analyzed for their effects on surface waters and seasonal drawdown in specific zones.

Units of Measure

- Acres of floodplains and riparian areas within land use allocations under the alternatives
- Miles of streams within land use allocations under the alternatives
- Number of developed and undeveloped springs within land use allocations under the alternatives

Relevant Data and Information to Be Used

- SWReGAP for riparian areas and other relevant data sets from BLM and USDA Forest Service databases showing riparian areas
- BLM riparian condition database (proper functioning condition)
- USDA Natural Resources Conservation Service SSURGO data
- National Hydrography Dataset (NHD) for surface waters
- National Wetlands Inventory (NWI) for wetlands
- BLM wetland mapping data and USDA Forest Service wetland mapping data
- UDWQ Ambient Water Quality Monitoring System data for sites within the Planning Area, including UDWQ assessment for each AU listed in the most recent Integrated Report (UDWQ 2022) as well as data and recommendations from UDWQ total maximum daily load (TMDL) reports, specifically the Cottonwood Wash TMDL
- Federal Emergency Management Agency (FEMA) mapped floodplains
- Data from the BLM and USDA Forest Service on improved riparian areas
- GIS coverage of existing and proposed management allocations (e.g., OHV open use areas, Visual Resource Inventory (VRI) areas, Visual Resources Management (VRM) areas, and ACECs)
- BLM AIM data
- RIPS
- USDA Forest Service spring inventory data
- SSI field surveys and data collection on BLM-administered and NFS lands
- USDA Forest Service fen data
- BLM springs database
- U.S. Geological Survey (USGS) database
- Utah Valley University reports
- EPA reports, including reports on springs monitoring near White Mesa
- Traditional Indigenous Knowledge regarding the management and location of important water resources

- Management goals and suggestions from the Soil and Water Resources section of the BEITC LMP

Analytical Conclusions to Be Answered

- Degree of change in the extent and proper functioning of riparian areas, wetlands, and aquatic ecosystems and changes in water quality from management under the alternatives

Analysis Display

- Map to identify impaired watersheds (HUC 6), associated UDWQ AUs and impaired waterbodies, including rivers, streams, lakes, reservoirs, and ponds, as defined by UDWQ in the most recent Integrated Report (UDWQ 2022)
- Table to summarize acres of floodplain and riparian areas that are open or closed (through buffers) to land use activities
- Table to summarize trends in 303(d) and 305(b) impaired waters
- Table to summarize water quality/water quantity trends on rivers, streams, and springs based on BLM and USDA Forest Service data (i.e., fecal coliform data, spring flows in Grand Gulch)
- Table to summarize USDA Forest Service–collected water quality data trends from 2000 to the present
- Map to identify water resources valued in cultural and historical context of Tribal Nations

5.12.2 How would BENM management affect groundwater quality and quantity, groundwater-dependent ecosystems, public drinking water source protection zones, groundwater protection zones, or associated surface water resources?

Geographic and Temporal Scale of Analysis

The groundwater analysis area is the underlying aquifers crossed by the Planning Area and groundwater recharge areas. The temporal scale of analysis is the life of the plan.

Relevant Assumptions

- Current drought trends will continue.
- Current trends in demand for water use will continue.

Analysis Methodology and Techniques

- Quantify the number of known springs and seeps by proposed management activity under the alternatives.

Units of Measure

- Acres of land use allocation by alternative
- Count of spring and seeps by management activities under the alternatives
- Groundwater elevation

- Daily and/or annual production rates from water wells in acre-feet (AF) or gallons per minute based on local consumption values for permitted use and season of use
- Location of known springs, spring-fed streams, GDEs, public water reserves (PWRs), public drinking water protection zones, groundwater protection areas, and water wells

Relevant Data and Information to Be Used

- NHD for streams and spring-fed streams
- USGS principal aquifers
- Utah Geological Survey (UGS) springs and wells
- SSI field surveys and data collection on BLM-administered and NFS lands
- USDA Forest Service spring inventory data
- USDA Forest Service fen data
- BLM springs database
- BLM database for PWRs
- Public drinking source protection zones for Kane Gulch, Sand Island, and Natural Bridges National Monument
- Utah Division of Water Rights database for water wells
- EPA reports on spring monitoring, specifically near White Mesa
- BLM reports on groundwater remediation, specifically of the Fry Canyon area
- Traditional Indigenous Knowledge regarding culturally important water sources and best practices for water resource management
- Management objectives and suggestions from the Soil and Water Resources section of the BEITC LMP
- Known springs, spring-fed streams, GDEs, water wells, public drinking water source protection zones, groundwater protection areas, PWRs, and any associated buffers or limitations to permitted activities

Analytical Conclusions to Be Answered

- Changes to groundwater hydrology, groundwater recharge areas, springs, spring-fed stream systems, public drinking water source protection zones, Natural Bridges National Monument groundwater protection zone, PWRs, and GDEs
- Degradation in groundwater quality from land development occurring in proximity to aquatic resources critical to groundwater recharge

Analysis Display

- Map to display known springs, seeps, spring-fed streams, water wells, public drinking water protection zones, groundwater protection areas, and PWRs, identifying them relative to management activities contemplated under the alternatives
- Table to summarize the total springs, seeps, spring-fed streams, water wells, and other groundwater resources in the Planning Area

5.12.3 How will proposed land use allocations and discretionary uses impact water quantity?

Geographic and Temporal Scale of Analysis

The analysis area is the subwatershed (HUC 6) that crosses into the Planning Area. The temporal scale of analysis is the life of the plan.

Relevant Assumptions

- Current drought trends will continue.
- Current trends in demand for water use will continue.

Analysis Methodology and Techniques

- Quantify the number, locations, and types of water resources and active water uses in the analysis area and Planning Area under the alternatives.
- Estimate potential changes in precipitation from climate change and include a qualitative discussion on how that would affect hydrology, water quantity, and water quality in surface and groundwater in the analysis area under the alternatives.
- Summarize the BLM instruction memorandum (IM) for monitoring new water right applications and water uses by existing water rights (current and new applications) and estimating impacts to the Planning Area under the alternatives.
- Summarize BLM IM 2013-094, *Resource Management During Drought*, to understand drought impacts on local land use decisions (BLM 2013) under the alternatives.
- Quantify changes in stream flows, spring flows, and water levels in water wells over time with available data.

Units of Measure

- Acres of riparian areas and floodplains
- Number of springs and seeps that have downward trends in surface flows, including their designated use
- Number and locations of water wells with lowered water levels
- AF/year for water use

Relevant Data and Information to Be Used

- SWReGAP for riparian areas and other relevant data sets from BLM and USDA Forest Service databases showing riparian areas
- NHD for surface waters
- NWI for wetlands
- USGS principal aquifers
- USGS flow data

- USGS springs and wells
- BLM databases of springs data
- USDA Forest Service databases of springs data
- SSI database
- USGS database
- BLM RIPS database
- State of Utah water rights data
- Water well locations and water level data from all available sources
- Traditional Indigenous Knowledge regarding water resources and associated BMPs
- Water resource management goals and strategies outlined in the BEITC LMP
- BEC springs data
- Indigenous drought management plans

Analytical Conclusions to Be Answered

- Compare the likely impact of each alternative on changes in water quantity from climate change.
- Discuss trends in human water in each alternative including projected future human water uses (e.g., new water rights outside the Monument).

Analysis Display

- Table to summarize the number, locations, and types of water rights in the Planning Area in the past 10 years, including SITLA parcels exchanged into the Monument
- Flow chart to summarize the BLM and USDA Forest Service process for monitoring and reviewing water rights (current and new applications) for estimating impacts to the Planning Area
- Table or graphical figure to quantify changes in stream flow in the past 10 years inside the Planning Area

5.13 MINERALS

5.13.1 How would proposed management affect valid existing rights for locatable and leasable minerals in the Planning Area?

Geographic and Temporal Scale of Analysis

Proclamation 10285 withdrew all federal lands and interests in lands within the boundaries of BENM from location, entry, and patent under the mining laws and from disposition under all laws relating to mineral and geothermal leasing. The geographic scale of analysis is the Planning Area. The temporal scale of analysis is the life of the plan.

Relevant Assumptions

- Operators may develop valid existing rights[1] in BENM in accordance with applicable laws; not all valid existing rights may end up being developed.
- Determining whether mining claims are valid existing rights requires the completion of a validity examination. Development of claims determined to be valid would be allowed only in a manner that does not result in unnecessary or undue degradation.
- As identified in *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022), "historically and today, Native people travel long distances to collect materials for use in ceremonies," including minerals, stones, and pigments.

Analysis Methodology and Techniques

- Examine claim records from the BLM Mineral & Land Records System to determine acres of mineral resources claimed or leased and determine whether the RMP alternatives would reduce access to those claims.

Units of Measure

- Types and acres of mining claims and proximity to access roads

Relevant Data and Information to Be Used

- Claim and lease data downloaded from the BLM Mineral & Land Records System
- Traditional Indigenous Knowledge of traditionally significant minerals

Analytical Conclusions to Be Answered

- How many acres of existing mining claims in BENM may have access limited by the alternatives?

[1] For leasable minerals, a valid existing right is a lease that was issued prior to the date of withdrawal from mineral leasing and that has not been terminated. To constitute a valid existing right on a locatable mining claim that would allow for mining activities in an area despite a withdrawal from the Mining Law of 1872, a mining claim must be valid as of the date of the withdrawal and must continue to be valid from that date forward without substantial interruption until validity is determined by a certified mineral examiner.

Analysis Display

- Table and map showing the number and acres of claims within the boundaries of BENM may be included if the alternatives would result in varying effects on access to the existing claims.

5.13.2 How would proposed minerals management affect public health and safety in the Planning Area?

Geographic and Temporal Scale of Analysis

The geographic scale of analysis is the Planning Area. The temporal scale of analysis is the life of the plan.

Relevant Assumptions

- The only mineral development that would occur in the Monument would be from valid existing rights, and effects to public health and safety would be addressed in accordance with applicable laws.
- As identified in *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022), "Within the BENM uranium mining and oil and gas development would be detrimental to air and water quality, and the sound and vibrations caused by its extraction and transport would disturb plant life, wildlife, and other aspects of the cultural and natural environment. The production, use, and/or contamination of water as part of energy development in an arid environment such as Bear's Ears is a major contradiction to traditional beliefs regarding respect for the land and its resources."

Analysis Methodology and Techniques

- Qualitatively describe the risks associated with abandoned mines and future mines on existing claims that are then abandoned, such as groundwater contamination, drinking water contamination, air quality effects, and other potential releases of toxic substances, and the process for reclamation and hazard reduction.

Units of Measure

- Number of known hazardous abandoned mine sites reclaimed in the past
- Number of hazardous mine sites reclaimed per year

Relevant Data and Information to Be Used

- Number of hazardous mine sites that were sealed or reclaimed in the past and average per year (if records are available)
- Relevant scientific literature, including
    - *Impact of Upstream Oil Extraction and Environmental Public Health: A Review of the Evidence* (Johnston et al. 2019)
    - *The History of Uranium Mining and the Navajo People* (Brugge and Goble 2002)
    - *Health Effects of Uranium: New Research Findings* (Brugge and Buchner 2011)
- Mineral extraction concerns outlined in the BEITC LMP

Analytical Conclusions to Be Answered

- What are the current conditions of abandoned mine lands, and what process would be followed to safeguard public health and safety if new hazardous abandoned mine lands were discovered in BENM?

Analysis Display

- None

5.14 PALEONTOLOGY AND GEOLOGY

5.14.1 How would proposed management decisions regarding paleontological resource management (such as curation, protection, survey, collection, outreach, and interpretation) impact paleontological resources, research communities, local communities, and visitor experience?

Geographic and Temporal Scale of Analysis

The geographic scale of analysis is the Planning Area. The temporal scale of analysis is the life of the plan.

Relevant Assumptions

- Documentation/potential excavation would allow for research/interpretive uses.
- Public education would increase public awareness of the need for protection
- Pennsylvanian, Permian, Triassic, Jurassic, and Quaternary fossils from the Monument are extremely important to researchers, globally significant, and carry high public interest as they provide information about the Carboniferous-Permian icehouse-greenhouse transition, evolution of fully terrestrial tetrapods, and the rise of dinosaurs following the end-Triassic mass extinction as well as record dry climate responses to sudden temperature increases, as occurred at the end of the last glacial maximum.
- Once impacted, paleontological sites/specimens are not likely to be returned to their original condition.

Analysis Methodology and Techniques

- Qualitatively and quantitatively review existing data, current conditions, and trends given specific alternatives.

Units of Measure

- Units of measure will vary by relevant data type and will include measures such as acres of potential fossil yield classification (PFYC) system Classes 3, 4, and 5; number of known localities; and trends in survey, collection, and preservation.

Relevant Data and Information to Be Used

The data and information to be used will depend on the alternative and may include some of the following:

- Assessment of the significance of paleontological resources to the research community
- Number of acres in areas with significant fossil potential being proactively inventoried
- Number of fossils currently in collections being actively managed to curatorial standards
- Monetary/Economic value of fossil resources to the regional economy
- Number of research papers or publications produced annually on significant resources

- Number of significant fossils collected and curated annually
- Available space for curation of future collections at interested approved repositories
- Number of partnerships formed (or planned) 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, and other methods
- Number of visitors to field sites per year
- Traditional Indigenous Knowledge of paleontological resources
- Management goals and objectives provided in the BEITC LMP

Analytical Conclusions to Be Answered

- Draw conclusions about quantitative and qualitative changes to the above data and information under each alternative.

Analysis Display

- The analysis will be displayed in a PFYC map and map with paleontological resource.

5.14.2 How would proposed land use allocations and discretionary uses impact paleontological resources?

Geographic and Temporal Scale of Analysis

The geographic scale of analysis is the Planning Area. The temporal scale of analysis is the life of the plan.

Relevant Assumptions

- Potential for scientifically significant fossils is tied to the underlying geological units.
- Certain land use activities in areas with high and very high PFYC ratings have the potential to disturb significant fossils.
- Once impacted, paleontological resources cannot be returned to their original condition and lose important contextual data and scientific value.
- In areas where management actions and activities, either initiated by the agencies or by other land users, may threaten substantial or noteworthy fossils, the agencies will follow their policies to assess any threat and mitigate damage.

Analysis Methodology and Techniques

- Intersect PFYC units with areas affected by land use activities and areas of increased access under each alternative. Quantify or qualitatively assess degrees of impact associated with different activity levels.

Units of Measure

- Number of sites with paleontological resources affected
- Acres of geologic units with moderate to very high potential to contain important paleontological resources
- Degree of land use activity imparted

Relevant Data and Information to Be Used

- GIS data of site locations and geologic units with varying potential for containing important paleontological resources; categorization of disturbance (low, moderate, severe)
- Traditional Indigenous Knowledge of paleontological resources
- Relevant management goals and objectives provided in the BEITC LMP

Analytical Conclusions to Be Answered

- Determine the differences in the number of sites with paleontological resources affected and/or the acres of geologic units with moderate to very high potential to contain important paleontological resources impacted by each alternative. May be discussed qualitatively if exact areas and locations are not known.

Analysis Display

- The analysis will be displayed in a PFYC map and map with paleontological resources.

5.14.3 How would proposed land use allocations and discretionary uses impact unique geologic features?

Geographic and Temporal Scale of Analysis

The geographic scale of analysis is the Planning Area. The temporal scale of analysis is the life of the plan.

Relevant Assumptions

- Increased traffic to interpreted areas create potential negative impacts on special geological features, including arches, canyons, hoodoos, and cliffs.
- Once impacted, geological features are not likely to be returned to their original condition.
- As identified in *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022), “there are many traditional stories about animals that are not around today, and it is understood that these beings existed before humans. These creatures, as evidenced today as fossils, should be acknowledged and respected.”

Analysis Methodology and Techniques

- Intersect select locations of special geological features with defined alternative footprints or qualitatively discuss the potential for impacts by alternative.

Units of Measure

- Number of current locations of unique and interpreted geological features or with potential to be interpreted and experience high visitation
- Categorization of impacts as low, medium, or high

Relevant Data and Information to Be Used

- Locations of unique and interpreted geological features or those with potential for future interpretation
- Mapped geologic units to locate potential interpreted sites
- Polling of visitor services for inventory of high traffic sites without interpretation
- Estimates of visitor numbers
- Qualitative estimates of impacts (low, medium, or high)
- Traditional Indigenous Knowledge of culturally significant geologic resources, as noted in the BEITC LMP

Analytical Conclusions to Be Answered

- Determine the number of sites and anticipated impacts on those sites under each alternative.

Analysis Display

- The analysis will be displayed in a map of geological units with point locations of unique geological features.

5.15 AIR QUALITY

5.15.1 How would proposed management actions and land use allocations contribute to air pollutant emissions and affect air quality and visibility?

Geographic and Temporal Scale of Analysis

The geographic scale of analysis is the Planning Area air basins. The temporal scale of analysis is the life of the plan. Information is specifically provided for San Juan County, which encompasses the Monument and Garfield County, which borders the west side of the Monument. As identified in *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022), for the Tribal Nations of the BEITC, "clean air is important because it is part of an overarching earth stewardship that is part of all Native traditions."

Relevant Assumptions

- Air quality and visibility trends would follow the trends estimated by the U.S. Environmental Protection Agency (EPA) in the most recent regional haze modeling.
- Any new mineral development would be limited to valid existing rights; any impacts from valid existing rights, if any exist, would be the same across the No Action and action alternatives.

Analysis Methodology and Techniques

- Discuss baselines and trends for criteria air pollutants, including identification of nonattainment areas, and air quality related values such as visibility and deposition.
- Provide a quantitative discussion of the nature and type of air impacts based on management actions and allowable uses for each alternative, including from travel management, livestock grazing, vegetation management, wildland fire, and fugitive dust from resource uses such as vegetation management, grazing, and travel management.
- Provide a qualitative discussion of fugitive dust from natural processes.

Units of Measure

- Tons of criteria and hazardous pollutant emissions based on vehicle miles traveled by motorized vehicle type
- Tons of criteria and hazardous pollutant emissions from mechanical treatments based on acres of vegetation treated per year
- Tons of criteria and hazardous pollutant emissions from prescribed fire used for vegetation management based on annual acres burned
- Tons of criteria and hazardous pollutant emissions from non-road equipment used for livestock grazing, vegetation management, and travel management (road maintenance) based on types and numbers of equipment and estimated hours of operation
- Tons of fugitive dust emissions based on vehicle miles traveled on unpaved roads and trails

Relevant Data and Information to Be Used

- Trends in criteria air pollutant emissions and concentrations

- Trends in visibility in Class I areas
- Acres allocated to allowable uses
- Emissions inventory data
- EPA emission factors
- Public health concerns outlined in the BEITC LMP

Analytical Conclusions to Be Answered

- How would the action alternatives impact air quality and visibility when compared with current management?

Analysis Display

- Existing criteria pollutant emissions by Planning Area county
- Air monitoring data for the past 3 years compared against the National Ambient Air Quality Standards (NAAQS)
- Trends in ozone and particulate matter concentrations
- Trends in visibility in Class I areas
- Trends in deposition
- Table of emissions by BLM- and USDA Forest Service–authorized activity

5.16 CLIMATE CHANGE

5.16.1 How would proposed land use allocations and discretionary uses contribute to greenhouse gas emissions?

Geographic and Temporal Scale of Analysis

Climate change is a global issue, and the geographic scale of analysis for greenhouse gases (GHGs) cannot be restricted to one region. For the purposes of the RMP/EIS, the GHG/climate change geographic analysis area is focused on Utah and the United States.

The temporal scale of analysis is both 20 years and 100 years to represent the differing effects from shorter- and longer-lived GHGs based on their 20-year and 100-year global warming potential.

As identified in *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022), "it is important to the Tribal Nations of the BEITC that the climate is acknowledged as a physical and spiritual force in BENM" and that "any changes in climate need to be recognized as impacting (positively or negatively) the cultural landscape of the Bear's Ears region."

Relevant Assumptions

- While GHG emissions from valid existing rights would be the same across alternatives based on the Proclamation prohibiting new mineral development, emissions from management in general would vary and are being analyzed across alternatives.
- For cumulative effects analysis purposes, GHG emissions from other federal, state, and private lands would follow current trends.

Analysis Methodology and Techniques

- Quantitatively assess emissions of carbon dioxide, methane, and nitrous oxide from livestock grazing operations, travel management, and vegetation management activities.
- Compare emissions from USDA Forest Service– and BLM-authorized activities to GHG emissions at other geographic scales (e.g., county, state, United States, and global) and other equivalency metrics (e.g., emissions from home energy use, emissions avoided by wind turbines, or carbon sequestered by acres of U.S. forests annually) for context.

Units of Measure

- Metric tons of carbon dioxide, methane, and nitrous oxide emissions and their carbon dioxide equivalencies based on acres of vegetation treated per year
- Metric tons of carbon dioxide, methane, and nitrous oxide emissions and their carbon dioxide equivalencies from prescribed fire used for vegetation management based on annual acres burned
- Metric tons of carbon dioxide, methane, and nitrous oxide emissions and their carbon dioxide equivalencies based on acres of vegetation treated per year
- Metric tons of methane emissions from livestock based on number of animal unit months (AUMs)

- Metric tons of carbon dioxide, methane, and nitrous oxide emissions and their carbon dioxide equivalencies from non-road equipment used based on types and numbers of equipment and estimated hours of operation

Relevant Data and Information to Be Used

- PRISM datasets (1991–2020) for average annual temperature and precipitation
- *National Oceanic and Atmospheric Administration State Climate Summary for Utah* (Frankson et al. 2022)
- *2020 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends* (BLM 2021)
- *Fourth National Climate Assessment, Southwest Region* (Gonzalez et al. 2018)
- *Climate Change Vulnerability and Adaptation in the Intermountain Region* (Halofsky et al. 2018)
- *International Panel on Climate Change (IPCC) Climate Change 2021: The Physical Science Basis* (IPCC 2021)
- *Colorado Plateau Rapid Ecological Assessment* (Bryce et al. 2012)
- Climate change concerns outlined in the Climate Change section of the BEITC LMP

Analytical Conclusions to Be Answered

- Would the action alternatives result in a change in GHG emissions compared with current management?

Analysis Display

- Graphical displays of annual temperatures and precipitation
- Tables of emissions

5.16.2 How would proposed land use allocations and discretionary uses affect long-term carbon storage and sequestration in BENM?

Geographic and Temporal Scale of Analysis

The analysis scale is the Decision Area for the life of the plan.

Relevant Assumptions

- Vegetation management and forestry and woodlands product management may result in changes in carbon storage.
- Due to potential variability in future conditions and the unknown nature and extent of future natural disturbances, small differences in carbon impacts among management alternatives, coupled with high uncertainty in carbon stock estimates, make the detection of statistically meaningful differences among alternatives unlikely.
- Management of BENM would contribute to EO 14008 to conserve 30% of the nation’s lands and water by 2030.

Analysis Methodology and Techniques

- Describe the carbon sequestration potential of Decision Area lands and qualitatively discuss the potential changes based on management actions and the potential outcome of treatments and timber harvest on carbon storage and sequestration over the long term.

Units of Measure

- Annual acres of prescribed fire used for vegetation management
- Annual acres of vegetation treated
- Acres available for timber harvest

Relevant Data and Information to Be Used

- *National Assessment of Geologic Carbon Dioxide Storage Resources—Allocations of Assessed Areas to Federal Lands* (Buursink et al. 2015)
- *2020 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends from Coal, Oil, and Gas Exploration and Development on the Federal Mineral Estate* (BLM 2021)

Analytical Conclusions to Be Answered

- Would the action alternatives result in a change in carbon storage capacity compared with current management?

Analysis Display

- None identified

5.17 ENVIRONMENTAL JUSTICE AND SOCIAL AND ECONOMIC VALUES

5.17.1 How would proposed management impact jobs and income in the socioeconomic analysis area?

Geographic and Temporal Scale of Analysis

The socioeconomic analysis area is San Juan County, as this is the county in which BENM is located, and any impacts to the economy or employment will most likely occur in and around the population centers within this county.

Historical data will be averaged over 5 years, 2015 to 2019. Where possible, 2020 data will not be used, especially for tourism and recreation data, as the data are often considered to be an outlier due to the COVID-19 pandemic.

Relevant Assumptions

- Expenditure and management actions will be modeled as a direct, one-time input to the economy to analyze the impacts.
- Actual spending level and associated contributions would vary by year. However, the model provides an estimate of the total economic contributions with the best information available.

Analysis Methodology and Techniques

- The economic impacts of the management alternatives will be estimated for affected resource uses using the IMPLAN economic impact model. The IMPLAN model was originally developed by the USDA Forest Service and is commonly used by the BLM, the USDA Forest Service, many other government agencies, and private sector organizations to estimate the total economic impacts of various activities and policies. The model tracks interindustry and consumer spending in a local or regional economy, allowing estimation of indirect and induced economic impacts in the economy that result from the original economic activity or a change in economic activity. Indirect impacts result from the interindustry transactions (e.g., when a recreation outfitter buys supplies from a local grocery store). Induced impacts result from respending of household income (e.g., when employees of the recreation outfitter buy goods for personal use at a local grocery store). Outputs of the IMPLAN model include employment, labor income, value added, and gross regional economic output.

Units of Measure

- The units of measure for the output would be the number of employees (jobs) and 2022 dollars for income, value added, and economic output.

Relevant Data and Information to Be Used

- Data on public land uses and values within BENM will be collected, such as data on level of recreation and tourism in and around the Monument, federal expenditures, level of grazing, and timber harvested. BLM and USDA Forest Service revenue data for these uses will also be collected or calculated from available information. The analysis also includes data sources that are included in the IMPLAN model; these include data from the Bureau of Economic Analysis and U.S. Bureau of Labor Statistics among other sources.

- Data on land uses and values in BENM by Tribal Nations, from the BEITC LMP.

Analytical Conclusions to Be Answered

- The analysis will show the direct, indirect, and induced jobs, income, value added, and economic output that would be generated from the proposed management action.

Analysis Display

- The input data used in the IMPLAN model will be provided in tables as well as discussed in paragraph form. The output data will also be displayed in a table and interpreted.

5.17.2 How would proposed management impact the nonmarket benefits individuals receive from natural areas?

Geographic and Temporal Scale of Analysis

The geographic scale of analysis is the Planning Area. The temporal scale of analysis is over the plan lifetime. Historical data will be averaged over 5 years, from 2015 to 2019. Where possible, 2020 data will not be used, especially for tourism and recreation data, as the data are often considered to be an outlier due to the COVID-19 pandemic.

Relevant Assumptions

- Three nonmarket values are considered in the analysis: 1) the economic benefits to local communities from the amenity values provided by open space and scenic landscapes; 2) the economic benefits to individuals, such as the value to recreationists and visitors above and beyond the cost that they pay to recreate; and 3) ecosystem service values.

Analysis Methodology and Techniques

Nonmarket values are important to consider because they help tell the entire socioeconomic story. Estimates of nonmarket values supplement estimates of income generated from commodity uses to provide a more complete picture of the economic implications of proposed resource management decisions. It is difficult to put a dollar number on those values, but the correct answer is not zero. The agencies are increasingly asked to consider these nonmarket values; in effect, to replace that zero with a more useful number for planning and analysis purposes. In some cases, these values can be calculated if appropriate information is available. In other cases, this is not possible, but it may be helpful to discuss these values qualitatively or to provide examples of these values in analogous situations.

Economic benefits to local economies will be examined with literature impacts of proximity to open spaces on property values. Economic benefits to individuals will be measured using consumer surplus values to calculate the value of BENM to recreationalists and visitors. Consumer surplus is defined as the maximum dollar amount, above any actual payments made, that a consumer would be willing to pay to enjoy a good or service. For instance, hikers pay a market price for gasoline used to reach a trail but pay nothing to use the trail. Any amount that a recreationist would be willing to pay to use this otherwise free resource represents the nonmarket consumer surplus value of that resource to that consumer. A 2016 report summarized the findings of consumer surplus values per person per day by recreation activity from 421 studies (totaling 3,192 different value estimates) covering the United States and Canada from 1958 to

2015 (Rosenberger 2016). These values, or a range of values from specific individual studies that are most comparable to the Planning Area, will be applied to recreational usage figures (e.g., visitor days) to estimate the recreation-related nonmarket use value—the consumer surplus—for the Planning Area. Economic benefits from ecosystem services will be examined by providing an inventory of the ecosystem benefits from BENM, including any applicable benefits from potable water from groundwater recharge, flood control from intact wetlands, and carbon sequestration from healthy forests and certain agricultural lands.

Units of Measure

- The units of measure for the analysis will include dollar increases in property values and dollar values of consumer surplus for recreational activities.

Relevant Data and Information to Be Used

- Data will be collected on property value impacts from proximity to open spaces as well as consumer surplus values for recreation activities. Data on recreational usage, such as visitor days, will be used. Information on ecosystem conditions from other resource areas will also be gathered. Traditional Indigenous knowledge will also be used to assess nonmarket values.

Analytical Conclusions to Be Answered

- Discuss the value that the proposed management has to individuals from natural resources that cannot be quantified from the economic impact analysis or any other market mechanism under specific alternatives.

Analysis Display

- The results of the analysis will be displayed in a table and discussed quantitively, when possible. When the values are not able to be quantified, a qualitative discussion will be provided.

5.17.3 Would proposed management result in disproportionate or adverse impacts on environmental justice populations?

Geographic and Temporal Scale of Analysis

The environmental justice analysis area is San Juan County, which is the county that encompasses BENM and the populations in this county, which might have cultural or historical ties to the Planning Area and would be directly impacted by the proposed management. The reference area will be the State of Utah. The temporal scale of analysis is over the plan lifetime.

Current data on minority populations and low-income[2] populations will be used to identify environmental justice populations, and current data on impacts from other resource areas will be used to analyze any disproportionate or adverse impacts from the proposed management. Other resource areas include mineral development, groundwater usage, and forage. The analysis will include a discussion of how these resources correspond to environmental justice communities in the vicinity of the Monument.

[2] Low-income populations are defined as the percentage of a population in a specific location exceeding the poverty level by some measure, typically twice the census-defined poverty level. For this reason, low-income population percentages will almost always exceed poverty percentages for the same location.

Relevant Assumptions

- Environmental justice populations in the environmental justice analysis area are identified based on guidelines from CEQ and the BLM. See Section 6.16 for more details.

Analysis Methodology and Techniques

EO 12898 requires federal agencies to identify environmental justice communities in and around the Planning Area and determine if there are disproportionate high and adverse impacts to these communities from a proposed action. Environmental justice communities are defined as communities that have high percentages of the population that identify as low-income, minority, and/or Native American.

In order to identify environmental justice populations, CEQ issued guidance for federal agencies. CEQ states that minority populations are present where the percentage of people who identify as American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic of any ethnicity is greater than or equal to 50% or is meaningfully greater than the percentage of people who identify as a minority population in a reference area (CEQ 1997). CEQ guidance does not specify how to identify a "low-income population," but in practice a similar approach used for minority populations can be followed—where persons in poverty status are greater than 50% of the area's total population, or where the percentage in poverty is equal to or greater than the percentage in the general population or an appropriate comparison area (the reference population). CEQ guidance does not define what constitutes meaningfully greater. However, the BLM issued guidance, and recommends using 10 percentage points as the threshold of "meaningfully greater" for minority population and a low-income population is present if the poverty rate of a defined geographic area is at or above the poverty rate of the reference area (BLM 2020).

For the purpose of this analysis, the thresholds stated above, from the CEQ and the BLM Socioeconomic Desk Guide (BLM 2020), will be used to identify any low-income or minority communities in the environmental justice analysis area. The reference area is the respective state within which the analysis area is located (i.e., Utah).

CEQ explains, in regard to disproportionately high and adverse effects, that the following factors should be considered when examining whether human health effects are disproportionately high and adverse (CEQ 1997):

- Are the health effects significant or above generally accepted normal rates or risks?
- Are the risks or rates of harm to environmental justice communities significant and greater than the risk or rate to the general public or comparison community?
- Are the environmental justice communities impacted by cumulative effects?

CEQ states that the following issues should be considered when examining whether environmental effects are disproportionately high and adverse:

- Are the impacts on the environment significant and negatively harm environmental justice communities?
- Are the impacts on the environment more harmful to environmental justice communities than to the general population or comparison community?
- Are the environmental justice communities impacted by cumulative effects?

In the analysis, these issues will be examined with regard to impacts from the proposed management on the identified environmental justice communities.

Units of Measure

- The units of measurement for the analysis, when possible, will be reported in dollars. When it is not possible to quantify the impacts, a qualitative discussion on the impacts will be provided.

Relevant Data and Information to Be Used

- To determine whether environmental justice communities exist in the analysis area, county-level data will be collected from the U.S. Census Bureau on the number of individuals who fall below the poverty line and the number of individuals who identify as one or more minority ethnicities or races (American Indian or Alaskan Native, Asian or Pacific Islander, Black, not of Hispanic origin, or Hispanic), within the environmental justice analysis area.
- To determine whether there will be adverse and disproportionate impacts on environmental justice communities in the analysis area, data on impacts from the proposed management will be collected from other resource topic areas, in addition to any impacts from proposed management on social and economic values.

Analytical Conclusions to Be Answered

- Determine whether there are significant impacts from the proposed management and if those impacts are disproportionate and adverse on environmental justice communities.

Analysis Display

- The results of the analysis will be displayed in a table, when possible, and discussed quantitively and qualitatively. Maps will be provided on the environmental justice analysis area and will highlight any identified environmental justice populations.

5.18 LANDS AND REALTY

5.18.1 How would proposed land use allocations and discretionary uses affect land use authorizations and land tenure the Planning Area?

Geographic and Temporal Scale of Analysis

The geographic scale of land use authorizations and land tenure adjustments is the Planning Area. The temporal scale of analysis is the lifetime of the plan.

Relevant Assumptions

- The demand for new ROWs, other land use authorizations (e.g., film permits), and installation of power lines and communication sites would remain stable or increase slightly throughout the life of the RMP.
- Expanding uses adjacent to the BLM-administered and NFS lands or on private inholdings within BLM-administered lands, particularly residential and commercial development, increases the demand for ROWs on BLM-administered and NFS lands to accommodate those uses. In turn, uses and development on BLM-administered and NFS lands within the Monument also increases the demand for ROWs.
- The BLM would continue to process land tenure adjustments that are in the interest of the public and that further the protective purposes of the Monument, pursuant to Proclamation 10285.

Analysis Methodology and Techniques

- Conduct a GIS analysis to determine the acres of existing ROWs and other land use authorizations and ROW exclusion and avoidance areas within the Planning Area.
- Conduct a GIS analysis of acres of designated utility corridors within the Planning Area.
- Conduct a GIS analysis of acres of designated communication sites within the Planning Area.
- Conduct a GIS analysis of acres of land not administered by the BLM or USDA Forest Service within the Planning Area. The acres of land not administered by the BLM or the USDA Forest Service within the Planning Area would remain the same in all alternatives, but the criteria used to evaluate lands for potential acquisition may vary between alternatives. These acreages and criteria will help the responsible official understand the differences between the alternatives with regard to the ability of managers to issue permits and to acquire or exchange land within the Planning Area.
- Using this data, a quantitative analysis would be conducted to compare a change in land use authorizations, land tenure adjustments, and withdrawals within each alternative. A qualitative analysis would also be conducted to describe impacts on the lands and realty program from lands and realty actions and actions under other resource programs under each alternative. Land tenure would be analyzed by comparing previous BENM boundaries to the present Decision Area boundaries, comparing land tenure criteria within each alternative, and assessing the BLM's ability to engage in land exchanges or acquisitions.

Units of Measure

- Acres would be used to measure impacts on land use authorizations and land tenure adjustments under each alternative.

Relevant Data and Information to Be Used

- GIS data for acres of ROW avoidance and exclusion areas, utility corridors, and communication sites in the Planning Area under each alternative
- 2018 BENM AMS
- Traditional Indigenous Knowledge of culturally significant access and use areas

Analytical Conclusions to Be Answered

- Compare acres available or unavailable for ROWs, utility corridors, and communication sites by each alternative.
- Analyze land tenure adjustments by determining land use allocations and discretionary uses that would affect the BLM's ability to engage in land exchanges or acquisitions within each alternative.
- A qualitative discussion about the extent to which land use allocations and discretionary uses may impact opportunities for land use authorizations under each alternative.

Analysis Display

- Maps showing ROW avoidance and exclusion areas, designated utility corridors, and communication sites under each alternative
- A table with acreages of the attributes listed above for each alternative
- Written criteria will be established to guide how the acquisitions and disposals will be considered.

5.19 LANDSCAPE CHARACTERISTICS

5.19.1 How will the BENM resource management plan impact scenic quality, landscape (scenic) character, scenic integrity, and the public's highly-valued experience of enjoying scenery?

5.19.2 How will the BENM resource management plan affect inventoried visual values?

5.19.3 How will factors outside of BLM and USDA Forest Service control affect inventoried visual values?

Issues 5.19.1, 5.19.2, and 5.19.3 all have the same analytical framework, described below.

Geographic and Temporal Scale of Analysis

The geographic scope for analysis corresponds to the visible area surrounding BENM up to 15 miles beyond the boundary that is associated with the limit of the background distance zone of the BENM Visual Resource Inventory (VRI). The temporal scope of analysis will be the life of the plan. As identified in *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022), "Viewsheds are [the] visible portion of the landscape seen from any particular vantage point. Everything in the natural world – rocks, plants, animals, water, and other natural elements – have meaning and character. All these elements are interconnected and viewsheds are important beyond that of simply being 'scenery' in the sense of a view from a road or overlook."

Relevant Assumptions

- Based on project implementation and use trends over the past 25 years, the development of recreation, livestock grazing, and community-scale utility infrastructure treatments and vegetation management would continue to be the primary types of projects that could affect visual resource values within BENM.
- Several singular projects within a viewshed that individually do not alter the landscape (scenic) character and meet visual management objectives (VRM classes or SIOs) could cumulatively result in degradation of visual values.
- Visitors, local residents, and Tribal Nations highly value scenic quality within BENM.
- The construction of residential, commercial, recreational, and utility infrastructure in proximity to BENM and on inholdings will continue.
- Drought and wildfires that affect vegetation and surface water will continue, if not intensify.
- Factors outside BLM and USDA Forest Service control (e.g., development on adjacent land and inholdings, drought, wildfires) may affect visual values.

Analysis Methodology and Techniques

Since the two federal agencies use different systems to identify visual resources and assess impacts, the analysis will be similar but differ slightly to address their respective visual management systems. For BLM-administered lands, effects on scenic quality resulting from different VRM class allocations, which allow for varying levels of modification to the characteristic landscape, will be compared with the inventoried Class A, B, and C scenic quality areas under each RMP alternative. Effects to scenic quality will also be discussed qualitatively. For NFS lands, effects on scenic attractiveness resulting from different SIO allocations, allowing for varying levels of scenic deviation, will be analyzed. These potential changes to landscape (scenic) character could lead to diminishing scenic quality (or scenic attractiveness), where the designated VRM class objectives (or SIOs) would allow these types of management activities. The analysis on NFS lands is based on availability of the final SMS inventory, including scenic attractiveness, during the NEPA phase of this planning effort. If these data are not available, the analysis will focus on qualitative discussions and may rely on interim data if approved by the USDA Forest Service. Effects on sensitivity and distance zones will be analyzed qualitatively using the best available data. Contrast rating analysis will be used to evaluate proposed projects on BENM to reduce contrast and determine conformance with visual objectives.

Additionally, if the SMS inventory is available during the NEPA phase of this planning effort, the existing scenic integrity levels will also be used to compare the existing scenic integrity with the proposed SIO to assess how well the valued scenic character in those highly intact areas will be protected.

Units of Measure

- For BLM-administered lands, acres of proposed VRM class objectives within Class A, B, and C scenic quality areas under different VRM class objective allocations
- For NFS lands, if the SMS inventory is available, acres of proposed SIOs within Class A, B, and C scenic attractiveness areas under different management allocations
- For NFS lands, if the SMS inventory is available, acres of proposed SIOs within very high, high, moderate, and low existing scenic integrity areas under different management allocations

Relevant Data and Information to Be Used

- BENM, Monticello FO, and Moab FO VRIs
- Monticello FO and Moab FO VRM classes (existing)
- BENM BLM VRM classes (RMP alternatives)
- Manti-La Sal National Forest SMS inventory (if available)
- Manti-La Sal National Forest VQOs (existing)
- Manti-La Sal National Forest SIOs (LRMP selected alternative)
- The Viewsheds and Soundscapes section of the BEITC LMP, as well as VRM objectives and strategies
- Traditional Indigenous Knowledge regarding landscape character and scenic quality

Analytical Conclusions to Be Answered

- The level of protection provided in each alternative to visual values will be determined and explained qualitatively. Additionally, for BLM scenic quality, the scenic quality scores (A, B, or C) compared with the VRM class allocations across alternatives will identify areas and acres of protection levels provided by each alternative. For USDA Forest Service scenic attractiveness, the scenic attractiveness scores (A, B, or C), if available, will be compared with the SIO allocations to identify areas and acres of protection levels provided by each alternative. The management of other resources and resource uses, and how those might affect landscape (scenic) character, will also be examined and explained in narrative format.

- If available, the analysis would also compare the existing scenic integrity level (very high, high, moderate, or low) with the proposed SIO allocations to identify the level of protection for the areas with the highest scenic integrity within the Monument. The management of other resources and resource uses, and how those might affect scenic integrity, will also be examined and explained in narrative format.

Analysis Display

- Tables and maps will be developed to display the scenic quality ratings (and existing scenic integrity and scenic attractiveness [if available] for NFS lands) and the proposed VRM classes (and SIOs) across the range of RMP alternatives.

5.19.4 How will proposed management actions (under the alternatives affect dark night skies?

5.19.5 How will factors outside of BLM and USDA Forest Service control (e.g., development on inholdings and on lands outside the BENM boundary) affect dark night skies?

Geographic and Temporal Scale of Analysis

The geographic scope for the dark night skies analysis corresponds to the Planning Area and adjacent communities producing sky glow within the Monument. The temporal scope of analysis will be the life of the plan.

Relevant Assumptions

- Visitors and local residents appreciate and value night skies that are unimpaired by light pollution.
- Anthropogenic sky glow caused by nighttime lighting impairs the visible clarity of starlit skies and an increase in activities and uses associated with the emittance of artificial light (e.g., residential and commercial development, transportation networks, and recreation use and/or facilities) within or adjacent to BENM would increase the level of sky glow in BENM.
- The quality of dark night skies is dependent on the weather, the clarity of the air, and the amount of light pollution present.
- Astrotourism contributes to local economies.
- As identified in *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022), "There is consensus that the night sky in open spaces should be protected in order to preserve these ancestral connections. Light and dust pollution are factors that affect the quality of the night sky."

Analysis Methodology and Techniques

A qualitative assessment of different management approaches across alternatives will be used. Alternatives will include differing BMPs to protect dark night skies. A part of this assessment will be the consideration of focusing more stringent management of light pollution in areas already impacted by existing light sources and focusing management in the darkest areas to meet Monument objects and values. The analysis will then compare these areas of more stringent dark night sky management, including areas where no projects that require artificial light would be allowed or where they would be allowed but only with restrictive BMPs, with the existing sky brightness level to identify the extent of the Monument where these increased protections would occur.

Units of Measure

- Acres of the Monument with differing management approaches to protect dark night skies compared to 1) those areas already impacted by sky glow, and 2) the portions of the Monument largely unaffected by sky glow.

Relevant Data and Information to Be Used

- *The New World Atlas of Artificial Night Sky Brightness* (Falchi et al. 2016)
- Areas within the Monument proposed for differing ranges and types of dark night sky protection measures under different RMP alternatives
- *Bears Ears National Monument: Indian Creek and Shash Jáa Units Sky Quality Meter Readings* (Ogden Valley International Dark-Sky Association Chapter 2017)
- VRM strategies pertaining to night skies from the BEITC LMP

Analytical Conclusions to Be Answered

- Analysis of the different RMP alternatives by comparing the acres of the Monument with varying dark night sky management requirements and the existing darkness thresholds. The analysis will identify the affected portions of the Monument and to what degree dark night sky resources will be affected.
- Analysis of how other resources and resource uses would affect dark night skies will be qualitatively analyzed and explained in a narrative format.

Analysis Display

- Tables and maps will be developed to display the existing sky brightness levels and areas where differing management prescriptions would occur across the range of RMP alternatives.

5.19.6 How will the resource management plan ensure protection of the natural quiet soundscapes within BENM?

5.19.7 How will proposed management actions under the alternatives affect natural quiet soundscapes?

5.19.8 How will factors outside BLM and USDA Forest Service control (e.g., airplane traffic, noise-generating activities outside the BENM boundary but within the soundshed) affect natural quiet soundscapes?

Geographic and Temporal Scale of Analysis

The geographic scope for the natural soundscapes analysis corresponds to the Planning Area and the area within 3 miles[3] of the Planning Area. The temporal scope of analysis will be the life of the plan.

As identified in *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022), "Tribal Nations of the BEITC consider BENM to be a spiritual place and thus value the need for peace and quiet. Hopi people believe that the spirits of their ancestors still reside at BENM, and any disruption of peace will disturb them."

Relevant Assumptions

Assumptions for analysis of the soundscape issues noted above include:

- Visitors, local residents, and Tribal Nations appreciate and value quiet natural soundscapes, and they are intrinsic to the visitor experience of BENM.
- Noise caused by airplane traffic and recreational use will continue.
- The BLM and USDA Forest Service cannot control the noise caused by airplane traffic or the levels of noise caused by different types of motorized vehicles.

Analysis Methodology and Techniques

The BLM has identified standards for managing soundscapes indirectly for other resources. For example, near greater sage-grouse leks there is a limit of increasing noise 10 dBA above the background which equates to doubling the existing sound levels. Based on the quiet landscapes that comprise BENM, this standard would be appropriate for other noise-sensitive receptors, including developed and primitive recreation locations. Since there are no management classifications associated with soundscapes, like BLM VRM classes or USDA Forest Service SIOs for visual resources, this analysis will first focus on a qualitative assessment of different management approach alternatives. The RMP alternatives will include differing BMPs to reduce impacts on natural soundscapes. Additionally, where identified in the range of RMP alternatives, areas where motorized use is allowed, or other planned development, including new recreation sites, will be mapped to identify the extent of the Monument where noise-producing management activities may occur. These areas will then be compared to the different existing soundscape conditions within the Monument to identify where existing soundscapes are most likely to be impacted.

[3] Noise deceases with distance according to the inverse square law. 6 dB with a doubling of distance. Significant noise levels will likely decrease to nonsignificant levels within 3 miles.

Units of Measure

- Acres of the Monument where noise-producing management activities and uses may occur compared to different existing soundscape conditions

Relevant Data and Information to Be Used

- Lands and realty data – utility corridors
- Different management areas from the range of RMP alternatives, including areas where resource uses that could generate noise (i.e., motorized use along existing and proposed roads or trails) would be allowed as well as other planned development within the Monument such as proposed recreation areas
- NPS Sound Map: Existing Conditions
- GSENM acoustic monitoring report (Southern Utah University 2020)
- Culturally important areas where quiet may be particularly important
- The Viewsheds and Soundscapes section of the BEITC LMP

Analytical Conclusions to Be Answered

- Analysis of the different RMP alternatives would occur by comparing the acres of the Monument where noise-producing activities and uses may occur with the existing soundscape conditions.
- Analysis of other resources and their uses, and how those might affect natural soundscapes, will be examined and explained in a narrative format.

Analysis Display

- Tables and maps will be developed to display the existing soundscape conditions areas (e.g., dBA thresholds) and how many acres could have increased noise pollution within these areas, affecting natural soundscapes, across the range of RMP alternatives.

5.20 LANDS WITH WILDERNESS CHARACTERISTICS

5.20.1 How would proposed land use allocations and discretionary uses affect the apparent naturalness, size, and opportunities for solitude or primitive and unconfined recreation of lands with wilderness characteristics?

Geographic and Temporal Scale of Analysis

The geographic scale of the analysis consists of the extent of the identified lands with wilderness characteristics. The temporal scale of the analysis is the life of the plan.

As identified in *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022), "the Tribes of the BEITC share cultural connections to the sacred landscapes of the Bears Ears National Monument" and "any changes to that landscape that are done in a disrespectful manner negatively affect all people, the ecosystem, and all life forms."

Relevant Assumptions

- Demand to use and develop BLM-administered and NFS lands would increase into the foreseeable future.
- In the short term, wilderness characteristics could be impacted due to an increase in human presence, vehicle use, and road use in certain areas.
- Potential impacts on lands managed for wilderness characteristics from subsequent undertakings (implementation of the planning decisions or site-specific project proposals) would require a separate NEPA analysis.

Analysis Methodology and Techniques

- The analysis will determine whether the proposed management for other resources and resource uses, such as areas and routes managed as limited, closed, or open to mechanized or motorized uses; VRM classes; vegetation and fuels treatments; and ROW avoidance or exclusion, would impact the requirements of naturalness, size, and opportunities for solitude or primitive and unconfined recreation to be considered lands with wilderness characteristics.

Units of Measure

- Acres of lands with wilderness characteristics on BLM-administered lands within the Planning Area

Relevant Data and Information to Be Used

- Inventory forms or background information for lands with wilderness characteristics on BLM-administered lands within the Planning Area
- Geodatabase of lands with wilderness characteristics units

Analytical Conclusions to Be Answered

- A narrative discussion of how management of other resources and uses across the Decision Area under each alternative would affect the apparent naturalness, size, and opportunities for solitude or primitive and unconfined recreation of lands with wilderness characteristics.

Analysis Display

- A map displaying lands with wilderness characteristics
- A table displaying lands with wilderness characteristics unit names and acreages
- A table displaying acres of lands with wilderness characteristics and open to motorized travel, ROW location, and VRM class by alternative; conclusions will be explained in the text

5.21 SPECIAL LAND DESIGNATIONS FOR CONSERVATION AND PROTECTION

5.21.1 Areas of Critical Environmental Concern

How would proposed land use allocations affect the relevant or important values of existing and potential Areas of Critical Environmental Concern?

GEOGRAPHIC AND TEMPORAL SCALE OF ANALYSIS

The geographic area for ACECs is the area of each ACEC and potential ACEC in the Planning Area. The temporal scale is the life of the plan.

RELEVANT ASSUMPTIONS

- ACEC management prescriptions apply only to those lands in each specific ACEC, as outlined.
- Management decisions to protect BENM objects would strive to protect relevant and important values, including cultural values.

ANALYSIS METHODOLOGY AND TECHNIQUES

The analysis methodology and techniques include impacts to relevant and important values because of ACEC management decisions and quantitative discussion of management decisions overlapping the ACECs as they relate to relevant and important values.

Impacts on ACECs would result from management actions that would damage the identified relevant and important values for which the ACECs were designated. These impacts could result from recreational use, livestock grazing management, mineral development, and other activities that could affect cultural, paleontological, geologic, scenic, and natural relevant and important values.

To determine whether the management direction of each alternative protects the relevant and important resource values associated with each ACEC, the BLM would first list and map the locations of ACECs by alternative. Next, special management to protect or maintain each ACEC relevant and important values would be defined by alternative. Lastly, for each alternative, the BLM would determine whether specific management activities or the lack of management direction would affect the relevant and important values within each ACEC.

UNITS OF MEASURE

- Units of measure include acreage of existing ACECs and acres of ACECs overlapping management decisions and allocations that could protect or diminish the presence of relevant and important values. Other impacts will be described qualitatively.

RELEVANT DATA AND INFORMATION TO BE USED

- GIS data of existing ACEC boundaries
- GIS data of potential ACEC boundaries
- GIS data of potential and existing ACEC boundaries with overlapping acreages of other land use allocations and other special designations for each alternative: ROW exclusion and avoidance,

mineral allocations, VRM classes, SRMAs, WSAs, livestock grazing allotments, OHV designations, and other special designations

- Special management attention needed to protect or maintain the relevant and important values of individual ACECs
- Traditional Indigenous Knowledge of the cultural importance of lands designated as ACECs

ANALYTICAL CONCLUSIONS TO BE ANSWERED

- A description of how land use allocations (special area designations) and land use allocations and discretionary uses for each alternative affect the relevant and important values for each area.

ANALYSIS DISPLAY

- ACEC locations and interaction with relevant management decisions (by alternative).
- The analysis will be presented through text that describes the impacts each proposed management action would have on the relevant and important values identified for each proposed ACEC. Tables will also be included that show a breakdown of proposed ACEC acreages, designations by alternative, applicable relevant and important values, and management direction, if designated.

5.21.2 Wild and Scenic River Resources

How will the BENM resource management plan affect identified eligible and suitable wild and scenic rivers segments?

GEOGRAPHIC AND TEMPORAL SCALE OF ANALYSIS

The geographic scale of the analysis will use GIS data for the acres and miles of suitable wild and scenic river (WSR segments) to demonstrate current conditions.

RELEVANT ASSUMPTIONS

- The BLM will determine whether the management direction of each alternative protects outstandingly remarkable values (ORVs) of suitable WSRs.
- The BLM will manage suitable segments to protect their preliminary classification, free-flow, and ORVs pending congressional action.

ANALYSIS METHODOLOGY AND TECHNIQUES

- Examine the impacts to suitable WSR segments under each alternative as measured by acres and miles of suitable WSR segments. Specific management affecting WSR segments and ORVs may vary under alternatives, which would require the use of additional analysis indicators. Special management attention will be needed to protect ORVs, which may vary under alternatives.

UNITS OF MEASURE

The analysis will examine the impacts to WSR segments under each alternative as measured by acres and miles of suitable SWR segments. Measurements will be made in miles and acres of each suitable river corridor that would be impacted by a management action, where applicable. Other impacts will be described qualitatively. GIS data for the acres and miles of suitable WSR segments will be used to demonstrate current conditions.

- Miles of suitable WSR segments
- Acres of suitable WSR segments

RELEVANT DATA AND INFORMATION TO BE USED

- BLM GIS data
- GIS data for suitable river corridors on BLM-administered lands in the Monument
- Miles of suitable river corridors by administrative unit and tentative classification (wild, scenic, or recreational)
- GIS data of suitable river corridors with overlapping acreages of other land use allocations for each alternative.
- Traditional Indigenous Knowledge of the cultural significance of WSR segments

ANALYTICAL CONCLUSIONS TO BE ANSWERED

Discussion of the effects on WSR segments under each alternative to meet resource and resource use objectives for the various programs

ANALYSIS DISPLAY

The analysis will use a table to show existing acres and miles of suitable WSR segments.

5.21.3 Wilderness/Wilderness Study Areas/Recommended Wilderness

How would proposed land use allocations and discretionary uses affect the wilderness character of designated wilderness and wilderness characteristics of wilderness study areas?

GEOGRAPHIC AND TEMPORAL SCALE OF ANALYSIS

The analysis areas for wilderness areas, WSAs, and recommended wilderness would comprise each designated wilderness area, WSA, and recommended wilderness within the Planning Area. The temporal scale of analysis would be the life of the plan; however, the length of time for congressional action on wilderness designation would also be considered.

RELEVANT ASSUMPTIONS

- Dark Canyon Wilderness would be managed as required by the 1964 Wilderness Act.
- Consistent with BLM Manual 6330, *Management of Wilderness Study Areas*, the BLM would manage WSAs to not impair their suitability for preservation as wilderness until Congress either designates or releases all portions of WSAs from further consideration for wilderness.
- WSA management prescriptions would apply only to those lands in each specific WSA.

ANALYSIS METHODOLOGY AND TECHNIQUES

For WSAs, the BLM and USDA Forest Service would determine whether the management direction of each alternative protects the suitability of each WSA for preservation as wilderness. First, the agencies would list and map the locations of the existing and proposed WSAs in the Planning Area by alternative. Next, special management needed to protect or maintain the wilderness characteristics of WSAs would be defined by alternative. Activities within WSAs must be temporary and create no new surface disturbance. Finally, the agencies would determine whether specific management activities or the lack of management direction would affect the wilderness characteristics for WSAs.

For Dark Canyon Wilderness, the analysis methodology would follow a similar approach. The location of designated wilderness within the Planning Area would be mapped. Next, special management needed to protect all components of wilderness character would be defined by alternatives. Activities must preserve the qualities of untrammeled, undeveloped, natural, and outstanding opportunities for solitude or a primitive and unconfined type of recreation, and other features of value, such as ecological, geological, scientific, scenic, or historic values unique to the wilderness area. Finally, the USDA Forest Service would determine whether proposed management direction, or the lack of management action or direction, would affect the components of wilderness character for Dark Canyon Wilderness.

UNITS OF MEASUREMENT

- Measurements will be in acres within each designated wilderness area, WSA, and recommended wilderness that would be impacted by a management action, where applicable.
- Other impacts will be described qualitatively, such as impacts to the qualities of wilderness character like opportunities for solitude or primitive and unconfined recreation.

RELEVANT DATA AND INFORMATION TO BE USED

- WSA inventories and monitoring reports for BLM-administered lands within the Planning Area
- Recommended wilderness data from the USDA Forest Service
- GIS data of designated wilderness, WSA, and recommended wilderness parcel boundaries
- Acres of lands managed to protect designated wilderness, WSAs, and recommended wilderness by alternative, with overlapping acreages of other land use allocations: ROW exclusion, VRM class, and OHV allocations
- Traditional Indigenous Knowledge of cultural significance within areas with wilderness or WSA designations

ANALYTICAL CONCLUSIONS TO BE ANSWERED

- A description of how land use allocations and management direction for each alternative affect each designated wilderness, WSA, and recommended wilderness in the Planning Area

ANALYSIS DISPLAY

- The analysis will be presented through text that describes the impacts that each proposed management action would have on each designated wilderness, WSA, and recommended wilderness. Additionally, a table showing the impacts on each designated wilderness, WSA, and recommended wilderness by alternative and map(s) depicting designated wilderness, WSA, and recommended wilderness boundaries within the Planning Area will be included as part of the analysis.

5.21.4 Inventoried Roadless Areas

How would proposed management affect the roadless characteristics of inventoried roadless areas?

GEOGRAPHIC AND TEMPORAL SCALE OF ANALYSIS

The analysis area for IRAs would comprise each IRA within the Planning Area. The temporal scale of analysis would be the life of the plan; however, the length of time for congressional action on roadless designation would also be considered.

RELEVANT ASSUMPTIONS

- Consistent with the 2001 Roadless Rule (36 CFR 294), the USDA Forest Service would manage IRAs to not impair the roadless characteristics associated with each specific IRA.

ANALYSIS METHODOLOGY AND TECHNIQUES

- For IRAs, the USDA Forest Service would determine whether the management direction of each alternative protects the suitability of each IRA for preservation as wilderness. First, the USDA Forest Service would list and map the locations of the existing and proposed IRAs in the Planning Area by alternative. Next, the roadless characteristics of IRAs would be defined by alternative. Activities must be temporary and create no new surface disturbance. Finally, the agencies would determine whether specific management activities or the lack of management direction would affect the roadless characteristics of IRAs.

UNITS OF MEASUREMENT

- Measurements will be in acres within each IRA that would be impacted by a management action, where applicable.
- Other impacts will be described qualitatively, such as impacts to the qualities of roadless character like soil, water and air; drinking water; diversity of plant and animal communities; habitat for species dependent on large undisturbed tracts of land; primitive recreation classes; reference landscapes for research study; landscape character and integrity; cultural sites; and unique characteristics (Riddle and Vann 2020).

RELEVANT DATA AND INFORMATION TO BE USED

- IRA reports and worksheets from the USDA Forest Service
- GIS data of IRA parcel boundaries
- Acres of lands managed to protect IRAs by alternative, with overlapping acreages of other land use allocations: ROW exclusion, VRM class, and OHV allocations

ANALYTICAL CONCLUSIONS TO BE ANSWERED

- A description of how land use allocations and discretionary uses for each alternative affect each IRA in the Planning Area.

ANALYSIS DISPLAY

- The analysis will be presented through text that describes the impacts that each proposed management action would have on each IRA. Additionally, a table showing the impacts on each

IRA by alternative and map(s) depicting IRA boundaries within the Planning Area will be included as part of the analysis.

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CHAPTER 6. PLANNING AREA PROFILE

This chapter documents the current conditions, trends, and forecasts for resources, resource uses, existing nondiscretionary designations, and social and economic conditions in BENM that are relevant to the purpose and need and the planning issues identified by the agencies.

6.1 TERRESTRIAL HABITAT, VEGETATION RESILIENCE AND CONSERVATION (LARGE-SCALE AND LOCAL ECOTYPES)

This section discusses vegetation types, including special status plant species in the Planning Area. Vegetation related to riparian, woodlands, and grazing are covered in their respective sections.

6.1.1 Current Conditions

Terrestrial Vegetation

Terrestrial vegetation includes plant species not associated with rivers, creeks, lakes, springs, wetlands, or other surface or shallow subsurface water. Most Planning Area vegetation is terrestrial. Terrestrial vegetation provides an enormous variety of functions in an ecosystem and a variety of human and animal uses, including longstanding use of plants and woodland resources by the Tribal Nations of the BEITC for food, medicine, shelter, dyes, fibers, oils, resins, gums, soaps, waxes, latex, tannins, and religious and spiritual purposes, as described in *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022). Terrestrial 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. The Planning Area also provides habitat to a variety of endemic, rare, and culturally important species of plants. Ecosystems reflect complex sets of interactions between plants, animals, soil, water, air, temperature, topography, fire, and humans; for Tribal Nations of the BEITC, "cultural resources and natural resources are not two different categories" (BEC 2022). Influences exerted on one component affect other components in the system. Vegetation and habitat management affects other resources, including wildlife, noxious weed and invasive vegetation management, rangeland management, recreational uses, and more. For example, management of healthy woodlands has many indirect effects on other resources and values (e.g., wildlife and personal woodlands use). Management of noxious weeds and invasive vegetation is central to ecosystem health, with effects on many resources. Currently, due to past management such as fire suppression, artificially high fuel loads that stretch across broad, remote landscapes pose unique management challenges in terms of method (e.g., prescribed fire) and outcomes (e.g., potential for noxious weed and invasive infestations) as well as management of human safety during wildfire response and/or treatments.

Existing Vegetation Types

LANDFIRE's Existing Vegetation Type product represents the current distribution of terrestrial ecological systems (LANDFIRE 2022). LANDFIRE defines terrestrial ecological systems as groups of plant community types that tend to co-occur within landscapes with similar ecological processes, substrates, and/or environmental gradients. Acres of LANDFIRE Existing Vegetation Types in the Planning Area are summarized in Table 6.1-1. Detailed descriptions of the ecological systems are available in NatureServe (2009). Figure 6.1-1 gives a general overview of the vegetation cover types present in the Planning Area. The LANDFIRE vegetation types were grouped into general categories.

Table 6.1-1. LANDFIRE Existing Vegetation Types in the Planning Area

Existing Vegetation Type	Acres
Colorado Plateau Pinyon-Juniper Woodland	491,390
Colorado Plateau Blackbrush-Mormon-tea Shrubland	327,099
Colorado Plateau Mixed Bedrock Canyon and Tableland	217,326
Colorado Plateau Pinyon-Juniper Shrubland	188,972
Southern Rocky Mountain Ponderosa Pine Woodland	57,483
Inter-Mountain Basins Big Sagebrush Shrubland	34,966
Inter-Mountain Basins Mixed Salt Desert Scrub	23,901
Southern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest and Woodland	17,155
Rocky Mountain Gambel Oak-Mixed Montane Shrubland	16,298
Inter-Mountain Basins Semi-Desert Shrub-Steppe	14,544
Great Basin & Intermountain Ruderal Shrubland	12,959
Southern Colorado Plateau Sand Shrubland	12,683
Rocky Mountain Lower Montane-Foothill Shrubland	11,297
Rocky Mountain Cliff Canyon and Massive Bedrock	7,567
Rocky Mountain Aspen Forest and Woodland	6,544
Inter-Mountain Basins Shale Badland	6,006
Western Cool Temperate Pasture and Hayland	5,334
Rocky Mountain Lower Montane-Foothill Riparian Woodland	3,161
Inter-Mountain Basins Greasewood Flat	3,095
Inter-Mountain Basins Montane Sagebrush Steppe	2,961
Western Cool Temperate Urban Shrubland	2,481
Southern Rocky Mountain Mesic Montane Mixed Conifer Forest and Woodland	2,305
Inter-Mountain Basins Semi-Desert Grassland	1,908
Colorado Plateau Mixed Low Sagebrush Shrubland	1,729
Inter-Mountain Basins Active and Stabilized Dune	1,611
Inter-Mountain Basins Mat Saltbush Shrubland	1,598
Great Basin & Intermountain Introduced Annual Grassland	1,439
Great Basin & Intermountain Introduced Annual and Biennial Forbland	1,324
Western Cool Temperate Fallow/Idle Cropland	1,054
Great Basin & Intermountain Introduced Perennial Grassland and Forbland	1,005
Interior West Ruderal Riparian Scrub	996
Southern Rocky Mountain Montane-Subalpine Grassland	793
Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	782
Interior Western North American Temperate Ruderal Grassland	705
Western Cool Temperate Urban Evergreen Forest	615
Interior West Ruderal Riparian Forest	476
Rocky Mountain Subalpine-Montane Mesic Meadow	429
Interior Western North American Temperate Ruderal Shrubland	414

Existing Vegetation Type	Acres
Western Cool Temperate Close Grown Crop	361
Western Cool Temperate Urban Herbaceous	348
Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland	323
Rocky Mountain Lower Montane-Foothill Riparian Shrubland	301
Western Cool Temperate Developed Shrubland	260
North American Arid West Emergent Marsh	203
Western Cool Temperate Wheat	165
Rocky Mountain Alpine Bedrock and Scree	126
Total	1,484,490

Source: LANDFIRE 2022

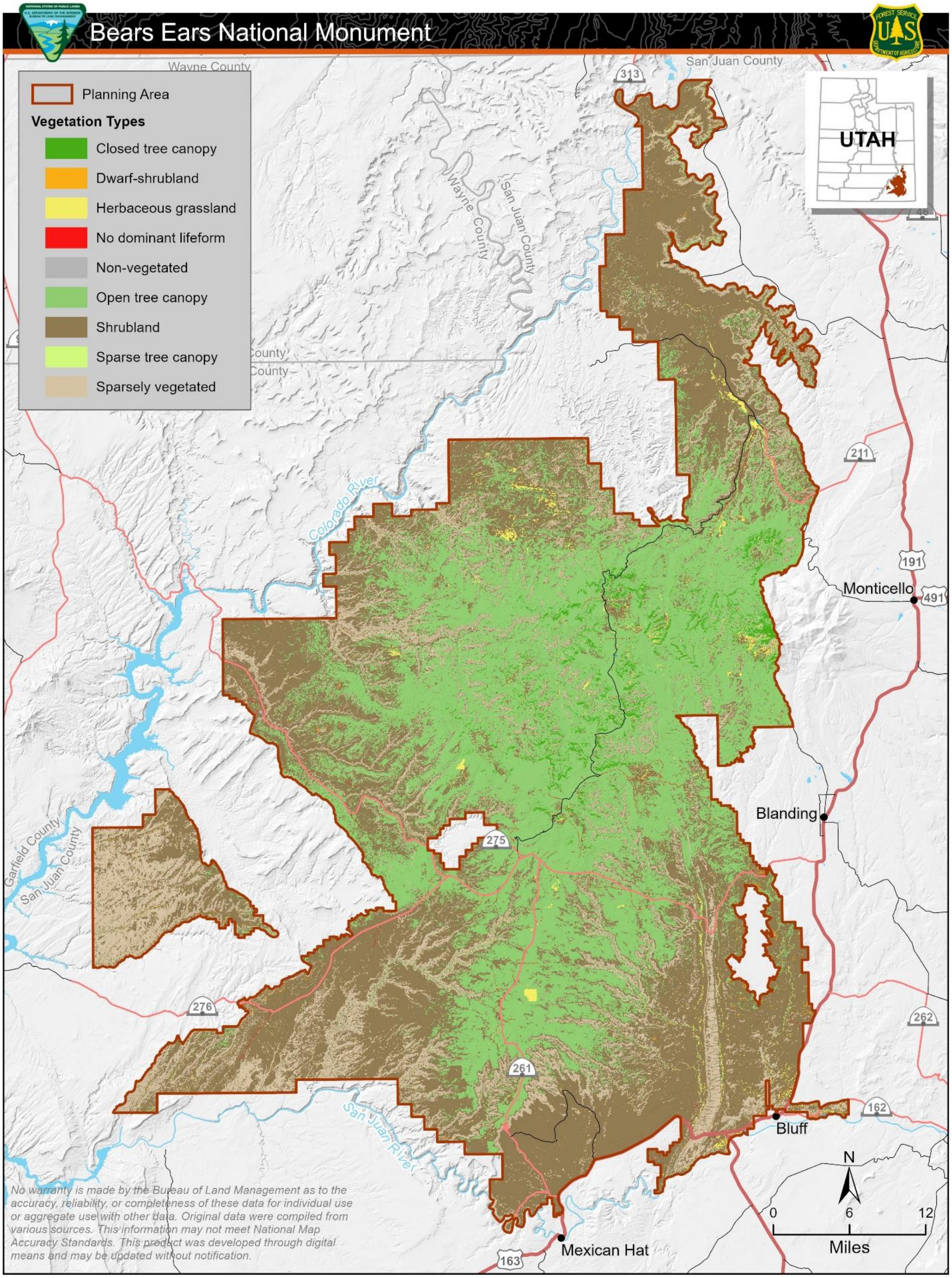

Figure 6.1-1. Vegetation types in the Planning Area.

Ecological Site Groups

Ecological site groups are generalized groupings of NRCS ecological sites. Ecological sites provide additional context and information to land managers about how landscapes may respond to management. Nauman et al. (2022) generalized the ecological site concepts based on unifying underlying soil, geomorphology, and climate patterns to delineate ecological site groups in the Upper Colorado River region, where an inventory of ecological sites is incomplete. The type and amount of ecological site groups for BLM-administered lands in the Planning Area are summarized in Table 6.1-2. No data for ecological site groups was available for NFS lands.

Table 6.1-2. Ecological Site Groups in the Planning Area

Ecological Site Group	BLM Acres
No Data	813,394
Upland Dissected Slope (Twoneedle Pinyon-Utah Juniper)	137,698
Upland Shallow Loam (Pinyon-Utah Juniper)	81,608
Semidesert Shallow Sandy Loam (Blackbrush)	32,459
Desert Shallow Sandy Loam (Blackbrush)	29,609
Desert Shallow Sandy Loam (Shadscale)	26,036
Semidesert Sandy Loam (4-Wing Saltbush)	20,454
Alkali Fan (Valley Saltbush)	11,888
Desert Sandy Loam (Blackbrush)	11,655
Loamy Bottom (Big Basin Sagebrush)	5,811
Upland Loam (Big Basin Sagebrush)	4,320
Mountain Shallow Loam (Ponderosa Pine)	4,083
Mountain Loam (Oak)	3,989
Upland Very Steep Stony Loam (Pinyon/Utah Juniper)	3,937
Desert Sand (Sand Sagebrush)	3,726
Semidesert Boundary Fan (Blackbrush)	2,840
Semidesert Stony Loam (Blackbrush)	2,125
Desert Stoney Loam (Blackbrush)	1,487
Alkali Flat (Greasewood)	1,073
Semiwet Saline Streambank (Fremont Cottonwood)	853
Semidesert Loam (Wyoming Big Sagebrush)	746
Semidesert Shallow Sandy Loam (Utah Juniper, Blackbrush)	566
Semidesert Sandy Loam (Blackbrush)	356
Upland Loam (Big Sagebrush)	4
Loamy Bottom	1
Total	1,200,718

Source: BLM GIS 2022

The BLM uses AIM Strategy data and LMF data as a tool to determine land conditions, trends, plant groups, cover rates, and functions. These data are collected from monitoring plots across the western

United States, including 105 plots in BENM, and include direct field observations of standardized indicators.

According to AIM Strategy and LMF data, approximately 74% of monitoring plots in BENM have greater than 95% native plant cover relative to total plant cover (Table 6.1-3). Native plant communities promote biodiversity and are less susceptible to large fires.

Table 6.1-3. Number and Percentage of Planning Area Monitoring Locations with Different Amounts of Native Plant Cover Relative to Total Plant Cover, 2013–2021

Percentage of Foliar Plant Cover from Native Plants	Plot Count	Percentage of Plots in the Planning Area
< 85	15	14.3
85–95	12	11.4
> 95	78	74.3

Source: BLM GIS 2022

Approximately 9% of plots have between 5% and 35% tree cover (Table 6.1-4). Trees are native to western rangelands but can increase in the absence of fire or as a result of other disturbances, altering ecosystem functions. Pinyon-juniper woodland encroachment trends in BENM are discussed in more detail below.

Table 6.1-4. Number and Percentage of Planning Area Monitoring Locations with Different Amounts of Tree Cover, 2013–2021

Indicator	Value Category	Number of Plots	Percentage of Plots in the Planning Area
Tree Cover	< 5%	93	88.5
Tree Cover	5-15%	6	5.7
Tree Cover	15-35%	3	2.9
Tree Cover	> 35%	3	2.9

Source: BLM GIS 2022

Perennial grasses and forbs provide forage for wildlife and livestock and help stabilize soil. According to AIM Strategy and LMF data, approximately 37% of monitoring plots in BENM have greater than 5% noninvasive perennial grass and forb cover (Table 6.1-5).

Table 6.1-5. Number and Percentage of Planning Area Monitoring Locations with Different Amounts of Noninvasive Perennial Grass and Forb Cover, 2013–2021

Indicator	Value Category	Number of Plots	Percentage of Plots in the Planning Area
Perennial Grass and Forb Cover	< 1%	41	39.1
Perennial Grass and Forb Cover	1-5%	25	23.8
Perennial Grass and Forb Cover	> 5%	39	37.1

Source: BLM GIS 2022

Locations where more than 20% of the soil surface is in canopy gaps greater than 6.6 feet have increased susceptibility to soil erosion (Webb et al. 2014). Approximately 87% of monitoring plots in BENM are in this category (Table 6.1-6).

Table 6.1-6. Number and Percentage of Planning Area Monitoring Locations with Susceptibility to Soil Erosion, 2013–2021

Indicator	Value Category	Number of Plots	Percentage of Plots in the Planning Area
Plant Canopy Gaps > 6.6 feet	Less Susceptible to Erosion (< 20% large gaps)	14	13.3
Plant Canopy Gaps > 6.6 feet	More Susceptible to Erosion (> 20% large gaps)	91	86.7

Source: BLM GIS 2022

The sagebrush ecosystem is one of the most imperiled ecosystems in North America due to a variety of factors. Very little surviving sagebrush across its range is undisturbed, with 50 to 60% having altered understories or having been lost to direct conversions from catastrophic wildfire, farming, urban development, and tree encroachment (Knick et al. 2003; USFWS 2013). Since the 1850s, sagebrush-steppe communities, which dominated the Intermountain West, have shifted to woodlands or invasive annual-dominated communities (Miller and Wigand 1994; Tausch et al. 1981). Pinyon-juniper woodlands have increased substantially in both density and extent throughout the Intermountain West over the past 130 to 150 years, often invading landscapes previously dominated by sagebrush (Miller and Wigand 1994; Tausch et al. 1981). The lack of natural disturbances, such as fire, has resulted in major changes to plant community age diversity, structure, and composition. According to terrestrial AIM Strategy data, only 3.8% of monitoring locations in BENM have abundant sagebrush (Table 6.1-7).

Table 6.1-7. Number and Percentage of Planning Area Monitoring Locations with Different Amounts of Sagebrush Cover, 2013–2021

Indicator	Value Category	Number of Plots	Percentage of Plots in the Planning Area
Sagebrush Cover	< 5%	97	92.4
Sagebrush Cover	5-9%	4	3.8
Sagebrush Cover	> 9%	4	3.8

Source: BLM GIS 2022

6.1.2 Special Status Species

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). Table 6.1-8 lists special status plant species that consist of federally listed and BLM and USDA Forest Service sensitive plant species that have been documented or have the potential to occur in the Planning Area.

Table 6.1-8. Special Status Species That Occur or Have Potential to Occur in the Planning Area

Common Name (scientific name)	Habitat	Status	Known or Potential Occurrences
Chatterley onion (*Allium geyeri* var. *chatterleyi*)	Found in pinyon-juniper and ponderosa pine-manzanita community types where there is open, shallow, fine-textured sandy loam soil and rock outcrops at elevations of 6,600 to 8,200 feet.	FSS	Potential
Cronquist's milkvetch (*Astragalus cronquistii*)	Found in sandy and gravelly ridges on red sandstone. Also on Mancos Shale and on substrates derived from the Morrison Formation in the eastern part of its range at elevations of 4,800 to 5,800 feet.	BSS	Potential
Navajo sedge (*Carex specuicola*)	Restricted to Navajo Sandstone seeps-springs, pockets, or hanging gardens, ranging from almost inaccessible sheer cliff faces to accessible alcoves at elevations of 5,700 to 6,000 feet. Blooms late June–July.	FT	Potential
Jones cycladenia (*Cycladenia humilis* var. *jonesii*)	Found in badland habitats in semiarid central Utah, usually on the steep slopes of hills or mesas. Grows in fine-textured soils derived from sandstone at elevations of 4,500 to 5,600 feet.	FT	Potential
Pinnate spring-parsley (*Cymopterus beckii*)	Found in sandy soils weathered from Navajo Sandstone and on slickrock ledges and cracks, generally in association with montane vegetation types at elevations of 5,500 to 8,600 feet. Blooms April–June.	FSS/BSS	Potential
Hole-in-the-rock prairie-clover (*Dalea flavescens* var. *epica*)	Found in sandstone bedrock and sandy areas in blackbrush and mixed desert shrub communities at elevations between 4,700 and 5,000 feet. Blooms May–June.	BSS	Potential
Abajo draba (*Draba abajoensis*)	Found in subalpine meadows and spruce, fir, or pine forests at elevations of 6,200 to 12,500 feet. Blooms May–August.	FSS	Potential
Abajo daisy (*Erigeron abajoensis*)	Found in sagebrush, pinyon-juniper, ponderosa pine, and spruce-fir vegetation communities on open rocky or gravelly slopes at elevations of 9,100 to 11,400 feet. Blooms July–August.	FSS	Potential
Kachina daisy (*Erigeron kachinensis*)	Found in lower elevation seeps, springs, and hanging gardens and higher elevation mesic slopes in aspen and ponderosa pine at elevations of 5,200 to 8,000 feet. Blooms May–July.	FSS/BSS	Potential
Bluff buckwheat (*Eriogonum racemosum* var. *nobilis*)	Found in juniper and ponderosa pine communities at elevations of 6,200 to 7,215 feet.	BSS	Potential
Canyonlands lomatium (*Lomatium latilobum*)	Found in sandy soil or crevices in Entrada and Navajo Sandstone and slot canyons. Prefers sheltered, cool habitat on all slopes and aspects at elevations of 4.800 to 6,855 feet. Blooms April–June.	FSS/BSS	Potential
Entrada skeletonplant (*Lygodesmia grandiflora* var. *entrada*)	Found in mixed desert shrub and juniper communities at elevations of 4,400 to 4,800 feet. Blooms in June.	BSS	Potential
Tuhy's breadroot (*Pediomelum aromaticum* var. *tuhyi*)	Found in pinyon-juniper and mixed desert shrub communities on the Entrada, Kayenta, and Mossback Formations, on rimrock or shallow sand, at elevations of 5,600 to 6,500 feet. Blooms May–June.	BSS	Potential

Common Name (scientific name)	Habitat	Status	Known or Potential Occurrences
Alcove rock-daisy (*Perityle specuicola*)	Found in desert shrub and hanging garden communities in narrow, protected canyons, alcoves, and at cliff bases in Navajo Sandstone and the Cedar Mesa Formation, at elevations of 3,700 to 4,200 feet. Blooms mid-July–late September.	BSS	Potential
Drab phacelia (*Phacelia indecora*)	Found in hanging garden plant communities in alcoves at elevations of 3,600 to 4,500 feet. Known only from San Juan County, Utah. Blooms May–June.	BSS	Known
Jane’s globemallow (*Sphaeralcea janeae*)	Found in salt desert shrub communities on the Organ Rock and White Rim members of the Cutler Formation at elevations of 4,000 to 4,600 feet. Blooms May–July.	BSS	Known
Ute ladies’-tresses (*Spiranthes diluvialis*)	Found in wet meadows, marshes, abandoned oxbow meanders, springs, lakes, and along stream banks at elevations below 7,000 feet in Utah.	FT	Potential

Source: BLM 2018; USFWS 2022; personal communication, comments received from Barb Smith, USDA Forest Service, Bears Ears National Monument special status plant species, September 2022

* BSS = BLM special status species, FSS = USDA Forest Service sensitive species, FT = federally listed threatened species.

Seed and Plant Collection

Private individuals may collect seeds and plants after acquiring a permit, which includes a list of stipulations. The public may collect seed on BLM-administered lands during non-drought years from a seed source that has been verified as being in good vegetative condition (e.g., vigor and viable seed). Popular species for seed collection include fourwing saltbush, globemallow (*Sphaeralcea* spp.), rabbitbrush (*Chrysothamnus* spp.), winterfat, and needle-and-thread grass. For seed, collectors are charged 10% of market value. The BLM and USDA Forest Service also have native seed collections to develop seed sources and native plant materials for revegetation and restoration efforts. Seeds of Success is a national native seed collection program, led by the BLM in partnership with a variety of federal agencies and other non-federal organizations. The mission of Seeds of Success is to collect wildland native seed for ecosystem restoration, research development, and conservation (BLM 2022).

The 2020 BENM MMPs restrict plant and seed collection to only those areas that have been verified to be meeting rangeland health standards. Federally protected plant species may not be collected, but BLM sensitive species may be collected if the population is sufficiently large as to not be affected. Before collecting plant specimens, a collection permit must be submitted to the local BLM office for review. A list of species collected and a copy of the herbarium labels produced for each specimen must be submitted to the BLM UTSO at the end of collection season.

For all the tribes of the BEITC, ethnobotany is a means of documenting the cultural significance of plants, including the seasonality of use, harvesting practices, and traditional management. There are specific plants that are used in ceremonies as well, and often there are cultural practices surrounding their collection (BEC 2022).

6.1.3 Trends

The main driver that has historically affected vegetation in the region, as well as the Planning Area, is vegetation community conversion and precipitation patterns. This has primarily due to pinyon-juniper woodland encroachment into sagebrush communities and droughts. Loss of aspen has occurred due to large-scale insect infestations, disease outbreak, wildland fires, herbivory, and browsing. Community conversion has also occurred because of invasive nonnative plant spread, including cheatgrass. Anthropogenic and natural disturbances, such as wildfire and fire management activities, mineral development, ROW development, vegetation management to improve vegetative conditions, and livestock grazing, have also affected Planning Area vegetation. 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 climate changes drive pinyon-juniper woodland distribution. In the absence of fire (e.g., due to fire suppression policies), pinyon-juniper woodlands have infilled into sagebrush habitats, leading to increased fuel loading and greater potential for severe wildfires. Additionally, when pinyon-juniper expand into sagebrush-steppe habitats, they outcompete understory species for light, moisture, and nutrients. This cycle eventually results in a nearly complete loss of ecologically valuable understory vegetation species such as sagebrush, grasses, and forbs. Droughts limit available moisture for plant development, growth, and reproduction. These situations can reduce the frequency of plants with a corresponding increase in bare ground. The altered condition affects soils, vegetation structure and composition, water, nutrient and fire cycles, forage production, carbon storage, and plant and wildlife biodiversity.

