U.S. Department of the Interior

Bureau of Land Management

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Utah State Office Evaluation of September and December 2018 Oil and Gas Lease Sales Environmental Assessment

DOI-BLM-UT-0000-2023-0007-EA

Bureau of Land Management
Utah State Office
440 West 200 South
Salt Lake City, Utah 84101

The Bureau of Land Management's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

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LIST OF ABBREVIATIONS

Units, Elements, and Compounds

bcf/d	billion cubic feet per day
bpd	barrels per day
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_{2e}	carbon dioxide equivalent
dB	decibels
dBA	A-weighted decibels
dv	deciview
m	meters
MHz	megahertz
MMst	million short tons
Mt	megatonnes
NH_4	ammonia
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
N_2O	nitrous oxide
O_3	ozone
Pb	lead
$PM_{\#}$	particulate matter
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
SO_2	sulfur dioxide
$\mu g/m^3$	micrograms per cubic meter

A

ACEC	area of critical environmental concern
ACHP	Advisory Council on Historic Preservation
AIRFA	American Indian Religious Freedom Act
AMR	*Utah Bureau of Land Management Air Resource Management Strategy 2022 Monitoring Report*
Annual GHG Report	*2021 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends*
AOI	Area of Influence
APD	application for permit to drill
AQRV	air quality related value
ARMS	Air Resource Modeling Study

B

bbl	barrels
BLM	Bureau of Land Management
BMP	best management practice
BOEM	Bureau of Ocean Energy Management

C

CAA	Clean Air Act

CAP	criteria air pollutant
CBNG	coalbed natural gas
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CIAA	cumulative impact analysis area
COA	condition of approval
CSU	controlled surface use

D

December 2018 DNA	*Price Field Office December 2018 Competitive Oil and Gas Lease Sale Determination of NEPA Adequacy*
DOI	U.S. Department of the Interior

E

EA	environmental assessment
EIA	U.S. Energy Information Administration
EIS	environmental impact statement
EJ	environmental justice
EO	executive order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
EUR	estimated ultimate recovery

F

FO	field office
FONSI	finding of no significant impact
FLPMA	Federal Land Policy and Management Act

G

GAO	U.S. Government Accountability Office
GHG	greenhouse gas
GIS	geographic information system

H

HA	herd area
HAP	hazardous air pollutant
HMA	herd management areas
HUC	Hydrological Unit Code

I

ID Team	Interdisciplinary Team
IM	instruction memorandum
IPCC	Intergovernmental Panel on Climate Change
IQ	intelligence quotient
IRA	Inflation Reduction Act
IWG	interagency working group

K

KOP	key observation point

L

LWC	land with wilderness characteristics
LUP	land use plan

M

MLA	Mineral Leasing Act
MLP	master leasing plan

N

NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NETL	National Energy Technology Laboratory
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NPS	National Park Service
NSO	no surface occupancy
NWI	National Wetland Inventory

O

OHV	off-highway vehicle
OO	Onshore Order

P

PFO	Price Field Office
PFO RMP	*Price Field Office Record of Decision and Approved Resource Management Plan*
PFYC	Potential Fossil Yield Classification
PSD	prevention of significant deterioration

R

RFDS	reasonably foreseeable development scenario
RMP	resource management plan
ROS	Recreation Opportunity Spectrum
ROW	right-of-way

S

SC-GHG	social cost of greenhouse gases
September 2018 EA	*September 2018 Oil and Gas Lease Sale Environmental Assessment*
SHPO	State Historic Preservation Office
SOP	standard operating procedure
SQI	sky quality index
SRMA	special recreation management area
STEO	short-term energy outlook
State RMP	*State of Utah Resource Management Plan*
SUWA	Southern Utah Wilderness Alliance
SWCA	SWCA Environmental Consultants

T

TMA	travel management area
TMDL	total maximum daily load
TMP	travel management plan

U

UDAQ	Utah Division of Air Quality
UDWQ	Utah Division of Water Quality
UDWR	Utah Division of Wildlife Resources
Unit	Canyonlands National Park Horseshoe Canyon Unit
USC	United States Code
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USO	Utah State Office

V

VOC	volatile organic compound
VRM	Visual Resource Management

W

WO	Washington Office
WOTUS	waters of the United States
WSA	Wilderness Study Area
WSR	Wild and Scenic River
WSRA	Wild and Scenic Rivers Act

CHAPTER 1. INTRODUCTION

1.1 BACKGROUND

The Bureau of Land Management (BLM) is preparing this environmental assessment (EA) in compliance with the National Environmental Policy Act (NEPA),[1] for the leasing decisions and associated NEPA documents previously prepared in connection with BLM's September 2018 Competitive Oil and Gas Lease Sale and December 2018 Competitive Oil and Gas Lease Sale, NEPA project numbers DOI-BLM-UT-0000-2018-0001-EA and DOI-BLM-UT-G020-2018-0057-DNA. This EA evaluates the potential impacts from affirming the previous leasing decisions for 59 leases (totaling 121,679.70 acres) on lands managed by the BLM Price Field Office (PFO).

The Southern Utah Wilderness Alliance, et al. (SUWA), in *SUWA v. Haaland*, Case No. 1:20-cv-03654, challenged the BLM's previous leasing decisions authorizing 77 leases in the PFO from the September and December 2018 oil and gas lease sales (Lease Sales), alleging, in part, violations of NEPA. The parties negotiated a settlement resolving the above lawsuit in which the BLM agreed to conduct additional NEPA analysis for the leasing decisions from the September and December 2018 lease sales. Eighteen of the 77 leases have since terminated. Therefore, only 59 of the 77 leases from the Lease Sales will be analyzed in this new analysis.[2,3] The 2018 NEPA documents include the *September 2018 Oil and Gas Lease Sale Environmental Assessment* (BLM 2018a) and the *Price Field Office December 2018 Competitive Oil and Gas Lease Sale Determination of NEPA Adequacy* (DNA) (BLM 2018b) and are referred to as the September 2018 EA and December 2018 DNA, respectively. This document is referred to as the *Utah State Office Evaluation of September and December 2018 Oil and Gas Lease Sales Environmental Assessment* (EA).

The 59 leases cover 121,679.70 acres on public lands administered by the BLM. A list of the lease numbers, acreages, and status, along with a map, is included in Appendix A. The legal descriptions of the leases, including stipulations and notices, are found in Appendix B. The leases are located in Emery County and Wayne County, Utah, under the jurisdiction of the BLM PFO. Four of these leases – UTU93475, UTU93476, UTU93479, and UTU93480 – are currently part of a legislatively mandated land exchange with the State of Utah that BLM is processing under the John D. Dingell, Jr. Conservation, Management and Recreation Act, Public Law (PL) 116-9, Section 1255 (Dingell Act). Two additional leases – UTU93500 and UTU93503 – are part of a proposed legislative land exchange under proposed Senate Bill 1405 *Utah School and Institutional Trust Lands Administration Exchange Act of 2023*, the text of which may be found online (Congress.gov 2023).

Pursuant to 40 Code of Federal Regulations (CFR) 1508.1(ff), this EA tiers to and incorporates by reference the final environmental impact statement (EIS) contained in the PFO Resource Management

[1] This EA conforms to the CEQ NEPA regulations that were in place prior to September 14, 2020, to the extent permitted by law.

[2] The 59 leases analyzed in this EA are: UTU93466; UTU93468; UTU93469; UTU93470; UTU93471; UTU93472; UTU93473; UTU93474; UTU93475; UTU93476; UTU93477; UTU93478; UTU93479; UTU93480; UTU93481; UTU93482; UTU93483; UTU93484; UTU93485; UTU93486; UTU93487; UTU93489; UTU93491; UTU93492; UTU93493; UTU93494; UTU93495; UTU93496; UTU93497; UTU93498; UTU93499; UTU93500; UTU93501; UTU93502; UTU93503; UTU93504; UTU93505; UTU93506; UTU93507; UTU93508; UTU93509; UTU93510; UTU93511; UTU93512; UTU93513; UTU93514; UTU93518; UTU93519; UTU93520; UTU93521; UTU93523; UTU93524; UTU93525; UTU93526; UTU93527; UTU93530; UTU93533; UTU93713; and UTU93534. All leases except UTU93713 are from the September 2018 sale. UTU93713 is from the December 2018 sale.

[3] As of October 25, 2023, North American Helium fully relinquished eight leases (UTU93466; UTU93477; UTU93478; UTU93482; UTU93500; UTU93501; UTU93503; and UTU93504) and partially relinquished three leases (UTU93468; UTU93481; and UTU93483), Therefore, any decision made for this EA will not apply to the eight relinquished leases or the relinquished portions of the three leases listed above.

Plan (RMP) (BLM 2008a), the September 2018 EA (BLM 2018a), and the December 2018 DNA (BLM 2018b).

This EA includes seven appendices: Appendix A, Lease List and Map; Appendix B, Stipulation and Notice List; Appendix C, Full Text Stipulations and Notices; Appendix D, Summary of the Typical Phases of Oil and Gas Development; Appendix E, Public Comments and BLM's Responses; Appendix F, Best Management Practices; and Appendix G, Emissions Tables. Appendices will be referenced throughout to provide additional context to the content of this EA.

1.2 PURPOSE AND NEED

The purpose of federal action is to comply with the terms of the *SUWA v. Haaland* settlement agreement and prepare additional NEPA analysis associated with the leasing decisions. The need for the action alternatives proposed is established by the BLM's responsibility under the Mineral Leasing Act (MLA), as amended, the Mining and Minerals Policy Act of 1970, the Federal Onshore Oil and Gas Leasing Reform Act of 1987, and Federal Land Policy and Management Act (FLPMA).

1.3 DECISIONS TO BE MADE

Based on the analysis in this EA, BLM will decide whether to affirm the BLM's 2018 leasing decisions for the remaining 59 leases, cancel these leasing decisions (or a portion therein), or amend and affirm the leases with revised terms.

1.4 PLAN CONFORMANCE REVIEW

Under FLPMA, the BLM must manage for multiple uses of public lands in a combination that will best meet the present and future needs of the public and the various resources based on an approved RMP. The BLM is required to declare in the RMP how the federal mineral estate will be managed, including identification of all appropriate lease stipulations (43 CFR 3101.1 and 43 CFR 1601.0-7[b]); BLM Manual 1601, *Land Use Planning* (BLM 2005) and BLM Handbook H-1624-1, *Planning for Fluid Mineral Resources* (BLM 2013a).

The proposed alternatives were reviewed for conformance (43 CFR 1610.5) with the PFO RMP (BLM 2008a), as amended.

1.4.1 Price Field Office

PFO RMP, October 2008, as amended

The PFO RMP designated approximately 1,910,000 acres of federal mineral estate open for continued oil and gas development and leasing. The PFO RMP (with associated amendments) also describes specific stipulations that would be attached to new leases offered in certain areas. Under the proposed alternatives in this EA, the leases are subject to stipulations prescribed by the PFO RMP. In addition, site visits were conducted by the PFO Interdisciplinary Team (ID Team) of resource specialists prior to the 2018 Lease Sales to verify consistency with the PFO RMP. The proposed alternatives conform to the fluid mineral leasing decisions in the RMP and subsequent amendments and are consistent with the PFO RMP's goals and objectives for natural and cultural resources. The proposed alternatives specifically conform to the PFO RMP decisions presented below.

1.4.1.1 Leasable Minerals (MLE)-5 (PFO RMP, p. 125)

The BLM has identified leasing allocations for all lands within the PFO. In addition, the PFO RMP describes specific lease stipulations (PFO RMP, Appendix R-3) that apply to a variety of different

resources, including raptors, greater sage-grouse (*Centrocercus urophasianus*), and big game habitat, as well as program-related best management practices (BMPs) (PFO RMP, Appendix R-14) that may be applied on a case-by-case, site-specific basis to prevent, minimize, or mitigate resource impacts (PFO RMP, Map R-8).

1.4.1.2 MLE-6 (PFO RMP, p. 125)

Review all lease parcels prior to lease sale. If the PFO determines that new resource data information is available at the time of the lease review that warrants changing a leasing allocation or specific lease stipulation, the PFO will make appropriate changes through the plan maintenance or amendment process. The PFO may also apply appropriate conditions of approval (COAs) at the permitting stage to ensure conformance with the RMP and all applicable laws, regulations, and policies.

1.4.1.3 MLE-9 (PFO RMP, p. 126)

Oil and gas leasing management will be conducted as shown on Map R-25a of the PFO RMP (BLM 2008a):

- Areas open to leasing subject to the standard terms and conditions of the lease form (1,161,000 acres)
- Areas open to leasing subject to moderate constraints (timing limitations, controlled surface use [CSU], and lease notices) (467,000 acres)
- Areas open to leasing subject to major constraints (NSO) (282,000 acres)
- Areas unavailable to leasing (569,000 acres)

The combination of all restrictions on oil and gas development is shown on Map R-26a of the PFO RMP (BLM 2008a).

1.5 RELATIONSHIP TO RELEVANT LAWS, REGULATIONS, POLICIES AND OTHER DOCUMENTS OR PLANS

The mandate of the BLM, as derived from various laws, including the MLA and FLPMA, as amended, is to promote the exploration and development of oil and gas in the public domain. Additionally, the Federal Onshore Oil and Gas Leasing Reform Act of 1987 states that lease sales shall be held for each state where eligible lands are available at least quarterly and more frequently if the Secretary of the Interior determines such sales are necessary. The MLA establishes that deposits of oil and gas owned by the United States are subject to disposition in the form and manner provided by the MLA under the rules and regulations prescribed by the Secretary of the Interior, where consistent with FLPMA and other applicable laws, regulations, and policies.

Purchasers of oil and gas leases are required to comply with all applicable federal, state, and local laws and regulations, including obtaining all necessary permits prior to any lease development activities.

A listing of applicable statutes, regulations, and policies is provided in Table 1-1. Other plans are discussed in Section 1.6.

The regulations, policies, and plans that were reviewed in preparing this EA include, but are not limited to, the following:

Table 1-1. Relationship to Statutes, Regulations, Orders, and Policies

Relevant Statute, Regulation, Order, or Policy	Relationship to the Proposed Alternatives
Endangered Species Act (ESA)	The ESA requires all federal departments and agencies to consult with the U.S. Fish and Wildlife Service on all actions authorized, funded, or carried out by the agency to ensure that the action will not likely jeopardize the continued existence of any threatened and endangered species or adversely modify critical habitat. See the text of stipulation HQ-TES-1 in Appendix C for details. Additional species-specific notices are attached to appropriate leases. Please refer to AIB-3, AIB-8, and AIB-11.
FLPMA	FLPMA established guidelines to provide for the management, protection, development, and enhancement of public lands (PL 94-579). Section 103 of FLPMA defines public lands as any lands and interest in lands owned by the United States (43 CFR 3101.1 and 43 CFR 1601.0-7(b); BLM Handbooks H-1601-1 and H-1624-1).
Federal Onshore Oil and Gas Leasing Reform Act	This Act directs the BLM to conduct quarterly oil and gas lease sales whenever eligible lands are available for leasing.
MLA	The MLA establishes that deposits of oil and gas owned by the United States are subject to disposition in the form and manner provided by the MLA under the rules and regulations prescribed by the Secretary of the Interior, where consistent with FLPMA, NEPA (PL 91-90, 42 United States Code [USC] Section 4321 et seq.), and other applicable laws, regulations, and policies.
National Historic Preservation Act (NHPA)	Leasing is considered an undertaking pursuant to 54 USC Section 300101 et seq., commonly known as the NHPA, as amended, and 54 USC Section 306108, commonly known as Section 106 of the NHPA (Section 106). Section 106 requires all federal agencies to take into account the effects on historic properties from a federal undertaking. As a part of Section 106, federal agencies consult with the State Historic Preservation Office (SHPO) on all undertakings authorized, funded, or carried out by the agency. Agencies may follow a phased approach to Section 106 compliance. At the leasing level, existing records reviews and consultation with SHPO, Native American Tribes, consulting parties, and the public drive identification of historic properties. Class III cultural resource surveys are an important part of identification at the lease-development level. See the text of stipulation HQ-CR-1 in Appendix C for details.
Helium Act of 1925, 50 USC 161	The Helium Act of 1925 authorized the conservation, production, and exploitation of helium gas, a mineral resource pertaining to the national defense, to the development of commercial aeronautics, and for other purposes. The act grants authority to the Secretary of the Interior to enter into agreements with private parties for the recovery and disposal of helium on federal lands upon such terms and conditions as the Secretary deems fair, reasonable, and necessary.
Helium Stewardship Act of 2013, PL 113-40, 127 Stat. 534	The Helium Stewardship Act of 2013 amended the Helium Act of 1925 to complete the privatization of the federal helium reserve in a competitive market fashion that ensures stability in the helium markets while protecting the interests of American taxpayers, as well as for other purposes.
John D. Dingell, Jr. Conservation, Management, and Recreation Act of 2019 (Dingell Act), Section 1109	Section 1109 of the Dingell Act amends the first section of the MLA (30 USC 181) to include that "extraction of helium from gas produced from such lands shall maintain the lease as if the extracted helium were oil and gas."

Relevant Statute, Regulation, Order, or Policy	**Relationship to the Proposed Alternatives**
Dingell Act, Part II Sections 1211–1461	Part II of the Dingell Act covers Emery County public land management, including the San Rafael Swell Recreation Area, wilderness areas, wild and scenic river designation and wild and scenic rivers, land management and conveyances, off-highway vehicle recreation areas, and regulations guiding other conservation and wildlife actions.
Utah Oil and Gas Conservation Act (Utah Code Annotated 40-6-1–19) (1955)	This act governs aspects of oil and gas drilling in the state of Utah, prohibits waste of oil and gas, provides procedures for obtaining a permit and royalty payments, and creates penalties for violations of the act.
43 CFR 3100 – Oil and Gas Leasing	These regulations govern onshore oil and gas leasing, development, and production of federal minerals.
BLM Manual 3120, *Competitive Leases* (BLM 2013b)	This manual section contains guidance and procedures for federal onshore competitive oil and gas leasing, except for the National Petroleum Reserve in Alaska.
BLM Handbook H-3120-1, *Competitive Leases* (BLM 2013c)	This handbook sets forth the policy and procedures required for competitive oil and gas leasing with the Federal Onshore Oil and Gas Leasing Reform Act of December 22, 1987, and the regulations in 43 CFR 3120.
BLM Manual MS-1794, *Mitigation* (BLM 2021a)	This manual provides guidance to support the BLM's multiple use and sustained yield mission by providing policies to: Implement consistent principles and procedures for mitigation in the BLM's authorization of public land uses. Consider mitigation well in advance of making decisions about anticipated land uses by identifying opportunities for mitigation in mitigation strategies and incorporating mitigation into land use plans and programmatic or large geographic-scale NEPA analyses. Apply mitigation to address reasonably foreseeable impacts to resources (and their values, services, and/or functions) from public land uses.
BLM Handbook H-1794-1, *Mitigation* (BLM 2021b)	The purpose of this handbook is to elaborate on and provide additional clarity to the policy guidance identified in the BLM Mitigation Manual (above).
Instruction Memorandum: Updating Oil and Gas Leasing Reform – Land Use Planning and Lease Parcel Reviews (BLM WO IM 2018-034) (BLM 2018c)	This IM sets out the policy of the BLM to simplify and streamline the leasing process to alleviate unnecessary impediments and burdens, to expedite the offering of lands for lease, and to ensure quarterly oil and gas lease sales are consistently held in accordance with the MLA (30 USC 226), Executive Order (EO) 13783, and Secretarial Order 3354. This IM supersedes existing policy announced in IM No. 2010-117, Oil and Gas Leasing Reform – Land Use Planning and Lease Parcel Reviews, issued on May 17, 2010, and replaces any conflicting guidance or directive found in the BLM Manual or Handbook.
The Utah Oil and Gas Conservation General Rules (2020 as amended)	These rules apply to any land in the state of Utah in order to conserve the natural resources of oil and gas in the state, to protect human health and the environment, to prevent waste, to protect the correlative rights of each owner and to realize the greatest ultimate recovery of oil and gas.

Relevant Statute, Regulation, Order, or Policy	Relationship to the Proposed Alternatives
Inventory of Onshore Federal Oil and Natural Gas Resources and Restrictions to Their Development 2008 Phase III Inventory-Onshore United States	This inventory is a detailed review of federal oil and gas resources and constraints on their development within 18 geological provinces in the United States. This inventory serves as a planning tool for federal agencies that manage public land, including the BLM, to evaluate whether the documented impediments and restrictions are appropriate, and to what extent they constrain oil and gas development.
Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994)	This EO, issued in 1994, directs federal agencies to make achieving environmental justice part of their missions by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.
Secretarial Order 3399: Department-Wide Approach to the Climate Crisis and Restoring Transparency and Integrity to the Decision-Making Process (2021)	This secretarial order prioritizes action on climate change and establishes a Departmental Climate Task Force within the Department of the Interior. This order also provides instruction on how science may be used in the decision-making process and clarifies departmental policy to improve transparency to the public on the Department's decision-making process.