Special Status Species

A range of threats to special status plant species, including habitat degradation from improper livestock grazing, trampling, unauthorized or cross-country OHV use, weed spread, droughts 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 those species. Little information is available documenting the current trends, habitat conditions, and population size of most special status plant populations throughout Utah.

6.1.4 Forecasts

Warming temperatures, drought, fire, and other extreme weather effects are expected to increase in frequency and will likely contribute to impacts on terrestrial vegetation and special status plants as climate change continues. The Colorado Plateau Rapid Ecological Assessment suggests that that the ecoregion is expected to undergo general warming, 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). Average summer temperatures are expected to increase, and simulations show even greater increases in precipitation for winter (Bryce et al. 2012).

Temperature increases are expected to interact with water limitations to alter vegetation community composition and distribution. 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). Colorado Plateau Rapid Ecoregional Assessment models (Bryce et al. 2012) predict increasing temperatures in all seasons as well as reductions in winter and summer precipitation.

Forage demands from wildlife are anticipated to continue at the present rate, as the trend appears relatively stable. Deer in 2020 San Juan Unit Management Plan are listed as stable for the Abajo subunit and in need of a reduction in the Elk Ridge subunit (UDWR 2020). According to the Utah Statewide Elk Management Plan, the elk population objective is stable to slightly below (UDWR 2015). While the 2017 Utah Pronghorn Statewide Management Plan does not necessarily state a management objective, the plan reports pronghorn numbers as being stable (UDWR 2017). Forage demand from livestock is also anticipated to continue at the present rate. Public interest in the Monument continues to grow. Recreationists are increasing in numbers, and they are seeking new destinations as well as continuing to visit popular areas such as the San Juan River, Indian Creek, and Grand Gulch/Cedar Mesa.

Seed, firewood, and pine nut collection are becoming more popular and should experience an increase in demand.

Although difficult to predict, other factors, including disease, insect infestations, and management activities associated with minerals, lands and realty, forestry and woodlands, vegetation, livestock grazing, and recreation, could continue to impact desirable vegetation through declines in vegetative productivity.

6.2 NOXIOUS WEEDS AND INVASIVE NONNATIVE PLANTS

6.2.1 Current Conditions

Noxious weeds and invasive nonnative plants disrupt or have the potential to disrupt or alter natural ecosystem function, composition, or diversity of infested areas. These species complicate natural resource use and may interfere with management objectives.

Invasive plants are nonnative and able to establish on many sites, grow quickly, and spread to the point of disrupting plant communities or ecosystems. These species have the potential to become a dominant or codominant species in an area if their future establishment and growth is not controlled by management interventions. Species that become dominant for only one to several years (for example, a short-term response to drought or wildfire) are not invasive plants (BLM 2008).

Noxious weeds are a subset of invasive plants. These 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 2008). Noxious weeds in the Planning Area are designated by the Utah Noxious Weed Act of 2008.

Noxious weeds have been found in a variety of locations and habitat types, with waterways and transportation systems being the major vectors of spread. Other vectors include vehicle use, wind, wildlife, livestock, and humans.

Table 6.2-1 summarizes the noxious weeds documented in the Planning Area.

Table 6.2-1. Noxious Weeds Documented in the Planning Area

Name	Weed Class*
Russian knapweed (*Acroptilon repens*)	3
Jointed goatgrass (*Aegilops cylindrica*)	3
Camelthorn (*Alhagi pseudalhagi*)	1B
Hoary cress or whitetop (*Cardaria draba*)	3
Musk thistle (*Carduus nutans*)	3
Canada thistle (*Cirsium arvense*)	3
Field bindweed (*Convolvulus arvensis*)	3
Russian olive (*Elaeagnus angustifolia*)	4
Scotch thistle or cotton thistle (*Onopordum acanthium*)	3
Tamarisk or saltcedar (*Tamarix ramosissima*)	3
Puncturevine or goathead (*Tribulus terrestris*)	3

Source: Personal communication, email from Jed Carling, Rangeland Management Specialist, Bureau of Land Management Monticello FO, to Audrey McCulley, SWCA Environmental Consultants, August 3, 2022; Utah Weed Control Association 2022

* 1B = Limited distribution in Utah, early detection, rapid response; 3 = Widely distributed in Utah, considered beyond control, control expansion; 4 = Present in Utah, prevent distribution through seed law.

Noxious weeds such as tamarisk (*Tamarix ramosissima*) and Russian olive (*Elaeagnus angustifolia*), have invaded waterways and riparian areas throughout the Planning Area, including the San Juan River floodplain and tributaries, and drastically changed the composition of riparian vegetation communities. Populations of Russian knapweed (*Acroptilon repens*) have also reached high levels in many river corridors with camelthorn (*Alhagi pseudalhagi*) and ravennagrass (*Saccharum ravennae*) following suit. Field bindweed (*Convolvulus arvensis*) and Scotch thistle (*Onopordum acanthium*) are known to occur along roadways, rangelands, disturbed areas, and developed areas. Jointed goatgrass (*Aegilops cylindrica*) occurs along roadways and in developed and disturbed areas. Hoary cress (*Cardaria draba*) occurs along waterways and in riparian areas and developed areas. Musk thistle (*Carduus nutans*) and Canada thistle (*Cirsium arvense*) are known to occur along roadways and waterways and in rangelands, disturbed areas, and developed areas. Puncturevine (*Tribulus terrestris*) is also known to occur in rangelands and developed and disturbed areas.

Additional weeds on the Utah Noxious Weed List (Utah Weed Control Association 2022) that have been documented in the region and have the potential to become introduced in the Planning Area described in Table 6.2-2.

Table 6.2-2. Noxious Weeds Documented in the Region

Name	Weed Class*
Diffuse knapweed (*Centaurea diffusa)*	2
Yellow starthistle (*Centaurea solstitialis*)	2
Spotted knapweed (*Centaurea stoebe*)	2
Squarrose knapweed (*Centaurea virgata*)	2
Poison hemlock (*Conium maculatum*)	3
Bermudagrass (*Cynodon dactylon*)	3
Houndstongue (*Cynoglossum officinale*)	3
Quackgrass (*Elymus repens*)	3
Leafy spurge (*Euphorbia esula*)	2
Dyers woad (*Isatis tinctoria*)	2
Perennial pepperweed or tall whitetop (*Lepidium latifolium*)	3
Dalmatian toadflax (*Linaria dalmatica*)	2
Purple loosestrife (*Lythrum salicaria*)	2
Johnsongrass (*Sorghum halepense*)	3

* 2 = Widely distributed in Utah, considered controllable; 3 = Widely distributed in Utah, considered beyond control, control expansion.

While not listed on Utah's Noxious Weed List, an invasive nonnative plant species of concern and significant change agent in the region is cheatgrass (*Bromus tectorum*). Change agents alter ecosystem processes, such as fire regimes, and have the potential to expand their distribution in spite of human and natural disturbances and to adapt and shift their range in response to climate change (Bradley et al. 2012).

Annual invasive grasses, such as cheatgrass, are known to increase fire frequency and alter ecosystems in western rangelands (Bradley et al. 2018). Cover greater than 1% of invasive annual grasses translates to higher fire frequency. According to terrestrial BLM AIM Strategy and Landscape Monitoring Framework (LMF) data from 2013 through 2021, a majority (69%) of the monitoring plots had little to no invasive annual grass cover (Table 6.2-3). The most abundant invasive annual grass is cheatgrass. Red brome (*Bromus rubens*) and annual wheatgrass (*Eremopyrum triticeum*) are also recorded on monitoring plots in the Planning Area (BLM 2022).

Table 6.2-3. Invasive Annual Grass Cover in the Planning Area

Invasive Annual Grass Cover (%)	Plot Count	Plots in the Planning Area (%)
< 1	19	18.1
1-5	8	7.6
> 5	8	7.6

Source: BLM GIS 2022

6.2.2 Trends

Controlling undesirable and nonnative species is one of the most difficult challenges, as well as one of the most significant problems, facing vegetation managers. The Monticello FO contracts with San Juan County to control weeds on BLM-administered land and on average treats 55 acres per year in BENM primarily along the San Juan River corridor. San Juan County surveyed roads within the Monticello FO for noxious and invasive plant species in 1997 and 1998. When possible, these surveys are updated annually. A list of species can be found in the Monticello RMP. The USDA Forest Service hires seasonal workers and uses force account to monitor and treat between 250 and 300 acres of nonnative species a year.

Although known as a highly invasive species, without official designation as a problematic species, tamarisk eradication has not been mandatory in Utah. Tamarisk and Russian olive have invaded waterways throughout the Planning Area and drastically changed the composition of riparian vegetation communities. Populations of Russian knapweed have also reached high levels in many river corridors.

The use of certified weed-free hay is one guideline implemented from *Rangeland Health: Utah's Standards and Guidelines for Healthy Rangelands* (BLM 1997) to control the spread of noxious weeds. The USDA Forest Service also maintains a stipulation that weed-free hay must be used. For revegetation purposes, the use and perpetuation of native species have been a priority, except for instances when non-intrusive, nonnative species are more ecologically or economically feasible.

6.2.3 Forecasts

Established weed populations will likely continue to expand, and new weed species will continue to appear in the Planning Area as a result of natural and anthropogenic introductions. The Colorado Plateau Rapid Ecoregional Assessment (Bryce et al. 2012) predicted an 85% increase in invasive species' distribution within the region (which includes the Planning Area) by 2025. The degree to which these species spread is directly correlated to human activities, disturbances, and control efforts. Recreation equipment such as sleeping bags, tents, and clothing contribute to weed populations. Vehicular travel and other land use activities contribute to weed proliferation, although natural elements, such as wind and wildlife, will likely also continue to contribute.

Noxious weeds and invasive nonnative plants will be more likely to establish in newly disturbed areas, especially near existing populations. In some areas, control efforts will eradicate species locally.

Invasive annual species, such as cheatgrass, will continue to alter fire regimes by facilitating increases in fire frequency and size. This will come about due to increasing fine fuel loads and continuity in areas that were once fuel-limited, or had less to burn. As fires burn these areas, cheatgrass will replace native vegetation, reinforcing this feedback cycle.

Control of noxious weeds and invasive nonnative 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 activities that contribute to the spread of noxious weeds, requiring prompt reclamation of these disturbed areas, reducing traffic through infested areas, requiring power washing of equipment, implementing integrated invasive plant management strategies, 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.

6.3 SOILS AND BIOLOGICAL SOILS CRUSTS

6.3.1 Current Conditions

Soils are the medium for plant growth, and soils provide support for nearly all terrestrial organisms. Soils in the Planning Area are derived primarily from sedimentary geologic deposits and have developed in residuum, colluvium, alluvium, eolian sands, and loess. Underlying geology, geomorphology, and soil parent material strongly influence soil texture and density of rock fragments. Soils formed in young eolian material range in texture from sandy loam, loamy sand, to sand, whereas soils that derived from shale are clay loam or clay. Deep soils (60 inches or greater) occur within mountainous areas as well as in alluvium, valley fills, and gently sloping mesas or benches. Shallow soils form along exposed rock escarpments, rims, and benches.

Temperatures and precipitation within the Planning Area vary substantially throughout the year and across elevations, which strongly influences soil development and characteristics. For example, soil within lower elevations that are formed along canyon floors, on structural benches, and or salt valleys are generally dry and hot, whereas soils in high-elevation mountain areas are generally cold and moist.

USDA Soil Taxonomy Orders mapped within the Planning Area consist of Alfisols, Aridisols, Entisols, and Mollisols. Alfisols are generally formed under forest or savanna vegetation and display an accumulation of illuvial clay in the subsurface. Aridisols form under dry climates and contain one or more diagnostic subsurface horizons (e.g., argillic, natric, cambic, calcic/petrocalcic, gypsic/petrogypsic, salic, or duripan). Entisols are young soils that have no diagnostic horizons. Mollisols contain nearly black, organic-rich surface horizons and generally form in relatively high moisture conditions (i.e., mountainous areas of the Planning Area).

Soil Mapping Data

BLM-administered lands within the Planning Area were included in the *Soil Survey: San Juan Area, Utah* (Soil Conservation Service 1962), *Soil Survey of San Juan County, Utah, Central Part* (Soil Conservation Service 1993), and *Soil Survey of Canyonlands Area, Utah, Parts of Grand and San Juan Counties* (Soil Conservation Service 1991) and are available as SSURGO data (NRCS 2022). These soil surveys share a common border and include similar landscapes. Consequently, some of the soils are described in all three survey reports. NFS lands were not covered in these surveys but are instead delineated in the STATSGO dataset (NRCS 2022).

The soils are delineated as Detailed Soil Map Units, and the descriptions of each map unit are detailed the soil survey reports and available on Web Soils Survey (NRCS 2022). A map unit delineation represents an area dominated by one or more major kinds of soil(s) and is identified and named according to the taxonomic classification of the dominant soil(s). However, soils are natural phenomena and have the characteristic variability of all-natural phenomena. Consequently, every map unit is made up of the soils for which it is named and some “included” soils that belong to other taxonomic classes.

A soil series consists of soils with profiles that are almost alike. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of one series can differ in texture, slope, stoniness, salinity, wetness, degree of erosion, and other characteristics. A soil series is divided into soil phases based on these differences. For example, soil map unit 44-Redhouse fine sandy loam, 2 to 8 percent slopes would be a phase of the Redhouse series.

Some map units are made up of two or more major soils. These map units are complexes or associations. A complex consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The soil map unit 25-Milok-Skos-Strych complex is one example. An association is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated uses of the map units in a survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. The soil mapping unit 35-Myton family-Skos-Rock outcrop association is one example. Areas referred to as miscellaneous areas are given a descriptive name, such as rubble land, rock outcrop, and riverwash.

The maps and map unit descriptions contained in the Web Soil Survey (NRCS 2022) can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

Table 6.3-1 shows the soil map unit and acreage in the Planning Area within BLM-administered lands, which were derived from SSURGO data. Table 6.3-2 provides soil map units and acreages within the NFS lands of the Planning Area, which were derived from STATSGO data.

Table 6.3-1. Soil Map Units on BLM-Administered Lands in the Planning Area

Soil Mapping Unit	Acreage
Arches-Rizno-Mido complex	7,964
Arches-Sheppard-Rock outcrop complex, 2 to 8 percent slopes	3,726
Badland	4,128
Badland-Rock outcrop complex	2,391
Bankard family-Riverwash complex	4,169
Bankard family-Sheppard complex	128
Barnum loam, 0 to 3 percent slopes	602
Barx fine sandy loam, 3 to 8 percent slopes	2,321
Barx very fine sandy loam, 1 to 4 percent slopes	27,808
Begay fine sandy loam, 2 to 6 percent slopes	7,823
Begay fine sandy loam, moist, 2 to 6 percent slopes	2,218
Begay-Rizno complex, 3 to 15 percent slopes	10,003
Begay-Rock outcrop-Mido complex, 2 to 35 percent slopes	678
Blanding very fine sandy loam, 2 to 10 percent slopes	607
Bluechief fine sandy loam, 1 to 8 percent slopes	377
Bluechief-Limeridge-Nakai complex, 1 to 6 percent slopes	29,609
Bodot-Strych-Skos association	6,406
Bond-Rizno fine sandy loams, 3 to 15 percent slopes	7,267
Bond-Windwhistle complex, 2 to 15 percent slopes	4,320
Bookcliff-Bookcliff, dry, complex	2,972
Bookcliff-Skos-Strych complex	3,989
Cahona fine sandy loam, 2 to 8 percent slopes	129
Cataract loamy fine sand, 2 to 8 percent slopes	1,808
Factory gravelly fine sandy loam, 2 to 6 percent slopes	1
Falcon-Bond-Rock outcrop complex, 15 to 70 percent slopes	1,197

Soil Mapping Unit	Acreage
Falcon-Bond-Rock outcrop complex, 2 to 15 percent slopes	4,083
Gilco silt loam, 0 to 1 percent slopes	4
Gilco silty clay loam, 0 to 1 percent slopes	41
Gilco-Trail complex, 0 to 2 percent slopes	133
Gladel-Rock outcrop complex, 5 to 15 percent slopes	10
Green River-Bankard families-Riverwash association, 0 to 4 percent slopes	853
Hoskinnini very gravelly fine sandy loam, 0 to 8 percent slopes	911
Ignacio-Leanto fine sandy loams, 2 to 6 percent slopes	5,204
Ignacio-Leanto fine sandy loams, dry, 2 to 6 percent slopes	1,611
Kiln loam, 2 to 15 percent slopes	2,217
Levante family complex, 0 to 15 percent slopes	1
Limeridge gravelly very fine sandy loam, 4 to 12 percent slopes	9,903
Littlenan-Moenkopie-Recapture complex	982
Littlenan-Ruinpoint-Rizno association, 1 to 20 percent slopes	1,634
Mellenthin very rocky fine sandy loam, 4 to 25 percent slopes	317
Metuck very gravelly sandy loam, 25 to 65 percent slopes	1
Mido loamy fine sand, 2 to 8 percent slopes	166
Mido loamy fine sand, dry, 2 to 8 percent slopes	7,122
Mido-Riverwash complex	716
Mido-Rock outcrop-Arches complex	2,037
Milok fine sandy loam, 1 to 6 percent slopes	7,603
Milok-Mivida complex	25,877
Milok-Skos-Strych complex	2,840
Mivida fine sandy loam, 1 to 6 percent slopes	5,313
Mivida fine sandy loam, 2 to 8 percent slopes	2,051
Mivida-Pastern-Rock outcrop complex, 1 to 8 percent slopes	16,327
Moab gravelly fine sandy loam, 2 to 8 percent slopes	845
Moab very cobbly fine sandy loam, 3 to 30 percent slopes	2,125
Moenkopie-Moenkopie, warm, complex	26,036
Moenkopie-Rock outcrop complex	13,819
Moenkopie-Rock outcrop complex, 1 to 15 percent slopes	15,888
Moffat fine sandy loam, 0 to 2 percent slopes	261
Moffat loamy fine sand, 2 to 5 percent slopes	655
Myton family-Nakai-Redhouse complex	19,363
Myton family-Rock outcrop complex	2,358
Myton family-Shalet-Badland complex	617
Myton family-Skos-Rock outcrop association	63,822
Nakai fine sand, 2 to 8 percent slopes	3,064
Nakai fine sandy loam, 1 to 6 percent slopes	4,219

Soil Mapping Unit	Acreage
Nakai-Moffat-Sheppard association	11,655
Nepalto gravelly sandy loam, 2 to 8 percent slopes	1,487
Newsrock loamy fine sand, 1 to 3 percent slopes	356
Nomrah-Plumasano-Gladel complex, 2 to 8 percent slopes	1
Oljeto family, 10 to 40 percent slopes	133
Pastern-Rizno-Rock outcrop complex	12,721
Piute-Sheppard-Rock outcrop association	11,267
Plumasano-Tanoan family-Gladel complex, 2 to 50 percent slopes	4
Recapture fine sandy loam, 0 to 2 percent slopes	1
Recapture-Redbank family-Bankard family association, 0 to 8 percent slopes	2,305
Redbank family-Riverwash-Green River family association, 0 to 4 percent slopes	4,532
Redbank fine sandy loam, dry, 0 to 3 percent slopes	4,694
Redbank fine sandy loam, dry, 3 to 8 percent slopes	3,409
Redbank very fine sandy loam, alkali, 0 to 3 percent slopes	90
Redhouse fine sandy loam, 2 to 8 percent slopes	2,601
Rizno, dry-Rock outcrop complex, 3 to 15 percent slopes	15,008
Rizno-Barx-Yarts complex	137,698
Rizno-Cahona-Rock outcrop complex	1,656
Rizno-Littlenan-Bodot association	11,888
Rizno-Mido complex	249
Rizno-Rock outcrop complex	74,851
Rizno-Rock outcrop complex, 3 to 15 percent slopes	37,764
Rizno-Ruinpoint-Rock outcrop complex	9,443
Rizno-Skos-Rock outcrop complex	78,272
Rizno-Strych association	3,936
Robroost family-Gypsum land complex	7,307
Rock outcrop	38,171
Rock outcrop-Moenkopie complex, 3 to 15 percent slopes	28,404
Rock outcrop-Nizhoni-Bamac complex, 5 to 60 percent slopes	6
Rock outcrop-Piute-Sheppard complex	4,527
Rock outcrop-Piute-Skos association	32,459
Rock outcrop-Rizno complex, 3 to 15 percent slopes	48,191
Rock outcrop-Rizno, dry complex, 3 to 15 percent slopes	45,695
Rock outcrop-Strych-Rizno association	40,973
Rock outcrop-Ustic Torripsamments complex, 2 to 15 percent slopes	22
Rubble land-Rock outcrop complex	11,136
Ruinpoint-Cahona association	140
Sandstone rockland, steep	1,070
Shalako-Anasazi-Rock outcrop complex, 3 to 15 percent slopes	24

Soil Mapping Unit	Acreage
Sheppard fine sand, 2 to 8 percent slopes	2,679
Skos channery fine sandy loam, 4 to 30 percent slopes	4,025
Skos, warm-Rock outcrop complex	20,570
Strych, warm-Skos, warm-Badland complex	15,283
Strych-Rizno-Strych, very steep association	22,570
Strych-Skos-Badland complex	264
Thoroughfare fine sandy loam,2 to 8 percent slopes	6,237
Trail fine sand, 0 to 5 percent slopes	967
Trail fine sandy loam, 0 to 1 percent slopes	19
Ustic Torrifluvents-Ustic Torrifluvents, sodic-Typic Ustifluvents complex, 0 to 6 percent slopes	3,506
Ustic Torriorthents-Lithic Torriorthents, warm-Rock outcrop complex, 10 to 80 percent slopes	54,237
Waas very fine sandy loam, 2 to 8 percent slopes	313
Water	430
Windwhistle very fine sandy loam, 1 to 6 percent slopes	142
Windwhistle-Sazi very fine sandy loams, 1 to 3 percent slopes	247
Yarts fine sandy loam, 5 to 30 percent slopes	1,412
Total	**1,200,717**

Table 6.3-2. Soil Map Units by Acreage within the NFS Lands of the Planning Area

Soil Mapping Unit	Acreage
Hagerman-Cahona-Begay (s7958)	229
Namon family-Flygare family-Dranyon-Broad Canyon family (s8002)	6,432
Rock outcrop-Moenkopie-Hoskinnini (s7952)	0
Rock outcrop-Rizno (s7957)	0
Rock outcrop-Rizno (s7959)	6,571
Strych-Rizno (s7948)	24,312
Strych-Rock outcrop-Rizno-Montvale-Monticello (s7940)	46,590
Strych-Skos-Bookcliff (s7943)	72,351
Tolman family-Harpole-Falcon family-Cabin-Bookcliff (s8001)	79,122
Tomasaki-Sessions-Richens-Harpole-Broad Canyon family (s8003)	37,660
Ustic Torriorthents-Rock outcrop-Lithic Torriorthents (s7954)	13,212
Waas-Tomasaki-Herm-Falcon (s7961)	2,805
Total	**289,284**

Sensitive Soils

A number of sensitive soils occur or have potential to occur within the Planning Area. These sensitive soils have physical and or chemical characteristics that make them susceptible to disturbance and challenging to restore or reclaim. Sensitivity classes that could occur within the Planning Area are droughty (marked by little or no precipitation or humidity), shallow, hydric (soils permanently or seasonally saturated by water), high risk of wind or water erodibility, low erosion tolerance, shallow, acidic, gypsiferous (soils containing sufficient quantities of gypsum to interfere with plant growth), desert pavement, saline, and high calcium carbonate (calcareous).

Biological Soil Crusts

Many of the biotic communities found in the Planning Area have evolved with the presence of BSCs. BSCs include mats or filaments of cyanobacteria, lichens, and mosses. These crusts play a major role in reducing water and wind erosion and preventing the establishment of invasive annual grasses (Belnap et al. 2001). Late succession crusts (dominated by of mosses and lichen) commonly appear dark, rough, and pinnacled, where a combination of frost heaving and dust capture increase surface microtopography. Early succession crusts appear as a smoother, two-dimensional layer on the surface and are dominated by cyanobacteria (Belnap et al. 2001).

The presence of biological crusts in arid and semiarid lands have a very significant influence on reducing soil erosion by both wind and water, fixing atmospheric nitrogen, retaining soil moisture, and providing a living organic surface mulch. They can be used as an indicator of rangelands' ecological health. Development of biological crusts is strongly influenced by soil texture, soil chemistry, and successional colonization by crustal organisms. The type and abundance of biological crusts can be used by the land manager to determine the ecological history and condition of a site (Belnap et al. 2001).

Severity, size, frequency, and timing influence the impact of disturbances on biological crusts. Greater impacts and slower recovery result when the disturbance kills or removes the crustal organisms. Hot ground fires often kill crustal organisms, which results in slower recovery of the surface crust. Fine-textured soils have faster crust recovery rates than coarse-textured soils (Belnap et al. 2001).

Managing for healthy biological crusts requires that impacts occur when the crusts are less susceptible to damage and when conditions are best for recovery. Sandy soils are less susceptible to disturbance when moist or wet, while crusts on fine-textured soils are less susceptible when the soil is dry. Failure to properly manage soils after a disturbance can allow irreversible invasion by annual grasses (e.g., cheatgrass). Human impacts can be harder to control, since people prefer to walk and drive in open areas that depend on biological crusts for stability (Belnap et al. 2001). Additionally, according to *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022), healthy biological crusts are important for the traditionally used sand for sand paintings by some Tribes. Soil and minerals gathered by the Navajo from Shashjaa' are used for sand paintings and dyes, and when these items are gathered, offerings are made in a traditional manner before the items are collected.

The soil surveys do not contain information on the amounts or types of biological crusts that may occur in each soil map unit. No survey or inventory data has been collected specific to BSCs within the Planning Area and is not required for the BENM planning effort.

6.3.2 Trends

Climate

Future trends for soils indicate a warmer and drier climate with less precipitation, resulting in increased drought conditions, wind erosion and the production of dust. The USGS has recorded at least seven multiyear droughts in Utah since 1896 (Wilkowske et al. 2003), and droughts are becoming increasingly common and more severe than in the past (Littell et al. 2016; Seager et al. 2007). Trends in the soil water balance over time have shown a greater water deficit within the soil of topographically diverse environments (escarpments and mesa lands), which are generally associated with pinyon/juniper and/or shrubland vegetation (USDA Forest Service 2017).

The interactions of increased soil temperature and changes in type and amount of precipitation will also affect soil functions differently across different soil types. Finer soil textures are expected to buffer changes in climate more readily than coarse soil textures, and those areas with finer soil textures will experience change more slowly (IAP 2016). Soil carbon changes could lead to changes in soil structure, soil bulk density, and soil porosity (IAP 2016), potentially changing water infiltration rates and rooting depth. Warmer soil temperatures will likely lead to increased losses of soil carbon (IAP 2016; USDA Forest Service 2017).

Grazing and Other Human Activities

Grazing is an ongoing land use with a strong influence on soil resource conditions. Climate change will decrease the resilience of soil resources to the physical impacts of grazing on vegetation and soil resources.

Mineral exploration and production and recreation have been ongoing disturbances, which impact soils through salinity loading, increased erosion rates, and reduced soil health and productivity. These impacts can be minimized through the use of BMPs during mineral-related activities and managing recreational access and activities.

6.3.3 Forecasts

Increased recreational activities and continued livestock grazing will place an increased demand on soil resources, while future impacts from climate change are expected to further strain the resilience of soil resources. Disturbance to soils associated with recreation include trails, OHV use, campgrounds, dispersed camping, events, staging areas, and recreational facilities. Disturbance to soils from livestock grazing activities include water developments, vegetative treatments, and range improvements. The impacts to soils resulting from these disturbances include increased compaction, decreased infiltration rates, increased erosion rates, and reduced nutrient cycling.

6.4 RANGELAND HEALTH AND LIVESTOCK GRAZING MANAGEMENT

Presidential Proclamation 10285 speaks specifically to livestock grazing:

> The Secretaries shall manage livestock grazing as authorized under existing permits or leases, and subject to appropriate terms and conditions in accordance with existing laws and regulations, consistent with the care and management of the objects identified above and in Proclamation 9558. Should grazing permits or leases be voluntarily relinquished by existing holders, the Secretaries shall retire from livestock grazing the lands covered by such permits or leases pursuant to the processes of applicable law. Forage shall not be reallocated for livestock grazing purposes unless the Secretaries specifically find that such reallocation will advance the purposes of this proclamation and Proclamation 9558.

6.4.1 Current Conditions

There are approximately 1,356,769 acres available for livestock grazing within BENM. Thirty allotments fall within or overlap with the boundaries of the Monument: eight of these are administered by the USDA Forest Service and 21 are managed by the BLM (Table 6.4-1, Figure 6.4-1).

Approximately 63% of the allotment areas (by acres) fall within the Monument boundary (see Table 6.4-1). Because rangeland conditions correlate directly with forage health and grazing operations, the BLM manages for rangeland health and the USDA Forest Service administers lands in the allotments for desired conditions.

AUM means the amount of forage necessary for the sustenance of one cow/calf pair or its equivalent for a period of one month. HMs are defined as 1 month’s use and occupancy of the range by one weaned or adult cow with or without a calf, a bull, steer, heifer, horse, burro, or mule, or five sheep or goats. Table 6.4-1 shows AUMs for BLM allotments and HMs for USDA Forest Service allotments. All the allotments graze cattle; six of the BLM allotments and four of the USDA Forest Service allotments permit horses along with cattle. Range improvements such as water sources are in place throughout the Monument.

Table 6.4-1. Approximate Allotment Acres within BENM

Allotment Name	Public Allotment Acres	Acres within BENM	Active Livestock (AUMs)	Authorized Livestock (HMs)
Babylon*	41,132	41,132	283	214
Bears Ears*	15,875	15,875	886	658
Blue Creek*	30,548	24,124	2290	3268
Camp Jackson*	17,709	4,805	1332	1009
Comb Wash	66,988	65,806	734	556
Cottonwood	32,716	24,190	1,434	1086
Cottonwood*	62,148	62,148	1184	1563
East League	14,165	412	1,345	1019
Gooseberry*	28,216	28,216	0	0
Harts Draw	28,814	12,402	1,100	833
Harts Draw*	18,863	681	2290	3268
Harts Point	17,735	8,310	1,100	833

Allotment Name	Public Allotment Acres	Acres within BENM	Active Livestock (AUMs)	Authorized Livestock (HMs)
Hatch Point	98,592	7,659	11,282	8547
Hurrah Pass	17,418	16,738	262	198
Indian Creek	227,886	227,814	8,518	6453
Kane Springs	14,458	25	307	233
Lake Canyon	367,819	175,216	5,009	3795
Lockhart	38,768	38,570	1,360	1030
Lone Cedar	18,484	3,783	1,966	1489
Mccracken Wash	16,610	569	950	720
North League	4,782	2,607	388	294
Perkins North	56,781	56,647	4,626	3505
Perkins South	45,210	26,027	2,716	2058
Slickhorn	128,604	128,604	1,795	1360
Tank Bench Brushy Basin	62,053	38,062	3,589	2719
Tank Draw	9,483	1,267	993	752
Texas-Muley	60,094	60,093	1,960	1485
Twin Springs*	78,298	78,298	5286	4000
West Mountain*	26,265	26,264	848	671
White Canyon	199,820	164,898	5,616	4255
White Mesa	50,456	14,401	4,374	3314
Windwhistle	6,292	1,126	631	478
Total	1,903,081	1,356,769	76,454	61,663

Source: BLM GIS 2022; USDA Forest Service 2022

Note: In addition to the allotments listed above, the Chippean allotment (USDA Forest Service) was closed to grazing with a NEPA decision and has not been in use since the 1990s.

* Denotes USDA Forest Service allotment.

The language for *Standards for Rangeland Health and Guidelines for Grazing Management for BLM Lands in Utah* differs between agencies, but both focus on moving the land toward desired conditions though vegetation management and range improvements (BLM 1997; USDA Forest Service 1990). It is all also based upon the analysis of rangeland conditions through monitoring, analysis of data, and the history of allotments. Each agency uses a set of standards and guidelines to ensure that range health is met and measures are taken.

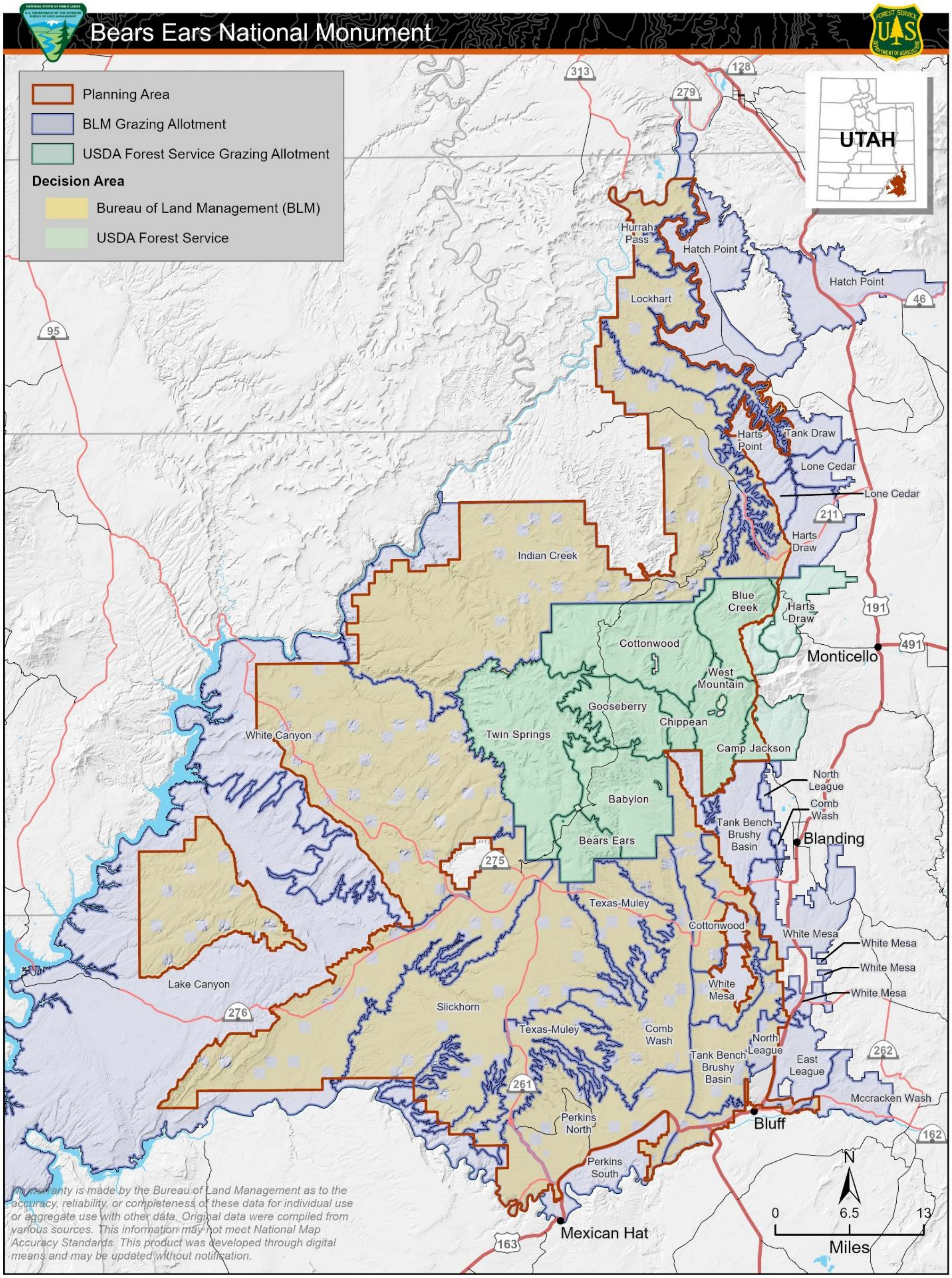

Figure 6.4-1. Grazing allotments in and overlapping with the Planning Area.

6.4.2 Trends

The actual use or billed AUMs/HMs for allotments in the Monument have decreased on average over the past 20 years. Actual use means where, how many, and what kind or class of livestock, and how long livestock graze on an allotment or on a portion or pasture of an allotment (43 CFR 4100.0-5). The permittee is required to submit this information at the end of the allotment's season of use.

Grazing can be used to move rangelands toward desired conditions. Rangeland conditions are not only impacted by grazing but also invasive weeds, roads, wildlife, public use, etc. (BLM 2001). See Sections 6.2, 6.5, 6.6, 6.10, and 6.17 for more information on these impacts to livestock grazing.

Trends indicate an increase in recreational use by the public in BENM, which increases interactions with livestock grazing and operations and can cause such issues as gates being left open and camping at range improvements (e.g., corrals, water troughs, etc.) that disrupt livestock operations.

Trends indicate drier conditions and less water, which reduce available forage and water for livestock, as indicated by long-term rangeland monitoring and reductions in livestock use (e.g., AUMs or HMs).

6.4.3 Forecasts

The BLM and USDA Forest Service forecast that the demand for livestock forage and permits will remain stable due to steady demand in the Monument. The demand for other land uses such as recreation will continue increasing. This will increase the potential for livestock and user interaction where allotments and recreation areas overlap. This could result in localized impacts such as damage to range improvements, access issues, livestock misplaced due to gates being left open, and harassment of livestock.

Forecasted drier and warmer conditions will reduce available forage and water for livestock. Therefore, further adaptive management will be required that may include additional range improvements, reduced livestock numbers, shortened grazing periods, altered grazing rotations, reduced big game numbers, etc.

There is a direct competition for forage and water resources between livestock and wildlife. This is found throughout the Monument but is most prevalent in the riparian areas where water and forage are present or of higher quality than in uplands.

Planned vegetation management in allotments will improve habitat for livestock and wildlife as well as increase available forage quality over the long term.

6.5 RECREATION USE AND VISITOR SERVICES

6.5.1 Current Conditions

Recreation opportunities in the Planning Area are managed by the BLM and USDA Forest Service. The Planning Area is surrounded by public lands that are popular with a variety of recreational users, including Glen Canyon National Recreation Area, Goosenecks State Park, Canyonlands National Park, Natural Bridges National Monument, the BLM Monticello FO, and the Manti-La Sal National Forest.

Public recreational uses in the Planning Area include cultural site visitation, hiking, camping, backpacking, OHV riding[4], scenic driving, canyoneering, rock climbing, rafting and boating, heritage tourism, mountain biking, and hunting. Lands and waters available for hunting and fishing will remain unchanged. Current recreational uses are largely consistent with management goals established in the Monticello RMP and Manti-La Sal LRMP.

BLM

The 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, road and trail counter data, and professional judgment. Visitation is estimated by the number of visits and by visitor days. A visit is the entry of a visitor onto lands or waters administered by the BLM for the pursuit of recreational experiences, regardless of visit duration. A visitor day is a common recreation unit of measure used among federal agencies that represents an aggregate of 12 visitor hours at a single site or area. (Visitor hours are defined as a unit of measure of the presence of one or more persons in an area for continuous, intermittent, or simultaneous periods totaling 1 hour.) Table 6.5-1 lists RMIS data regarding visits (not visitor hours) from 2012 through 2021.

Table 6.5-1. BLM Recreation Management Area Visit Data

BENM Unit	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Beef Basin SRMA	2,179	2,945	2,952	898	949	958	858	554	631	1,033
Canyon Rims SRMA	76,072	94,033	69,611	84,029	93,744	106,328	94,532	75,992	59,397	168,803
Cedar Mesa SRMA	32,897	73,158	74,702	65,209	76,390	131,516	140,136	147,433	81,079	109,155
Dark Canyon SRMA	1,510	2,125	1,505	1,642	1,594	3,268	2,879	2,708	2,794	3,080
Indian Creek SRMA	14,961	106,048	111,028	129,472	147,761	187,511	209,049	216,224	18,104	37,439
Indian Creek SRMA (est. 2020)	x	x	x	x	x	x	x	x	125,911	298,826
Monticello ERMA	21,325	24,956	26,690	28,962	32,150	38,533	39,420	42,538	31,838	59,779
San Juan SRMA	39,853	35,864	38,931	41,049	38,801	41,393	38,708	40,283	33,611	39,092

[4] BLM regulations for OHVs include all motorized vehicles, including passenger vehicles.

BENM Unit	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Shash Jáa (est. 2020)	x	x	x	x	x	x	x	x	35,336	71,504
Total	**188,797**	**339,129**	**325,419**	**351,261**	**391,389**	**509,507**	**525,582**	**525,732**	**388,683**	**788,711**

Source: BLM 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021a
Note: x = BENM units without area visitor data because unit was not established until 2020.

Recreation levels in the Planning Area have been monitored for many years; however, recorded visitor numbers do not fully capture the total 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 Planning Area that does not receive frequent monitoring. In addition, many popular use areas and trails are not designated, and this makes it more difficult to accurately determine the actual amount of recreational use these areas receive. Known types of recreation use in the area include hiking, camping, backpacking, OHV riding, automobile touring, equestrian activities, canyoneering, rock climbing, wildlife viewing, photography, and hunting.

RECREATION MANAGEMENT AREAS

Recreation management areas are the BLM's primary means for planning and managing recreational use of public lands. Public lands are identified for recreation as an SRMA or an ERMA, and all lands that are not designated as either an SRMA or ERMA are considered public lands not designated. BLM guidance and the definition of an ERMA have changed since recreation management area designations were made in the 2008 RMP. ERMAs were previously managed similar to undesignated public lands and included all areas within the Monticello FO that were not designated as SRMAs. SRMAs recognize unique and distinctive recreation values that are managed to enhance a targeted set of activities, experiences, benefits, and recreation setting characteristics, which becomes the priority management focus. These areas often have high levels of recreation activity or valuable natural resources. ERMAs recognize existing recreation use, demand, or recreation and visitor services program investments. They are managed commensurate with other resources and resource uses to sustain the ERMA's principal recreation activities and associated qualities and conditions. A recreation management area may be subdivided into RMZs to further delineate specific recreation opportunities (e.g., motorized versus non-motorized zones). SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences, and benefits derived from those experiences), which become the focus of recreation and visitor services management. ERMAs may be subdivided into RMZs to ensure recreation and visitor services are managed commensurate with the management of other resources and resource uses. For public lands not designated, the BLM manages to meet basic recreation and visitor services and resource stewardship needs. Recreation is not emphasized on these lands; however, recreation activities may occur, except on those lands closed to public use. Recreation and visitor services are managed to allow recreation uses that are not in conflict with the primary uses of these lands.

Currently, the BLM manages 10 SRMAs and one ERMA in BENM (Tank Bench SRMA and White Canyon SRMA are not in the RMIS database and are therefore not accounted for in Table 6.5-1). These are shown in Figure 6.5-1.

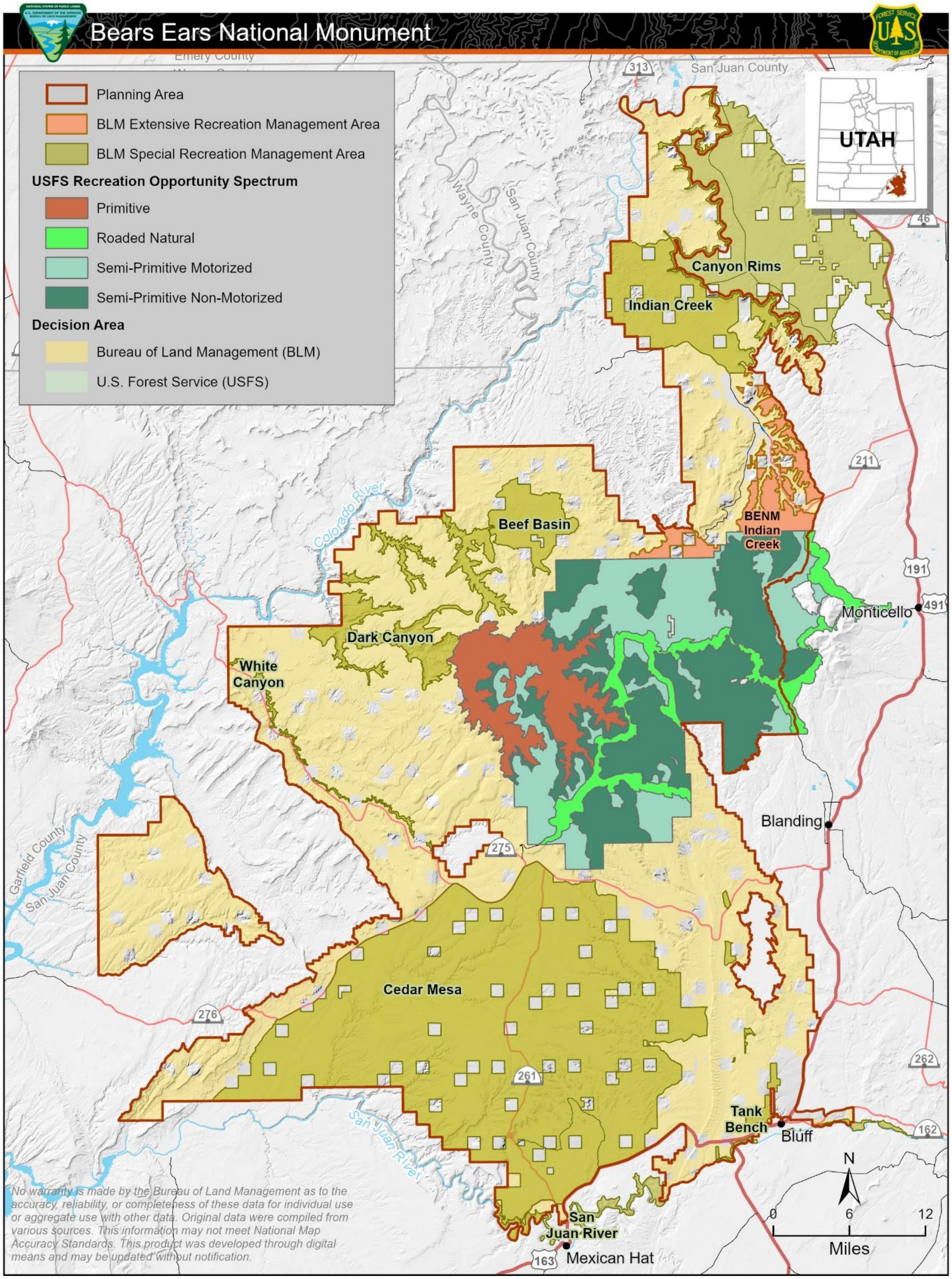

Figure 6.5-1. Recreational lands categorization in the Monument.

DEVELOPED RECREATION SITES

Developed recreation sites are areas that incorporate visitor use with roads, parking areas/trailheads, campgrounds, and other facilities that protect the resource and support recreation users in their pursuit of activities, experiences, and benefits. Visitor infrastructure is a management tool that can minimize impacts on resources, concentrate use, and reduce visitor conflicts. Developed recreation sites help accomplish these goals. Developed recreation sites relevant to BENM are listed in Table 6.5-2.

Table 6.5-2. Current Day Use Sites and Trailheads by Unit (from 2022 RMIS data)

Recreation Management Area	Day Use Site or Contact Station	Campground	Trailhead	Point of Interest
Beef Basin				Beef Basin dispersed camping
Canyon Rims				Anticline Overlook Needles Overlook
Cedar Mesa	Kane Gulch Ranger Station		Bullet Canyon Collins Spring Fish and Owl Canyons Government Trail Kane Gulch Todie Flat	Cedar Mesa Grand Gulch Plateau Road Canyon Register Slickhorn Canyon Register Box Snow Flat Kiosk Valley of the Gods
Dark Canyon			Sundance	Fable Valley
Indian Creek	Indian Creek Falls	Creek Pasture Creek Pasture Group Site Hamburger Rock Indian Creek Falls Indian Creek Falls Group Site		
Indian Creek (est. 2020)	Donnelly Canyon	Superbowl Campground Superbowl Group Site		Newspaper Rock
Monticello				Black Hole San Juan Three Kiva Pueblo
San Juan	Clay Hills Takeout Mexican Hat Boat Launch Montezuma Creek Boat Launch Sand Island Recreation Site	Sand Island Group Sites		San Juan River

Recreation Management Area	Day Use Site or Contact Station	Campground	Trailhead	Point of Interest
Shash Jáa (est. 2020)		Comb Wash Recreation Site	Arch Canyon Kiosk Site Mule Canyon	Butler Wash Interpretive Trail Comb Ridge RMZ House on Fire McLoyd Canyon-Moon House RMZ Mule Canyon Rest Area

Source: BLM 2021a

COMMERCIAL, COMPETITIVE, AND ORGANIZED GROUP RECREATION

As authorized by the Federal Lands Recreation Enhancement 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. The permits are issued to manage visitor use, protect natural and cultural resources, accommodate commercial recreational uses, and provide guided and organized recreation opportunities. The BLM issues SRPs or Individual Special Recreation Permits (ISRPs) 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 is often used. 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. Some recreation use can be estimated through recreation activities requiring special permits. Table 6.5-3 lists the numbers and types of active SRPs in 2022 (from RMIS data from the Monticello and Moab FOs), and Table 6.5-4 lists the numbers and types of ISRPs issued in 2021 (data provided from BLM Monticello FO Statistics Database).

Table 6.5-3. Current Special Recreation Permits

Recreation Activities	Current Permits
Backpacking	55
Ballooning	2
Bicycling events/Tours	16
Boating	17
Camping	85
Canyoneering	22
Day hiking	75
Handcart trekking	1
Horseback riding	1
Hunting	17
OHV tours/Events	7
Other	1

Recreation Activities	Current Permits
Photography	3
Rock writing tours	4
Rock climbing	34
Running events	2
Shuttle	1
Wilderness therapy	1
Vehicle tours	3

Note: There are a total of 120 SRPs administered by the Monticello FO area of BENM and 26 SRPs administered by the Moab FO area of BENM. Some permits authorize multiple activities.

Table 6.5-4. 2021 Individual Special Recreation Permits

Recreation Activities	2021 Permits
Cedar Mesa Day Use Permits	7,112
Cedar Mesa Backpacking and Moon House Permits	2,384
San Juan Permits	1,428

USDA Forest Service

BENM contains NFS lands managed by the Manti-La Sal National Forest. Recreational pursuits in the Manti-La Sal National Forest include scenic driving, hiking, backpacking, horseback riding, OHV riding, visiting cultural sites, camping, and hunting. There is no data specific to NFS lands in the Planning Area, but total visitation to the Manti-La Sal National Forest in 2016 was 295,000 visits (USDA Forest Service 2016). The most popular recreation activities were bicycling, hunting, relaxing, driving for pleasure, hiking/walking, viewing natural features, fishing, developed camping, motorized trail activity, and primitive camping (USDA Forest Service 2016).

Notably, BENM contains the 45,000-acre Dark Canyon Wilderness, which provides limited primitive recreation opportunities to visitors. According to 2016 NVUM data, visitors to designated wilderness were 75% satisfied with access and services and 100% satisfied with feelings of safety. Crowding in designated wilderness was rated as 2/10—or hardly anyone there—with raw USDA Forest Service solitude monitoring data indicating that less than 15 individuals were encountered on any given day on any of the trails in wilderness areas. Wilderness visitation was rated as low, and most visits to wilderness areas were for the purpose of recreation.

DISPERSED RECREATION

Dispersed recreation occurs outside of formal recreational facilities. It occurs mostly along or adjacent to roads and includes activities such as driving for pleasure, camping, hiking or mechanized trail use, hunting, fishing, and wilderness travel. Factors such as population growth, available leisure time, and energy costs affect this use. As dispersed recreation activities in the forest increase, use will need to be controlled or limited in certain areas to reduce resource damage and/or conflict with other resource uses while maintaining the desired opportunities and quality of the recreation experience.

DEVELOPED RECREATION SITES

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 infrastructure is a management tool that can minimize impacts on resources, concentrate use, and reduce visitor conflicts. Developed recreation sites help accomplish these goals. The Bears Ears Planning Area on NFS lands contains a limited amount of developed recreation sites. There is a network of roads and trails that access many parts of NFS lands and beyond onto BLM-administered lands. There are developed trailheads, minimal signage, and several restroom facilities; however, there are no developed campgrounds. The USDA Forest Service area of the Monument offers more dispersed and primitive recreational experiences.

In the 2016 forest-wide NVUM report (which provides data for the entire Manti-La Sal National Forest), visitors were 95% satisfied with developed facilities, 83.9% satisfied with access, 85.7% satisfied with services, and 95.2% satisfied with feelings of safety in developed recreation areas. Visitors ranked crowdedness for developed day use sites as 4.6/10 and for developed overnight use sites as 4.8/10 (with 1 being hardly anyone there and 10 being overcrowded), and 84.4% reported being very satisfied with their overall recreation experience.

COMMERCIAL, COMPETITIVE, AND ORGANIZED GROUP RECREATION

As authorized under the Federal Lands Recreation Enhancement Act, the USDA Forest Service requires SUPs for all commercial uses and for some non-commercial group uses. SUPs are issued for a variety of activities such as outfitters and guides, recreation events, filming and photography, outdoor education, and organization camps. The permits are issued to manage visitor use; protect natural, cultural, and social resources; and help provide extraordinary recreational experiences to the public. The USDA Forest Service issues non-commercial group use permits in certain instances where group sizes are 75 persons or more outside developed campgrounds if it is necessary to meet resource management objectives and conditions. SUPs can offer specialized and often inaccessible recreational opportunities to the general public without the skills, equipment, or resource knowledge to recreate independently and safely. Commercial recreational use can be tracked through SUP use. New SUP demand is increasing in the Planning Area. Table 6.5-5 lists the numbers and types of active SUPs in 2022.

Table 6.5-5. Active Special Recreation Permits in the Planning Area in 2022

Recreation Activities	Current Permits
Bikepacking (multiday)	6
Day hiking	2
Horseback riding	1
Hunting	12
Jeep/Van/OHV tours/events	5
Motorcycle tours	3
Mountain biking	1
Non-commercial use	2
Overnight backpacking	6
Rock climbing	1
Running events	1

6.5.2 Trends

BLM

There are no indications of significant change related to the primary types of recreation activities in the Planning Area; however, recreation uses may need to change to protect objects and values identified in the Proclamation. Cultural site visitation, hiking, camping, backpacking, ATV/UTV/motorcycle riding, scenic driving, canyoneering, rock climbing, rafting and boating, heritage tourism, mountain biking, and hunting are still the predominant recreation uses. However, staff contacts with visitors at the Monticello FO and in the field indicate there is increasing public demand or expectation for BLM-developed campgrounds and more developed interpretive site visitation opportunities.

In addition, demand for developed and dispersed camping use is expected to increase in areas throughout the Planning Area due to general visitation increases and the proliferation of RV and camper van rentals, which make these opportunities more accessible to a broader range of visitors (e.g., international travelers). There are limited developed sites within the Planning Area, and demand for dispersed camping areas continues to grow. During busy spring and fall weekends, it is becoming difficult to find an open dispersed site near a designated route and trailhead parking areas. Large vehicles, such as camper vans, RVs, and trailers, have also increased within the Planning Area. Dispersed camping areas provide scenic views, easy accessibility from the road, opportunities for solitude, no fees, and offer no amenities. The BLM has noted increased impacts to soil and vegetation, human waste and litter, multiple access points and increasing size of disturbed areas, and in some cases damage to archaeological resources in such areas.

In response to increasing use, the Monticello FO works closely with partners, including Edge of the Cedars State Park, to monitor cultural sites through the site steward program. The BLM also works with Friends of Cedar Mesa and the BEC to provide interpretive and Visit with Respect and Respect and Protect information to area visitors through the site ambassador program as well as performing cultural site inventory and stabilization projects. The Monticello FO is in various planning phases of project-level plans to provide additional BLM-facilities, trail and camping improvements, and interpretive opportunities within the Planning Area.

USDA Forest Service

While visitor use data has not been collected specifically for the NFS portion of the Planning Area, NVUM does occur on a forest-wide level every 5 years, providing the most relevant, reliable, and accurate data available on national forest visitation. NVUM data are collected using a random sampling method that yields statistically valid results at the national forest level. However, results for any single year or season may under- or overrepresent some groups of visitors. Additionally, applying this data at smaller scales than the forest, is especially challenging, especially at a site level.

Average daily traffic (ADT) counts from counters placed on selected forest roads also provide insight to forest visitation. In 2019, 6,707 vehicles drove in and out of the Monument via the route near Natural Bridges National Monument; 2,499 vehicles drove in and out of the Monument via South Cottonwood Wash; and 6,971 vehicles drove in and out of the Monument via South Elks Ridge. Nine years of data collection show weekday and weekend ADT has experienced modest growth across the forest.

In the past, voluntary site registers were placed at the Doll House Ruin, and it is estimated that between 20 and 50 people visited the site per year prior to 2020.

Since the adoption of the 1986 LRMP, recreation activities on the forest have changed, especially in regard to motorized recreation. OHV use and availability, coupled with technological advances, have allowed visitors to travel to places within the Planning Area that had previously been difficult to access. Providing for non-motorized activities separated from motorized uses has become increasingly difficult.

Along with the increase in the number of vehicles, many trailers and RVs are much longer and, with slide outs, much wider than older models. The popularity of dispersed camping, coupled with the size of RVs, has impacted natural resources at dispersed campsites.

Within the past 20 years, entire industries have been created around the new technologies that have arisen. Visitors can now GPS their locations from their smart phones, reach home computers through a cloud network, find an OHV that is as comfortable to ride in as a car, and set up camp in self-contained RVs with microwaves and large screen TVs. Paying active attention to these emerging trends in technology is challenging but will help resource managers ensure that recreation users continue to have ample opportunity to enjoy their national forests.

New technology is fueling recreational activities that are changing outdoor recreation across the forest, including side-by-side OHVs, electric and fat tire mountain bikes, ski and track conversions for motorcycles, and over-snow OHVs. The unanticipated impacts of these new uses can often be difficult for managers to address.

Social media and other web-based applications have highlighted and provided directions to sensitive areas and cultural sites on the forest that in the past were protected by their anonymity. Strategies for dealing with increased use to these areas is needed.

Visitation is increasing in the NFS portion of the Monument. Road count numbers for BENM indicate that 6,971 vehicles visited the NFS portion of the Monument in 2019, and over 14,000 visited in 2020. The only trail counter installed within the current boundaries of the NFS portion of the Monument is a counter on the access road to Doll House Ruin. The counter was installed in July 2017. The counter recorded 326 vehicles using the access road between July 2017 and January 2018, 376 vehicles between April 2018 and November 2018, and 342 vehicles between May 2020 and October 2020, with numbers for 2020 expected to exceed 400 vehicles. Assuming that at least a portion of the vehicles were carrying more than one person, this is likely a significant increase in visitation to the site from the years before the counter was installed. Additionally, USDA Forest Service data indicate that there was a tenfold increase in use of Lewis Lodge in 2020, with approximately 500 individuals visiting the site.

In response to increasing use, the USDA Forest Service works closely with partners such as Edge of the Cedars State Park to monitor cultural sites through the site steward program. The USDA Forest Service also works with Friends of Cedar Mesa to provide interpretive and Visit with Respect and Protect and Respect information to area visitors through the site ambassador program, as well as performing cultural site inventory and stabilization projects. Ongoing project-level planning will add facilities and improve trails and interpretive opportunities within the Planning Area.

6.5.3 Forecasts

BLM

National BLM data indicate that in 2021, total recreational use of public lands increased by 10% from the previous year (BLM 2021b). In 2020, visitation to BLM-administered lands in Utah was nearly double what it was in 2010 (BLM 2010). While this trend may be exaggerated by the anomalous 2020 visitation due to COVID-19, the BLM anticipates an increasing demand for day use activities such as hiking and visiting easily accessible interpretive sites. With national monument status, this type of visitor demand and expectation is anticipated to continue. Areas such as Grand Flat will see a higher level of use and dispersed camping due to increased visitor interest in Bears Ears Buttes. Increasing visitation and interest in the area will require the BLM to manage and provide for new recreation opportunities, while continuing to protect cultural and natural resources. New technologies such as social media and outdoor recreation apps will also lead to more visitation at sensitive sites and lesser-known areas, as visitors are able to easily find information on the sites and their locations.

USDA Forest Service

Based on state and national trends suggesting a general increase in outdoor recreation (Cordell 2012), it is expected that recreation use will continue to increase in the Monument area. The monument designation has led to an increase of users and visitation will likely continue to increase. If not managed appropriately, increased use could have impacts on Monument objects and values due to such as erosion and damage to culturally significant areas. (BEITC LMP). New technologies such as social media will lead to more visitation at sensitive sites as users are able to easily find information on the sites.

6.6 TRAVEL, TRANSPORTATION, AND ACCESS MANAGEMENT

6.6.1 Current Conditions

Current transportation and access routes into and through the Planning Area consist of federal and state highways; BLM and NFS roads, primitive roads, and trails; county road systems; and ROW access roads. The transportation system includes approximately 141 miles of federal and state highways, 1,364 miles of BLM motorized routes and 470 miles of NFS motorized routes.

The BLM manages motorized access under three designations. These designations are based on BLM land use planning decisions that consider natural resource protection, route utility, and public safety. The OHV categories are 1) "open," which allows for unlimited travel, including cross-country travel, 2) "limited," where OHV use is restricted to meet specific resource management objectives, and 3) "closed" to motorized use, where no motorized use can occur.

The USDA Forest Service manages roads under five maintenance levels, which are as follows:

- Maintenance Level 1: Assigned to intermittent service roads that are closed to vehicular traffic but may be open and suitable for non-motorized uses. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level and to perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level.
- Maintenance Level 2: Assigned to roads open for use by high-clearance vehicles where passenger cars are discouraged or prohibited and high-clearance vehicles are accepted or discouraged. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log hauling may occur at this level.
- Maintenance Level 3: Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car where passenger cars are either encouraged or accepted and can be discouraged or prohibited for certain classes of vehicles or users. Roads in this maintenance level are typically low speed and single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed material.
- Maintenance Level 4: Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds and where passenger cars are encouraged. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved and/or dust abated.
- Maintenance Level 5: Assigned to roads that provide a high degree of user comfort and convenience and where passenger cars are encouraged. Roads are usually double lane and paved. Some may be aggregate surfaced and dust abated.

The USDA Forest Service manages motorized use according to the 2005 Motorized Travel Management Rule (36 CFR 212). The agency uses ROS classes to determine suitability for motorized uses. The classes used in BENM and their descriptions are as follows:

- Primitive: Large remote, wild, and predominantly unmodified landscapes; areas with no motorized activity and little probability of seeing other people; few management controls.
- Semi-primitive non-motorized: Areas of the forests managed for non-motorized use; uses include hiking and using equestrian trails, mountain biking, and using other non-motorized, mechanized equipment; rustic facilities and opportunity for exploration, challenge, and self-reliance.

- Semi-primitive motorized: Backcountry areas used primarily by motorized users on designated routes; roads and trails designed for OHVs and high-clearance vehicles; offers motorized opportunities for exploration, challenge, and self-reliance; rustic facilities; often provides portals into adjacent primitive or semi-primitive non-motorized areas.
- Roaded natural: Frontcountry areas accessed by open system roads that can accommodate sedan travel. Facilities are less rustic and more developed, with campgrounds, trailheads, and airstrips often present. Provides access points for adjacent semi-primitive motorized, semi-primitive non-motorized, and primitive settings.
- Rural: Highly developed recreation sites and modified natural settings; easily accessed by major highways; in populated areas where private land and other land holdings are nearby and obvious; facilities are designed for user comfort and convenience.

OHV use within areas designated as OHV limited areas on BLM-administered lands will be managed according to the Monticello FO TMP, until or unless new implementation-level travel planning is completed. Motorized uses on NFS lands will be managed according to the Monticello Ranger District motorized vehicle use map (USDA Forest Service 2022).

BLM

The combination of highways, state roads, and secondary paved and unpaved roads in the Planning Area creates the access web for current uses, including recreation activities, range management, and timber management, and is expected to provide access for future use. Management and use of routes on BLM-administered lands is consistent with BLM Travel and Transportation Manual 1626, Handbook 8342, and other applicable guidance.

BENM has a mix of backcountry and frontcountry travel opportunities. In addition to OHV use, the travel network allows for a variety of permitted uses, including SRPs, ranching, and research. Highways and main roads allow easy access to large areas of public lands in the Planning Area. SR-211 and the Indian Creek Corridor Scenic Byway provide access to popular sites in Indian Creek, including Newspaper Rock, Superbowl Campground, Creek Pasture Campground, Hamburger Rock Campground, and Indian Creek Falls Group Campsite before terminating at the Needles District of Canyonlands National Park.

SR-95, also known as the Bicentennial Highway, cuts across BENM east to west and provides access to exceptional scenic views, OHV trails, and developed cultural sites, such as the Butler Wash Interpretive Site, Mule Canyon Village, and the Salvation Knoll Trail. SR-316, accessed from SR-95, leads to Goosenecks State Park, and SR-276 provides sweeping views of Red House Cliffs and access to the Collins Trailhead south of its origin on SR-95.

SR-261 bisects Cedar Mesa north to south between SR-95 and U.S. Highway (US-)163 and provides access to the Kane Gulch Ranger Station, the Moqui Dugway, and a network of County B routes leading to developed pedestrian trailheads. US-163 provides access from Bluff, Utah, to Sand Island Campground before crossing the south end of Comb Ridge and bounding the southeastern side of the Planning Area.

There are also two major highways outside the Planning Area: US-191 (bounds the eastern side of BENM) and SR-275 (leading to Natural Bridges National Monument), which are used by visitors to access recreation opportunities within BENM. SR-95, SR-275, SR-261, and US-163, in combination with various other U.S. highways, state routes, and county roads, make up the Utah portion of the federally designated Trail of the Ancients National Scenic Byway.

Several other well-traveled designated routes in the Planning Area are Butler Wash and Comb Wash Roads, which provide access to the east and west sides of the large north-south-trending rock formation of Comb Ridge, respectively. Valley of the Gods Road is a popular 17-mile scenic drive between US-163 and SR-261. The Elk Ridge Road Scenic Byway, including North Cottonwood Wash Road and Elk Ridge Road, travels generally north-south across NFS lands from Indian Creek to Bears Ears Buttes, while Lockhart Basin Road travels a rugged track north from Indian Creek to the Colorado River outside Moab. The Needles/Anticline Overlook Scenic Backway, or County Road 133, is mostly located outside the Planning Area but accesses two developed overlooks within Canyon Rims Recreation Area. Clay Hills Road accesses Clay Hills Boat Ramp, outside the Planning Area. The travel plan also includes a network of miles of improved and primitive roads providing access to more remote parts of the Planning Area, such as Dark Canyon, Beef Basin, and Mancos Mesa (BLM 2008).

There are many footpaths and trails managed for non-motorized and non-mechanized use designated in the travel plan.

All OHV and mechanized (such as bicycles) travel within the Decision Area is limited to routes designated for those purposes. Table 6.6-1 displays the existing travel designations in the Planning Area. There are currently zero acres of land open to OHV use, meaning that cross-country OHV travel is prohibited within the entire BENM.

Table 6.6-1. Existing Travel Designations

Travel Designation	Acres
Open	0
Limited	682,480
Closed	390,260

Source: BLM GIS 2022

The BLM currently manages two travel management areas, one in the Moab FO and one in the Monticello FO. Of the total acres designated as limited, approximately 7,410 acres are in the Moab FO and 68,750 acres are in the Monticello FO (BLM GIS 2022). The total acreage of areas designated as closed is within the Monticello FO (BLM GIS 2022).

There are approximately 303 miles of ATV and motorcycle designated routes. Mechanized travel is limited to designated roads and trails. Non-mechanized uses are permitted throughout BENM, unless limited for resource protection purposes.

Although most use on existing roads, primitive roads, and trails on BLM-administered land is defined as casual use, other travel considerations associated with administrative use and authorized actions (e.g., livestock grazing, forestry, and emergency purposes) may be considered during the planning process. Administrative access and authorized uses are exempt from the OHV regulations; the BLM will consider these kinds of uses when determining the purpose of and need for routes individually and as a network.

The BLM can impose limitations on the type of vehicle allowed on specific designated routes if monitoring indicates that a particular type of vehicle is causing disturbance to the soil, wildlife habitat, cultural resources, or vegetative resources, especially by off-road travel in an area that is limited to designated routes.

USDA Forest Service

The USDA Forest Service travel plan includes forest highways, forest development roads, and trails. There are 470 miles of travel routes within BENM managed by the USDA Forest Service. All motorized use is limited to designated roads and trails, and cross-country motorized travel is prohibited on these NFS lands.

NFS roads are assigned a maintenance level from 1 to 5, which defines the level of service provided by and the maintenance required for a specific road. The maintenance level of the roads within BENM are shown in Table 6.6-2.

Table 6.6-2. Existing Maintenance Levels

Maintenance Level	Miles
Level 1	136
Level 2	331
Level 3	3
Level 4	0
Level 5	0
Total	470

Source: USDA Forest Service 2022

The 2005 Travel Management Rule (36 CFR 212) is used to inform decisions related to the designation of roads, trails, and areas for motor vehicle use. Under the new Proclamation, new roads and motorized trails would only be constructed to protect objects and values in BENM and to protect public safety.

In its 2015 *Travel Analysis Report for Subpart A Manti-La Sal National Forest*, the USDA Forest Service found that approximately 37 roads (approximately 21 miles) were identified as “likely not needed” in BENM (USDA Forest Service 2015).

Most (177,190 acres) of the NFS routes in BENM are classified as having no motorized uses (semi-primitive non-motorized or primitive (Table 6.6-3).

Table 6.6-3. Recreation Opportunity Spectrum Classes

ROS Class	Acres
Primitive	48,440
Semi-primitive non-motorized	128,750
Semi-primitive motorized	86,160
Roaded natural	25,700
Rural	0

Source: USDA Forest Service 2022

The primary areas of focus for access are 1) providing an adequate road system to meet the needs of public recreation and discretionary uses, 2) maintaining the road system to standards with a limited and decreasing budget, and 3) minimizing impacts to natural resources, including wildlife and fish habitats and municipal water supplies resulting from soil erosion. Some of the issues facing travel management in the Planning Area are as follows:

- Funding is inadequate for maintaining the current transportation system to standard.
- Some roads are causing adverse impacts to soil productivity, water quality, wildlife habitat, and cultural resources.
- Resources are being damaged as a result of motor vehicle travel off system roads.
- There are some roads that are likely not needed or that present a greater risk of causing adverse impacts to the surrounding environment than they are beneficial in providing access opportunities.

6.6.2 Trends

Demand for recreation access on the travel and transportation network is expected to continue to increase in the Planning Area. Increased travel across public lands by motorized and non-motorized equipment would increase the need to manage, maintain, and, in some cases, improve the transportation system on some routes. The undeveloped nature and unique natural setting of the area is highly valued by certain user groups, and development and improvement would need to be carefully considered. Within the Planning Area, there has been an increase in the types and variety of recreation activities. Controversy surrounding continued motorized access for recreational users and other permitted users will affect planning efforts in BENM. Increased dispersed camping along designated routes is causing resource impacts and will need to be considered in both recreation and travel management planning.

Increased visitation to cultural sites and climbing areas and increasing motorized use on designated routes will drive future travel and transportation planning. Considerable controversy exists over motorized access within Arch Canyon and will need to be considered as part of the area designation process.

Recreation uses of the USDA Forest Service transportation system has increased while road maintenance funding has decreased over the past two decades (USDA Forest Service 2018; also see the Trends subsection in Section 6.5). Combined with a large backlog of deferred maintenance, this has caused deteriorated road conditions and will likely cause the transportation system to deteriorate faster. As a result of decreasing budgets, routine maintenance is reduced, maintenance cycles have been extended, and selective repairs are made to ensure public safety and prevent significant resource damage. Over time, roads may develop severe public safety or resource damage issues and may need to be evaluated for closure. The USDA Forest Service has continued partnerships with local county governments and other land management agencies over the past two decades, which has been helpful for road maintenance.

6.6.3 Forecasts

Existing and future demand for recreation resources in BENM, including highly undisturbed scenery and access to cultural sites, prehistoric rock writing visitation, scenic driving, world class climbing, and OHV use, as well other recreational uses will continue to create demand for the BENM road system. Media coverage about BENM has increased public awareness of the area and its spectacular scenery and cultural resources. This awareness is expected to continue to contribute to the increase in demand for recreational activities. The demand for access to BENM through the travel and transportation network is expected to continue commensurate with increasing recreational visitors. See the Forecasts subsection in Section 6.5.

Motorized and mechanized vehicles used to access and manage rangelands and woodlands would continue in BENM; management of these areas, including for fuels treatments and timber harvesting, would also continue.

USDA Forest Service budgets may increase with revenue generated by BENM's recreation use fees, mostly from camping uses. With increased revenue, there could be more funding for maintenance and work to eliminate deferred maintenance to ensure public safety and prevent resource damage.

6.7 CULTURAL RESOURCE MANAGEMENT, NATIVE AMERICAN RELIGIOUS CONCERNS, AND TRIBAL USE

BLM policy, as detailed in Manual 8100 – *The Foundations for Managing Cultural Resources,* defines a cultural resource as “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” (BLM 2004:2). This definition is further refined by stating, “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 described in this Manual series. They may be but are not necessarily eligible for the National Register” (BLM 2004:2).

A Tribal perspective expands this definition of a cultural resource by including much of what Western science considers distinct natural resources. Cultural resources and natural resources are not two different categories according to Indigenous cultures. An individual depends on other living plants, animals, and surrounding land for subsistence and also to maintain cultural and religious ties to certain places with special value to Tribal Nations, such as BENM; thus, the natural resources gathered, hunted, prayed to, and walked on become cultural resources. Resources and places on the landscape cannot be considered separately from the landscape as a whole. From a Native perspective, the natural world is much more than just a physical realm to sustain the material needs of life. The natural resources of the Bears Ears cultural landscape—water, land, wind, sound—are imbued by powerful religious, artistic, and other cultural meanings significant to Native communities with ancestral and present-day ties to this region.

Archaeological resources are areas where prehistoric or historic activity altered the earth or where deposits of physical remains are discovered. Prehistoric archeological resources are those materials deposited or left behind before the Historic period (the time recorded by written Euro-American history in Utah). Historic archaeological resources are those materials deposited or left behind during the Historic period by both Euro-American and American Indian peoples. From the Zuni perspective, all of the archaeological sites in BENM are conceptually grouped together and identified as *enote hes’ahdowe* literally, “old homes.” Hopi and Zuni consider all of these archaeological sites to be monuments that commemorate the lives of their ancestors. Hopi and Zuni cultural advisors have expressed that these sites are important sources of information, and more importantly, they are still occupied by the spirits of ancestors. Navajo people have always had respect for the *Anaasazi* sites. The sites are referred to as *Anaasazi’ da’bighan intee’* (ancestors’ homes). Navajo peoples generally do not visit or disturb these sites because they are viewed as the homes of the early people. Navajo oral traditions and archaeological and historical records document their occupation in and around Bears Ears. Exploitation of prehistoric artifacts and sites are of great concern to Navajos. Historic and prehistoric remains of the Ute people are evident in the form of tipi rings, wickiups, artifacts, and rock art.

Architectural resources are standing structures of historic value. Traditional resources can include archaeological resources, structures, topographic features, habitats, plants, wildlife, and minerals that Indigenous peoples, tribal nations, or other groups consider essential for the preservation of traditional culture and traditional values. Traditional values of living communities can be manifested at locations called traditional cultural properties (TCPs), Indian sacred sites, or cultural landscapes. To date, there have not been comprehensive ethnographic studies of BENM for any of the Tribal Nations of the Bears Ears Commission. While there are known and documented TCPs within Bears Ears, they are outnumbered by known but undocumented TCPs. Importantly, cultural resources include places that, do not meet the strict definition of a TCP but are nonetheless culturally significant to American Indians or other groups. For example, in ethnographic work in the region, certain sites exhibit symbols that are related to broad patterns in Tribal Nations' histories but are not currently used for ongoing cultural practices. These locations do not meet the definition of a TCP but are still culturally significant resources.

More than a century of research in the Planning Area and the surrounding region has provided researchers with a wealth of information on the lifeways and cultural traditions of southeastern Utah. Much of this received wisdom is described and summarized in culture history sections of archaeological survey and excavation reports, in an occasional regionally specific archaeology or history textbook, and in peer-reviewed journal articles. The primary objective of this section is to provide a summary of this century of accumulated knowledge, organized as a regional culture history. This section summarizes 1) the prehistory of the region, or the time before Euro-American exploration and settlement; 2) the lifeways of American Indians in the area at the time of Euro-American contact and since then; and 3) the history of Euro-Americans here.

6.7.1 Current Conditions

Prehistoric Context

Southeastern Utah contains one of the richest records of prehistoric archaeology in the United States. The record is dominated by the remains of cultural material from Ancestral Puebloans, although previous occupation by "preceramic" foragers and farmers is abundant. The area also shows considerable evidence of occupation by ethnohistoric and historic peoples. These cultures are broken down into four broad prehistoric periods: Paleoindian, Archaic, Formative, and Ethnohistoric/Protohistoric (Table 6.7-1). The Ethnohistoric/Protohistoric period ended when Euro-American explorers and settlers arrived in the region, which marks the beginning of the Historic period, which is discussed in the next section.

Table 6.7-1. Prehistoric Cultural Chronology for the Planning Area

Period	Years before Present (B.P.) or B.C./A.D.*	Sub-Period	General Diagnostic Features and Artifacts
Paleoindian	> 11,000–10,000 years B.P.	Not applicable (N/A)	Projectile points are fluted (Clovis and Folsom) and non-fluted (Black Rock Cave and Great Basin Concave Base variants); large stemmed projectile points of the Great Basin/Western Stemmed and Windust varieties. Paleoindian archaeology typically consists of isolated projectile points, features, or artifact scatters and kill sites, rock writing, and small open campsites.
Archaic	10,000–2,500 years B.P.	Early	In chronological order of first appearance: Pinto points, Elko Series points, Humboldt Concave base points, and Northern Side-notched points; basketry, netting, and snares as well as some rock writing elements—the oldest style in the area is Glen Canyon Linear
		Middle	Projectile points: Elko Series, Northern Side-notched, Humboldt Concave base, Rocker Side-notched, Sudden Side-notched, and Hawken Side-notched; slight increase in the frequency of ground stone; residential and logistical use of upland settings increase
		Late	Projectile points: Gatecliff, Gypsum, San Rafael Side-notched, Chiricahua, and Armijo; upland areas sometimes used more intensively than lower elevation areas; ground stone becomes more prominent; trade in exotic or hard-to-find items such as obsidian, turquoise, and marine shells is more common; some Indian Creek Barrier Canyon rock writing elements appear
Formative	500 B.C.–A.D. 1300		See Table 6.7-2.

Period	Years before Present (B.P.) or B.C./A.D.*	Sub-Period	General Diagnostic Features and Artifacts
Ethnohistoric / Protohistoric / Pueblo IV	A.D. 1300–1850†	N/A	Out-migration across most of the Colorado Plateau and aggregation in massive communities in the northern Rio Grande and northeastern Arizona; sites are sparse lithic scatters with low quantities of brown ware ceramics; diagnostic rock writing; and occasionally characteristic wikiup remains; Uncompahgre Brown Ware, Desert Side-notched and Cottonwood Triangular projectile points; archaeological record begins to match ethnographic descriptions of Ute, Paiute, and Navajo groups

* In this section, dates in years before present (B.P.) are provided for the Paleoindian and Archaic periods. Calendrical dates are provided using B.C. and A.D., and such dates are used for the Formative and Ethnohistoric/Protohistoric periods.

† Most of the Ancestral Puebloan villages in the Four Corners area, including all of those in southeastern Utah, were not occupied by about A.D. 1275. The majority of researchers therefore consider subsequent Pueblo IV developments to be part of the Ethnohistoric/Protohistoric period (e.g., Hurst and Robinson 2014).

PALEOINDIAN PERIOD

The earliest conclusive evidence for a human presence in the northern Colorado Plateau region dates to just before 11,000 years B.P., or approximately 13,000 calendar years ago (Beck and Jones 1997; Graf and Schmitt 2007). The Paleoindian period represents adaptations to terminal Pleistocene environments and is characterized by small groups of relatively mobile foragers who used most sites only briefly or infrequently. This stage is further split into three traditions named for their characteristic projectile points: Clovis (12,000 to 11,000 years B.P.), Folsom (11,000 to 10,300 years B.P.), and Plano (10,300 to 9,800 years B.P.). The primary difference among these traditions is the slight variability in projectile point form that they exhibit, which likely resulted from changing environments and subsistence strategies. In many cases, Paleoindian-associated artifacts are found in lower elevations along major river valleys where Pleistocene megafauna congregated. As the climate warmed and vegetation changed, Plano peoples also began to exploit resources found in higher elevations such as the La Sal Mountains.

The terminal Pleistocene and early Holocene environment of the Colorado Plateau also differed in several key ways from those of the modern era. As a result of deglaciation, elevational gradients of plant communities lowered as much as 800 m in parts of the Colorado Plateau (Anderson 1993; Betancourt et al. 1990; Cole 1990). Shifts of subalpine and montane communities to lower elevations consequently occurred during this time. In addition, riparian and montane plants inhabited the lowest elevations, where modern refugia populations are still observed in well-watered outcoves (Betancourt et al. 1990). Now-extinct Pleistocene mammals on the Colorado Plateau and the adjacent Great Basin were numerous and included species such as saber-toothed cat (*Smilodon fatalis*), species of horse (*Equus* spp.), camel (*Camelops hesternus*), large-headed llama (*Hemiauchenia macrocephala*), musk ox (*Bootherium bombifrons*), giant short-faced bear (*Arctodus simus*), short-faced skunk (*Brachyprotoma brevimala*), ground sloth (*Glossotherium*), and mammoth (*Mammuthus columbi*) (Heaton 1985; Mead and Agenbroad 1992; Miller 1976, 1982, 1987; Nelson and Madsen 1978, 1980, 1983; Romer 1928). These and other species went extinct as part of the mass extinction that occurred before the Holocene, the cause of which remains the subject of considerable debate.

Paleoindian archaeological materials are rare on the Colorado Plateau, especially in comparison with the Great Plains region to the east and the Great Basin region to the west, so considerations of Paleoindian lifeways in the Planning Area must be extrapolated from regional data (Spangler et al. 2010:56). Traditional literature on Paleoindian lifeways has emphasized big game hunting, and some postulate that over-exploitation of Pleistocene megafauna led directly to the extinction of those animals throughout the continent (Martin 1973). That hypothesis has been challenged in more recent literature (e.g., Haynes 2007), as has the idea that Paleoindians relied almost entirely on hunting as a means of subsistence. Ethnoarchaeological evidence (e.g., Binford 1984; Hawkes et al. 1991) suggests that Paleoindian foragers relied on a wide array of resources, were likely organized at a band level, and hunted individually or in small groups. Later Paleoindian populations may have organized larger, more communal hunting efforts (e.g., Carlson and Bement 2013).

Paleoindian archaeology typically consists of isolated features or artifact scatters, kill sites, rock writing, and small open campsites, and is sparse in and around the Planning Area. The so-called Bluff Mammoth site—observed by local artist Joe Pachak and reported by Malotki and Wallace (2011) and Malotki (2012)—is an apparent depiction of two Columbian mammoths in the Upper Sand Island petroglyph panel on the San Juan River corridor near the town of Bluff. In addition, an extensive and significant Clovis site is located south of Bluff. Known as the Lime Ridge Clovis site, it was the first Clovis site on the northern Colorado Plateau where artifacts diagnostic of this period were positively confirmed (Davis 1989). Research conducted in the Glen Canyon area of San Juan County has also demonstrated a limited human presence there during the Paleoindian period (Geib 1996:7). Two Paleoindian projectile points have also been found in the vicinity of Natural Bridges National Monument: a Hell Gap point found in association with *Bison bison* bones and an unfinished and broken fluted biface similar to a Clovis point (Irwin 1999). A broken Folsom point has been documented on Milk Ranch Point on the southeastern edge of the Elk Ridge plateau (Irwin et al. 2000), and another Folsom projectile point fragment has recently been identified in Indian Creek (Loebig 2020).

ARCHAIC PERIOD

By the 1970s, *Archaic* had become the term of choice to categorize the preceramic, nonagricultural, and non-Paleoindian phenomena found throughout the Southwest and Great Basin regions (Lipe and Pitblado 1999). The Archaic period spans approximately 10,000 to 2,500 years B.P. Matson (1991) divides the Archaic period into four subperiods: Early (approximately 10,000 to 6,000 years B.P.), Middle (6,000 to 4,000 years B.P.), Late (4,000 to 3,000 years B.P.), and Terminal (3,000 to approximately 2,500 years B.P.). Compared to other areas on the Colorado Plateau, the higher, cooler, and wetter locations of Cedar Mesa, Montezuma Canyon, Natural Bridges National Monument, and Elk Ridge in and around BENM are noted for numerous Archaic period sites of varying size and complexity (Irwin-Williams 1979; Lipe and Pitblado 1999).

Archaic artifacts, most frequently in the form of isolated diagnostic projectile points, are occasionally found within the Planning Area and throughout the surrounding region (Hurst and Robinson 2014:25). Rock writing elements that researchers associate with the Archaic have also been identified along the San Juan River south of the Planning Area and along the Salt Creek drainage and nearby Indian Creek near the northern portion of BENM.

Early Archaic

The Early Archaic period encompasses most of the early and middle Holocene periods of warm and dry climate (Grayson 1993, 2011). For the broad eastern Great Basin and northern Colorado Plateau region, environmental changes during the period leading up to and including the middle Holocene have been particularly well documented at Homestead Cave (Madsen 2000). These records indicate increased mean temperatures, increased aridity, and corresponding changes in vegetation, such as a substantial increase in the abundance of shadscale relative to sagebrush. Pinyon pine approached its modern distribution during this period (Rhode and Madsen 1998).

Climatic changes caused a reduction in the distribution of Pleistocene megafauna, in some cases to the extinction of animals that were typically adapted to the cooler, moister climates. With changing climates came the expansion and modification of artifact assemblages as people adapted to a wider, more dispersed fauna and plant resource base. Continuing the trend that began during the later Paleoindian period, higher elevation settings began to be used even more frequently during the Early Archaic, perhaps representing further subsistence generalization. An expansion of diet breadth is certainly indicated by the increased frequency of ground stone artifacts that occurs across the region during this period; this increased use of grinding tools undoubtedly reflects the incorporation of high-cost small seeds into the diet, most likely due to declines in the abundances of higher-return wetland resources (Grayson 1993, 2011; Janetski et al. 2012; Rhode et al. 2006).

Middle Archaic

The Middle Archaic period spans the remainder of the middle Holocene, and the climate generally continued to be warm and dry. However, a slight increase in the frequency of ground stone seems to indicate a stronger reliance on plant resources than in previous periods (Matson 1991). Middle Holocene environmental changes reconfigured the spatial and temporal distribution of resources important to earlier occupants of the region. As a result, settlement and subsistence systems tethered to discrete locations of abundance fell apart during the Middle Archaic.

Archaeological sites of Middle Archaic age tend to be ephemeral in nature and are often quite difficult to adequately place in time. The Middle Archaic is characterized by an expansive, albeit short and transient, use of nearly every available habitat; occupations were brief and people were mobile, occupying a variety of task-specific sites (Simms 2008). Previously, some scholars posited that the region was largely uninhabited during the middle Holocene. On the Colorado Plateau, adaptive shifts and increased relative mobility likely explain gaps in the data that appear during the Middle Archaic (Geib 1995).

Late and Terminal Archaic

The beginning of the Late Archaic coincides roughly with the time when the climate began to approach modern conditions; because of this, throughout much of the Colorado Plateau, the Late Archaic saw the establishment of a mixed farming-foraging subsistence economy and a concomitant increase in sedentism (Huckell 1996). Simms (2008:167) characterizes the Late Archaic as a “culmination of the foraging way of life.” Archaeological evidence indicates that nearly every available resource in nearly every available place was in use. Additionally, Late Archaic peoples more often lived in rockshelters than did earlier more mobile groups and it was also a time of trade in exotic or hard-to-find items such as obsidian, turquoise, and marine shells.

In the Planning Area, the Late Archaic period is represented by Old Man Cave (42SA21153). Old Man Cave is a dry shelter located on the northeastern edge of Cedar Mesa where both Basketmaker II and Archaic cultural materials were evident (Geib and Davidson 1994). The cave appears to have been steadily occupied for about 1,000 years before an extended hiatus from about 6,000 years ago to about 1,800 years ago (i.e., between the terminal Archaic and the Basketmaker II era) (Geib and Davidson 1994:200–201).

Late Archaic culture started to diminish in what Schroedl (1976) suggested is the Terminal Archaic, which has an indefinite termination, probably centering around 2,000 years B.P. when horticulture begins to replace strictly hunter-gatherer modes of subsistence in the Planning Area. Subsequent paleodietary research focused on coprolite and skeletal remains from Cedar Mesa (Coltrain et al. 2007) has demonstrated that local populations were fully dependent on cultivated maize by 3,000 years B.P. or earlier, such that most scholars of Southwest archaeology now push the Basketmaker II horizon back to that date and eliminate the idea of a Terminal Archaic period altogether.

FORMATIVE PERIOD

The Formative period is marked by an emphasis on domesticated plants, most notably maize (*Zea mays*); sedentary or semisedentary settlement near areas optimal for horticulture; and the introduction of pottery

(Horn et al. 1994; Matson 1991). With the introduction of horticulture, human occupation of the Colorado Plateau became more intensive, as this new means of food acquisition allowed for larger population densities. The Formative era in the Planning Area is represented by Ancestral Puebloan occupation (Table 6.7-2), although Fremont presence and influence are noted in the northern portions of the Planning Area (see Geib 1996; Geib and Bungart 1989). The culture phase sequence used here follows the classification system proposed by A. V. Kidder at the first Pecos Conference in 1927, and although errors have been pointed out in this system, there is definite region-wide patterning in architecture, occupation and out-migration sequences, and tree-cutting booms and busts that articulate with paleoclimate data in a manner that broadly agrees with the Pecos Classification (see Benson and Berry 2009; Bocinsky et al. 2016; Matson et al. 2015; Matson et al. 1988).

Table 6.7-2. Ancestral Puebloan Chronology*

Period	Dates B.C./A.D.	General Diagnostic Features and Artifacts
Basketmaker II	1500 B.C.–A.D. 500	Shallow pit houses with slab-lined entryways; earliest maize cultivation; general absence of pottery; more hunting implements, including atlatls, curved throwing sticks, rabbit nets, and a variety of snares; and petroglyphs and pictographs are relatively common features.
Basketmaker III	A.D. 500–750	Characterized by the adoption of ceramic vessels, typically brown wares constructed from self-tempered alluvial clays; early gray and white wares are evident later in the period as are plain gray jars and simple black-on-white bowls; residential sites, or hamlets, and pit houses are indicated by shallow depressions and/or house-sized ash stains; the bow and arrow replaces the atlatl with Rosegate style, Abajo Stemmed, and Dolores Straight or Expanding Stem projectile points.
Pueblo I	A.D. 750–900	Pueblo I habitations consisted of an arc of jacal, adobe, and/or stone masonry rooms with one or more pit structures located in an unenclosed plaza or courtyard area to the south with a deep, generally subrectangular, structure with a ventilator shaft complex; walls are rectilinear; storage rooms are basally lined with upright slabs; residential units also include room blocks arranged end-to-end to form curving or L-shaped composite room blocks with associated pit structures in front. Ceramic assemblages are marked by the addition of neck-banded gray ware (Moccasin Gray and early Mancos Gray), more refined white ware (White Mesa Black-on-white), and sophisticated red ware (San Juan Red Ware types such as Abajo Red-on-orange and Bluff Black-on-red).
Pueblo II	A.D. 900–1150	The “great house” system of community organization, which is best known from the Chaco Canyon area emerges; continuation of Pueblo I trends such as unit pueblo layouts, earthen-walled subterranean pit structures, and surface room blocks of rectilinear rooms with narrow walls and rounded-to-square corners, and the introduction of the kiva; side-notched projectile points, with a small version of the Bull Creek Triangular style; slab-lined milling bins with permanently emplaced metates.
Pueblo III	A.D. 1150–1290[†]	Settlements relocated to reliable springs and into canyons or on cliff walls; Pueblo III ceramic assemblages include Mesa Verde Corrugated, McElmo Black-on-white, and Mesa Verde Black-on-white and vessels show the replacement of pitcher forms by mugs; less long-distance trade; architectural innovations include multistory habitations with kivas wholly or partially enclosed by rooms or walls, Mesa Verde keyhole-shaped kivas, tri-wall structures, towers, large, plaza-oriented pueblos, reservoirs, shrines, stone check dams, and field houses; stone masonry almost entirely replaced construction with timber elements; the middle and late Pueblo III period saw complex agglomerations of room blocks and kivas in tightly aggregated pueblos clustered on canyon rims with associated towers.
Pueblo IV	A.D. 1300–1600[†]	Out-migration across most of the Colorado Plateau and aggregation in massive communities in the northern Rio Grande and northeastern Arizona; sites are sparse lithic scatters with low quantities of brown ware ceramics; diagnostic rock writing; and occasionally characteristic wikiup remains; Uncompahgre Brown Ware, Desert Side-notched and Cottonwood Triangular projectile points.

* This regional summary is based on the Pecos Classification (Kidder 1927). Regional and subregional variations are described in the literature but are not noted here.

[†] Most of the Ancestral Puebloan villages in the Four Corners area, including all of those in southeastern Utah, were not occupied by about A.D. 1275. The majority of researchers therefore consider subsequent Pueblo IV developments to be part of the Ethnohistoric/Protohistoric period (e.g., Hurst and Robinson 2014).

Basketmaker II

The early Basketmaker II period (ca. 1500 B.C. to A.D. 450) is an "agricultural, atlatl-using, non-pottery-making stage" marked by an increasingly sedentary settlement system, the advent of more substantial dwellings, and an increasing reliance on maize and squash horticulture (Burrillo 2016a; Kidder 1927:490; Lipe 1999). Although foraging for wild plants and hunting did not cease, a trend toward seasonal sedentism occurred until settlement in small villages or hamlets replaced the nomadism of the Archaic period (Dohm 1994; Lipe 1999; Matson 1991). The result was a farmer-forager subsistence complex in which people were tied to the land as farmers while they continued to hunt and gather (Charles 2009:13).

Occupation in and around BENM during the Basketmaker II period seems to have focused first on rockshelter habitations in canyon areas where floodwater could be utilized for irrigation (Matson 1991), including the canyons of Comb Wash, Butler Wash, and the Grand Gulch area (Hurst and Robinson 2014:26). Starting around 100 B.C., people built open-air, relatively substantial pit houses in higher upland areas that also offered floodwater farming potential, such as Cedar Mesa (Dohm 1988). By the A.D. 300s, populations clustered into neighborhoods of pit houses in open upland settings in areas more suited to dry farming than floodwater farming (Dohm 1994; Matson 1991).

In southeastern Utah, the Basketmaker II period is best represented on Cedar Mesa. Lipe (1970:93–104) first reported on limited Basketmaker presence in Castle Wash and Moqui Canyon to the west of Cedar Mesa while conducting fieldwork associated with the Glen Canyon Project. Regional knowledge of early Basketmaker architectural styles (Pollock 2001), settlement patterns (Dohm 1994), mortuary practices (Hurst and Turner 1993), and rock writing (Cole 1993) all either derive from, or are heavily informed by, the extensive Basketmaker II archaeology of Cedar Mesa. Elsewhere in the Planning Area, Basketmaker II remains have been formally excavated at Old Man Cave (Geib and Davidson 1994) in Comb Wash. The extensive representations of San Juan Basketmaker rock writing along the San Juan River and its tributaries have been the focus of several major studies, from descriptive documentation (Noxon and Marcus 1992) to models of socioeconomic organization (Robins 1997).

Basketmaker III

Generally, the Basketmaker III period (A.D. 450–750) can be distinguished from the preceding period by the introduction of three new cultural traits: the use of the bow and arrow, the cultivation of beans, and the production of well-made gray and white ware pottery—all of which imply a more settled and sedentary way of life (Nichols 2002; Reed 2000; Wilshusen 1999a). Comparison of the ratios of known Basketmaker II and III sites throughout the Southwest indicate that a large population increase occurred during the Basketmaker III period.

The most common type of late Basketmaker site is the hamlet, or residential site. They account for the overwhelming majority of the known Basketmaker III sites in the region (Wilshusen 1999a). The tool, faunal, and macrobotanical inventories from this period from a wide range of sites indicate that exploitation of wild resources continued, but farming had become the predominant subsistence activity. The widespread adoption of ceramic vessels during the Basketmaker III period marks the appearance of ceramic production in the local archaeology, including ceramic firing pits, or kilns. Surface remains of kilns are generally limited to curvilinear alignments or enclosures of upright stone slabs. In most cases, kilns can be distinguished from similar-looking features like storage cists or hearths principally on the basis of location: on slopes or in drainages, in areas between two drainages, and on slopes and benches below rims. The length of Cedar Mesa contains a high percentage of sites with associated kilns.

By the late A.D. 600s, community organization of these residential structures began to exhibit what Lipe (2006) calls the "San Juan pattern" of settlement layout: surface architecture (consisting of only non-contiguous storage cists in the Basketmaker III period), pit structure, and midden arrayed in a north/northwest to south/southeast alignment. Overall population in the Southwest began to grow during this period. In some areas, settlements clustered into clear communities, sometimes with extraordinarily large pit structures or great kivas that may have served community integrative functions.

In general, Basketmaker III sites on the Colorado Plateau are numerous and have been well researched; in and around the Planning Area, extensive Basketmaker III occupation has been demonstrated along the San Juan River and in at least one major drainage area on Cedar Mesa (Benson 1984). Basketmaker III communities have been studied extensively on Elk Ridge and in Montezuma Canyon (see Montoya 2008). The most important excavated Basketmaker III site in the area surrounding BENM is situated just to the west of Bluff along the San Juan River, where investigations revealed several pit houses, a communal midden, and a communal cemetery in a late A.D. 600s village (Hurst and Robinson 2014:30; Neily 1982). Kilns have been found in association with field houses and habitation sites in the South Cottonwood drainage and in and around Recapture Wash that likely date to this era (Severance 2015:120–122). And in Comb Wash, the iconic Procession Panel is believed to be a Basketmaker III site that depicts many people traveling toward a central place, possibly a great kiva (Wilshusen 2009:22–23). Significantly, this panel represents Zuni sacred text because it conveys Zuni migration history, a significant historical event, depicted on the vertical sandstone face by the Zuni ancestors to communicate important information to their descendants. Specifically, the Procession Panel is located near the summit of Comb Ridge and represents an impressive petroglyph panel in the northern Southwest depicting a procession.

Pueblo I

The emergence of villages is often touted as *the* hallmark of the Pueblo I period (A.D. 750–900) throughout southeastern Utah, although its expression was quite variable in form and organization (Allison et al. 2012; Wilshusen 1999b). Changes in architecture, settlement layout, and diagnostic ceramic styles are notable during this period; Pueblo I populations in some areas were aggregated into large villages with as many as 400 rooms, while populations in other districts continued to occupy dispersed hamlets of three to 20 rooms scattered across the landscape (Wilshusen 2009:23). Villages consisted of multiple households with contiguous aboveground living and storage rooms, sometimes with an associated oversized pit structure or great kiva, rock writing panels, and landscape features such as shrines and plaza areas.

Pueblo I ceramic developments were vast and varied, reflecting the noteworthy cultural migrations and aggregations that typify this time period. Pueblo I ceramic assemblages are marked by the addition of neck-banded gray ware, more refined white ware, and a new and remarkably sophisticated red ware technology to the ceramic inventory.

In southeastern Utah, Pueblo I populations appear to have concentrated in large settlements along major drainages and in the uplands surrounding the upper reaches of South Cottonwood Wash, including Comb Wash, Cottonwood Wash, Recapture Canyon, Montezuma Canyon, and along the San Juan River (see Hurst and Robinson 2014 for discussion and summary). Many Pueblo I sites are found in wet upland locations with deep soils (e.g., Elk and Alkali Ridges), and Pueblo I is not well represented in lower upland settings like the top of Cedar Mesa (Matson et al. 1988). This pattern may represent a response to drought conditions during the A.D. 800s, with low precipitation and extended growing seasons favoring settlement along major drainages and in upland areas with higher effective precipitation (Petersen 1988).

Pueblo I sites are well documented in the high upland areas north of Cedar Mesa on and around Elk Ridge and Bears Ears (Allison et al. 2012; Burrillo 2017), with the majority of them being found on Milk Ranch Point (e.g., Guilfoyle 2004).

Pueblo II

The Pueblo II period spans the interval from about A.D. 900 to 1150, in which a climatic change to cooler, drier conditions around A.D. 890 seems to have caused a shift in the settlement pattern to small hamlets (Benson and Berry 2009). Early Pueblo II populations dispersed over much wider areas to seek out those ecological niches where their form of subsistence could still be practiced. Habitation sites of this period are not common and regional populations appear to have been small.

While much of the population continued to occupy small dispersed habitations, the middle to late Pueblo II period witnessed significant increases in population and settlement proliferation throughout the northern San Juan region, most likely due to local fecundity in response to a series of rainy decades. The increasing population and settlement density of the middle to late Pueblo II period is also suggestive of immigration (Hurst and Robinson 2014; Wilshusen and Ortman 1999).

During the A.D. 1000s, climate appears to have been prevailingly hospitable to subsistence farmers, which resulted in a proliferation of settlement in most localities. Great houses, great kivas, and enormous roads form central elements of a surrounding community of dispersed households and farmsteads. Chaco-style great houses and segments of Chacoan roads have been found on and around Cedar Mesa (Cameron 2009). Pueblo II great house remnants have been identified throughout the BENM area, including the Arch Canyon–Comb Wash confluence (Hurst and Robinson 2014:34) and in nearby Bluff (Cameron 2009).

The increase in population and connection to other areas led to remarkable shifts in ceramic types affiliated with this period. Significant ceramic changes are evident in all three major technological wares. Slab-lined milling bins with permanently emplaced metates also became common throughout the northern San Juan region during this time. However, no distinctive Pueblo II style of rock writing has thus far been defined.

By the end of the Pueblo II period, the Four Corners region was in the grip of a severe drought, and people throughout the region had ceased construction of Chaco-style great houses (Lipe 2009:30). The area west of Comb Ridge was essentially depopulated at the end of Pueblo I or the beginning of Pueblo II (Lipe 2014). Archaeological evidence indicates that people most likely moved to the area east of Blanding. After an absence of about 150 years, many of the descendants of these migrants returned to the area west of Comb Ridge to their formerly occupied homeland (Lipe 2014; Matson et al. 1988). Pueblo II communities have also been documented on Cedar Mesa (Matson et al. 1988) and Natural Bridges National Monument (McVickar 2000). Pueblo II sites are also common along Cottonwood Wash (Irwin et al. 2000). A dissertation by Haase (1983) focuses on late Pueblo II and early Pueblo III occupation on and around Cedar Mesa, based on data from the Cedar Mesa Project; he contends that habitations are small compared to Pueblo II settlements elsewhere in the Southwest (Matson et al. 1988) but that an increase in the number and complexity of sites was nonetheless evident.

Pueblo III

Pueblo III has been characterized by the emergence of large communities, highly elaborate artistry, and specialization of crafts and social functions. It is during the Pueblo III period (A.D. 1150–1300) that the iconic cliff dwellings of the Southwest appeared. The last century and a half of Pueblo occupation in the San Juan region witnessed more changes over a shorter span than any previous era (Varien 2006:39).

The early Pueblo III period is marked by extensive evidence of cultural upheaval and reorganization (Hurst and Robinson 2014:36). The shift in settlement locations from those featuring arable soils to those featuring water sources during the early Pueblo III period is intriguing. For about 600 years, Ancestral Puebloan farmers had lived adjacent to the areas they farmed and journeyed to fresh water sources.

During the early thirteenth century, they began to do the precise opposite: living by their water sources and journeying to their fields (Matson et al. 2015; Varien 2006:41). Settlements often aggregated around springs, in a possessive posture that appears to mark a pronounced departure from earlier settlement location protocols that had discouraged settlement in direct proximity to springs.

In and around the BENM area, Ancestral Puebloan communities appear to have flourished during the Pueblo III period. Populations in the San Juan region probably reached their peak around A.D. 1200; however, subsequent decades witnessed drastic changes. Populations continued to aggregate into larger, more compact and architecturally complex settlements, often defensively sited or constructed. Pueblo III settlements in southeastern Utah were considerably less spectacular than the sites of the great centers like Mesa Verde but nonetheless indicate a heavy occupational density up to the decades of the mass depopulation (Brew 1946).

Architectural innovations also appeared and spread quickly throughout the region during the early Pueblo III period. In addition to population aggregation, these developments also signal a change in social organization, increased ceremonialism, and intensification of the agricultural subsistence base. Throughout the Four Corners region, pottery types became quite distinct in design, layout, and form. However, long-distance trade became less and less common through the Pueblo III period, with communities becoming more and more isolated from each other over time (Varien 2006:44). This likely represents a breakdown of regional social exchange and interaction that accompanied environmental stressors in the late thirteenth century A.D.

Towers became a popular architectural feature during the later Pueblo III period (Kantner 2004:171–174). Towers were most often located at the heads of canyons, as in the Cave Towers complex on Cedar Mesa, although they were also built in open areas, on top of rock escarpments or buttes, and in large alcoves. Late Pueblo III villages show increasing levels of territoriality and defensiveness, being sometimes placed in locations that offered intervisibility that enabled signaling or mutual observation (Hurst and Robinson 2014:37).

Numerous Pueblo III period sites in the BENM area have been identified in open-air and alcove settings throughout southeastern Utah (Lipe and Varien 1999), including Cedar Mesa (Matson et al. 1988), Salt Creek (Chaffee et al. 1994), Beef Basin (Rudy 1955), and Cottonwood Wash (Irwin et al. 2000). Nearly all of the cliff dwellings in BENM—including those in Salt Creek, Comb and Butler Washes, Cottonwood Canyon, Beef Basin, and Grand Gulch—date to the Pueblo III period (Burrillo 2016b; Spangler et al. 2010)

For still-uncertain reasons, Puebloan populations withdrew completely from the San Juan Basin area by the end of the A.D. 1300s (Glowacki 2015). The out-migration was apparently a gradual process, and Cedar Mesa appears to have been largely unoccupied earlier than the rest of the San Juan Basin by at least a few decades, where local depopulation began to occur well before the mega-drought of the A.D. 1270s (Matson et al. 2015). Most researchers believe that these populations probably moved south, eventually joining other groups in large communities along the Rio Grande and Little Colorado Rivers and their tributaries in New Mexico and Arizona, and where their descendants continue to occupy Pueblo villages to the present day (Adler 1996).

FREMONT COMPLEX FARMERS AND FORAGERS

The Fremont archaeological complex represents an extension of agricultural adaptations into the far northern Colorado Plateau, the Wasatch Plateau, and the eastern Great Basin. The distribution of Fremont ceramics covers an even larger area, ranging from what is now central Nevada into southern Idaho and southwestern Wyoming (e.g., Hockett and Morgenstein 2003).

Although there is evidence for considerable adaptive diversity in the eastern Great Basin and surrounding areas throughout prehistory, this is especially true for the Fremont period. As Madsen and Simms (1998) note, groups attributed to the Fremont complex adopted a variety of subsistence and mobility strategies, and individuals within those groups may have pursued a range of strategies within their lifetimes (see also Barlow 2002; Coltrain and Leavitt 2002). Fremont sites range from fairly large settled villages to more ephemeral camps that suggest a high degree of mobility, to alcoves and caves (e.g., Aikens 1970; Bryan 1977). The full range of subsistence strategies from pure hunting and gathering to relatively intensive farming is evident at Fremont sites.

A few characteristics of material culture that are found throughout the Fremont area provided the basis for the original definition of Fremont as an archaeological complex (see discussion in Madsen 1989; Madsen and Simms 1998). It is important to point out, however, that not all of these characteristics are found at all Fremont sites; indeed, there may be no single site where all of them occur together. Moreover, most archaeologists who study the Fremont would agree that the "behavioral approach" to studying variability within Fremont material culture that Madsen and Simms (1998) advocate is more useful than the typological approach of culture historians.

Maize appears in the archaeological record of the southern Wasatch Plateau ca. 150 B.C. (see discussions in Barlow 2002; Madsen and Simms 1998), long after it began to be farmed in the Southwest (e.g., Hard and Roney 1998; Smiley 1994). Fremont subsistence practices were locally variable, but as a generalization, the wild plant and animal resources that were harvested earlier in the region continued to be used along with domesticates (Madsen et al. 2005:42–43).

In the wake of the Glen Canyon Project and its massive output of data, scholars have come to realize that interaction and articulation between Fremont and Ancestral Puebloan groups during the Formative period was nearly constant (Geib 1996:98). The bow and arrow, ceramic technology, and maize horticulture all made their way into the Fremont complex via interaction with Ancestral Puebloan cultures, trickling in at various intervals throughout the Formative period rather than arriving all at once as a package (Simms 2008:209–212).

In the Planning Area, Fremont archaeology occurs in the northwestern portion in places like Beef Basin and Indian Creek (Lohman 1974; Rudy 1955). The iconic Newspaper Rock, in Indian Creek, is one of the best-preserved petroglyph panels in the region and contains elements from Fremont, Ute, Ancestral Puebloan, and historic Anglo contributors (Lohman 1974:12).

Ethnohistoric/Protohistoric/Pueblo IV Period

In Ancestral Puebloan chronology, the Pueblo IV period (A.D. 1290 to 1500) can be considered the start of the Ethnohistoric/Protohistoric period and is represented by large plaza-oriented pueblos in the Rio Grande and western Pueblo areas and the emergence of the kachina cultural phenomenon. The Colorado Plateau experienced widespread depopulation at most Pueblo communities and aggregation into large villages or "supracommunities," like at Hopi and Zuni, most likely due to resource depression compounded by drastic climatic changes (Benson and Berry 2009; Varien 2006). In eastern Utah and westernmost Colorado, this period is associated with the Numic expansion. After A.D. 1300, archaeology is sparse in the Planning Area, and occupation by Puebloan groups after the out-migration of the late thirteenth century cannot be demonstrated archaeologically (Spangler et al. 2010:137); however, it is during this time that modern-day groups, such as the Utes, Paiutes, and Navajos began to utilize the area. The exact timing of the arrival of these groups in southeastern Utah is also debated, although it is believed that all of them had arrived within what is now the boundary of the state of Utah by A.D. 1300 (Janetski 1997).

The archaeology of Ute, Paiute, and Navajo occupation in the Planning Area is poorly understood and has only recently been a subject of intensive scrutiny (Spangler et al. 2010). Since 2005, the Comb Ridge Heritage Initiative Project has been documenting Ute and Navajo archaeological sites in the Comb Ridge, Comb Wash, and Butler Wash areas to the east of Cedar Mesa (Hurst and Willian 2011). Most of the Navajo sites they have located in these areas appear to date after about 1870 (Hurst and Willian 2011:51). Hurst and Willian report that Ute archaeology is even rarer, despite the known density and historicity of Ute usage of the area. Ute rock writing, on the other hand, occurs widely throughout their study area, although large-scale, detailed Ute depictions of humans and animals that are iconic to Cottonwood Wash do not occur there (Hurst and Willian 2011:54–55).

The earliest documented contact between Utes and Europeans in the northern Southwest was the Spanish expedition led by Juan de Oñate in 1626, so most researchers conclude that Utes and Paiutes inhabited the Abajo Mountains region sometime between A.D. 1300 and 1500 (McPherson 2009:58). The oldest confidently dated Navajo structures in this region, hogans and sweat lodges in the White Canyon and upper Comb Wash areas, are tree-ring dated to the early A.D. 1600s (Spangler et al. 2010:151–152).

The Ethnohistoric/Pueblo IV period is characterized by out-migration of most of the Colorado Plateau and aggregation in massive communities in the northern Rio Grande and northeastern Arizona. Sites from this period typically consist of sparse lithic scatters with low quantities of brown ware ceramics, diagnostic rock imagery, and occasionally characteristic wikiup remains. During this period the archaeological record begins to match ethnographic descriptions of Ute, Paiute, and Navajo groups.

Historic Context

The Historic period refers to the time recorded by Euro-American written history. The Historic period in Utah started with the first Euro-American explorers trekking through the region and continues to the present day. The history of the Planning Area can be divided into four major periods: Early Exploration, and Settlement (A.D.1765–1880); Industry and Growth (A.D. 1765–1929); the Great Depression and World War II (A.D. 1929–1945); and the Postwar period (A.D. 1945–present).

EARLY EXPLORATION AND SETTLEMENT (1765–1880)

Spanish mission expeditions represented some of the first Euro-American explorations into the West, and these expeditions paved the way for later fur trading and settlement. Expansion of the Spanish frontier into Alta California required establishing a land route—the Spanish Trail—between present-day Monterrey, California, and Santa Fe, New Mexico. The first known Spanish expedition into the San Juan River corridor to the east of BENM was led by Juan Maria Antonio de Rivera in 1765, and it followed the San Juan to the present-day locations of Aneth and Bluff. The 1776–1777 expedition by Fathers Francisco Atanasio Domínguez and Silvestre Vélez de Escalante in search of a route from Santa Fe, New Mexico, to the California coast did not cross the BENM Planning Area (Black and Metcalf 1986:18), but explorers and fur traders used the detailed information about the region and its inhabitants, as well as their maps.

Stockmen were also early entrants to the region, beginning in the mid-1870s (Peterson 1974:46). Many of these cowboys came with their herds from Colorado; others came from other locations in Utah (Peterson 1974:48). Several cattlemen settled near La Sal, but a few found the lands near the Abajo Mountains (also known as the Blue Mountains).

Friction between Navajo inhabitants of the Bears Ears region and Euro-American settlers was common in the mid-1800s culminating in the Long Walk of the Navajo—also called the Long Walk to Bosque Redondo—which began in 1864. During forced marches of the Long Walk, Navajo people were forcibly relocated from their ancestral lands in and around the Bears Ears area to eastern New Mexico. In all, there were more than 50 forced marches that occurred as part of the Long Walk displacement and more than 200 Navajo people died during the events. Manuelito, or Hastiin Ch'il Haajini was a principal leader of the Navajo during the Long Walk period and was reportedly born and raised in the immediate Bears Ears vicinity.

INDUSTRY AND GROWTH (1880–1929)

The earliest recorded non–Native American settlement in the southern portion of San Juan County was established by Peter Shirts, alternately spelled "Shurtz" in Perkins et al. (1957:28). In 1887, he built a home where Montezuma Creek meets the San Juan River (McPherson 1995:96). In June of 1879, Shirts greeted an exploration party sent by the Church of Jesus Christ of Latter-day Saints (the church) to the Montezuma Creek area (McPherson 1995:97; Perkins et al. 1957:24–28). The exploring party built Fort Montezuma on the San Juan River, not far from the mouth of Montezuma Creek (McPherson 1995:97). These settlers were followed by more church settlers who eventually took the Hole-in-the-Rock route to what would become Bluff. The Hole-in-the-Rock route involved widening a cleft in the rock rim above the Colorado River and then developing "a road below the steep cliff-face" and a route out of the canyon along the river (McPherson 1995:98). It took from November 1879 until the end of January 1880 before the work was completed and the party could progress by carefully lowering the wagons through the new gap and ferrying them across the Colorado River (McPherson 1995:98; Miller 1966:109). The Hole-in-the-Rock route followed some existing trails in the area and is considered one of the keystones of early Latter-day Saint exploration and settlement in San Juan County.

The settlers built additional roads, including one from the top of Clay Hill Pass down to Whirlwind Bench, one from San Juan Hill up and over Comb Ridge, and Comb Wash Road (Miller 1966:132–133, 138). By April 6, 1880, settlers had reached Cottonwood Wash and chose to stop their journey there instead of traveling another 18 miles east to Montezuma Creek. They named this location Bluff (McPherson 1995:103–104; Miller 1966:139–140).

With the establishment of Bluff, running the newly settled region was the next order of business. San Juan County was officially incorporated in 1880 from Iron, Kane, and Piute Counties by the Utah Territorial Legislature (McPherson 1995:319). The San Juan River flooded in 1884, washing away dams, channels, and the community of Montezuma Creek (McPherson 1995:103). By 1885, some of the settlers began moving out of the fort into the county to find better farming and cattle lands due to difficulties with irrigation ditches, the general lack of water, and poor crops (McPherson 1995:103; Perkins et al. 1957:64–66). Nearby locations were problematic because private landowners, such as Harold and Edmund Carlisle, the English owners of the Kansas and New Mexico Cattle and Land Company, already held a large portion of the lands nearby (McPherson 1995:105–106). By 1887, work to lay out a new town in the north fork of Montezuma Canyon began at the request of Francis Hammond, church stake president. The new town was originally to be named Hammond, but it was eventually named Monticello after Thomas Jefferson's estate (McPherson 1995:106–107; Perkins et al. 1957:96; Van Cott 1990:256). The Homestead Act of 1862, the Desert Land Act of 1877, and the Enlarged Homestead Act of 1909 further encouraged the development of the region by providing access to inexpensive public land made available in part by forced Native American relocation campaigns, like the Long Walk discussed above (McPherson 1995:110).

The Latter-day Saint settlers experienced some conflict as they expanded into and laid claim to the territory of the Utes and Navajos in the Planning Area. Tensions increased as the settlers and American Indians disagreed on grazing areas, water usage, and settlement locations.

The settlers at Bluff began farming potatoes, fruits, alfalfa, and corn, while the settlers in the upper country grew small grains, alfalfa, and garden crops (Perkins et al. 1957:276). These crops were dependent on irrigation from mountain runoff or nearby running water sources, such as the San Juan River (Perkins et al. 1957:276). The region was better suited for dry farming, given the difficulty of irrigating many of the elevated areas. In addition to farming, ranching continued to grow in popularity, and by the mid-1880s, cattle were not the only livestock roaming the region. Flocks of sheep, owned by Navajos and Euro-Americans, had been imported and were competing with cattle for food. Although some cattlemen shifted to sheep or integrated them into their cattle operations, the drought and overgrazing meant less grazing feed was available. By 1904, many outfits had both cattle and sheep to reduce losses (McPherson 1995:177). Many of the flocks were cared for by Hispanic herders from Colorado and New Mexico, many of whom would settle in Monticello.

Prospecting for precious metals also brought Euro-Americans to the area. Cass Hite's discovery of placer gold in Glen Canyon triggered a rush in 1883, but no major deposits were found (McPherson 1995:242; Perkins et al. 1957:269). The Abajo Mountains saw a fair share of prospectors in 1892, with more than 300 claims staked, but prospectors spent more money than they earned (McPherson 1995:246; Perkins et al. 1957:269–270). The next big gold rush focused on the San Juan River, with much of the activity around and below Mexican Hat, Utah, between 1892 and 1893 (McPherson and Kitchen 1999). While the gold rushes never quite panned out, copper was found in Red Canyon and in the Abajo Mountains, but mining and processing of the ore did not happen until 1916 (McPherson 1995:248–249; Perkins et al. 1957:270).

While oil was initially discovered along the San Juan River in 1882 by E. L. Goodridge, no active drilling attempts were made until 1907 (Harline 1963:295; McPherson 1995:249). By 1909, eight oil companies had drilled "twenty-five holes, 80 percent of which were producing, and had established a field that eventually encompassed the lands between Bluff and Slickhorn Canyon" (McPherson 1995:249). However, the wells sunk near Mexican Hat and Goodridge were the only ones that produced significant amounts of oil, and the boom ended by 1912 (Harline 1963:296; McPherson 1995:251).

THE GREAT DEPRESSION AND WORLD WAR II (1929–1945)

As was the case for many communities throughout the West, resource exploitation and extractive industries were firmly established in Utah's economy, which suffered a severe financial blow when the stock market crash in late 1929 heralded the onset of the Great Depression. The earlier postwar slump in San Juan County left it ill-equipped to endure further economic strain. The lack of a substantial manufacturing and industrial base aggravated the situation. Unemployment rates soared, as did delinquencies on loans and taxes, further eroding the county's economy. Utah's farmers received assistance from the federal government through the Agricultural Adjustment Act, which controlled production and provided crop subsidies (Hinton 1986:271–272).

The area was also impacted by the 1934 Taylor Grazing Act, which regulated the use of public grazing land (McPherson 1995:180–181). The act's intended purpose was to stabilize the sometimes economically volatile livestock industry and stop the misuse and abuse of public lands through regulatory control of those lands by the Grazing Service (a precursor of the BLM). With beef and wool prices at unprecedented lows, hundreds of area ranchers could not afford the price of permits to graze their livestock on public lands (McPherson 1995:181). In addition, a statewide drought in 1934 dried up waterholes and springs "that had never been known to go dry," causing a lack of range forage (Arrington 1986:253).

As the nation continued to languish in the throes of the depression, the U.S. government established programs of institutional relief. President Franklin Roosevelt's New Deal funded various aid programs, such as the Works Progress Administration (WPA) and the Civilian Conservation Corps (CCC), to help struggling communities. CCC crews stationed in several areas in San Juan County built roads, fences, corrals, and flood control projects, culverts, telephone lines, and campgrounds (Baldridge 1971:364–377; CCC Legacy 2015; McPherson 1995:224). CCC Camp DG-34, located south of Blanding, made significant contributions to water control features and roads by constructing reservoirs, improving wells and springs, and constructing miles of truck trails through the Abajo Mountains (including the Blanding–Montezuma truck trail) (Baldridge 1971:171; McPherson 1995:224–225). The presence and importance of the WPA, the CCC, and other work relief programs in Utah remain evident today in buildings, water systems, transportation features, sidewalks, landscaping, and parks.

With the nation's entry into World War II in 1941, Utah's attention turned toward supporting the war effort. Increased demands for agricultural products helped the county recover from the economic downturn. Local farmers participated in the Food for Victory program sponsored by the Farm Security Administration (*San Juan Record* 1942). Cattle prices were restored to pre-depression levels and the demand for wool increased prices, benefiting local sheep ranchers (McPherson 1995:182–183).

Because of the complex grammar and mutual unintelligibility of the Navajo language with even other closely related Native American dialects, Navajo code talkers were instrumental to the success of the U.S. military in the Pacific theater of World War II. Common, but combat-important terms, concepts, and tactics were given descriptive terms in Navajo, and native Navajo speakers who had enlisted in the military translated important tactical messages between units in combat.

As the war drew to a close, both returning soldiers and a decreased national demand for agricultural products resulted in an inevitable shift in the economy. A decline in the demand for wool led to yet another weak period for the sheep industry. However, the cattle industry was one of the few industries to weather the postwar years with success. The industry adopted technological changes that improved breeding and productivity. Combined with a growing national and international reputation for high-quality beef, these changes solidified the cattle industry in the area's social and economic spheres.

THE POSTWAR PERIOD (1945–PRESENT)

To prevent an unstable economy after the war, higher pricing remained in effect until the end of 1946 on all consumer items except sugar, rice, and rent (Bishop 1997:201–202). The uranium boom, beginning with Charlie Steen's discovery in 1952, would fuel the region's economy for the next three decades.

In 1964, President Lyndon B. Johnson signed a Congressional act creating Canyonlands National Park (Barnes 1988:154). The park was expanded by 87,000 acres in 1971 (Barnes 1988:154; Schmieding 2008:xiii). Located in the northwestern portion of the Planning Area, the park serves as a popular recreation and tourist destination for hiking, mountain biking, four-wheel-drive and OHV use, and other outdoor activities. More parks and designated areas (such as WSAs) followed the success of Canyonlands National Park.

The Four Corners region was one of the few areas in and around Utah to enjoy an economic boom during the postwar period, fueled by the U.S. government's drive to establish a domestic stockpile of refined yellowcake uranium oxide. While most uranium mining and milling operations were centered around Lisbon Valley and Monticello, other major uranium mining locations included White Canyon (where the Happy Jack Mine was located) and Cottonwood Wash (Chenoweth 2006:536). According to the EPA, nearly 30 million tons of uranium ore were extracted from Navajo lands between 1944 and 1986 (EPA 2022). Many Navajo people worked at these mines, often locating their families nearby the mines and mills. Federal buying programs and production incentives drove companies to produce a surplus, which was achieved by the mid-1960s. By the mid-1970s, public awareness of the health risks associated with uranium mining and processing spread (Christie 1998:16–17). The growing costs associated with long-term adverse effects of uranium milling, a more-than-sufficient stockpile of uranium oxide, and President Ronald Reagan's steps to eliminate federal subsidies for specific industries resulted in a near total collapse of the domestic uranium industry in 1984.

For Tribal Nations that currently manage land in the area immediately adjacent to the Monument, active economic development is ongoing. Today, economic development on the Navajo Nation is assisted by the Division of Economic Development, one of the divisions within the Executive Branch of the Navajo Nation government. The Division of Economic Development assists both native and nonnative businesses operating within the Navajo Nation in commercial, tourism, industrial, and small business sectors. For the Ute Mountain Ute, the Tribal Division of Economic Development is involved with economic development initiatives from within the reservation and from national and international enterprises interested in developing sustainable business relationships with the Ute Mountain Ute Tribe. The division oversees several Tribal Enterprises, including the Ute Mountain Ute Casino and Resort, Weeminuche Construction Authority, the Ute Mountain Ute Farm & Ranch, the Ute Mountain Ute Pottery/Gallery, and the Ute Mountain Ute Travel Plaza.

The last 50 years in the region has seen growth in terms of both population and economy. Regional leaders have developed plans to continue the expansion of the economic base and improve the quality of life for residents well into the next century. Although ranching is still conducted, recreational tourism is now the largest industry in the county.

6.7.2 Trends

Under current management, long-term observations and specific site monitoring suggests that cultural resources are in stable condition. Looting of cultural resource sites is rare but ongoing and vandalism is similarly uncommon but does still occur. Casual collection of artifacts and historical objects continues to be a problem but is actively addressed by public education efforts. Nonetheless, current observations suggest that looting has tapered off in recent years largely due to public education and law enforcement efforts.

Increased visitation and recreation have caused impacts to cultural resources. Impacts to cultural resources from visitation and casual colleting may have increased coincidentally with increased OHV use and associated access. Access to cultural resources increases the number of visitors who can access cultural resource localities, this may lead to more looting or inadvertent damage. Additional factors contributing to impacts to cultural resources from visitation and recreation include publication of site locations on social media, as well as unintentional effects from visitor use, such as camping in alcoves and on open sites, and from social trailing and user-created parking areas in or across sites.

A significant challenge for management of cultural resources in BENM are the effects of increased public contact with sensitive localities because of increased access. As more people visit the region looking for solitude and a wilderness experience, more remote and heretofore unvisited areas are finding more visitors. Simple increases in foot traffic across sensitive locations impacts these sites through establishment of social trails and accelerated erosion from destabilization of the ground surface. Ease of access is afforded by the area's many travel routes, and the effects of this access are greatly enhanced by the region's attractiveness for recreational use. Southeastern Utah has positioned itself as a destination for tourism since the early twentieth century, and this has intensified in recent decades as outdoor recreation has become a significant component of the area's economy. Along with the economic benefits that may come with recreational activities, which largely revolve around four-wheel-drive travel and non-motorized travel across the Monument, come significant conflicts with cultural resources.

The consequences of global climate change are impacting landscapes across the western United States in ways that significantly affect the integrity and even the continued presence of important cultural resources. Climate change across the West is altering vegetation communities, altering the composition of those communities and potentially changing the co-occurrence of cultural important plants and other resources. Changes in rainfall and associated drought are setting the stage for catastrophic wildfire like those seen nearby in northern Arizona as well as increasing the occurrence of other rainfall-related extreme weather events like flash flooding. Both wildfire and flooding can have detrimental effects to cultural resources.

6.7.3 Forecasts

Under current management, conditions will likely remain stable. Recreation and tourism are expected to increase regionally and to accordingly increase within BENM. Such increases in visitation will likely bring increased OHV use and associated access to more and more remote cultural resources. Additional visitation to these more remote locations will likely have an associated impact to these sites. As noted above, a simple increase in foot traffic at cultural sites establishes social trails and accelerates erosion.

Wildfire and other natural forces will continue to stress resources within BENM. In the case of wildfire, sensitive materials and objects may be damaged or destroyed, but post-fire conditions may threaten sites through intensified erosion or other post-fire processes. Additionally, the removal of the vegetative cover also encourages unauthorized motorized use within burn areas. Fluctuations in precipitation, freeze-thaw cycles, and seasonal access to the Monument are also stressing cultural resources. High-intensity rainfall may alter erosional patterns and accelerate structural decay, while fluctuations in weather patterns may permit a wider window of visitor access.

6.8 FORESTRY AND WOODLANDS

Woodland resources within the Planning Area consist primarily of pinyon-juniper and Gambel oak woodlands as well as mixed conifer (dry) communities.

6.8.1 Regional Context

BLM

This analysis describes approximately 1,075,083 acres of woodlands managed by the BLM that occur within the Planning Area. SWReGAP data were used for the woodland acreage calculations. There are eight designated timber harvest areas in these woodlands (BLM 2008): Cedar Mesa, Salt Creek Mesa, Harts Draw, South Cottonwood, North Comb Ridge, Shash Jáa Unit, Dark Canyon Plateau, and White Canyon (Figure 6.8-1). The BLM currently partners with Tribal Nations to cut and deliver fuelwood.

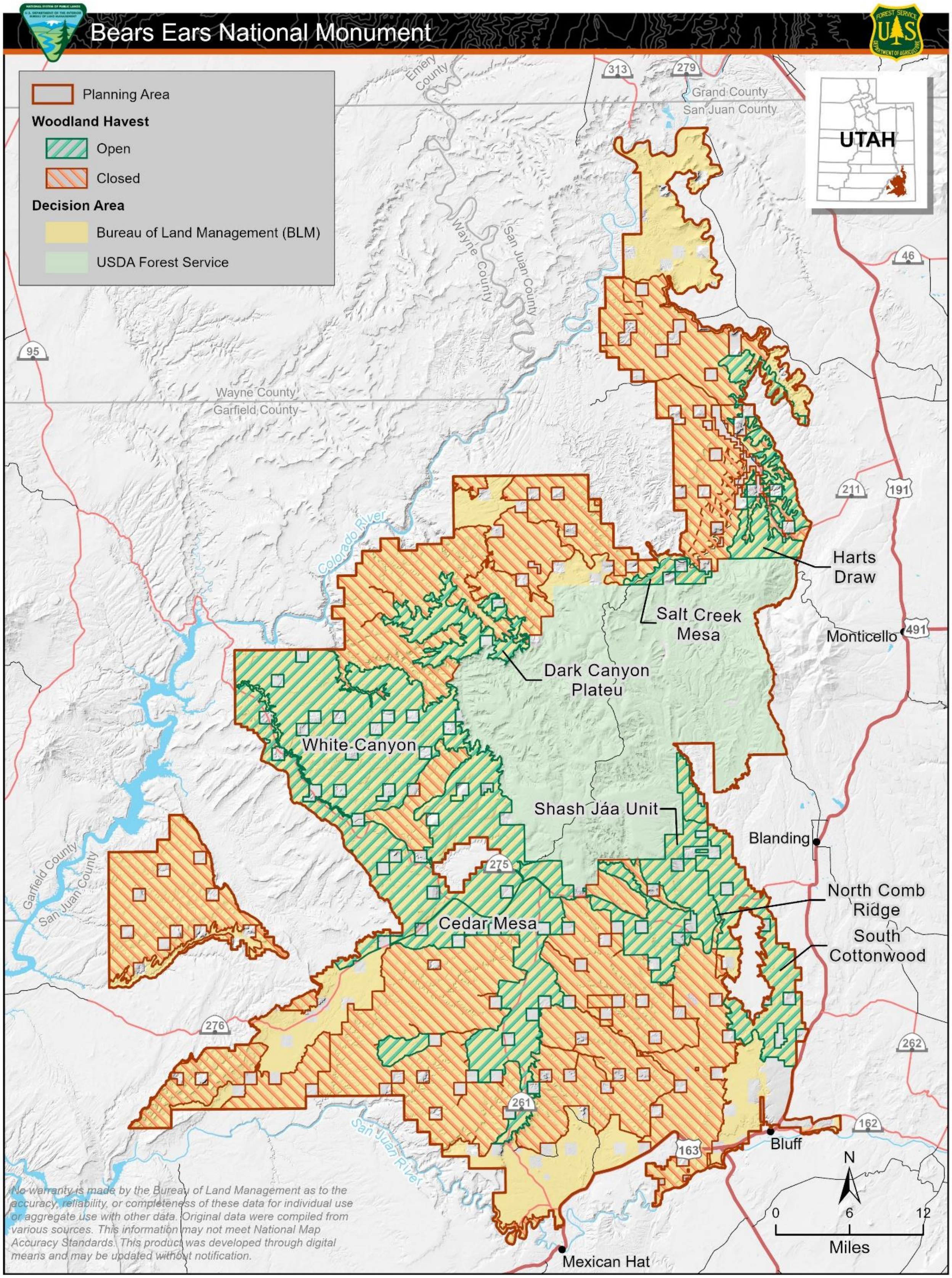

Figure 6.8-1. BLM-designated timber harvest areas.

USDA Forest Service

In addition to BLM woodlands, this analysis also describes approximately 242,673 acres of woodlands managed by the USDA Forest Service within the Planning Area.

6.8.2 Current Conditions

WOODLAND USES

Harvesting of fuelwood by individuals is the primary use of woodlands in the Planning Area. Harvesting of fenceposts and Christmas trees also occurs to a lesser degree. Harvesting of woodland products for Native American ceremonial and traditional uses also occurs in the Planning Area. Table 6.8-1 shows the number of woodland permits sold on USDA Forest Service lands in the Planning Area from 2018 to 2022.

Table 6.8-1. Wood Permits Sold from 2018 to 2022

Permit Type	Permits Sold	Wood Type	Volume Sold	Value
Christmas trees	19	Combined softwood	443	$4,430.00
Every Kid Free Christmas Tree	1	Subalpine fir	1	$10.00
Fuel wood	1,137	Oak	159	$1,555.00
		Dead	3,229	$16,145.00
		Dead (free use COVID-19)	1,210	$6,050.00
		Free use fuelwood	94	$945.00
Poles	2	Aspen	100	$20.00
		Softwood	50	$20.00
Posts	41	Aspen	95	$57.00
		Juniper	24	$9.60
		Ponderosa	143	$114.40
		Combined softwood	480	$384.00
		7- to 8.9-foot aspen	405	$405.00
		7- to 8.9-foot ponderosa	170	$170.00
Ornamental	1	Aspen	1	$5.00
		Combined softwood	4	$25.00
Total	**1,201**	**N/A**	**6,608**	**$30,345.00**

Source: Eckhout 2022

Woodland Types

Woodland types in the Planning Area are described in detail below. There are 1,075,083 acres of woodlands administered by the BLM and 242,673 acres administered by the USDA Forest Service in the Planning Area. The Pinyon-Juniper and Gambel Oak Woodlands forest type is the most dominant type, with 471,668 BLM acres and 131,067 USDA Forest Service acres for a total of 602,755 acres. The Mixed

Conifer (Dry) forest type is the second most dominant type, with 2,697 BLM acres and 69,060 USDA Forest Service acres for a total of 71,757 acres.

ASPEN AND ASPEN-MIXED CONIFER COMMUNITIES

Aspen and aspen-mixed conifer communities are found on 98 acres of BLM-administered land and 6,753 acres of NFS land within BENM, totaling 6,851 acres.

This community is important for a large number of species throughout its stages of succession, serving as nesting and foraging habitat for such species as Cassin's finch and western tanager, cavity nesters, and raptors, including northern goshawk. It is also important summer range for big game such as mule deer and elk, providing both forage and cover components. Aspen also provides forage and cover for livestock. In addition, aspen maintains watershed condition, enhances soil productivity, and is aesthetically pleasing.

Seral quaking aspen are generally lacking except in some burned areas. Generally, tree ages vary from 60 to 150 years. On NFS land within BENM, most of the species fall within the 6- to 12-inch-diameter class range. The large number of small diameter trees is a result of past disturbances, such as wildfires, insects, and diseases. These size classes are within an acceptable range for the aspen component. However, aspen-mixed conifer stands presently lack mature structure or large diameter conifers. Ideally, stands would comprise a broad distribution of conifer size classes with the diameter of some trees exceeding 19 inches.

MIXED CONIFER-MOUNTAIN SHRUB WOODLANDS

Mixed conifer-mountain shrub communities cover approximately 63 acres of BLM-administered land and 1,601 acres of NFS land within BENM, totaling 1,664 acres.

These woodlands are composed of various conifer species, such as Douglas-fir (*Pseudotsuga menziesii*), mountain mahogany (*Cercocarpus*), and other higher elevation species. These communities provide valuable wildlife habitat and wildlife food sources. Productivity, species composition, and resiliency differ within this type depending on soil depth. As stands mature toward full canopy closure, understory vegetation becomes sparse and forage values decrease. These communities are the primary target for timber harvest permitted by the Monticello FO and pine nut gathering by members of Tribal Nations. These stands are also regularly evaluated and treated for high fire potential and undesired encroachment into other habitats.

MIXED CONIFER (DRY) COMMUNITIES

These woodland community types cover 2,697 acres of BLM-administered land and 69,060 acres of NFS land within BENM, totaling 71,757 acres.

Ponderosa pine (*Pinus ponderosa*) typically grows in pure pine communities, whereas Douglas-fir (*Pseudotsuga menziesii*) typically has white fir (*Abies concolor*), ponderosa pine, and/or aspen (*Populus tremuloides*) intermixed. Pure ponderosa pine communities occur across the top of Elk Ridge. These communities vary between even-aged ponderosa pine communities and mixed conifer multilayered canopy types, primarily due to natural and small-scale human-caused disturbances.

Endemic levels of insects and diseases are present in this woodland type. Insects (including Douglas-fir beetle and mountain pine beetle), disease, and fire have had a major role in maintaining the diversity of composition and structure in this community type. Fire suppression has resulted in increased stand densities, predisposing them to increased insect mortality.

Dry mixed conifer stands provide important habitat for many wildlife species, including threatened, endangered, and regionally sensitive species. The diversity of vegetation composition, structure, and multilayered canopy are all important attributes for the many wildlife species that depend on this habitat type, particularly late seral–dependent species. Burned stands provide habitat for some bird species, especially Lewis's woodpecker (*Melanerpes lewis*) and three-toed woodpecker (*Picoides dorsalis*) and cavity-nesting species such as western bluebird (*Sialia mexicana*). Other species, including Grace's warbler (*Setophaga graciae*), flammulated owl (*Otus flammeolus*), and Allen's big-eared bat (*Idionycteris phyllotis*), require habitat components associated with mature forests, such as higher canopy cover, large trees, and snags. Wild turkeys are common in ponderosa pine habitats, where mature stands mixed with openings provide large trees for roosting and a productive understory herbaceous component for foraging.

Abert's squirrel (*Sciurus aberti woodhouse*) is the species most directly dependent on ponderosa pine habitat in the Planning Area. Tree characteristics largely determine the quality of squirrel habitat, with a direct relationship between the number of interlocking crowns and the quality of habitat (Brown 1984).

Past timber harvesting, particularly in the 1960s, removed the large older ponderosa pines from stands while ignoring dense ponderosa pine and conifer understory components. Fire exclusion resulted in second-growth ponderosa pine stands with higher densities than would have occurred under historical fire regimes. Historical stand structures were typically multilayered with a range of tree sizes. In ponderosa pine stands, past timber management practices have resulted in a variety of structural stages. The majority of acreage is dominated by 12- to 18-inch-diameter trees (68% according to VCMQ mapping). Old-growth ponderosa pine has been reduced and is fragmented across the national forest.

PINYON-JUNIPER AND GAMBEL OAK WOODLANDS

These vegetation types cover 471,688 acres of BLM-administered land and 131,067 acres of NFS land in BENM, totaling 602,755 acres.

Pinyon pine is generally more abundant in stands at middle elevations where annual precipitation exceeds 15 inches. At lower elevations, juniper typically dominates. Utah juniper is a surface feeder with a shallow, spreading root system, making it highly competitive with other plants. Its distribution and density have increased at lower elevations because of grazing and lack of fire, allowing it to occupy areas with deeper soils. As it increases on these sites, it displaces sagebrush and, in some instances, mountain shrub communities. Pinyon pine becomes more abundant on sites where annual precipitation exceeds 15 inches.

Pinyon-juniper and Gambel oak woodlands are typically found between conifer forest and sagebrush vegetation communities. These woodlands have expanded beyond their historical distribution in geographic extent and are quite dense due to fire suppression. Unproductive rocky and bare sites are in need of less management, such as thinning and mastication, to improve understory productivity, because there is less vegetation present.

Historically, pinyon and juniper occupied two site conditions. On better sites, pinyon and juniper grew in a savannah-like community. Grass and forb species occupied the understory below open grown trees. Frequent surface fires kept these communities from becoming overly dense. Pinyon-juniper also occupied rocky, bare ridgelines as well as hillslopes. The lack of a fine herbaceous understory prevented fire from spreading into these sites. Early settlers cut pinyon and juniper for railroad ties, fence posts, and other uses. This cutting, in addition to overuse by livestock, altered the ecology of these sites. Many native species were lost as well as most of the topsoil. Today, these areas have rocky, shallow soils incapable of supporting a herbaceous understory that could be burned by fire. Pinyon-juniper communities provide habitat to a very diverse group of neotropical migratory bird species.

Stands in this community are high density. The grass-forb component in overmature and dense stands of pinyon and juniper has been substantially reduced as a result of competition for available light, space, and moisture with pinyon and juniper. Currently, in some stands, the herbaceous understory may be unable to respond following a fire. Opportunities exist to burn these areas to remove the pinyon-juniper overstory and restore the community to an open condition through mechanical treatments and mixed-severity fire.

In conjunction with stress caused by climate change and drought, a number of insects and diseases can cause mortality in pinyon-juniper communities. Agents of particular importance include pinyon Ips (*Ips confusus*), twig beetles (*Pityophthorus* spp.), pitch moths (Pyralidae [especially *Dioryctria* spp.]), black stain root disease (*Leptographium wageneri*), and pinyon dwarf mistletoe (*Arceuthobium divaricatum* spp.). Pinyon Ips are the most important insect mortality agent, causing most of the pinyon mortality in the Intermountain West (Rogers 1993; Shaw et al. 2005).

DEVELOPED/URBAN FORESTS

Developed/urban forest communities cover 418 acres of BLM-administered land and 269 acres of NFS land within BENM, totaling 687 acres. This community includes the western cool temperate developed and urban deciduous, evergreen, and mixed forest types.

These forest types occur in low to moderately urbanized settings. According to GIS mapping of LANDFIRE data, these acres of developed and urban forest were found along the major roadways and found on developed sites. This forest type is generally characterized by unnatural combinations of species (primarily native species, although they often contain slight or substantial numbers and amounts of species alien to the region as well).

6.8.3 Trends

Aspen and Aspen Mixed Conifer Communities

The lack of disturbance allows the natural progression of aspen to succeed to conifers. Increases in the abundance and density of conifers make this forest type more susceptible to large-scale insect infestations, disease outbreaks, severe wildland fires, drought, and climate change possibly endangering overall forest ecosystem health (Hood and Miller 2007).

Aspen dieback and decline from insect disease agents were part of a trend of increasing damage reported across the western United States, which peaked in 2007. Decline and dieback damage was largely caused by canker diseases and insect borers, but defoliators played a role in some areas (Guyon and Hoffman 2011. The lost acres have converted to ponderosa pine, Douglas-fir, or white fir forest types within the Planning Area. Mortality of trees in aspen communities, over the entire national forest acreage, has increased from 1993 more than five times (U.S. Department of Agriculture/Pacific Northwest Research Station 2016).

Herbivory and browsing have impacts on aspen stands. Long-term or heavy ungulate browsing can alter aspen demography and composition. Aspens have higher nutrient value than slower-growing trees, and thus are more appealing to ungulates as a food source (Seager et al 2013).

In addition, there are a lack of early seral communities in this forest type. Early seral communities are the ecological communities that emerge after a stand-replacing disturbance.

Mixed Conifer-Mountain Shrub Woodlands

Trends for mixed conifer-mountain shrub communities are localized and for the most part stable. There have been some impacts by encroachment of pinyon and juniper and loss due to heavy browse by wildlife. For a discussion about the impacts from wildfire see Section 6.9 of this document.

Mixed Conifer (dry) Communities

A variety of structural stages are present across the landscape. The majority of average stand sizes fall within the 12- to 18-inch-diameter range (68% of composition). Because of limited management activities, drought, climate change, and fire suppression activities, stand densities have increased, particularly in the smaller size classes. Past management practices have had variable impacts to structure and species composition.

Dwarf mistletoe (*Arceuthobium* spp.) affects approximately one-quarter of ponderosa pine (Ogle et al. 1998). As a result of fire exclusion for the last 100 years, ladder fuels and a dense understory of oak, manzanita, or pinyon-juniper amongst stands of ponderosa could contribute to wildfires outside the historical range of intensity and size.

The reduction in numbers of Douglas-fir and white fir are partly because of western spruce budworm (*Choristoneura occidentalis*) and Douglas-fir beetle (*Dendroctonus pseudotsugae*), which have impacted Douglas-fir and true firs on the forest (U.S. Department of Agriculture/Agricultural Research Service, Systematic Entomology Laboratory 2016).

Pinyon-Juniper and Gambel Oak Woodlands

Unhealthy pinyon-juniper stands are evident across the Planning Area, especially in areas with shallow soils. Pinyon and juniper mortality, attributed to the combination of drought, Ips beetles, and root disease, occurs in the Monticello FO area. Pinyon is a valuable resource for firewood harvest and wildlife habitat management. It also provides pine nuts for human collection and consumption. The increase in dead wood has led to an increase in fuel loading and area fire hazards, although this increase may also temporarily support firewood collection needs.

On the other hand, pinyon-juniper encroachment in areas with deep soils is continuing. More sagebrush communities and understory vegetation are lost as this occurs, resulting in an increase in soil erosion and creation of a monoculture of pinyon-juniper communities.

Pinyon-juniper plant community distribution and dynamics across the landscape are primarily driven by climate. Since the mid-1900s, pinyon-juniper communities have expanded into other forest communities. Movement of pinyon-juniper woodlands into both higher and lower elevations is driven by increasing temperatures, increasing CO_2 levels and increasing availability of nitrogen from air pollution (Tausch 1999). It is estimated that pinyon-juniper woodlands have increased ten-fold over the past 130 years throughout the Intermountain West (Miller and Tausch 2001). Fire suppression and lack of thinning have contributed to dense, overmature stands, leading to higher risks from insect and disease infestations as well as uncontrolled wildfires.

Watersheds with large areas of pinyon-juniper encroachment would become susceptible to increased erosion if large high-intensity fires were to denude the landscape. The geographic range or extent in occurrence is expanding due to encroachment into sites that were historically sagebrush or mountain shrub communities. Unbalanced densities (structure), compositions, and patterns are indicators of improperly functioning conditions and have affected the value of this wildlife habitat. If watershed conditions decline, the availability and quality of wildlife habitat, especially where water or riparian resources are present, could be affected. There may be cases of other invasive, nonnative species, such as cheatgrass (*Bromus tectorum*), occurring within the pinyon-juniper cover type. The existence or potential establishment of these species should be considered when identifying areas to treat.

Developed/Urban Forests

There is not enough information on this forest type to determine trends.

6.8.4 Forecasts

For a discussion about the impacts from wildfire, see Section 6.9 of this document. In general, demand for woodland product harvest has increased since 2018, and the trend is expected to continue. The BLM and USDA Forest Service anticipate an increased need for more active woodland and woodland harvest management due to trends such as insect-caused mortality, increased fire, and changing vegetation communities. In addition to an increase in demand, there is an increase of disturbance in wood cutting zones. Future management decisions regarding OHV use, ACECs, WSAs, and visual resources may impact where wood cutting and vegetative treatments would be allowed to take place.

ASPEN AND ASPEN-MIXED CONIFER COMMUNITIES

Stressors and Drivers

Conifers such as Douglas-fir, Engelmann spruce, ponderosa pine, white fir, and subalpine fir have been replacing seral aspen for the past 130 years. Aspen is an early seral tree species in the mixed conifer zone that relies primarily on vegetative suckering to regenerate. Lack of disturbance allows conifer tree encroachment that results in fewer aspen, increased acreage of conifer stands that are less diverse, and forest stands that are structurally continuous (less mosaic-like). Herbivory and browsing by ungulates such as livestock, deer, and elk are stressors to these communities. Previous silvicultural treatments at the stand scale have been successful in regenerating aspen when at least 100 acres or more has been harvested or when at least 75% of the conifer overstory has been killed by fire.

MIXED CONIFER-MOUNTAIN SHRUB WOODLANDS

Stressors and Drivers

With fire suppression, this woodland type has vigorously colonized many sites formerly occupied by open ponderosa pine woodlands. These invasions have dramatically changed the fuel load and potential behavior of fire in these forests. In particular, ponderosa pine now codominates on drier sites and increases the potential for high-intensity crown fires by increasing the amount of fuel available. Increased landscape connectivity, in terms of fuel loadings and crown closure, has also increased the potential size of crown fires.

Fire suppression has led to the encroachment of more shade-tolerant, less fire-tolerant species and an attendant increase in landscape homogeneity and connectivity (from a fuels perspective). This could increase the lethality and potential size of fires.

MIXED CONIFER (DRY) COMMUNITIES

Insects and Disease

Climate change will likely increase stress in ponderosa pine stands, making them more susceptible to bark beetle infestation and large replacing fire (which kills all or most of the living overstory trees in a forest) (Bond et al. 2012). Denser stocking and increased ladder fuels will also increase the likelihood of insect outbreaks. The last large insect outbreak occurred in the late 1990s. Mortality due to mountain pine beetle peaked in the mid-1980s and the late 1990s along the South Elk Ridge area. The USDA Forest Service conducted timber sales in the South Elk Ridge area in the late 1990s in response to increasing pine beetle mortality.

Stressors and Drivers

As a result of fire exclusion for the last 100 years, ladder fuels and dense stands of ponderosa pine could contribute to wildfires outside the historical range of intensity and size. Additionally, a buildup of forest litter increases potential fire hazard and lethal fire effects on vegetation by concentrating heat on the upper soil layers and around the stems of trees and shrubs. In addition to unplanned vegetation changes, more intense disturbances have significant negative effects on soil and water quality. Potential loss or reduction of habitat conditions for late seral–dependent wildlife species is high.

Most of the mixed conifer (dry) vegetation communities could experience a frequent fire return interval (0 to 35 years), with mixed-severity fire resulting in less than 75% of the dominant overstory vegetation being replaced. This is typical for this forested community. The next 25% within this vegetation community could experience a longer fire return interval (35 to 100 years) with less than 75% of the dominant overstory vegetation being replaced. The vegetation type is trending away from open park-like stands to denser stocked stands, allowing for more shade-tolerant species, thus transitioning from historically frequent/low-severity fire return intervals to less frequent/higher severity fire return intervals.

Ponderosa pine forests have gained some acreage from riparian zones, aspen, sagebrush, and mountain brush but have lost acreage to Douglas-fir and white fir invasion (Kaufmann et al. 2005).

PINYON-JUNIPER AND GAMBEL OAK WOODLANDS

Stressors and Drivers

Because of the lack of historical disturbance regime, the expansion of pinyon and juniper on sagebrush and grassland sites will continue. In phase one, trees establish, and seedling and sapling trees are scattered throughout big sagebrush and perennial grasses. In phase two, trees rapidly encroach and codominate with shrubs and herbs. Growth rates of trees increase until they mature, then the growth rate declines as the canopy closes.

In addition to expansion, stand density has increased, resulting in increased vulnerability to crown fire (Kaufmann et al. 2005), as well as susceptibility to drought and insects. As the canopy of the woodlands closes, understory plants, especially shrubs, rapidly decline (Chambers 2008). The expansion of woodlands now covers an average of three to four times the pre-Euro-American settlement area. These areas represented some of the more diverse and productive sagebrush ecosystems in the region and currently support, or will support, some of the highest levels of tree dominance and fuel loads. Consequently, sagebrush communities continue to decline as tree dominance continues to increase (Despain and Mosley 1990). The rate of the transition from sagebrush ecosystem to tree-dominated woodland is variable depending on the site potential for transition. In general, a minimum of 60 to 90 years is required for trees to dominate a site (Barney and Frischknecht 1974). In addition, climate change and drought are a stressor to these woodland types.

DEVELOPED/URBAN FORESTS

There is not enough information on this forest type to determine forecasts.

6.9 WILDFIRE AND FUELS MANAGEMENT

6.9.1 Current Conditions

Fire and Fuels

BLM and USDA Forest Service fire management plans (FMPs) describe desired resource conditions related to fire management in terms of FRGs (Table 6.9-1) and VCCs (Table 6.9-2). The VCCs refer to the degree of Vegetation Departure (VDep) from historic to present conditions. VCCs are described in detail in Table 6.9-2. This information is derived from LANDFIRE (2022) and is used to prioritize areas for treatment.

Table 6.9-1. Fire Regime

Historic Fire Regime	Fire Frequency	Severity
I	0 to 35 years	Low to mixed, less than 75% of dominant overstory vegetation replaced
II	0 to 35 years	Replacement severity, greater than 75% of dominant overstory vegetation replaced
III	35 to 200 years	Low to mixed
IV	25 to 200 years	High severity, stand-replacing fire
V	200+ years	High severity, stand-replacing fire

Table 6.9-2. Vegetation Condition Class

VCC	Description
IA: Very Low, VDep 0–16 IB: Low, VDep 17–33	Fire regimes are within historic time frames. The loss of key ecosystem components from the occurrence of fire is low. Areas are healthy and functioning adequately.
IIA: Low to Moderate, VDep 34–50 IIB: Moderate to High, VDep 51–66	Fire regimes have been moderately altered from their historic time frames by increased or decreased fire frequency and are at moderate risk of losing key ecosystem components. Areas are unhealthy and the rate of deterioration is expected to increase moderately to rapidly.
IIIA: High, VDep 67–83 IIIB: Very High, VDep 84–100	Fire regimes have been significantly altered from historic time frames and loss of key ecosystem components is high. Areas are unhealthy and nonfunctioning.

FRGs within the Monument are provided in Table 6.9-3. The majority of acreage (53.8%) is within FRG III, which represents low- to mixed-severity fires. Additionally, 11.59% and 12.85% of the Monument are within FRGs IV and V, respectively, which represent high-severity stand replacement fires. These fires, in themselves, are not unwanted and may be within the natural fire regime. They simply represent the most difficult type of fire to suppress if management direction determines this as the desired action. About 10% (10.71%) of the Monument has been described as barren and likely represents slickrock regions with little to no vegetation cover.

Table 6.9-3. Current BENM Fire Regime Groups

Fire Regime Groups	BLM (acres)	USDA Forest Service (acres)	State (acres)	Private (acres)	Total (acres)	Percentage of Monument
No Data	39,527.64	97,684.67	2,813.93	414.91	140,463.28	9.42
Barren	136,111.22	9,497.16	13,154.23	843.10	159,624.63	10.71
FRG III	571,126.38	166,048.12	57,710.79	6,925.36	801,883.96	53.80
FRG IV	148,644.87	8,057.69	14,625.17	1,346.23	172,719.19	11.59
FRG V	161,395.47	3,936.63	22,605.25	3,498.78	191,452.48	12.85
Sparsely Vegetated	18,353.67	3,878.88	1,541.84	47.18	23,825.26	1.60
Water	371.21	7.56	20.86	36.01	435.65	0.03
Total	**1,075,530.46**	**289,110.70**	**112,472.06**	**13,111.57**	**1,490,404.45**	**100.00**

Current VCCs are presented in Table 6.9-4. The majority of the Monument (47.37%) is within VCC IB, which represents fire regimes within historic time frames, where the loss of key ecosystem components from the occurrence of fire is low. These areas are considered ecologically healthy and are functioning adequately. VCC IIA is the next largest fire regime, covering 29.19% of the Monument; which represents fire regimes that have been low to moderately altered from their historic time frames. VCC IIB comprises 10.13% of the Monument and represents a moderate to high departure from historic fire regimes. VCC IIA and VCC IIB VCC categories represent areas within BENM where fire regimes have been low to moderately or moderately to highly altered from their historic time frames, respectively (see Table 6.9-2). The changes have occurred by either increased or decreased fire frequency and are at moderate risk of losing key ecosystem components. These areas are unhealthy, and the rate of deterioration is expected to increase moderately to rapidly. Only 0.28% (4,203 acres) of the Monument is in VCC IIIA, which represents a high departure from the historic fire regime. This fire regime has been significantly altered from its historic time frame, loss of key ecosystem components is high, and the affected areas are unhealthy and nonfunctioning.

Table 6.9-4. Current BENM Vegetation Condition Classes

Vegetation Condition Class	BLM (acres)	USDA Forest Service (acres)	Natural Bridges National Monument (acres)	State (acres)	Private (acres)	Total (acres)	Percentage of Monument
Barren	136,111.22	9,497.16	18.92	13,154.23	843.10	159,624.63	10.71
Burnable Agriculture	750.46	179.63	0.17	50.12	792.46	1,772.84	0.12
Burnable Urban	2,006.80	778.22	23.25	704.55	821.48	4,334.29	0.29
Non burnable Agriculture	437.88	160.04	0	43.41	400.69	1,042.02	0.07
Non burnable Urban	2,200.22	544.92	36.07	238.32	110.96	3,130.49	0.21
Sparsely Vegetated	18316.49	3,854.27	3.68	1,538.73	45.63	23,758.79	1.59
VCC IB	495,011.93	149,956.02	65.11	55,090.21	5,937.67	706,060.94	47.37
VCC IIA	334,355.15	63,868.48	23.86	33,985.58	2,781.97	435,015.05	29.19

Vegetation Condition Class	BLM (acres)	USDA Forest Service (acres)	Natural Bridges National Monument (acres)	State (acres)	Private (acres)	Total (acres)	Percentage of Monument
VCC IIB	85,381.84	56,671.21	8.40	7,629.75	1,335.38	151,026.59	10.13
VCC IIIA	587.28	3593.21	0.17	16.30	6.21	4,203.16	0.28
Water	371.21	7.56	0.02	20.86	36.01	435.65	0.03
Total	**1,075,530.46**	**289,110.70**	**179.65**	**112,472.06**	**13,111.57**	**1,490,404.45**	**100.00**

Across BENM, many fire-adapted vegetative communities exist, including grasslands, sagebrush, mountain shrub, aspen, and mix conifer communities (BLM 2018). Some communities, such as salt desert shrub and blackbrush, are not adapted to frequent fire and instead have historically experienced long fire return intervals.

The spread of invasive, nonnative species has altered fire regimes across the landscape. For example, cheatgrass and other vegetation types can alter fire-return intervals and expand the species' range post-fire. These species can therefore facilitate the expansion of invasive species, decrease the area's biological resource values, and increase fire behavior across the landscape.

Table 6.9-5, Table 6.9-6, and Figure 6.9-1 represent the statistics for fire occurrence from 2011 to 2021 (11 years) for all lands administered in BENM. From 2011 to 2021, BENM had an average of approximately 30 fires per year. The majority of these fires (88%) were started naturally by lightning, while the remaining 12% were human-caused ignitions. The average fire size per year is 538.25 acres; however, larger fires can and do occur. Fires are most likely to occur from May through October but can occur at any time of the year.

Table 6.9-5. BENM Fires by Location, Agency, and Acres, 2011–2021

BLM No. of Fires	BLM Fire Sizes (acres)	USDA Forest Service No. of Fires	USDA Forest Service Fire Sizes (acres)	State No. of Fires	State Fire Sizes (acres)	Private No. of Fires	Private Fire Sizes (acres)	Total No. of Fires	Total Fire Size (acres)
153	70.50	163	5,831.87	4	6.57	4	12.90	325	5,921.84

Table 6.9-6. BENM Fire Statistics, 2011–2021

Year	Natural Ignition Fires	Acres Burned from Natural Ignitions	Human Ignition Fires	Acres Burned from Human Ignitions	Unknown Ignition Fires	Acres Burned from Unknown Ignitions	Total Fires	Total Acres Burned
2011	33	9.60	2	0.6	0	0	35	10.20
2012	29	10.61	7	0.9	1	0.3	37	11.81
2013	34	357.70	2	0.6	0	0	36	358.3
2014	22	13.70	2	1.15	0	0	24	14.85
2015	16	7.50	2	0.59	0	0	18	8.09
2016	27	10.86	3	13.8	0	0	30	24.66
2017	31	108.00	1	0.3	0	0	32	108.30
2018	38	37.49	2	0.2	0	0	40	37.69
2019	10	5,300.60	0	0	5	0.5	15	5,301.10
2020	14	37.48	6	1.21	5	2.38	25	41.07
2021	32	5.67	1	0.1	0	0	33	5.77
Total	**286**	**5,899.21**	**28**	**19.45**	**11**	**3.18**	**325**	**5,921.84**

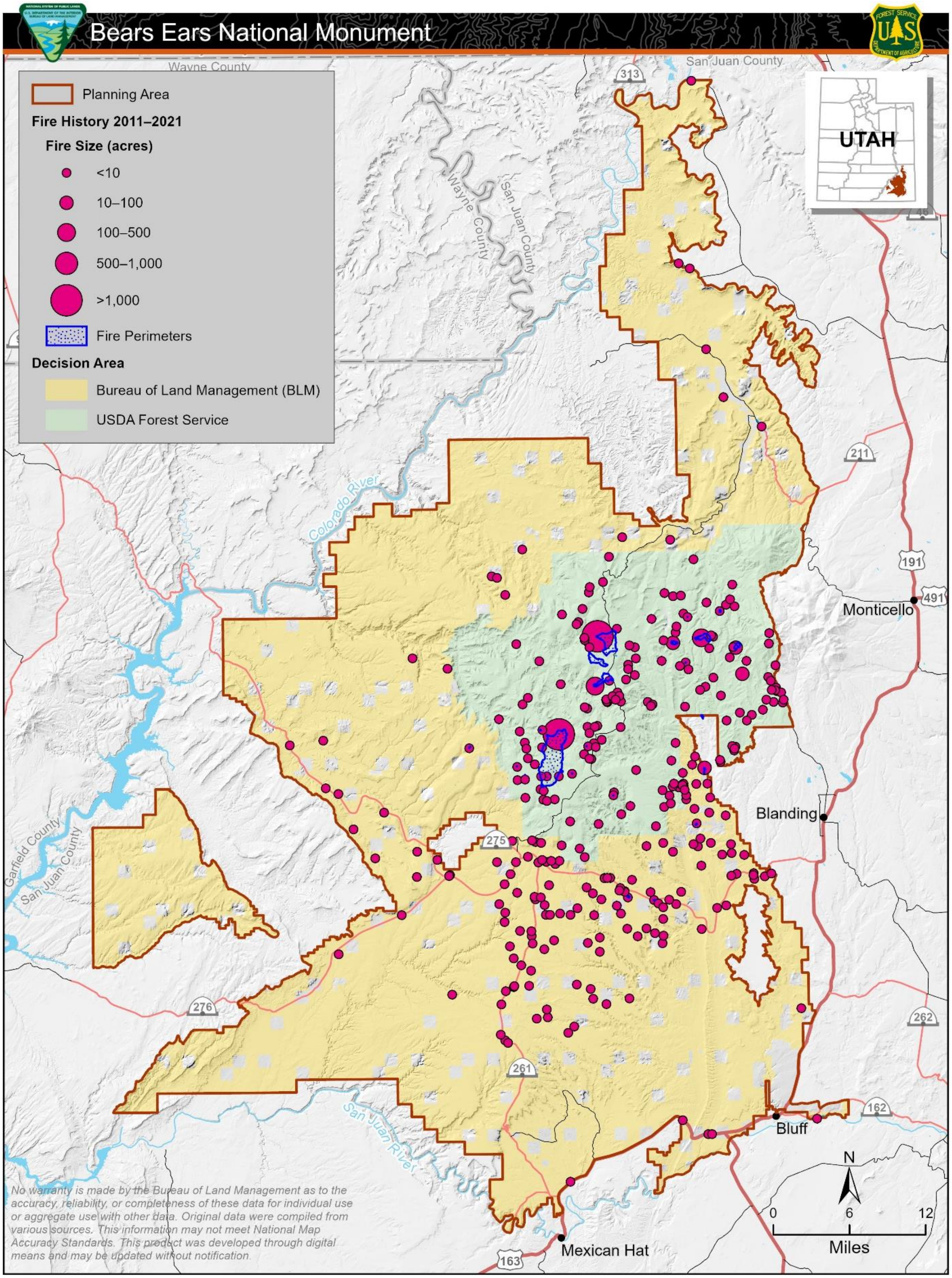

Figure 6.9-1. BENM spatial fire statistics, 2011–2021.

Fuels and Fire Management

Fuels management projects in the area have been increasing to improve vegetation resilience to disturbance, including wildfire. Fuels projects over the past 10 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 VCCs in the Planning Area. These goals are accomplished through interdisciplinary partnerships such as the Utah Watershed Restoration Initiative (Utah WRI). These partnerships identify priority watersheds to address a variety of interdependent resource issues and improve long-term watershed conservation and restoration. Specific watersheds are then targeted and prioritized for funding through BLM and USDA Forest Service program dollars, with additional coordination and funding prioritized through Utah WRI. Treatment types include prescribed fire and mechanical and chemical treatments. These treatments are completed for a variety of reasons, including fuels reduction; protecting WUI areas; and improving wildlife habitat, watershed conditions, and rangeland resources. Table 6.9-7 and Table 6.9-8 summarize some of the major fuels treatments and vegetation management that have occurred since 2013 in the Planning Area. As of 2013, 9,973.87 acres of BENM have undergone fuels treatments and vegetation management. These treatments have primarily focused on pinyon-juniper removal, invasive plant treatments, and fuels reductions. Spatial locations for the various fuels treatments are provided in Figure 6.9-2.