1.5.1 Other Documents

The following NEPA documents were reviewed and incorporated into this analysis as appropriate:

- September 2018 EA (DOI-BLM-UT-0000-2018-0001-EA) (BLM 2018a). Relevant sections referenced were the project location and legal description; project background; plan conformance review; relationship to statutes, regulations, policies, or other plans; resources/issues brought forward for analysis; environmental impacts; cumulative impacts; and coordination and consultation.
- December 2018 DNA (DOI-BLM-UT-G020-2018-0057-DNA) (BLM 2018b). Relevant sections referenced were the description of the proposed action and any applicable mitigation measures, land use plan conformance, consultation information, and the relevant attachments included with the December 2018 DNA.
- January 2021 *Analysis for Greenhouse Gas Emissions Related to Oil and Gas Leasing in Utah Environmental Assessment* (DOI-BLM-UT-0000-2021-0001-EA) (BLM 2021c). This document was reviewed and referenced in the development of analysis for Sections 3.3.1 and 3.3.2 of this EA.
- 2016 *Record of Decision and Moab Master Leasing Plan/Approved Resource Management Plan Amendments for the Moab and Monticello Field Offices* (DOI-BLM-UT-Y010-2010-0001-RMP-EIS) (BLM 2016b).

In order to reduce redundant paperwork and analysis in the NEPA process, the previous documents and their associated information or analysis are hereby incorporated by reference.

1.5.2 Other Plans

There are two non-federal resource management planning documents that have a relationship to the proposed alternatives. Each of these are identified and discussed below. Alternative A and Alternative B conform with these plan documents as they contemplate affirming leasing decisions. Although Alternative C contemplates cancelling leases, neither the *State of Utah Resource Management Plan* (State RMP) nor the Emery County General Plan directly promote the affirmation of leases; rather, these plans support energy development while in compliance with applicable regulations (Emery County 2016; State of Utah 2018). The BLM considered these plans in the analysis of the proposed range of alternatives.

- *State RMP*. The State of Utah maintains a statewide RMP used to define the state's policies, goals, and objectives for the management of natural resources on public lands. With respect to energy production (including petroleum and natural gas), the State RMP indicates that "Utah's general policy on energy production is that it supports all forms of energy. Utah is an 'all-of-the-above' state and believes that there is room in its energy portfolio for all forms of energy" (State of Utah 2018). Specific sections of the State RMP that may be relevant to this analysis include the following:
    - The petroleum subsection of the Energy Resources chapter acknowledges the state's goal to ensure continued economic development through access to its own clean and low-cost energy resources. This is ensured by using a balance of fossil fuels and renewable resources that is market-driven, cost-effective, and environmentally responsible.
    - The natural gas subsection of the Energy Resources chapter acknowledges that a strong natural gas industry contributes to Utah's historically low energy costs and provides a foundation for success across all industrial sectors statewide. Support for natural gas development will continue to be a major component of the state's energy plan as new technologies emerge that allow energy producers to access supplies of domestic natural gas from shale formations and other unconventional reservoirs.
- *Emery County General Plan*. Emery County adopted a general plan in 1996, which was subsequently amended in 1999, 2012, and 2016. The 2016 General Plan states that "Emery County supports development of extraction industries" while expecting compliance with applicable regulations to minimize, reduce, or compensate for impacts of industrial activities including exploration, extraction, development, production, and transport (Emery County 2016). Specific sections of the Emery County RMP that may be relevant to this analysis include the following:
    - Section 6.2 acknowledges the county's public lands, the federal and state agencies, and policies that maintain them, and the opportunities for local government to participate in public land decision-making processes.
    - Section 8.7 states the county's support of mineral and energy resource extraction through the conditional use permitting process, development rights associated with mineral leases, and addressing of concerns for the environment.
    - Section 8.8 acknowledges the county's preference for public land being managed under the "multiple use and sustained yield" concept that includes, but is not limited to, grazing, all-season recreation, agriculture, wildlife, hunting, fishing, camping, historic and prehistoric cultural resources, and watershed.
    - Section 8.9 states the county's commitment to actively participating in federal and state land management decisions, to the extent allowed by federal, state, and local laws and ordinances.

- Section 9.8 states the county's support of mining and mineral resource production on public lands, to the extent allowed by county ordinances, jurisdictional agencies, and local history, customs, traditions, and culture.
- Section 9.1 states the county's desire to protect public lands without impacting the county's economy through the designation of wilderness.
- Section 9.11.4.1 affirms the ability of the county's property owners to use and enjoy private lands located adjacent to those designated as wilderness, Wilderness Study Areas (WSAs), and all other special designation public lands.
- Section 9.11.4.6 expresses the county's support of access to mining claims owned by individuals, groups, and businesses remaining unrestricted.

1.6 INTERNAL SCOPING

Internal scoping for this EA was initiated in January 2023, where the 59 leases from the September and December 2018 competitive oil and gas lease sales were presented to the ID Team. Resource specialists on the ID Team helped identify the following issues through coordination and meetings.

1.7 ISSUES

The Council on Environmental Quality (CEQ) regulations at 40 CFR 1500.4(i) state that the scoping process should be used "not only to identify significant environmental issues deserving of study, but also to deemphasize insignificant issues narrowing the scope of the [NEPA] process accordingly." 40 CFR 1501.9(f)(1) indicates that the lead agency "shall identify and eliminate from detailed study the issues that are not significant or have been covered by prior environmental review(s), narrowing the discussion of these issues in the statement to a brief presentation of why they will not have a significant effect on the human environment or providing a reference to their coverage elsewhere."

Through internal scoping the following issues were identified for detailed analysis in this EA:

- Air Quality: What type and quantity of air pollutants would be produced based on the assumptions for analysis? How would air pollutant emissions from subsequent development of the leases affect air quality resource values?
- Greenhouse Gas and Social Cost of Carbon: How would proposed and potential development of leases contribute to greenhouse gas (GHG) emissions and climate change?
- Socioeconomics/Environmental Justice: What are the potential impacts to social and economic conditions and environmental justice (EJ)?
- Lands with Wilderness Characteristics (LWCs): How would proposed and potential development of leases impact the apparent naturalness, size, and outstanding opportunities for solitude or primitive recreation experience of lands determined to possess wilderness characteristics in the short and long term?
- Wilderness: How would proposed and potential development of issued leases impact undeveloped, untrammeled, natural, and outstanding areas of solitude or primitive, unconfined recreation in designated Wilderness areas?
- Soundscapes: How would proposed and potential development of issued leases affect the visitor experience with regard to natural soundscapes on public lands and nearby National Parks?
- Visual Resources: How would proposed and potential development of leases affect inventoried visual resource values and management objectives?

- Night Skies: How would proposed and potential development of leases affect dark night skies in the short and long term?
- Recreation: How would proposed and potential development of leases affect recreation access, sites, and user experience within special recreation management areas (SRMAs)? How would proposed and potential development of the leases affect recreation sites, access, and user experience outside of SRMAs?
- Transportation and Access: How would proposed and potential development of leases impact public access and travel on existing travel management plan (TMP) designated routes?
- Water Resources: How would potential development of the leases impact the availability and quality of groundwater and surface water resources?

An additional 18 resource uses were identified, considered, and analyzed in brief. Explanations for why these resources were analyzed in brief are presented in Section 3.2. Table 1-2 lists resources or concerns that were considered but determined not to warrant further analysis in this EA due to the fact that the resource issue is not present in the leasing area for the 59 leases. In general, in this EA, the term *analysis area* will refer to the 59 leases totaling 121,679.70 acres. Where the analysis area may differ, it will be separately defined.

Table 1-2. Issues Not Present in Analysis Area and Not Included in Further Detail in the Environmental Assessment

Resource	Rationale for Not Further Discussing in Detail in the EA
Farmlands (prime or unique)	Based on local BLM specialist knowledge and Natural Resources Conservation Service soil survey and knowledge of the soils, there are no designated prime/unique farmlands within the leases.
Wilderness Study Areas	There are no Wilderness Study Areas located within the lease acreage.
Wildlife – greater sage-grouse	There are no greater sage-grouse priority habitat management areas or general habitat management areas within the lease acreage.
National Historic and Scenic Trails	There are no National Scenic and Historic Trails located within the lease area.
National Monuments/ National Conservation Areas	There are no National Monuments or National Conservation Areas located within the lease acreage.
Other designations (e.g., natural areas, research natural areas, etc.)	There are no other special designations, such as natural areas, research natural areas, or outstanding natural areas, within the leases.

1.8 PUBLIC COMMENT PERIOD

The BLM provided the public with an opportunity to participate in the EA process during a 30-day public review and comment period, held from July 26 to August 25, 2023. Appendix E provides a summary of the comments and responses.

1.9 RECENT COURT DECISIONS

The plaintiffs in *SUWA v. Haaland* (Case No. 1:20-cv-03654 (D.D.C.)) challenged the BLM's decisions authorizing 77 leases in the PFO from the September and December 2018 oil and gas lease sales, alleging, in part, violations of NEPA. The parties negotiated a settlement resolving the above lawsuit in which the

BLM agreed to conduct additional NEPA analysis for the leasing decisions that supported the 77 challenged leases from the September and December 2018 lease sales. Eighteen of the leases have now terminated. Therefore, only 59 challenged leases from the September and December 2018 lease sales are analyzed in the new analysis.

On January 27, 2022, the United States District Court for the District of Columbia issued a decision in *Friends of the Earth v. Haaland* vacating offshore oil and gas lease sale 257 because the Department of the Interior did not quantify the effects of that sale on emissions from the foreign consumption of oil and gas, despite (in the court's view) possessing the tools and methodology to do so (2022 WL 254526 (D.D.C. Jan. 27, 2021)). Given the analysis presently available to the BLM, *Friends of the Earth v. Haaland* does not affect BLM's analysis of this proposed lease sale (BLM 2023a).

Unlike the Bureau of Ocean Energy Management (BOEM)—the agency responsible for sale 257—the BLM has not traditionally used simulation tools like MarketSim (the tool at issue in *Friends of the Earth v. Haaland* and used by BOEM in preparation for sale 257) when evaluating effects on foreign consumption from proposed BLM state office lease sales. Indeed, the *Friends of the Earth v. Haaland* court recognized that it had previously upheld BLM's decision not to consider foreign effects where the BLM had "refused to quantify emissions resulting from particular leases, and thus could not conceptualize the extent to which the lease sales would contribute to the local, regional, and global climate change" (2022 WL 254526). Likewise, the court ruled against BOEM for forgoing the foreign consumption analysis for sale 257 in part because BOEM shortly thereafter applied that analysis to a draft NEPA analysis for proposed offshore sale 258. The court's reasoning does not apply to the BLM, which, as noted above, lacks access to any historical or imminent foreign effects analysis at the level of individual BLM state office lease sales. If and when the BLM undertakes this or similar analysis in the future, it may be appropriate to include and consider that analysis when proposing onshore lease sales (BLM 2023a).

CHAPTER 2. DESCRIPTION OF ALTERNATIVES

2.1 INTRODUCTION

This EA analyzes three alternatives: Alternative A (No Action Alternative), Alternative B (Wilderness and Lands with Wilderness Characteristics Alternative), and Alternative C (Lease Cancellation Alternative).

The leases would be subject to measures necessary to mitigate adverse impacts, according to the categories, terms, conditions, and stipulations identified in the PFO RMP, as amended (BLM 2008a). Additionally, BLM regulations at 43 CFR 3101.1-2 allow for the relocation of proposed oil and gas leasing operations up to 200 meters (m) and/or timing limitations up to 60 days in order to provide additional protection, ensuring that proposed operations minimize adverse impacts to resources, uses, and users. This approach would apply to all alternatives that consider affirmation of leases.

A stipulation and notice list, which described mitigation measures attached to each lease, was provided in the 2018 EAs. This list has been updated to reflect the leases being analyzed in this EA and is provided in Appendix B of this document. The stipulations and leases described in Appendix B are common to all alternatives and would apply regardless of which alternative is ultimately selected. Stipulations and notices that have been added since the September 2018 EA and December 2018 DNA are noted as new in Appendix B.

2.2 ALTERNATIVE A – NO ACTION ALTERNATIVE

Under the No Action Alternative, the BLM would affirm its previous leasing decisions to offer and issue 59 leases[1] (encompassing 121,679.70 acres) from the 2018 Lease Sales.

Figure 2-1 shows the locations of these leases. Legal land descriptions for each lease and corresponding stipulations and notices are included in Appendix B.

The leases are subject to the standard lease terms and conditions under Section 6 of the BLM Lease Form (Form 3100-11), along with all stipulations required by policy (such as the BLM Competitive Leasing Handbook H-3120-1) and stipulations identified in the PFO RMP (BLM 2008a).

[1] The 59 leases analyzed in this EA are: UTU93466, UTU93468, UTU93469, UTU93470, UTU93471, UTU93472, UTU93473, UTU93474, UTU93475, UTU93476, UTU93477, UTU93478, UTU93479, UTU93480, UTU93481, UTU93482, UTU93483, UTU93484, UTU93485, UTU93486, UTU93487, UTU93489, UTU93491, UTU93492, UTU93493, UTU93494, UTU93495, UTU93496, UTU93497, UTU93498, UTU93499, UTU93500, UTU93501, UTU93502, UTU93503, UTU93504, UTU93505, UTU93506, UTU93507, UTU93508, UTU93509, UTU93510, UTU93511, UTU93512, UTU93513, UTU93514, UTU93518, UTU93519, UTU93520, UTU93521, UTU93523, UTU93524, UTU93525, UTU93526, UTU93527, UTU93530, UTU93533, UTU93713, and UTU93534.

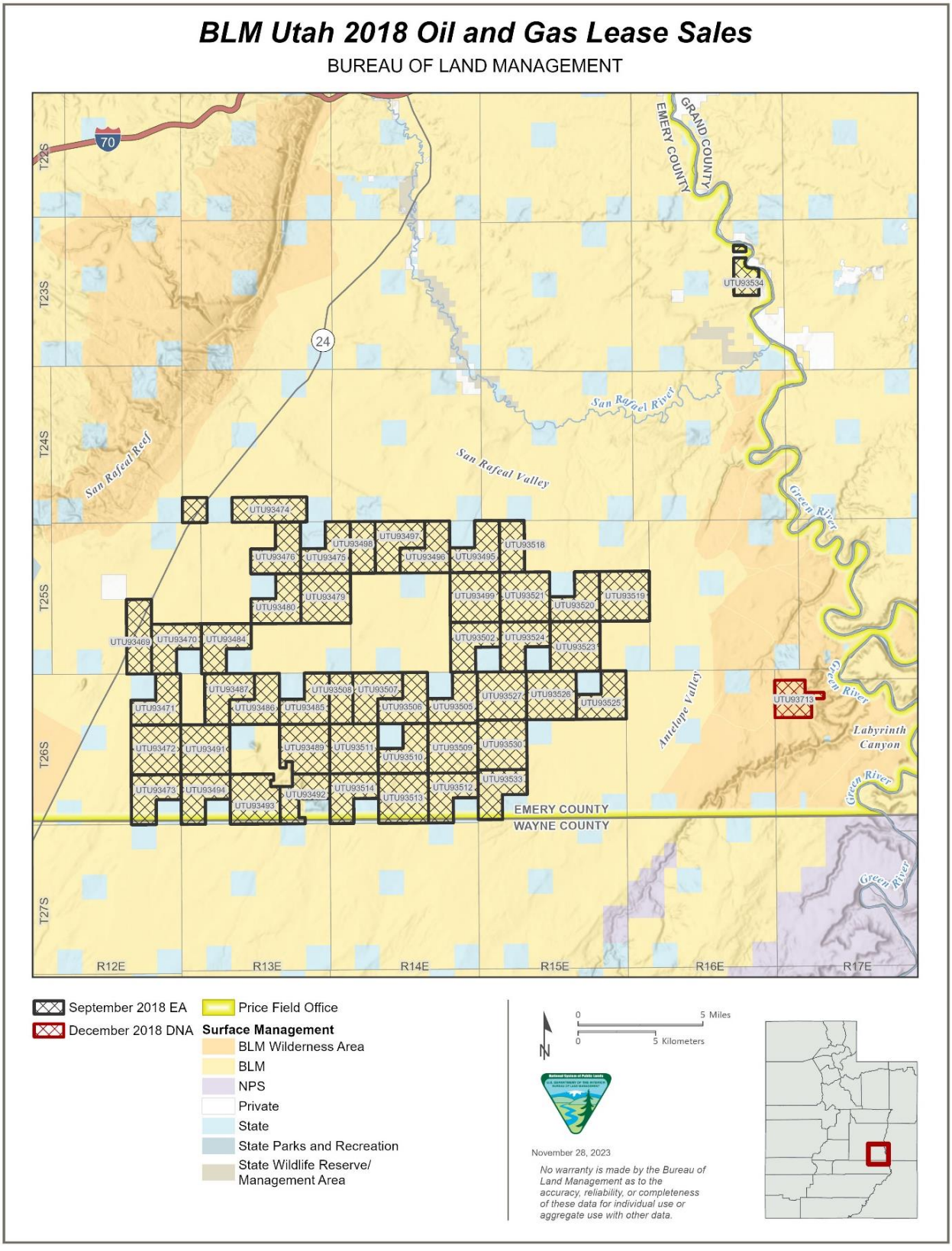


Figure 2-1. Location of the 59 leases under Alternative A and Alternative C.

2.3 ALTERNATIVE B – WILDERNESS AND LANDS WITH WILDERNESS CHARACTERISTICS ALTERNATIVE

Under Alternative B, the BLM would cancel 48 leases (encompassing 75,494.99 acres) that contain identified LWCs and one lease, UTU93713 (encompassing 1,408.01 acres) within a designated wilderness area. The BLM would affirm its previous leasing decisions to offer and issue the 10 remaining leases (encompassing 20,779 acres; Table 2-1) from the 2018 Lease Sales (Figure 2-2).

The 10 leases carried forward would include the standard lease terms and conditions for development of the surface of oil and gas leases provided in 43 CFR 3100 (BLM Form 3100-11) along with all stipulations mandated by policy (such as BLM Handbook H-3120-1, *Competitive Leases* [BLM 2013b]) and by the PFO RMP (BLM 2008a).

Legal land descriptions for each lease and corresponding stipulations and notices, which have been attached to each lease to address resource issues found through review and analysis, are included in Appendix B. In addition to the stipulations provided for by the PFO RMP, as amended (BLM 2008a), and BLM policies, lease notices have been developed for conservation measures and have been applied on specific leases as warranted by Interdisciplinary Parcel Review Team review.

Table 2-1. Leases to Be Affirmed under Alternative B

Lease Number	Acres
UTU93471	1,952.60
UTU93472	2,560.00
UTU93473	1,920.00
UTU93485	1,951.12
UTU93486	1,950.48
UTU93487	1,982.36
UTU93491	2,520.28
UTU93492	1,600.00
UTU93493	2,460.00
UTU93494	1,882.16
Total	**20,779.00**