Table 6.9-7. BENM BLM-Directed Fuels Treatments and Vegetation Management, 2013–2021

Year	Treatment Name	NFPORS Treatment Type	Land Manager	Fire Management Unit	Total
2013	3_MA - MOFO - Bluff - Bullhog Unit 2	Mastication	BLM and Tribal	San Juan Basin	8.78
2013	3_MA - MOFO - Bluff - Herbicide - Unit 3	Chemical (herbicide)	BLM and Tribal	San Juan Basin	11.38
2013	MOFO - Swinging Bridge - Bullhog - Unit 2	Mastication	BLM and Tribal	San Juan Basin	15.95
2013	MOFO - Sand Island - Bullhog - Unit 1	Mastication	BLM, Tribal, and private	San Juan Basin	15.84
2013	MOFO - Sand Island - Bullhog - Unit 2	Mastication	BLM and Tribal	San Juan Basin	8.78
2013	MOFO - Sand Island - Bullhog - Unit 3	Mastication	BLM and Tribal	San Juan Basin	11.38
2013	MOFO - Sand Island - Bullhog - Unit 4	Mastication	BLM and Tribal	San Juan Basin	20.70
2015	1_HL_MA - MOFO - Bluff - Herbicide	Chemical (herbicide)	BLM, Tribal, and private	San Juan Basin	36.00
2015	1_HL_MA - MOFO - Bluff - Bullhog	Mastication	BLM, Tribal, and private	San Juan Basin	36.00
2013	3_MA - MOFO - Bluff - Bullhog Unit 3	Mastication	BLM and Tribal	San Juan Basin	11.38
2013	3_MA - MOFO - Bluff - Bullhog Unit 4	Mastication	BLM and Tribal	San Juan Basin	20.70
2014	3_MA - MOFO - Bluff - Bullhog Waterwheel	Mastication	BLM	San Juan Basin	4.19
2013	3_MA - MOFO - Bluff - Herbicide - Unit 4	Chemical (herbicide)	BLM and Tribal	San Juan Basin	20.70
2014	3_MA - MOFO - Bluff - Herbicide	Chemical (herbicide)	BLM and Tribal	San Juan Basin	35.33

Year	Treatment Name	NFPORS Treatment Type	Land Manager	Fire Management Unit	Total
2016	1_WRI_Dark Canyon II Bullhog	Mastication	BLM	Cedar Mesa	237.82
2015	WRI Wildlife Beef Basin Drill Seed	Seeding	BLM	Cedar Mesa	864.22
2015	WRI Wildlife Beef Basin Herbicide	Chemical (herbicide)	BLM and state	Cedar Mesa	958.02
2015	WRI Wildlife Beef Basin Aerial Seed	Seeding	BLM	Cedar Mesa	864.22
2016	1_RTRL San Juan River Bullhog	Mastication	BLM	San Juan Basin	9.79
2016	1_RTRL San Juan River Thin	Thinning	BLM	San Juan Basin	9.79
2016	1_RTRL San Juan River Pile	Hand pile	BLM	San Juan Basin	9.79
unknown	1_RTRL San Juan River Chemical	Chemical (herbicide)	BLM	San Juan Basin	9.79
2017	1_Dark Canyon 4 PJ Removal Bullhog	Mastication	BLM	Cedar Mesa	1,122.13
2018	1_RTRL San Juan River Lop Scatter	Lop and scatter	BLM	San Juan Basin	1.05
2018	1_Dark Canyon 3 PJ Removal Bullhog	Mastication	BLM and state	Cedar Mesa	660.68
2018	1_San Juan River 2.0 Herbicide	Chemical (herbicide)	BLM and Tribal	San Juan Basin	1.92
2019	San Juan River 2.0 Herbicide	Chemical (herbicide)	BLM and Tribal	San Juan Basin	5.29
2020	1_San Juan River Restoration 3.0 Herbicide	Chemical (herbicide)	BLM and Tribal	San Juan Basin	591.68
2019	San Juan River 2.0 Lop Scatter	Lop and scatter	BLM and Tribal	San Juan Basin	5.29
2018	2_Dark Canyon 5 PJ Removal Bullhog	Mastication	BLM and state	Cedar Mesa	912.98
2020	1_San Juan River Restoration 3.0 Thin	Lop and scatter	BLM and Tribal	San Juan Basin	4.24
2020	1_San Juan River Restoration 3.0 Bullhog	Chipping	BLM and Tribal	San Juan Basin	0.35
2021	2_Bluff River Trail Bullhog	Mastication	BLM and Tribal	San Juan Basin	2.70

Note: chemical = herbicide application to kill unwanted (usually invasive) plant species; chipping = mechanical conversion of wood to wood chips; hand pile burn = a prescribed fire used to ignite vegetation piles; lop and scatter = removing the upward extending branches from the tops of felled trees to keep slash low to the ground, to increase the decomposition rate, to lower the fire hazard, or as a pretreatment prior to burning; mastication = a mechanical fuels treatment that changes the structure and size of fuels where vegetation is chopped, ground, or chipped and the resulting material is left on the soil surface; NFPORS = National Fire Plan Operations and Reporting System; thinning = targeted removal of vegetation, usually to reduce fuel loading.

Table 6.9-8. BENM USDA Forest Service–Directed Fuels Treatments and Vegetation Management, 2013–2021

Year	Treatment Name	NFPORS Treatment Type	Land Manager	Fire Management Unit	Total
2013	Brushy Basin Mechanical	Chipping	USDA Forest Service and BLM	Abajo, Dark Canyon, and Montezuma	470.85

Year	Treatment Name	NFPORS Treatment Type	Land Manager	Fire Management Unit	Total
2014	Brushy Basin Mastication	Chipping	USDA Forest Service	Abajo and Dark Canyon	879.3
2014	Nizhoni Fire Restoration	Mechanical site preparation for planting	USDA Forest Service	Abajo	30.87
2014 and 2015	Brush Basin Hand	Machine pile and machine pile burn	USDA Forest Service	Abajo	28.6
2015	Johnson Creek	Machine pile and machine pile burn	USDA Forest Service	Abajo	167.84
2016	Johnson Creek	Chipping	USDA Forest Service	Abajo and Dark Canyon	208.72
2016	Mormon Pasture Mountain	Machine pile	USDA Forest Service	Dark Canyon	936.76
2016	Nizhoni Mix	Broadcast burn and chipping	USDA Forest Service	Dark Canyon	12.9
2017	Johnson Creek	Broadcast burn	USDA Forest Service	Abajo and Dark Canyon	132.49
2018	Johnson Creek	Broadcast burn	USDA Forest Service	Abajo	0.12
2018	Johnson Creek	Chipping	USDA Forest Service	Abajo and Dark Canyon	996.85
2018	Mormon Pasture Mountain	Machine pile	USDA Forest Service	Dark Canyon	722.34
2019	Johnson Creek	Broadcast burn	USDA Forest Service	Abajo and Dark Canyon	595.77
2021	Elk Ridge Recovery	Lop and scatter	USDA Forest Service	Dark Canyon	210.26

Note: chemical = herbicide application to kill unwanted (usually invasive) plant species; chipping = mechanical conversion of wood to wood chips; hand pile burn = a prescribed fire used to ignite vegetation piles; lop and scatter = removing the upward extending branches from the tops of felled trees to keep slash low to the ground, to increase the decomposition rate, to lower the fire hazard, or as a pretreatment prior to burning; mastication = a mechanical fuels treatment that changes the structure and size of fuels where vegetation is chopped, ground, or chipped and the resulting material is left on the soil surface; NFPORS = National Fire Plan Operations and Reporting System; thinning = targeted removal of vegetation, usually to reduce fuel loading.

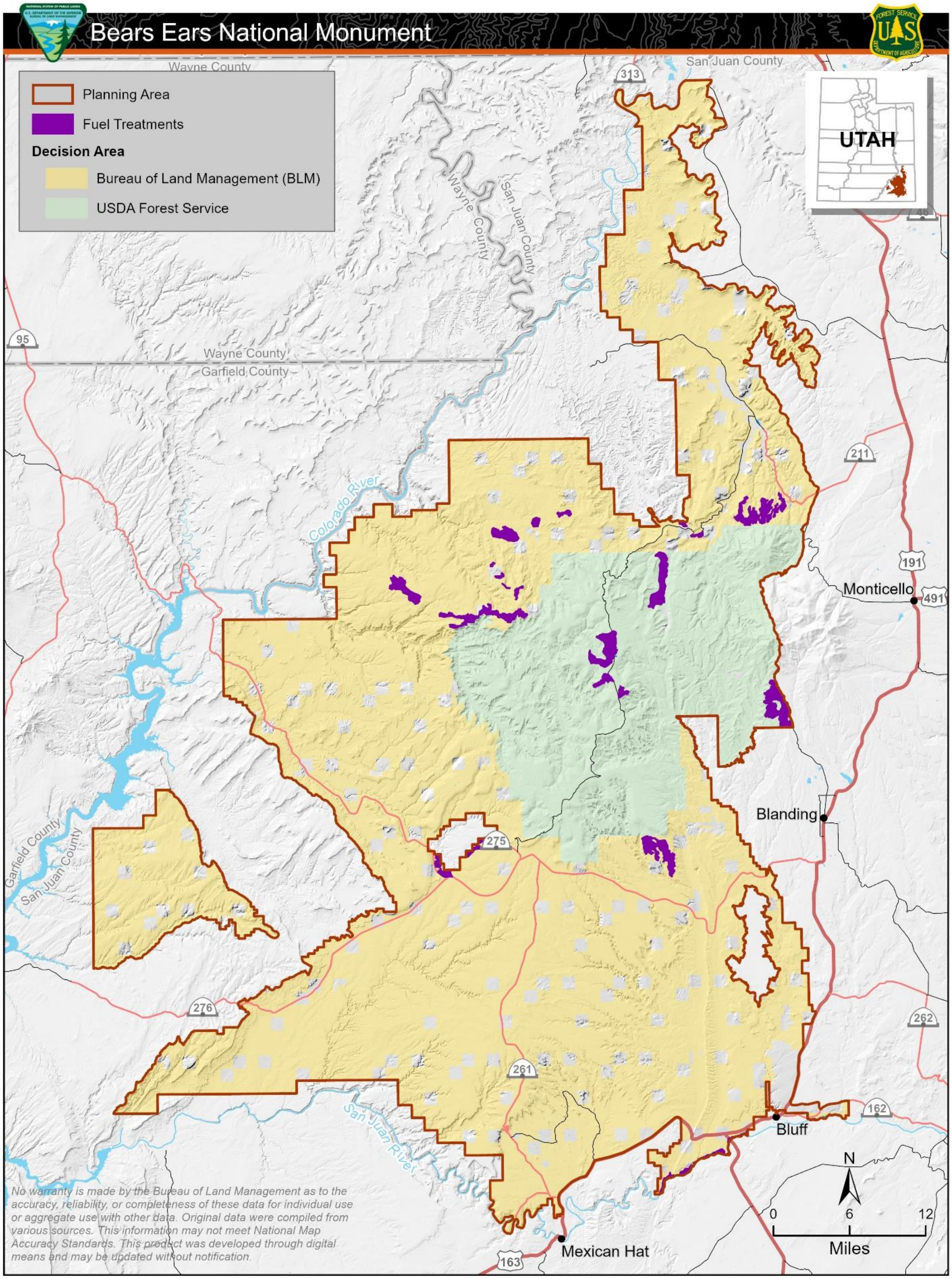

Figure 6.9-2. BENM Fuels Treatments, 2013–2021.

Land managers should consider integrating Indigenous vegetation and fuels treatments. Paleoecological and archaeological data has demonstrated that Indigenous fuelwood collection and vegetation clearing reduced wildfire extent and severity in southwestern ecosystems, which helped to create more patchy, healthy, and diverse landscapes (Carter et al. 2021; Roos et al. 2021). These vegetation management practices may be especially useful for protecting BENM's cultural resources and treating overgrown areas that are not suitable for prescribed fire.

PRESCRIBED FIRE

Prescribed fire is typically used by the BLM and USDA Forest Service to restore natural forest and rangeland conditions and enhance and/or maintain natural resource benefits. A typical prescribed fire burning season on BLM-administered lands consists of burning piles up to 300 acres in aggregate, for the pile-burning season. Additionally, in ponderosa pine–type communities, BLM management activity can also include mechanical thinning followed by prescribed burning to remove activity-created ground fuels. On NFS lands in ponderosa pine–type communities, a low intensity broadcast prescription burn is typically done. Most burns thus far have been conducted in VCC III areas, with the goal of moving them closer to either VCC I, VCC II, or a combination of the two. Prescribed fire projects, as well as wildfire managed for resource objectives in the Planning Area, are closely tied to habitat, watershed, and other natural resource objectives and hazardous fuels reduction. At times, these projects are followed by seeding and planting and additional vegetation enhancement work; seeding and planting, however, typically follows natural- and human-caused wildfires. Between 2013 and 2021, multiple prescribed fire projects were carried out on NFS lands in the current BENM Planning Area (see Table 6.9-8).

Land managers should consider the historical role of Indigenous prescribed fire for future treatments. Indigenous peoples of the Southwest were known to utilize low intensity burns in forests and rangelands. These low intensity burns helped to create diverse and ecologically healthy forests and rangelands (USDA Forest Service 2021). For instance, they helped to create and maintain plant and wildlife habitat, aid in nutrient cycling, and bolster ecosystem health (Southwest Climate Adaptation Science Center 2020). A significant departure from these conditions throughout the Southwest occurred in the twentieth century (USDA Forest Service 2021). The use and integration of the concepts and practices of Indigenous fire traditions could help BENM meet its fire, forestry, and vegetation management objectives.

NON-COMMERCIAL FIREWOOD/FUELWOOD COLLECTION

Personal non-commercial firewood collection, especially from members of local Tribal Nations, occurs throughout the Monument, typically in forested and woodland (pinyon-juniper) regions. Areas where firewood is collected should be focused on regions with pinyon-juniper encroachment or with unhealthy/dead stands of pinyon (due to Ips beetles). Other regions should focus on overgrown forests which are outside of their historic FRG (i.e., large departure from VCC I). If properly managed and coordinated, firewood collection can help mangers meet vegetation, forestry, and fire management goals. Fuelwood collection can reduce hazardous fuels, restore natural fire regimes, and maintain healthy VCCs. Fuel and firewood collections can also be complimentary to mechanical fuels reduction treatments by helping to remove slash and other down woody material.

Historical fire and fuelwood collection by Indigenous peoples in the Southwest was known to reduce wildfire severity and extent and yield more healthy and resilient ecosystems (Roos et al. 2021). Land managers should work with local Tribal Nations and integrate Indigenous fire and fuelwood collection practices into their management strategies.

EMERGENCY STABILIZATION AND REHABILITATION

Currently no Emergency Stabilization and Rehabilitation (ESR) or Burned Area Emergency Response (BAER) work has been done in BENM in the past 10 years. Short-term objectives of ESR actions are to determine the need for and to prescribe and implement emergency treatments to minimize threats to life or property and to stabilize/prevent unacceptable degradation to natural and cultural resources resulting from the effects of fire. ESR guidelines include the following:

- ESR teams will be formed and a Stabilization Plan will be submitted no later than 7 calendar days after containment of a fire.
- Emergency stabilization actions will be taken within 1 year of containment of the fire.
- Rehabilitation actions must be taken within 3 years of a wildland fire to repair or improve fire-damaged lands unlikely to recover naturally to a management-approved condition.
- ESR actions are aimed primarily at stabilizing burned areas to prevent, to the extent possible, damage to soils via excessive erosion and the resulting long-term loss of significant resource values. Treatments include, but are not limited to, construction of protective fences, construction of water erosion abatement structures, aerial seeding, chaining to cover seed, and drill seeding a mixture of grass and forb species to re-establish ground cover to hold soil in place.
- Over the short term, nonnative species may be seeded in conjunction with native plant materials to promote soil stability and reduce the encroachment of cheatgrass and/or other invasive weed species.
- Livestock will not be permitted to graze until the vegetation has recovered or has been established (usually a minimum of two growing seasons).
- Plan accomplishments are performance and fiscally evaluated, tracked, and reported in the National Fire Operations and Reporting System for ESR tracking and project implementation.
- Once ESR treatments are completed and monitored over a 3-year period, the project is turned back to the respective FO for any further restoration.

COMMON INTERAGENCY MANAGEMENT RESPONSE

The Moab Interagency Fire Center (MIFC) covers federal, state, and private lands in BENM. Fire personnel handle fire management responsibilities such as preparedness, suppression, and extended attack, with dispatching occurring from MIFC in Moab, Utah. Response to wildfires will be coordinated with all affected agencies/cooperators regardless of the jurisdiction at the point of ignition.

BLM FIRE MANAGEMENT PLAN

The BLM Canyon Country FMP (BLM 2021), which the BLM updates periodically (last updated in 2021), describes fire and fuels management activities in the Moab and Monticello FOs (which cover BENM). The FMP provides for firefighter and public safety and includes fire management strategies, tactics, and alternatives based on direction outlined in the Moab and Monticello RMPs. The FMP identifies values to protect and public health issues, describes fuels and restoration projects, and is consistent with resource management objectives.

Wildfires can be concurrently managed for one or more objectives, as specified in the RMPs and FMP. Objectives can change as a fire spreads across the landscape and are affected by changes in fuels, weather, and/or topography; varying social understanding and tolerance; and involvement of other governmental jurisdictions having different missions and objectives.

Management response to a wildfire on federal land is based on objectives established in the RMPs and FMP. A wildfire may be concurrently managed for more than one objective. Unplanned natural ignitions may be managed to achieve RMP and FMP objectives when risk is within acceptable limits.

Response to wildfires is based on the ecological, social, and legal consequences of the fire. The appropriate management response to the fire is dictated by the following:

- The circumstance under which a fire occurs
- The likely consequences to firefighter/public safety and welfare
- The natural/cultural resource values to be protected

Within the Planning Area, special concern should be given to cultural sites. According to the Canyon Country FMP, generally, protection of cultural measures are site-specific and include avoidance of archaeological remains. Reintroduction of low intensity prescribed fire is often recommended for fire-adapted archaeological sites. A qualified Fire Archaeologist is always present whenever bulldozers are employed during suppression events to assure that no National Register–eligible sites are harmed. Cultural resource specialists provide extensive guidance/recommendations as post-fire-rehabilitation efforts are planned and implemented. Compliance with Section 106 of the NHPA and consultation with SHPO and interested Tribal Nation groups, will be completed on a project-specific basis before decisions are made to carry out fire management activities that could affect cultural resources. Individual fire management activities (e.g., fuels management/reduction, wildfire suppression, and post-wildfire emergency stabilization) carried out under the FMP will be preceded by a complete review of known resources and complimentary field surveys, as appropriate, to identify cultural resources that might be affected by any proposed activities.

Fire Management Units (FMUs) are specific land management areas 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 Canyon Country FMP 2021 update. An interdisciplinary team developed 15 FMUs that serve to define management objectives, physical characteristics, resource values, and treatment actions necessary to achieve resource management objectives across the Moab and Monticello FOs, as identified in the current Canyon Country FMP. FMUs have dominant management objectives and preselected fire suppression strategies assigned to accomplish these objectives. Seven of these FMUs cover BLM-administered lands within BENM and are listed in Table 6.9-9.

USDA FOREST SERVICE

Proactive management of wildfires and/or management-ignited fire (prescribed fire) under chosen conditions provides an opportunity to restore fire-adapted ecosystems, decrease fuels, and decrease the risk of future adverse fire outcomes to achieve the desired conditions of an LMP. Decisions and analysis that occur as part of the LMP process provide a foundation for all aspects of fire management: fire planning, strategic fuels planning and implementation, preparedness planning, prevention, mitigation, response, and post-fire rehabilitation. Additionally, direction from the LMP may inform meaningful fuels management objectives in site-specific NEPA analysis. The Manti-La Sal National Forest is currently in the process of updating its LMP (last updated in 1986). This revised draft plan (USDA Forest Service 2020) describes the current and desired fire and fuel conditions appropriate management strategies, objectives, and guidelines for achieving the desired fire and fuel conditions. Specific to cultural resources, the LMP states that the Manti-La Sal National Forest will "develop and maintain a database with maps for fire sensitive cultural resources and make it available for the fire management and fuels reduction planning and for resource protection during fire management activities within three years of plan decision." Additionally, the LMP states that wildfire protection activities and fuels management project designs will consider techniques and outcomes that benefit cultural resources preservation and improve resiliency to fire management activities.

The USDA Forest Service no longer uses FMPs. These have been replaced with Spatial Fire Planning (SFP) contained in the Wildland Fire Decision Support System (WFDSS) and the Fire Management Reference System (FMRS), a collection of both optional and required documents and data for fire program management. These systems were adopted to streamline implementation of the federal fire policy in maintaining and improving the conditions of fire-adapted landscapes in accordance with an LMP's desired conditions and replaces Forest Service Handbook (FSH) 5109.19. Fire management planning will be a continued effort to ensure that guidance represented spatially in WFDSS and the FMRS are consistent with LMP direction, reflecting available fire response options to move from current to desired conditions.

Decisions made in the LMP, developed with public and cooperator input, provide the foundation for SFP in WFDSS, fire response decisions, and meaningful incident objectives. To achieve the desired wildfire management conditions, LMPs should describe the Desired Wildland Fire and Fuel conditions for the Planning Area. These should include how and where wildfire is desired and the standards and guidelines that lead to appropriate management requirements for incident management. Fire management should prioritize fuels treatments, document strategic and incident objectives in WFDSS, and provide the basis for sound risk management for responders. To inform fire management strategy and priorities, LMPs should describe the specific values and resources to be protected from wildfire versus those that benefit from wildfire, and compare their relative importance.

Options for wildfire response are included in WFDSS as Strategic Objectives and Management Requirement shapes that are determined from the LMPs. Strategic Objectives and Management Requirements, as well as current conditions (e.g., location, weather, fuels, and time of year) provide the foundation for wildfire response decisions, incident objectives, and strategies and tactics throughout the life of the incident.

Key Features

Key features include WUI areas and special management areas in the FMUs. Special management areas include ACECs, WSAs, WSRs, and communications sites (see Table 6.9-9).

Table 6.9-9. Special Management Areas in the Planning Area

FMU Name	Managing Agency	Acres in BENM	WSAs	WSRs	ACECs
Abajo	USDA Forest Service	11,754.18	–	–	–
Canyonlands	NPS	136.87	Butler Wash (4.32 acres), Indian Creek (19.32 acres)	–	Indian Creek (1.10 acres)
Cedar Mesa	BLM	504,486.43	Bridger Jack Mesa (5,010.23 acres), Butler Wash (21,995.73 acres), Cheese Box Canyon (1,312.87 acres), Fish Creek Canyon (35,602.39 acres), Mule Canyon (6,170.94 acres), Road Canyon (23,667.68 acres), South Needles (15.18 acres)	Dark Canyon (suitable wild, 1,887.42 acres)	Shay canyon (77.85 acres)
Colorado River Corridor	BLM	910.96	–	Colorado River (suitable scenic, 789.00 acres)	–

FMU Name	Managing Agency	Acres in BENM	WSAs	WSRs	ACECs
Dark Canyon	USDA Forest Service	278,007.50	Mule Canyon (0.07 acre)	–	–
Dry Valley	BLM	70,400.54	Bridger Jack Mesa (106.89 acres)	–	Lavender Mesa (649.13 acres), Shay Canyon (41.53 acres)
La Sal	BLM	2,070.51	–	–	–
Lockhart Basin	BLM	84304.2	Indian Creek (6,534.84 acres)	Colorado River (suitable scenic, 740.79 acres)	Indian Creek (3,934.49 acres)
Montezuma	BLM	53,174.36	–	–	–
Natural Bridges National Monument	NPS	11.25	–	–	–
San Juan Basin	BLM	482,105.02	Cheese Box Canyon (13,518.54 acres), Fish Creek Canyon (10,499.94 acres), Mancos Mesa (50,843.52), Road Canyon (28.736.71 acres)	San Juan River (suitable wild, 1,178.74 acres)	San Juan River (1,266.25 acres), Valley of the Gods (22,769.54 acres)
White Mesa	BIA	2,727.96	–	–	–
	Total (acres)	**1,490,089.78**	**204,179.18**	**4,595.95**	**28,739.89**

Note: – = No acreage of special management area designation within the FMU.

6.9.2 Trends

Fire and Fuels

Frequent drought, fire suppression-based forest management tactics, and climate change have worked together to increase forest and rangeland vulnerability. By removing natural fire from fire-dependent ecosystems, drought, insects, and diseases have resulted in increased fuel buildup and alterations to vegetation composition (Goodwin et al. 2021). These forest changes can increase the risk of uncharacteristically large high-severity fires (Goodwin et al. 2021; Schoennagel 2017). In the past few years, fires have grown to record sizes and are burning earlier, longer, hotter, and more intensely than they have in the past (Westerling 2016; Westerling et al. 2006).

The shifting climate, particularly rising temperatures, frequent drought, and the extension of the fire season, are escalating wildfire risk across the Southwest. The length of the fire season in the southwestern United States has increased significantly since 1979, and since the 1970s, the frequency of large fires has increased dramatically. Specifically, the occurrence of large fires has increased by 462% in southwestern U.S. forests (Schoennagel 2017). When accounting for climate change, this pattern is expected to amplify in the future and promote wildfire potential across western U.S. forests (Abatzoglou and Williams 2016).

The primary vegetation trends in the region are in sagebrush shrubland, where grazing and fire exclusion have resulted in pinyon and juniper (as well as other conifer species) encroachment. This trend will increase fuel loads and, consequently, fire behavior. Sagebrush is also transitioning to older age classes, which means increased fuel loads and therefore higher severity fires. In addition, nonnative species are spreading, which can increase fire risk, especially in areas with heavy cheatgrass prevalence. This occurs mainly in sagebrush, grass, and pinyon-juniper vegetation communities. Changing climate conditions may also impact the spread of nonnative species (BLM 2018).

6.9.3 Forecasts

Fire and Fuels

It is expected that, due to the current fire regime conditions in BENM and factors outside the control of the fire program (e.g., invasive weed control, vegetation management issues, cultural resource protection, drought, and grazing), VCC 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 increased fire behavior will continue in lower elevation sagebrush communities. It is also anticipated that 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 fuels reductions, ESR, and BAER, could slow the decline of resources.

Currently, there is only one planned future vegetation and fuels treatment in BENM. The BLM is planning on conducting the Shay Mesa Retreatment, which will be a lop and scatter treatment of pinyon and juniper woodlands in the Shay Mesa region of the Cedar Mesa FMU. Treatment should occur in the 2023 fiscal year and treat approximately 1,800 acres.

In 2021, the Bipartisan Infrastructure Law (BIL) was passed. The law provides $1,055,000,000 for the DOI and $2,309,200,000 for the USDA Forest Service for fiscal years 2022 to 2026. Priorities for BIL funds will emphasize working collaboratively across boundaries. BIL funds should focus on all actions necessary to conduct effective, efficient wildfire risk reduction, including pre-treatment assessment, implementation, and post-treatment effectiveness evaluation. Community assistance work funded with BIL should ensure there is a federal land nexus. BIL directs funding to the following fuels management categories of action:

- General fuels management work
- Conducting mechanical vegetation thinning, timber harvest, and precommercial thinning
- Planning and conducting prescribed fires and related activities, such as planning, implementing, and monitoring prescribed fire projects
- Developing or improving potential control locations, including fuel breaks
- Working collaboratively across boundaries using agreements, contracts, youth/Tribal, and force account seasonal laborers or work months for permanent full-time staff that will directly support BIL work

6.10 WILDLIFE AND FISHERIES

The Planning Area supports complex and rare 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.

Wildlife is inextricably tied to all aspects of traditional Native beliefs and practices, and many wildlife species are used for food and in ritual activities. Birds, mammals, reptiles, insects, and other animals are tied to Native spiritual, cultural, and economic welfare, and many species, especially bird and raptor species, are valued as brothers, sisters, and kin to Native people. Traditional wildlife harvesting and ritual activities are used in daily culture, ceremonies, and religious practices (BEC 2022). The BLM and USDA Forest Service work closely with UDWR to manage habitat for fish and wildlife (including big game, upland game, waterfowl, migratory birds, small mammals, amphibians, and reptiles) to achieve and maintain suitable habitat for desired population levels and distribution within the Planning Area. UDWR is responsible for managing wildlife population levels, while the BLM and USDA Forest Service are responsible for managing wildlife and fisheries habitat in a condition that will support desired levels of species. The BLM and USDA Forest Service work cooperatively with UDWR through habitat management and restoration to maintain and re-establish populations of species that have used the historic range located within the Planning Area.

6.10.1 Current Conditions

Fish

The Planning Area contains several Upper Colorado River Basin hydrologic systems, including the San Juan River, Arch Canyon and Comb Wash, and Indian Creek that support fish populations.

The San Juan River is a major tributary to the Colorado River and borders the southern edge of the Planning Area. In these reaches, the San Juan is a warm-water system with shallow, silty water well suited for several native fish species. High spring runoff events carry heavy sediment loads through this portion of the river and seasonal flood events create off-channel spawning habitat for several native fish (USFWS 2022a). Fish species found in the San Juan River system include Colorado pikeminnow (*Ptychocheilus lucius*), razorback sucker (*Xyrauchen texanus*), flannelmouth sucker (*Catostomus latipinnis*), bluehead sucker (*Catostomus discobolus*), channel catfish (*Ictalurus punctatus*), roundtail chub (*Gila robusta*), speckled dace (*Rhinichthys osculus*), plains killifish (*Fundulus zebrinus*), fathead minnow (*Pimephales promelas*), red shiner (*Cyprinella lutrensis*), sand shiner (*Notropis stramineus*), smallmouth bass (*Micropterus dolomieu*), common carp (*Cyprinus carpio*), brown trout (*Salmo trutta*), rainbow trout (*Oncorhynchus mykiss*), white sucker (*Catostomus commersonii*), various sucker hybrids, green sunfish (*Lepomis cyanellus*), and black bullhead (*Ameiurus melas*). Other nonnative species such as largemouth bass (*Micropterus salmoides*), striped bass (*Morone saxatilis*), and walleye (*Sander vitreus*) occur rarely in the upper reaches of the San Juan River, as they are present in Lake Powell and occasionally migrate into the lower San Juan River during high flow events (Ryden 2003)

Arch Canyon and Comb Wash is a larger tributary of the San Juan River that flows south out of the Planning Area. This stream is characterized as a warm-water system with shallow, silty water and exhibits some similar high flow events to the larger San Juan system. Seasonal flooding events may contribute to off-channel spawning habitat for several native fish, especially near the confluence with the San Juan River. Fish species found in this system include flannelmouth sucker, bluehead sucker, speckled dace, mountain sucker (*Catostomus platyrhynchus*), fathead minnow, red shiner, and plains killifish.

Indian Creek drains the north side of the Abajo Mountains; flows may or may not reach the drainage's confluence with the Colorado River, depending on seasonal water fluctuations and high flow events caused by warm season precipitation. Aquatic habitats in this stream system range from small cold-water systems in high elevation wet meadows to ephemeral and intermittent streams bounded by sandstone canyons that are heavily affected by flash flood events and corresponding heavy sediment loads (Driscoll et al. 2019). The only fish species known from this system are cutthroat trout (*Oncorhynchus clarkii*): however, other fish species are likely present Table 6.10-1. includes fish species previously inventoried by UDWR in river systems within the Planning Area.

Table 6.10-1. Utah Division of Wildlife Resources Inventory of Fisheries within the Planning Area

River	Species
San Juan River	Colorado pikeminnow, razorback sucker, flannelmouth sucker, bluehead sucker, channel catfish, roundtail chub, speckled dace, plains killifish, fathead minnow, red shiner, sand shiner, smallmouth bass, largemouth bass, common carp, brown trout, rainbow trout, white sucker, various sucker hybrids, green sunfish, black bullhead
Arch Canyon and Comb Wash	Flannelmouth sucker, bluehead sucker, speckled dace, mountain sucker, fathead minnow, red shiner, plains killifish
Indian Creek	Cutthroat trout

Source: BLM 2005

Aquatic habitats in the Planning Area also support a diverse assemblage of aquatic invertebrate species, and these species can be used to gauge health and availability of aquatic habitat (USDA Forest Service 1986). These organisms provide critical food sources for fish, birds, and mammals. 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

While wildlife habitat needs vary significantly by species, it is generally understood that healthy and sustainable wildlife populations can be supported where there is a diverse mix of vegetation communities that supply structure, forage, cover, and other specific habitat requirements. The Planning Area supports a variety of ecoregions, vegetation communities, and perennial water sources that provide habitat for a high diversity of small mammals, bats, birds, reptiles, amphibians, and invertebrates (insects) (BLM 2005). Four Level IV ecoregions overlap with the Planning Area: Semiarid Benchlands and Canyonlands, Arid Canyonlands, Dry Forests and Shrublands, and Subalpine Forests (EPA 2011) (Figure 6.10-1). Semiarid Benchlands and Canyonlands and Arid Canyonlands are characterized by areas of both high and low topographic relief. Wind and water forces erode terrain features such as mesas, benches, cliffs, arches, and canyons. The Subalpine Forests and Dry Forests and Shrublands ecoregions overlap with the Abajo Mountains. The Subalpine Forests ecoregion is characterized by heavily forested, mountainous terrain, while the Dry Forests and Shrublands ecoregion includes lower elevation forested slopes (EPA 2011). Major vegetation communities that comprise wildlife habitat in the Planning Area include sagebrush and blackbrush shrub, arid grassland, mixed-desert shrub, pinyon-juniper woodlands, montane forest, and riparian (see Section 6.1 for a detailed description of vegetation communities in the Planning Area). The current conditions in this section are generalized and reflect inventories, cataloged observations, and research conducted in BENM.

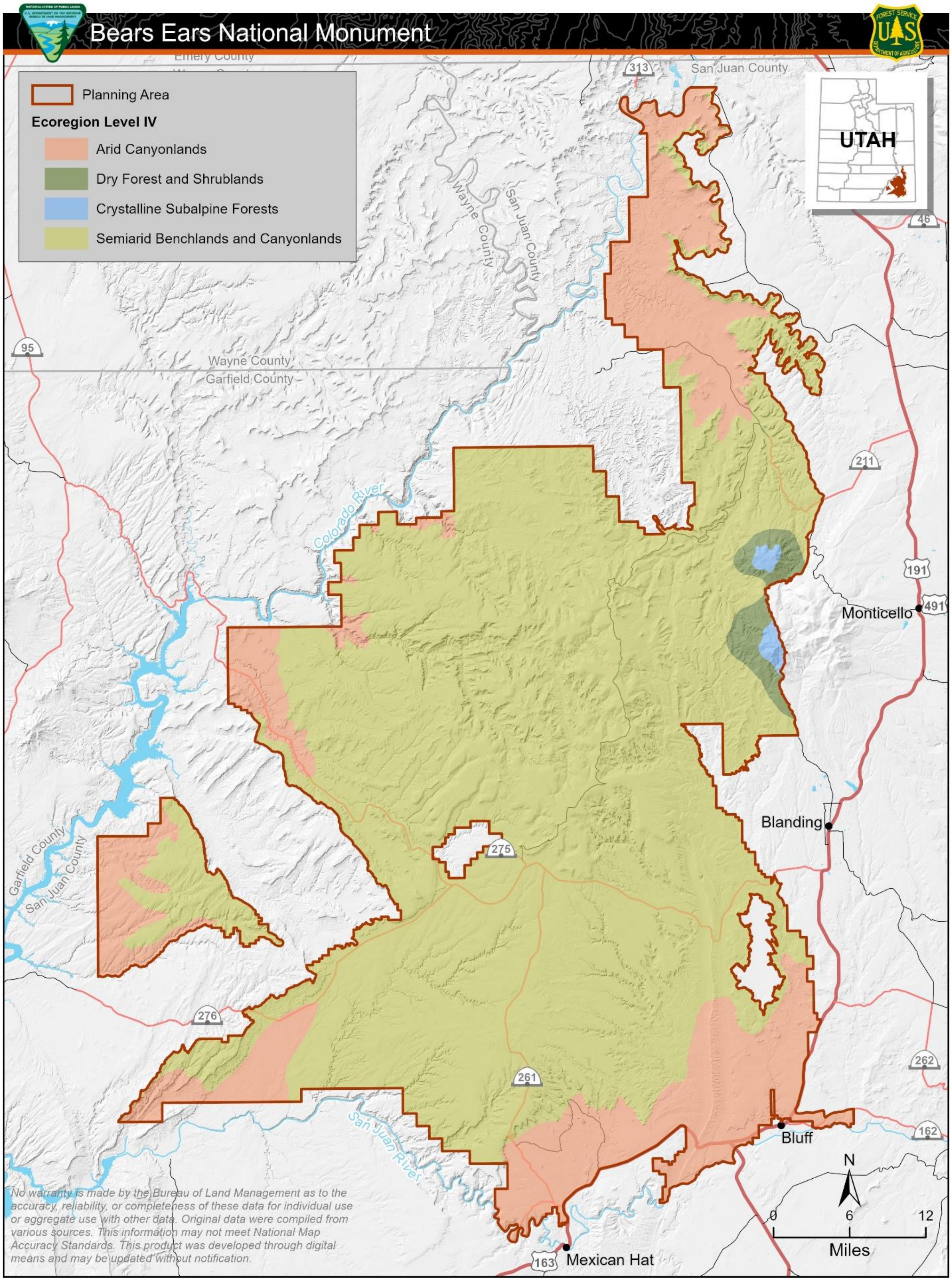

Figure 6.10-1. Ecoregions in the Planning Area.

Several species of bats occupy the Planning Area, including the big free-tailed bat (*Nyctinomops macrotis*), pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendi*i), spotted bat (*Euderma maculatum*), and silver-haired bat (*Lasionycteris noctivagans*) (UDWR 2019a, 2020a). Bats use a variety of habitats for roosting and foraging, including mountainous areas, intermontane basins, lowland desert scrub, arid grasslands, coniferous forests, and woodland habitats often near rocky outcrops or water sources (UDWR 2020a, 2020b). Individuals mainly roost in cliff walls and canyons and are also known to roost in buildings, caves, and tree cavities (UDWR 2020a). There are over 170 bird species that occur on the Colorado Plateau in Utah, including raptors, migratory birds, and waterfowl species (Parrish et al 2002). Avian species utilize the wide range of habitats found throughout the Planning Area, including alcoves of canyons, grasslands, shrublands, pinyon-juniper woodlands, montane forest communities, and riparian communities. Species of lizards and snakes may be found throughout the Planning Area (UDWR 2019a). Reptile species that have potential to occur within the Planning Area include, but are not limited to, the gopher snake (*Pituophis catenifer*), night snake (*Hypsiglena torquata*), striped whipsnake (*Masticophis taeniatus*), western rattlesnake (*Crotalus oreganus*), Utah night lizard (*Xantusia vigilis*), eastern fence lizard (*Sceloporus undulatus*), ornate tree lizard (*Urosaurus ornatus*), sagebrush lizard (*Sceloporus graciosus*), side-blotched lizard (*Uta stansburiana*), plateau striped whiptail (*Aspidoscelis velox*), midget faded rattlesnake (*Crotalus concolor*), and many-lined skink (*Plestiodon multivirgatus*) (UDWR 2019a). Grasslands and mixed-desert shrub communities provide habitat for reptiles, birds, and small mammals; hunting opportunities for raptor species; and forage for livestock and ungulates, particularly pronghorn. Dominant plant species associated with grassland communities in the Planning Area include galleta (*Pleuraphis jamesii*), blue gramma (*Bouteloua gracilis*), and western wheatgrass (*Pascopyrum smithii*) (Utah State Geographic Information Database [SGID] 2022). In the shrub communities, dominant plant species include shadscale (*Atriplex confertifolia*), sagebrush (*Artemisia* sp.), and blackbrush (*Coleogyne ramosissima*) (Utah SGID 2022). Raptor species such as American kestrel (*Falco sparverius*), ferruginous hawk (*Buteo regalis*), northern harrier (*Circus cyaneus*), and red-tailed hawk (*Buteo jamaicensis*) hunt in open, arid grasslands and nest in scattered trees and open woodland habitat (UDWR 2019a).

Avian species associated with mixed desert shrublands in the Planning Area may include sage thrasher (*Oreoscoptes montanus*), scaled quail (*Callipepla squamata*), sagebrush sparrow (*Artemisiospiza nevadensis*), Brewer's sparrow (*Spizella brewer*i), black-throated sparrow (*Amphispiza bilineata*), western kingbird (*Tyrannus verticalis*), loggerhead shrike (*Lanius ludovicianus*), horned lark (*Eremophila alpestris*), western meadowlark (*Sturnella neglecta*), Brewer's blackbird (*Euphagus cyanocephalus*), spotted towhee (*Pipilo maculatus*), and western bluebird (*Sialia mexicana*) (UDWR 2019a). Remnant shrub species and seed provide important food sources for upland game birds and songbirds over winter (Utah State University [USU] 2017).

Wildlife such as pronghorn, deer, elk, and black bear may forage in mixed desert shrublands and grasslands (USU 2017). Small mammals such as desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), prairie dog (*Cynomys* sp.), Botta's pocket gopher (*Thomomys bottae*), white-tailed antelope squirrel (*Ammospermophilus leucurus*), Colorado chipmunk (*Neotamias quadrivittatus*), canyon mouse (*Peromyscus crinitus*), North American deer mouse (*Peromyscus maniculatus*), pinyon mouse (*Peromyscus truei*), and desert woodrat (*Neotoma lepida*) can also be found in this habitat and provide a prey source for raptors (UDWR 2019a).

Pinyon-juniper woodland offers nesting and roosting opportunities for avian species as well as foraging opportunities and cover for other wildlife. The dominant woodland species in the Planning Area is Utah juniper (*Juniperus osteosperma*) (Utah SGID 2022). Several bird species, including black-chinned hummingbird (*Archilochus alexandri*), Cassin's kingbird (*Tyrannus vociferans*), gray flycatcher (*Empidonax wrightii*), gray vireo (*Vireo vicinior*), Bewick's wren (*Thryomanes bewickii*), juniper titmouse (*Baeolophus ridgwayi*), bushtit *(Psaltriparus minimus*), black-throated gray warbler (*Setophaga* *nigrescens*), pinyon jay (*Gymnorhinus cyanocephalus*), and black-throated sparrow breed almost exclusively in pinyon-juniper woodland. Other avian species associated with this habitat may include common poorwill (*Phalaenoptilus nuttallii*), ash-throated flycatcher (*Myiarchus cinerascens*), plumbeous vireo (*Vireo plumbeus*), blue-gray gnatcatcher (*Polioptila caerulea*), dusky flycatcher (*Empidonax oberholseri*), and Woodhouse's scrub-jay (*Aphelocoma woodhouseii*) (UDWR 2019a*)*. Pinyon-juniper habitat is often associated with rocky terrain where topographic features such as plateaus, mesas, cliffs, canyons, and large areas of exposed rock provide habitat for several wildlife species (NPS 2015). The cliff faces of rimrock formations provide nesting habitat for several upland game birds, canyon wren (*Catherpes mexicanus*), and raptor species such as peregrine falcon (*Falco peregrinus*) and golden eagle (*Aquila chrysaetos*). Rimrock habitat may also support mammals such as bighorn sheep and mountain lion (UDWR 2019a). Montane forest within the Planning Area includes ponderosa pine (*Pinus ponderosa*), quaking aspen (*Populus tremuloides*), and mixed conifer forests. The dominant forest species in the Planning Area is ponderosa pine (Utah SGID 2022). Avian species typically associated with ponderosa pine include flammulated owl (*Psiloscops flammeolus*), Clark's nutcracker (*Nucifraga columbiana*), common raven (*Corvus corax*), band-tailed pigeon (*Patagioenas fasciata*), northern saw-whet owl (*Aegolius acadicus*), Williamson's sapsucker (*Sphyrapicus thyroideus*), plumbeous vireo, western bluebird, and western tanager (*Piranga ludoviciana*) (UDWR 2019a). Many avian species, such as mountain chickadee (*Poecile gambeli*), rely on cavities in aspen trees for nesting opportunities (UDWR 2019a). Mixed conifer forests support species such as blue-gray gnatcatcher, dusky flycatcher, green-tailed towhee (*Pipilo chlorurus*), black-headed grosbeak (*Pheucticus melanocephalus*), and dusky grouse (*Dendragapus obscurus*). Raptor species such as bald eagle (*Haliaeetus leucocephalus*), northern goshawk (*Accipiter gentilis*), and great horned owl (*Bubo virginianus*), inhabit forested areas, often near permanent water sources (UDWR 2019a). Large mammals such as elk, deer, bear, and mountain lion may also inhabit these forests (UDWR 2019a).

Riparian habitat is interspersed throughout the Planning Area and is generally associated with perennial water sources in the Colorado and San Juan River Basins (BLM 2005). Greater plant and wildlife diversity is often observed in riparian areas due to the availability of water, higher densities of vegetation, and more structural habitat complexity (Hawkins 1994). Wildlife abundance is higher where vegetation is also abundant, and wildlife diversity is often correlated with structural diversity such as canopy structure and groundcover. Deer, elk, and carnivore species such as badger, coyote, striped skunk, ringtail, gray fox, and bobcat may be found throughout riparian habitat in the Planning Area (UDWR 2019a).

In arid climates, such as the southwestern United States, riparian habitat is associated with increased species richness of breeding birds and avian population sizes (Hawkins 1994). Riparian-associated bird species in the Planning Area may include downy woodpecker (*Dryobates pubescens*), eastern screech owl (*Megascops asio*), white-breasted nuthatch (*Sitta carolinensis*), black-capped chickadee (*Poecile atricapillus*), house wren (*Troglodytes aedon*), yellow warbler (*Setophaga petechia*), yellow-breasted chat (*Icteria virens*), black-headed grosbeak, song sparrow (*Melospiza melodia*), and Bullock's oriole (*Icterus bullockii*) (UDWR 2019a).

Amphibian and aquatic invertebrate species require water sources to support part of their life cycle. Areas within the Planning Area that may provide habitat for amphibious species include Arch Canyon, Grand Gulch, Indian Creek, and riparian habitat along the San Juan River. There is currently limited data to identify species diversity within the Planning Area; however, species known to occur in Arch Canyon include Woodhouse's toad (*Bufo woodhousii*), red-spotted toad (*Bufo punctatus*), and northern leopard frog *(Rana pipiens*). Canyon tree frog (*Hyla arenicolor*) is known to occupy Grand Gulch, and red-spotted toad and *Bufo* sp. tadpoles have been recorded in Indian Creek (BLM 2007). Other amphibious species that may exist within the Planning Area include Great Basin spadefoot (*Spea intermontana*) and tiger salamander (*Ambystoma tigrinum tiger*) (UDWR 2019a).

Game Species

The diverse landscape of the Planning Area supports habitat for several game species. Portions of the San Juan Wildlife Management Unit overlaps with the Planning Area, including the Abajo Mountains, Elk Ridge, Hatch Point, San Juan Lockhart, North San Juan, and South San Juan subunits. Game populations within these subunits are managed by UDWR. UDWR classifies big game habitats as “crucial.” “yearlong,” “spring,” “summer,” “fall,” and “winter.” Crucial habitats are designated areas that contain the necessary resources for a species survival and reproduction. Substantial habitat is an area that is used by a wildlife species but is not crucial for population survival. Year-long habitats are used by the species through all seasons. Big game species are reliant on crucial winter and summer habitats and availability of prey species; therefore, degradation and loss of crucial habitat areas has a significant impact on species populations. There are currently 2,262,201 acres of crucial, substantial, and year-long habitats for big game species within the Planning Area, described in more detail for each game species in the sections below. Game species have been harvested by Native people for millennia, for both sustenance and ceremonial purposes (BEC 2022). Big game species known to occur within the Planning Area include mule deer (*Odocoileus hemionus*), Rocky Mountain elk (*Cervus elaphus nelsoni*), pronghorn (*Antilocapra americana*), and desert bighorn sheep (*Ovis canadensis nelsoni*). Other large game species include black bear (*Ursus americanus*) and mountain lion (*Felis concolor*).

UPLAND GAME SPECIES

Upland game species occupy a range of diverse habitats within the Planning Area, including forested communities, shrub-steppe rangelands, and rocky outcroppings (UDWR 2022). Annual fluctuations in population size are attributed to fluctuations in annual weather patterns, particularly during nesting, rearing seasons, and winter conditions (UDWR 2022). Unlike big game species, most upland game species do not concentrate in winter range areas where populations can easily be monitored and therefore limited data about current populations are available. Upland game populations are currently managed through post-season harvest surveys and opportunistic sightings (UDWR 2022). Upland game species managed within the Planning Area include populations of dusky grouse, chukar partridge (*Alectoris chukar*), Rio Grande and Merriam’s turkey (*Meleagris gallopavo*), Gambel’s quail (*Callipepla gambelii*), mourning dove (*Zenaida macroura*), band-tailed pigeon (*Patagioenas fasciata*), white-winged dove (*Zenaida asiatica*), back-tailed jackrabbit (*Lepus californicus*), and desert cottontail (*Sylvilagus audubonii*) (BLM 2007).

DESERT BIGHORN SHEEP

As of 2018, UDWR estimates the population of desert bighorn sheep in Utah to be 2,900 individuals. Utah currently has 13 individually managed populations of desert bighorn sheep, many of which are the result of translocation efforts. Translocation efforts are also ongoing south of the Planning Area on the Navajo Nation. The San Juan Lockhart, North San Juan, and South San Juan subunits overlap with the Planning Area and provide high-quality habitat for desert bighorn sheep. The landscape is characterized by steep talus slopes, numerous side canyons, and broad mesas that provide areas for foraging and safety and are used year-round by the species (UDWR 2019b). There are currently three UDWR herd units located in the San Juan Basin (BLM 2007). Population counts for the four populations in the Planning Area were 55 individuals in the San Juan, Lockhart Unit (2017), 34 individuals in the San Juan, North Unit (pre-culling efforts, 2017), 62 individuals in the San Juan, South Unit (2017), and 42 individuals in the San Juan, River Unit (2017) (UDWR 2018). There is also supporting evidence of the Lockhart herd utilizing the Redd Sheep Trail to occupy the Hatch Point area (BLM 2007). Approximately 423,886 acres of year-long bighorn sheep habitat is present within the Planning Area (Figure 6.10-2). Bighorn sheep are native to the Planning Area; however, UDWR has been augmenting the populations to promote genetic diversity and to expand the existing population for hunting and viewing opportunities. Habitat within the

Planning Area is in generally good condition, although increased OHV and road access is resulting in habitat fragmentation. Diminishing water sources and foraging opportunities are also causing stress to local populations (BLM 2007).

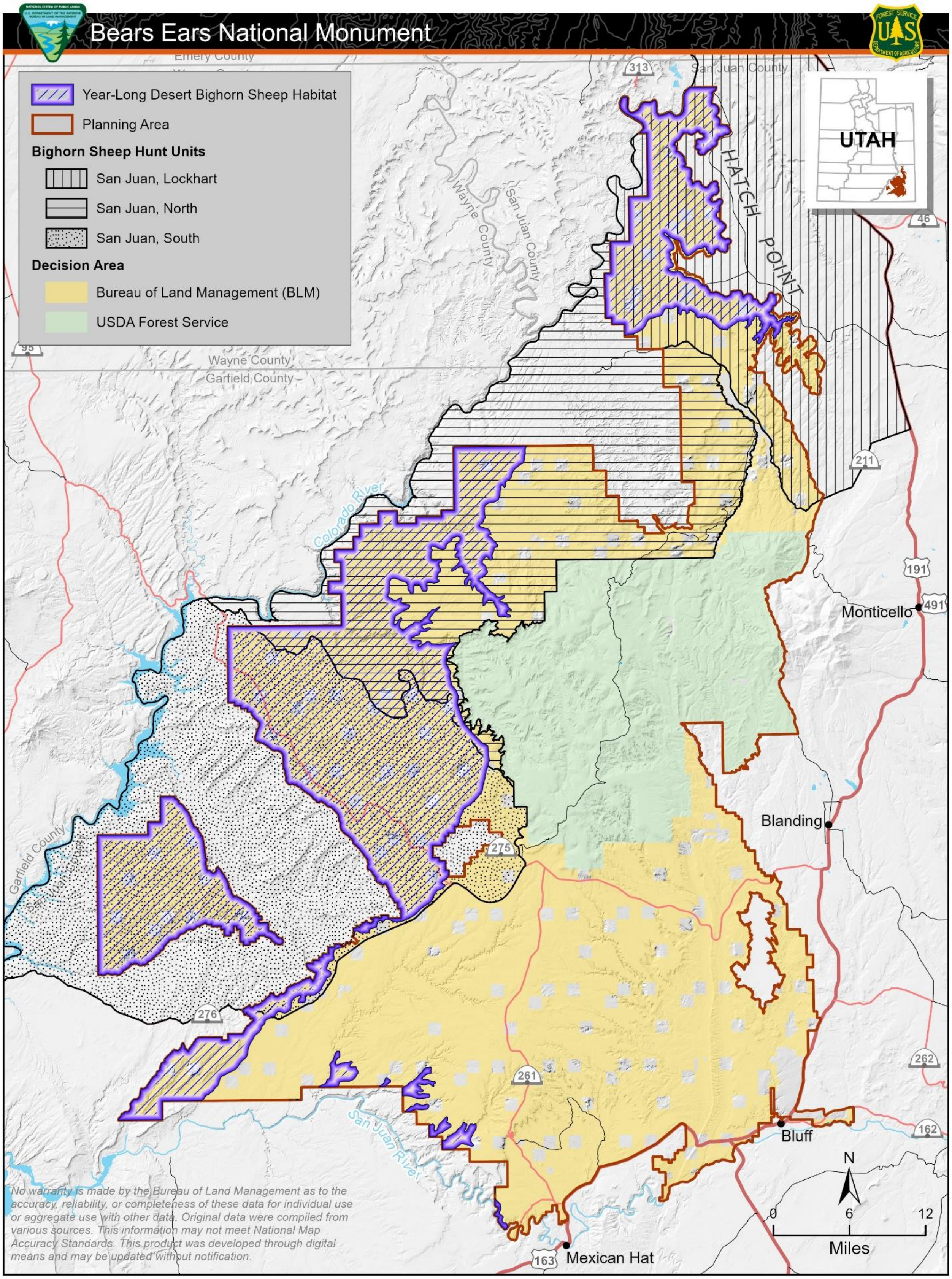

Figure 6.10-2. Bighorn sheep habitat in the Planning Area.

PRONGHORN

The Utah statewide population estimate for pronghorn is 15,695 individuals, and efforts are ongoing to reintroduce the species into historical habitats to augment existing populations (UDWR 2017). Pronghorn occupy large rolling plains or grassland areas that provide ample shrub and forb communities for foraging. Pronghorn fawning occurs throughout the range of this species. Lactating females rely on succulent forbs in the spring and early summer and require high-quality browse above snow level in winter (UDWR 2017). Pronghorn are typically found in the Dry Valley and Hatch Point areas adjacent to the Planning Area and rely on this habitat year-round. Approximately 6,616 acres of year-long crucial pronghorn habitat exists within the Planning Area (Figure 6.10-3). The San Juan population has been a beneficiary of such augmentation, receiving over 300 individuals between 1971 and 2014; the current population in this management unit was estimated at 240 individuals in 2017.

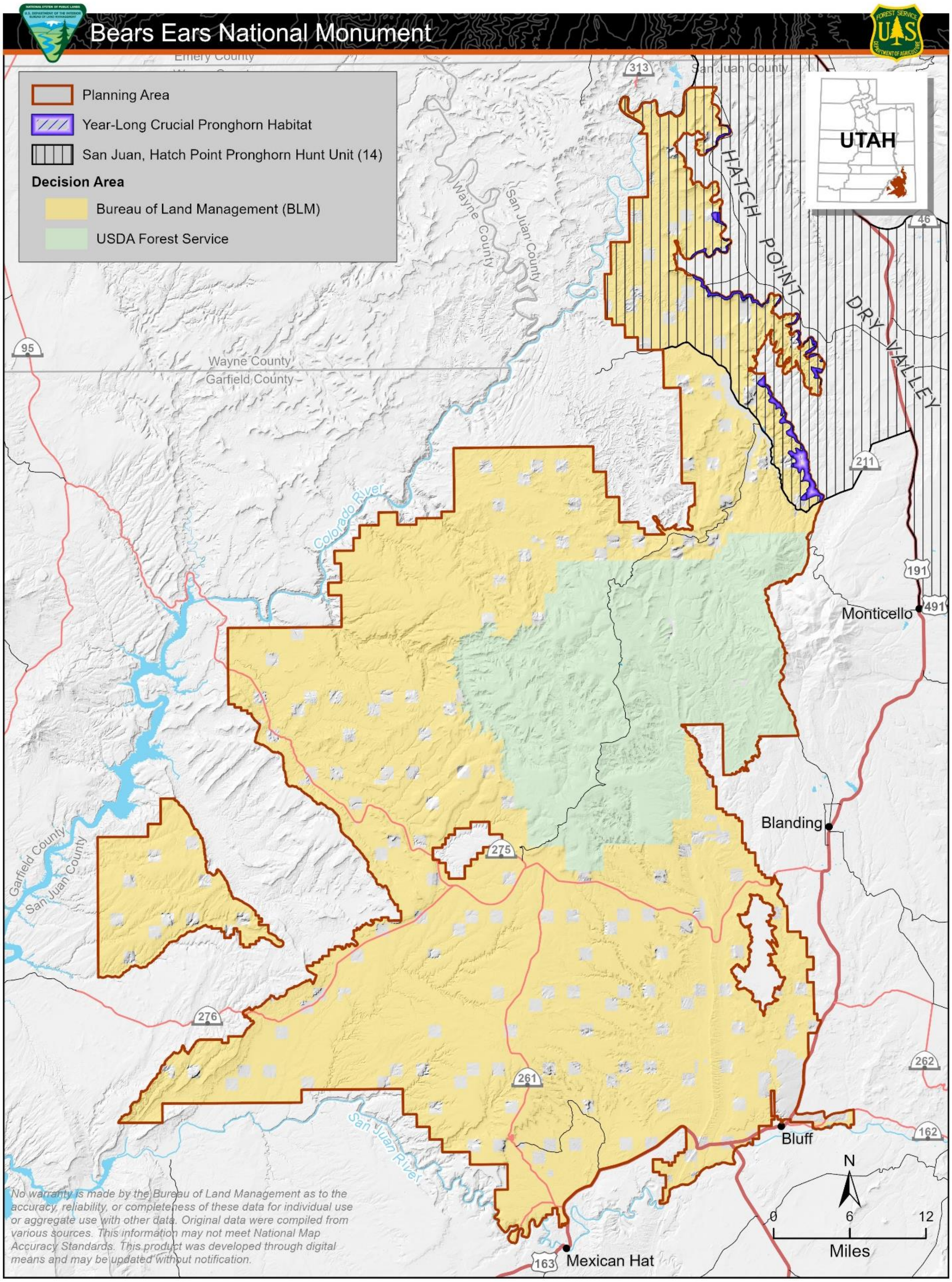

Figure 6.10-3. Pronghorn habitat in the Planning Area.

MULE DEER

The 2019 post-season statewide population estimate for mule deer in Utah was 372,500 individuals, 82% of the long-term management objective of 453,100 individuals. The mule deer population demonstrated good growth during the mid- to late 1990s, but then declined during the severe drought years from 2000 to 2003 when fawn production decreased. The harsh winters in northern Utah in 2007–2008 and in southern Utah in 2009–2010 negatively impacted adult and fawn survival, resulting in additional population declines. Weather conditions from 2011 to 2015 were very favorable for mule deer, resulting in an increase of nearly 100,000 deer. Overall, the deer population in Utah has grown at an average rate of 1.6% over the past 20 years (UDWR 2020c).

Mule deer occupy a large range of habitat for summer and winter survival within the Planning Area, including portions of the Abajo Mountain and Elk Ridge subunits (BLM 2007) (Table 6.10-2, Figure 6.10-4). Mule deer summer range within the Planning Area primarily consists of Gambel oak woodlands, aspen and mixed conifer forests, and montane meadows. Summer range is limited within the Planning Area and is also crucial fawning habitat for the San Juan population. In the winter, mule deer primarily rely on sagebrush shrublands and pinyon-juniper woodlands habitats. Insufficient quality or quantity of winter habitat may result in increased concentrations in these areas. Crucial wintering areas within the Planning Area include Beef Basin and Harts Draw near Indian Creek. Current herd populations in the Abajo Mountains are at 50% of the UDWR population objective and populations within the Elk Ridge herd are at 34% of the state objective (BLM 2007).

Table 6.10-2. Acres of Mule Deer Habitat within the Planning Area

Habitat	Acres
Spring/Fall Crucial	118,695
Summer Crucial	195,772
Winter Crucial	491,230
Winter Substantial	222,428
Total	**1,028,125**

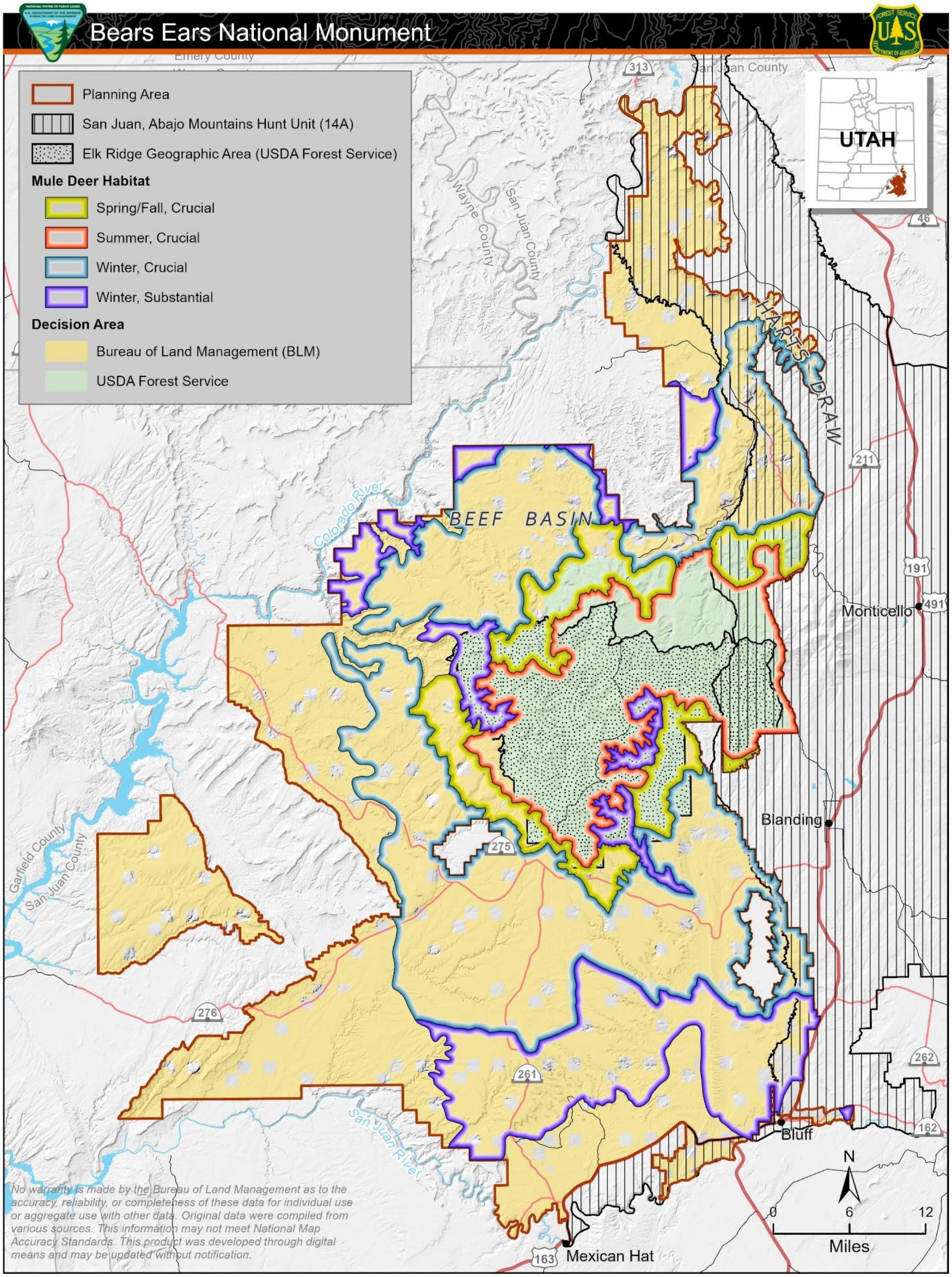

Figure 6.10-4. Mule deer habitat in the Planning Area.

ROCKY MOUNTAIN ELK

Elk are well established throughout Utah, with the current statewide population estimated at approximately 81,000 individuals. From 1975 to 1990, the elk population in Utah grew 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 2015).

Elk are habitat generalists with varied diets consisting of forbs, grasses, and shrubs (USDA Forest Service 2005). This allows them to survive in a variety of habitat types, including montane forest and low desert shrubland habitats. Elk within the Planning Area follow seasonal migration patterns, spending summers in high-elevation aspen and conifer forest while moving to mid- or low-elevation shrub and sagebrush communities during the winter (Table 6.10-3, Figure 6.10-5). The San Juan Herd Unit overlaps with the Planning Area and currently, the state population objectives are met for the species (UDWR 2016).

Table 6.10-3. Acres of Elk Habitat within the Planning Area

Habitat	Acres
Spring/Fall Crucial	26,404
Summer Crucial	100,927
Winter Crucial	269,978
Winter Substantial	128,837
Total	**526,146**

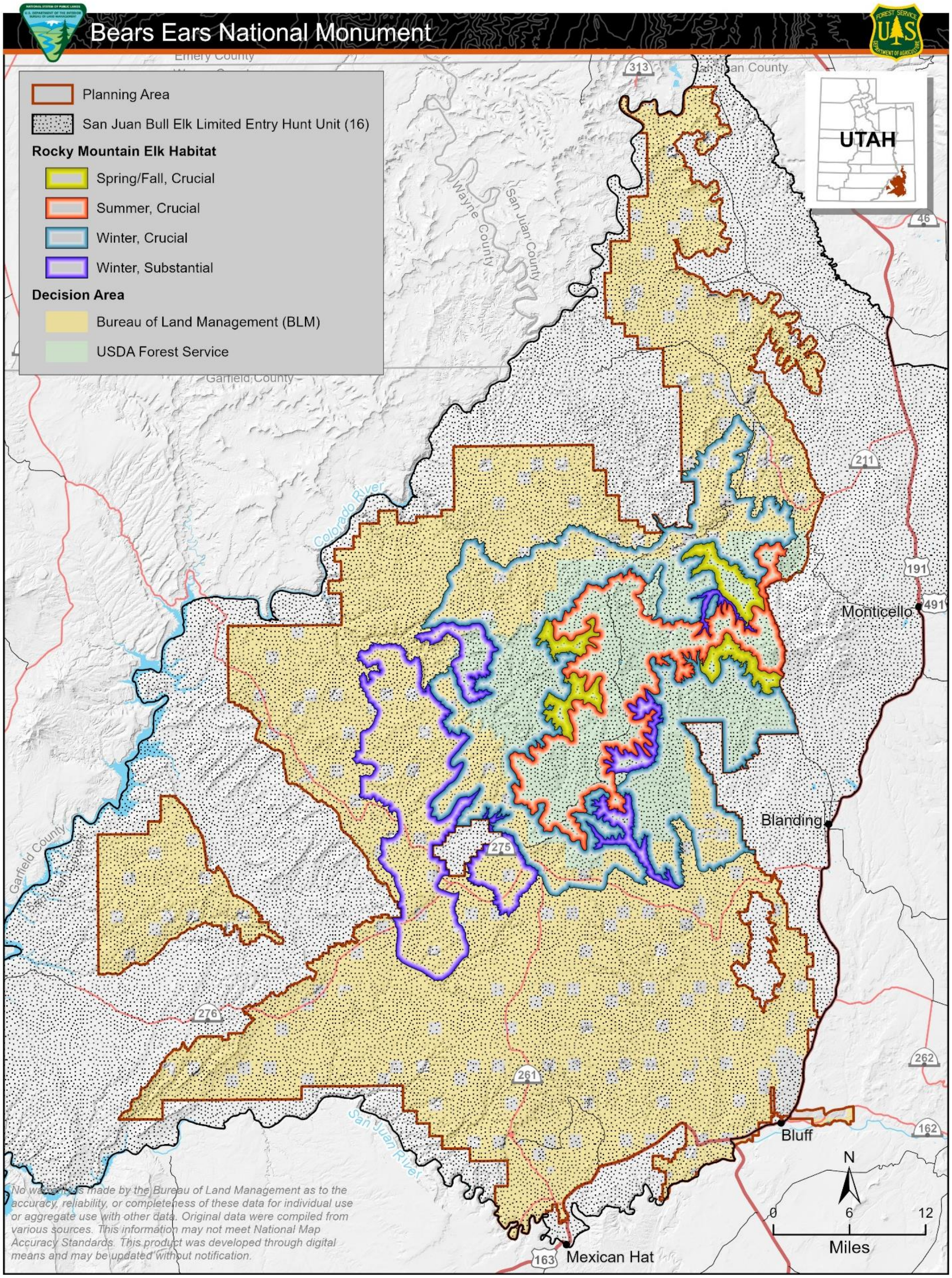

Figure 6.10-5. Rocky Mountain elk habitat in the Planning Area.

BLACK BEAR

In the Intermountain West, black bears are typically associated with forested or brushy mountain environments and wooded riparian corridors. Black bears tend to be nocturnal and crepuscular and are considered omnivorous. Preferred foods consist of berries, honey, fish, rodents, birds and bird eggs, insects, and nuts. Black bears obtain most of their meat from carrion. From November to April, bears enter a period of winter dormancy. Winter dens are located in caves, under rocks, or beneath the roots of large trees where they are kept nourished and insulated by a several-inch-thick layer of fat (UDWR 2011).

A Black Bear Management Plan for the State of Utah was completed by UDWR in 2011, and an updated plan is expected to be completed by 2023. The current 2011 plan outlines the historic and current management of black bears in the state. With respect to black bears, the goal of the wildlife management units in the Planning Area is to maintain a healthy bear population capable of providing a broad range of recreational opportunities (including hunting and viewing in existing occupied habitat) while considering human safety, economic concerns, and other wildlife species. The management objectives are to maintain bear distribution and increase it in suitable unoccupied or low density areas; maintain current bear populations with a reasonable proportion of older age animals and breeding females; balance bear population numbers with other wildlife species; minimize the loss in quality and quantity of UDWR-identified, crucial, and high-priority bear habitat, including migration corridors between occupied areas; reduce the risk of loss of human life and reduce chances of injury to humans by bears; reduce the number of livestock killed by bears; and maintain quality consumptive and nonconsumptive recreational opportunities (UDWR 2011). Approximately 277,428 acres of year-long crucial habitat exist within the Planning Area (Figure 6.10-6).

Although population estimates of black bears are unknown, UDWR manages wildlife populations and establishes tag limits, and populations are considered sufficient to support recreational hunting regulations.

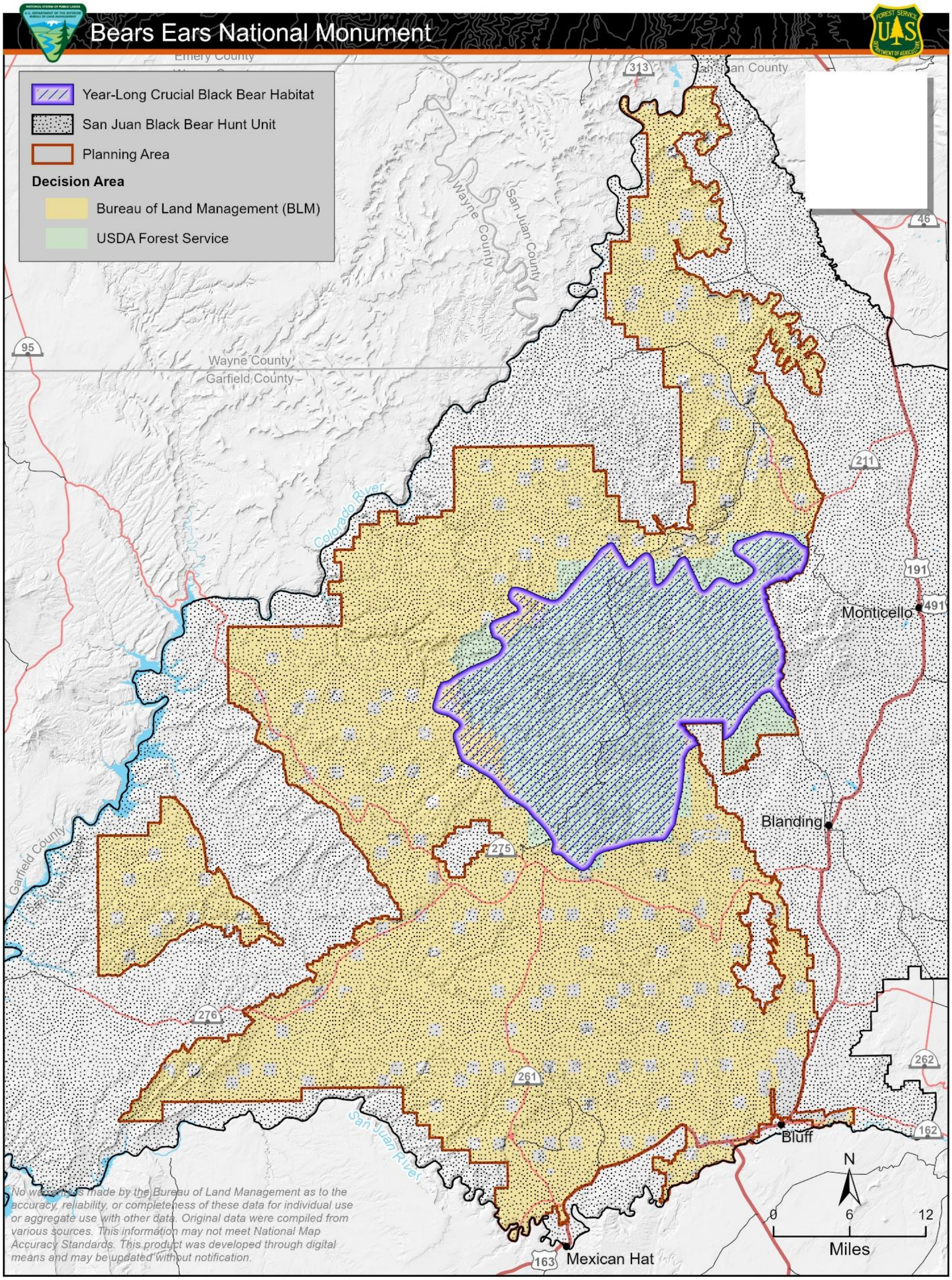

Figure 6.10-6. Black bear habitat in the Planning Area.

MOUNTAIN LION

Mountain lions (cougars) are commonly found in the rough, broken terrain of foothills and canyons, often in association with montane forests, shrublands, and pinyon-juniper woodlands. Mule deer are preferred prey species and seasonal habitat use is likely to parallel those of mule deer. The last statewide cougar population estimates were developed in conjunction with the Utah Cougar Management Plan in 1999 (UDWR 2020d) and estimate the statewide population to be between 2,528 and 3,936 cougars. The Planning Area overlaps with Cougar Hunt Unit #16 (UDWR 2020d) (Figure 6.10-7).

Cougar populations may be limited by prey abundance, availability, and vulnerability (Pierce et al. 2000; Sweanor et al. 2000), and the relationship between predator and pretty is very complex. Much controversy surrounds whether cougar predation can restrict or limit population growth of prey species; however, most research indicates that cougars and predation alone are not a major limiting factor of prey species abundance (UDWR 2020d). UDWR began managing cougar harvests through statewide limited entry hunting in 1990 and increased numbers of permits through 1995–1996. An individual hunter is restricted to holding either a limited entry, a cougar harvest, and/or a spot and stalk permit or a harvest objective permit per each season and must wait 3 years to reapply once they acquire a limited entry permit.

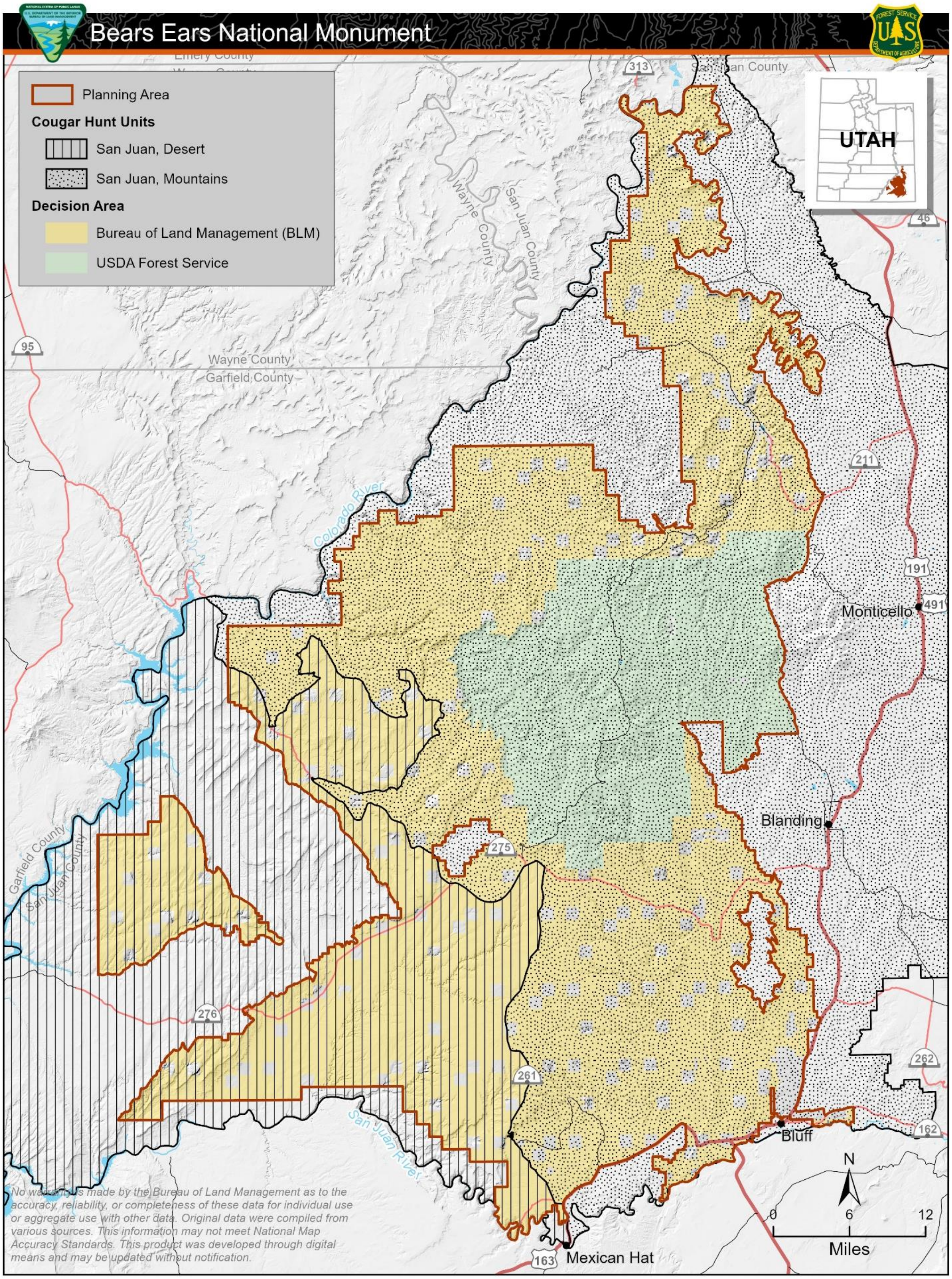

Figure 6.10-7. Cougar hunt units in the Planning Area.

Special Status Species

Special status species are species that require specific management action and attention as a result of population or habitat concerns. Special status species include federally threatened, endangered, proposed, and candidate species, BLM sensitive species, USDA Forest Service species of conservation concern (SCC), USDA Forest Service Management Indicator Species (MIS), Birds of Conservation Concern (BCC), Utah Partners in Flight (PIF) priority species, and species recognized as Species of Greatest Conservation Need (SGCN) by UDWR. Species on these lists may overlap with culturally important species. With the aid of UDWR occurrence records and correspondence with BLM and USDA Forest Service biologists, the list of special status species known to occur or with potential to occur within the Planning Area was refined (see sections below).

FEDERALLY LISTED SPECIES

Endangered or threatened species are those that the Secretary of the Interior has officially listed under the ESA and for which a final rule has been published in the *Federal Register*. Proposed species are those that the Secretary of the Interior 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 the 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. Under the ESA, management agencies are required to implement conservation programs to recover imperiled species and their habitats and ensure authorized activities are carried out without contributing to further harm of the species or its habitat, including critical habitat. The USFWS Information for Planning and Consultation website lists 10 federally listed, candidate, or proposed species with potential to occur within the Planning Area (Table 6.10-4).

Table 6.10-4. Federally Listed, Proposed, and Candidate Species with Potential to Occur within the Planning Area

Common Name	Scientific Name	Status	Occurrence within BENM
Birds			
California condor	*Gymnogyps californianus*	Endangered and experimental population, non-essential*; Utah SGCN; PIF	May occur. BENM is within the experimental population range, with one small portion east of US-191 outside the experimental range where California condor is considered endangered, but breeding has not been recorded.
Mexican spotted owl	*Strix occidentalis lucida*	Threatened, Utah SGCN	Known to occur. Uncommon within BENM; present in areas with mixed age forests with undisturbed cliff faces, canyons, and caves.
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered, Utah SGCN	Uncommonly occurs along riparian corridors associated with the Colorado and San Juan Rivers; potential breeding habitat may be present along the San Juan River within BENM.
Yellow-billed cuckoo	*Coccyzus americanus*	Threatened, Utah SGCN	May occur along riparian corridors associated with the Colorado and San Juan Rivers; potential breeding habitat may be present along the San Juan River within BENM.
Fish			
Bonytail	*Gila elegans*	Endangered, Utah SGCN	May occur. Assumed present in upper Colorado River tributaries during migration periods.

Common Name	Scientific Name	Status	Occurrence within BENM
Colorado pikeminnow	*Ptychocheilus lucius*	Endangered, Utah SGCN	Known to occur within the San Juan River; critical habitat is designated along the San Juan River bordering BENM.
Humpback chub	*Gila cypha*	Threatened, Utah SGCN	May occur. Assumed present in upper Colorado River tributaries during migration periods.
Razorback sucker	*Xyrauchen texanus*	Endangered, Utah SGCN	Known to occur within the San Juan River; critical habitat is designated along the San Juan River bordering BENM.
Invertebrates			
Monarch butterfly	*Danaus plexippus*	Candidate	Known to occur. Breeding habitat is limited to areas with milkweed species (*Asclepias* spp.).
Silverspot butterfly	*Speyeria nokomis nokomis*	Proposed threatened	May occur. The Planning Area is within the potential range of this species.

Source: USFWS 2022b, 2022c

* The Planning Area is partially within the species' non-essential experimental population (NEP) area. Under Section 9 of the ESA, members of NEP populations within designated NEP areas are treated as species proposed for listing. Members of NEP populations outside designated NEP areas are treated as they are listed under the ESA.

The Planning Area contains designated critical habitat for four listed species: Colorado pikeminnow, Mexican spotted owl, razorback sucker, and southwestern willow flycatcher (Table 6.10-5). Two fish species, bonytail (*Gila elegans*) and humpback chub (*Gila cypha*), do not have designated critical habitat within the Planning Area, although designated critical habitat for these species is located upstream and downstream along the Colorado and Green Rivers outside the Planning Area (USFWS 2022c) (Figure 6.10-8)

Table 6.10-5. Acres of Designated Critical Habitat within the Planning Area

Species	Acres	Units
Colorado pikeminnow	595	Upper Colorado River Basin
Mexican spotted owl	595,211	CP-14: Dark Canyon Primitive and Wilderness, San Juan, Wayne, and Grand Counties, Utah
Razorback sucker	595	Upper Colorado River Basin
Southwestern willow flycatcher	905	Unit 17: San Juan Management Unit

Source: USFWS 2022d

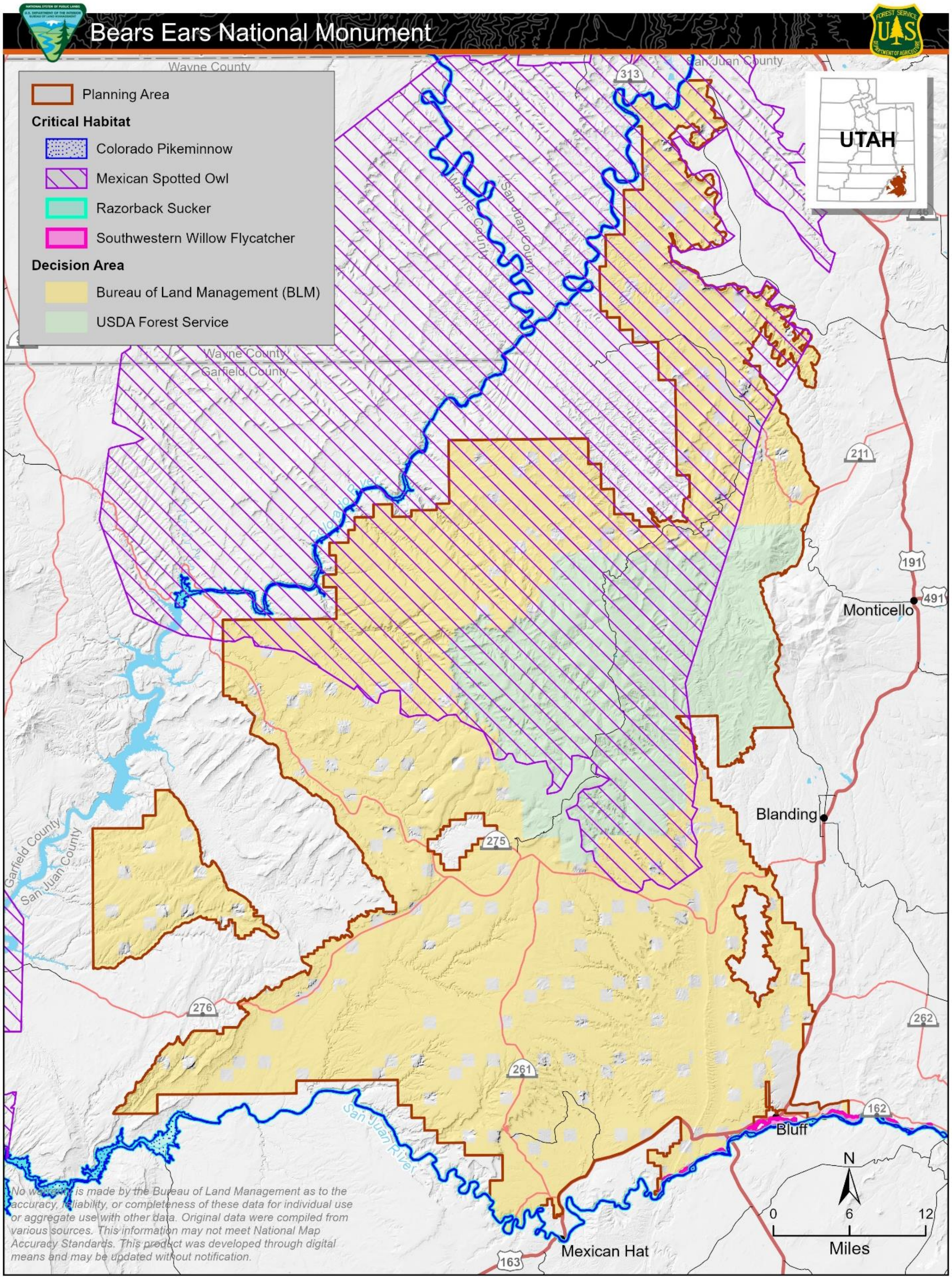

Figure 6.10-8. Designated critical habitat within the Planning Area.

BLM SENSITIVE SPECIES

BLM special status species include wildlife species that are listed as endangered, threatened, proposed, and/or candidate under the ESA as well as those animal species designated as sensitive by the BLM (BLM 2018). Special status arises from habitat degradation and direct disturbance to individuals, often combined with inherently restricted species' distributions. BLM special status species are managed under two primary objectives: 1) to conserve or allow ESA-listed species and their habitats to recover so that ESA protections are no longer needed, and 2) to initiate conservation measures that reduce or eliminate threats to sensitive and non-listed species to minimize the likelihood of, and need for, listing under the ESA (BLM 2008). 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 2008). BLM special status species listed as threatened, endangered, candidate, or proposed are described in Table 6.10-4 and those with no status under the ESA are listed in Table 6.10-6.

USDA FOREST SERVICE SENSITIVE, MANAGEMENT INDICATOR SPECIES, AND SPECIES OF CONSERVATION CONCERN

USDA Forest Service sensitive species are wildlife populations for which viability is a concern and there are significant downward trends in population numbers or population densities. MIS are a select group of species which can indicate change in habitat resulting from activities on the forest. Criteria used in selecting MIS include threatened, endangered, and sensitive species status; special habitat indicators; economically or socially important species; or ecological indicators. Under the 1986 LRMP, eight wildlife species and macroinvertebrates are classified as MIS with specific habitat management guidelines and monitoring requirements.

SCCs are generally considered to have declining population trends or appear to be in need of concentrated conservation actions, but insufficient data is available to list the species under the ESA. SCCs are defined as "a species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area" (36 CFR 219.9). Manti-La Sal National Forest has identified SCCs through an ongoing LRMP revision process that was not final at the time of the development of this AMS and are included in the AMS.

USDA Forest Service sensitive species, SCC, and MIS known to occur or with potential to occur within the Planning Area are listed in Table 6.10-6.

USFWS BIRDS OF CONSERVATION CONCERN AND PARTNERS IN FLIGHT PRIORITY SPECIES

The USFWS manages a list of Birds of Conservation Concern (BCC) that identifies migratory and nonmigratory avian species that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973. The Planning Area is located within Bird Conservation Region 16. Partners in Flight (PIF) Priority Species are those species recognized by Utah Partners in Flight as birds most in need of conservation and are described in further detail in the Utah Partners in Flight Avian Conservation Strategy (Parrish et al. 2002). BCC species known to occur or with the potential to occur within the Planning Area are listed in Table 6.10-6.

UTAH SPECIES OF GREATEST CONSERVATION NEED

Species on the Utah SGCN list include federally listed wildlife species (as well as candidates for federal listing) and other species for which there is credible scientific evidence to substantiate a threat to continued population viability. It is anticipated that wildlife species of concern designations will identify species for which conservation actions are needed and that timely and appropriate conservation actions implemented on their behalf will preclude the need to list these species under the provisions of the federal ESA. Utah SGCN known to occur or with potential to occur within the Planning Area are listed in Table 6.10-6.

Table 6.10-6. Other Special Status Species with Potential to Occur within the Planning Area

Common Name	Scientific Name	Status	Occurrence within BENM
Mammals			
Abert's squirrel	*Sciurus aberti*	MIS	Known to occur within BENM
Allen's big-eared bat	*Idionycteris phyllotis*	BLM sensitive, Utah SGCN	Known range overlaps BENM
Big free-tailed bat	*Nyctinomops macrotis*	BLM sensitive	Known range overlaps BENM
Bighorn sheep	*Ovis canadensis*	USDA Forest Service sensitive	Known to occur within BENM
Dwarf shrew	*Sorex nanus*	SGCN	Known to occur within BENM
Fringed myotis	*Myotis thysanodes*	SCC, Utah SGCN, BLM sensitive	Known to occur in San Juan County; known range overlaps BENM
Gunnison's prairie-dog	*Cynomys gunnisoni*	BLM sensitive, Utah SGCN	Known to occur within BENM
Kit fox	*Vulpes macrotis*	BLM sensitive, Utah SGCN	Occurrences are unknown within BENM, although spatial prediction analyses show this species occurring from the Cedar Mesa area north to Indian Creek.
Long-eared myotis	*Myotis evotis*	SGCN	May occur within BENM
Mule deer	*Odocoileus hemionus*	MIS	Known to occur within BENM
Rocky Mountain elk	*Cervus elaphus nelsoni*	MIS	Known to occur within BENM
Silky pocket mouse	*Perognathus flavus*	BLM sensitive	Known range overlaps BENM
Spotted bat	*Euderma maculatum*	BLM sensitive, USDA Forest Service sensitive, Utah SGCN	Known to occur in San Juan County; known range overlaps BENM
Townsend's big-eared bat; Townsend's western big-eared bat	*Corynorhinus townsendii*; *Corynorhinus townsendii townsendii*	BLM sensitive, USDA Forest Service sensitive (western subspecies only), SCC, Utah SGCN	Known to occur in San Juan County; known range overlaps BENM
Western red bat	*Lasiurus blossevillii*	BLM sensitive, Utah SGCN	May occur within BENM
Yuma myotis	*Myotis yumanensis*	SGCN	May occur within BENM
Birds			
American three-toed woodpecker	*Picoides dorsalis*	BLM sensitive, USDA Forest Service sensitive	Known range overlaps BENM
American white pelican	*Pelecanus erythrorhynchos*	BLM sensitive, Utah SGCN	Not known to nest within BENM but has been observed at Recapture Reservoir and on the San Juan River

Common Name	Scientific Name	Status	Occurrence within BENM
Bald eagle	*Haliaeetus leucocephalus*	BLM sensitive, USDA Forest Service sensitive, Utah SGCN	Not known to nest within BENM; has been observed during migratory patterns during winter months
Band-tailed pigeon	*Patagioenas fasciata*	SGCN	Known to occur within BENM
Black rosy-finch	*Leucosticte atrata*	SCC, BCC, PIF, Utah SCGN	Known to occur within BENM
Black-chinned sparrow	*Spizella atrogularis*	BCC, PIF	Known to occur within BENM
Bobolink	*Dolichonyx oryzivorus*	BLM sensitive, PIF	Known to occur in San Juan County, may occur within BENM
Broad-tailed hummingbird	*Selasphorus platycercus*	BCC	May occur within BENM; species range includes BENM
Burrowing owl	*Athene cunicularia*	BLM sensitive, Utah SGCN	Observed within BENM along Indian Creek and the Colorado River
California gull	*Larus californicus*	BCC	May occur within BENM.
Cassin’s finch	*Haemorhous cassinii*	BCC, PIF	Known to occur within BENM
Clark’s grebe	*Aechmophorus clarkii*	BCC	May occur within BENM.
Clark’s nutcracker	*Nucifraga columbiana*	BCC	Known to occur within BENM.
Evening grosbeak	*Hesperiphona vespertina*	BCC, PIF	Known to occur within BENM
Ferruginous hawk	*Buteo regalis*	BLM sensitive, Utah SGCN	No known nests within BENM; has been observed foraging within the Planning Area
Flammulated owl	*Psiloscops flammeolus*	USDA Forest Service sensitive, BCC, PIF	Known to occur within BENM
Golden eagle	*Aquila chrysaetos*	BLM sensitive, MIS, Utah SGCN	Known to occur within BENM
Grace’s warbler	*Setophaga graciae*	BCC, PIF	Known to occur within BENM
Lewis’s woodpecker	*Melanerpes lewis*	BLM sensitive, BCC, Utah SGCN, PIF	Known to occur within BENM
Long-billed curlew	*Numenius americanus*	BLM sensitive	Known to occur within BENM
Long-eared owl	*Asio otus*	SGCN	May occur within BENM.
Northern goshawk	*Accipiter gentilis*	USDA Forest Service sensitive, BLM sensitive†, MIS	Known to occur within BENM; nests at higher elevations within BENM
Olive-sided flycatcher	*Contopus cooperi*	BCC, SGCN	Know to occur within BENM
Peregrine falcon	*Falco peregrinus*	USDA Forest Service sensitive, Utah SGCN	Known to occur within BENM; may nest within suitable habitat (cliffs)
Pinyon jay	*Gymnorhinus cyanocephalus*	BCC, PIF, Utah SGCN	Known to occur within BENM
Scaled quail	*Callipepla squamata*	PIF	May occur within BENM
Short-eared owl	*Asio flammeus*	BLM sensitive, BCC	No known occurrences within BENM; non-breeding range includes BENM
Virginia’s warbler	*Leiothlypis virginiae*	BCC, PIF	Known occurrences in Fish Canyon and elsewhere within BENM
Western grebe	*Aechmophorus occidentalis*	BCC, SGCN	May occur within BENM

Common Name	Scientific Name	Status	Occurrence within BENM
White-faced ibis	*Plegadis chihi*	SGCN	Known to occur within BENM
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	BCC	Known to occur within BENM
Reptiles			
Cornsnake	*Elaphe guttata*	BLM sensitive	Known to occur within BENM
Desert night lizard	*Xantusia vigilis*	BLM sensitive	Occupies habitat along the Colorado River in western San Juan County; occurrences may extend into BENM
Midget faded rattlesnake		SGCN	Known to occur within BENM
Smooth green snake	*Opheodrys vernalis*	BLM sensitive	Known to occur within BENM
Fish			
Bluehead sucker	*Catostomus discobolus*	BLM sensitive†, SCC, Utah SGCN	Known occurrences in the San Juan River, may be present in other tributaries of the Colorado River within BENM
Colorado River cutthroat trout	*Oncorhynchus clarkii pleuriticus*	BLM sensitive†	Specific occurrences within BENM are unknown; may be present in tributaries of the Colorado River within BENM
Flannelmouth sucker	*Catostomus latipinnis*	BLM sensitive†, Utah SGCN	Specific occurrences within BENM are unknown; may be present in tributaries of the Colorado River within BENM
Roundtail chub	*Gila robusta*	BLM sensitive†, Utah SGCN	Known occurrences in the San Juan River, may be present in other tributaries of the Colorado River within BENM
Invertebrates			
Dipterans	*Chironomidae* sp.	USDA Forest Service MIS	Known to occur within BENM
Mayflies	*Epeorus* sp.	USDA Forest Service MIS	Known to occur within BENM
Stoneflies	*Zapada* sp.	USDA Forest Service MIS	Known to occur within BENM
Utah sallfly*	*Sweltsa gaufini*	SCC, USDA Forest Service MIS	May occur within BENM
Yavapai mountainsnail	*Oreohelix yavapai*	Utah SGCN	May occur within BENM; known from a historic sample collection in western San Juan County
Western bumblebee*	*Bombus occidentalis*	BLM sensitive, SCC	May occur within BENM; species range includes BENM
Western green drake	*Drunella doddsii*	USDA Forest Service MIS	Known to occur within BENM
Pale morning dun	*Ephemerella excrucians*	USDA Forest Service MIS	Known to occur within BENM

Common Name	Scientific Name	Status	Occurrence within BENM
Amphibians			
Great Plains toad	*Anaxyrus cognatus*	BLM sensitive	May occur within BENM; species range includes BENM
Northern leopard frog	*Lithobates pipiens*	SGCN	May occur within BENM

Source: BLM 2018; eBird 2022; PIF 2016; UDWR 2020e; USDA Forest Service 2020; USFWS 2020, 2021, 2022b; personal communication, phone call from Barb Smith, USDA Forest Service, and Gabriel Bissonette and Melissa Wardle, Bureau of Land Management, July 6, 2022.

* Proposed for the 2023 USDA Forest Service SCC list.

† Conservation agreement species. Conservation agreements are developed to expedite implementation of conservation measures for species in Utah as a collaborative and cooperative effort among resource agencies.

6.10.2 Trends

Fish

On a statewide basis, little is known about the overall current condition of Utah's aquatic habitats, although the general impression among resource professionals is "poor and declining." A number of projects are currently in progress to determine aquatic habitat condition in Utah and guide future habitat monitoring (UDWR 2014).

Some aquatic habitats within the Planning Area, including the San Juan River, Arch Canyon and Comb Wash, and Indian Creek, have experienced gradual degradation due to anthropogenic influences, including expanding agricultural water and land use, increasing recreational disturbance, and the expansion of development and industry across the Planning Area and on lands upstream from the Planning Area (UDWR 2014). At least seven large-bodied fishes were historically widespread and inhabited main-stem reaches of the Colorado River and tributaries, including the San Juan River. Four of these—the humpback chub, bonytail, Colorado pikeminnow, and razorback sucker—are listed as federally endangered due to population declines. The three other large-bodied species have also experienced decline: the roundtail chub, flannelmouth sucker, and bluehead sucker (Bestgen 2011). Aquatic habitat fragmentation, rising water temperatures, and reduced water quality and quantity, along with the introduction of nonnative fish species to many portions of the Upper Colorado River Basin, have contributed to the decline in native fish populations (UDWR 2014; USFWS 2022d).

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 (USFWS 2022d).

Wildlife

In general, wildlife populations are being impacted by an increase in habitat loss, degradation, or disturbance. Using landscape intactness as a factor in determining species stability, Bryce et. al (2012) analyzed spatial data for a number of species which are acknowledged in the Planning Area. Most of the species' populations that are acknowledged in the Planning Area are considered stable to decreasing because of habitat loss. The availability of quality habitat, forage production, and prey availability have a direct correlation with population viability. Recent drought conditions affecting these factors have resulted in downward trends for some species (Bryce et al. 2012). By evaluating the impact on habitat for each species (including riparian and terrestrial habitats), the potential impacts to these species' populations can be assessed. Outside of game species, most wildlife species are not monitored regularly or intensively to determine trends in distribution and abundance.

As identified in *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022), some BEITC Tribal members believe negative impacts to wildlife from uncontrolled recreation have already occurred in BENM, such as from people who “may harvest live wood for campfires, which harms the animals that still live within BENM.” Certain activities, such as OHV use or rock climbing, may contribute to greater and more direct disturbances than other activities, such as hiking. This is due to an increase in associated noise, faster speeds, access to otherwise inaccessible habitats, and other factors. Restriction of public access or types of recreation use may reduce disturbance of wildlife individuals and/or habitats in the areas to which access or type of use is restricted.

BIG GAME AND UPLAND GAME SPECIES

Big-game populations are managed by the state, and trends are estimated in each species’ statewide management plan. These management plans are typically relevant at a state or county level and do not indicate specific trends within the Planning Area.

Desert bighorn sheep trends vary by herd unit and population. Of the 13 individually managed populations of desert bighorn, five are showing increasing trends, seven are stable, and one (San Juan, North Unit) located within the Planning Area is declining as a result of culling efforts due to disease outbreak (UDWR 2018). The San Juan mule deer herd unit has two subunits and is located partially within the Planning Area. One subunit—San Juan, Abajo Mountains—has shown stable population growth from 2015 to 2020. The Elk Ridge subunit population, however, remains low due to prolonged drought and poor summer range conditions (UDWR 2020c). Most pronghorn populations remain stable, but quality habitat has been lost in parts of Utah due to urbanization, construction of roads, OHV use, energy development, and associated activities. The distribution of pronghorn has increased throughout the state, and efforts to reintroduce pronghorn into suitable habitats and augment existing populations are ongoing (UDWR 2017). Within the San Juan management unit, the elk population is limited by the extent of summer range which is determined by trends in annual precipitation on the Abajo Mountains (UDWR 2016). Healthy and productive elk herds require high amounts of quality habitat. Crucial elk habitat is continually being fragmented or lost due to human expansion and development. Additionally, elk summer ranges such as aspen habitat have been gradually replaced by conifers due to fire suppression, and winter ranges that were once dominated by shrubs and perennial grasses have been replaced by annual grasses or invasive weeds that are not beneficial to elk (UDWR 2016).

Black bear and mountain lion populations within the Planning Area are inversely managed by the availability of prey and habitat. Mule deer are the preferred prey of mountain lions, and mule deer populations are down across the state. Within the Planning Area, there has been loss of winter habitat due to drought, grazing, and insect infestation (BLM 2007). There is insufficient data to conclude how mountain lion populations are responding to a decrease in prey availability, but trends may suggest a lower carrying capacity for the Planning Area. Utah’s black bear population appears to have increased since 1990. However, results of population reconstruction for Utah bears (reconstructing a minimum population to support the harvest age distribution) suggest the bear population from 2000 to 2006 may have stabilized (UDWR 2011).

Trends in upland game populations are directly correlated with habitat management. Wild populations are currently augmented by the UDWR stocking program and may experience short-term trends that increase, decrease, or maintain wild population sizes. Stocking efforts have been ineffective at maintaining or increasing established breeding population; therefore, long-term population trends are driven by availability of quality habitat and predation (UDWR 2022). Upland game species have been experiencing trends in habitat degradation and fragmentation due to natural and anthropogenic disturbances such as wildfires, recreation, and vegetation management (UDWR 2022).

Special Status Species

Recovery plans, special management area designations, and special management conditions are used to protect special status species. Currently, there is no RMP for the San Juan River management area. Increases in recreation, especially in riparian areas and canyons, is impacting special status species, making protection more difficult.

FEDERALLY LISTED SPECIES

The bonytail was historically common to abundant in warm-water reaches of larger rivers from Mexico to Wyoming (USFWS 2002a). Currently, bonytail is the rarest of the endangered, native fish of the Colorado River, and recovery efforts for this species are ongoing, with stocking occurring at multiple locations in both the Upper and Lower Colorado River Basins (USFWS 2022e). Populations of humpback chub are low but either remain stable, or in some instances, are in decline, with differences in the documented populations in the upper basin and lower basin units (USFWS 2018a). In the San Juan River Basin, populations of Colorado pikeminnow declined concurrently with the construction of Navajo Dam and Lake Powell on the upstream and downstream reaches of this river (Miller 2014); annual stocking has enabled the remaining adult population to maintain spawning (USFWS 2022f). The razorback sucker population in the Colorado River subbasin has been increasing over the last decade through stocking efforts and is currently estimated at 5,000 to 8,000 adults; however, without continued management efforts, all populations would eventually decline to an extirpated condition, and those in low or extirpated condition would decline more rapidly (USFWS 2018b).

Captive-bred California condors initially released in Arizona have expanded into Utah (California Department of Fish and Wildlife [CDFW] 2022), and approximately 112 of the 500 total individuals worldwide live within the population that spans Utah and Arizona, making the area important condor habitat (Utah Public Radio [UPR] 2021). The success of wild-breeding has been increasing, and efforts to reduce the use of lead-based ammunition are designed to decrease condor mortality due to lead poisoning, but California condor populations still remain low (CDFW 2022; UPR 2021). While the Planning Area is within the experimental population range for condor, breeding has not been recorded in the Planning Area (USFWS 2022c). Despite the increasing population numbers, the primary threat to the species, exposure to lead and resulting toxicosis, continues to be a major factor throughout the range of the species and was the cause of approximately 50% of all condor deaths with known causes between 1992 and 2017 (USFWS 2019).

Mexican spotted owl exists in small isolated subpopulations and is threatened by habitat loss and disturbance from recreation, overgrazing, road development, catastrophic fire, timber harvest, and mineral development (USFWS 2012). Population trends across the species’ range remain unclear due to few data on populations or occupancy rates (USFWS 2012). Conclusions on population trends cannot be drawn from the limited data available in the Planning Area; however, habitat models generated for Mexican spotted owl on the Colorado Plateau indicate a declining trend of habitat intactness (Bryce et al. 2012).

Southwestern willow flycatcher population declines are attributed to numerous, complex, and interrelated factors such as habitat loss and modification; expansion of invasive, nonnative plants into breeding habitat; brood parasitism by cowbirds; vulnerability of small population numbers; and winter and migration stress (USFWS 2002b). Range-wide population trends for this species are difficult to establish due to an increase in intensive surveys identifying new breeding pairs, but current and future climate change on the Colorado Plateau will likely diminish the area of suitable nesting habitat for this species (USFWS 2013).

Western yellow-billed cuckoo population declines are tied to loss and fragmentation of riparian habitat due to agricultural use, road development, and urban development; previously known populations for this species in Utah were too low to establish trends throughout the state (USFWS 2011), and little is known about populations or individuals within the Planning Area. The western yellow-billed cuckoo suffered substantial range reductions in the twentieth century due to loss of the riparian habitat it prefers for breeding, and most of the remaining breeding pairs are found in Arizona, California, and New Mexico (Dudek 2014; Johnson 2009).

Monarch butterfly populations are in decline across the western United States due to many factors, including a loss of their winter habitat, the use of some types of pesticides, and fewer milkweed plants (USFWS 2020). In December 2020, the monarch was designated as a candidate species for listing under the ESA due to dramatic population decreases since the 1980s (Castle Country Radio [CCR] 2021).

In May 2022, the USFWS proposed to list a subspecies of silverspot butterfly (*Speyeria nokomis nokomis*) as threatened under the ESA due to danger of extinction in the foreseeable future. Primary threats to this species include habitat loss and fragmentation, climate change, incompatible livestock grazing, human alteration of natural hydrology, and genetic isolation. The USFWS is not proposing critical habitat for this species due to the threat of collection and trade (USFWS 2022g).

OTHER SPECIAL STATUS SPECIES

Other special status species, including BLM sensitive, USDA Forest Service sensitive, SCC, MIS, BCC, PIF priority species, and Utah SGCN, display various population trends.

Special status fish species populations have generally been declining throughout Utah; this downward trend is largely due to habitat degradation and loss of habitat complexity caused by erosion, riparian vegetation removal, and channelization (USFWS 2022d). Few data exist to determine trends for special status fish species in the Planning Area. The Colorado Plateau Rapid Ecoregional Assessment modeled near-term (2025) aquatic habitat intactness in the Colorado Plateau ecoregion. Modeled habitat intactness for aquatic species, including razorback sucker, flannelmouth sucker, and Colorado cutthroat trout, declined from low to very low (Bryce et al. 2012), indicating declining trends for these species.

Regional habitat intactness can be used to gauge trends for terrestrial special status wildlife species. The Colorado Plateau Rapid Ecoregional Assessment modeled near-term (2025) terrestrial habitat intactness, and results indicate relatively small changes in a negative direction (i.e., lower habitat intactness). Several terrestrial bird species, including golden eagle, burrowing owl, and peregrine falcon, 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).

6.10.3 Forecasts

Fish

The BLM and USDA Forest Service have little control over water use and river flows on the largest river system within the Planning Area, the San Juan River. Water rights usage and irrigation practices upstream from the Planning Area are outside the scope of BLM and USDA Forest Service management. Many streams and riparian systems within the Planning Area exhibit extreme ranges in flow due to isolated heavy rainfall events; restoration or improvement of fisheries where possible should focus on sustainable flows and management of high flow events to the advantage of native fish populations. Restoration of in-stream habitat (backwaters, embayments) and riparian vegetation is also tied to improvement of native fish populations (Ecosystems Research Institute 2021). In areas where fisheries are tied to habitat improvement, the BLM could coordinate with state and federal agencies, private landowners, and other groups to implement habitat improvement projects (e.g., the San Juan Basin Recovery Implementation Program) and ensure watershed conditions are appropriate for the conservation of listed and native fish species within the Planning Area.

Adequate water quality is fundamental to support aquatic habitat for fish populations (Poff et al. 2002). Climate change is the primary stressor for future potential water quality conditions. Other potential stressors are wildfire and natural disasters; increased water quantity demands via grazing; increased population driving, increased industrial, irrigative/agricultural, recreational, and municipal needs; low and peak flow volumes; and related effects to channel morphology and habitat.

Wildlife

Population trends are forecasted to be stable to decreasing within the Planning Area (Bryce et al. 2012). As wildlife populations reach carrying capacity, population trends are potentially influenced by vegetation and habitat trends. Increases in land use activities and increased human disturbance to wildlife populations threaten vegetation communities and contribute to habitat fragmentation, create additional displacement of animals within the Planning Area, decrease overall vegetation habitat health, and reduce wildlife habitat availability and quality. Drought conditions are forecasted to continue, which will have short- and long-term effects on vegetation, ecological, and wildlife communities.

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 Rapid Ecoregional Assessment 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). Average summer temperatures are expected to increase, but even greater increases are simulated for the winter (Bryce et al. 2012).

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). Invasion of nonnative species into native vegetation communities are a significant problem for terrestrial and aquatic species and habitats in Utah (UDWR 2014). 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 vegetation 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. 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); this will, in turn, alter the distribution and availability of habitat for fish and wildlife.

6.11 HYDROLOGY (GROUNDWATER, SURFACE WATER, WETLANDS, RIPARIAN AREAS, FLOODPLAINS, AND WATER QUALITY)

6.11.1 Current Conditions

Surface Water

The Planning Area crosses four level-four (HUC8) subbasins. The subbasins and acreages within the Planning Area include the Lower San Juan Basin (HUC 14080205) (316,603 acres), the Lower San Juan-Four Corners Subbasin (HUC 14080201) (376,628 acres), the Upper Lake Powell Subbasin (HUC 14070001) (529,206 acres), and the Upper Colorado-Kane Springs Subbasin (HUC 14030005) (267,964 acres). The subbasins and acreages within the Planning Area and the Manti-La Sal National Forest include the Lower San Juan Basin (HUC 14080205) (3,696.58 acres), the Lower San Juan-Four Corners Subbasin (106,249.45 acres), the Upper Colorado-Kane Springs Subbasin (65,728.45 acres), and the Upper Lake Powell Subbasin (66,999.47 acres)

Several important watercourses flow through the Planning Area. The largest are the Colorado River on the northwest and the San Juan River on the southern boundary of the Planning Area. The San Juan River is a large river draining southwestern Colorado, northeastern New Mexico, and parts of southeastern Utah and runs along the southern Planning Area boundary for over 24 miles. Many stream segments in the Planning Area have intermittent (flowing more than 30 days in a row) to perennial (or year-round) stream flow. These stream segments are fed by springs, and flows can vary depending on annual or seasonal conditions.

On the western side of the Planning Area, the Upper Lake Powell Subbasin (HUC 14070001) drains into Glen Canyon. On the southern side of the Planning Area, the Lower San Juan Basin (HUC 14080205) and its tributaries drain into the San Juan River.

The northern portion of the Planning Area crosses into the Upper Colorado-Kane Springs Subbasin (HUC 14030005) and includes the Indian Creek, North Cottonwood Creek, Lockhart Canyon, and Dripping Springs drainages. Based on NHD mapping for this area, the Planning Area has a total of approximately 6,124 miles of streams or washes. Of that total length, 5,936 miles are intermittent streams, and 95 miles are perennial streams.

Stream flow is monitored throughout the Planning Area, mostly with USGS flow gages. See Table 6.11-1 for a list of USGS flow gages in the Planning Area.

Table 6.11-1. U.S. Geological Survey Flow Gages in the Planning Area

USGS Gage Station #	Stream Name	Location
9379000	Comb Wash	Near Bluff, Utah
9378700	Cottonwood Wash	Near Blanding, Utah
9186500	Indian Creek	Above Cottonwood Creek, near Monticello, Utah
9187000	Cottonwood Creek	Near Monticello, Utah
9187550	Indian Creek	Below Bogus Pocket, near Monticello, Utah
9187500	Indian Creek	Above Harts Draw, near Monticello, Utah
9185600A	San Juan/Colorado River	Potash

Ephemeral channels and arroyos are subject to rare but intense short-duration flows during and immediately following upgradient precipitation events. Flash flooding can occur in canyons and washes in the Planning Area. 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.

Flash floods can cause damage to water resources and related infrastructure (e.g., roads, campgrounds, trails, 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 several factors, including the location, intensity, and duration of the flash flood, the functionality and stability of the floodplain, as well as the stability and integrity of the uplands prior to the flash flood, and the type and location of structures within the flood's path.

WATER QUALITY

Surface water quality conditions are monitored primarily by conducting water chemistry sampling and macroinvertebrate sampling. BLM participates in a cooperative program with UDWQ to sample sites for water chemistry and biotic components. BLM personnel take field measurements and collect grab samples, and the State of Utah provides laboratory analysis and data management.

Every other year, UDWQ 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 (UDWQ 2022). The Integrated Report includes a 303(d) list, which lists impaired waters that fail to meet water quality standards, and provides information regarding the impaired uses and cause of impairment for each listed waterbody. The USGS, BLM, and UDWQ conduct water quality and stream flow monitoring programs. UDWQ and BLM sampling programs support State of Utah water quality assessments and are extensive, including many of the smaller creeks, springs, and lakes. Table 6.11-2 identifies the AUs in the Planning Area boundary and the cause of impairment. Data reported here are from the 2022 reporting year (UDWQ 2022).

Additionally, the BLM has also conducted bacteriological monitoring in Grand Gulch (coliform) and has coordinated with the county health department. It has also completed macroinvertebrate sampling and coordinated with the National Aquatic Monitoring Center to share data.

Potential concerns with water quality within the Planning Area can include high stream temperatures, low dissolved oxygen levels, high sediment loads, high nutrient levels, and high levels of total dissolved solids (TDS), salinity, and high coliform bacteria levels. High stream temperatures and low dissolved oxygen levels are associated with low stream flow conditions but can also be due to lack of riparian vegetation and associated shading. High sediment loads are often associated with natural flood events but can be increased by land use activities upstream in the watershed, including development of roadways and recreational vehicle trails, construction activities, and improper livestock grazing.

A number of UDWQ AUs cross into the Planning Area. Table 6.11-2 lists these AUs and the assessment results from the 2022 Integrated Report. The 303(d) listed waters include impairments resulting from elevated temperature, selenium, dissolved solids, dissolved oxygen, radium, iron, lead, cadmium, aluminum, copper, and mercury. In some cases, land use activities may contribute to water quality impairment, whether by direct effects, such as those of animal and/or human waste on dissolved oxygen or nutrients (nitrogen or phosphorus), or by indirect effects, such as by increasing erosion, which increases sediment loading (turbidity), TDS, and associated metals. Such effects may also impair benthic macroinvertebrate and fish habitat and result in low observed/expected bioassessment scores. Additionally, surface interaction with groundwater is another possible source of contamination. The

White Mesa Mill is a uranium mill located just south and east of the Planning Area, within sight of Bears Ears Buttes. UDWQ operates and maintains several monitoring wells on BLM and has documented groundwater contamination adjacent to the mill (USGS 2012).

Table 6.11-2. Utah's 303(d) List of Waters for Reporting Year 2022

AU Name	Benefit Class	Assessment Results	Cause of Impairment	AU Acres	Acres in BENM
Butler Wash	1C, 2A, 3B, 4	3:Insufficient Data. Need more	none documented	35,746.22	34,298.93
Colorado River-3	1C, 2A, 3B, 4	4A:Approved TMDL. Impaired	Use Class 3B: selenium	12,187.72	800.78
Comb Wash	1C, 2A, 3B, 4	5:TMDL required. 303d impaired	Use Class 3B: dissolved oxygen, selenium, temperature, Benthic Invertebrate Assessment; Use Class 4: TDS	184,674.33	181,491.40
Cottonwood Wash-1	1C, 2A, 3B, 4	2:Supports all assessed uses	none	62,816.37	38,854.84
Cottonwood Wash-2	1C, 2A, 3B, 4	5/4A:TMDL required/TMDL Approved	Use Class 1C: radium, arsenic, alpha particles; Use Class 3B: dissolved oxygen, temperature	57,318.03	23,219.28
Cottonwood Wash-3	1C, 2A, 3B, 4	5/4A:TMDL required/TMDL approved	Use Class 1C: radium, alpha particles; Use Class 4: radium, alpha particles	86,144.10	85,918.44
Grand Gulch	1C, 2A, 3B, 4	3:Insufficient data. Need more.	none documented	115,458.22	114,130.24
Harts Draw	1C, 2A, 3B, 4	3:Insufficient data. Need more.	none documented	79,390.48	19,814.28
Indian Creek-1	1C, 2A, 3B, 4	3:Insufficient data. Need more.	none documented	18,592.37	18,584.92
Indian Creek-2	1C, 2B, 3A, 4	2:Supports all assessed uses.	none	22,538.27	9,542.98
Johnson Creek	1C, 2B, 3A, 4	5:TMDL required. 303d impaired.	Use Class 3A: dissolved oxygen, temperature	15,547.70	1,233.19
Kane Spring Wash	2B, 3C, 4	5:TMDL required. 303d impaired.	Use Class 3C: temperature; Use Class 4: TDS	418,144.16	37.71
North Cottonwood Creek	1C, 2A, 3B, 4	5:TMDL required. 303d impaired.	Use Class 3B: Benthic Invertebrate assessment	73,968.21	73,902.80
Recapture Creek-1	1C, 2A, 3B, 4	5: TMDL Required (Impaired 303d list)	Use Class 3B: Dissolved Oxygen	104,399.02	802.06

AU Name	Benefit Class	Assessment Results	Cause of Impairment	AU Acres	Acres in BENM
Salt Creek-Canyonlands	1C, 2A, 3B, 4	3:Insufficient data. Need more.	None documented	74,410.08	18,437.27
San Juan River-1	1C, 2A, 3B, 4	5:TMDL required. 303d impaired.	Use Class 1C: E. coli, Lead, Thallium Use Class 2A: E. coli Use Class 3B:Lead, Thallium, copper, iron,	7,492.42	868.49
San Juan River-1 Tributaries	1C, 2A, 3B, 4	5:TMDL required. 303d impaired.	Use Class 4: TDS	170,915.73	133,288.84
San Juan River-2	1C, 2A, 3B, 4	5:TMDL required. 303d impaired.	Use Class 1C: E. coli, Thallium; Use Class 2A: E. coli; Use Class 3B: Iron, Lead, Cadmium, Benthic Invertebrate Assessment	4,707.78	910.63
Westwater Creek	1C, 2A, 3B, 4	5:TMDL required. 303d impaired.	Use Class 3B: Temperature; Use Class 4: Total dissolved solids	18,807.38	91.78
White Canyon	1C, 2A, 3B, 4	3:Insufficient data. Need more.	None documented	177,299.13	166,008.35

Note: Although there are impaired waters identified in the watersheds that cross into the Planning Area, the BLM and USDA Forest Service are only responsible for management of streams within the Planning Area.

The BENM Planning Area is located within the Upper Colorado River Basin, where salinity is a regional and national concern. With the passing of the Colorado River Basin Salinity Control Act of 1974 (Public Law 93-320) and subsequent public laws, the DOI was mandated to implement salinity control actions in the Colorado River Basin.

The primary nonpoint source of salinity in the Planning Area is diffuse overland runoff from saline soils and erosion and transport of saline soils during flow events. Any surface activities that occur on these soils have the potential to increase erosion and associated salinity and sediment loading to the Colorado River Basin, especially when the soils are wet and easily compacted. See Section 6.3 for more information on soils in the Planning Area.

Vehicle Recreation Monitoring

Detailed water sampling was conducted as part of a monitoring program for vehicle recreation permits, including Jeep Safari, ATV Safari, Jeep Jamboree, and other events. Samples were collected by BLM staff in Arch Creek from 2003 to 2010. Samples were taken from two locations: sample site *Arch Ck near mouth* and sample site *Arch Ck 4 miles ab Comb Wash*. Sample site *Arch Ck near mouth* is located downstream of all but one (59/60) road crossings of Arch Creek and serves as a comprehensive site for the effect of recreational vehicles on water quality. Samples were usually taken several days before an event, the day of the event, and several days after the event. Laboratory tests included several hydrocarbon analyses, total suspended solids, and TDS. Field data included pH, specific conductivity, stream temperature, turbidity, and stream flows.

Hydrocarbon analysis included total recoverable petroleum hydrocarbons, total petroleum hydrocarbons-diesel range organics, and total petroleum hydrocarbons gasoline range organics (TPH-g). Minor amounts of total recoverable petroleum hydrocarbons, which include oil and grease, were detected after several permitted events. Values ranged from 3.3 to 3.7 milligrams per liter (mg/L), all above the level of detection (3.0 mg/L).

Vehicles, especially oil and grease from the undercarriage, are the most likely source of these hydrocarbons. As vehicles cross the stream, water splashes on the undercarriage and can wash dirt, grease, and any leaking fluids into the stream. During high stream flow, these levels can increase as the vehicles travel through deeper water crossing the stream.

The State of Utah standard for turbidity is a change of less than 10 nephelometric turbidity unit (NTUs), usually comparing upstream and downstream of an activity. Turbidity increased from 10 NTUs pre-event to 61 NTUs on the day of the event, with a reduced level of 6 NTUs post-event. With a consistent stream flow and no other disturbances to the stream, this general comparison indicates an increase in sediment load on the day of the event, decreasing within hours of recreational vehicle disturbance. Although it is difficult to quantify the sediment contribution from vehicle use, it can be assumed that vehicles re-suspend sediment already present in the streambed when crossing the stream.

Other parameters sampled during the permitted events are determined to not be influenced exclusively by the recreational vehicles. Stream temperature, dissolved oxygen, and total phosphorous levels have been elevated at the sample locations but are related to the high day-time temperatures and low flow conditions during mid- to late summer.

Although this effort was focused on one area of the Monument, it points to water contamination from vehicle disturbance and the need for additional data on this activity throughout the Monument.

Manti-La Sal National Forest

Water quality in the Manti-La Sal National Forest is assessed using the USDA Forest Service Watershed Condition Framework. In 2011, twelfth-level subwatersheds (typically 10,000 to 40,000 acres) across all NFS lands were classified using the national watershed condition framework (USDA Forest Service 2011). The classification was re-evaluated in 2016 and again in 2021. The watershed condition framework was designed to be a consistent, comparable, and credible process for improving the health of watersheds across all NFS lands.

Watershed integrity is evaluated in the context of the natural disturbance regime, geoclimatic setting, and other important factors within the context of a watershed. The definition encompasses both aquatic and terrestrial components because water quality and aquatic habitat are inseparably related to the integrity and functionality of upland and riparian areas within a watershed. The three watershed condition classes are directly related to the degree or level of watershed health or integrity:

- Class 1 – functioning properly: watersheds exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.
- Class 2 – functioning-at-risk: watersheds exhibit moderate geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.
- Class 3 – impaired: watersheds exhibit low geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.

Using this framework, a watershed is considered in good condition if it is functioning in a manner similar to one found in natural wildland conditions. This characterization should not be interpreted to mean that managed watersheds cannot be in good condition. A watershed is considered to be functioning properly if the physical attributes are appropriate to maintain or improve biological integrity. This consideration implies that a Class 1 watershed in properly functioning condition has minimal undesirable human impact on natural, physical, or biological processes and is resilient and able to recover to the desired condition when or if disturbed by large natural disturbances or land management activities. By contrast, a Class 3 watershed has impaired function because some physical, hydrological, or biological threshold has been exceeded. Substantial changes to the factors that caused the degraded state are commonly needed to set them on a trend or trajectory of improving conditions that sustain physical, hydrological, and biological integrity.

Table 6.11-3 provides the 2021 watershed framework indicator ratings for USDA Forest Service twelfth-level HUCs that cross into the Manti-La Sal National Forest and are therefore managed in part by the USDA Forest Service.

Table 6.11-3. 2021 Watershed Framework Indicator Ratings for USDA Forest Service Twelfth-Level Hydrologic Unit Codes in the Manti-La Sal National Forest

HUC 12 Name	Total Acres	Percentage of NFS Acres	Watershed Condition Class
Johnson Creek	15,548	80	Class 2
Peavine Canyon	18,714	100	Class 2

Watersheds within the Manti-La Sal National Forest are managed by the USDA Forest Service to improve the condition class. This includes physical attributes that improve biological integrity. The presence of invasive species of flora including reeds and trees diminish the indigenous biological diversity critical for a watershed to be classified in Class 1. The NFS has internal programs to improve watersheds by eradication of invasive species. The internal program, Watershed Improvement Tool, provides efforts to treat and remove tamarisk along streams. In 2015, the Watershed Improvement Tool resulted in the biological herbicide treatments of 7.1 miles of streams within BENM and the physical removal of tamarisk along an additional 2.5 miles of stream within the Monument. These efforts aim to increase water resources to indigenous species, improve natural habitat of fauna, and increase the overall condition of these watersheds. See Section 6.1 for more information on invasive vegetation removal.

WATER QUANTITY

Average precipitation in the Planning Area is varied based on elevation. In the Planning Area, there are 14 BLM rain gauges located across a range of elevations, from the Lake Canyon Rain Gauge at 5,300 feet above sea level to the Dark Canyon Plateau Rain Gauge at 7,500 feet above sea level.

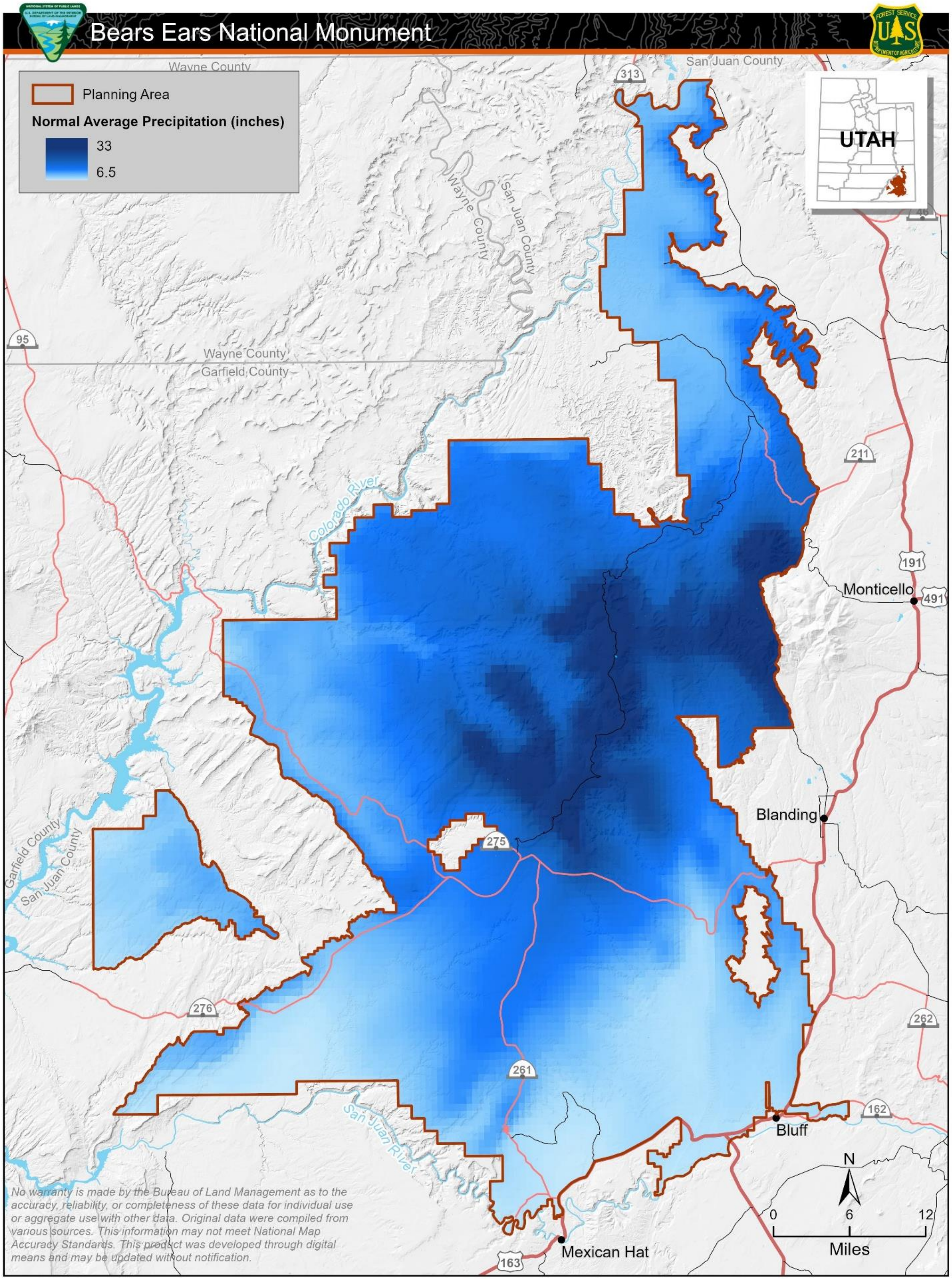

Figure 6.11-1. Average precipitation in the Planning Area.

There is high variability in precipitation across the Planning Area that is largely tied to elevation; average annual precipitation rates are between 7 and 33 inches (Figure 6.11-1), with areas closer to Lake Powell, Lockhart Basin, and Indian Creek receiving closer to 7 inches and higher elevation regions, such as Deer Flat and Dark Canyon Plateau receiving 14 to 16 inches on BLM-administered lands (Northwest Alliance for Computational Science and Engineering 2022).

Within the Planning Area, there are 53 active water rights. Current management for the USDA Forest Service (Water Uses Management (F07) [III 33-04]) prohibits new or expansion of existing spring or other water source development and related facilities when loss of water results in unacceptable impacts on riparian areas, vegetation, fisheries, or other USDA Forest Service resources and uses (USDA Forest Service 1986).

PWRs are federally reserved water rights created by EOs and are designed to reserve natural springs and water holes on public lands for general public use. A PWR designation is a federally reserved water right as well as a land withdrawal. To date, many of these PWRs have not been registered with the State of Utah and/or are not adjudicated. There are 96 PWRs within the Planning Area.

Groundwater

Groundwater is the source of water for streams, springs, and seeps that support riparian resources and wildlife habitat in the Planning Area boundary. Groundwater occurs in both consolidated and unconsolidated rock aquifers that underly the Planning Area. Surface water and groundwater resources are interconnected. Changes to groundwater conditions, such as water quality or depths, can affect surface water resources over time. Groundwater resources, recharge by infiltration of snowmelt, rainwater, and, sometimes, stream flows can be affected by surface water conditions and climatic variations.

Shallow groundwater resources are found in unconsolidated rock alluvial aquifers in valley bottoms, especially along Comb Wash and Butler Wash. Alluvial aquifers are generally characterized by high transmissivities and high storage coefficients (up to 20%). Waters are shallow, and depth to water fluctuates seasonally. The principal aquifer that underlays most of the Monument is located in Cedar Mesa Sandstone.

Within the Planning Area, there are three drinking water protection zones. A drinking water source protection plan was created in 2000 for three different wells located on BLM-administered lands within the Planning Area, just east of Blanding, Utah (Martin 2000), including the Kane Gulch Ranger Station, the Sand Island Ranger Station, and portions of Natural Bridges National Monument. All three wells are located in the Cedar Mesa Sandstone at between 500 and 750 feet below ground surface. These wells are used for drinking water and restroom facilities, and water use ranges from 700,000 to 800,000 gallons per year (Martin 2000).

A formal water rights agreement between the State of Utah and the United States was signed in 2010 to address federal reserve water rights in Natural Bridges National Monument, including groundwater and other natural sources of water. This agreement established a groundwater protection zone, which is mainly located on BLM-administered lands for groundwater occurring within the Cedar Mesa Sandstone. As part of this agreement, diversion limits were placed on the groundwater protection zone, which can be found in *Natural Bridges National Monument Water Rights Agreement* ((Utah Department of Natural Resources 2010).

In 1997 a preliminary evaluation report was written for the Kane Gulch Well. This well and associated water system is classified as a transient/non-community water system and was drilled to support residential use (BLM-Moab FO 1997). This well was drilled into the Cedar Mesa Sandstone and water was encountered at around 600 feet below ground surface (BLM-Moab District 1997). The preliminary evaluation report was written to support the BLM in seeking protected aquifer classification (BLM-Moab District 1997). As part of this preliminary report, it was determined that the travel velocity is 0.007 foot/day and the total travel distance over a period of 250 day is 2 feet (BLM-Moab District 1997).

Groundwater occurs in both consolidated and unconsolidated rock aquifers within the Planning Area. The main aquifer, known as the P aquifer, is in Cedar Mesa Sandstone. Recharge primarily occurs as infiltration from precipitation in the upland areas and is higher in areas with highly fractured rock or in areas with shallow sandy soils and high infiltration rates. Recharge can also come from infiltration of surface water from streams and springs. Discharge from this aquifer can be found at most springs, seeps, and streams throughout the Planning Area.

Surface and groundwater fluctuations in the Abajo Mountains and in mesas and canyons are driven by geology and climate (USDA Forest Service 2017). Climatic conditions such as wind erosion, freezing/thawing, and fluvial processes have shaped the landscape. Water flow patterns are highly influenced by topography and bedrock geology. The high-elevation portions generally have low erosion risk. Water flow patterns are highly influenced by topography and bedrock geology.

SPRINGS

Springs are critical resources within management areas because they provide critical biological ecosystems, especially considering the semi-arid climate of BENM. Their inventory and preservation through sound management practices ensure intact ecosystems and high-functioning environmental services.

There are multiple resources available for information on springs, including the BLM database, BLM RIPS database, NHD, USGS database, SSI, and USDA Forest Service database. No one resource reflects a comprehensive view of all springs and their associated locations and data. More work needs to be done to achieve this comprehensive view.

A field inventory of springs in BENM on land managed by the USDA Forest Service was conducted by SSI, a 501(c)(3) non-profit organization dedicated to advancing the understanding and stewardship of springs ecosystems. SSI gathered springs data from diverse sources, including a wide array of agencies, universities, researchers, non-governmental organizations, and knowledgeable members of the public prior to field verifying the collected data in mid-September 2021. Following this effort, SSI identified records of 66 springs within the Planning Area on lands managed by the USDA Forest Service (SSI 2022).

Of these 66 springs, 15 were assessed as having impaired conditions based on geomorphology. The report identified the impairment as likely due to the development of those springs for livestock use. However, the report also acknowledged the “techniques and equipment that can be employed to develop springs for livestock use while minimizing impact on the microhabitat array” (SSI 2022).

Springs inventories were verified along two different protocols: Level I and Level II. Level I springs are field verified through photographic and georeferenced evidence of criteria supporting the classification that the region is a spring. Level I protocol applies to springs and other temporally dependent variables in field verifications. Level II protocol dictates more robust studies of springs including the geomorphology, measurement of water quantity and quality, and the delineation of habitat dependent upon the water resources. Springs verified by Level II protocol are controlled through quality assurance procedures.

By mid-September 2021, SSI had completed Level 1 and Level II protocol data collection procedures on 24 springs on NFS lands within the Planning Area. This consisted of seven springs verified by Level 1 protocols and 17 springs verified by Level II protocols (SSI 2022).

Additionally, the EPA has partnered with the Ute Mountain Ute Tribe to complete spring surveys in the White Mesa area of the Planning Area. Both Tribal and non-Tribal communities in White Mesa use groundwater for drinking water and watering livestock. This ongoing effort is to understand potential impacts of the White Mesa Mill on groundwater. Springs on BLM-administered land that are currently being targeted for sampling consist of Corral Spring, Cottonwood Spring, Entrance Spring, Oasis Spring, and Ruin Spring are all monitored as part of this effort. At each well, data is collected on flow, water chemistry, and ecological characterization (personal communication, Ann Aubry, Canyon Country District Hydrologist, Bureau of Land Management, to Collin Larrick, Water Quality Program Manager, Ute Mountain Ute Tribe, July 29, 2021). As part of initial sampling at these springs, the Ute Mountain Ute Tribe Water Quality Program has identified elevated uranium and gross alpha at Entrance Seep, located near the White Mesa Mill. Additional sampling efforts are ongoing to understand the water quality and conditions of these springs (personal communication, Ann Aubry, Canyon Country District Hydrologist, Bureau of Land Management, to Collin Larrick, Water Quality Program Manager, Ute Mountain Ute Tribe, July 29, 2021).

UDWQ operates and maintains several monitoring springs on BLM-administered land to monitor contamination from the White Mesa Mill.

Water quality present in springs are directly related to the support of vegetation, aquatic species, and human communities in the immediate area of the spring. As identified in *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022), "Prayers and offerings are regularly made at springs and shrines along a given travel route. Therefore, trails, trail markers, springs, and shrines all constitute a sacred geographical complex associated with travel." Additionally, water from springs in BENM is used for religious and ceremonial purposes (BEC 2022). The studies conducted by SSI and the EPA in partnership with the Ute Mountain Ute Tribe, referenced above, seek to determine water quality at springs within the Planning Area to determine the health of immediate habitats for diverse vegetation and aquatic species.

GROUNDWATER QUALITY

Most springs originate from the Cedar Mesa Sandstone aquifer; in general, the quality is excellent, and no treatment outside of chlorination is needed (NPS 2020).

Shallow groundwater resources are found in unconsolidated rock alluvial aquifers in valley bottoms, especially along Comb Wash and Butler Wash. Alluvial aquifers are generally characterized by high transmissivities and high storage coefficients (up to 20%). Waters are shallow, and depth to water fluctuates seasonally.

Wetlands and Riparian Areas

Wetlands are areas that are periodically or permanently inundated by surface water or groundwater and support vegetation adapted for life in saturated soil. Wetlands include swamps, marshes, bogs, and similar areas (U.S. Army Corps of Engineers 2022). Riparian zones are lands that occur along edges of waterbodies such as rivers and lakes (NPS 2022). Wetlands and riparian areas are some of the most productive and diverse portions of land, but they typically compose small percentages of the total land area in the arid Southwest. Benefits from these areas are essential to both human and wildlife values. For humans, wetland and riparian areas provide recreational, scenic, livestock production, and hunting values.

Additionally, the lifecycles of most mammals, birds, amphibians, and fishes rely partially or wholly on these areas. Riparian areas offer wildlife species water, food, cover, and travel corridors.

Wetland and riparian areas are often used as indicators of overall land health and watershed conditions because they are fragile resources and are often some of the first landscape features to reflect impacts from management activities. Within the arid Southwest, wetlands are heavily reliant on the duration, frequency, and source of water availability. There are many watercourses within the Planning Area; the largest is the San Juan River in the southern Planning Area and the Colorado River in the northern portion of the Planning Area.

Based on NWI data, there is approximately 16,640 acres of wetlands within the Planning Area (Figure 6.11-2, Table 6.11-4) (USFWS 2022).

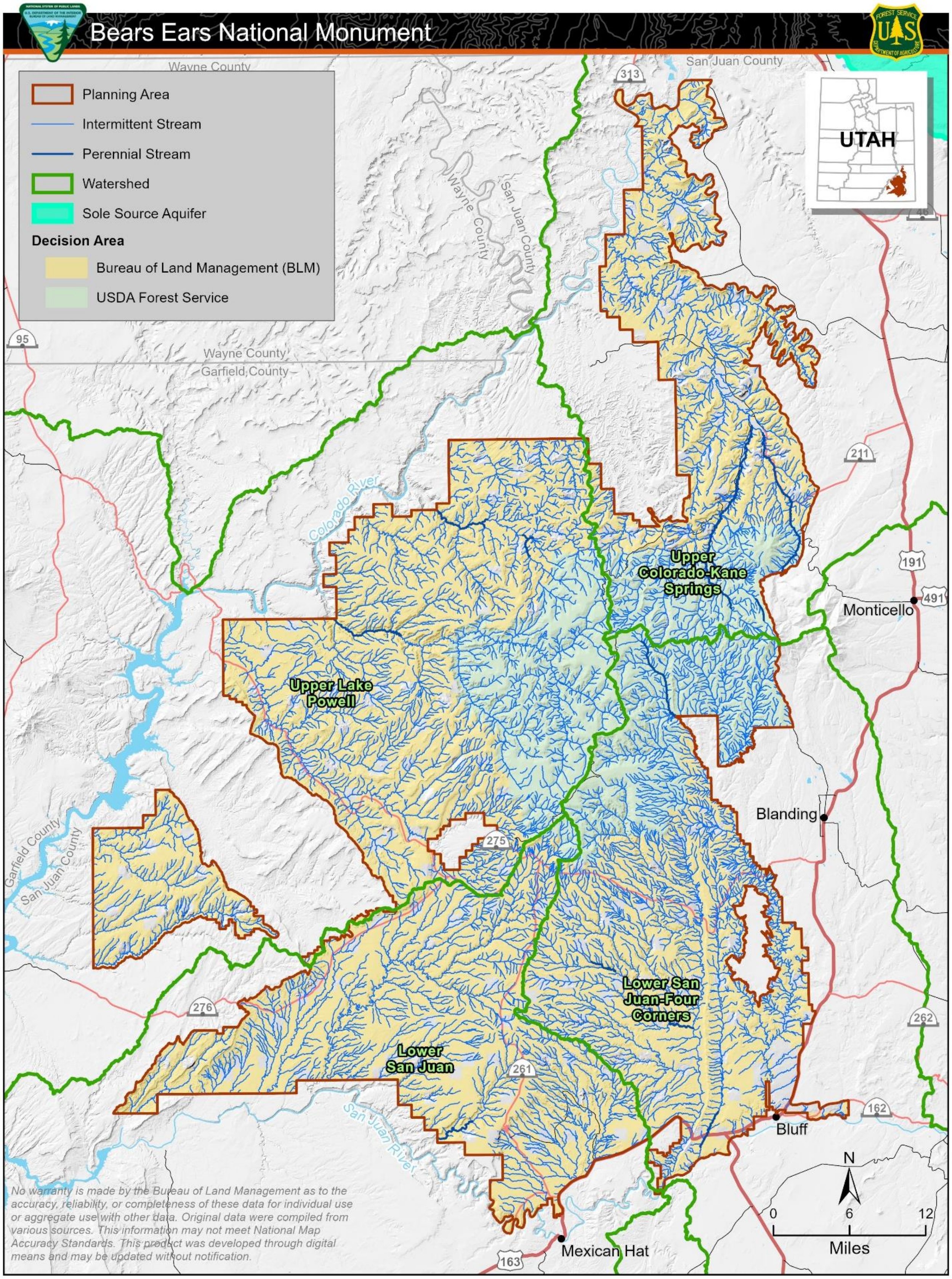

Figure 6.11-2. National Wetlands Inventory data for the Planning Area.

Table 6.11-4. National Wetlands Inventory Data within the Planning Area by Landownership

Wetland Classification*	Acres								
	BLM	Indian Reservation	NPS	Private	State	State Parks and Recreation	USDA Forest Service	USFS Wilderness Area	Total
Lacustrine, Limenetic				36.85					**36.85**
Palustrine, Aquatic Bed	18.91			1.08	3.28		34.23		**57.50**
Palustrine, Emergent	67.35	5.41		4.25	14.12		40.86	20.39	**152.38**
Palustrine, Forested	29.43	6.76							**36.20**
Palustrine, Scrub-Shrub	518.37	145.33	0.00	35.81	25.77		6.21	4.11	**735.59**
Palustrine, Unconsolidated Bottom	0.35	0.17		0.50			3.17		**4.19**
Palustrine, Unconsolidated Shore	62.73			1.91	5.28		9.93		**79.85**
Riverine, Intermittent	10,584.14	1.41	1.58	164.71	1,089.81	0.80	2431.11	658.12	**14931.68**
Riverine, Lower perennial	159.65	165.92		3.41					**328.98**
Riverine, Unknown perennial	45.99	0.18		8.91	5.24		12.53		**72.85**
Riverine, Upper perennial	91.07	2.72		29.37	15.96	0.60	63.81		**203.54**
Total	**11,577.99**	**327.89**	**1.58**	**286.80**	**1,159.46**	**1.40**	**2,601.86**	**682.62**	**16,639.61**

* Based on NWI classification codes (USFWS 2022)

Riparian areas are lands that occur along edges of rivers, streams, lakes, and other waterbodies (NPS 2022). Riparian areas include streambanks, riverbanks, and floodplains. Healthy riparian systems filter and purify water as it moves through riparian zones; reduce sediment loads and enhances soil stability; reduce destructive energies associated with flood events; provide physical and thermal microclimates in relation to the surrounding uplands; and contribute to groundwater recharge and base flow (BLM 1993). Significant changes to surface flows and vegetation communities have occurred throughout the arid West and have led to a change in the distribution of riparian ecosystems (Webb et al. 2007).

In total, there are approximately 6,031 miles of intermittent and perennial streams and washes within the Planning Area (Table 6.11-5) (Utah Automated Geographic Reference Center and USGS 2022). There are also approximately 4,970 acres of riparian habitat mapped within the Planning Area (Table 6.11-6, Figure 6.11-3) (LANDFIRE 2020).

Table 6.11-5 National Hydrography Dataset Features within the Planning Area by Landownership

Type	Linear Feet								
	BLM	Indian Reservation	NPS	Private	State	State Parks and Recreation	USDA Forest Service	USFS Wilderness Area	Total
Canal/Ditch	1.01	0.00	0.00	4.78	0.53	0.00	1.65	0.00	**7.96**
Connector	8.03	0.00	0.00	0.13	0.45	0.00	2.41	0.11	**11.13**
Pipeline: Aqueduct; Underground	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	**0.04**
Pipeline: General Case; Underground	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.00	**0.82**
Stream/River: Intermittent	4,222.09	1.16	0.60	67.83	430.96	0.36	997.84	263.34	**5,984.19**
Stream/River: Perennial	59.94	15.55	0.02	13.12	4.49	0.18	26.63		**119.92**
Total	**4,291.06**	**16.71**	**0.62**	**85.86**	**436.43**	**0.54**	**1,029.39**	**263.45**	**6,124.06**

Table 6.11-6. LANDFIRE Riparian Cover Types within the Planning Area

LANDFIRE Cover Type	BLM	Indian Reservation	NPS	Private	State	State Parks and Recreation	USDA Forest Service	USFS Wilderness Area	Total
Interior West Ruderal Riparian Forest	374.99	55.90	0.00	31.60	13.95	0	0	0	**476.44**
Interior West Ruderal Riparian Scrub	763.08	57.77	0.00	66.82	65.47	0.22	37.80	4.50	**995.67**
Rocky Mountain Lower Montane-Foothill Riparian Shrubland	53.65	0.84	0	13.50	6.13	0	208.96	18.35	**301.42**
Rocky Mountain Lower Montane-Foothill Riparian Woodland	1,285.79	25.81	0.02	285.61	93.26	0.74	1247.45	221.89	**3160.58**
Rocky Mountain Subalpine-Montane Riparian Shrubland	1.87	0	0		0.01	0	18.67	0	**20.56**

LANDFIRE Cover Type	BLM	Indian Reservation	NPS	Private	State	State Parks and Recreation	USDA Forest Service	USFS Wilderness Area	Total
Rocky Mountain Subalpine-Montane Riparian Woodland	0.21	0	0		0.03	0	14.36	0	**14.60**
Total	**2,479.59**	**140.33**	**0.03**	**397.52**	**178.86**	**0.96**	**1,527.24**	**244.74**	**4,969.25**

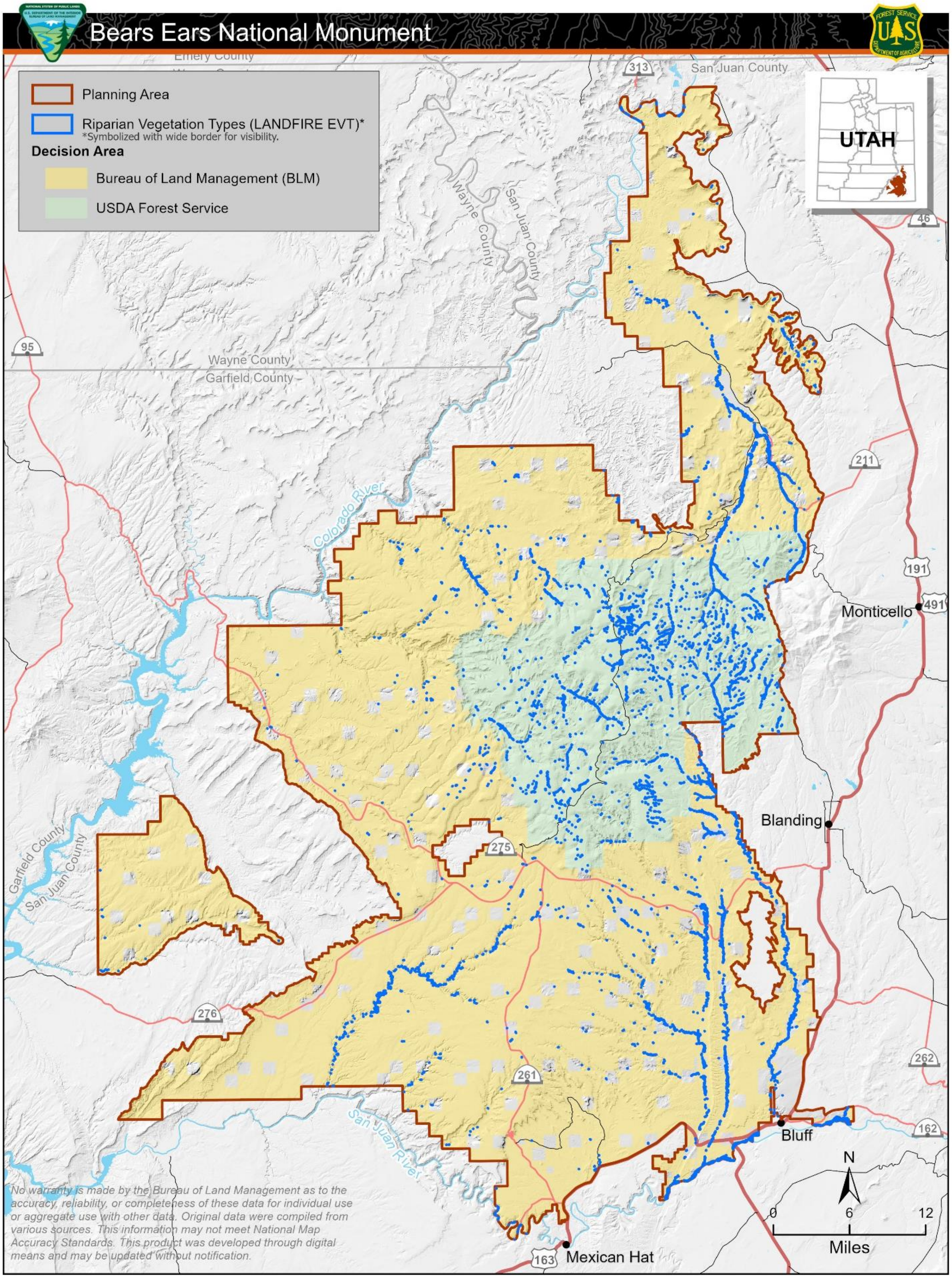

Figure 6.11-3. Riparian LANDFIRE vegetation types within the Planning Area.

FLOODPLAINS

A floodplain is defined as a low-lying area adjoining a river or body of water that is subject to periodic flooding. Floodplains provide risk reduction benefits such as storing flood water and slowing runoff as well as environmental value such as erosion control, groundwater recharge, and fish and wildlife habitat protection (FEMA 2020a). A 100-year floodplain, or Special Flood Hazard Area (SFHA), is defined as an area with at least a 1% probability of flooding in a given year, and a 500-year floodplain is an area with at least a 0.2% probability of flooding in a given year (FEMA 2020b).

Compliance with EO 11988 Floodplain Management requires project development evaluation to ensure that federal agencies "avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and . . . avoid direct or indirect support of floodplain development wherever there is a practicable alternative." The stipulations to this RMP, and subsequently a master leasing plan, under EO 11988, are confined by the extent floodplains have been modeled and mapped by the FEMA National Flood Insurance Program (NFIP). Currently, no portion of the Planning Area has been analyzed through hydrologic and hydraulic modeling to establish an SFHA pursuant to the definition defined by the FEMA NFIP. This does not exempt the Planning Area from FEMA SFHA regulations as any region of interest to federal agencies associated with the occupancy or modification of a floodplain must conduct modeling to determine a hazard.

6.11.2 Trends

Surface Water

WATER QUALITY

Water quality improvement is assumed with the development and implementation of BMPs. The effectiveness of BMPs has been well documented over time (Schuler and Briggs 2000; Seyedbagheri 1996). However, water quality trends since 1982 include higher stream temperatures due to climate change and drought conditions, and aquatic habitat conditions have degraded due to lower flows and larger flood events.

Major degradation of watershed conditions occurred from around 1880 to 1903 due to overgrazing, which led to a lack of vegetation, excessive erosion, flooding, increased sediment in streams, and pollutants such as *E. Coli*. Watershed restoration activities have occurred, beginning mainly in the 1950s with contouring, furrowing, and seeding. These types of restoration activities aid in pollutant loading reductions to surface waters by reducing erosion and reducing surface flow reaching streams. Additionally, the combination of improved land management practices and BMPs have, overall, resulted in improved watershed conditions since the period of 1880 to current times.

Changes in climate play a role in changes to water quality, especially for stream temperature (Poff et al. 2002; USGS 2005; Wenger 2010). The primary effects to water quality from altered flows as a result of climate change are increased salinity, sedimentation, and water temperature (EPA and USGS 2015). Stream temperatures are estimated to rise by 3.13°F within the next 40 years (USDA Forest Service 2016).

WATER QUANTITY

Climatic conditions in the Colorado Plateau region are expected to undergo general warming over the entire region with as much as 3.8°F (2°C) increase by 2060 in some locations. Average summer temperatures are expected to increase, but even greater increases are simulated for the winter months.

Precipitation is expected to decline throughout much of the year during the 2015–2030 period (with the exception of certain months in the fall) with severe drought likely to occur in some areas (Bryce 2012).

Climate change analysis indicates that maximum daily temperatures and minimum daily temperatures have been rising since the 1960s and are predicted to continue rising, by as much as 10°F (12.22°C) through the year 2100. For the past 50 years, hydrologic regimes of the western United States have trended toward earlier snow melt runoff, reduced water yield, lower summer flows, and increased or altered flood risk (Wenger et al. 2010),

Data analysis of water quantity show four major trends: increasingly earlier runoff, lower summer flows, reduced total water yield, and increased or altered flood risk (USGS 2005; Wenger et al. 2010). These alterations will modify snowpack residence time, the timing and volume of peak flows, center of flow mass, summer low flow volumes, and the amount of water available for use (Cummins 2016).

In the IPCC's *Climate Change 2014: Impacts, Adaptation, and Vulnerability*, it was determined that climate change impacts to water supply include decreased water availability and stress on ecosystems as a result of this decreased water availability (Romero-Lankao et al. 2014).

Groundwater

Future trends for water resources within the Planning Area include less recharge to groundwater related to climate change and increased water use for drinking water and recreation uses. These trends will lead to reduced groundwater availability.

Wetlands and Riparian Areas

Riparian and wetland areas are likely to decrease in quality and quantity due to the increasing temperatures, decreasing precipitation, increases in prolonged droughts causing a reduction in groundwater availability, and increases in human activities. Additionally, riparian and wetland ecosystems are greatly used for human, wildlife, and livestock activities, particularly in the arid Southwest where summer temperatures are often extremely high and the area is often in a drought.

Human recreational activity within these ecosystems also typically occurs in the spring and fall seasons. As temperatures increase and precipitation decreases, it is likely that the demand for water resources from humans and animal activities with potential to impact wetland and riparian areas directly or indirectly will increase (Romero-Lankao et al. 2014).

Riparian areas are critical water sources for both livestock and wildlife and will continue to be used in the future. Timing and intensity of livestock grazing in riparian areas has direct effects on degradation of stream channel morphology, reduced riparian and wetland functionality, and decreased biodiversity (Belsky et al. 1999). Upland water sources and range improvements can further distribute livestock across a landscape and reduce grazing pressure on wetlands and/or riparian areas.

FLOODPLAINS

An increase in the occurrence and size of heavy precipitation events has been observed within the United States and has been linked to climate change (Wright et al. 2019). There is evidence that both the size and frequency of these events will continue to increase per degree of warming (Swain et al. 2020). The increase in frequency of heavy rainfall events could result in increased out-of-bank flooding and an expansion of the 100- and 500-year floodplain. These heavy rainfall and flooding events could also remove vegetation within riparian areas and reduce the ability of riparian areas to withstand external influences and maintain stream channel morphology.

6.11.3 Forecasts

Surface Water

WATER QUALITY

Adequate water quality is fundamental for supporting aquatic habitat and geographic ranges of aquatic habitat and wetland species (Poff et al. 2002). The primary drivers for determining future potential water quality conditions are climate change and land use. Potential stressors include wildfire and other natural disasters, alteration of vegetative cover, increasing water demands (i.e., grazing, municipal, and recreational), and increasing demand on riparian areas from land management activities, including grazing, road construction and maintenance, and salvage timber harvest. Potential future stressors are wildfire and natural disasters; decreased water quantity; increased population driving increased industrial, irrigative/agricultural, recreational, and municipal needs; low and peak flow volumes; and related effects to channel morphology and habitat.

WATER QUANTITY

In addition to projected average temperature increases, changing precipitation, continued reductions to snow residence time, increased evapotranspiration, and reduced groundwater recharge also contribute to increased pressure on water quantity (Cummins 2016). Potential watershed stressors include the consequences of altered precipitation, snow storage time, dust impacts to snow residence, and increasing temperatures, as well as increased riparian and recreational area use, increased water demand associated with increasing populations, agricultural/irrigative use and industry, grazing and natural disturbances. Changes can be expected to modify aquatic habitat type and extent, alter vegetation community types, and accelerate evapotranspiration, reducing available flow volume and drying out soils faster. The interconnectedness of these components cannot be overemphasized, and changes in one element can act synergistically with others, compounding the magnitude and severity of effects (Poff et al. 2002).

Additionally, the expected increase in recreational activities may result in increased demand for both surface water and groundwater. This increase in water use may cause reduced stream flows and spring flows and lower groundwater levels.

Groundwater

The expected increase in recreational activities may result in increased demand for both surface and groundwater. This increase in water use may cause reduced stream flows and spring flows and lower groundwater levels, subsequently affecting riparian conditions and aquatic habitats.

As mentioned in the Springs subsection, the 2022 SSI report identified livestock use as impactful to the geomorphology of some springs in the Planning Area (SSI 2022). Enclosures, fencing, and other methods of managing water access for livestock can reduce grazing pressure on natural springs.

As described in the Water Quality subsection in Section 6.11.2, a decrease in stream flows and water levels are documented throughout the Planning Area, impacted by long-term drought (NIDIS 2022). Changing climate conditions may indirectly impact groundwater resources in the Planning Area. Predicted conditions include reduced annual precipitation, warmer temperatures, reduced snowpack, and a shorter winter season of cooler temperatures (Halofsky 2018a, 2018b). This has the potential to reduce aquifer recharge and reduce quantity of flows and length of seasonal flows at springs, seeps, and intermittent stream segments.

Riparian Areas and Wetlands

There is an expected increase in demand on riparian and wetland areas due to the trend of increasing temperatures and decreasing frequency of precipitation and water on the landscape. The reduction in precipitation will likely reduce the acres of riparian and wetland habitat increasing the demand on the remaining areas. With the decreasing quantity and quality of riparian and wetland areas, the demand for diverse wildlife habitat and refuge will become more critical as more species and habitats become sensitive or endangered.

Floodplains

Large flood events are expected to increase in size and frequency due to the increase in heavy precipitation events. The expected increase in 100- and 500-year floods could affect stream morphology and vegetation establishment along streambeds. Additionally, fire damage and loss of riparian vegetation cover can increase the intensity and impacts of flooding. These flood events may reduce the functionality and quality of riparian habitat, increasing the stress on remaining areas.

6.12 MINERALS

6.12.1 Oil and Gas (fluid leasable minerals)

Current Conditions

There are 22 authorized oil and gas leases on BLM-administered minerals in or partially in BENM covering 7,700 acres (Figure 6.12-1). None of these are on federal mineral estate underlying NFS surface. None of the leases are producing; all have been suspended.

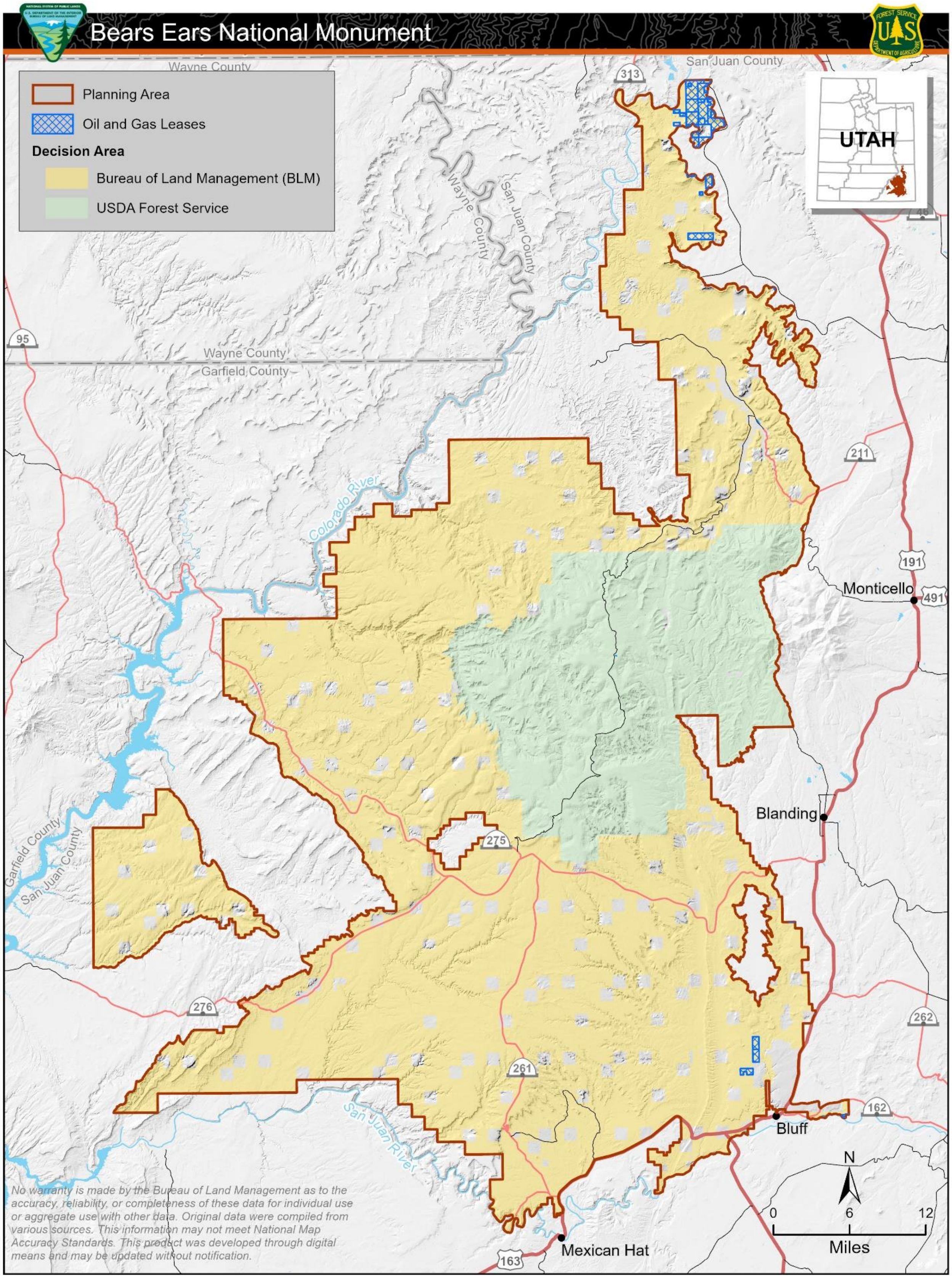

Figure 6.12-1. Existing oil and gas leases and development potential in BENM.

The northern portion of BENM, from Monticello north, is part of the Buried Fault Block Play and has high oil and gas development potential (BLM 2005). As shown in Table 6.12-1 and Figure 6.12-1, this area covers 226,738 acres, or 16% of the Monument (BLM GIS 2022). The majority of the Monument (53%) has moderate oil and gas development potential.

Table 6.12-1. Oil and Gas Development Potential

Development Potential	Acres
High	226,738
Moderate	752,749
Low	450,145

Source: BLM GIS 2022

Trends

The existing oil and gas leases within the Monument were issued in the 1970s and 1980s as well as the early 2000s. They were suspended in the 1990s and late 2000s. The most recent lease suspension was in 2008. There are no producing or active wells in the Monument, and all past wells have been plugged and abandoned.

Forecast

It is possible that existing leases in BENM could be developed, although this is unlikely given that the leases have been suspended since 2008 or earlier.

Presidential Proclamation 10285 withdrew BENM from mineral leasing; no future leases for oil and gas will be issued.

6.12.2 Solid Leasable Minerals

Current Conditions

There are no existing or historical coal leases in BENM.[5]

BENM overlaps 2,607 acres of the Cane Creek known potash leasing area, which has high potential for potash and salt occurrence (Figure 6.12-2). There are 12 pending leases on BLM-administered minerals that have not been issued. These leases have been pending since between 2008 and 2015. None of the pending leases are on federal mineral estate underlying NFS surface.