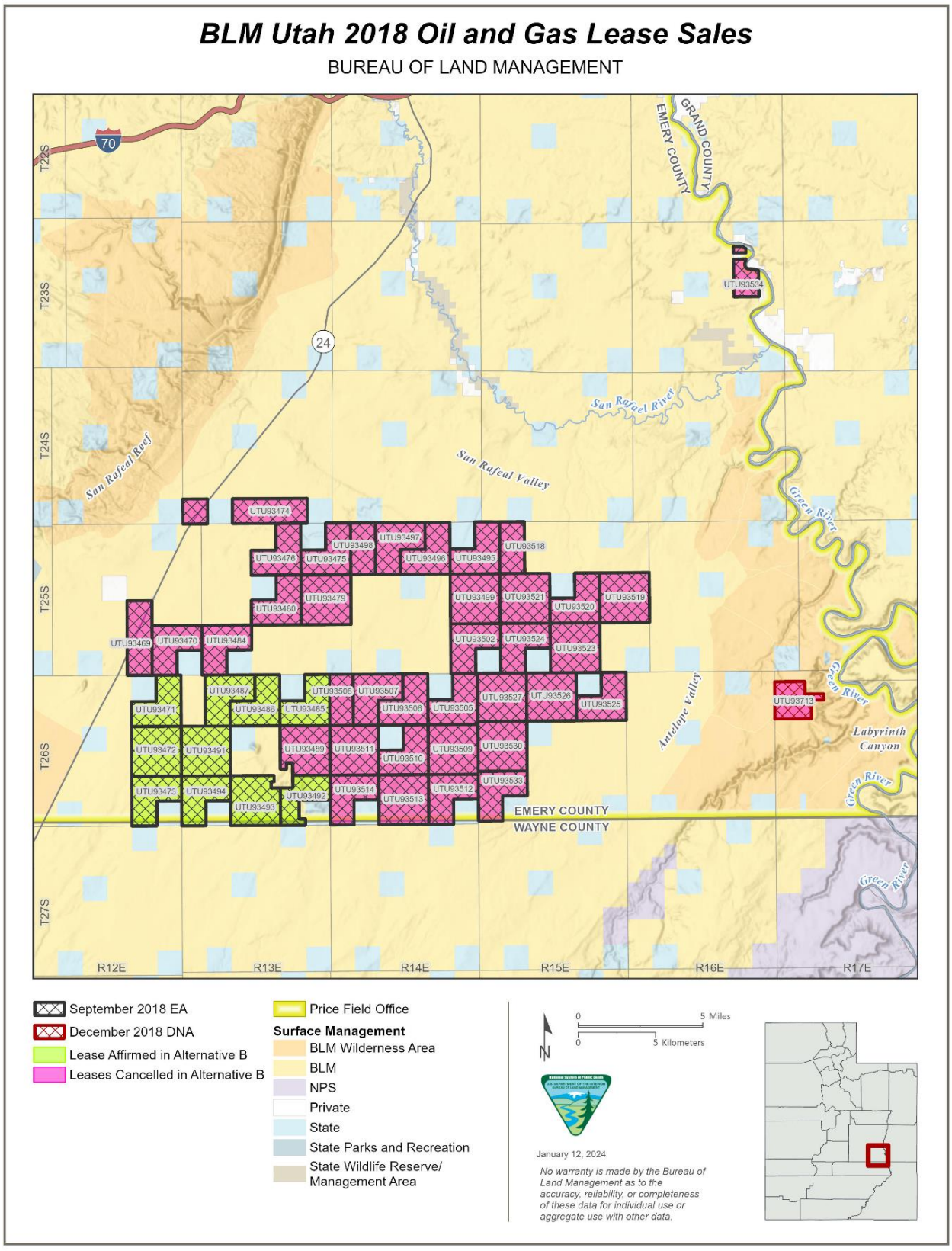


Figure 2-2. Leases cancelled and affirmed under Alternative B.

2.4 ALTERNATIVE C – LEASE CANCELLATION ALTERNATIVE

Under Alternative C, the BLM would cancel all 59 previously issued leases, and there would be no future development of any of the leases at this time. Although the No Action Alternative typically serves as the benchmark for impacts that would occur if development did not move forward, because the 59 leases have already been issued, Alternative C serves that purpose in this EA.

Choosing Alternative C would not prevent future leasing of the lands in question consistent with applicable laws and relevant land use planning decisions, and any future leasing would be subject to appropriate stipulations identified in the respective RMP.

2.5 OTHER ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

On April 16, 2018, the BLM received a letter with scoping comments for the September 2018 EA (BLM 2018a) and December 2018 DNA (BLM 2018b). These comments included four suggested alternatives. One of these alternatives (leasing outside of LWCs) was brought forward by the BLM for detailed analysis (Alternative B). The remaining three alternatives were considered but ultimately dismissed from further analysis. The BLM did not consider any alternatives that were not also considered in the original 2018 analyses. A summary of each alternative, and rationale for dismissal, is provided below. No additional scoping occurred; however, the public comment period for this environmental analysis was held between July 26 and August 25, 2023.

2.5.1 No Surface Occupancy Alternative

Under the No Surface Occupancy (NSO) alternative, the BLM would only offer LWC areas which are not identified by the BLM as a WSA for lease with non-waivable NSO stipulations.

The BLM dismissed this alternative because stipulations and notices, including NSO stipulations, as well as other restrictions, are already included in any lease sale. A complete list of stipulations and notices that pertain to the leases at issue in this EA are included in Appendix B. An NSO stipulation for LWCs in the PFO currently does not exist and would require an amendment to the 2008 PFO RMP. This is currently beyond the scope of the decision to be made described in Section 1.3 of this EA.

2.5.2 Phased Development Leasing Alternative

Under the Phased Development Leasing Alternative, the BLM would require lessees and operators to first explore and develop land outside BLM-identified LWCs and to prove that such areas are capable of production in paying quantities prior to developing in BLM-identified LWCs.

The BLM dismissed this alternative as beyond the scope of the decision to be made, as described in Section 1.3 of this EA. The San Rafael Desert Master Leasing Plan (MLP) (BLM 2018d) development scenarios cited by SUWA in their 2018 comments relate to the reasonably foreseeable development scenario (RFDS). The RFDS is a forward-looking planning tool used to estimate what oil and gas exploration and development activities may occur, should a decision to lease an area be approved. The RFDS is not a concrete statement that can provide proof of oil production or paying quantities but does inform the BLM of the potential cumulative impacts that may occur should a lease area be developed. Additionally, the 2008 PFO RMP is the guiding document for identifying lands designated as open for oil and gas development; land designations can only be changed through a PFO RMP amendment. The 2018 leasing decisions were reviewed for conformance with the PFO RMP.

2.5.3 Mitigation Leasing Alternative

Under the Mitigation Leasing alternative, the BLM would attach additional mitigation measures and BMPs to each lease, including CSU and NSO stipulations, to protect sensitive resources, including cultural resources and BLM-identified LWCs.

Like the NSO alternative, the BLM dismissed this alternative because opportunities to attach mitigation measures to leases are already provided through the stipulation and notice list (see Appendix B), and site-specific measures, including BMPs and other mitigation or control measures, are recommended at the application for permit to drill (APD) stage.

CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 INTRODUCTION

Chapter 3 contains the effects analysis related to the issues identified in Section 1.5.3. Section 3.2 presents the issues considered but eliminated from detailed analysis. Section 3.3 presents issues analyzed in detail. Lease stipulations and notices are referred to throughout the analysis in Sections 3.2 and 3.3 in terms of their protective influence on resources that may be impacted by future potential development of the leases. Lease stipulations "are conditions of lease issuance which provide protection for other resources values or land uses by establishing authority for substantial delay or site changes or the denial of operations within the terms of the lease contract" (BLM 1990). Lease stipulations are enforceable terms of the lease contract and supersede any inconsistent provisions of the standard lease form. Lease notices (also referred to as Information Notices in BLM Handbook H-1624) provide "notice of existing requirements and may be attached to a lease by the authorized officer at the time of lease issuance to convey certain operational, procedural, or administrative requirements relative to lease management within the terms and conditions of the standard lease form" (BLM 1990). While lease notices may not serve as the basis for denial of lease operations, they offer resource protections because they result in information gathering and the identification of resource values and land uses that the BLM, based on its authority under Section 6 of the lease form, can require protection for within the constraints enumerated in the lease form (e.g., terms and conditions that would be attached at the APD stage) (also see Section 2.2). BMPs (such as the Gold Book [BLM and U.S. Forest Service (USFS 2007)] and Appendix F), standard operating procedures (SOPs), and site-specific mitigation may also be applied at the APD stage as COAs.

Analysis Assumptions

Under Alternative A, the BLM would affirm its previous leasing decisions for the 59 leases. Surface management, the legal land description of the leases (totaling 121,679.70 acres), and lease stipulations and notices attached to the leases are included in Appendix B. Full text descriptions of the stipulations and notices is contained in Appendix C. Under the No Action Alternative, the BLM authorized officer has the authority to affirm the leases, based on the analysis of potential effects presented in this EA.

An issued lease may be held for 10 years, after which the lease expires unless oil or gas is produced in paying quantities (43 CFR 3107.2).[1] A producing lease can be held indefinitely by economic production. The drilling of wells on leases is not permitted until the leaseholder submits, and the BLM approves (subsequent to additional site-specific environmental review documentation), a complete APD package (Form 3160-3) following the requirements specified under Onshore Oil and Gas Orders listed in 43 CFR 3162.[2] The BLM has authority, according to the standard terms and conditions of the leases, to attach COAs to the APD that reduce or avoid impacts to public land, resources, and/or resource values.

Under 43 CFR 3101.1–2, such reasonable measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Measures shall be deemed consistent with lease rights granted provided that they do not require relocation of proposed operations by more than 200 m; require that operations be sited off the leasehold; or prohibit new surface-disturbing operations for a period in excess of 60 days in any lease year.

[1] The regulations, however, recognize an exception to this rule for a lease that is within an operating unit and the unit is held by production of wells on other leases within the unit.

[2] Additional information regarding the BLM's oil and gas management program can be accessed online at: https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/.

The BLM has received APD packages on three leases evaluated in this EA (lease numbers UTU93475, UTU93476, and UTU93479) for helium production. These APDs underwent separate environmental review (DOI-BLM-UT-G020-2021-0017-EA) with the BLM and were approved on September 20, 2023. As Alternative B considers cancelling leases that contain identified LWCs; each of the three leases for which APDs have been approved would be cancelled under Alternative B.

3.1.1 Reasonably Foreseeable Development Scenario

The RFDS is a planning tool to provide a reasonable estimate of what oil and gas exploration and development activities might be proposed, should a decision be made to lease the area. The RFDS is a 20-year, forward-looking estimation of oil and gas exploration and development that is exclusive of other concerns that might compete for use of land in a multiple-use scenario.

When and if an APD is submitted for any of the leases, BLM would adhere to numerous IMs (as revised through the life of an active lease), including specific instructions for bonding and other laws (such as the National Historic Preservation Act [NHPA], ESA, etc.). Management provisions would adhere to Gold Book BMPs (BLM and USFS 2007) and the BMPs listed in Appendix F. In general, activities are anticipated to take place as described in Appendix D below. This appendix provides a general discussion of possible post-leasing RFDS activities. All of these activities would require additional NEPA review when a lease holder submits an APD.

The U.S. Government Accountability Office (GAO) completed a detailed data review of approximately 47,925 federal onshore oil and gas leases issued from 1987 through 1996 (GAO 2008). The GAO found that only 6% (2,904 leases) of the leases issued were drilled during the 10-year lease term, and about 5% (2,386 leases) of the leases produced oil and gas by 2007.