[5] Personal communication, telephone call, Robert James, Geologist, Bureau of Land Management Monticello Field Office, and Katie Patterson, EMPSi, July 12, 2022.

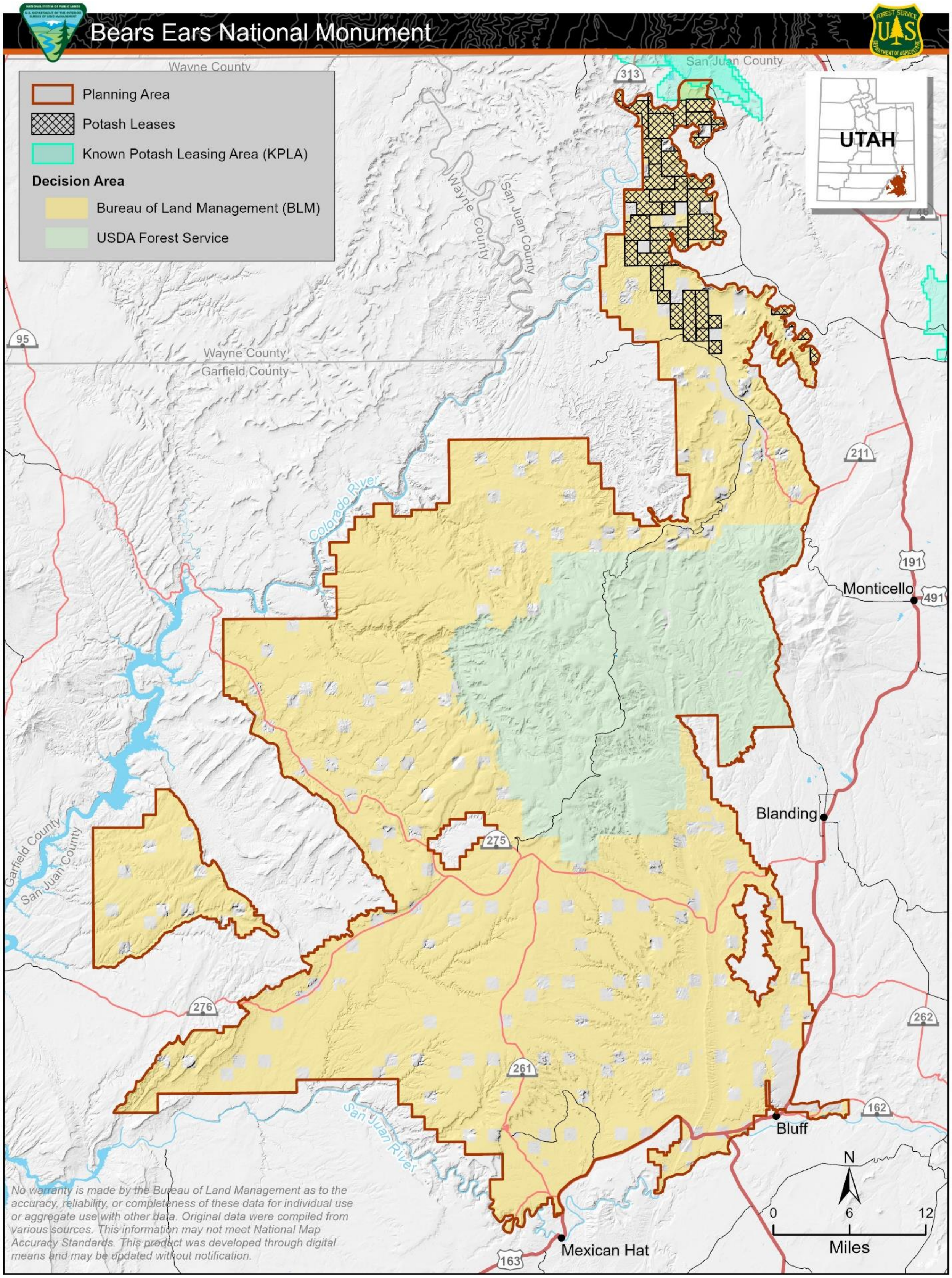

Figure 6.12-2. Existing potash leases and the known potash leasing area in BENM.

Trends

BENM is adjacent to the San Juan Coal Field, but any coal development potential would be low (BLM 2005).

Potash demand is driven mainly by demand for fertilizer. A combination of high fertilizer demand and disruptions in potash supplies have driven up potash prices over the last year, and that trend is expected to continue (Baffes and Koh 2022).

Forecast

Due to the poor quality of the coal resources in BENM, future interest in development is not expected (BLM 2005). Similarly, the agencies expect that interest in potash development in BENM is unlikely due to the high cost of extraction for the potash resources in BENM and easier to mine deposits outside BENM (BLM 2005).

Presidential Proclamation 10285 withdrew BENM from mineral leasing; no future leases for coal, potash, or any other solid leasable mineral will be issued.

6.12.3 Locatable Minerals

Current Conditions

There are 76 active mining claims on BLM-administered mineral estate in BENM and one active notice-level operation, all for uranium and vanadium (BLM GIS 2022).[6] Twenty of the claims were filed in 2018, shortly after the boundaries of BENM were shrunk by Presidential Proclamation 9681. The rest were filed before BENM was originally designated. None of these are on federal mineral estate underlying NFS lands.

Table 6.12-2 and Figure 6.12-3 show existing claims and areas in BENM with uranium and vanadium development potential. Approximately 8% of BENM has high development potential. There are 26 active claims in areas with high development potential, including six claims on federal mineral estate underlying NFS lands (BLM GIS 2022).

Table 6.12-2. Uranium and Vanadium Development Potential

Development Potential	Acres
High	114,303
Moderate	334,837
Low	305,951

Source: BLM GIS 2022

[6] Personal communication, email from Robert James, Geologist, Bureau of Land Management Monticello Field Office, to Katie Patterson, EMPSi, July 26, 2022. A notice is required for exploration on a mining claim causing surface disturbance of 5 acres or less of public lands on which reclamation has not been completed.

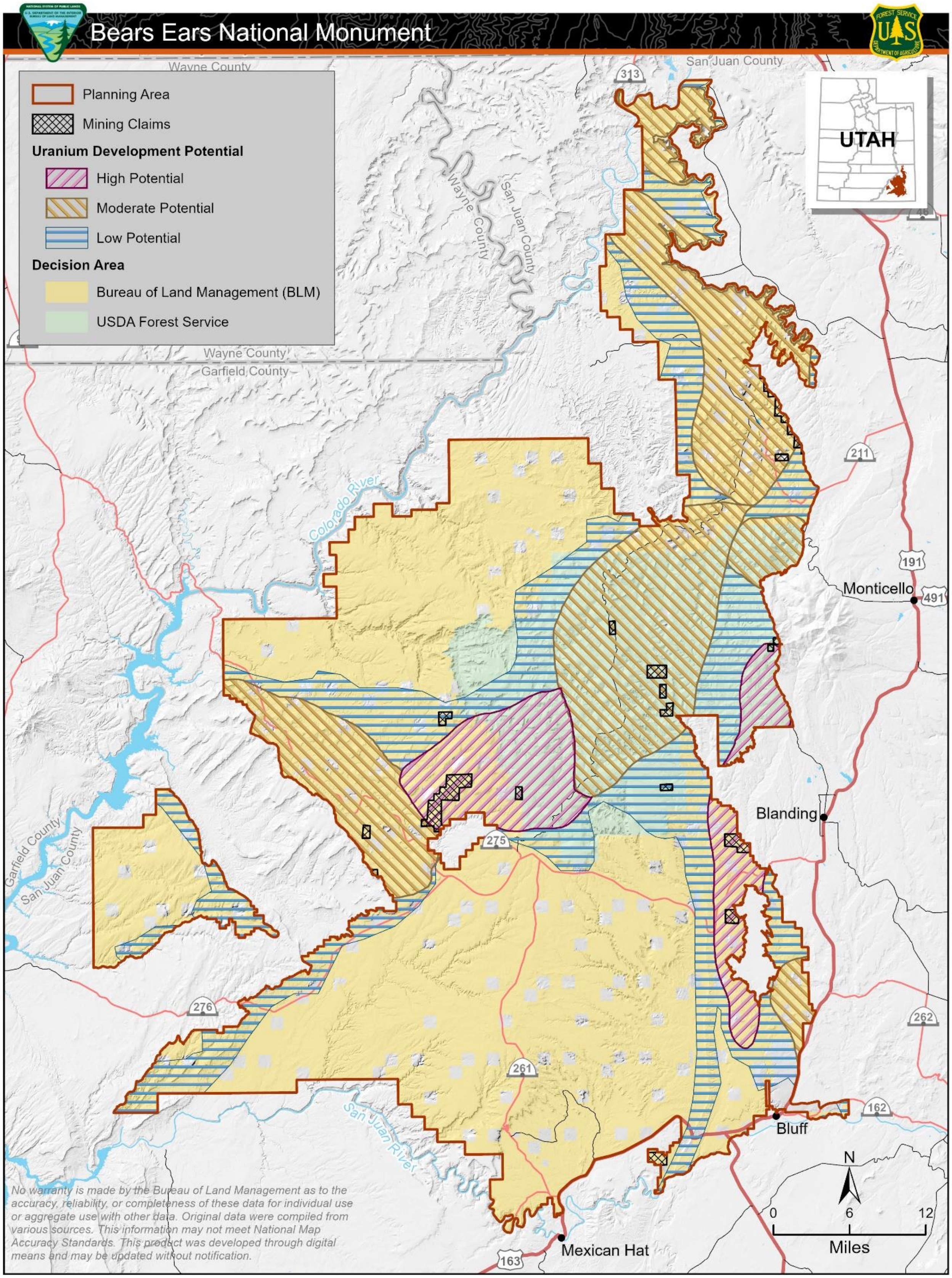

Figure 6.12-3. Mining claims and development potential in BENM.

Trends

Uranium demand is primarily driven by nuclear power generation, and global uranium demand is expected to continue to grow over the next 20 years (World Nuclear Association 2022). Uranium prices have been rising since late 2021 from levels near $30 per pound in September 2021 to a high of over $60 per pound in April 2022. As of August 2022, the current price is just below $50 per pound (Trading Economics 2022). Vanadium is used to produce steel, chemicals, batteries, and aerospace materials and has been listed by the USGS as a critical mineral in 2022 (USGS 2022a). Average vanadium pentoxide prices reached a high of $16.4 per pound in 2018 before declining to $6.7 per pound in 2020. In 2021, prices averaged $8.2 per pound (USGS 2022b). While U.S. consumption of vanadium increased by 25% from 2020 to 2021, vanadium production in Utah did not occur in 2020 or 2021 (USGS 2022b).

Forecasts

Given current prices, interest in uranium and vanadium mining on existing claims is not expected to occur unless prices increase. Existing mining claims would need to undergo a validity examination process before they could be developed. The probability of development depends on a variety of factors, including the quality of the deposits, price trends of the subject mineral resources, and the distance to processing facilities and markets. Any exploration development would also be subject to stipulations to minimize degradation of resource values associated with mineral extraction.

Presidential Proclamation 10285 withdrew BENM from mineral entry; no new mining claims can be staked and located in BENM.

6.12.4 Salable Minerals

Current Conditions

Table 6.12-3 and Figure 6.12-4 show potential for sand and gravel (both salable minerals) in BENM. While BENM has areas with high potential for these salable minerals, there are no existing salable mineral pits in BENM. Previously developed salable minerals pits in BENM have been closed and reclaimed.[7]

Table 6.12-3. Sand and Gravel Potential

Sand and Gravel Potential	Acres
High	84,012
Moderate	77,716
Low	33,595

Source: BLM GIS 2022

[7] Personal communication, telephone call, Robert James, Geologist, Bureau of Land Management Monticello Field Office, to Katie Patterson, EMPSi, August 25, 2022.

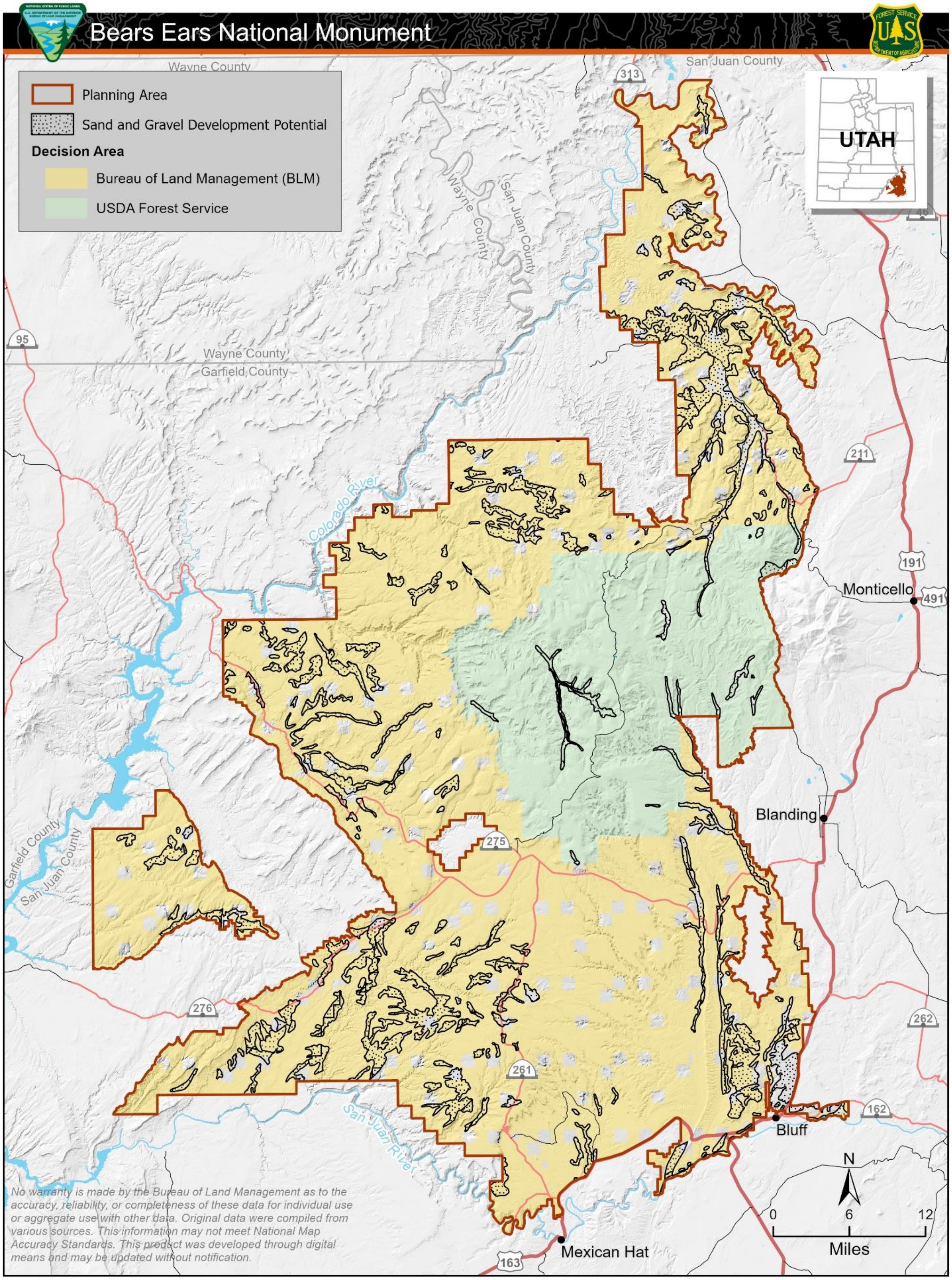

Figure 6.12-4. Sand and gravel potential in BENM.

Trends

Salable mineral pits are typically developed near road or other construction projects to supply materials. There are numerous existing roads throughout BENM; however, there are no existing salable mineral pits in BENM.

Forecast

Because there are no existing salable mineral pits in BENM, the agencies do not expect new interest in salable mineral development in BENM.

Presidential Proclamation 10285 withdrew BENM from sale or other disposition under the public land and mining laws; no new salable mineral disposal may occur in BENM.

6.12.5 Abandoned Mine Lands

Current Conditions

There are abandoned mine land sites in BENM; these have been documented in separate inventories conducted by the UGS, U.S. Department of Energy, and BLM. The Fry Canyon site in BENM was identified as a priority watershed project in Utah by the BLM (BLM 2006). An engineering evaluation/cost analysis comparing options for removal actions has been signed for the site in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).[8]

[8] Personal communication, telephone call, Robert James, Geologist, Bureau of Land Management Monticello Field Office, and Katie Patterson, EMPSi, July 12, 2022.

6.13 PALEONTOLOGY AND GEOLOGY

Presidential Proclamations 9558, 9681, and 10285 specifically call out paleontological resources within BENM and point out that protection of this area will provide important opportunities for further paleontological study. The Proclamations identify geologic formations rich with fossils that provide a rare and relatively complete picture of the paleoenvironment, striking landscapes, unique landforms, and rare and important plant and animal species. The Paleontological Resources Preservation Act of 2009 (PRPA) defines a "paleontological resource" as any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest and that provide information about the history of life on Earth. Among paleontologists, fossils are generally considered to be scientifically significant if they are unique, unusual, rare, diagnostically or stratigraphically important, or add to the existing body of knowledge in a specific area of science. Natural or accelerated erosion, decay, improper collection, and vandalism can remove, alter, or damage those characteristics that make the paleontological resource scientifically important or enjoyable to the public. Thus, the primary resource indicator is whether there is a loss of those characteristics that make the fossil locality or feature important for scientific use or public education and enjoyment.

6.13.1 Current Conditions

The Planning Area is located near the western margin of the Colorado Plateau uplift and comprises a series of plateaus, buttes, and mesas that reflect the type and structure of the underlying geologic strata. The Colorado Plateau is characterized by relatively flat-lying strata that have been locally offset and folded during vertical movements between north- and south-oriented blocks in the earth's crust. This uplift and folding has created spectacular scenery for which the area is known worldwide. The diverse geologic features such as Comb Ridge, Bears Ears Buttes, North and South Sixshooter Peaks, Lavender and Bridger Jack Mesas, and the massive Wingate Sandstone cliffs include unique sequences of exposed sedimentary rock layers. Near the center of the Planning Area are the iconic Bears Ears Buttes—twin buttes of Wingate Sandstone that overlie the Triassic Chinle Formation.

The Planning Area includes bedrock geologic formations ranging in age from Pennsylvanian to Late Cretaceous and unconsolidated Neogene deposits probably dating back to at least the early Pleistocene (Figure 6.13-1). The geology of the Planning Area is characterized primarily by the stratigraphic sequence of sedimentary units dating from the Jurassic, Triassic, Permian, and Pennsylvanian periods. The older Pennsylvanian/Permian and Triassic rocks, which include the Cutler Group, the Moenkopi Formation, and the Chinle Formation, are the dominant geologic units within the Planning Area. The remainder of the Monument is still dominated by younger sedimentary units of Jurassic age, which includes the Morrison Formation and the Glen Canyon Group. Fossil-bearing sedimentary rocks range in age from latest Pennsylvanian to Jurassic, with some overlying Quaternary-Holocene age deposits. Fossils preserved in these deposits include invertebrate, vertebrate, and plant fossils. Vertebrate fossils include the body remains of fish, amphibians, reptiles (including dinosaurs), and mammals as well as their tracks and traces. These fossils can occur in rocks of Pennsylvanian, Permian, Triassic, Jurassic, Quaternary, and Holocene age and include specimens unique to this area (Gay et al. 2020).

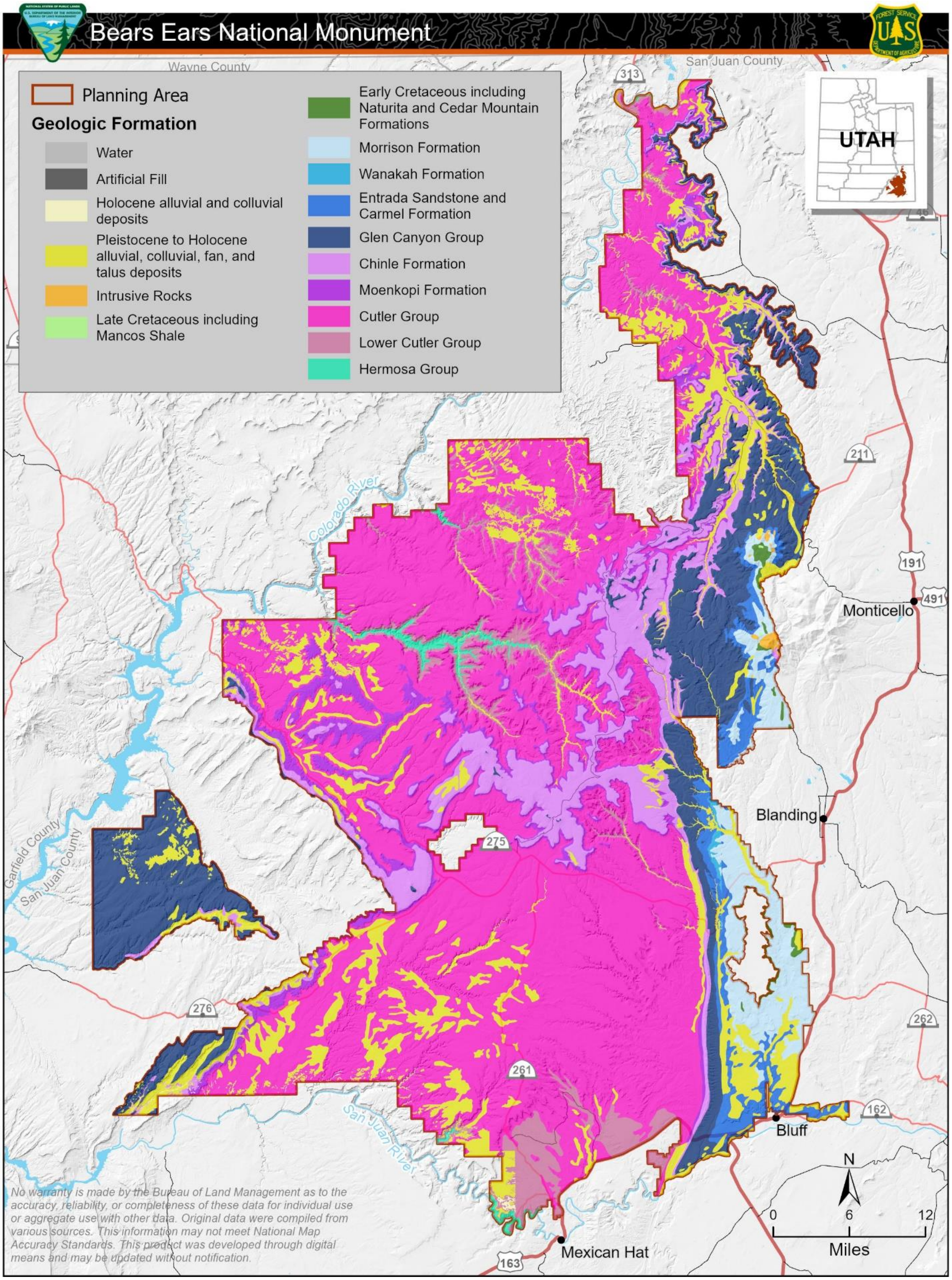

Figure 6.13-1. Geologic formations in the Planning Area.

The first scientific work done in this area was the description of a phytosaur (crocodile-line reptile) from the Chinle Formation of San Juan County (Lucas 1898). Since this time, several additional research teams have come to the area intermittently to search for fossils. The types of fossils preserved in a sedimentary rock sequence depend on the geologic age of the rocks in which they occur and the environment in which the sediments that comprise the rocks accumulated. The types of rocks that are exposed at the surface of an area and can potentially yield fossils is the result of geologic history through processes such as original deposition, structural deformation, and erosion. Portions of the Planning Area, such as the northeast corner in and around Indian Creek, have a higher number of vertebrate and trace fossils; this is due in part to a higher number of field surveys that have taken place in units where trace and vertebrate fossils are commonly found.

A paleontological resources classification system utilized by management agencies, including the BLM and USDA Forest Service is the Potential Fossil Yield Classification (PFYC) system, which classifies areas according to their potential to contain vertebrate fossils or noteworthy occurrences of invertebrate or plant fossils (BLM 2022a). Under the PFYC, geologic units are classified based on the relative abundance of vertebrate fossils or uncommon invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher potential. This classification is best applied at the geologic formation or member level. It is not intended to be an assessment of whether important fossils are known to occur occasionally in these units (i.e., a few important fossils or localities scattered widely throughout a formation does not necessarily indicate a higher class), nor is it intended to be applied to specific sites or areas. The classification system is intended to provide baseline guidance to assessing and mitigating impacts to paleontological resources. In many situations, the classification should be an intermediate step in the analysis and should be used to assess additional mitigation needs. Classifications are from very low to very high potential to contain paleontological resources (PFYCs 1 to 5) as well as unknown potential (PFYC U). PFYC classes for the Planning Area are shown on Figure 6.13-2.

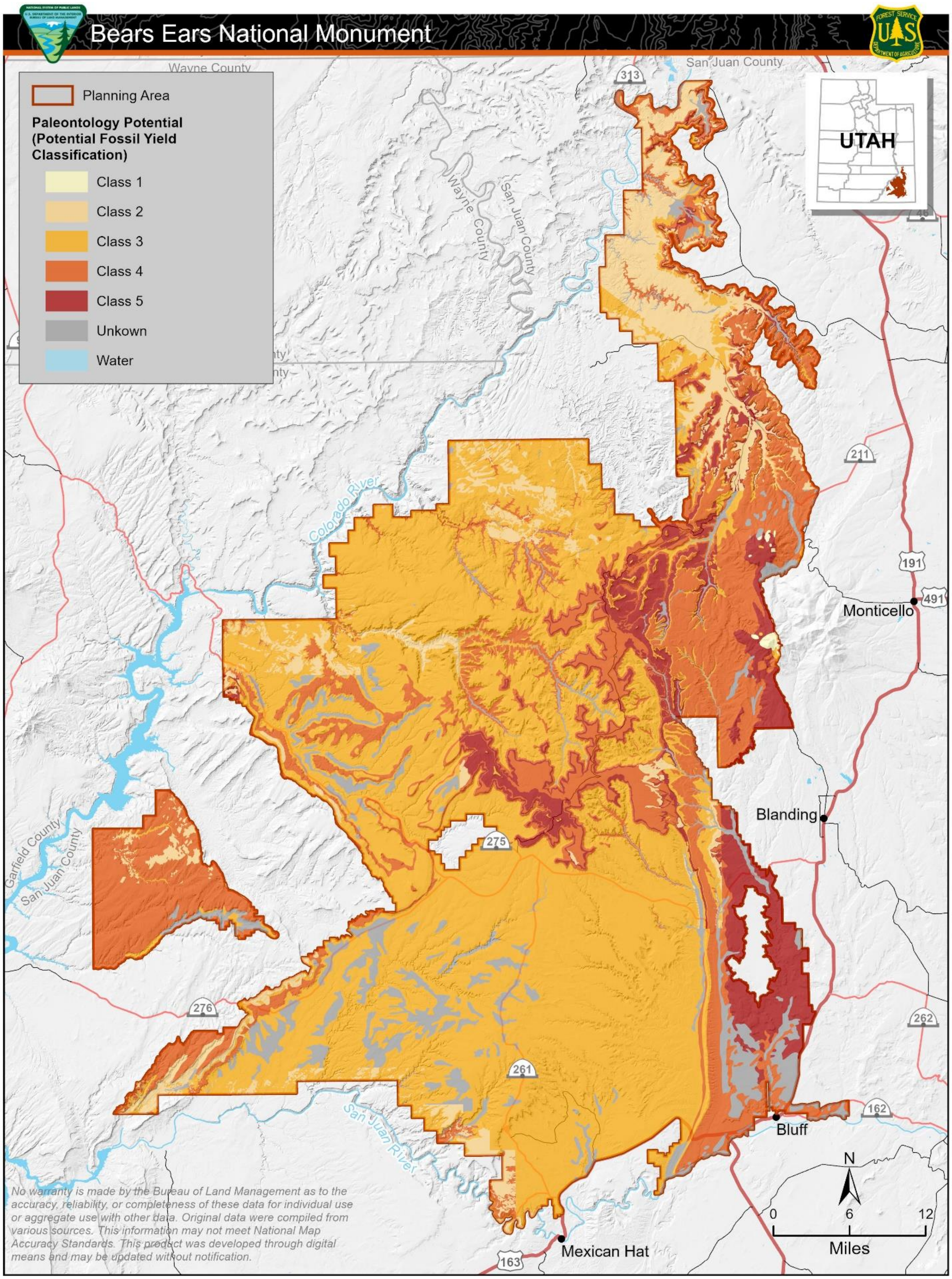

Figure 6.13-2. Potential Fossil Yield Classification of the Planning Area.

Approximately 32% of the lands within the Planning Area have high potential (PFYC 4 or 5), 53% have moderate potential (PFYC 3), 9% have lower potential (PFYC 2); and 7% have unknown potential (PFYC U) for finding fossils (BLM 2022b). Table 6.13-1 list the geologic units, PFYC ranking, and acres of each geologic unit in the Planning Area and Table 6.13-2 summarizes the Planning Area by PFYC rank and landownership. In addition to paleontological potential, the accessibility to the exposures may impact the potential for finding, documenting, collecting, and research of specimens. Some of the geologic units, including the Cutler Group and the Moenkopi and Morrison Formations, have vast exposures with multiple access points in the Planning Area. Conversely, exposures of other units, including those of the lower Jurassic Wingate and Navajo Sandstones, which contain some of the first dinosaurs, form steep slopes that are difficult to access. The Kayenta Formation is also difficult to access and is thin, making the potential for surface discoveries more challenging. Some of the Chinle Formation badlands are accessible by roads originally constructed to access the area for the study of uranium deposits, otherwise these badlands would be nearly impenetrable (Gay et al. 2000).

Table 6.13-1. Geologic Units within the Planning Area

Geologic Unit Name	Map Abbreviation(s)	Age	PFYC	General Fossil Description*	Acres
Artificial fill	Qf	Holocene	2	Disturbed sediment. Fossils unlikely but if present are out of geological context.	2
Younger alluvial, eolian, and colluvial deposits	Qac, Qae, Qal1, Qace, Qae	Holocene	2	Sediments are generally too young to contain fossils.	951
Mixed eolian, colluvial, alluvial stream, and alluvial fan deposits, often eolian sand at the surface covers the alluvial deposits	Qace, Qae, Qe, Qea, Qeaf, Qeat, Qes	Pleistocene to Holocene	2	No known paleontological resources. Pleistocene deposits could contain fossils. Unofficial mentions of fossils in gravels in the area.	74,332
Alluvial fan, stream, eolian, and colluvial deposits	Qaec, Qaeo, Qal, Qa, Qao, Qe	Pleistocene to Holocene	U	No known paleontological resources. Pleistocene deposits could contain fossils. Unofficial mentions of fossils in gravels in the area.	92,581
Mixed alluvial fan, eolian, colluvial, and talus deposits, including some older deposits	Qafe, Qafeo	Pleistocene to Holocene	3	Pleistocene deposits could contain fossils.	1,152
Talus deposits with eolian sand	Qmte, Qmt	Pleistocene to Holocene	U	In situ fossils unlikely. Fossils, if observed, will be out of their original geologic context.	747
Mass-movement landslides, slumps, and talus	Qms, Qmsb, Qmst, Qls	Pleistocene to Holocene	2	In situ fossils unlikely. Fossils, if observed, will be out of their original geologic context.	16,516
Older alluvial and eolian deposits	Qaco	Pleistocene	U	Pleistocene deposits could contain fossils. Unofficial mentions of fossils in gravels in the area.	42
Terrace deposits	Qat	Pleistocene	U	Pleistocene deposits could contain fossils. Unofficial mentions of fossils in gravels in the area.	63
Intrusive rocks-Tertiary	Ti	Paleocene to Pliocene	1	No fossils, igneous rock formation.	1,513
Late Cretaceous Formations including the Mancos Shale	K2	Cretaceous, Mesozoic	3	Numerous types of vertebrates, invertebrates, plants in these geologic units. Types depend on specific geologic unit.	205

Geologic Unit Name	Map Abbreviation(s)	Age	PFYC	General Fossil Description*	Acres
Early Cretaceous Formations including the Naturita (unit previously assigned to the Dakota) and Cedar Mountain (or Burro Canyon) Formations	K1	Cretaceous, Mesozoic	5	Numerous types of vertebrates, invertebrates, plants including footprints of theropods, sauropods, and ornithischians in the Burrow Canyon, unidentified leaves in the Naturita, and petrified wood from ferns in both formations.	3,632
Morrison Formation, including the Bluff Sandstone Member	J2, Jmbl	Jurassic	5	Diverse vertebrate fauna famous for dinosaurs including body fossils of ornithischians, sauropods, and theropods, as well as footprints and trackways. Other fossils include conchostracans, fish, squamates, sphenodontian, mammaliaforms, crocodyliform footprints, invertebrate traces, wood, palynomorphs, and multiple taxa of leaves including those of ferns, ginkgophytes, and conifers.	49,546
Salt Wash Member, Morrison Formation	Jms	Jurassic	4	Less fossiliferous than other members, still contains important localities. Fossils include petrified wood.	675
Wanakah Formation	Jw	Jurassic	2	Few fossils, except bioturbation (trace fossils) and algal mats	1,533
Entrada Sandstone	Je	Jurassic	3	Mostly tracks and traces including burrows and dinosaur footprints, possibly a small crocodyliform.	220
Early Jurassic Formations including the Summerville, Entrada, and Carmel Formations	J1	Jurassic	4	Mostly tracks including important theropod tracks in the Summerville and some marine fossils Carmel includes extensive invertebrate assemblages in marine facies and dinosaur footprints in costal deposits.	28,662
Carmel Formation, undivided	Jc	Jurassic	3	Extensive invertebrate fossil assemblages and dinosaur footprints	5,074
Dewey Bridge Member of Carmel Formation	Jcd	Jurassic	2	No fossils document but are possible in the paleoenvironment.	357
Navajo Sandstone	Jn	Jurassic	4	There are burrowed and rooted horizons, as well as fossiliferous playa lake facies that contain large conifer logs, leaves, ostracods, invertebrate and vertebrate burrows, and diverse assemblage of vertebrate tracks. Vertebrate body fossils are rare, the Planning Area contained the early sauropodomorph dinosaur *Seitaad ruessi*, and there are additional vertebrate taxa, including other sauropodomorphs, a theropod, crocodylomorphs, and actinopterygian fish.	36,172
Limestone and dolomite beds in Navajo Sandstone	Jnl	Jurassic	3	Fossiliferous playa lake facies	8
Kayenta Sandstone	Jk	Jurassic	4	Unionid bivalves, petrified wood, and tetrapod rib. Vertebrates south of the Planning Area include hybodont and osteichthyan fishes, amphibians, caecilians, turtles, crocodiles, dinosaurs, cynodonts, mammals, and more. Diverse and abundant track assemblages are common.	55,136

Geologic Unit Name	Map Abbreviation(s)	Age	PFYC	General Fossil Description*	Acres
Wingate Sandstone	JTRw, Jw	Triassic to Jurassic	3	Vertebrate body fossils are limited to the Chinle-Wingate contact. Numerous tracks on slump blocks, but none in original stratigraphic position.	16,193
Glen Canyon Group (Navajo, Kayenta, Wingate, Moenave Formations) and Nugget Sandstone	Jg	Jurassic	4	Numerous types of vertebrates, invertebrates, and plants in these geologic units. Types depend on specific geologic unit. See individual units for details.	86,764
Chinle Formation, undivided	Tr2	Triassic	3	Diverse (see other Chinle Formation table cells below for specifics)	28,790
Chinle Formation includes Church Rock, undivided Owl Rock and Petrified Forest, and undivided Moss Back and Monitor Butte Members, as well as unmapped Kane Springs beds	TRc, TRcc, TRcl, TRcmm, TRcop, TRcu	Triassic	5	Very diverse flora and fauna, including the first vertebrate fossil, a phytosaur, documented in the Planning Area region. Other fossils include vertebrate tracks, lung fish burrows, gastropods, molluscs, crustaceans, temnospondyl amphibians, unknown vertebrate bones and teeth, and a diversity of leaves, including ferns and conifers. Church Rock Member preserved articulated skeletons of actinopterygian and at least one type of coelacanth, as well as possibly a very rare procolophonid parareptilia (or from the Owl Rock Member). Rare occurrences described from the Monitor Butte Member are bones from at least crocodylomorphs and from the Petrified Forest Member are a possible theropod vertebrae and claws and an ornithischian right mandible.	67,655
Chinle Formation includes Moss Back and Shinarump Conglomerate members	TRcms, TRcs	Triassic	3	Wood and leaves, including ferns and conifers. Vertebrates include metoposaurid temnospondyls, phytosaurs, and aetosaurs. Invertebrates include bivalves, gastropods, and ostracods.	37,832
Moenkopi Formation	Tr1	Triassic	4	Numerous types of vertebrates, invertebrates, plants in these geologic units. Specific types depend on specific geologic unit. See individual units for details.	34,279
Moenkopi Formation, including the Hoskinnini Sandstone and Upper Members	TRm, TRmu, TRmh	Triassic	4	Abundant tracks and traces such as archosauriform reptile swim tracks; plant fragments; fish, including actinopterygian scales, vertebrae, and teeth; amphibian bones.	39,058
White Rim Sandstone (or Formation) and Arkosic facies, Cutler Group	Pwr, Pca	Permian	2	No fossils document but are possible in the paleoenvironment.	38,518
Organ Rock Shale (or Formation), Cutler Group	Po	Permian	3	Fish, amphibians, including large-bodied taxa (e.g., *Diadectes* and *Seymouria*) and the sphenacodontid *Ctenospondylus*, tetrapod trackways, and plants	50,941
Cedar Mesa Sandstone, Cutler Group	Pcm	Permian	3	Osteichthyans, amphibians, amniotes dominated by the synapsid *Sphenacodon*, leaf and stem impressions including conifers, and permineralized logs	290,392

Geologic Unit Name	Map Abbreviation(s)	Age	PFYC	General Fossil Description*	Acres
Cutler Group including White Rim Sandstone, Organ Rock Shale, Cedar Mesa Sandstone, as well as lower Cutler beds	P1	Permian	3	Diverse (see other Cutler Group and lower Cutler bed table cells above and below for specifics)	360,884
lower Cutler beds, including those units mapped as Rico, Elephant Canyon, and Halgaito Formations	PIPhgu, IPhgu, IPhgl, Pcl, PIPcl	Upper Pennsylvanian to Permian	4	Vertebrate fauna, including xenacanth sharks, Chondrichthyans, actinopterygians, temnospondyl amphibians (e.g., Eryops), non-mammalian synapsids, conodonts, marine invertebrates, and plants including leaves and steams of conifers, ferns, and lycopsids.	30,643
lower Cutler beds, including unit mapped as Rico Formation	PP	Upper Pennsylvanian to Permian	3	Specific types depend on specific geologic unit. See individual units for details.	30,571
Honaker Trail Formation, Hermosa Group	IPh, IPht, IPhtl, IPhtu	Upper Pennsylvanian	4	Shark teeth, conodonts, and diverse marine invertebrate fauna, including fusulinaceans, brachiopods, rugose corals, and bryozoan	4,444
Honaker Trail and Paradox Formations, Hermosa Group	P	Upper Pennsylvanian	2	Specific types depend on specific geologic unit. See individual units for details.	4,491
Paradox Formation, Hermosa Group	IPp	Upper Pennsylvanian	3	Poorly fossiliferous salt, some important palynomorphs and interbeds with invertebrates; biohermal dolomitic limestones; diverse microfossils (used in biostratigraphy), conodonts	188

Source: BLM 2022b, Gay et al. 2000

Note: Eighty-two acres are mapped as water and are not included in this table.

* Within and adjacent to the Planning Area, pack rat middens are known to contain bones and teeth of small mammals, avifauna, and herpetofauna. These deposits are younger than the geologic units in which they are found. Thus, they are not included within this classification system.

Table 6.13-2. Acres of Potential Fossil Yield Classification in the Planning Area

PFYC	BLM	State	USDA Forest Service*	Private	Total Acres
PFYC 1	0	0	1,513	0	1,513
PFYC 2	109,817	9,327	2,789	4,853	126,786
PFYC 3	633,425	55,958	97,244	2,708	789,335
PFYC 4	196,507	26,216	124,949	2,222	349,894
PFYC 5	56,370	8,054	54,708	756	119,888
PFYC U	79,951	12,914	7,909	2,572	103,346
Total acres	**1,076,070**	**112,469**	**289,112**	**13,111**	**1,490,762**

Note: Eighty-two acres are mapped as water and are not included in this table.

* Including wilderness areas.

The BLM has identified four objectives for the management of fossil resources on lands it administers. They are 1) locating, evaluating, managing, and protecting fossil resources; 2) facilitating appropriate scientific, educational, and recreational uses of fossils; 3) ensuring that proposed land uses do not inadvertently damage or destroy important fossil resources; and 4) fostering public awareness of the nation's rich paleontological heritage (BLM 1998). As described in "*Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022), there are many traditional stories about animals that are not around today, and it is understood that these beings existed before humans. These creatures, as evidenced today as fossils, should be acknowledged and respected."

Procedural guidance for management of paleontological resources on BLM-administered lands is provided by Paleontological Resources Manual 8270, Handbook 8270-I, Instruction Memoranda 2009-011, Permanent Instruction Memorandum 2022-009; and on NFS lands in the *Training Guide for Management of Paleontological Resources* (BLM 1998, 2008, 2022a; USDA Forest Service 2005).

The PRPA was signed into law March 30, 2009, and outlines responsibilities for managing and protecting paleontological resources on federal lands using scientific principles and expertise. The law directs five federal agencies, including the BLM and USDA Forest Service, to develop appropriate plans for inventory, monitoring, and the scientific and educational use of paleontological resources. Interagency coordination and collaborating with non-federal partners, the scientific community, and the public are important to a successful paleontological program.

The PRPA (16 USC 470aaa-1) states that the Secretary shall manage and protect paleontological resources on federal land using scientific principles and expertise. The Secretary shall develop appropriate plans for inventory, monitoring, and the scientific and educational use of paleontological resources, in accordance with applicable agency laws, regulations, and policies. This plan shall emphasize interagency coordination and collaborative efforts where possible with non-federal partners, the scientific community, and the public. The BLM and USDA Forest Service final paleontological resources preservation rules (BLM 2022c; USDA Forest Service 2015) provide additional details for the management of paleontological resources.

The USDA Forest Service and BLM require, by law and regulation, that collection of any vertebrate fossil requires a permit. The PRPA (16 USC 470aaa-3) states that a paleontological resource may not be collected from federal land without a permit (except for the casual collecting exemption), and directs the agencies to implement a paleontology permit system: An applicant must be qualified to carry out the permitted activity; activity must be undertaken for the purpose of furthering paleontological knowledge or for public education; and paleontological resources collected from federal land must remain the property of the United States. Thus, significant fossils, which include all vertebrate and any designated plant or invertebrate fossils, can only be collected after obtaining a permit that is issued to qualified researchers. Vertebrate fossils are the remains or traces of fish, turtles, dinosaurs, mammals, reptiles, and birds and include material such as fossil bones, teeth, tracks, coprolites, and burrows. The USDA Forest Service and BLM require that a paleontological permit be acquired for all research collection, regardless of whether the fossils are vertebrates or microinvertebrates (e.g., foraminifera). In addition, casting of vertebrate fossils, including dinosaur tracks, is prohibited unless allowed under a scientific/research permit issued by the land managing agency.

The USDA Forest Service and BLM generally allow for casual collection of common non-significant invertebrate and plant (including petrified wood) fossils, except in select areas. Petrified wood is often treated as a mineral material and may be collected under the Material Sales Act of 1947 (as amended) but cannot be obtained under the General Mining Law of 1872. The BLM and USDA Forest Service receive several inquiries each year regarding public fossil collecting. Although casual or recreational fossil collecting of common invertebrates, plants, and petrified wood is appropriate on most lands administered by the BLM or USDA Forest Service, the Planning Area is currently entirely closed to casual collection. For BLM-administered lands, in accordance with Part 49.805 of the PRPA 2022 final rule, areas such as national monuments can be closed to casual collecting by statute and through the BLM land use planning process set forth at 43 CFR 1600. In addition, per 36 CFR 291.12, the USDA Forest Service does not allow casual collecting within national monuments. The portions of the Planning Area within the previous BENM Planning Area, as defined by Proclamation 9681 in 2017, were closed to casual collection since the signing of Proclamation 9558 in 2015, while most of those areas excluded from BENM in Proclamation 9681 were open to casual collection until the signing of Proclamation 10285 in late 2021.

The Planning Area contains exceptional paleontological resources, with ongoing related science that involves excavations and discoveries (see Gay et al. 2020 for details). Fossils occur subsurface in unconsolidated or bedrock units, weathering on the surface in recent colluvium, or in private and public collections. These exceptional paleontological resources are accessible due to the excellent exposures of their host geologic formations. Traditionally, the BLM and USDA Forest Service have measured fossil condition with a single indicator: Are fossils in collections or the field in good condition? However, beyond their simple presence in the landscape as inanimate 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 fossils are being utilized by various interest groups that are legally permitted to use them. While this is more labor intensive to implement and assess, it is imperative that special designation areas like the Planning Area strive toward such holistic active management. Such approaches are appropriately used in many NPS units that manage fossil resources of similar or lesser significance.

As of a study conducted in 2020, 30% of the paleontological publications from the Planning Area focused on the Upper Triassic Chinle Formation (Gay et al. 2000). A review of UGS fossil locality data through 2021 reveal a total of 949 paleontological localities recorded within the Planning Area through 2021. Of the 949 fossil localities identified, 648 contain vertebrate fossils; 93 contain invertebrate fossils; 135 contain plant fossils; and 142 contain trace fossils (or a combination of these types). Information from this database, supplemented by publications and BLM Paleontologist experience, document that vertebrate surface fossils (which the BLM considers of scientific significance) are known from at least nine formations in the Planning Area.

Within the Planning Area, numerous institutions have conducted paleontological and geological field expeditions and research partnerships between institutions and agencies (e.g., BLM, USGS, UGS). These institutions facilitate cleaning and stabilizing fossils, curating important specimens, field collecting significant specimens, providing exhibits and interpretation, and conducting research. The higher the number of partnerships, the greater benefit the public and the fossils will receive. These partners do not necessarily need financial support. The BLM issued approximately two paleontology permits during 2021 specifically for the 2021 BENM boundary. The BLM also issued approximately 95 consulting and surface collecting permits in Utah, many of which were statewide and included portions of the Planning Area. The USDA Forest Service issues only project-specific permits, and none were issued for the Planning Area in 2021. In addition to paleontological discoveries made as part of formal survey and research or previous casual collecting activities a portion of documented localities within the Planning Area are inadvertent discoveries made by the public while recreating followed by proper reporting to the land management agency.

Fossil theft and vandalism, particularly vertebrate fossil collection, occur with some regularity throughout the Planning Area. Only a small number of these occurrences are ever prosecuted. Escalating commercial values of fossils also mean that fossils on federal lands are increasingly subject to theft and vandalism. These crimes reduce scientific and public access to scientifically significant and instructive fossils and destroy the contextual information critical for interpreting the fossils. Illegal casting of dinosaur tracks, as well as theft of dinosaur bone, is a particular problem within the Planning Area. The PRPA states that a person may not excavate, remove, damage, or otherwise alter or deface any paleontological resources located on federal land and provides criminal penalties that include fines and discusses when fines can be doubled, civil penalties, and rewards for information about an incident (16 USC 70aaa-5–470aaa-7).

New areas are inventoried each year, but because there are numerous individual programs, the acreage of new survey is variable. Known paleontological resource field sites are monitored by the individual research programs, and changes to field condition are documented, including public impacts (e.g., theft, vandalism, and unintentional impacts), scientific potential, and basic condition. This ensures that the data needed to manage and conserve the sites are available. Where scientifically noteworthy fossils are threatened by natural hazards or unauthorized collection, the BLM and USDA Forest Service work with permittees and other partners to salvage specimens and reduce future threats to resources at risk. These agencies work with the institutions that house the paleontological collections from the Planning Area to ensure they are being managed to curatorial standards. Collections space at most museums holding specimens from the Planning Area is limited.

Efforts to share scientific discoveries within the Planning Area are twofold: scientific publication and public exhibits and interpretation. Special public events and public outreach via lectures, schoolroom demonstrations, field tours, and the like keep the public informed on issues and discoveries and gain public support of resource management. Approximately one exhibit is completed every few years for public exhibition. Some of these are portable, while others are fixed at institutions like visitor centers, in situ fossil localities, and museum exhibit halls. For example, along the short trail at Butler Wash, dinosaur tracks can be viewed in the Jurassic Entrada Sandstone. In 2018, interpretive signage was installed that discusses the paleontological history of the area, in addition to information on modern local plant and animal life. Additionally, there are dinosaur tracks at the bottom of the streambed in the Shay Canyon ACEC, and visitation to this ACEC has increased over the last few years. The geologic features in the Valley of the Gods ACEC are a prime destination for many, and visitor numbers there continue to increase. Visitors like the opportunity to combine short hikes with the chance to increase their education about resources, and fossil sites are often a good combination of shorter hikes and potential for quality interpretation. The public interest in paleontological destinations is also high, and the six interpreted public fossil sites in the Moab FO, to the north, receive considerable visitation by the public, along with organized commercial and educational tours, and by school groups.

6.13.2 Trends

Since the 1990s, research productivity has been increasing in the Planning Area, and based on UGS locality data from the last few years, it appears that it will continue to increase. As field time for prospection and monitoring increases, the number of documented fossils increases, and so does the number of known localities, museum collections with type specimens, and publications. The number of researchers working in the Planning Area has fluctuated, increasing over the last few years with the creation and modifications of BENM boundaries. Depending on the number of sites that are excavated each year, the number of in situ field sites that are monitored for resource condition fluctuates. An increasing number of in situ field sites is a positive trend, indicating robust research and inventory programs. As survey and collection have continued at a near constant rate, the number of fossils being actively managed to curatorial standards in collections has steadily increased as new collections are made. No instances of objects being housed in unacceptable conditions have arisen and that is the desired condition. If major partnerships dissolve or conditions change over time, standard BENM-specific paleontological curation policy would be helpful for both new collections and those fossils collected but not formally curated.

Public interest in paleontology is high. Evidence of this interest is found in sustained high attendance at museums, rock and fossil shows, at national parks and monuments, and at tourist attractions featuring fossils. Museums continue to develop new exhibits and courses dedicated to interpreting the evolution of life and other aspects of paleontology. In addition, a plethora of Internet websites have been developed by museums, universities, professional paleontologists, and amateur and commercial collectors that are available for viewing by the public. Some of these websites tell where fossils can be visited and/or collected on public lands. These sites record high numbers of hits or visits by the public but may foster problems with vandalism and illegal collection of fossils from public lands.

Visitor use is increasing in the Planning Area. This will increase the probability of unique or significant paleontological and geologic features and materials being affected. In the Planning Area, there are currently two paleontological destinations, the Butler Wash Dinosaur Tracksite and Shay Canyon. It is anticipated that the public will continue to look for additional opportunities to visit paleontological resources in their original setting, and additional interpretive locations may be necessary to accommodate new discoveries and increasing visitation.

Hikers, mountain bikers, and other outdoor enthusiasts will continue to unintentionally discover fossils; some of these discoveries will be passed on to the appropriate agencies and some will not. Increased streamlined public education about fossils and paleontological resource management may further encourage the public to properly report these discoveries. Certainly, amateurs or those who inadvertently encounter fossils will continue to make important paleontological discoveries, but the number of such discoveries is likely to remain at least partially unknown. In addition, as is demonstrated by the continued existence and growth of local rock hounding clubs and avocational paleontology groups, the BLM and USDA Forest Service will likely continue to receive several inquiries each year regarding public fossil collecting. Fossil theft and vandalism is occurring. Public interest in fossils and the commercial value of fossils have increased significantly in recent years. Fossil sales are booming via the Internet, in rock shops, and through art galleries, with prices ranging from a few dollars to millions of dollars, depending on the rarity and intricacy of the fossils. As public interest waxes and the prices of fossils rise, federal land management agencies (including the BLM and USDA Forest Service) will be under increasing pressure to both protect scientifically significant fossil resources and ensure their appropriate availability to the public. Escalating commercial values of fossils also means that, increasingly, fossils on federal lands are subject to theft and vandalism. These crimes reduce scientific and public access to scientifically significant and instructive fossils and destroy the contextual information critical for interpreting the fossils. Often, the most pronounced damage is the loss of the context and other significant scientific data, the worth of which is difficult to evaluate in monetary terms.

6.13.3 Forecasts

Professional paleontologists conducting research or assessment and mitigation are regulated through the permit process. The number of research surface and excavation is expected to increase.

Demand for visitation resources within the Planning Area is likely to increase in the future. This future demand could necessitate further inventories, monitoring, and mitigation as a result of other land use authorizations, as directed in the PRPA (16 USC 470aaa-1), such as realty actions, including roads or recreation projects such as campground or trail construction. This work would be done by qualified paleontologists under a permit. It is anticipated that this type of activity will increase. Geologic features that may need protection include Comb Ridge, Bears Ears Buttes, North and South Sixshooter Peaks, Lavender and Bridger Jack Mesas, and Wingate Sandstone cliffs as well as other arches, bridges, slot canyons, and other culturally significant resources. Areas of high use include areas designated for recreating, especially hiking and climbing on or near these unique geological features. Projected increases in OHV recreational use could increase the risk of damage and unauthorized collection in areas where paleontological resources are present. Management actions to identify and protect sensitive areas or to mitigate impacts to paleontological resources would reduce the nature and degree of these impacts.

Hobby collecting may necessitate protection. This could include septarian nodules, agates, and petrified wood.

An increased need for outreach and to educate to visitors to the Planning Area regarding the rules and regulations of fossil collecting will be necessary. This could be accomplished through the development of paleontological destination trails and roadside exhibits. PRPA also instructs efforts to be made in education and outreach. The PRPA (16 USC 470aaa-1) also directs the agencies to emphasize interagency coordination and collaborative efforts where possible with non-federal partners, the scientific community, and the general public. The PRPA (16 USC 470aaa-2) also requires agencies to establish a program to increase public awareness about the significance of paleontological resources.

Ongoing paleontological discoveries will continue to make invaluable contributions to the understanding of Earth’s past. Given the general trend of current intensive paleontological resource management, the number of scientifically important fossil 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. Paleontological outreach efforts should also help counter looting and vandalism and lead to greater citizen stewardship. BENM-specific paleontological guidance documents would help advance scientific goals and resource protection, preservation, and conservation. It is anticipated that additional curatorial space could be necessary to safely house newly collected specimens within the life of the plan.

6.14 AIR QUALITY

6.14.1 Current Conditions

Air quality is measured by the concentration of air pollutants and air quality related values such as visibility and atmospheric deposition within a geographic area. Ecological factors such as wind, temperature, humidity, geographic features, vegetation, and wildfire, as well as human-related activities such as recreation and livestock grazing, have the potential to affect air quality.

Air quality indicators include criteria air pollutants and sulfur and nitrogen compounds, as well as methane, that could contribute to visibility impairment and atmospheric deposition. National and state ambient air quality standards set the maximum thresholds for criteria air pollutants and the federal Prevention of Significant Deterioration (PSD) program establishes allowable increases of a given pollutant for Class I areas and Class II areas of interest such as wilderness.

Criteria Air Pollutants

The EPA, in accordance with the 1963 Clean Air Act, as amended (CAA), has established NAAQS for six air pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide. Table 6.14-1 shows current NAAQS for the EPA-designated criteria pollutants (EPA 2022).

Table 6.14-1. National Ambient Air Quality Standards

Pollutant		Primary/Secondary	Averaging Time	Level	Form
Carbon monoxide		Primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead		Primary and Secondary	Rolling 3-month average	0.15 µg/m^3*	Not to be exceeded
Nitrogen dioxide		Primary	1 hour	100 ppb	98th percentile, averaged over 3 years
		Primary and Secondary	1 year	53 ppb†	Annual mean
Ozone		Primary and Secondary	8 hours	0.070 ppm‡	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle pollution	$PM_{2.5}$	Primary	1 year	12 µg/m^3	Annual mean, averaged over 3 years
		Secondary	1 year	15 µg/m^3	Annual mean, averaged over 3 years
		Primary and Secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years
	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

Pollutant	Primary/Secondary	Averaging Time	Level	Form
Sulfur dioxide	Primary	1 hour	75 ppb§	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 2022

* In areas designated nonattainment for the lead 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.

† The level of the annual nitrogen dioxide standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of a clearer comparison to the 1-hour standard level.

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

§ The previous sulfur dioxide 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 which is designated nonattainment under the previous sulfur dioxide standards or is not meeting the requirements of a State Implementation Plan (SIP) call under the previous sulfur dioxide standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its SIP to demonstrate attainment of the required NAAQS.

The existing air quality in the Planning Area is typical of undeveloped regions in the western United States. San Juan and Garfield Counties are currently designated attainment/unclassifiable for all criteria air pollutants. The Utah Division of Air Quality (UDAQ) is responsible for regulating air quality in Utah. At present, UDAQ does not have state ambient air quality standards and is responsible for ensuring compliance with the NAAQS within the State of Utah.

UDAQ emphasizes air quality monitoring in more developed areas of the state where nonattainment of NAAQS is more problematic. There is only one UDAQ-operated air monitoring station in the Planning Area; this station monitors ozone at GSENM in Garfield County (UDAQ 2022:36). Federal agencies have collected data near the Planning Area related to pollution concentrations, visibility, and atmospheric deposition.

The most recent Utah Statewide Emissions Inventory report (UDAQ 2017) estimates that the primary air pollutant in San Juan and Garfield Counties is volatile organic compounds (VOCs) followed by carbon monoxide, particulate matter less than 10 microns in diameter (PM_{10}), nitrogen oxides (NOx), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and sulfur oxides. Table 6.14-2 lists the criteria pollutant levels (those compounds for which pollution criteria have been established) in tons per year from the 2017 Statewide Emissions Inventory.

Table 6.14-2. 2017 Emissions Inventory by Source (tons per year)

County	Source	Carbon Monoxide	NOx	PM_{10}	$PM_{2.5}$	Sulfur Oxides	VOCs
San Juan	Area source	1,016.51	16.14	6,711.21	784.51	6.20	443.79
	Oil and gas	239.82	156.98	1.86	1.86	2.35	845.46
	Off-road mobile	923.79	66.66	6.03	5.57	0.33	143.87
	On-road mobile	1,767.72	707.26	281.19	84.93	3.40	159.86
	Point source	45.26	75.68	68.68	13.97	3.23	9.82
	Biogenics	16,610.50	915.93	0.00	0.00	0.00	76,054.60
	Wildfires	532.83	6.94	53.91	45.68	3.90	125.62
	Total	**21,136.43**	**1,945.59**	**7,122.89**	**936.52**	**19.41**	**77,783.02**

County	Source	Carbon Monoxide	NOx	PM_{10}	$PM_{2.5}$	Sulfur Oxides	VOCs
Garfield	Area source	237.28	7.42	2,568.76	302.25	1.92	174.47
	Oil and gas	0.10	0.08	0.00	0.00	0.08	183.77
	Off-road mobile	644.51	44.52	6.21	5.79	0.29	120.36
	On-road mobile	913.15	269.47	71.38	22.93	1.28	90.81
	Point source	0.26	0.08	0.13	0.03	0.06	0.02
	Biogenics	9,381.27	396.02	0.00	0.00	0.00	44,976.50
	Wildfires	42,736.93	571.81	4,337.46	3,675.81	317.70	10,079.80
	Total	**53,913.49**	**1,289.40**	**6,983.94**	**4,006.81**	**321.33**	**55,625.73**

Source: UDAQ 2017

VOCs are organic compounds that easily become vapors or gases. Biogenic sources of VOCs in Garfield and San Juan Counties make up 80% and 98% of total VOC emissions, respectively. 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 NOx and sunlight react in the atmosphere to form ground-level ozone, or smog. Burning fuel such as gasoline, coal, natural gas, and wood releases VOCs. VOCs would be expected to increase during periods of high wildfire activity or burns for vegetation management. 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).

While not a recognized air quality issue in the Planning Area, ground-level ozone is a regional issue affecting Class 1, metropolitan, and energy-producing areas in Utah and surrounding states. Ozone and its precursors (VOCs and NOx) can be transported both into and out of the Planning Area and therefore are pollutants of concern.

Carbon monoxide 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, OHVs, airplanes, and trains also produce carbon monoxide. Carbon monoxide combines with oxygen in the atmosphere to create carbon dioxide. In Garfield County, wildfires account for approximately 80% of carbon monoxide emissions, whereas in San Juan County, biogenic sources make up the majority (78%) of carbon monoxide emissions.

NOx are emitted through the use of nitrogen fertilizers, certain industrial and waste management processes, and when fuel burns at high temperatures, such as in internal combustion engines. In Garfield County, wildfires account for the highest contribution to nitrogen oxide emissions, followed by biogenic and on-road mobile sources. In San Juan County, biogenic sources followed by on-road mobile sources are the largest contributors to these emissions.

Natural sources of sulfur dioxide include volcanoes and hot springs. Sulfur dioxide is formed by the oxidation of hydrogen sulfide. Oxidation occurs when hydrogen sulfide combines with the oxygen in the air. Human-made sources of sulfur dioxide include fossil fuel processing and burning, with high-sulfur fuels generally producing higher levels of sulfur dioxide as a byproduct. Almost all of the sulfur oxide emissions in Garfield County come from wildfires. San Juan County's sulfur oxide emissions are not significant compared to sulfur oxide emissions reported for Garfield County (19.40 and 321.32 tons per year, respectively).

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 levels are likely a result of fugitive dust sources. 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 activities authorized by the BLM and USDA Forest Service, particulate matter (both PM_{10} and $PM_{2.5}$) is considered a pollutant of concern. In Garfield County, wildfires are the largest emitters of particulate matter followed by area sources, while in San Juan County, area sources are the largest contributor to particulate matter.

Of concern to air quality are burns from vegetation management and naturally caused fires. Short-term effects on air quality from vegetation management burns include a general increase in particulate matter, carbon dioxide, and ozone precursor emissions. Any smoke emissions resulting from annual vegetation management burning projects or treatments in the Planning Area are managed in compliance with guidelines in the Utah Smoke Management Plan and interagency group program (UDAQ 2021). Active group participants include various federal and state agency land managers and UDAQ. The purpose of this program and the smoke management plan is to ensure the implementation of mitigation measures to reduce the impacts on public health and safety and visibility from vegetation management and wildland fire used for resource benefits. Compliance with the plan is the primary mechanism for land managers to implement vegetation management 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.

PREVENTION OF SIGNIFICANT DETERIORATION

The PSD program ensures that air quality in areas with clean air does not significantly deteriorate, while maintaining an allowable margin for future industrial growth. The PSD program protects air quality within Class I areas by allowing only slight incremental increases in pollutant concentrations. 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. Class I areas near the Planning Area are Canyonlands National Park and Arches National Park (NPS 2022a).

Areas of Utah not designated as PSD Class I areas are classified as Class II areas. For Class II areas, greater incremental increases in ambient pollutant concentrations are allowed, as a result of controlled growth.

VISIBILITY AND REGIONAL HAZE

Visibility is “the clarity with which distant objects are perceived” (EPA 2001) and is affected by pollutant concentrations, plume impairment, regional haze, relative humidity, sunlight, and cloud characteristics. A typical visual range without any human-made air pollutants would be about 140 miles in the western states (EPA 2001). Aerosols (small particles made of solid and/or liquid molecules dispersed in the air) are the pollutants that most often affect visibility in Class I areas. Five key contributors to visibility impairments are sulfate, nitrate, organic carbon, elemental carbon, and crustal materials.

Visibility can be expressed in terms of deciviews, a measure for describing perceived changes in visibility. One deciview is defined as a change in visibility that is just perceptible to an average person or equivalate to about a 10% change in light extinction. To estimate potential visibility impairment, monitored aerosol concentrations are used to reconstruct visibility conditions for each day monitored.

These daily values are then ranked from clearest to haziest and divided into three categories to indicate the mean visibility for all days (average), the 20% of days with the clearest visibility (20% clearest), and the 20% of days with the worst visibility (20% haziest).

The CAA included legislation to prevent future and remedy existing visibility impairment in Class I areas. In 1985, the EPA established a collaborative monitoring program called Interagency Monitoring of Protected Visual Environments (IMPROVE) to monitor visibility in Class I areas. There is an IMPROVE monitoring station in Canyonlands National Park, located at the Island in the Sky entrance to the national park, approximately 1 mile west of Indian Creek in the north (NPS 2022b).

ATMOSPHERIC DEPOSITION

Atmospheric deposition refers to the processes by which air pollutants are removed from the atmosphere and deposited on terrestrial and aquatic ecosystems. It is reported as the mass of material deposited on an area (kilogram per hectare) per year (kg/ha-yr). 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 (µeq/L).

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 (NADP) stations in Utah: Logan, Murphy Ridge, Green River, Bryce Canyon National Park, and Canyonlands National Park. The NADP station in Canyonlands National Park has assessed precipitation chemistry since 1997.

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 (CASTNET) has measured dry deposition of ozone, sulfur dioxide, nitric acid, sulfate, nitrate, and ammonium in the United States since the late 1980s. The closest CASTNET station to the Planning Area is located at Canyonlands National Park.

6.14.2 Trends

Regional air quality is influenced by a combination of factors, including climate, meteorology, the magnitude and spatial distribution of local and regional air pollution sources, and the chemical properties of emitted pollutants. Within the lower atmosphere, regional and local scale air masses interact with regional topography to influence atmospheric dispersion and transport of pollutants.

Wind patterns in the area vary widely by season and local terrain; therefore, dispersion and transport of pollutants from area sources are also variable in the region.

Current trends suggest an increase in recreational activities and travel to the area. Some recreational visitors engage in motorized activities that represent emission sources in addition to the highway vehicles utilized for transportation. Additional concerns focus on livestock grazing, prescribed fire used for vegetation management, wildfires, and existing valid mineral and ROW leases., within the Planning Area and in adjacent regions.

Pollutants of Concern

Ozone is a regional problem typical in the western states as precursor gases (NOx and VOCs) from forest fires, transport from shipping lanes, electric power generation, oil and gas production, and a conglomerate of other sources that combine under certain meteorological conditions to form ozone. Particulate matter is another issue during dust storms or when kicked up from other activities in this dry region.

Data collected at Canyonlands National Park shows a relatively unchanging trend between 2011 and 2022 (NPS 2022c). While current ozone concentration is below the NAAQS, it is still near the standard, and the historic data record shows past exceedances.

The BLM and USDA Forest Service regularly authorize 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 due to particulate matter in the Planning Area include the immediate operation areas around surface-disturbing activities such as construction of major ROW projects.

Visibility

The visibility trend data from 2011 to 2020 is available for Canyonlands National Park (NPS 2022c). Improvement in park visibility on the clearest days has been documented since 2011, but visibility on the haziest days has not changed significantly for Canyonlands National Park. The CAA visibility goal requires visibility improvement on the 20% haziest days, with no degradation on the 20% clearest days. While some visibility impairments are the result of natural, uncontrollable sources, such as windblown dust and soot from wildfires, human-made sources of pollution can also impair visibility. The human-made sources include motor vehicles (organic carbon), electric utility and industrial fuel burning (sulfates and particulates), and manufacturing operations (sulfates and fine particulate matter). Visibility in the area is primarily influenced by sulfates and organic carbon.

Atmospheric Deposition

Total deposition refers to the sum of airborne material transferred to the Earth's surface by both wet and dry deposition. The primary gases involved with inorganic nitrogen deposition are ammonia, NOx, and nitric acid, while the primary particles are nitrate and ammonium. Agricultural sources are the most common source of ammonium. Total nitrogen deposition is calculated by summing the nitrogen portion of wet and dry deposition of nitrogen compounds, and total sulfur deposition is calculated by summing the sulfur portion of wet and dry deposition of sulfur compounds.

Total deposition has been measured at Canyonlands National Park from 2011 through 2020 (NPS 2022c). Total nitrogen deposition has ranged from 0.7 to 1.7 kg/ha-yr between 2011 and 2020. Total nitrogen deposition of 3 kg/ha-yr represents the total pollution loading where acidification is unlikely and "below which a land manager can recommend a permit be issued for a new source unless data are available to indicate otherwise" (Fox et al. 1989). Nitrate deposition to terrestrial systems can cause chemical alterations to soil, affecting microorganism and native vegetation.

The air quality trend at Canyonlands National Park shows improvement for sulfate concentrations between 2011 and 2020 (NPS 2022c).

6.14.3 Forecast

The forecast for the Planning Area includes increased tourism and recreation. With the increased travel to the area there will be increased fuel consumption, with the trend for increased levels of VOCs, carbon monoxide, ground-level ozone, and sulfur oxide emissions. With increased OHV recreation in the region, 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 reduced increase in fugitive dust.

Warming temperatures and increasing drought conditions due to climate change create better conditions for wildfires to occur. As wildfires become more frequent and severe, especially in the Southwest region, they will contribute to increased levels of all criteria air pollutants, especially carbon monoxide.

Mineral development would not be a significant source of future emissions, as no new mineral development is allowed within the expanded Monument boundary except for that subject to valid existing rights.

6.15 CLIMATE CHANGE

6.15.1 Current Conditions

Climate change is defined by the 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 that 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 2018)

Ongoing scientific research has identified the potential impacts of GHG emissions (including carbon dioxide, 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 carbon dioxide equivalent (CO_2e) concentrations to increase dramatically and are likely to contribute to overall global climatic changes.

In the Planning Area, as 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 2020, carbon dioxide emissions from combustion of fossil fuel for energy production in the United States were equal to 73% of total United States anthropogenic GHG emissions) (U.S. Energy Information Administration 2022). Other major GHGs that are caused by human activity include methane and nitrous oxide. Methane, which largely comes from landfills, coal mines, oil and natural gas operations, and agricultural operations, accounted for up to 11% of total GHG emissions in 2020, while nitrous oxide, created primarily from using certain industrial and waste management processes, nitrogen fertilizers, and burning fossil fuels made up about 7% of total anthropogenic United States GHG emissions (U.S. Energy Information Administration 2022).

GHG emissions are offset to some degree by carbon that is sequestered in terrestrial ecosystems. Terrestrial ecosystems on federal lands were estimated to have sequestered an average of 195 million metric tons of CO_2e per year nationally between 2005 and 2014; in Utah, the annual average sequestration was 8.6 million metric tons of CO_2e per year (Buursink et al. 2018).

The Planning Area is primarily within the Colorado Plateau ecoregion. Ecoregions are large areas of similar climate where ecosystems recur in predictable patterns. The Colorado Plateau ecoregion covers the southeastern half of Utah, western Colorado, northern New Mexico, and northwestern Arizona. The climate of most of the Colorado Plateau is classified as semi-arid and 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, in which summers are hot with infrequent afternoon thunderstorms that tend to occur mostly on higher-elevation areas. In the south, peak precipitation occurs in the winter and again in the summer during a distinct wet period characterized by intermittent but often intense monsoonal storms from southern weather patterns. Spring and fall are generally the driest periods. Annual precipitation amounts are less than 10 inches at the middle 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 (Bryce et al. 2012).

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 (Bryce et al. 2012). Based on records from long-term stations, average temperatures (1991–2020) in the mountains of Utah are around 20°F during the winter months, while lower elevations in the southern portion of the state frequently experience days over 100°F during the summer (Frankson et al. 2022). Average annual temperature and precipitation (1991–2020) in the Planning Area are shown on Figure 6.15-1 and Figure 6.15-2, respectively.

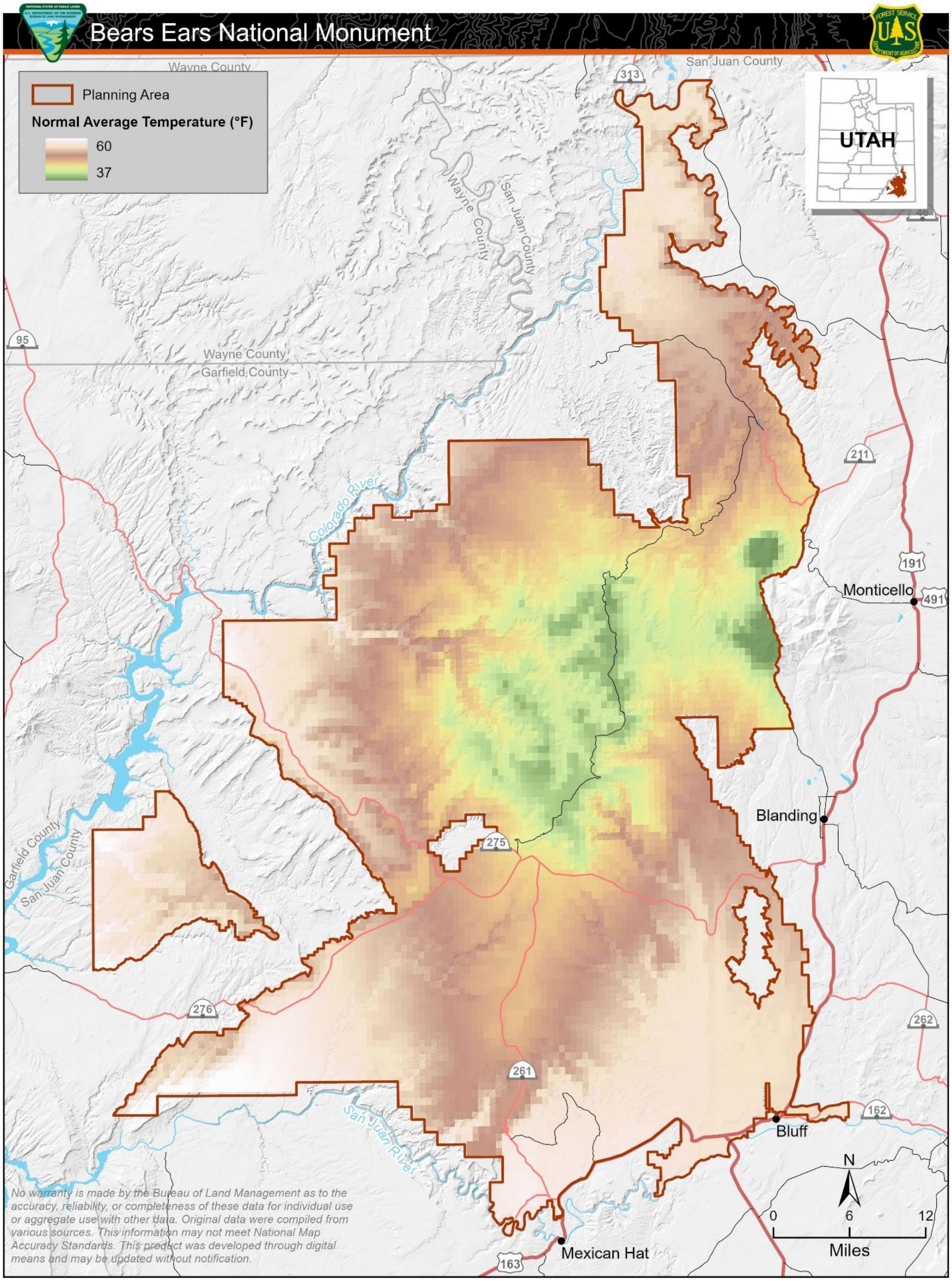

Figure 6.15-1. Average annual temperature based on 30-year climate normals.

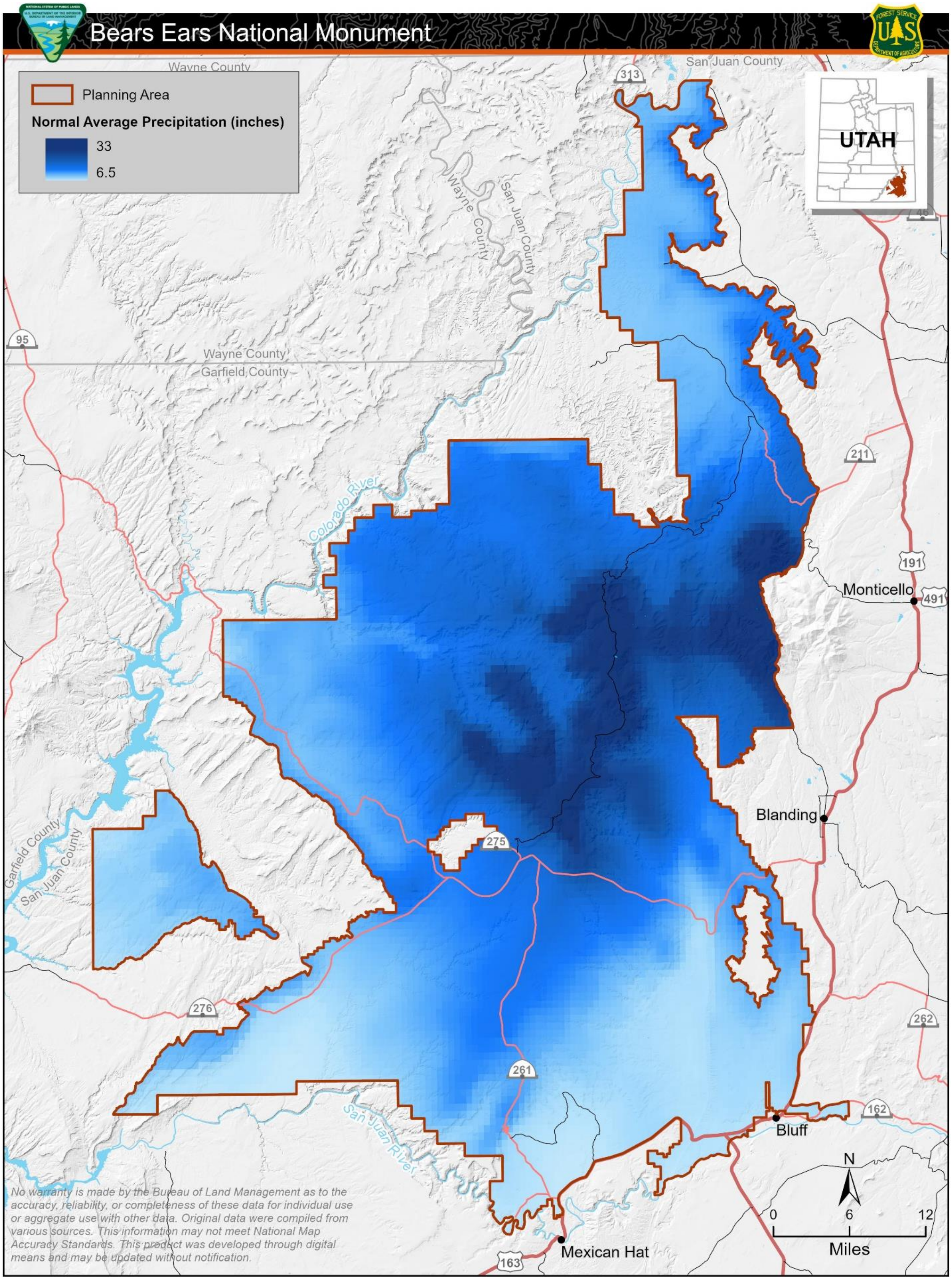

Figure 6.15-2. Average annual precipitation based on 30-year climate normals.

6.15.2 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 2021 were 1.5°F (0.85 °C) warmer than the 1951–1980 baseline average and 1.9°F (1.1 °C) warmer than late-nineteenth-century levels, representing the start of the industrial revolution (National Aeronautics and Space Administration 2022). Collectively, the 8 years leading up to 2021 were the warmest years since 1880, when modern recordkeeping began (National Aeronautics and Space Administration 2022). Other aspects of the climate, such as rainfall patterns, extreme drought, snow and ice cover, and sea level, are also changing.

Within the Southwest region of the United States, the average annual temperature increased 1.6°F (0.9°C) between 1901 and 2016 (Figure 6.15-3). The region recorded more warm nights and fewer cold nights between 1990 and 2016, including an increase of 4.1°F (2.3°C) for the coldest day of the year (Gonzalez et al. 2018). Temperatures in Utah have risen more than 2.5°F (1.4°C) since the beginning of the twentieth century. The period since 2012 has been the warmest on record for Utah, with 8 of the 10 warmest recorded years. The highest number of extremely hot days in the historical record occurred from 2000 to 2004. The state has experienced a dramatic increase in the number of very warm nights and a decrease in the number of very cold nights.

As the state has warmed, the percentage of precipitation falling as snow during the winter has decreased, as have snow depth and snow cover (Frankson et al. 2022). Figure 6.15-4 shows changes in snowpack for the western United States between 1955 and 2020. According to this figure, snowpack for two locations near the Planning Area (Buckboard Flat within the Manti-La Sal National Forest and at Lower Lasal Mountain located northeast of the Planning Area) indicate a decrease in snowpack between 20% and 40% during the 1955–2020 time period. Accumulation of dust on top of snowpack is a significant contributing factor to decreasing snowmelt.

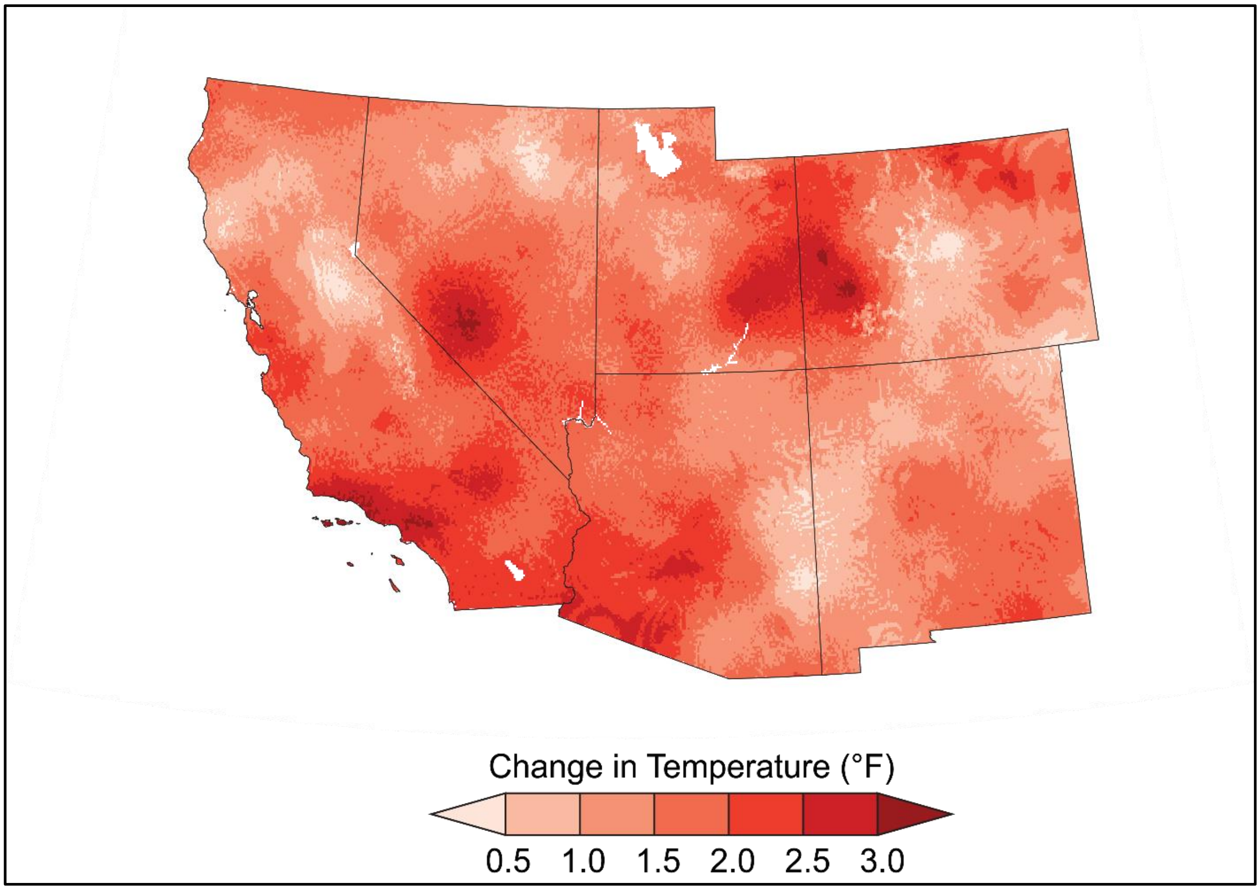

Figure 6.15-3. Change in temperature across the Southwest region (1901–2016) (Gonzalez et al. 2018).

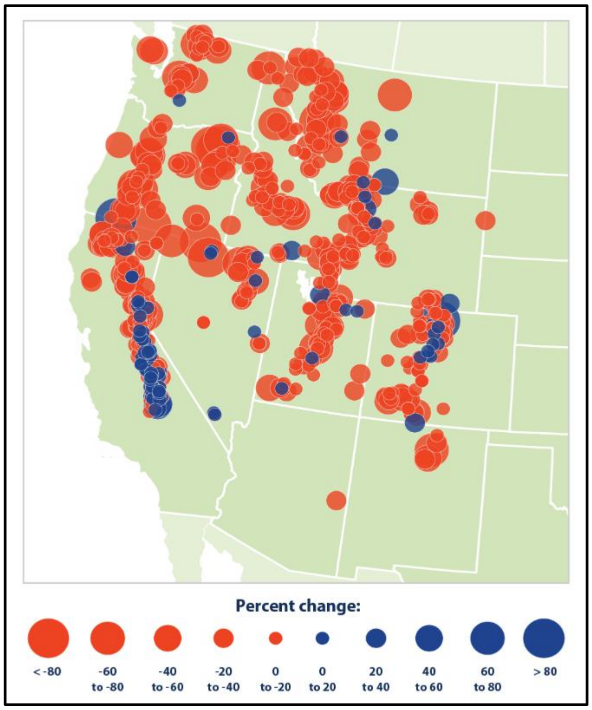

Figure 6.15-4. Change in snowpack across the Southwest region (1955–2020) (EPA 2022).

6.15.3 Forecasts

According to the IPCC Sixth Assessment Report, compared to 1850–1900, global surface temperature averaged over 2081–2100 is very likely to be higher by 1.8 to 3.2°F (1.0°C to 1.8°C) under the very low GHG emissions scenario, by 3.8 to 6.3°F (2.1°C to 3.5°C) under the intermediate GHG emissions scenario, and by 5.9 to 10.3°F (3.3°C to 5.7°C) under the very high GHG emissions scenario (IPCC 2021).

The annual average temperature of the contiguous United States is projected to rise throughout the century. Increases for the period 2021–2050 relative to 1976–2005 are projected to be about 2.5°F (1.4°C) for a lower GHG scenario and 2.9°F (1.6°C) for a higher GHG scenario (Vose et al. 2017). Within the Southwest region, annual average temperatures are projected to increase by 3.72°F (2.07°C) and 4.80°F (2.67°C) by mid-century (2036–2065) under low and high GHG scenarios, respectively (compared with 1976–2005) and by 4.93°F (2.74°C) and 8.65°F (4.80°C) by late century (2071–2100) under low and high GHG scenarios, respectively (Vose et al. 2017). The frequency and intensity of cold waves is projected to decrease while the frequency and intensity of heat waves is projected to increase throughout the century (Vose et al. 2017).

Climate change modeling predictions show that the Colorado Plateau 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. Climate change modeling predicts up to a 1.08°F (0.6°C) increase (2015–2030) and 1.8°F (1°C) increase (2045–2060) in average summer temperatures in the northern portion of the ecoregion and up to a 1.44°F (0.8°C) increase (2015–2030) and 2.16°F (1.2°C) increase (2045–2060) in the southern portion of the ecoregion (Bryce et al. 2012). Precipitation is expected to decline throughout much of the year during the 2015–2030 period (with the exception of October and December), with severe drought likely to occur in some areas. The 2045–2060 period would remain drier (or comparable to historic conditions) during most of the year, but sporadic wetter months (e.g., February, June, October, and December) could result in overall increases in annual precipitation in some areas (Bryce et al. 2012).

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).

The long-term potential for climate change within BENM ranges from very low to very high (Figure 6.15-5). The northern and western portions of BENM have a lower long-term potential for climate change compared with the rest of BENM.

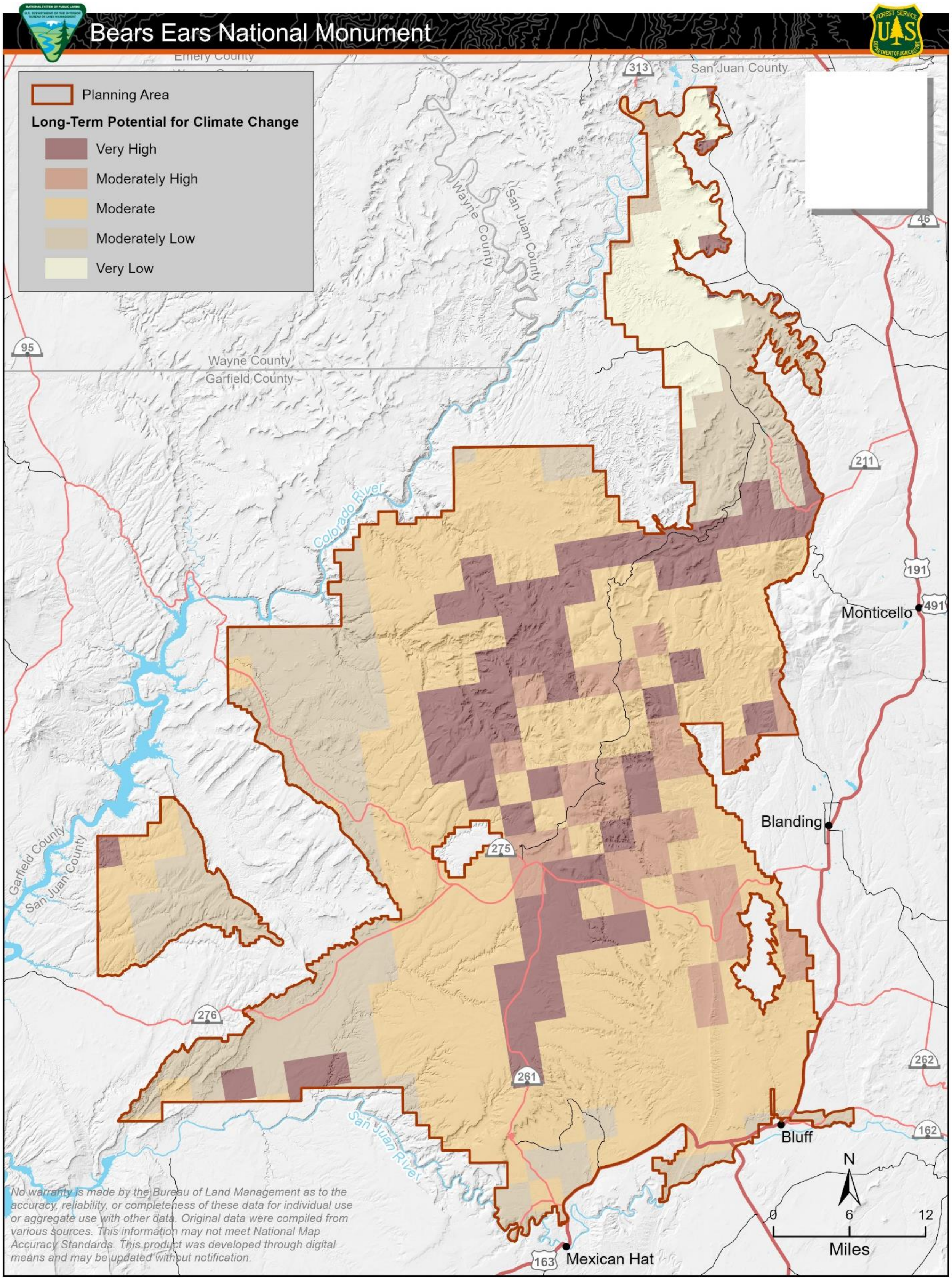

Figure 6.15-5. Long-term potential for climate change.

6.16 ENVIRONMENTAL JUSTICE AND SOCIAL AND ECONOMIC VALUES

The following subsections discuss current conditions, trends, and forecasts of socioeconomic and environmental justice values associated with uses of BLM-administered and NFS lands for the socioeconomic analysis area (San Juan County, Utah). This county includes the entire extent of federal surface lands within the Planning Area, which are composed of approximately 1,075,000 acres of BLM-administered lands (all located within the BLM Monticello FO) and approximately 289,000 acres of NFS lands (all of which are located within the Monticello Ranger District of the Manti-La Sal National Forest). This discussion focuses on information that is most relevant to the scope of the current planning effort for BENM.

6.16.1 Current Conditions

Environmental Justice

EO 12898 requires each federal agency to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations" (59 *Federal Register* 7629, February 16, 1994). Fundamental principles of environmental justice require that federal agencies:

- Avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
- Ensure the full and fair participation by all potentially affected communities in the decision-making process.
- Prevent the denial of, reduction in, or significant delay in the receipt of benefits of the project by minority and low-income populations.

An evaluation of environmental justice impacts requires identification of minority and low-income populations (including Tribal Nations) within the affected area and evaluation of the potential for the alternatives to have disproportionately high and adverse impacts on such populations.

This section provides the first step in the environmental justice analysis—a screening analysis of the environmental justice analysis area for the planning action to identify the presence and location of any environmental justice populations. Evaluation of potential adverse impacts on these populations will take place during the impacts analysis phase of the planning process.

Subsequent to the publication of EO 12898, CEQ, part of the Executive Office of the President, issued guidance for considering environmental justice within the NEPA process (CEQ 1997). This guidance defines minorities as individuals who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. The guidance further defines a minority population as follows: "Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis" (CEQ 1997).

The guidance also makes clear that Tribal Nations in the affected area should also be considered in the environmental justice screening analysis. CEQ guidance does not specify how to identify a "low-income population," but in practice the same approach used for minority populations can be followed—where persons in poverty status are greater than 50% of the area's total population, or where the percentage in poverty is equal to or greater than the percentage in the general population or an appropriate comparison area (the reference population).

This threshold is based on experience evaluating environmental justice indicators and the sense that this threshold represents a significant difference between the affected and reference populations. For the purposes of this screening, the thresholds stated above, from CEQ (1997) and the BLM Socioeconomic Desk Guide (BLM 2020), are used to identify any low-income or minority communities in the environmental justice analysis area.

Table 6.16-1 shows data for potential environmental justice populations in the environmental justice analysis area. The reference group for whether an environmental justice population exists is the State of Utah.

Table 6.16-1. Environmental Justice Screening for the Socioeconomic Analysis Area (2020)

Geography	Percentage below Poverty	Percentage Minority Population	Percentage Native American Population
Socioeconomic analysis area (San Juan County)	22.8%	55.7%	48.8%
Reference area (Utah)	9.1%	22.1%	4.8%

Source: U.S. Census Bureau 2020

The percentage of minority populations in San Juan County (55.7%) is well above the average percentage for the State of Utah (22.1%). The percentage of the population in poverty in San Juan County (22.8%) is also above the state average (9.1%). Based on this comparison, San Juan County meets the threshold for an environmental justice community (U.S. Census Bureau 2020). Specific Native American populations occurring in the socioeconomic analysis area include Navajo, Hopi, and Ute Mountain Ute communities.

Social and Economic Demographics and Values

A variety of groups and communities of interest are stakeholders to the use and management of BLM-administered and NFS lands, including Tribal partners and cultural resource stakeholders, habitat and resource conservation stakeholders, recreation stakeholders, mineral development and production stakeholders, visual resource stakeholders, and local residents and communities. These stakeholder organizations and individuals have varying interests in the use and management of BLM-administered and NFS lands Different types of stakeholders have distinct sets of attitudes, beliefs, values, opinions, and perceptions about BLM-administered and NFS lands and the effects of various management policies and actions. These views reflect different cultural and economic linkages that people have to BLM-administered and NFS lands.

Tribal and cultural resource stakeholders and the BEC value BENM for its cultural and even spiritual significance. For these stakeholders, protection of cultural resources, combined with maintaining access to traditional cultural sites, is extremely important. These cultural sites include areas of past occupation as well as areas where traditional practices, such as plant gathering and woodland harvest, have occurred. The cultural importance of springs, lakes, and rivers is well documented for the Paiute (Kelly 1964) and for other BENM area Tribal Nations (Sabata 2018). According to *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument* (BEC 2022), water is of central importance to Native religion and identity. For instance, the Zuni understand water as both a blessing that is indelibly connected to all aspects of the world as a complex, interrelated, and dynamic system, and as a life-giving force that—in and of itself—is living and alive. Similarly, the Ute people believe that water sources are places where spiritual beings reside and that activity on or near water sources affect those entities. See Section 6.7 for more details.

Habitat and resource conservation stakeholders have a number of conservation objectives, but most believe broadly that protecting at-risk species and maintaining habitats and ecosystems for all species is a fundamental value and should be a high priority in public policy. Most believe in the intrinsic value of wildlife, well-functioning ecosystems, and pristine areas. Some advocate resource conservation for human as well as wildlife needs, pointing to the beauty and solitude values of unspoiled areas in the Planning Area. A major concern for them is the potential for oil, gas, coal, and mineral development, especially on lands that were eliminated from the Monument boundary and opened to mineral location and entry during Presidential Proclamation 9681 because of the impacts from associated infrastructure such as roads, drilling pads, and pipelines. Additional resource conservation topics that are of interest to these stakeholders include water, air, and soil resources as well as vegetation and riparian zone management. Persons and organizations concerned with protection of paleontological, cultural, and historic sites also generally fit into this category of resource conservation stakeholders.

There are many types of recreational activities in the socioeconomic analysis area. A concern of many recreation stakeholders is potential degradation and loss of recreational use values from potential mineral resource development. These stakeholders typically view resource development as having permanent impacts on recreation values. They seek protection of areas with high recreation values so that future generations can enjoy these values. For many recreationists, maintaining recreation values and habitat or ecosystem values go hand-in-hand; these stakeholders say that healthy ecosystems support positive recreation experiences. For many recreation stakeholders, the preservation of natural soundscapes is also important to provide users with adequate opportunities for quiet recreation. For these stakeholders, resource development and new roads would be incompatible with this objective. Recreation stakeholders believe that the region relies on tourism and recreation as its primary economic driving force. They point out how expenditures by mountain bikers, rafters, hunters, fishermen, OHV riders, and other recreationists help support local businesses, provide local jobs and income, and generate sales taxes and other public revenues. They maintain that the recreation and tourism industry has proven to be a stable and an increasing economic engine for the area and often compare this to local historic experience with and future potential for downturns in commodities-based industries. See Section 6.5 for more details.

Mineral development and production stakeholders believe mineral development is a vital component of national, state, and local economies—creating jobs, generating income, and contributing tax and royalty payments to all levels of government. Throughout the West, many of these stakeholders also believe mineral development and production are socially important, and because they support the social systems of local communities by providing private sector livelihoods and revenues to government. With respect to oil and gas production, these stakeholders believe that domestic development and production are important to national energy security. They believe that many years of compatible development have been achieved in the area, providing significant benefits to the local and regional economy. See Section 6.12 for more details.

Visual resource stakeholders focus on the scenic qualities of the area. Although they share many of the perspectives of habitat and resource conservation stakeholders and recreation stakeholders, they emphasize the role of visual resources as the fundamental asset underlying both direct recreational use of public lands and general tourism to the region. They believe that the scenic quality of the landscape in and around the Planning Area is world renowned and that national parks and other federally and state-managed lands are a huge economic draw to southern Utah and the area in and around the Planning Area because of their scenic qualities. Based on this view of visual resources as a unique and valuable asset, these stakeholders emphasize that the visual integrity of the area needs to be maintained. As stated in

Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument (BEC 2022), emphasizing the importance of the BENM landscape, Octavius Seowtewa (2018:50) stated that "this whole area is sacred to us – from a petroglyph to a site, from a spring to a viewshed, from the smallest rock to the mountains, they talk, they speak with us." See Section 6.18 for more details.

Intertwined with these stakeholder groups are local residents and their communities, including Tribal communities; nearly 50% of all resident in San Juan County are Indigenous. Some residents of San Juan County seek to preserve the historical agricultural setting of the community and are reluctant to embrace change in the form of increased recreation and tourism. They are concerned about changes in community character and increased demands on local government services and infrastructure. Others welcome the opportunities that increased recreation and tourism may provide. This could be in the form of increased employment and earnings, including increased business opportunities. These could include increased opportunities for BLM and USDA Forest Service permitted activities, such as guiding and outfitting services. Some see increased opportunities for collaborative management with the very sizeable Native American population. Still others see increased fiscal revenues for local governments through tourism-related taxes.

Table 6.16-2 shows basic demographic makeup within the socioeconomic analysis area and the State of Utah. San Juan County has a population of 15,295. Within the socioeconomic analysis area, per capita and median household incomes are reported as being lower than the State of Utah. As is true nationally, nonlabor income is a significant portion of total personal income in San Juan County, but a lower share in Utah as a whole, likely due to the state's overall younger median age and likely a larger share of the population in the workforce (Table 6.16-3).

Table 6.16-2. Population Demographics and Household Income (2020)

Geography	Population	Median Age	Per Capita Income	Median Household Income
Socioeconomic analysis area (San Juan County)	15,295	32.6	$31,617	$52,025
Reference area (Utah)	3,151,239	31.1	$54,657	$77,684

Source: U.S. Department of Commerce 2022

Table 6.16-3. Components of Household Income (2020)

Geography	Labor Earnings	Dividends, Interest, and Rent	Age-Related Transfer Payments	Hardship-Related Payments	Other Transfer Payments
San Juan County	51.20%	15.80%	13.20%	13.60%	6.30%
Utah	64.50%	20.20%	7.10%	4.00%	4.20%

Source: U.S. Department of Commerce 2021a

Poverty rates for different categories of the population vary across the socioeconomic analysis area and the comparison region. Poverty rates are higher in San Juan County than in the state based on a variety of indicators (Table 6.16-4). When evaluated by race and ethnicity, poverty rates within the socioeconomic analysis area are similarly complex and varied. No clear patterns emerge when compared with the United States, an indication that economic conditions in the socioeconomic analysis area do not uniformly mirror national trends or statistics. What can be stated is that poverty rates for certain categories within the socioeconomic analysis area are markedly higher than the State of Utah.

Table 6.16-4. Percentage of People in Poverty (2020)

Indicator	San Juan County	State of Utah
People in poverty	22.8%	9.1%
People in “deep poverty” (earning less than half of the federal poverty level)	11.1%	4.1%
Families in poverty	18.1%	6.3%
Families with children in poverty	12.6%	4.7%
Single-mother families in poverty	6.1%	2.2%

Source: U.S. Department of Commerce 2021a, 2022

Table 6.16-5 shows total employment by industry in 2020 for San Juan County and the State of Utah. Due to the county’s small population, much of the sector data are estimates to protect smaller firms from disclosure requirements. As is the case in most of the nation, service-related jobs dominate those in non-service-related sectors. Services-related employment is the largest category in the county, followed by government.

Table 6.16-5. Jobs by Industry (2020)

Industry	San Juan County	State of Utah
Non-services related	1,385	327,007
Farm	711	20,925
Forestry, fishing, and agricultural services	70	4,299
Mining (including fossil fuels)	198	11,542
Construction	283	144,764
Manufacturing	123	145,477
Services related	2,880*	1,487,503
Utilities	14*	4,919
Wholesale trade	66*	59,796
Retail trade	409	211,052
Transportation and warehousing	86	86,115
Information	14*	43,646
Finance and insurance	126	138,597
Real estate and rental and leasing	112*	114,435
Professional and technical services	128*	169,367
Management of companies	0*	31,623
Administrative and waste services	115	114,885
Educational services	172*	71,356
Health care and social assistance	670*	178,534
Arts, entertainment, and recreation	76*	40,024
Accommodation and food services	607	121,770
Other services, except public administration	285*	101,384

Industry	San Juan County	State of Utah
Government	1,660	265,196
Total	**6,111**	**2,079,706**

Source: U.S. Department of Commerce 2021b
Note: All employment data are reported by place of work. Columns may not add up to reported totals due to rounding.
* Estimates for data that were not disclosed.

Local residents are interested not only in which sectors jobs are, but also in relative pay in those sectors. Table 6.16-6 shows relative pay by sector.

Table 6.16-6. 2020 Labor Earnings by Industry ($2021)

Industry	San Juan County	State of Utah
All non-services related	449	$62,957
Natural resources and mining	199	$68,817
Agriculture, forestry, fishing, and hunting	19	$39,508
Mining (including fossil fuels)	180	$89,111
Construction	180	$60,166
Manufacturing (including forest products)	71	$64,701
All services related	1,894	$56,364
Trade, transportation, and utilities	374	$51,658
Information	–	$101,452
Financial activities	–	$83,520
Professional and business services	84	$71,513
Education and health services	758	50,101
Leisure and hospitality	516	$22,588
Other services	–	$41,348
Unclassified	0	$86,809
All government	1,544	$55,537
Federal government	164	$76,010
State government	242	$61,526
Local government	1,138	$45,570

Source: U.S. Department of Labor 2021
Note: – = data not available.

BLM-administered and NFS lands and federal mineral estate managed within the socioeconomic analysis area affect government budgets at local (county, city, town, school district, and special district), state, and federal levels based on revenues from sales taxes, property taxes, payments in lieu of taxes (PILT), mineral royalties, severance taxes, fees, and other funding sources. Likewise, lands and federal mineral estate in the socioeconomic analysis area result in government expenditures for management, law enforcement, and other activities.

The federal government's Office of Natural Resources Revenue (ONRR) collects royalties and rents from leases of federal lands for production of coal, oil, gas, and other minerals. Federal mineral lease payments to the state are a function of royalties received from production on federal lands as well as lease payments for parcels leased but not in production. Royalties are the major source of federal receipts and can vary broadly based on energy prices and production. For several years after the Great Recession in 2008, mineral receipts declined sharply but have risen in recent years. The sources of these revenues, and their inherent uncertainty based on market factors, makes it difficult to forecast payments to counties and other recipients of state mineral lease payments.

The federal government returns 49% of the total collected revenues to the state in which the mineral production occurred. In fiscal year 2021, payments to Utah totaled $55,144,537 (ONRR 2022). These payments are then distributed by the state by appropriation or statutory formula (Utah Code 59-21-1).

BLM FOs and the USDA Forest Service collect fees and other revenue for a variety of other uses of public lands. These revenue sources include ROW rents, recreation fees, grazing fees, and various permit fees. Revenues from sales of land and vegetative and mineral materials, along with ROW rents, mostly go to the U.S. Treasury, whereas recreation fees are generally retained by the FO. Grazing permit fees also generate revenue for the U.S. Treasury, of which 12.5% is returned to the local grazing board via the state in which the grazing lands are located. This money is then disbursed to local ranchers through the local grazing board, using a 40/60 matching-funds formula, for use in range improvements and maintenance projects, per the Taylor Grazing Act, Section 10. The above payments totaled $76,198 to San Juan County in fiscal year 2019 (primarily fees under the Taylor Grazing Act) (BLM 2021).

In addition to these payments, Utah counties receive monies from the DOI, which compensates county governments for nontaxable federal lands within their borders via PILT. PILT are based on a maximum per-acre payment reduced by the sum of all revenue sharing payments and are subject to a population cap. Payments to San Juan County from PILT totaled $1,724,676 in fiscal year 2022 (DOI 2022).

In San Juan County, local revenues from recreation and tourism and landownership comprise an important portion of total local government revenues. Table 6.16-7 summarizes the tourism- and minerals-related local government revenues obtained from these sources.

Table 6.16-7. Local Government Revenues from Tourism- and Landownership-Related Sources (2020)

Revenue Source	San Juan County
Tourism-related revenues*	
Tourism-related sales taxes (primarily restaurant sales taxes)	$70,812
County transient room tax	$700,751
Local sales and use tax	$1,523,872.23
Landownership-related revenues	
Property tax	$11,999,213

Source: Kem C. Gardner Policy Institute 2022; Utah State Tax Commission 2021
* Many of these were down significantly from 2019 due to COVID-19 pandemic-related travel decreases.

It is important to note that the sectoral estimates in the tables above are not specific to BLM and NFS resources, or even to public lands generally. The tourism-related revenues are based on all tourism, which includes some activities on private property, as well as activities on state lands and other federal lands, including the local national parks and monuments. However, much of the tourism in San Juan County is based on the large and spectacular public lands base. The natural resource-related revenues include revenues from private property, as well as public lands. Again, public lands and minerals are the basis for much of the activity in these industries in the county.

San Juan County is rich in outdoor recreational resources. These resources are enjoyed by local residents and attract many nonresidents. Visitation for outdoor recreation—whether passive pursuits like scenic drives or high-energy active sports like rock climbing and OHV riding—supports an active tourism industry. This industry is an important economic base for the socioeconomic analysis area. See Section 6.5 for more details.

Livestock grazing is an important activity in BENM. Forage is important to many ranchers in the socioeconomic analysis area. Grazing on this forage puts weight on calves and sustains producing heifers. Forage on federal lands may be the only forage available to some ranchers during parts of the year. In addition to its economic benefits for local ranchers and the local economy, grazing on federal lands has important social and cultural significance. Some ranching families have been using these lands for generations, and these lands help support a ranching culture that is a key part of the social fabric of socioeconomic analysis area communities. Although the economy and culture of ranching have a less prominent role today than in years past, their historic and continuing cultural significance is clear to many in the region. See Section 6.4 for more details.

6.16.2 Trends

Environmental Justice

Table 6.16-8 shows the percentage of the population in poverty for the socioeconomic analysis area over time, as compared to the state. Both the State of Utah and San Juan County showed a decrease in poverty percentage from 2015 to 2020.

Table 6.16-8. Poverty Percentage for the Socioeconomic Analysis Area (2015–2020)

Geography	2015	2020
Socioeconomic analysis area (San Juan County)	28.1%	22.8%
Reference area (Utah)	12.3%	9.1%

Source: U.S. Census Bureau 2010, 2015, 2020

Minority population percentage for the socioeconomic analysis area was relatively steady from 2010 to 2020, whereas the state saw an increasing trend (Table 6.16-9). Conversely, the Native American population percentage saw a slight decrease over the 10-year period while the state percentage remained roughly the same (Table 6.16-10).

Table 6.16-9. Minority Population Percentage for the Socioeconomic Analysis Area (2010–2020)

Geography	2010	2015	2020
Socioeconomic analysis area (San Juan County)	55.8%	54.2%	55.7%
Reference area (Utah)	18.8%	20.5%	22.1%

Source: U.S. Census Bureau 2010, 2015, 2020

Table 6.16-10. Native American Population Percentage for the Socioeconomic Analysis Area (2010–2020)

Geography	2010	2015	2020
Socioeconomic analysis area (San Juan County)	51.3%	48.2%	48.8%

Geography	2010	2015	2020
Reference area (Utah)	1.7%	1.7%	1.8%

Source: U.S. Census Bureau 2010, 2015, 2020

Social and Economic Demographics and Values

Table 6.16-11 shows the basic demographic makeup within the socioeconomic analysis area and the State of Utah. From 2010 to 2020, at 7.0%, population growth in Sam Juan County was lower than in Utah, which experienced 18.6% growth during the same period. In 2020, San Juan County had a slightly older population (32.6 years median age) than Utah as a whole (31.1 years median age). Both the county and the state show an increasing median age over time, a trend which is national in scope.

Table 6.16-11. Demographic Trends (2010–2020)

	San Juan County	State of Utah
Population (2020)	15,295	3,151,239
Population percentage change (2000–2020)	7.0%	18.6%
Median age (2020)	32.6	31.1
Median age (2010)	30.0	28.8

Source U.S. Department of Commerce 2021a

Table 6.16-12 shows changes in employment by industry from 2010 to 2020. In the socioeconomic analysis area, most sectors have shown a decline, with the exception of modest growth in professional and technical services; forestry, fishing, and agricultural services; finance and insurance; and retail trade.

Table 6.16-12. Employment by Industry Trends (2010–2020)

	San Juan County	State of Utah
Non-services related	-318	79,900
Farm	-13	918
Forestry, fishing, and agricultural services	32	986
Mining (including fossil fuels)	-221	-3,126
Construction	-87	53,766
Manufacturing	-29	27,356
Services related	-104*	348,250
Utilities	-2*	644
Wholesale trade	-17*	9.963
Retail trade	5	38,803
Transportation and warehousing	0	35,215
Information	-7*	9,301
Finance and insurance	12	27,054
Real estate and rental and leasing	-28*	20,867
Professional and technical services	48*	62,350
Management of companies	0*	8,941

	San Juan County	State of Utah
Administrative and waste services	-75	25,075
Educational services	9*	22,404
Health care and social assistance	-19*	41,396
Arts, entertainment, and recreation	-5	5,544
Accommodation and food services	-15	22,091
Other services, except public administration	-10*	18,602
Government	-31	30,757
Total change in jobs	**199**	**458,907**

Source: U.S. Department of Commerce 2021b

Note: All employment data are reported by place of work. Columns may not add up to reported totals due to rounding.

* Estimates for data that were not disclosed.

6.16.3 Forecasts

Population is expected to increase in San Juan County over the next 40 years. By 2065, San Juan County population is projected to increase by 47%. The county has a notably lower forecasted rate of population growth compared to the State of Utah, which is projected to increase 94% by 2065 (Table 6.16-13).

Table 6.16-13. Population Forecasts (2015–2065)

Geographic Area	2015	2025	2035	2045	2055	2065	Percentage Change (2015–2065)
San Juan County	15,902	17,932	19,330	20,562	21,775	23,316	47%
Utah	2,997,404	3,615,036	4,178,317	4,745,057	5,285,767	5,827,810	94%

Source Perlich et al. 2017

Table 6.16-14 shows the forecasted employment for San Juan County and the State of Utah. The percentage increase for both geographic areas from 2015 to 2065 is similar to the percentage increase in population over the same time period.

Table 6.16-14. Total Employment Forecasts (2015–2065)

Geographic Area	2015	2025	2035	2045	2055	2065	Percentage Change (2015–2065)
San Juan County	6,386	7,738	8,684	9,447	10,146	10,850	70%
Utah	1,863,692	2,373,675	2,728,541	3,056,754	3,368,205	3,658,710	96%

Source Perlich et al. 2017

Table 6.16-15 shows the projected employment by industry for the State of Utah. The industries with the largest forecasted percentage growth are construction, professional and technical services, and administrative and waste services. Compared with the historical trends in employment by industry (Table 6.16-12), employment in the industries that have seen the largest historical growth for San Juan County (professional and technical services; forestry, fishing, and agricultural services; finance and insurance; and retail trade) also are expected to increase over the next 40 years.

Table 6.16-15. Total Utah Employment by Industry Forecasts (2015–2065)

Industry	2015	2025	2035	2045	2055	2065	Percentage Change (2015–2065)
Agriculture	5,375	6,139	6,680	7,261	7,878	8,527	58.70%
Mining	10,371	14,594	14,842	13,603	11,955	10,810	4.20%
Utilities	3,915	3,396	2,853	2,746	2,729	2,707	-30.80%
Construction	84,679	139,236	189,393	245,869	313,012	394,184	365.50%
Manufacturing	123,742	138,616	144,029	148,167	152,890	156,397	26.40%
Retail	157,969	179,273	189,685	201,068	211,428	220,018	39.30%
Transportation and warehousing	51,122	65,317	64,180	60,221	53,381	44,673	-12.60%
Wholesale	50,004	61,934	66,637	69,321	71,380	73,100	46.20%
Information	34,443	43,727	52,475	63,234	74,976	85,930	149.50%
Finance and insurance	60,386	74,663	84,591	95,522	105,455	113,366	87.70%
Real estate	18,643	21,591	24,105	26,032	27,040	26,307	41.10%
Professional and technical services	88,018	137,359	181,517	222,857	260,580	292,024	231.80%
Management	20,203	19,539	17,860	16,383	14,673	12,541	-37.90%
Administrative and waste services	85,999	130,583	162,265	191,742	220,526	248,263	188.70%
Education	42,128	61,471	70,392	75,231	80,101	86,199	104.60%
Health	140,163	190,858	232,200	261,278	280,145	289,890	106.80%
Arts, entertainment, and recreation	21,111	30,207	36,676	43,465	50,219	55,756	164.10%
Accommodations and food	112,549	137,441	143,292	147,809	151,409	154,388	37.20%
Other services	38,697	37,176	40,101	41,403	39,984	35,587	-8.00%
State and local government	198,676	233,844	264,700	296,485	328,071	358,892	80.60%
Federal government, civilian	34,958	40,581	43,789	46,583	49,215	51,831	48.30%
Federal government, military	16,166	15,296	15,277	15,320	15,350	15,356	-5.00%
All other employment	464,381	590,834	681,001	765,152	845,806	921,964	98.50%
Total	**1,863,692**	**2,373,675**	**2,728,541**	**3,056,754**	**3,368,205**	**3,658,710**	**96.30%**

Source: Perlich et al. 2017

6.17 LANDS AND REALTY

Lands and realty within the Planning Area is managed by the BLM and the USDA Forest Service. The BLM Lands, Realty and Cadastral Survey program mission encompasses a wide range of public land transactions such as acquisitions and disposals, which are achieved through exchanges, sales, purchases, or donations. Leases, permits and ROW authorizations support energy development, film production, and other economic activities for the use, occupancy, and development of public lands. Cadastral survey services establish official boundaries. Land records document all activities and authorizations (BLM 2022). The USDA Forest Service mission for the Lands and Realty Management Program secures and protects the American public's rights, title, value, and interests in its national forests and grasslands and authorizes a variety of uses on those lands to meet the needs of present and future generations (USDA Forest Service 2022).

6.17.1 Land Tenure (ownership) Adjustments

The establishment of BENM under Proclamation 9558 dictated, "All Federal lands and interests in lands within the boundaries of the monument are hereby appropriated and withdrawn from all forms of entry, location, selection, sale, or other disposition under the public land laws or laws applicable to the USDA Forest Service, from location, entry, and patent under the mining laws, and from disposition under all laws relating to mineral and geothermal leasing, other than by exchange that furthers the protective purposes of the monument." In December 2017, President Trump announced Proclamation 9681, which modified the boundaries of the Monument to exclude from its designation and reservation approximately 1,150,860 acres of land, leaving 201,876 acres of land under monument protection (82 FR 58081). On October 8, 2021, President Biden signed Presidential Proclamation 10285, restoring the boundaries and conditions of BENM provided by Proclamation 9558, and retained protections for the 11,200 acres added by Proclamation 9681. Of the 1.36 million acres in BENM, the BLM and USDA Forest Service currently manage 201,876 combined acres under the existing 2020 MMPs. The rest of the BENM acreage is currently managed under the existing 2008 Monticello FO RMP or the 1986 LRMP for the Manti-La Sal National Forest (BLM 2008; USDA Forest Service 1986).

Land ownership adjustments on NFS lands are completed through purchase, donation, exchange, or other authority. Land ownership adjustments are made to improve national forest management by consolidating ownership, reducing wildlife-human conflicts, providing for wildlife connectivity, improving public access to public lands, and retaining or acquiring key lands for wildlife fish and cultural resources.

6.17.2 Regional Context

BLM

As dictated by FLMPA, the BLM has a responsibility to plan and manage federally owned public lands that are administered by the Secretary of the Interior. Although FLMPA is the overarching guiding law for the BLM's Lands, Realty and Cadastral Survey program, the program also operates under a variety of laws and regulations. Monument designation adds specific requirements under BLM Manual 6220 – *National Monuments, National Conservation Areas, and Similar Designations*, which states, "the purpose of this manual is to provide guidance to BLM personnel on managing BLM public lands that are components of the BLM's NLCS and that have been designated by Congress or the President as National Monuments, National Conservation Areas, and similar designations" (BLM 2017). Within the Planning Area, approximately1,075,000 acres (approximately 72% of the Planning Area) of land falls under the management of the BLM.

USDA Forest Service

The USDA Forest Service issues special use permits (SUPs) that authorize the use of NFS lands and makes land tenure adjustments based upon guidance from NFMA, FLMPA, and the 1986 Manti-La Sal LRMP. Within the Planning Area, approximately 289,000 acres (approximately 19% of the Planning Area) falls under the management of the USDA Forest Service.

6.17.3 Current Conditions

Land Tenure (Ownership) Adjustments

According to Proclamation 10285, "All Federal lands and interests in lands within the boundaries of the monument are hereby appropriated and withdrawn from all forms of entry, location, selection, sale, or other disposition under the public land laws or laws applicable to the United States Forest Service, from location, entry, and patent under the mining laws, and from disposition under all laws relating to mineral and geothermal leasing, other than by exchange that furthers the protective purposes of the monument." Therefore, any land tenure adjustments will occur by exchange, acquisition, or donation.

BLM

LAND USE AUTHORIZATIONS

There are currently 18 ROW avoidance areas encumbering approximately 98,957 acres of the BLM-administered land within the Planning Area. These ROW avoidance areas make up 7.2% of the total Planning Area. Table 6.17-1 shows current BLM ROW avoidance areas within the Planning Area. Figure 6.17-1 shows ROWs within the Planning Area.

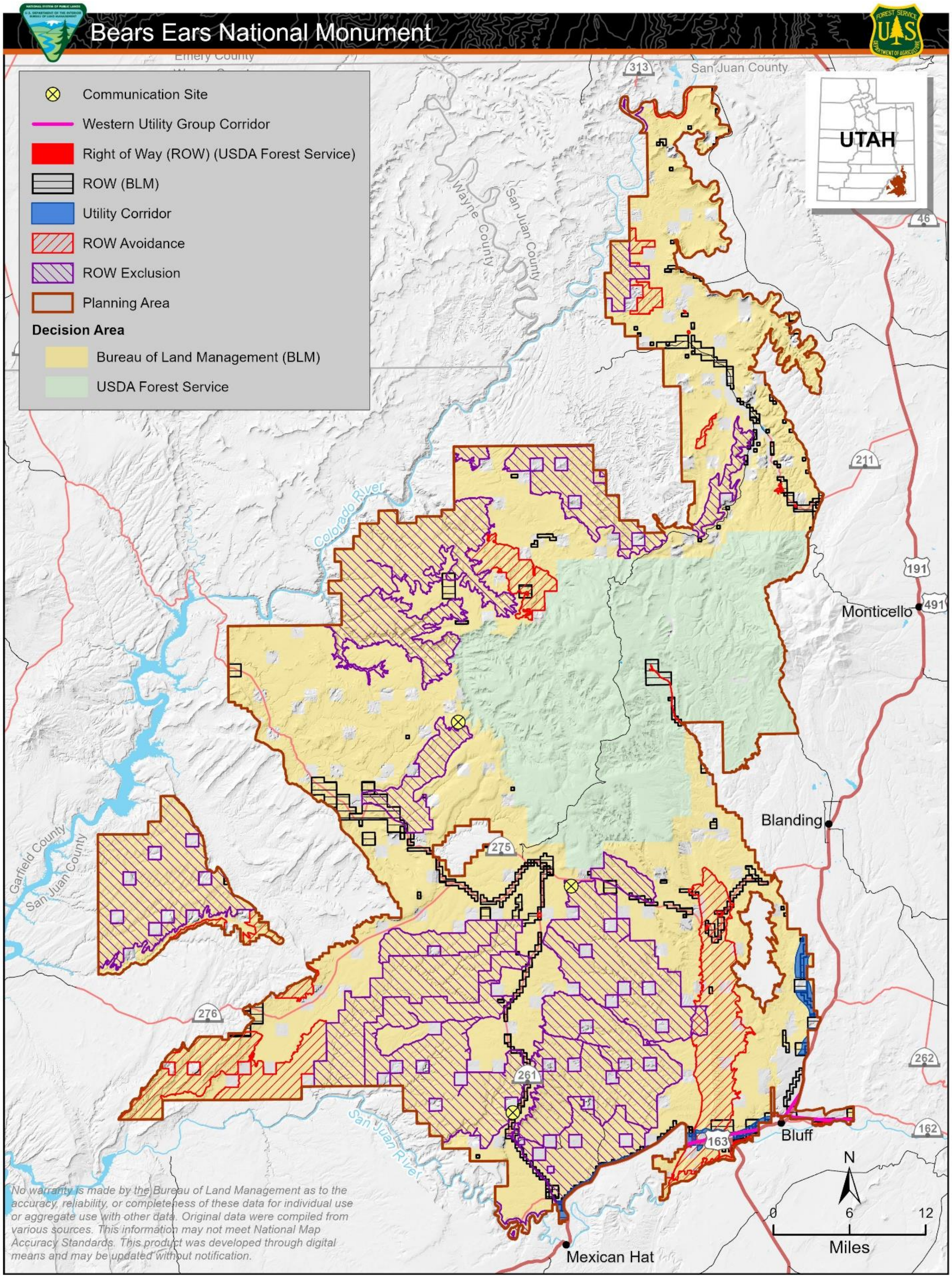

Figure 6.17-1. Rights-of-way within the Planning Area.

Table 6.17-1. Current BLM Right-of-Way Avoidance Areas within the Planning Area

Name	Acreage
Butler Wash	86.55
Colorado River #2	758.65
Comb Ridge CSMA	4,2356.26
Comb Wash camp	20.99
Dark Canyon WC	11,619.25
Grand Gulch WC	13,698.50
Hamburger Rock rec fac	21.63
Indian Creek ACEC	3,945.60
Indian Creek rec fac	13.16
Kane Gulch	41.23
Lavender Mesa ACEC	649.13
Mancos Mesa WC	5,026.81
Mule Canyon	7.37
Newspaper Rock rec fac	9.97
Nokai Dome East WC	18,406.53
San Juan River SRMA	2,140.96
Sand Island	35.98
Shay Canyon ACEC	119.38
Total	**98,957.92**

Source: BLM GIS 2022

There are currently 14 ROW exclusion areas encumbering approximately 404,773 acres of the BLM-administered land within the Planning Area. These ROW exclusion areas make up 29.8% of the total Planning Area. Table 6.17-2 shows the current BLM ROW exclusion areas within the Planning Area.

Table 6.17-2. Current BLM Right-of-Way Exclusion Areas within the Planning Area

Name	Acreage
Bridger Jack WSA	6,301.32
Butler Wash WSA	23,610.76
Cheese Box Canyon WSA	14,825.72
Colorado River segment 3	925.74
Dark Canyon WSA	67,728.87
Fish Creek Canyon	46,088.88
Grand Gulch WSA	105,151.84
Indian Creek WSA	6,545.27
Mancos Mesa WSA	50,763.67
Mule Canyon WSA	5,939.89
Road Canyon WSA	52,361.90
San Juan River segment 5	1,608.96

Name	Acreage
South Needles WSA	153.82
Valley of the Gods ACEC	22,766.99
Total	**404,773.63**

Source: BLM GIS 2022

In total, approximately 503,731 acres (37% of the Planning Area) of BLM-administered land within the Planning Area are categorized as either ROW avoidance areas or ROW exclusion areas.

UTILITY CORRIDORS

There are currently 7,146 acres (0.53% of the Planning Area) of utility corridors within the Planning Area. In the Monticello FO RMP, designated transportation and utility corridors include existing groupings of ROWs for electric transmission facilities, pipelines 16 inches and larger, communication lines, federal and state highways, and major county road systems.

COMMUNICATION SITES

The BLM typically issues communication use leases for communication facilities on BLM-administered land. There are three communication sites within the Planning Area: Upper Horse Flat Communication Site (Case File Number UTU-70116), Moss Back Butte Communication Site (Case File Number UTU-54721), and Cedar Mesa Communication Site (Case File Number UTU-20066).

FILM PERMITS

Within the Planning Area, current filming locations are Newspaper Rock, Moki Dugway, State Route 95, and Valley of the Gods. The Monticello FO has made a specific effort to accommodate filming activity in the area. According to the Monticello FO RMP, applications for filming permits in the Monticello Planning Area will be limited to existing highways, roads, and pullouts and previously disturbed or cleared areas throughout the FO (including Valley of the Gods, Moki Dugway, Highway 211, Newspaper Rock, and State Route 95). Film permits must also comply with the Proclamation’s mandate to protect cultural sites and cultural activities and practices within the Planning Area.

USDA Forest Service

LAND USE AUTHORIZATIONS

Table 6.17-3 shows the current land authorizations within the Planning Area. See Figure 6.17-1 for ROWs within the Planning Area.

Table 6.17-3. Current USDA Forest Service Land Use Authorizations within the Planning Area

Type	Acreage
Road Right-of-Way	30.2
Road Right-of-Way	48.8
Road Right-of-Way	8.76
Road Right-of-Way	48.8
Road Right-of-Way	48.8

Type	Acreage
Road Right-of-Way	21.04
Road Right-of-Way	48.8
Road Right-of-Way	18.17
Total	**273.37**

Source: USDA Forest Service 2022

Land Tenure (ownership) Adjustments

Proclamation 9681 reduced the Monument boundaries by 1,150,860 acres. Between December 4, 2017, and October 8, 2021, the lands excluded from the Monument were open to entry, location, selection sale, or other disposition under the public land laws and laws applicable to the USDA Forest Service; disposition under all laws relating to mineral and geothermal leasing; and location, entry and patent under mining laws (82 CFR 58081).

6.17.4 Trends

Land Use Authorizations

UTILITY CORRIDORS

In the last 4 years (December 4, 2017, to December 4, 2021), no new utility corridors have been approved in the Planning Area. During this time period, all major ROW requests in the Planning Area have been located within existing designated corridors or communication sites. New ROW requests are not expected to increase.

COMMUNICATION SITES

All three communication sites are either currently under a lease renewal or undergoing the lease renewal process. The Upper Horse Flat Communication Site lease was issued in 1993 for a 30-year term. However, in April 2021, the Monticello FO received an application to renew and amend the existing Upper Horse Flat Communication Site. The BLM is currently working with San Juan County to renew the lease for the site. An application has been received to renew the Moss Back Butte Communication Site, which includes some modifications to the ROW grant. The Cedar Mesa Communication Site has recently undergone a tower replacement, which was completed in 2020. No new communication sites have been applied for within the Planning Area in the last 4 years (December 4, 2017–December 4, 2021).

FILM PERMITS

Sixteen film permits were issued in 2017, and the number is expected to continue since Proclamation 10285 has expanded the boundaries of the Monument to its original 2016 boundaries. As of 2021, all film permits are issued under casual use permits, unless the permit includes specific requests. Examples of requests that would not be considered casual use, include, but are not limited to, the following:

- Professional/Stunt driver
- Set construction
- Traffic control that limits public access
- Use of livestock or trained animals

- Pyrotechnics or special effects
- Use of vehicles off of designated roads and trails
- Cast and crew of 21 or more
- Thirteen or more vehicles
- Production of longer than 14 days

The number of permits the BLM has issued in the last 5 years is as follows:

- 2018 – six film permits
- 2019 – 11 film permits
- 2020 – seven film permits
- 2021 – three film permits and five casual use permits
- 2022 – eight casual use permits

6.17.5 Forecasts

Land Tenure (ownership) Adjustments

Land tenure adjustments in the form of exchanges, acquisitions of private inholdings, and donations will continue to occur with willing sellers. Land sales are prohibited under Proclamation 10285. The Proclamation is also subject to valid existing rights, meaning if the federal government acquires any lands that are not under current control by the federal government within the Monument boundaries, such lands and interests in lands will be reserved as part of the Monument.

Land Use Authorizations

UTILITY CORRIDORS

There is currently a low demand for most forms of ROWs in BENM. The Monticello FO RMP identified the need to designate additional corridors as needed subject to physical barriers and sensitive resource values. However, an increase in the demand for ROWs is not anticipated,

COMMUNICATION SITES

The Moss Back Butte Communication Site is currently awaiting a renewal request for the existing communication facility ROW. The project status is currently in progress under decision and appeal. It is anticipated that any future development would continue to incrementally increase over the life of the RMP.

Film Permits

An increase in the demand for ROWs is not anticipated; however, filming activity is not likely to increase.

6.18 LANDSCAPE CHARACTERISTICS

6.18.1 Visual Resources

Regulatory/Policy Framework for Visual Resources

The visual (or scenic) resources of BENM, as noted in Proclamation 10285, encompass the entire landscape and specific areas and routes are highlighted. The Proclamation describes the visual landscape this way:

> The Bears Ears landscape—bordered by the Colorado River to the west, the San Juan River and the Navajo Nation to the south, low bluffs and high mesas to the east and north, and Canyonlands National Park to the northwest, and brimming with towering sandstone spires, serpentine canyons, awe-inspiring natural bridges and arches, as well as the famous twin Bears Ears Buttes standing sentinel over the sacred region—is not just a series of isolated objects, but is, itself, an object of historic and scientific interest requiring protection under the Antiquities Act.

As identified in BEC (2022) *Bears Ears Inter-Tribal Coalition: A Collaborative Land Management Plan for the Bears Ears National Monument*:

> Any disruption to the natural world would negatively affect the viewshed, and by extension Native people whose spiritual power resides in that natural world. Any changes to that landscape that are done in a disrespectful manner negatively affect all people, the ecosystem, and all life forms. Such changes include mining, clear-cutting of timber, and creating roads in formerly roadless areas.

This inclusion in the Proclamation establishes the requirement to manage lands within BENM to protect the visual resources.

For the BLM, other guidance includes BLM Manual 8400, *Visual Resource Management* (BLM 1984), and BLM Handbooks H-8410-1, *Visual Resource Inventory* (BLM 1986), and H-1601-1, *Land Use Planning Handbook* (BLM 2005). The BLM VRM system consists of three phases: the VRI; the establishment of management classes and corresponding objectives through the land use planning process; and the analysis of site-specific management action implementation to ensure compliance with the objectives established in the land use plan. 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 and variety. 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: Indistinctive, low degree of visual variety
- ***Viewer Sensitivity*** – a measure of the public’s tolerance for change in the visual environment
  - Maintenance of Visual Quality has High Value
  - Maintenance of Visual Quality has Moderate Value
  - Maintenance of Visual Quality has Low Value

- ***Distance Zones*** – where the landscape is viewed from
    - Foreground-Middleground Zone: from the viewing platform to 3 to 5 miles out
    - Background Zone: from the edge of the foreground-middleground zone to 15 miles out
    - Seldom-Seen Zone: areas not visible in the 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 lands:

- ***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 (wilderness, 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).
- ***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.

For the USDA Forest Service, other guidance includes Agriculture Handbook Number 462, *National Forest Landscape Management Volume 2. Chapter 1. The Visual Management System* (VMS) (USDA Forest Service 1974) and Agriculture Handbook Number 701, *Landscape Aesthetics: A Handbook for Scenery Management* (USDA Forest Service 1995). The current Manti-La Sal LRMP (USDA Forest Service 1986) established Visual Quality Objectives (VQOs) for the lands within the forest using the VMS. The definition for each VQO from Agriculture Handbook Number 462 are as follows:

- ***Preservation*****:** This visual quality objective allows ecological changes only. Management activities, except for very low visual-impact recreation facilities, are prohibited.
- ***Retention:*** This visual quality objective provides for management activities which are not visually evident. Activities may only repeat form, line, color, and texture which are frequently found in the characteristic landscape. Changes in their qualities of size, amount, intensity, pattern, etc., should not be evident.
- ***Partial Retention:*** Management activities remain visually subordinate to the characteristic landscape when managed according to the partial retention visual quality objective. Activities may repeat form, line, color, and texture common to the characteristic landscape, but changes in their qualities of sizes, amount, intensity, direction, pattern, etc., remain visually subordinate to the characteristic landscape. Activities may also introduce form, line, color, or texture which are found infrequently or not at all in the characteristic landscape, but they should remain subordinate to the visual strength of the characteristic landscape.
- ***Modification:*** Management activities may visually dominate the original characteristic landscape. However, activities of vegetative and landform alteration must borrow from naturally established form, line, color, or texture so completely and at such a scale that its visual characteristics are those of natural occurrences within the surrounding area or character type. Additional parts of these activities such as structures, roads, slash, root wads, etc., must remain visually subordinate to the proposed composition. Activities which are predominately introduction of facilities such as

buildings, signs, roads, etc., should borrow naturally established form, line, color, and texture so completely and at such scale that its visual characteristics are compatible with the natural surroundings.

- ***Maximum Modification:*** Management activities of vegetative and landform alteration may dominate the characteristic landscape. However, when viewed as background, the visual characteristics must be those of natural occurrences within the surrounding area or character type. When viewed as foreground or middle ground, they may not appear to completely borrow from naturally established form, line, color, or texture. Alteration may also be out of scale or contain detail which is incongruent with natural occurrences as seen in foreground or middle ground. Introduction of additional parts of these activities such as structures, roads, slash, and root wads must remain visually subordinate to the proposed composition as viewed in background.

The USDA Forest Service SMS will be used in subsequent forest planning efforts, including the current LRMP revision, and also consists of three phases: the inventory of existing scenery values; the establishment of management classes (i.e., SIOs) 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 land use plan. The intent is to minimize the scenic impacts of all ground-disturbing activities, regardless of the management class in which they occur. *Landscape Aesthetics* (USDA Forest Service 1995) includes a VQO/SIO crosswalk in Appendix H, which is depicted in Table 6.18-1.

Table 6.18-1. USDA Forest Service Visual Quality Objective and Scenic Integrity Objective Crosswalk

VQO	SIO
Preservation	Very High
Retention	High
Partial Retention	Moderate
Modification	Low
Maximum Modification	Very Low

SIOs are established during the land use planning process by balancing inventoried visual values with other resource needs and uses to establish the future desired condition of a given landscape area. These SIOs establish defined objectives, as follows, for future management of NFS lands:

- ***Very High:*** The valued landscape character is intact with only subtle, if any, deviations. Generally provides for ecological change only.
- ***High:*** Landscapes where the valued landscape character appears intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely, and at such scale, that they are not evident.
- ***Moderate:*** Refers to landscapes where the described landscape character appears slightly intact. Noticeable deviations must remain visually subordinate to the landscape character being viewed.
- ***Low:*** Activities must remain visually subordinate to the attributes of the described landscape character. Activities may repeat form, line, color, or texture common to the landscape character, but changes in quality of size, number, intensity, direction, pattern, and so on, must remain visually subordinate to the described landscape character.

- ***Very Low:*** Activities of vegetation and landform alterations may dominate the described landscape character but should appear as valued occurrences when viewed at background distances.

Since the revised Manti-La Sal LRMP has not been approved, the SMS inventory components are described below for context, but the Manti-La Sal National Forest SMS inventory will not be included in BENM planning until the Manti-La Sal LRMP is approved.

*The **SMS inventory*** documents the following:

- ***Scenic Attractiveness*** – a measure of the scenic importance of a landscape based on human perceptions of the intrinsic beauty. The scenic attractiveness classes are
  - Class A: Distinctive or outstanding scenic quality or interest
  - Class B: Typical or common diversity or interest
  - Class C: Indistinctive or weak diversity or interest
- ***Concern Level*** – a measure of the degree of public importance placed on landscapes viewed from travelways and use areas.
  - Level 1: High interest in scenery
  - Level 2: Moderate interest in scenery
  - Level 3: Low interest in scenery
- ***Distance Zones*** – landscape areas denoted by specific distances from the observer.
  - Foreground: Detailed landscape generally found from the observer to 0.5 mile away.
  - Middleground: The zone between the foreground and the background in a landscape, the area located from 0.5 mile to 4 miles from the observer.
  - Background Zone: The distant part of the landscape, the area located from 4 miles to infinity from the viewer.
  - Seldom-Seen Zone: Areas of the landscape that are infrequently viewed by the public.
- ***Existing Scenic Integrity*** – a measure of the intactness associated with the visual elements that define a particular landscape (for definitions, see the previous SIO definitions except for Unacceptably Low).
  - Very High
  - High
  - Moderate
  - Low
  - Very Low
  - Unacceptably Low: Deviations are extremely dominant and borrow little if any form, line, color, texture, pattern, or scale from the landscape character. Landscapes at this level of integrity need rehabilitation. This level should be used only to inventory existing integrity; it must not be used as a management objective.

Current Conditions

The visual resources of BENM are highly scenic, highly valued by the public, minimally developed, and highly intact. Many areas within BENM possess a high degree of scenic quality and a high level of sensitivity to change. BENM contains internationally recognized scenic destinations and draws an increasing number of visitors who come to the area to recreate and sightsee. In general, high scenic quality within BENM is a product of the area's diverse vistas and canyons; extraordinary topography; a scenic river corridor; dramatic, colorful, and unusual geology; cultural history, including prehistoric rock writing and structures; and lack of development. Areas with high visual sensitivity are the primary result of the high degree of visitor interest in and public concern for a particular area's visual resources, the area's high degree of public visibility, the level of use of an area by the public, and the type of visitor use that the area receives. For some (including members of the Hopi, Navajo, Zuni, and Ute Tribes), the entire BENM landscape is considered sacred and provides the opportunity to connect to ancestors.

In March 2018, the BLM completed a visual resource inventory for BENM, which included all BLM-administered lands within the Indian Creek and Shash Jáa Units (BLM 2018). The 2018 BENM VRI relied upon data collected during the 2012 Monticello RMP VRI. With the current, expanded boundary of BENM, this planning effort incorporates VRI data for a larger portion of the Monticello FO (BLM 2012) as well as a small section of the Moab FO (BLM 2010). The majority of BENM was inventoried as having High Scenic Quality (71%) and less than 2% inventoried as Low Scenic Quality. The highest-rated scenic quality rating unit in BENM is the Upper Indian Creek Unit (score of 26) that includes rugged, steep canyons; a prominent riparian corridor; and multiple highly eroded side canyons. Approximately 82% of BENM was inventoried as having high public sensitivity to changes in the landscape character with less than 1% of the area inventoried as having low public sensitivity to change in the landscape character. About 60% of the area was inventoried as being in the foreground-middleground distance zone (visible areas up to 5 miles from common viewing platforms – primary travel routes, communities, viewpoints), and approximately 37% was inventoried as being in seldom-seen locations due to landform screening or distance from viewing platforms (beyond 15 miles).

More than 33% of the lands in BENM are in WSAs and are classified as VRI Class I with the automatic VRI I classification of WSAs. Approximately 58% of the lands within BENM inventoried as VRI Class II, the highest classification that results from combining scenic quality, public sensitivity, and proximity to viewing platforms like commonly used roads. Slightly more than 6% was inventoried as VRI Class III. Less than 3% was inventoried as VRI Class IV.

The 1986 Manti-La Sal LRMP identified VQOs for all lands within the forest to establish a degree of acceptable alteration to the characteristic landscape based on the public's concern for scenic quality and the diversity of natural features. The forest portion of BENM contains the peaks forming Bears Ears Buttes as well as the upper portions of Arch Canyon and Dark Canyon Wilderness. Based on the 1986 Manti-La Sal LRMP, Dark Canyon Wilderness, an area adjacent to a natural arch in Allen Canyon, and a portion of Hammond Canyon were assigned a preservation VQO where management activities are limited, allowing only for ecological changes. Additionally, Texas Canyon, Arch Canyon, Butts Canyon, and the upper reaches of Cottonwood Creek, including Notch Canyon, are managed as a retention VQO where management activities cannot be visually evident. The remaining areas of the NFS portion of BENM are currently managed under a partial retention VQO, including Bears Ears Buttes and the Elk Ridge Road Scenic Backway corridor, or under a modification VQO.

Table 6.18-2 through Table 6.18-6 depict the different components of the BLM VRI, the current BLM RMP classes, and the current USDA Forest Service VQO for BENM. Further, Figure 6.18-1 through Figure 6.18-5 display these data within the boundaries of BENM.

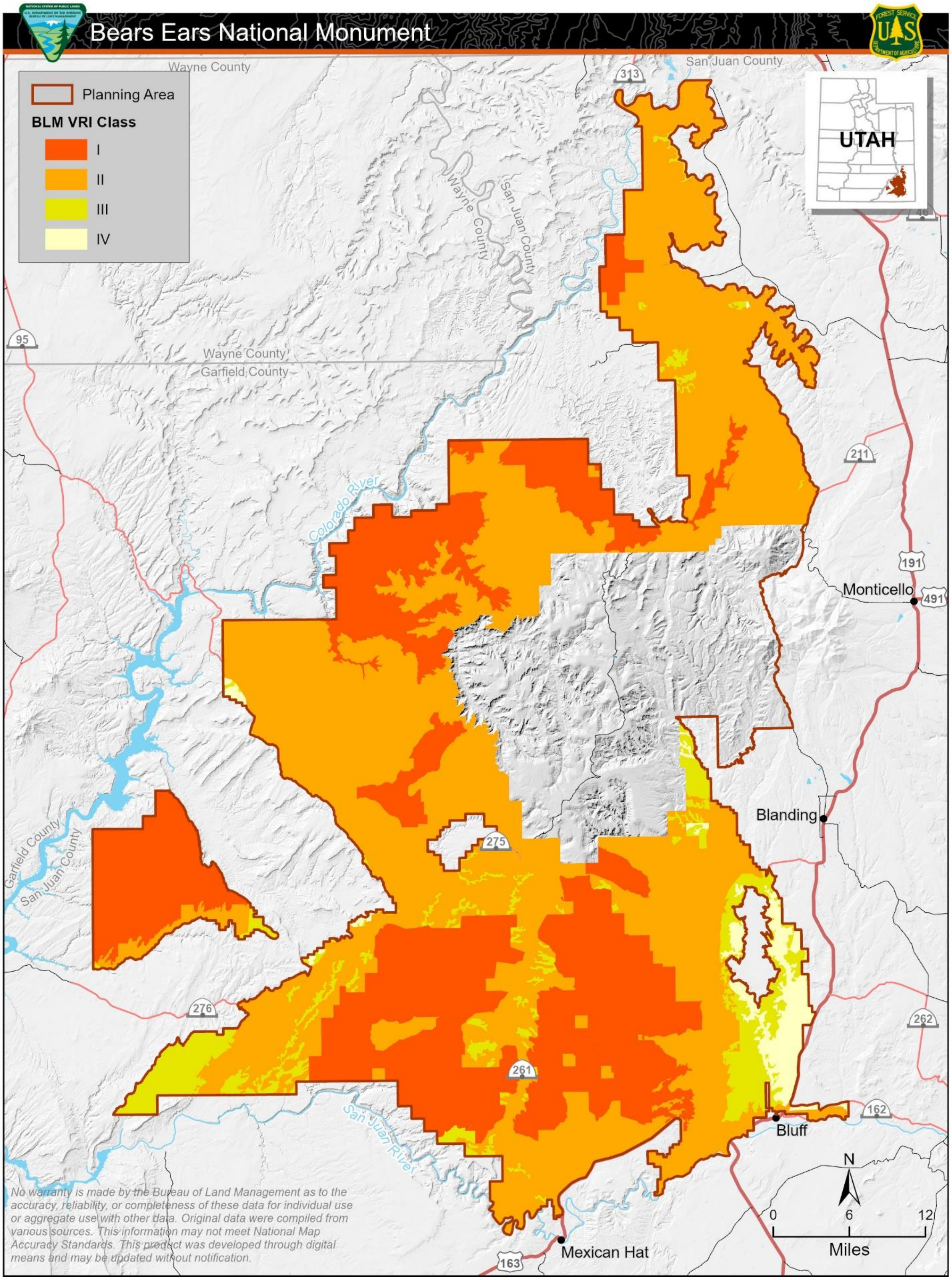

Figure 6.18-1. BLM Visual Resource Inventory classes.

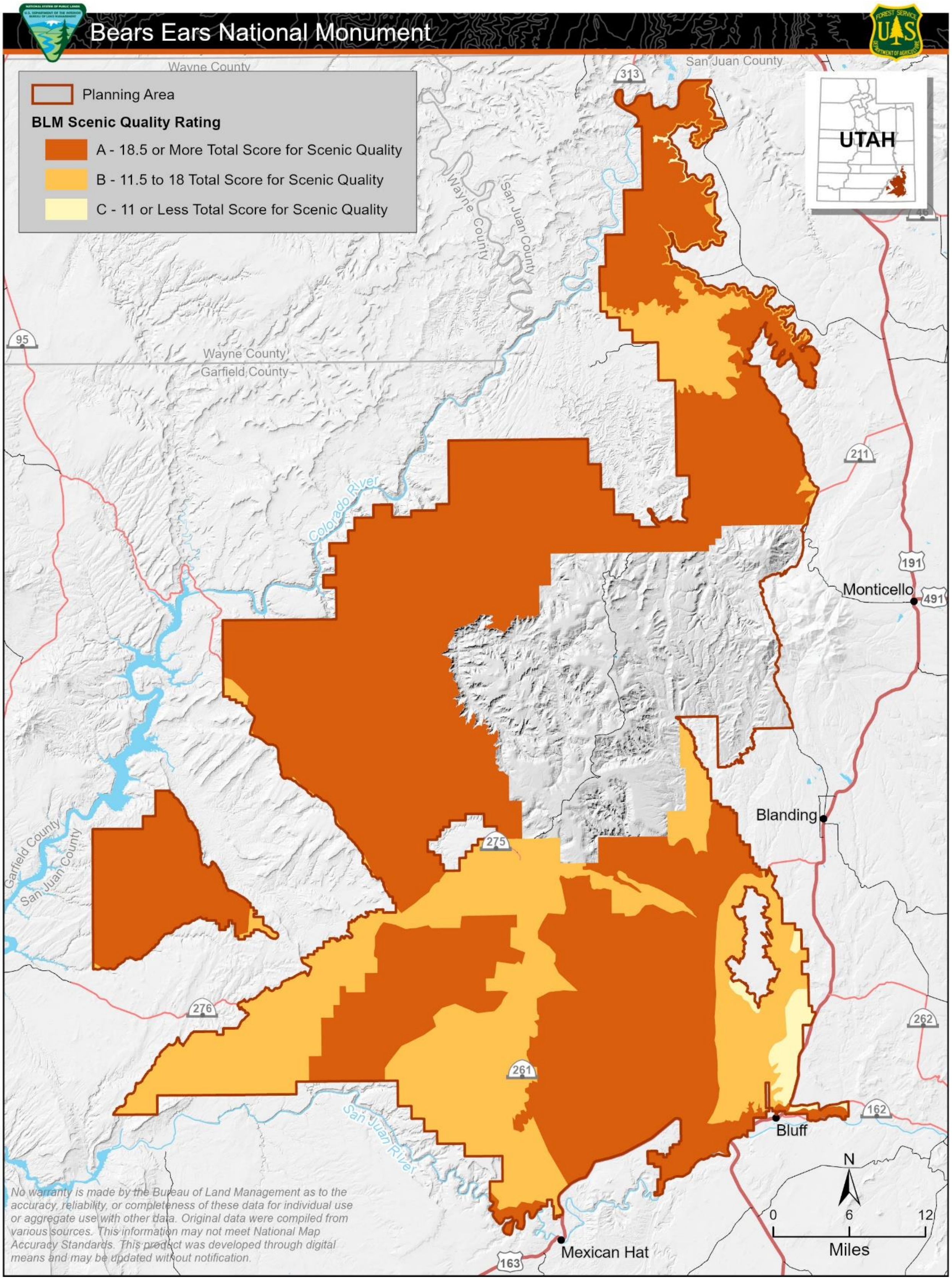

Figure 6.18-2. BLM Visual Resource Inventory scenic quality.

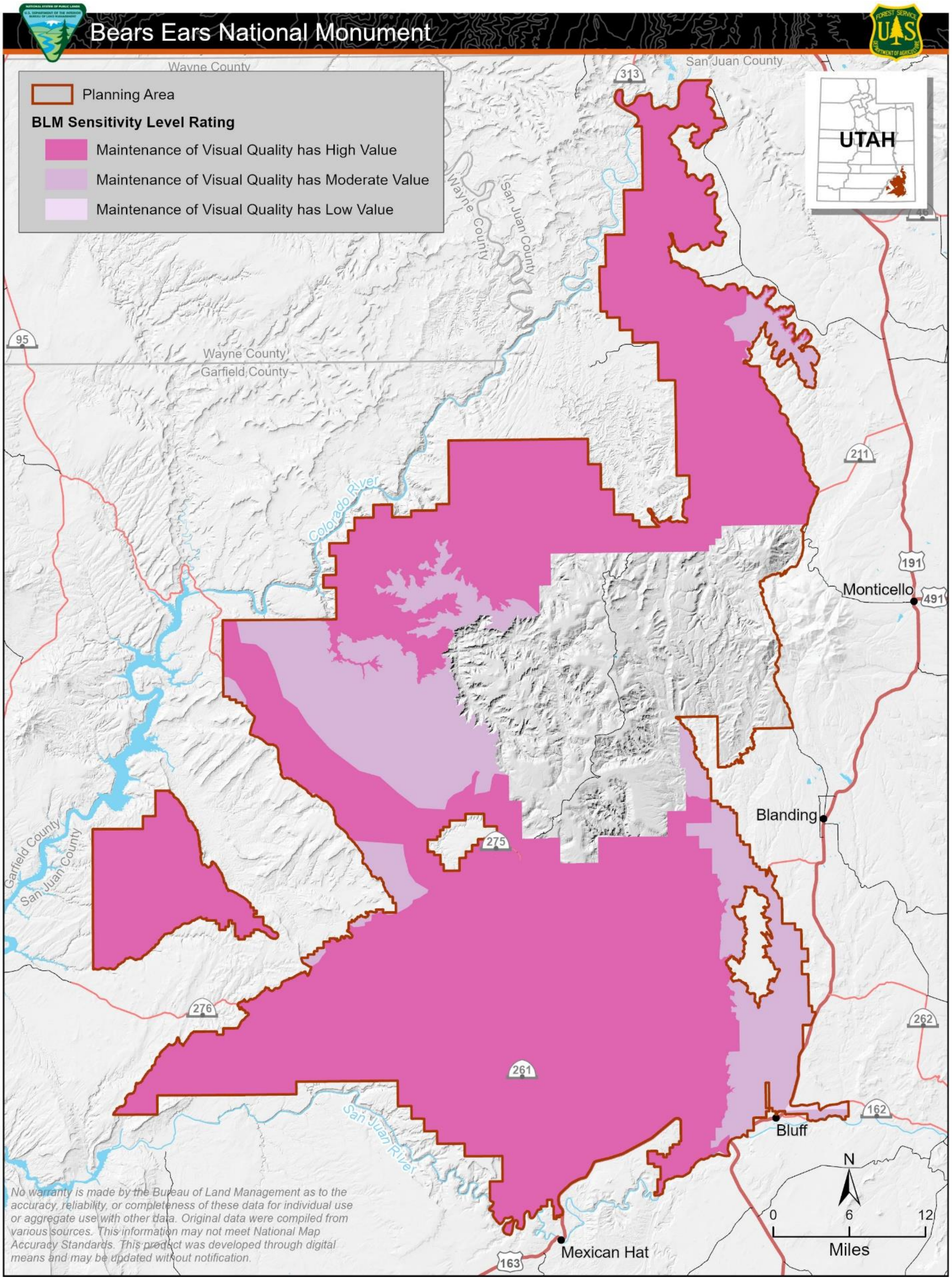

Figure 6.18-3. BLM Visual Resource Inventory sensitivity levels.

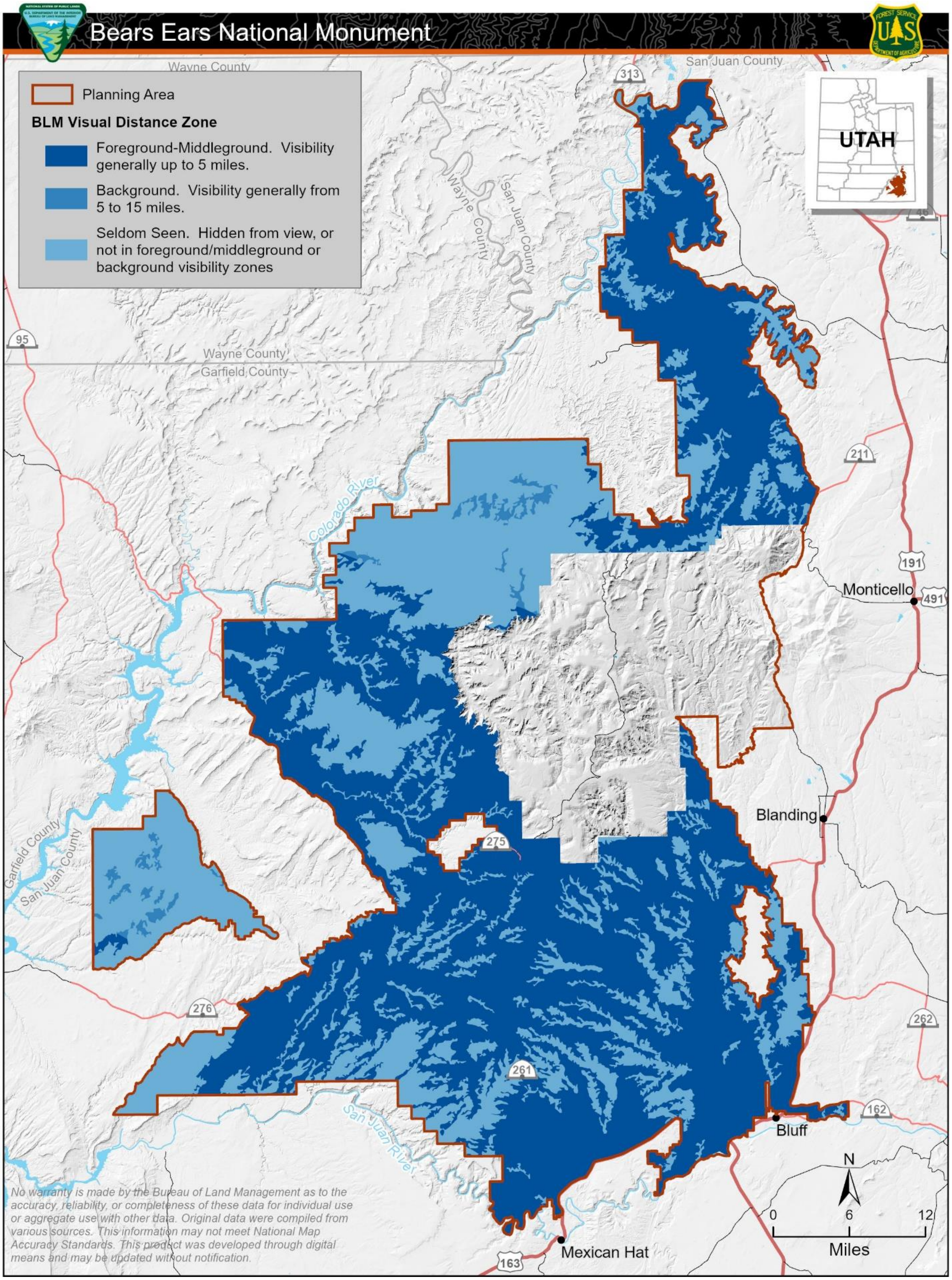

Figure 6.18-4. BLM Visual Resource Inventory distance zones.

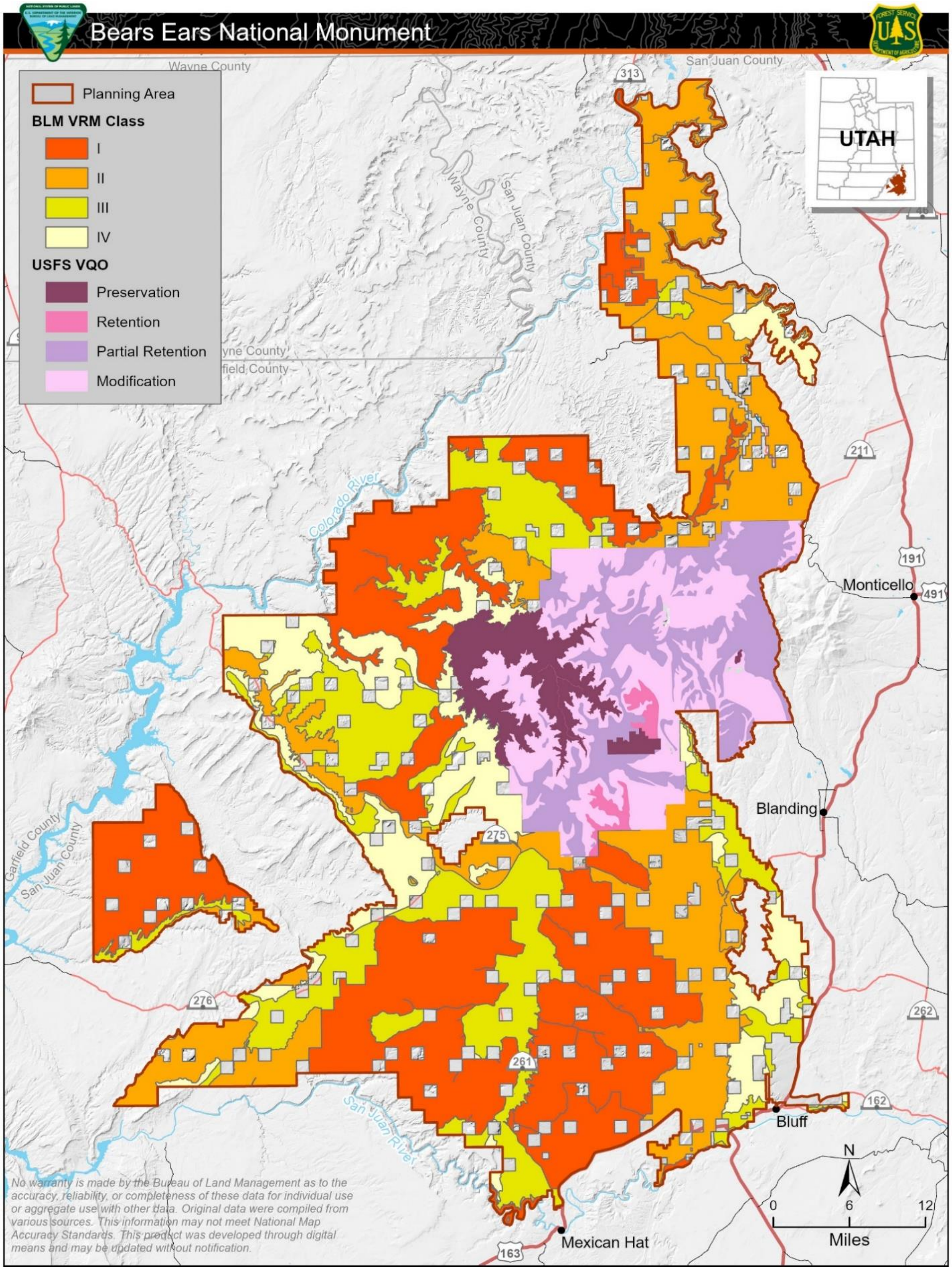

Figure 6.18-5. BLM Visual Resource Management classes and USDA Forest Service Visual Quality Objectives.

Table 6.18-2. BLM Visual Resource Inventory Class Acres with Visual Resource Inventory Class I Shown

BLM VRI Class	Acres
Class I	400,626
Class II	691,186
Class III	78,921
Class IV	29,733

Source: BLM 2010, 2012, 2018; USDA Forest Service 2022

Table 6.18-3. BLM Visual Resource Inventory Scenic Quality

BLM Scenic Quality	Acres
Class A	857,648
Class B	328,283
Class C	14,838

Source: Source: BLM 2010, 2012, 2018

Table 6.18-4. BLM Visual Resource Inventory Sensitivity Levels

BLM Sensitivity Level	Acres
Maintenance of Visual Quality has High Value	978,201
Maintenance of Visual Quality has Moderate Value	221,375
Maintenance of Visual Quality has Low Value	1,193

Source: BLM 2010, 2012, 2018

Table 6.18-5. BLM Visual Resource Inventory Distance Zones

BLM Distance Zone	Acres
Foreground-Middleground	739,432
Background	11,841
Seldom-Seen	449,495

Source: BLM 2010, 2012, 2018

Table 6.18-6. BLM Visual Resource Management Class and USDA Forest Service Visual Quality Objective Acres

BLM VRM Class	Acres	USDA Forest Service VQO	Acres
Class I	424,019	Preservation	51,096
Class II	324,684	Retention	9,069
Class III	212,452	Partial Retention	102,846
Class IV	143,864	Modification	125,425

Source: BLM 2008a, 2008b, 2020; USDA Forest Service 1986

Trends

Most of BENM is undeveloped and exhibits intact visual characteristics due to the remote, rugged, and inaccessible qualities of the area. Although not dominant, development imprints on the land include transmission lines, roads, livestock grazing infrastructure, vegetation management, and recreational developments. In general, due to the designation as a Monument, sparse population density, and large continuous tracts of BLM-administered and NFS lands have resulted in a stable trend for maintaining scenic quality and landscape (scenic) character within BENM. Increases in recreation and tourism, increased vehicular use, and increased visitation to adjacent national park units will facilitate increased use within BENM. This includes an increase in dispersed vehicle camping, resulting in more ground disturbance as well as the introduction of temporary bright-colored recreation equipment (e.g., tents, canopies, RVs, etc.). There is also increasing recreational OHV use, leading to illegal off-road uses that can create new linear disturbances. Firewood and forest product gathering, which has the potential to impact visual values through off-road incursions and improperly cut natural vegetation, has been relatively stable.

The BLM and USDA Forest Service analyze all proposed actions in BENM for their visual impacts and compliance with VMOs (i.e., BLM VRM classes, USDA Forest Service VQOs, or USDA Forest Service SIOs). Projects are planned and designed to meet or exceed visual management objectives so that projects blend in with the natural landscape (scenic) character and impacts to the visual environment are minimized. This approach has been and continues to be effective in maintaining the Monument’s landscape (scenic) character and scenic quality.

Forecasts

It is forecasted that VRI values will remain mostly stable into the future. That said, viewer sensitivity to landscape change is more likely to increase than scenic quality ratings or distance zones are likely to change. As undeveloped, naturally intact lands become more scarce throughout the country, and as local development pushes closer to the boundaries of BENM and inholdings are developed, it is likely that national and local publics will become increasingly sensitive to changes in landscape (scenic) character within BENM to the degree that sensitivity ratings shift in some inventoried areas of moderate and low sensitivity. Increases in sensitivity are anticipated to rise due to both the increasing number of visitors and visitation expansion into lesser-known areas as popular destinations become overcrowded. These factors are assumed to result in more of the landscape being explored and valued by more visitors compared to the existing condition. Distance zones are established on important viewing platforms like primary travel corridors, communities, trails, and viewpoints. Although development on the edges of local communities is likely to expand to some degree and some internal travel corridors may become more popular with increased travel counts, the viewing platforms are assumed to remain mostly the same as they were used in the inventory. Anticipated future increases in visitation could result in the need for additional recreational infrastructure (e.g., trailheads, campgrounds, interpretive sites, parking, trails). Additional livestock grazing infrastructure (fencing, water developments, etc.) and vegetation management and restoration projects are likely to be implemented based on past trends. Local- and regional-scale utility ROWs (buried and aboveground) are anticipated to be authorized if past trends continue, with these most likely being sited adjacent to existing highway corridors. This range of development within BLM and USDA Forest Service jurisdiction could result in modest increases in visual contrast, especially in foreground scenes, throughout the Planning Area, but these types of facilities are not forecasted to be implemented in locations or at scales or densities that would cause scenic quality ratings to shift.