BLM Utah issued 10.7% (5,127) of the total federal onshore oil and gas leases (47,925) analyzed in the GAO report. Of those leases in Utah, 6.17% (323) were drilled, and 4.39% produced as depicted in Table 3-1 (GAO 2008). Over a 5-year period between 2014 and 2018, on average of only 58% of approved APDs (federal and non-federal) across Utah were developed (Utah Division of Oil, Gas and Mining 2018).

Table 3-1. Onshore Leases Issued (1987–1996), Drilled, and Produced: Utah

	Number of Leases Issued	Number of Leases Drilled	Number of Leases that Produced	Percentage of Total Leases Drilled	Percentage of Total Leases that Produced
Utah	5,127	323	225	6.30%	4.39%

Source: GAO (2008).

The majority of the wells drilled in the PFO are drilled in coalbed natural gas (CBNG) resource in the Ferron Sandstone Member of the Mancos Shale. This relatively recent interest in CBNG also resulted in additional drilling in other coal-bearing formations, especially the Blackhawk Formation and the Emery Sandstone Member of the Mancos Shale. Most recently, interest has increased in the continuous and transitional gas resource in the Wasatch and Mesaverde Formations and potential gas resources in some deeper formations in the northeastern part of the RFDS planning area. Interests in the development of transitional gas resources are primarily in the Wasatch and Mesaverde Formations within the northeast corner of the PFO, where seismic surveys have identified drilling targets in deeper formations. These leases are in the San Rafael Group and the targeted play is most likely the Moenkopi Formation. The 2018 leases are identified as no CBNG potential and low conventional oil potential development to portions of high conventional oil potential development (Maps 3-20 and 3-21 in the PFO RMP [BLM

2008a]). Although portions of the leases are mapped in a high conventional oil potential development as determined in the RFDS, it has not come to fruition. This area is extremely exploratory. A total of 79 wells drilled have been drilled in the San Rafael Desert MLP area (BLM 2018d); many of the wells were drilled from 1985 and 1989, and all were dry holes.

The highest helium concentrations in Utah are found beneath shallow structural traps within the under-pressured Jurassic Entrada Sandstone reservoir at a depth of about 1,000 feet. There may also be significant economic helium potential in extensive and unexplored Devonian-Mississippian reservoirs of the Elbert Formation, Ouray Limestone, and Leadville Limestones. Twin Bridges, a Colorado-based company, applied for APDs and various rights-of-way (ROWs) to support the development of three mineral leases for helium on the Bowknot helium prospect in 2020 in the PFO. This project is located approximately 10 miles east of the proposed Project. The Grassy Trail helium play area also lies in Emery County, and multiple helium tests show economically viable helium deposits in that area, as well. The Utah DNR Miscellaneous Publication 174, *Proven and Hypothetical Helium Resources in Utah* (Wiseman and Eckels 2020) categorizes the region that the leases are located within as subeconomic but adjacent to known areas with high concentrations of helium (Paradox Basin). The BLM's 2007 technical note 429, *Helium Resources of the United States*, notes that there may be an estimated 76.47 billion cubic feet of measured[3] helium reserves in the Rocky Mountain region[4]; 82 billion cubic feet of probable[5] helium resources; 86.88 billion cubic feet of possible[6] helium resources, and 76.09 billion cubic feet of speculative[7] helium resources (Pacheco and Ali 2008). However, more recent findings suggest as much as 148 billion cubic feet of recoverable helium in the Rocky Mountain region (Brennen et al. 2021). Between 2002 and 2004, the BLM collected gas samples from 15 states; 60 of these samples were performed in Utah. None of the samples were taken in Emery County, however, samples taken in nearby Carbon County noted trace[8] components of helium (Gage and Driskill 2005). As global helium prices continue to be high, helium exploration and development will become more economical and may not be limited to areas of proven oil and gas production.

Over the years prior to 2018, 48 wells have been drilled in the proximity of the leases: 32 of these wells were on the leases, and all 48 wells were dry holes. The 2005 RFDS (Appendix M in the PFO RMP [BLM 2008a]) and the 2016 San Rafael Desert MLP RFDS (BLM 2018d) for oil and gas development categorizes the region the leases are within as exploratory (low potential for oil and/or natural gas development).

3.1.1.1 RFDS Assumption for Analysis in this EA

The leases cover 28% of the RFDS calculated for the San Rafael Desert MLP (BLM 2018d), translating to eight wells. For the analysis of the 59 leases encompassing 121,679.70 acres, it was estimated a maximum of eight wells would be drilled (BLM 2018d), and the maximum new disturbance would be 83.2 acres (one well pad at 4 acres, and access road and pipeline disturbance at 6.4 acres, for a total of 10.4 acres per well) (Table 3-2).[9] Due to the extreme exploratory nature and past unsuccessful attempts, it

[3] Measured reserves are materials whose quality and quantity have been determined, within a margin of error of less than 20%, from closely spaced and geologically well-known sample sites (USGS 1976).

[4] The Rocky Mountain region encompasses Idaho, Montana, Colorado, Utah, Wyoming, parts of New Mexico, and Arizona (Brennen et al. 2021).

[5] Probable reserves are calculated to be at least 50% likely to be recovered through drilling (Chen 2022).

[6] Possible reserves are unproved deposits where the probability of successful extraction is at least 10% (Fernando 2022).

[7] Speculative resources are undiscovered resources that may occur in either known types of deposits in a favorable geologic setting where no discoveries have been made, or in as yet unknown types of deposits that remain to be recognized (USGS 1976).

[8] The word *trace* is used to denote quantities of helium less than 0.005% (Gage and Driskill 2005).

[9] For the entire area within the former San Rafael Master Leasing Plan, future oil and gas drilling for the next 15 years is projected to average two wells per year for a total of 30 wells. Twelve of the wells are projected to be dry holes.

is anticipated that all wells drilled have a high probability of being a dry hole; however, for purposes of this analysis, the RFDS used is for eight wells total to be drilled on the 59 leases. The total acreage of Alternative B is approximately 17% of Alternative A. Therefore, under Alternative B (Section 2.3), the RFDS is assumed to be two total wells drilled with an estimated total surface disturbance of 20.8 acres. Given that the BLM has received and approved APD packages on three leases[10] for helium production, under Alternative A (Section 2.2), of the eight wells used for RFDS, three are assumed to be for helium development and five are assumed to be oil and gas development.

Table 3-2. Estimated Well Count and Production for the Leases

Alternative	Acres	Total Estimated Wells	Surface Disturbance (acres)	Oil Production (bbl)	Gas Production (mcf)	Produced Water Production (bbl)
A	121,679.70	5	52.0	237,455	195,912	444,013
A		3	31.2	*	*	†
B	20,779	2	20.8	237,390	170, 968	387,545

Source: BLM Lease Sale Emissions Tool (BLM 2022b).

Note: bbl = barrels (crude oil or produced water), mcf = thousand cubic feet.

* Assumes helium well will not produce oil and gas.

† Not available due to limited information regarding wastewater produced from helium wells. However, there could be some waste natural gas in the gas stream that would be vented, flared, or reinjected.

3.2 ISSUES ANALYZED IN BRIEF

Following internal scoping, 19 issues were identified, considered, and eliminated from detailed analysis by members of the ID Team in review of the proposed alternatives because these issues are either not relevant to the purpose and need or do not present a significant or potentially significant impact in which environmental analysis is necessary. Each of these issues is outlined below with a concise discussion regarding the affected area and degree of effects (i.e., short- and long-term; beneficial and adverse; effects on public health and safety, and effects that would violate Federal, State, Tribal, or local law protecting the environment) related to each issue. Stipulations HQ-TES-1 (compliance with the ESA), HQ-CR-1 (compliance with the NHPA), and Lease Notice HQ-MLA-1 (compliance with the MLA), as well as standard terms and conditions described in the lease form, would apply to all leases.

For the purposes of this analysis, short-term effects are those that cease after well construction and completion (30–60 days) or cease after interim reclamation (2–5 years). Long-term effects are considered to be those associated with operation production activities over the life of the well (for example, noise) or that otherwise extend beyond the short-term time period (for example, surface disturbance subject to final reclamation). As such, some long-term effects would cease immediately upon the end of operations, whereas other long-term effects would remain until successful landscape reclamation and remediation is accomplished. Note that the time frame for successful reclamation would vary by vegetation type and other factors such as the amount and timing of annual precipitation.

[10] The three helium leases with APDs are UTU93475, UTU93476, and UTU93479.

AIB-1 Native American Concerns

How would potential development of the leases impact religious and traditional concerns of Native American communities?

The PFO notified the following Tribes about the proposed September 2018 Lease Sale via certified letter sent on March 28, 2018: The Hopi Tribe, Jicarilla Apache Nation, Kaibab Band of Paiute Indians, Moapa Band of Paiute Indians, Navajo Nation, Northwest Band of Shoshone, Paiute Indian Tribe of Utah, Pueblo of Jemez, Pueblo of Laguna, Pueblo of Santa Clara, Pueblo of Zia, Pueblo of Zuni, San Juan Southern Paiute Tribe, Shoshone-Bannock Tribes (Fort Hall), Southern Ute Indian Tribe, Ute Indian Tribe, Ute Mountain Ute Tribe.

At that time, BLM received responses from the Hopi Tribe and the Southern Ute Indian Tribe requesting consultation. BLM consulted with both Tribes and provided them with copies of the cultural resources literature report for review and comment.

The PFO notified the following Tribes about the proposed December 2018 Lease Sale via certified letter sent on June 25, 2018: The Hopi Tribe, Jicarilla Apache Nation, Kaibab Band of Paiute Indians, Navajo Nation, Northwest Band of Shoshone, Paiute Indian Tribe of Utah, Pueblo of Jemez, Pueblo of Laguna, Pueblo of Santa Clara, Pueblo of Zia, San Juan Southern Paiute Tribe, Shoshone-Bannock Tribes (Fort Hall), Southern Ute Indian Tribe, Uintah Ouray Ute Indian Tribe, and the Ute Mountain Ute Tribe.

At that time, BLM received responses from the Hopi Tribe and the Southern Ute Indian Tribe requesting consultation. BLM consulted with both Tribes and provided them with copies of the cultural resources literature report for review and comment.

The BLM is not aware of any documented traditional cultural properties (TCPs) or sacred sites located within or in proximity to the leases. However, resources and locations of Native American religious and traditional concern may be present within the leases that have not been disclosed to the BLM. Should the leases be proposed for development in the future, additional coordination and consultation would be required at the APD stage. BMPs, SOPs, and site-specific mitigation may be applied at the APD stage as COAs to protect cultural resources and locations of Native American religious and traditional concern.

AIB-2 Cultural Resources

How would potential development of the leases impact cultural resources?

BLM archaeologists compiled cultural resource data from the PFO cultural resource records for the September and December 2018 oil and gas lease sales in April and May 2018 for the September 2018 lease sale and June–August 2018 for the December 2018 lease sale. BLM reviewed this data against the lease locations to determine if oil and gas development could occur in accordance with the 2018 RFDS, without incurring adverse effects to historic properties, and taking into consideration impacts to cultural resources, as well. The leases were also reviewed for the application of stipulations and lease notices as required by the PFO RMPs. The Cultural Resource Stipulation, as required by BLM Handbook H-3120-1, was applied to all leases. The stipulation (HQ-CR-1) reads as follows:

> *"This lease may be found to contain historic properties and/or resources protected under the National Historic Preservation Act, American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O. 13007, or other statutes and executive orders. The BLM will not approve any ground disturbing activities that may affect any such properties or resources until it completes its obligations under applicable requirements of the NHPA and other authorities. The BLM may require modification to exploration or development proposals to protect*

> *such properties or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized or mitigated."*

Additionally, Lease UTU-93534 lies entirely within the Dry Lake Archaeological District Area of Critical Environmental Concern (ACEC), and is subject to NSO constraints (UT-S-319) within the ACEC boundaries.

Application of these two stipulations would avoid, minimize, or mitigate adverse impacts to any cultural resources within the cultural resources analysis area; therefore, none of the alternatives discussed in detail in this EA would result in appreciable direct, indirect, or cumulative impacts to cultural resources.

Chapter 4 provides information about BLM's compliance with the NHPA, 54 USC 306108 (hereafter, Section 106). In summary, BLM reached a finding of "No Adverse Effect" to historic properties (36 CFR 800.5 (b)) for both the September and December 2018 lease sales. For the September 2018 Lease Sale, BLM consulted with the Utah State Historic Preservation Office (SHPO) in July 2018 and received SHPO concurrence on BLM's finding of No Adverse Effect on July 23, 2018. The Advisory Council on Historic Preservation (ACHP) affirmed BLM's proper application of and agreed with the finding of No Adverse Effect (36 CFR 800.5 (b)) on September 10, 2018. For the December 2018 Lease Sale, BLM consulted with the Utah SHPO in October 2018 and received SHPO concurrence on BLM's finding of No Adverse Effect on October 25, 2018. See Chapter 4 for more details about the Section 106 review.

Based on the type and density of sites within and surrounding the leases, the individual sizes of the leases, the application of the cultural resources protection stipulation and the Dry Lake ACEC NSO stipulation, and the varied topography of the leases, the BLM anticipates that reasonably foreseeable development can occur within the leases without adverse impacts to cultural resources and without an adverse effect to historic properties. Accordingly, anticipated development, as described by the RFDS described in Section 3.1.1, would also not result in direct, indirect, or cumulative impacts to cultural resources.

For future undertakings related to these leases, the BLM would not approve any ground disturbing activities until it completes its obligations to consider cultural resources under the NEPA, the NHPA, and other authorities specific to those future undertakings. New analysis of impacts to cultural resources and potential adverse effects to historic properties will be conducted during the review stage of any future site-specific development plans through new NEPA and NHPA Section 106 review processes. Future site-specific analysis may identify and document currently unknown and unrecorded cultural resources.

Lease Stipulations:

UT-S-319 *NSO Cultural ACEC* is attached to UTU-93534.

HQ-CR-1 *Cultural Resource Protection* is attached to all leases.

AIB-3 Fish

Non-Designated Species

How would potential development of the leases affect non-designated fish species?

There are no perennial streams on any of the leases and there are 204.96 miles of intermittent streams and 20.11 miles of connector channels and artificial paths within the lease boundaries (see Section 3.3.11, Table 3-30 and Figure 3-9 for details on which leases contain these features) (U.S. Geological Survey [USGS] 2019). The absence of perennial streams within the leases limits the availability of non-designated fish habitat on the leases, thereby limiting impacts to non-designated fish species. Additionally, Stipulation UT-S-127 *NSO – Intermittent and Perennial Streams* applies to all leases. This

stipulation prohibits surface-disturbing activities within 100m of riparian areas along intermittent and perennial streams and springs. Exceptions to this stipulation would only be allowed if there are no practical alternatives, the impacts of the exception could be mitigated completely, or if the exception is completed in such a way that the riparian or wetland resources is enhanced.

Although not directed at non-designated fish species, Lease Notice T&E-03 *Endangered Fish of the Upper Colorado River Drainage Basin* is attached to all leases (see Appendix B) and prohibits surface disturbance within 100-year floodplains of the Colorado River or in lands in this watershed that contain designated critical habitat for Colorado River fishes (see Appendix B). This stipulation provides additional protections for non-designated fish species. Impacts to habitat and water quality for all fish species are adequately addressed through the addition of Stipulation UT-S-127 NSO – *Intermittent and Perennial Streams*, and Lease Notices UT-LN-128 *Floodplain Management* and UT-LN-53 *Riparian Areas* applies to all leases (see Appendix B). These notices provide additional protections against habitat impacts by providing a buffer of NSO from aquatic habitat.

Lease Notices:

T&E-03 *Endangered Fish of the Upper Colorado River Drainage Basin* is attached to all leases.

UT-LN-128 *Floodplain Management* is attached to all leases.

UT-LN-53 *Riparian Areas* is attached to all leases.

Lease Stipulations:

UT-S-127 *NSO – Intermittent and Perennial Streams* is attached to all leases.

BLM Sensitive and Federally Listed Species

How would potential development of the leases affect BLM sensitive species or U.S. Fish and Wildlife Service (USFWS) designated species?

Water depletions from any portion of the Upper Colorado River drainage basin above Lake Powell are considered to adversely affect or adversely modify the critical habitat of the four resident threatened or endangered fish species: humpback chub (*Gila cypha*), razorback sucker (*Xyrauchen texanus*), Colorado pikeminnow (*Ptychocheilus lucius*), and bonytail (*Gila elegans*). However, there are no perennial streams on any of the leases. The absence of perennial streams limits the availability of designated fish habitat on the proposed leases, thereby limiting impacts to designated fish species. Critical habitat for the Colorado pikeminnow and razorback sucker has been identified adjacent to Lease UTU93534. Actions that may impact the four species mentioned above must be evaluated prior to site development with regard to the criteria described in the Upper Colorado River Endangered Fish Recovery Program. Water depletions are considered to adversely affect or modify critical habitat for the four threatened or endangered Colorado River fish that reside in the basin and must be evaluated regarding the criteria described in the Upper Colorado River Endangered Fish Recovery Program (Colorado River Recovery 2022). Under the RFDS, eight wells could be developed, which could utilize an estimated 4 to 32 acre-feet of water (see Section 3.3.11 for further details). Water use for well development would be limited to valid existing water rights.[11] Should an APD be received for development of a lease, water resources and potential impacts to

[11] The USFWS considers existing water rights perfected prior to 1988 to be historic, and additional Section 7 consultation is not required. Water rights perfected after 1988 are considered a new depletion and are subject formal consultation. At the leasing stage it is not possible to foresee the source of water used in lease operations nor can the BLM apply additional requirements on the selection of water rights used. Impacts to water resources, including water rights, are analyzed in further detail outside the leasing stage when and if an APD is received for a lease.

designated species would be analyzed in detail under separate NEPA analysis, consistent with USFWS guidelines on water depletions.

Additionally, Lease Notice UT-LN-49 *Utah Sensitive Species* is added to all leases, providing the opportunity to make adjustments at the site-specific level when an APD is received to reduce potential effects to BLM sensitive aquatic species that may be in the area. BLM sensitive fish and amphibian species with potential to occur in the leases are bluehead sucker (*Pantosteus discobolus*), flannelmouth sucker (*Catostomus latipinnis*), and roundtail chub (*Gila robusta*).

At the leasing stage, it would be too speculative to identify the potential source and status of permitted water sources used in the lease development. However, to account for the potential water depletions that may affect fish in downstream locations, Lease Notice T&E-23 *Colorado River Endangered Fish* and Lease Notice T&E-03 *Endangered Fish of the Upper Colorado River Drainage Basin* are attached to all leases (see Appendix B). Application of these lease stipulations and lease notices is expected to mitigate potential impacts to listed fish species.

Lease Notices:

UT-LN-49 *Utah Sensitive Species* is attached to all leases.

T&E-03 *Endangered Fish of the Upper Colorado River Drainage Basin* is attached to all leases.

Lease Stipulations

UT-S-127: *NSO – Intermittent and Perennial Streams* is attached to all leases.

AIB-4 Floodplains

How would potential development of the leases impact floodplains?

Floodplains are 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 floodwater and slowing runoff, erosion control, groundwater recharge, and fish and wildlife habitat protection (Federal Emergency Management Agency 2022). A 100-year floodplain, or Special Flood Hazard Area, is defined as an area with a 1% probability of flooding in a given year, and a 500-year floodplain is an area with a 0.2% probability of flooding in a given year (Federal Emergency Management Agency 2020). No leases are located within a 100- or 500-year floodplain.

Compliance with Executive Order (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 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".

All of the leases require implementation of Stipulation UT-S-127: *Intermittent and Perennial Streams*. This stipulation includes the exclusion of surface-disturbing activities in areas within the 100-year floodplain or 100 m (330 feet) on either side from the centerline, whichever is greater, along all perennial and intermittent streams, streams with perennial reaches, and riparian areas. Exceptions to this stipulation would only be accepted if there are no practical alternatives, the impacts of said exception could be mitigated completely, or if the exception is completed in such a way that the resource is enhanced. Further stipulations or lease notices may apply to other water resources that indirectly impact floodplains,

such as stream channels and riparian areas. The stipulations, lease notices, SOPs, BMPs, and COAs implemented during the leasing process will limit or reduce the impacts to floodplains, both directly and indirectly.

Additionally, Lease Notice UT-LN-128 *Floodplain Management* would be applied to all leases. This notice requires that in order to avoid any impacts to floodplains, facilities must be located outside the 100-year floodplain and that any impacts would be minimized by modification of surface use plans within floodplains present within the lease.