Causal factors that could also impact BENM scenic quality that are outside BLM or USDA Forest Service influence or control are climate change and the development of adjacent and inheld non-federal lands. The development of inholdings and properties on the Monument boundary for residential, commercial, and other uses are likely to continue and increase, resulting in changes to the landscape (scenic) character in those interface zones. The intensifying drought and severe wildfires associated with climate change are forecasted to change vegetation (e.g., dead and/or burnt stands of trees, reduced shrub and grass cover, increasing insect and disease pressure, reduced water availability, etc.), especially in shrubland, riparian, and pinyon-juniper woodland vegetation communities, as well as reduce the presence of surface water, potentially to the degree that inventoried scenic quality values would shift.

6.18.2 Dark Night Skies

Regulatory Framework for Dark Night Sky Resources

The dark night skies resources of BENM are not specifically described in Proclamation 10285, but under Proclamation 9558, the Monument's original designation proclamation, it was described this way: "The star-filled nights and natural quiet of the Bears Ears area transport visitors to an earlier eon. Against an absolutely black night sky, our galaxy and others more distant leap into view." This inclusion in the original Proclamation, which Proclamation 10285 confirms, restores, and supplements, establishes the requirement to manage lands within BENM to protect dark night sky resources.

In response to increased interest from the public regarding protection of dark night skies, the BLM is currently developing BMPs to provide comprehensive technical guidance on practical methods for reducing the impacts from artificial outdoor lighting from proposed projects or activities implementation. The BLM and USDA Forest Service have not yet developed policies regarding the management of dark night skies.

Current Conditions

In 2017, the Ogden Valley Chapter of the International Dark-Sky Association measured on-ground readings of existing light pollution levels from five locations within BENM (Newspaper Rock, Dugout Ranch, Butler Wash Ruins, Mule Canyon Indian Ruins, and Bears Ears Buttes), which revealed that BENM is one of the most naturally dark outdoor spaces left in the lower 48 U.S. states (Ogden Valley International Dark-Sky Association Chapter 2017). According to *The New World Atlas of Artificial Night Sky Brightness* (Falchi et al. 2016), large portions of the Monument have pristine night skies where the only natural sources of light, such as starlight, airglow, aurora, and zodiacal light, are visible to the human eye. Ground measurements of zenith (directly above observer[s]) sky luminance (brightness) in BENM supported this conclusion with mean zenith luminance as low as 21.9 magnitudes per square arcsecond (mpsa) (Dugout Ranch) and 21.8 mpsa (Newspaper Rock), comparable to the lower limit of 21.9 to 22.0 mpsa established by natural night sky phenomena. Additionally, only 30.4% 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 (Falchi et al. 2016). The routinely seen "pristine" night skies in the Monument are a testament to the rarity of these conditions.

Table 6.18-7 depicts the acres of BENM where different thresholds of existing sky glow currently exist. Figure 6.18-6 displays different thresholds of existing sky glow areas within the boundaries of BENM.

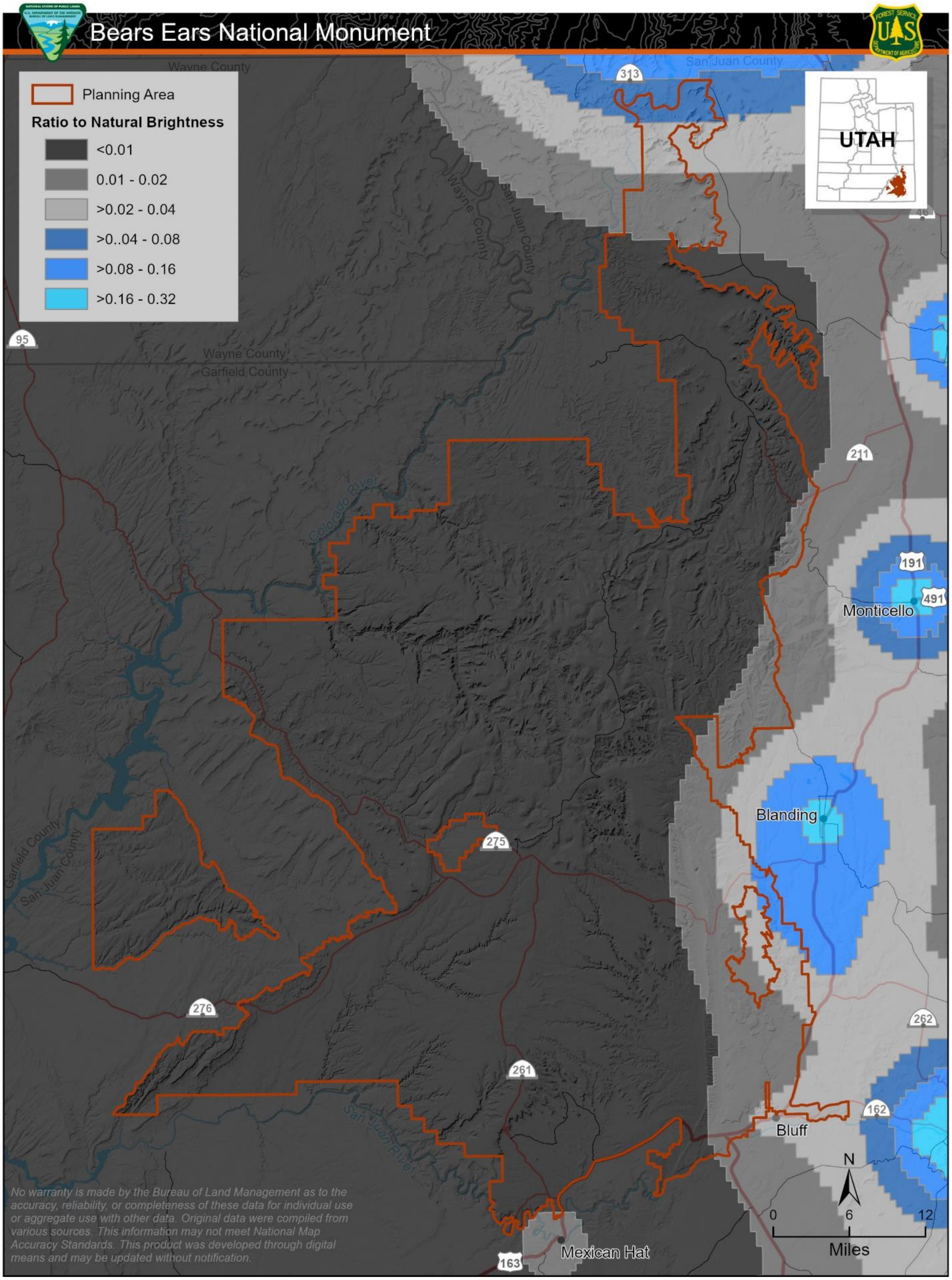

Figure 6.18-6. Dark skies: light pollution.

Table 6.18-7. Existing Sky Glow (ratio to natural brightness) Acres

Ratio to Natural Brightness	Acres
0–0.01	1,304,089
0.01–0.02	135,816
> 0.02–0.04	35,729
> 0.04–0.08	9,587
> 0.08–0.16	6,009

Source: Falchi et al. 2016

Trends

Development in the western United States is projected to continue to increase in the coming decades. BENM is not located in proximity to any cities or large towns, with the closet communities under 10,000 in population. These communities include Blanding, Monticello, Moab, and Page, Arizona. The nearest large metropolitan areas are Las Vegas, Nevada, at about 275 straight miles to the southwest and Salt Lake City, Utah, at about 200 straight miles to the north-northwest. 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 within BENM. With increasing development throughout the western United States, it is anticipated that light pollution would continue to increase in the periphery of the Monument with further encroachment of sky glow into the edges of the Monument.

Utah surpassed Texas in 2015 with more International Dark-Sky Association dark sky designations than any other state. To date, Utah has 24 dark sky designations. BENM is surrounded by several designations protecting night skies at a variety of scales, such as the recent designation of Goosenecks State Park as well as Natural Bridges National Monument, Rainbow Bridge National Monument, Canyonlands National Park, Dead Horse Point State Park, and others.

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 Canyon National Park area to the west and the area around Page, Arizona, to the south. The City of Moab, Grand County, and the Town of Bluff have passed ordinances that seek to protect against light pollution.

Night sky resources are increasingly of public concern and were noted during scoping for planning efforts and review of proposed projects on BLM-administered lands. At least two BLM national monuments (GSENM and BENM) recognize dark night skies as objects for protection in their Proclamations.

Forecasts

Outside BENM, the town and cities on the immediate periphery, as well as those farther away like Salt Lake and Las Vegas, are anticipated to continue to expand with residential, commercial, and industrial development and associated artificial lighting. This growth is forecasted to increase the encroachment of sky glow into the edges of the Monument. Public concerns for protecting dark sky resources on public lands are projected to continue and increase based on existing trends.

6.18.3 Natural Soundscapes

Regulatory Framework for Natural Soundscape Resources

The natural soundscape of BENM is not specifically described in Proclamation 10285, but under Proclamation 9558, the Monument's original designation proclamation, it was described this way: "The star-filled nights and natural quiet of the Bears Ears area transport visitors to an earlier eon. . . . As one of the most intact and least roaded areas in the contiguous United States, Bears Ears has that rare and arresting quality of deafening silence." This inclusion in the original Proclamation, which Proclamation 10285 confirms, restores, and supplements, establishes the requirement to manage lands within BENM to protect natural soundscapes.

Protection of ambient soundscapes has received growing attention over the past four decades, with legislation dating back to the Noise Control Act of 1972. Subsequent nationwide legislation has described the importance of the acoustical environment for resource protection and visitor experience in protected natural areas, including for NPS units, in the National Parks Air Tour Management Act of 2000. Because of the abundant noise found in urban and suburban areas, the majority of visitors to protected natural areas come seeking respite from ambient stressors such as noise. Natural quiet is important for visitors, ecosystem health, and the welfare of non-human species that reside in protected natural areas.

Current Conditions

Although no soundscape studies have been conducted in BENM, based on acoustic monitoring and audibility logging in a similar setting in the adjacent GSENM, the most frequently encountered unnatural sound sources were high-altitude jet aircraft and vehicles/engines (Southern Utah University 2020). Dominant ambient natural sounds included the wind and birdsong as well as natural quiet. The emphasis for types of use guides soundscape decisions; for motorized, developed settings, the soundscape is generally composed of unnatural, human-made noise as well as natural quiet; for non-motorized, undeveloped settings, the soundscape is generally composed of natural quiet. Several monitored sites in the adjacent GSENM were found to be within the range of the quietest locations monitored in the lower 48 states, based on exceedingly low decibel levels. Based on this study in a similar landscape setting, it is anticipated the soundscapes in BENM are also some of the quietest in the lower 48 states. Additionally, the NPS has developed data depicting existing soundscapes for the lower 48 states. A large portion of the Monument is very quiet—less than 30 dBA—which equates to a quiet whisper or rustling leaves. The auditory environment and natural soundscape are valued by the Tribal Nations of the BEITC and should remain pristine. For the Hopi, "sounds and vibrations give life, and it is through vibrations that one can hear and connect with the spirits. In Hopi ceremonies, sacred tones are sung in order to connect with the spirits, and disruptive sounds break the spiritual connections (BEC 2022).

Table 6.18-8 depicts the acres of BENM where different thresholds of existing sound levels currently exist. These are based on L50, a descriptor of loudness, which represents the existing ambient noise levels where the decibel level is exceeded 50% of the time. Figure 6.18-7 displays these existing sound levels within the boundaries of BENM.

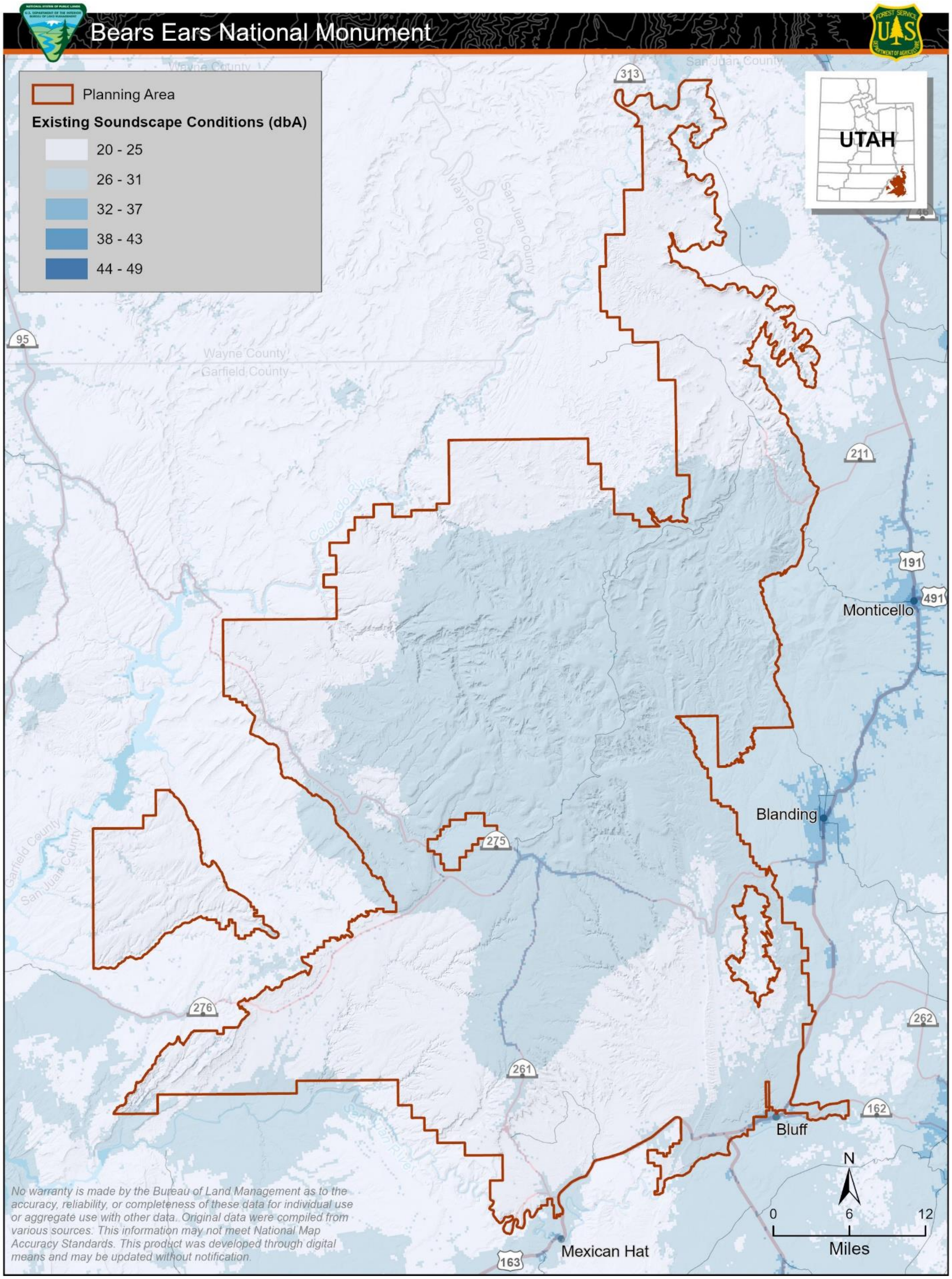

Figure 6.18-7. Existing soundscape conditions.

Table 6.18-8. Existing L50 Sound Levels (dBA) Acres

Sound Level (dBA)	Acres
Less than 25 dBA	379,688
25–30 dBA	1,077,330
More than 30 dBA	33,386

Source: NPS 2021

Trends

Natural soundscape resources are increasingly of public concern and noted during scoping for planning efforts and review of proposed projects on BLM-administered and NFS lands. Increases in noise are anticipated to continue as recreational visitation and air travel increase. Scenic overflights in places like nearby Grand Canyon National Park, and the use of drones for recreational and scientific purposes have increased in recent years.

Forecasts

With increasing recreational visitation and air travel (identified as the main generators of human-caused noise within the adjacent GSENM based on the Monument's 2020 baseline acoustic monitoring report [Southern Utah University 2020]), as well as other noise-producing activities (e.g., vehicle travel, including OHVs, scenic overflights, etc.), it is anticipated the Monument's acoustic environment would become less quiet over time, especially along primary and secondary travel corridors, although not to a significant degree across the entirety of the landscape because of the inaccessibility of a significant percentage of it.

The demand for scenic overflights on nearby national parks suggests that the demand for that use could occur at BENM, resulting in less quietness. The demand for use of drones for recreational and scientific purposes is forecast to continue. In accordance with the National Parks Air Tour Management Act of 2000, the NPS is currently developing air tour management plans to reduce noise impacts over the parks, including the portion of BENM within 0.5 mile of Canyonlands National Park (west and northwest edges of the Monument), Natural Bridges National Monument (within the Monument), and Glen Canyon National Recreation Area (southwest and south edges of the Monument).

6.19 LANDS WITH WILDERNESS CHARACTERISTICS

Although the BLM's authority under FLPMA Section 603 (43 USC 1782) expired in 1991, Congress gave the 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 FLPMA Section 201, and later per guidance outlined in BLM Manual 6310 (BLM 2021a), the BLM began updating findings for lands with wilderness characteristics in 1999 (BLM 1999). The BLM is currently working on verification and re-inventorying to further identify which areas in the Monument contain lands with wilderness characteristics; this updated inventory is expected to be complete in the fall of 2022.

6.19.1 Current Conditions

Of approximately 539,296 acres inventoried for wilderness characteristics, 389,936 acres were found to possess those characteristics in the Monument (Figure 6.19-1 and Table 6.19-1). The majority of inventory was completed in 1999 and confirmed in 2007 with some additional units inventoried based on subsequent public recommendations.

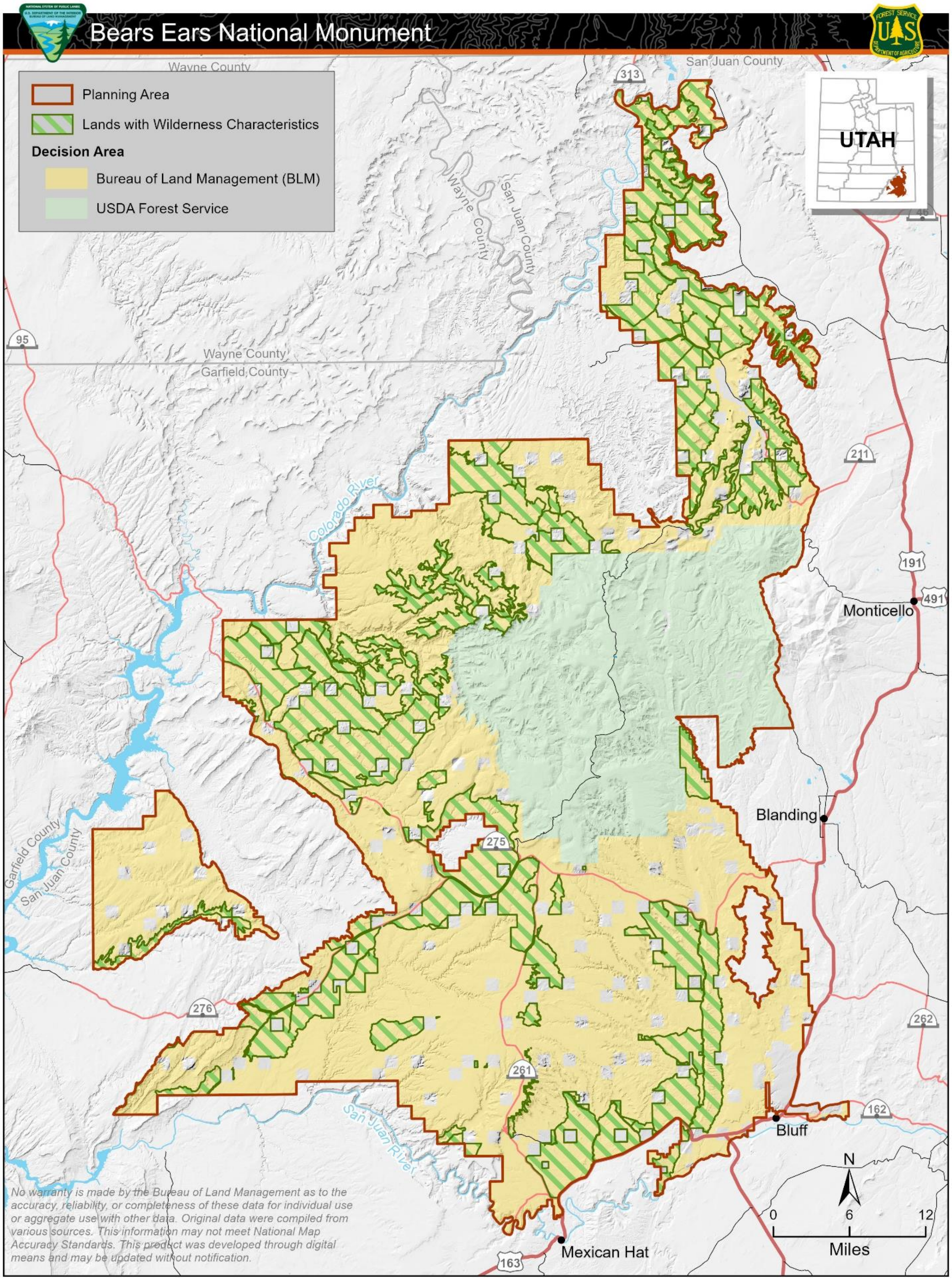

Figure 6.19-1. Lands with wilderness characteristics in BENM.

Table 6.19-1. Lands with Wilderness Characteristics

Unit Name	Acres of Unit with Wilderness Characteristics	Total Acres of Unit
Allen Canyon 1	0.0	7.6
Allen Canyon 2	0.0	0.0
Allen Canyon 4	0.0	0.0
Allen Canyon 5	0.0	1.1
Arch Canyon 1	0.0	18,079.0
Arch Canyon 2	0.0	1,826.3
Arch Canyon 3	0.0	31.8
Arch Canyon 4	38.6	38.6
Arch Canyon 5	0.0	2,119.6
Arch Canyon 6	0.0	2,690.7
Blue Notch	474.4	1,430.2
Bridger Jack Mesa	23,122.9	23,124.6
Bridger Jack Mesa 2	0.0	16.3
Bridger Jack Mesa 3	0.0	18.8
Bridger Jack Mesa 5	0.0	35.5
Bridger Jack Mesa 6	0.0	3.5
Butler Wash	1,661.0	1,941.1
Butler Wash 7	0.0	42.6
Cheesebox Canyon	13,240.8	13,243.4
Comb Ridge	13,778.2	13,778.2
Copper Point 2	0.0	3,451.8
Dark Canyon	54,652.3	67,549.1
Dark Canyon 1	0.0	26.6
Dark Canyon 2	0.0	89.9
Dark Canyon 6	0.0	13.4
Dark Canyon 7	0.0	22.2
Dark Canyon 8	0.0	10.2
Dark Canyon 9	0.0	10.8
Dark Canyon 10	0.0	21.7
Dark Canyon 11	0.0	62.6
Dark Canyon 12	0.0	35.1
Dark Canyon 13	0.0	121.8
Dark Canyon 16	0.0	30.7
Dripping Springs: Hatch/Lockhart/Hart	9,451.9	9,451.9
Fish and Owl Creeks	24,478.4	24,654.7
Fish Owl Creek Canyons 1	0.0	74.7
Fish Owl Creek Canyons 2	0.0	52.8

Unit Name	Acres of Unit with Wilderness Characteristics	Total Acres of Unit
Fish Owl Creek Canyons 3	0.0	134.2
Fort Knocker Canyon	12,408.8	12,408.8
Gooseneck	3,519.4	3,519.6
Gooseneck 4	0.0	213.6
Grand Gulch	33,410.8	47,229.0
Grand Gulch 13	0.0	68.3
Grand Gulch 14	0.0	246.2
Grand Gulch A	7,508.2	7,508.2
Grand Gulch B	630.8	630.8
Gravel & Long Canyon	36,878.8	36,969.1
Hammond Canyon	4,465.3	4,465.3
Harmony Flat	9,651.7	9,651.7
Harts Point	23,147.6	23,155.5
Hatch Lockhart Hart 1	0.0	135.4
Hatch Lockhart Hart 3	1,766.1	1,766.1
Hatch Lockhart Hart 6	0.0	180.4
Hatch Lockhart Hart 9	0.0	139.7
Hatch Lockhart Hart 23	0.0	3.4
Hatch/Lockhart/Hart	794.1	794.1
Hatch/Lockhart/Hart	0.0	563.9
Indian Creek	18,906.4	19,046.2
Indian Creek 3	12.2	12.2
Indian Creek 4	0.0	43.2
Indian Creek A	3,913.4	3,913.4
Indian Creek Adj.	23.1	23.1
Indian Creek B	99.4	99.4
Indian Creek C	290.3	290.3
Lime Creek	5,561.0	5,561.0
Lockhart Additions	577.2	577.2
Lockhart Basin	8,044.8	8,044.8
Lockhart_Harts_Add	9,275.2	9,275.2
Mancos Mesa	7,897.6	12,950.4
Nokai Dome	4,745.8	4,745.8
Nokai Dome East	0.0	18,417.5
Red Rock Plateau 2	0.0	29.0
Red Rock Plateau A	348.4	348.4
Red Rock Plateau B	0.0	897.2
Red Rock Plateau C	0.0	4,658.6
Road Canyon	11,295.6	11,347.3

Unit Name	Acres of Unit with Wilderness Characteristics	Total Acres of Unit
San Juan River	2,450.7	2,486.0
Shay Mountain 1	0.0	175.2
Shay Mountain A	6,709.8	6,709.8
Shay Mountain B	0.0	7,167.3
Shay Mountain C	0.0	994.1
Sheep Canyon	4,000.7	4,000.7
The Needle A	0.0	3,715.1
The Needle B	0.0	7,017.3
The Tabernacle A	0.0	6,246.7
The Tabernacle B	0.0	183.9
Trough Springs Additions	26.8	26.8
Unknown	255.5	31,024.7
Upper Indian Creek	6,386.3	6,386.3
Upper Red Canyon A	2,421.3	2,421.3
Upper Red Canyon B	0.0	152.3
Valley of the Gods A	13,663.6	13,663.6
Valley of the Gods B	0.0	890.2
White Canyon	6,291.5	6,291.5
White Canyon 1	0.0	1,140.6
White Canyon 2	0.0	178.4
White Canyon 3	0.0	646.5
White Canyon 4	0.0	230.0
White Canyon 5	0.0	83.8
White Canyon 6	0.0	12.1
White Canyon 7	0.0	191.2
White Canyon 8	384.2	384.2
White Canyon 9	1,244.8	1,244.8
White Canyon 10	0.0	1,227.2
White Canyon 11	0.0	123.3
White Canyon 14	0.0	39.2
White Canyon 15	0.0	39.9
White Canyon 17	30.0	30.0
Total	**389,935.6**	**539,296.4**

Source: BLM GIS (2022)

6.19.2 Trends

Public interest and use throughout BENM is expected to increase in the future. Recreational use will create alterations to the landscape over time through an increase in human presence, vehicle use, and road use in certain areas. With these alterations, there will be a need for recurring updated inventories of lands with wilderness characteristics to evaluate if wilderness characteristics are still present. Livestock grazing, wildlife infrastructure, and other land use activities may also impact lands with wilderness characteristics. Although the effects on minor features from these sources may be substantially unnoticeable, they may cumulatively affect the area's apparent naturalness with increased use.

6.19.3 Forecasts

Interest in wilderness resources throughout the Decision Area has local, regional, and national significance. Public interest in the BLM's inventory determinations, as well as management actions for these areas, has increased dramatically in the past 20 years and is expected to continue increasing. As the areas that meet the definition of lands with wilderness characteristics found in BLM Manuals 6310 and 6320 (BLM 2021a, 2021b) become more limited, pressure on the lands that meet these definitions are expected to increase.

6.20 SPECIAL LAND DESIGNATIONS FOR CONSERVATION AND PROTECTION

6.20.1 Areas of Critical Environmental Concern and Research Natural Areas

Current Conditions

Five ACECs are located entirely within the Planning Area (Figure 6.20-1). These ACECs are listed in Table 6.20-1, along with associated acreage, a description of each ACEC, and the relevance and importance criteria for which each ACEC was designated.

Research Natural Areas (RNAs) are established and maintained for research and education because the land has one or more of the following characteristics: 1) a typical representation of a common plant or animal association; 2) an unusual plant or animal association; 3) a threatened or endangered plant or animal species; 4) a typical representation of common geologic, soil, or water features; or 5) outstanding or unusual geologic, soil, or water features (43 CFR 8223).

There is one RNA that existed prior to initial monument designation that has been retained since designation: Cliff Dwellers Pasture RNA. This area is species rich. Features include birch and bluegrass communicates, Gambel oak-bigtooth maple woodlands, and slickrock shrub communities (USDA Forest Service 1986). Cliff Dwellers Pasture RNA is also shown in Figure 6.20-1.

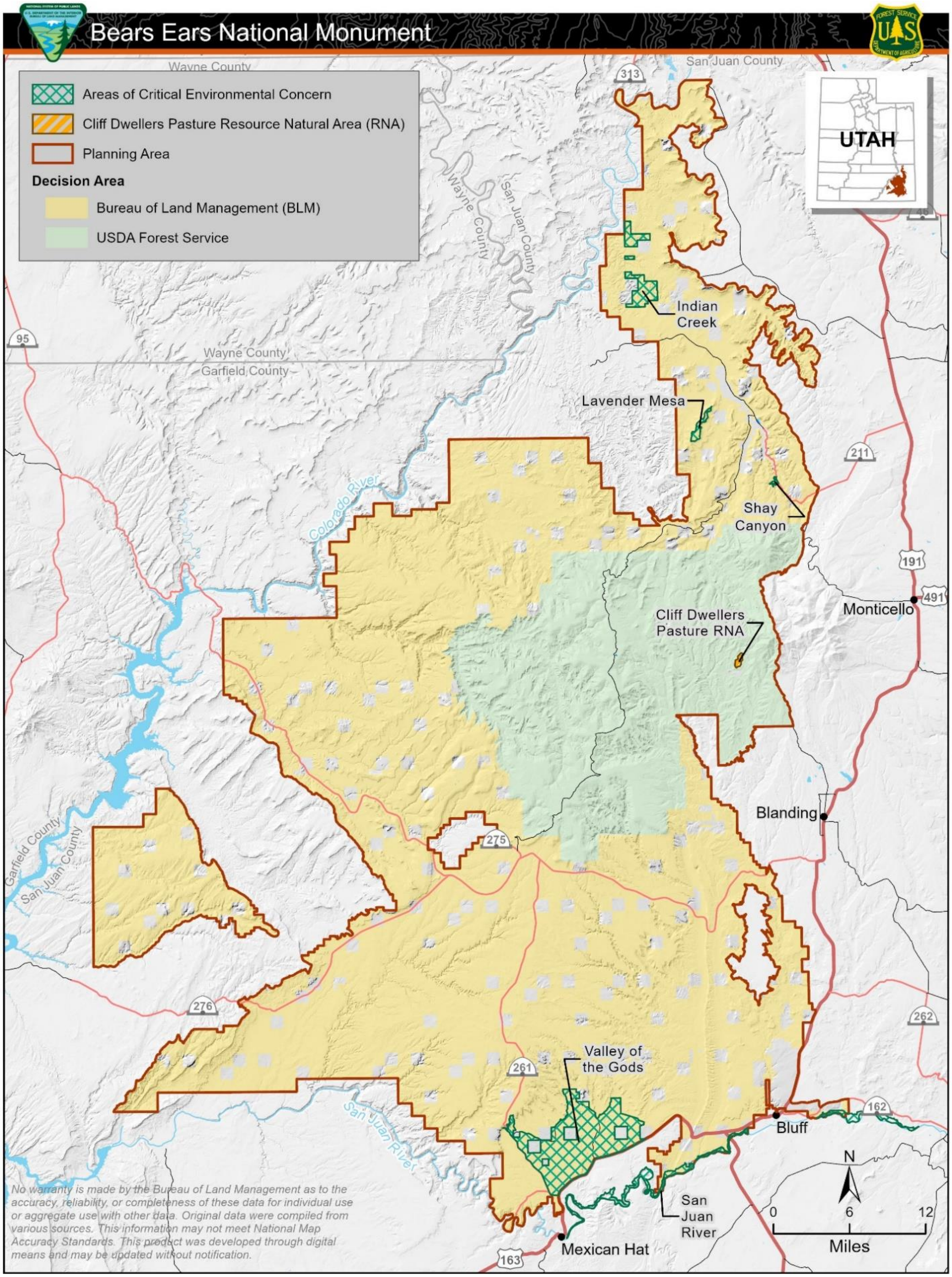

Figure 6.20-1. Areas of critical environmental concern and Research Natural Areas in the Monument.

Table 6.20-1. Name and Description of Areas of Critical Environmental Concern in the Planning Area

Areas of Critical Environmental Concern Name	Acreage	Relevant and Important Values	Description of Area
San Juan River ACEC	1,485*	*Scenic, Cultural, Fish and Wildlife, Natural Systems and Processes, and Geologic Features* The scenery along the San Juan River includes tilted formations as the river crosses Comb Ridge, steep vertical cliffs hundreds of feet high with walls of interbedded sandstone and limestone, and the 1,200-foot-high walls of the Goosenecks. The Goosenecks are one of the best examples of entrenched meanders in the United States. Riparian areas with various hues of green border the watercourse and contrast with the red sandstone, presenting a diverse and varied scenic viewing area. Hanging gardens occur in ledges of Navajo Sandstone. The rock writing along the San Juan River is unsurpassed, recognized as "type sites" for their specific rock writing motifs. Cultural sites are present along the riverbanks and within the tributaries of the San Juan River. San Juan ACEC contains populations and critical habitat for Colorado pikeminnow and razorback sucker, two federally listed endangered species. Bonytail and humpback chubs also occur within the upper Colorado River Basin, but there are no federally listed critical habitats nor any known populations within BENM. State- and BLM-listed sensitive fish species—roundtail chub, flannelmouth sucker, and bluehead sucker, collectively called the "3-species"—also occur within the San Juan River and connected tributaries. Bighorn sheep inhabit the rocky precipices of the lower river. The river corridor is used by migrating southwestern willow flycatcher (a threatened and endangered species), and yellow-billed cuckoo (a candidate species). The San Juan River supports riparian habitat for several other species of wildlife, such as amphibians, neo-tropical birds, and waterfowl.	The San Juan River ACEC is located along the river from west of Bluff, Utah, to Mexican Hat, Utah.
Lavender Mesa ACEC	649	*Relict Vegetation* The vegetative community present on the top of Lavender Mesa is unique because it has developed without the influence of grazing animals and most other mammals. The area is ecologically relevant because it presents an isolated, relict plant community that remains unaltered by human or animal intervention. The vegetative community is important as a baseline for comparative studies of pinyon-juniper woodland and sagebrush-grass communities in other parts of the Colorado Plateau.	Lavender Mesa ACEC covers the top of Lavender Mesa, located in the Indian Creek corridor.
Shay Canyon ACEC	119	*Scenic* Cultural resources in this area represent the interface between two prehistoric cultural groups: Ancestral Puebloan and Fremont. This interface is represented in the unique motifs in the rock writing. The area provides an opportunity for cultural scientific research and paleontology studies. Dinosaur tracks in the bottom of the Shay Canyon streambed are a unique visual reminder of the area's distant geologic and natural past.	Shay Canyon ACEC is located in the southern portion of the Indian Creek corridor. It includes the areas surrounding the mouth of Shay Canyon itself.

Areas of Critical Environmental Concern Name	Acreage	Relevant and Important Values	Description of Area
Valley of the Gods ACEC	22,863	*Scenic* Valley of the Gods provides significant vistas to those who travel the roads surrounding the area. Valley of the Gods is important to regional, national, and international visitors who view and photograph the scenery. Panoramic views can be seen from the highways bordering the area and from a 17-mile graded gravel and clay road. The eroded, wind-sculpted spires and buttes and long rock fins resemble animals or gods with names such as Seven Sailors, Rooster Butte, Setting Hen Butte, Pyramid Peak, Castle Butte, and Bell Butte. The West Fork of Lime Creek, Lime Creek, and the northwestern portion of Lime Ridge are included in this ACEC.	Valley of the Gods lies north of US-163, extending north to the south cliff line of Cedar Mesa. Valley of the Gods is currently a Special Emphasis Area within the existing Cedar Mesa ACEC.
Indian Creek ACEC	3,908	*Scenic* Indian Creek ACEC is noted for its incised, meandering canyons that wind through dark red mudstones, forming many rounded spires and hoodoos (boulders atop eroded rock that look like mushrooms). These various formations continue uninterrupted into Canyonlands National Park, which contains some of the most unique landforms in the world. Visitors from around the world come to view this area from overlooks across BLM-administered land and Canyonlands National Park.	Indian Creek ACEC is located in the northern area of the Monticello FO, east of and adjacent to Canyonlands National Park/Needles District. Indian Creek ACEC buffers the scenic view from Needles Overlook across BLM-administered land into Canyonlands National Park. The area includes the lower end of Indian Creek and Rustler Canyon.

* Acreage corresponds to the portion of the ACEC within the Monument.

Trends

San Juan River ACEC

There are many cultural resources along the San Juan River. Under current management, long-term observations and specific site monitoring suggests cultural resources are in stable condition. The BLM is actively managing several cultural resource sites for visitation, including River House, Big Kachina Panel, Barton Trading Post, and San Juan Hill. All these sites receive visitation from a route that runs along a bench above the San Juan River and visitation from river runners. River House is a large late Ancestral Puebloan village site that receives high numbers of visitation (thousands of visitors of a year) and is one of the most visited archaeological sites in the Monument. There are several cultural sites that are likely receiving intermittent visitation from recreationalists along the river and the road.

Currently, inadvertent impacts to archaeological resources are the biggest risk to these resources along the San Juan River. Large-scale looting of cultural resource sites is rare and smaller scale vandalism is similarly uncommon, but it has happened historically. The BLM has stabilized many of the structural sites, including River House. The BLM has also updated etiquette signage at River House to help educate visitors on lessening their impacts to the site. Casual collection of artifacts and historical objects continues to be a problem but is actively addressed by public education efforts. The reasons for this likely include ease of access and simple increases in the number of visitors who can access cultural resource localities. RMIS data show that there were 39,092 visitors to the entire San Juan River SRMA in 2021, many of whom likely experienced the resources contained in the ACEC. Between 2013 and 2021, visitation numbers were generally between 38,000 and 42,000—up from 35,864 visitors in 2013—with the exception of 33,611 visitors in 2020 (BLM 2013–2021). San Juan River boating is managed under a limited permit and allocation system, so boating recreation use has stayed relatively stable and is not likely to increase significantly.

San Juan River ACEC is heavily invaded by nonnative plants such as Russian olive, tamarisk, knapweed, and camelthorn, impacting riparian and aquatic conditions. Since the signing of the Monticello RMP in 2008, the tamarisk beetle, which was released to control tamarisk growth, has migrated from release sites and made its way through much of the river bottom system of the San Juan and its tributaries. This has resulted in large stands of standing dead and in declining habitat for southwestern willow flycatcher and yellow-bellied cuckoo (Jamison and van Riper 2018). There have been some fuels reduction type treatments to remove these standing dead tamarisks in San Juan ACEC. These areas only cover a small section of the ACEC but some native tree species and forbs have re-established successfully.

Regional trend data for 179 native bird species pulled from the Rocky Mountain Bird Observatory shows an overall slight decline in bird populations from regional monitoring data collected from 2014 to 2021 (Bird Conservancy of the Rockies 2022). However, this trend varies significantly by species, with some populations stable, some increasing, and some decreasing. The regional trend data for 26 BLM special status bird species also mirrors this decline, although it also can vary significantly by species.

Aquatic habitat complexity (i.e., riffles, runs, pools), including off-channel nursery habitats (e.g., side channels, backwaters, confluence habitats) are important for amphibians and special status fish species but are being lost as a result of woody species’ invasion and changes in hydrology related to water development and drought that synergistically result in infilling, aggradation, and further encroachment of invasive plant species. Aquatic connectivity between tributary streams and San Juan River ACEC are also limited by water availability resulting in intermittent, ephemeral, or no connectivity. The San Juan River contains many invasive aquatic species that compete with or predate upon special status fish species, and invasive bullfrogs compete with native amphibians. Feral horses cross the river from the south and graze on native riparian plants, often focusing on active riparian restoration projects.

Additionally, while there have been some high spring runoff years in the past decade, overall, since the signing of the Monticello RMP in 2008, the ongoing drought in the Southwest has reduced the yearly base water flows, resulting with dead vegetation in areas that once flooded on a more regular basis (USGS 2022). This is detrimental for both threatened and endangered (T&E) bird species and T&E fish species, as there is a reduction in usable habitat for foraging and nesting for birds and a lack of nursery-type habitat for T&E fish species. The San Juan River is a Clean Water Act Section 303(d) listed waterbody impaired in the following categories: iron, lead, benthic macroinvertebrates, *E. coli*, thallium, and cadmium.

Indian Creek ACEC

Indian Creek ACEC is a primarily scenic ACEC. Due to its remote location and difficulty to access, the Indian Creek ACEC sees very little on-the-ground visitation. However, it is visible from popular sightseeing overlooks in the Island in the Sky District of Canyonlands National Park and the Canyon Rims Recreation Area. This area is managed as VRM Class I.

Lavender Mesa ACEC

As Lavender Mesa ACEC gets very little to no visitation, the condition of the area remains relatively consistent. Lavender Mesa is an isolated mesa with sheer cliffs preventing access. It has never been grazed by livestock. According to GIS data, the dominant ecological type is an Upland Shallow Loam (Pinyon-Utah Juniper), with vegetation that consists of pinyon and juniper woodlands interspersed with sagebrush communities. Soils are a Rizno-Rock outcrop complex, 3 to 15 percent slopes, which are shallow eolian deposits over residuum weathered from sandstone or shale.

Shay Canyon ACEC

Shay Canyon ACEC is heavily traveled by visitors to the Needles District of Canyonlands National Park, as State Route 211 is the only way into and out of the park. Visitors typically stop to observe both paleontological and cultural resources at this site. Average daily traffic data from the BLM indicate that visitation to the Shay Canyon Trail, a cultural site, has increased between 2019 and 2022, and this increase is expected to continue.

Valley of the Gods ACEC

Valley of the Gods is a primarily scenic ACEC that draws international visitation due to its unique and accessible vistas. RMIS data indicate that there were 78,428 visitors to Valley of the Gods in 2021. This area is managed as VRM Class I and is a ROW exclusion area. Visitors frequently engage in photography and sightseeing in this ACEC, and hot air ballooning has also increased in popularity. Dispersed camping is increasing in this area and may lead to a decrease in visual quality of the site if left unchecked.

Cliff Dwellers Pasture RNA

Anecdotally, there has been somewhat of an increase in use of this RNA from conversations with landowners in the area (personal communication, Brian Murdock, USDA Forest Service, 2022). User-created trails to cultural resources are becoming more defined and in some areas are causing soil movement and erosion. Such visitation is likely also impacting vegetation and ecological community composition.

Use by native ungulates (deer and elk) is light. The RNA contains a unique native plant community due to the shallow water table. Sedge and horsetail still dominate the open meadows, but site visits in recent years indicate drier conditions (personal communication, Barb Smith, USDA Forest Service, 2022). Cheatgrass is well-established outside the RNA boundary but is currently uncommon within the RNA. There are some patches of an annual fescue, but no invasive or noxious weeds.

A main management concern is an ARPA violation, which has previously occurred in the area.

Forecasts

San Juan River ACEC

Under current management, cultural resources would likely remain stable in this ACEC. Recreation and tourism are expected to increase regionally and to accordingly increase within BENM. Such increases in visitation would likely bring increased OHV use and associated increased access to more remote cultural resources. More visitation to these remote locations would likely have an associated impact to these sites over time. The BLM would continue to manage recreation in this area and would continue to focus on management of recreation in this area.

It is expected that continued drought in the southwestern United States, coupled with increased demand for water due to human development, would continue to decrease base water flows, thereby decreasing usable habitat for foraging and nesting for T&E bird species and a lack of nursery type habitat for T&E fish species. Drought conditions and demands on water supply may also lead to increased stream/river temperatures with the potential to reach critical thermal thresholds for aquatic species during the summer months, shifts in stream permanence from perennial to intermittent to ephemeral, loss of spring habitat and flow that feeds tributaries, decreased tributary connectivity, and worsening water quality due to concentrating pollutants within lower flows.

Increased recreational use of the river, if management does not change, may also lead to potential for increases in human-caused fires and increased potential for invasive weeds (human vector).

Indian Creek ACEC

Due to the remote nature of Indian Creek ACEC, the area sees very little visitation and use. The scenic value of the ACEC is unlikely to be affected if current management is retained.

Lavender Mesa ACEC

Increased temperatures, impacts on vegetation diversity, and increased nonnative invasive species due to climate change could impair the relevant and important values of this ACEC.

Shay Canyon ACEC

Visitation to Shay Canyon ACEC may impact archaeological sites and paleontological resources if no new management of visitation intensity is put in place.

Valley of the Gods ACEC

Visitation to Valley of the Gods ACEC may impact the visual quality of the site if no new management of visitation intensity is put in place, but no real impacts to scenic geology are anticipated. Management of dispersed camping, which can damage vegetation, increase erosion, and change the visual composition of an area, may be required to protect the scenic value of this ACEC.

Cliff Dwellers Pasture RNA

Several factors, including increasing use of the area, increasing temperatures, invasion by nonnatives like cheatgrass, and human-caused fires due to increased recreation in the Monument, would likely impact the ecological, educational, and scientific values of Cliff Dwellers Pasture RNA. The extended drought in the area may impact the hydrologic regime, as would further water diversions in the watershed above the RNA. Visitation would also likely impact cultural values in this RNA if recreators violate ARPA. The new Manti-La Sal LRMP may close this area to camping, which could prevent some of the impacts caused by increased visitation.

6.20.2 Wild and Scenic River Resources

Congressional designation of a WSR is intended to protect a river’s free-flowing condition, water quality, and identified ORVs such as scenic, recreational, fish, wildlife, geologic, or cultural and historic. During planning efforts, agencies review all streams within their jurisdiction to evaluate their eligibility and suitability as a WSR.

For a segment to be determined eligible, it must be 1) free flowing, and 2) possess at least one ORV.

Once determined eligible, a corridor of one-quarter mile on either side of the eligible segment is identified for the protection and management of the WSR-related values. For interim management purposes prior to suitability determinations, eligible segments and corridors are classified as wild, scenic, or recreational based on the following criteria:

- Wild – 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.

- Scenic – Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
- Recreational – Those rivers or sections of rivers that are readily accessible by road or railroad, which may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

To be found as suitable for WSR designation, the benefits of designating the segments should outweigh the disadvantages. Those segments found to be suitable will be recommended to Congress for designation as a WSR. Those segments found not suitable are released from consideration, are no longer considered eligible, and interim protection measures would no longer apply. The final step, after the suitability study, is a recommendation to Congress for designation of suitable streams or stream segments.

Current Conditions

Evaluation and study of potentially eligible and suitable WSR river segments on the Manti-La Sal National Forest was conducted through one previous eligibility study (2003), two re-evaluations to the eligibility study (2006, 2007), and one suitability study (2008). In the 2007 re-evaluation, four NFS river segments within or partially within the Planning Area were identified as eligible but were not found to be suitable (2008). These suitability determinations are documented in the 2008 *Record of Decision and Forest Plan Amendments, Wild and Scenic River Suitability Study for National Forest System Lands in Utah* (USDA Forest Service 2008). Since the completion of the 2008 suitability study, the USDA Forest Service was given new criteria for evaluation WSRs (USDA Forest Service 2015). This direction requires that all “named streams” on the 7.5-minute USGS quad maps be evaluated. Evaluation of additional streams in the Manti-La Sal National Forest was conducted in 2017 and 2018. No NFS streams within the BENM boundary were identified as eligible during this process.

A systematic evaluation and study of potentially eligible and suitable WSR river segments within the BLM portion of the Planning Area was conducted as part of the 2008 Monticello RMP (BLM 2008) planning process. Nine BLM river segments within or partially within the Planning Area were identified as eligible. The suitability determinations for these segments are documented in the Monticello RMP. Of the nine identified eligible river segments within or partially within the BLM portion of the Planning Area, four segments were found to be suitable for designation in the National Wild and Scenic Rivers System. Table 6.20-2 displays the suitable WSR segments found in the Planning Area.

Because a systematic evaluation of eligible rivers and suitability study has been completed and documented during the previous BLM and USDA Forest Service planning processes, additional evaluation is only necessary under certain conditions. BLM Manual 6400 – Wild and Scenic Rivers – Policy and Program Direction for the Identification, Evaluation, Planning, and Management states that, “additional assessment and study through the land use planning process need only be done if: “(1) the documentation no longer exists or is outdated; (2) changed circumstances warrant additional review of eligibility (e.g. a new ORV); (3) there is a change in the suitability factors; or (4) the authorized officer (Field or District Manager) decides to reevaluate the suitability for one or more eligible segments during the land use planning process (BLM 2012). Land use plans should address whether existing evaluations of eligible rivers or suitability studies will be revisited.” Similarly, USDA Forest Service segments previously determined to be not suitable through a prior planning process do not need to be restudied, except at the discretion of the Responsible Official if changed circumstances warrant consideration (USDA Forest Service 2015).

Table 6.20-2. Suitable Wild and Scenic River Segments

Segment Name	Tentative Classification	ORV values	Length (miles)
Colorado River #2	Scenic	Scenic, fish, recreation, wildlife, cultural, ecological	6.56
Colorado River #3	Scenic	Scenic, fish, recreation, wildlife, cultural, ecological	11.64
San Juan River #5	Wild	Scenic, fish, recreation, geologic, wildlife, ecological	6.67
Dark Canyon	Wild	Scenic, recreation, wildlife	6.59
Total			31.46

Source: BLM GIS (2022)

Trends

Recreation is the primary use occurring in or on lands adjacent to the BLM-administered suitable segments. Increasing visitation and damage from overuse or improper use within the river segments and corridors has the potential to affect identified ORVs and water quality, particularly in the popular Dark Canyon area. Recreation use levels and the effects of recreation use on ORVs in the San Juan River suitable segment are relatively stable due to a limited permit and allocation system, which has been in place prior to WSR eligibility and suitability determinations. The permit system requires adherence to specific stipulations for natural and cultural resource protection.

Additional trends affecting conditions in suitable WSR segments include climate change and invasive nonnative plants and noxious weeds. Climate change has resulted in more frequent drought periods, along with higher average annual temperatures and reduced water flow in the Planning Area. Invasive species, including tamarisk, Russian olive, and knapweed, are present and have been increasing in the waterways of the Planning Area, which has changed the composition of riparian vegetation. These factors have the potential to affect flow, water quality, and the ORVs of suitable WSR segments, including scenery, recreation, fish, wildlife, and ecology.

Forecasts

Due to the complete overlap of the Monument objects identified for protection in Proclamation 10285 with the specific ORVs of each suitable river segment, the ORVs of the segments will be provided with an additional layer of management protection under BENM. River segments previously deemed not suitable for inclusion in the NWSRS may be more appropriately managed through protections provided in the BENM RMP. Suitable rivers would be protected in the RMP according to their values and classification, pending congressional action. Increasing recreation use in the Dark Canyon segment may require additional recreation management for the protection of ORVs and water quality. Climate change, including the continuation of drought conditions and higher average annual temperatures, would result in lower, less frequent, and less predictable flows, which could impact WSR segments by diminishing ORVs, reducing water flow, and negatively altering water quality. Control of noxious weeds and invasive nonnative plants would depend on the cost and feasibility of available treatment methods.

6.20.3 Wilderness/Wilderness Study Areas/Recommended Wilderness

This section discusses designated wilderness, WSAs, and recommended wilderness within the Planning Area. WSAs are managed by the BLM. The Dark Canyon Wilderness and recommended wilderness are managed by the USDA Forest Service.

With the passage of FLPMA, Congress directed the BLM to inventory, study, and recommend which public lands under its administration should be designated as wilderness. The Utah Wilderness Act of 1984 designated 706,736 acres of wilderness statewide, including the 46,333-acre Dark Canyon Wilderness. The *Utah Statewide Wilderness Study Report*, published in October 1991 (BLM 1991), reported the results and made recommendations to Congress about which areas should be designated as wilderness in Utah. The final recommendations for wilderness designation were forwarded to Congress on June 22, 1992. Congress has not yet acted on the recommendations.

Section 603(c) of FLPMA provides direction to the BLM on the management of WSAs. It 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. Instant study areas (ISAs) are natural areas that existed at the passage of FLPMA and were identified under FLPMA for accelerated wilderness review; they are managed the same way as WSAs.

Current Conditions

DARK CANYON WILDERNESS

The Utah Wilderness Act designated Dark Canyon Wilderness on the Manti-La Sal National Forest (Figure 6.20-2). The wilderness is named for its high, steep sandstone walls. The area contains great natural diversity, with rock arches, old-growth Ponderosa pine stands, meadows, springs, seeps, and hanging gardens. The abundant heritage resources found within Dark Canyon are important to the unique character of the wilderness as well. The Peavine Corridor is a narrow, motorized corridor around motorized trails #0089 and #5379 in a cherry-stemmed section of Dark Canyon Wilderness. This corridor is excluded from the wilderness boundary; however, increased use levels of the corridor are creating impacts to the adjacent designated wilderness through increased erosion and other resource concerns.

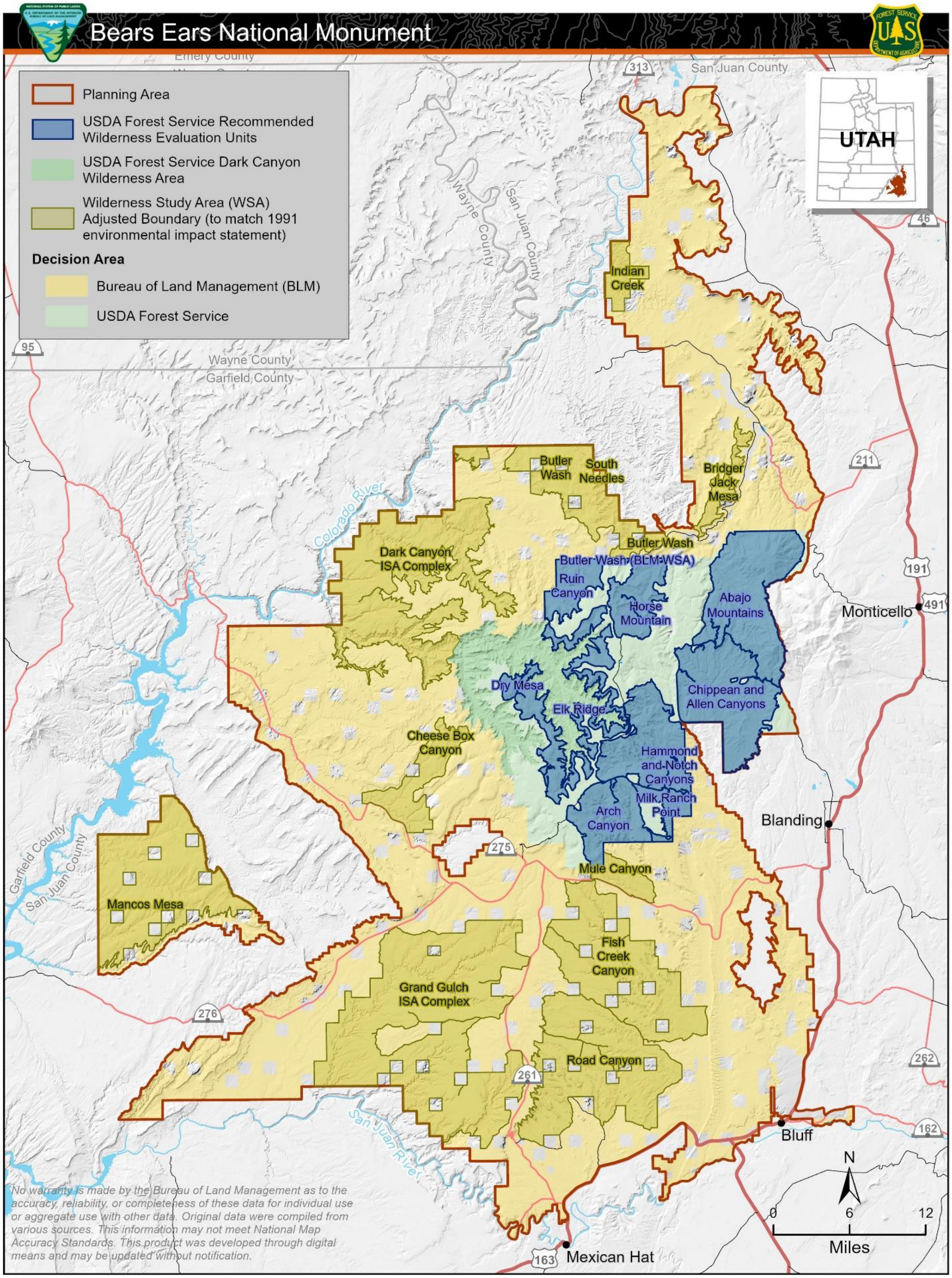

Figure 6.20-2. Wilderness study areas and instant study areas in the Planning Area.

WSAS/ISAS

Eleven WSAs and ISAs were identified in the Planning Area. These 11 WSAs and ISAs account for approximately 377,315 acres of the Planning Area (see Figure 6.20-2). A description of wilderness characteristics and other resource values and uses in each WSA and ISA can be found in the *Utah Statewide Wilderness Study Report* (BLM 1991). Table 6.20-3 provides a breakdown of each WSA and ISA and their acreages within BENM alongside the acreages originally identified for each WSA and ISA. All WSAs and ISAs identified under FLMPA Section 603 are non-discretionary units of the NLCS and managed under the provisions of BLM Manual 6330.

Within the area managed by the Monticello FO, there are 2,155 acres contiguous to the Butler Wash WSA that was studied as a boundary variation during the wilderness review mandated by Congress in FLPMA Sections 603(a) and (b). These lands were addressed in the *Utah Statewide Wilderness Environmental Impact Statement: Final* (BLM 1990) and were recommended for congressional wilderness designation in the *Utah Statewide Wilderness Study Reports* (BLM 1991). This recommendation was forwarded by the President of the United States to Congress in 1993. The lands would continue to be managed in a manner that does not impair their suitability for congressional designation in accordance with FLPMA Section 603(c). Subject to valid existing rights, the only case-by-case actions that would be considered would be those where it is determined that wilderness suitability would not be adversely impacted. Lands within this administratively endorsed area are not under management identified in *Interim Management Policy and Guidelines for Lands Under Wilderness Review* (BLM 1995).[9] This RMP would make decisions to protect those lands until Congress acts.

Table 6.20-3. Wilderness Study Areas and Instant Study Areas within BENM

WSA/ISA Name	Total (acres)*	1991 Utah Statewide Wilderness Study Report (acres)†
Bridger Jack Mesa WSA	5,117	5,290
Butler Wash WSA	22,046	24,190
Butler Wash Administratively Endorsed Area	2,226	2,155
Cheese Box Canyon WSA	14,831	15,410
Fish Creek Canyon WSA	46,102	46,440
Indian Creek WSA	6,554	6,870
Mancos Mesa WSA	50,889	51,440
Mule Canyon WSA	6,171	5,990
Road Canyon WSA	52,404	52,420
South Needles WSA	160	160
Dark Canyon ISA Complex	67,825	68,030
Grand Gulch ISA Complex	105,213	105,520
Total	**379,538**	**383,915**

* BLM GIS 2022; numbers have been rounded so totals may not match.
† BLM 2008

[9] The Interim Management Policy has been replaced with 2012 WSA guidelines (BLM 2012).

RECOMMENDED WILDERNESS

As part of the Manti-La Sal National Forest LMP revision process, the forest is undertaking a recommended wilderness evaluation process of all lands that may be suitable for inclusion in the National Wilderness Preservation System. Evaluation of wilderness characteristics is guided by the Wilderness Act of 1964 and Forest Service Handbook 1909.12 (USDA Forest Service 2015). Determinations about recommended wilderness lands will be made in the LRMP revision and recommended wilderness evaluation and are not covered here; this RMP will tier to those documents for recommended areas that fall within the BENM boundary once the decision is finalized (see Figure 6.20-2).

Trends

Visitation to BENM has been steadily increasing over the last several years. With visitation numbers increasing, threats to wilderness, WSAs, and recommended wilderness include improper OHV usage; illegal incursions into the wilderness, WSAs, and recommended wilderness; and degradation of natural and cultural resources. Specifically, within Dark Canyon Wilderness and Grand Gulch, Fish Creek, Mule Canyon, and Road Canyon WSAs, increased visitation is causing impacts on archaeological resources identified as one of the supplemental wilderness values of the area.

Some WSAs and ISAs within BENM are also experiencing resource impacts associated with illegal incursions for wood cutting. While wood cutting is a permitted activity under the existing RMP, these permits do not allow wood cutting in WSAs. This type of activity typically creates transportation linear disturbances, which can create impacts on cultural and archaeological resources, fragile soils, fire risk, and other wilderness values. Within the Planning Area, Grand Gulch ISA Complex is experiencing the highest levels of disturbances associated with wood cutting (Meyer 2020).

Forecasts

Designated wilderness is a congressional designation managed to preserve wilderness character under the authority of the Wilderness Act. WSAs, and recommended wilderness are non-discretionary units managed by the BLM and USDA Forest Service under existing law, regulations, and policy to protect wilderness characteristics from impairment until such time as Congress takes action to either designate these units under the authority of the Wilderness Act or release them from further consideration. Changes to these special area designations are beyond the scope and authority of this RMP.

6.20.4 Inventoried Roadless Areas

This section discusses IRAs within the Planning Area that are managed by the USDA Forest Service (Figure 6.20-3).

For decades, the USDA Forest Service has inventoried and administratively designated undeveloped areas of the NFS under various names and managed these areas to preserve their undeveloped qualities. Prior to the Colorado Wilderness Act of 1982 and the Utah Wilderness Act, an inventory of lands without roads and undeveloped lands was completed. This inventory identified areas that met the minimum definition of wilderness and qualified for wilderness evaluation per the NFMA (Riddle and Vann 2020). In 2001, the USDA Forest Service issued the first roadless rule and defined modern-day IRAs, setting the framework for modern USDA Forest Service management of these areas (36 CFR 294).The Manti-La Sal National Forest IRAs consist of approximately 645,285 acres and are managed in accordance with the 2001 Roadless Rule (36 CFR 294) to protect their roadless area values and characteristics.

IRAs contribute to ecological sustainability by providing clean drinking water and other ecosystem services and serve as biological strongholds for wildlife. They provide large relatively undisturbed landscapes that are important to biological diversity and the long-term survival of many at-risk species. They serve as barriers against the spread of invasive nonnative plant species and provide reference areas or study and research. IRAs also contribute to social sustainability by providing opportunities for dispersed outdoor recreation, which diminish as open space and natural settings are developed elsewhere.

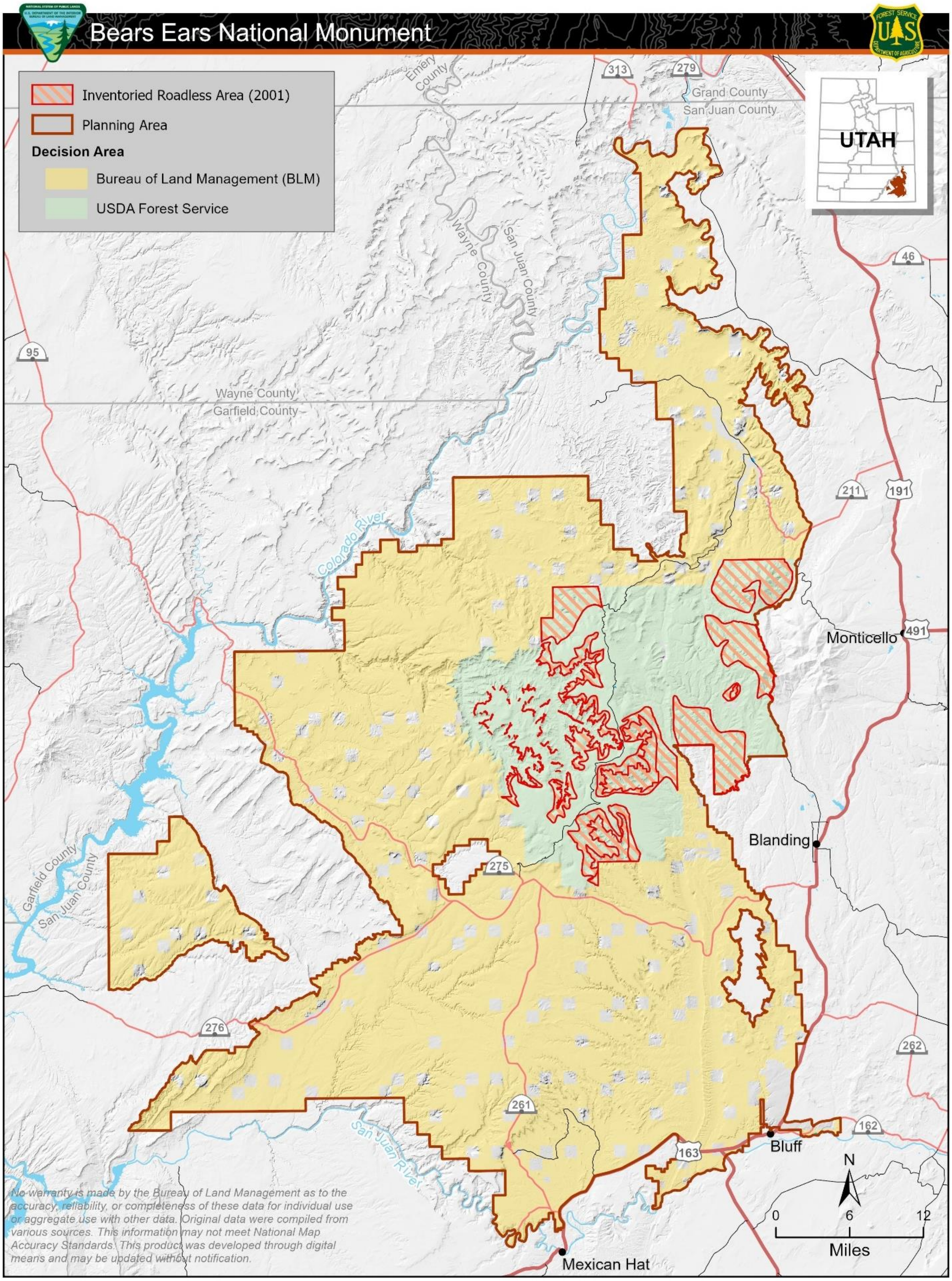

Figure 6.20-3. Inventoried roadless areas in the Planning Area.

Current Conditions

There are eight IRAs covering approximately 90,479 acres of the Decision Area. Table 6.20-4 provides a breakdown of each IRA and their acreages within BENM.

Table 6.20-4. Inventoried Roadless Areas within BENM

IRA Name	Total (acres)
Allen Canyon - Dry Wash	13,974
Arch Canyon	12,771
Blue Mountain	10,612
Cliff Dwellers Pasture	780
Dark - Woodenshoe Canyon	14,543
Hammond - Notch Canyon	16,558
Ruin Canyon	8,215
Shay Mountain	13,026
Total	**90,479**

Source: BLM GIS 2022; numbers have been rounded so total may not match.

Trends

Visitation to BENM has been steadily increasing over the last several years. With visitation numbers increasing, threats to IRAs include improper OHV use; illegal incursions into IRAs; and degradation of natural and cultural resources.

Forecasts

IRAs are managed in accordance with current USDA Forest Service regulation and policy. The USDA Forest Service will continue to manage activities in IRAs to follow the Roadless Area Conservation Rule and policy on road construction and timber cutting, sale, and removal, consistent with USDA Forest Service policy on preserving roadless character.

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CHAPTER 7. BENM PRELIMINARY ALTERNATIVES CONCEPTS

7.1 INTRODUCTION

Under NEPA, federal agencies are required to evaluate the potential environmental impacts of major federal actions—and to consider a range of reasonable alternatives. The purpose (the specific objective of the agency's proposed action) and the need (the broader underlying agency need or legal requirement to which the agency is responding) largely determine what constitutes a range of reasonable alternatives. "Reasonable alternatives" means a range of alternatives that are technically and economically feasible and that meet the purpose and need for the proposed action (40 CFR 1508.1(z)). All reasonable alternatives must be rigorously explored and objectively evaluated, though some may be eliminated from further analysis. Alternatives eliminated from detailed study must be included with a brief discussion of the reasons for eliminating them. The range of alternatives must also include consideration of a no action alternative, which means "no change" from current management direction or level of management intensity. In other words, the "no action" alternative is the continuation of the present course of action until that action is changed. The developed action alternatives will then be analyzed against the No Action Alternative as part of the NEPA analysis.

In this resource management planning process, alternatives are developed to address the management of BENM objects and values while allowing for responsible land stewardship in a way that reflects traditional knowledge and expertise. The preliminary action alternative concepts have been designed to provide different strategies to address management issues and conflicts. These are preliminary concepts only—they are not developed alternatives--and are meant to represent a starting point from which federal agencies and the BEC can continue to coordinate, and the public and cooperators can provide substantive input regarding other alternative solutions to address management issues and conflicts as they review the AMS.

The BEITC recently presented to the BLM and USDA Forest Service a collaborative LMP for BENM. The BEITC LMP synthesizes "Tribal perspectives on the management of the Bears Ears cultural landscape and . . . provide(s) the Tribal vision and foundation for the collaborative management of the BENM." As evident in the BEITC LMP, Tribal Nations have important knowledge, expertise, and an understanding of the spiritual significance of the Bears Ears region beyond the physical environment and that knowledge is critical to inform this land use planning process. As such, many of the concepts presented in the following preliminary alternatives are informed by the BLM and USDA Forest Service's initial review of the BEITC LMP. The depth and scope of inclusion of the BEITC LMP into the range of alternatives will be enhanced as the BLM, USDA Forest Service, and BEC further discuss the collaborative LMP and as the preliminary alternative concepts are developed into fully developed alternatives for the NEPA analysis.

The federal agencies will also work collaboratively with the BEC to understand and consider substantive input received from the public and cooperators, as appropriate, to further inform the fully developed alternatives.

7.2 DESCRIPTION OF THE ALTERNATIVES

7.2.1 Approaches Common to All Alternatives

In accordance with Proclamation 10285, if grazing permits or leases are voluntarily relinquished by the existing holders, the lands covered by such permits or leases would be retired from livestock grazing. Forage will not be reallocated for livestock grazing purposes unless the Secretaries specifically find that such reallocation will advance the purposes of the Monument designation.

Proclamation 10285 also withdrew BENM from all forms of mineral entry and location. The lands previously available for mineral and energy activities under the 2008 Monticello RMP, the 2008 Moab RMP, and the 1986 Manti-La Sal LRMP, are no longer available for such use, subject to valid existing rights. All management in the preliminary alternatives is subject to valid existing rights. This includes the rights of owners to access their existing private land inholdings as well as the rights of existing ROW holders approved by the BLM or USDA Forest Service.

All alternatives will incorporate the intent of the intergovernmental cooperative agreement between the Tribal Nations that make up the BEC and the BLM and USDA Forest Service to cooperate and collaborate in the management of BENM. This shared stewardship includes the federal agencies' commitment to ensure that Tribal knowledge and local expertise is reflected in the agency decision-making process for BENM, including through regular and project-specific communications. Further, the federal agencies acknowledge the responsibility to protect the ceremonies, rituals, and traditional uses that are part of the Tribal Nations' way of life on these lands since time immemorial, both in the land use plan to be developed and through the plan's implementation.

Furthermore, in all alternatives, the BLM, USDA Forest Service, and the BEC will commit to developing an implementation-level cultural landscape management plan to help provide further guidance on resource- and site-specific strategies to ensure the protection of the cultural landscape, including traditional uses, in BENM.

Finally, all alternatives will incorporate education and interpretation for the public regarding appropriate ways to recreate and engage in other activities while preserving BENM objects and values.

7.2.2 Alternative A: No Action Alternative

Alternative A, the No Action Alternative, represents existing management guided by management decisions in the BENM MMPs (2020), Monticello RMP, Moab RMP, and Manti-La Sal LRMP. Land use management direction in these plans guides BENM management to the extent that it is consistent with the protection, restoration, and/or increased resiliency of BENM objects and values and is therefore compatible with Proclamation 10285. Or in other words, existing management decisions from the previous land use plans will be modified under this alternative if necessary to ensure the protection, restoration, and/or increased resiliency of BENM objects and values. As such, some of the following summary may be further modified as the agencies continue to consider the previous decisions' compatibility with Proclamation 10285.

- Recreation areas: The BLM would manage recreation with six SRMAs and two ERMAs. The SRMAs and ERMAs would provide for specific, outcomes-based, recreational experiences. The USDA Forest Service would manage recreation on NFS lands within BENM based on the ROS categories of primitive, semi-primitive non-motorized, semi-primitive motorized, and roaded natural.

- Recreational facilities: This alternative would continue to manage the existing recreational facilities. An implementation-level recreation management plan would be developed to provide additional site-specific management.
- OHV use: BENM would be designated as OHV limited except for existing WSAs, IRAs, wilderness areas, and the existing San Juan RMZ, which would be designated as OHV closed.
- Transportation and access: Takeoff and landing of drones and aircraft would be allowed in OHV limited areas, in accordance with Federal Aviation Administration (FAA) regulations. Takeoff and landing of drones and aircraft would not be allowed in areas that are closed to OHVs.
- Target shooting: Target shooting would be prohibited in campgrounds/developed recreation sites, rock writing sites, and structural cultural sites.
- Livestock grazing: Most of BENM would be available for livestock grazing, including associated range improvements, and would be managed to maintain or improve land health. The following areas would continue to be closed to grazing:
    - Bridger Jack Mesa
    - Lavender Mesa
    - Existing developed recreation sites
    - Nine side canyons of Butler Wash
    - Comb Wash side canyons (Mule Canyon south of SR-95 and Arch, Fish, and Owl Canyons)
    - Arch Canyon, including Texas and Butts Canyons
- Vegetation management: Vegetation management would include appropriate tools to meet the desired vegetation condition class.
- Other discretionary activities: ROW exclusion areas on BENM would include designated wilderness, WSAs, Valley of the Gods ACEC, and segments of the San Juan and Colorado River. ROW avoidance areas include SRMAs, WSR segments, developed recreation areas, and all riparian and water features.
- Lands with wilderness characteristics: Some lands with wilderness characteristics would be managed to protect those characteristics and others would be managed to minimize impacts on wilderness characteristics while still allowing discretionary uses.

7.2.3 Approaches Common to All Action Alternatives

The BLM, USDA Forest Service, and the BEC will work together to appropriately incorporate a land management philosophy that emphasizes a holistic approach to BENM management that provides equity to the Indigenous knowledge and perspectives on the stewardship of the Bears Ears landscape. All action alternatives would give consideration to Traditional Indigenous Knowledge in the management of BENM and would include BENM-wide management to provide for the continued preservation not only of the physical landscape but also the cultural and spiritual landscape, including that which is visual and auditory. All action alternatives would include management actions to provide for and protect Tribal Nations traditional uses and rituals. Management of the cultural and spiritual landscape, as well as all natural resources, would be conducted in coordination with the BEC, its constituent Tribal Nations, and other Tribal Nations to ensure that Traditional Indigenous Knowledge is incorporated into management of the Bears Ears cultural landscape.

7.2.4 Alternative B

Alternative B would apply more prescriptive management direction for recreational uses in the Monument, while managing other uses in a manner more similar to the 2020 BENM MMPs. Representative examples of management direction include the following:

- Recreation areas: This alternative would focus high-intensity/high-density recreational uses in a limited set of areas. Outside those areas, management actions would limit recreational uses, emphasizing prescriptive controls (e.g., group size limitations) as necessary to protect, restore, and/or increase resiliency of BENM objects and values. This alternative may incorporate requirements to obtain permits for recreational activities in specific situations (e.g., known recreational conflicts with BENM objects and values). Some forms of SRPs would be prohibited in certain areas.
- Recreational facilities: Recreation area management plans would be developed for high-intensity/high-density recreational use areas and would include guidance on the development of facilities and interpretive materials.
- OHV use: The entirety of BENM would be OHV limited, except for the following areas that would be OHV closed:
    - Designated wilderness
    - WSAs
    - IRAs
    - Lands with wilderness characteristics identified for protection of those characteristics

  Future implementation-level travel planning may designate additional routes, but only where the primary purpose is the protection, restoration, and/or increased resiliency of BENM objects and values or for public safety.
- Transportation and access: Takeoff and landing of drones and aircraft would be prohibited in BENM (except for authorized and official use).
- Target shooting: Target shooting would be prohibited within the entirety of BENM.
- Livestock grazing: Same as Alternative A.
- Vegetation management: Vegetation management would include all available tools consistent with the protection, restoration, and/or increased resiliency of BENM objects and values. Traditional Indigenous Knowledge would be prioritized in guiding vegetation management, and emphasis would be on maintaining desirable future conditions of vegetation cover types for traditional uses.
- Other discretionary activities: Except for existing ROWs, most of BENM would be a ROW avoidance area, with wilderness, WSAs, and IRAs being ROW exclusion areas.
- Lands with wilderness characteristics: Same as Alternative A.

7.2.5 Alternative C

Alternative C would emphasize the protection of resilient and intact landscapes in BENM while allowing for discretionary uses in identified management zones similar to those used for BENM management in the 2020 BENM MMPs, the 2008 Monticello RMP, the 2008 Moab RMP, and the 1986 Manti La Sal LRMP. These zones are primitive, semi-primitive non-roaded, semi-primitive roaded, backcountry, and frontcountry. Representative examples of management direction are as follows:

- Recreation areas: This alternative would provide for more developed forms of recreation in the frontcountry and more primitive forms of recreation in the backcountry. In all cases, management would provide for outcomes-based recreational experiences while protecting, restoring, and/or increasing resiliency of BENM objects and values. Some SRPs would be allowed in certain management zones consistent with the goals and objectives of the zone while protecting, preserving, and enhancing BENM objects and values.
- Recreational facilities: Management zones would include areas in which recreational facilities could be developed to meet recreational needs.
- OHV Use: The entirety of BENM would be OHV limited except for the following areas that would be OHV closed:
    - Designated wilderness
    - WSAs
    - IRAs
    - Lands with wilderness characteristics identified for protection of those characteristics

Road density and siting criteria would vary between management zones. Future implementation-level travel planning would allow additional travel routes only in frontcountry and semi-primitive roaded zones, and only if the primary purpose is the protection, restoration, and/or increased resiliency of BENM objects and values or for public safety.

- Transportation and access: Takeoff and landing of drones and aircraft would be allowed in OHV limited areas that are located within certain frontcountry and semi-primitive roaded zones, in accordance with FAA regulations. Takeoff and landing of drones and aircraft would be prohibited in areas that are closed to OHVs.
- Target shooting: Target shooting would be limited to appropriate management zones.
- Livestock grazing: Livestock grazing would be managed to meet the goals and objectives of the management zones (e.g., frontcountry, backcountry, etc.) and to protect, restore, and/or increase resiliency of BENM objects and values. In addition to the areas closed to grazing in Alternative A, certain allotments may be made unavailable for livestock grazing or AUMs may be reduced. No new range improvements, including nonstructural range improvements, would be permitted unless, as a primary purpose of the range improvement, they contribute to the protection, restoration, and/or increased resiliency of BENM objects and values. Existing range improvements could be maintained/modified where they protect, restore, and/or increase resiliency of BENM objects and values.
- Vegetation management: Vegetation management in frontcountry and semi-primitive roaded zones would include all available tools. Vegetation management in backcountry, primitive, and semi-primitive non-roaded zones would emphasize nonmechanical treatments to the extent practicable while maintaining BENM objects and values.
- Other discretionary activities: Except for existing ROWs:
    - Frontcountry and semi-primitive roaded zones would be ROW avoidance.
    - Backcountry, primitive, and semi-primitive non-roaded zones would be ROW exclusion.
- Lands with wilderness characteristics: In some management zones, lands with wilderness characteristics would be managed to protect those characteristics and in other management zones lands with wilderness characteristics would be managed to minimize impacts on wilderness characteristics while still allowing discretionary uses.

7.2.6 Alternative D

Alternative D would allow for the continuation of natural processes by limiting or discontinuing discretionary uses. This alternative would minimize human-created facilities and management and would emphasize natural conditions. Representative examples of management direction are as follows:

- Recreation areas: Management actions would limit the intensity and density of recreational uses across BENM through prescriptive controls (e.g., group size limitations) to protect, restore, and/or increase resiliency of BENM objects and values. This alternative may incorporate requirements to obtain permits for recreational activities in specific situations (e.g., known recreational conflicts with BENM objects and values). Most SRPs would be prohibited.
- Recreational facilities: Existing recreational facilities would be maintained and improved only as needed to protect, restore, and/or increase resiliency of BENM objects and values. No new recreational facilities would be allowed unless their primary purpose is the protection, restoration, and/or increased resiliency of BENM objects and values.
- OHV use: Entire BENM would be OHV limited except for the following areas that would be OHV closed:
    - Designated wilderness
    - WSAs
    - IRAs
    - Lands with wilderness characteristics identified for protection of those characteristics
    - Areas where OHV use has damaged or is a current or foreseeable future risk to the protection, restoration, and resiliency of BENM objects and values
    - Areas where OHV use affects traditional use and cultural setting
    - With the exception of existing designated routes, areas within 300 feet of riparian habitat, perennial springs, and other perennial aquatic ecosystems

  In OHV limited areas, road density would be minimized, and siting criteria would be identified, especially in important resource areas, to ensure the protection, restoration, and/or increased resiliency of BENM objects and values. Future implementation-level travel planning would not allow designation of additional routes but would focus on refining (as needed) the existing designated route network.

- Transportation and access: Same as Alternative B.
- Target shooting: Same as Alternative B.
- Livestock grazing: Livestock grazing would be limited to grazing permits where the primary purpose is the protection, restoration, and/or increased resiliency of BENM objects and values (e.g., for vegetation management purposes or traditional uses). No new range improvements would be authorized, and existing range improvements would be removed unless they would protect, restore, and/or increase resiliency of BENM objects and values.
- Vegetation management: Vegetation management methods would prioritize natural processes and techniques over other methods.
- Other discretionary activities: Except for existing ROWs, the entirety of BENM would be ROW exclusion.
- Lands with wilderness characteristics: All the lands in BENM that have been inventoried as having wilderness characteristics would be managed to maintain and protect those characteristics.

7.3 ADDITIONAL POTENTIAL ALTERNATIVES

The BLM and USDA Forest Service will work collaboratively with the BEC and cooperating agencies to further develop the preliminary action alternatives identified. There are, however, other potential alternatives to be considered in the development of this range of alternative concepts. Any additional potential alternatives from Tribal Nations, the public, and cooperating agencies will be considered in this resource management planning effort.

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CHAPTER 8. REFERENCES

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8.2.1 Terrestrial Habitat, Vegetation Resilience and Conservation (large-scale and local ecotypes)

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