Any leases that would be accessed via off-lease directional drilling from other BLM lands would be addressed through a separate decision and would assess impacts to wetlands and riparian resources.

Applying these protective measures (stipulations and lease notices) at the time of leasing will inform the lessee of the resource. The protection offered by these stipulations coincides with riparian and water quality protection measures by eliminating potential floodplain altering disturbance activities in these areas, eliminating the need for a detailed analysis of floodplains. Additional mitigation measures and buffers may be applied at the APD stage, as necessary to protect these areas. Additional site-specific NEPA analysis will occur at that time.

Lease Notices:

UT-LN-128 *Floodplain Management* is attached to all leases.

Lease Stipulations:

UT-S-127 *NSO – Intermittent and Perennial Streams* is attached to all leases.

AIB-5 Fuels/Fire Management

How would potential development of the leases affect fuels and fire management?

Leasing alone has no direct impact on fuels or fire management. Following the approval of an APD, exploration and development within the wildland-urban interface would conform with the Fire Management Plan decisions to minimize wildfire size and frequency in the PFO planning area. Proper fuels management would reduce the risks of fire to wildlife and ecosystems. When applicable, the least intrusive fire suppression methods will be used over more intrusive methods. Because of these management actions, exploration and development of the leases does not conflict with the Fire Management Plan goals and objectives outlined in the PFO RMP (BLM 2008a).

Following the approval of an APD, BMPs and SOPs implemented during the lease development process would limit impacts to fuels and fire management by performing actions and following procedures that may mitigate the risk of wildfire to the area. Additionally, site-specific design features or mitigation may be applied at the APD stage as COAs to reduce or eliminate impacts to fuels/fire management, and the implementation of appropriate reclamation standards would prevent an increase of hazardous fuels. Federally, the National Interagency Fire Center guides the BLM in fire management and policies, and guiding principles from the Federal Wildland Fire Management Policy and Doctrine establish federally recognized fire stipulations, which may be applied and implemented in the lease sale area in order to prevent wildfire, respond to wildland fire, and to utilize fire as a tool to restore the landscape (National Interagency Fire Center 2023).

While fuels and fire management are not directly addressed by any stipulations, Lease Notice UT-LN-52 *Noxious Weeds* is attached to all leases, which may require lease/operator to implement BMPs to prevent

or control noxious weeds, helping reduce the spread and introduction of fuels that could elevate the risk of fire spread (see AIB-8 Vegetation).

Lease Notices:

UT-LN-52 *Noxious Weeds* is attached to all leases.

Lease Stipulations:

None.

AIB-6 Paleontology

How would potential development of the leases affect paleontological resources?

The Potential Fossil Yield Classification (PFYC) is a tool that allows the BLM to predict the likelihood of a geologic unit containing paleontological resources. The PFYC is based on a numeric rating system of 1 to 5. An area identified as PFYC 1 has a very low likelihood of containing paleontological resources, whereas an area identified as PFYC 5 is a geologic unit that has a very high likelihood of containing scientifically significant paleontological resources. PFYC U is a geologic unit with unknown likelihood of containing paleontological resources. Within areas identified as PFYC 2 or 3, paleontological resource management concern is generally low to moderate because the likelihood of encountering scientifically significant fossils is relatively low to moderate. Within areas identified as PFYC 4, paleontological resource management concerns are moderate to high.

If paleontological resources exist in the decision area, impacts could result in the immediate physical loss of fossils and their contextual data. Ground disturbance could also subject fossils to long-term damage or destruction from erosion as well as create improved access and increased visibility to the public, potentially resulting in unauthorized collection or vandalism. Ground disturbance can also reveal scientifically significant fossils that would otherwise remain buried and unavailable for scientific study. Such fossils can be collected properly and curated into the museum collection of a qualified repository, making them available for scientific study and education.

Surface disturbance and risk of effects on paleontological resources associated with reasonably foreseeable environmental trends and planned actions within the analysis area would depend on the locations of proposed disturbance relative to PFYC class. As currently mapped, nearly the entire leasing area is PFYC 2 with small areas of PFYC 4 and PFYC 3; there are no PFYC 5 areas identified in the leasing area.

No surface outcroppings (exposed layers of rock) are in formations that are likely to have vertebrate fossils except for the Morrison Formation, which is exposed in locations on top of the Flattops that are unlikely sites for well pads. In the PFO RMP (BLM 2008a), Paleontological Resources PAL-4 requires an assessment of fossil resources on a case-by-case basis, with mitigation measures as necessary, before and during surface disturbance. If an APD is filed, specific clearances would be conducted and incorporated into that future NEPA process at the development stage. If paleontological resources are discovered, the Administrative Office (AO) would be contacted. BMPs, SOPs, and site-specific mitigation may be applied at the APD stage as COAs.

Effects on paleontological resources can be mitigated by standard terms and conditions, which require a lessee to conduct inventories or special studies. Site-specific projects that would cause surface disturbance in areas with unknown or moderate to high potential require a paleontological survey and/or monitoring conducted at the time of proposed lease development in accordance with NEPA, Paleontological

Resources Perseveration Act (PRPA), and FLPMA. The BLM has applied Lease Notice UT-LN-72 *High Potential Paleontological Resources* to all leases in areas that are known to contain fossils or with high potential to contain fossils (PFYC 4 and PFYC 5) (see Appendix B). This notifies the lessee/operator that surveys will be required and modifications to the surface use plan of operations may be required to protect paleontological resources from surface-disturbing activities.

Additionally, fossils uncovered during ground disturbing activities would be protected by the standard unanticipated discovery protocol. Should a lease be located in an area that has high potential for paleontological resources, COAs would be applied at the APD stage. The proponent would be required to do preconstruction surveys and/or have a paleontologist on-site for any surface-disturbing activities. The proponent is required to notify the BLM of any discoveries identified during construction.

Lease Notices:

UT-LN-72 *High Potential Paleontological Resources* is attached to all leases except the following which are in PFYC 3 or lower areas: UTU93466, UTU93468, UTU93469, UTU93470, UTU93471, UTU93472, UTU93473, UTU93483, UTU93485, UTU93486, UTU93491, UTU93525, UTU93534, UTU93713.

AIB-7 Soils (Physical and Biological)

How would potential development of the leases impact soils?

The soils in the leasing area are derived primarily from sedimentary geologic deposits and have developed in alluvium and eolian sands. These soils typically form sandy loam, loamy sand, and sandy soils.

Soil movement disrupts the existing structure of the soil horizons to the depth of disturbance. When movement occurs, soil forming processes are halted and compaction of underlying horizons and loss or degradation of soil microbes may occur. These issues are compounded when fragile and/or sensitive soils are present.

Sensitive soils include those that have components that can be characterized as susceptible to compaction or other mechanical damage and/or are highly erodible when disturbed. Surface disturbance of fragile and/or sensitive soils occurring on increased slope profiles has the potential to affect soil stability and may lead to accelerated soil erosion and potential sedimentation to proximal water bodies.

Fragile soils are soil types that are easily damaged by use or disturbance and/or are those that are difficult to reclaim to pre-disturbance condition According to the NRCS, soils can be rated based on their susceptibility to degradation. Fragile soils are those that are most vulnerable to degradation. These soils tend to be highly susceptible to erosion and can have a low capacity to recover after degradation has occurred. Fragile soils are generally characterized by low content of organic matter, low aggregate stability, and weak soil structure. They are generally located on sloping ground and have sparse plant cover. The NRCS susceptibility index can be used for conservation and watershed planning to assist in identifying soils and areas highly vulnerable to degradation. Depending on inherent soil characteristics and climate, soils can vary from highly resistant or stable, to vulnerable and extremely sensitive to degradation. Under stress, fragile soils can degrade to a new altered state, which may have reduced functions and thereby affect the entire ecosystem. To assess fragility of the soil, indicators of vulnerability are used; these include organic matter content, soil structure, rooting depth, vegetative cover, slope, and aridity.

Mapped soil units within the lease areas are variable and identified using soil survey information, combined with slope and vegetation layers. Biological soil crusts consist of 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). These crusts are highly susceptible to disturbance and should be avoided by potential future ground disturbing actions. However, existing professional knowledge of the area suggests that there is a low likelihood of biological soil crust presence in the leasing area (J. Dalebout2023a). To avoid impacts to fragile soil resources, should biological soil crusts be found in the leases, well pads could be moved up to 200 m per BLM regulation 43 CFR 3101.1–2. Additionally, BMPs, SOPs, and site-specific mitigation may be applied at the APD stage as COAs to further avoid impacts to biological soil crusts or other fragile soils.

Under the assumptions in Section 3.1.1, Reasonably Foreseeable Development Scenario, there would be a total of 83.2 acres of soil disturbance associated with the development of the leases.

Areas with highly sensitive fragile soils on slopes greater than 40% have an NSO stipulation (UT-S-97). This would reduce potential impacts to soils by eliminating surface disturbance in areas most prone to erosion. Leases with slopes of 20% to 40% have a CSU stipulation (UT-S-101) requiring an approved erosion control strategy and topsoil segregation/restoration plan, further reducing potential impacts to soils (Table 3-3).

Table 3-3. Soil Slopes in the Lease Area

Lease	Acres of Slopes < 20%	Acres of Slopes 20%–40%	Acres of Slopes > 40%
UTU93466	1,964.38	2.63	–
UTU93468	1,911.78	–	–
UTU93469	1,916.65	0.31	–
UTU93470	1,918.26	–	–
UTU93471	1,945.54	–	–
UTU93472	2,554.98	–	–
UTU93473	1,914.94	2.38	–
UTU93474	2,556.08	0.10	–
UTU93475	1,850.31	71.38	45.64
UTU93476	1,895.08	50.04	24.28
UTU93477	1,948.99	53.31	13.67
UTU93478	1,311.48	6.36	–
UTU93479	2,557.45	0.25	–
UTU93480	1,918.34	0.18	–
UTU93481	2,552.07	–	–
UTU93482	1,911.78	6.12	0.21
UTU93483	2,557.41	0.01	–
UTU93484	1,916.62	–	–
UTU93485	1,947.03	4.07	–
UTU93486	1,946.91	0.79	–

Lease	Acres of Slopes < 20%	Acres of Slopes 20%–40%	Acres of Slopes > 40%
UTU93487	1,977.59	1.68	–
UTU93489	2,395.61	22.49	21.80
UTU93491	2,474.05	41.95	0.21
UTU93492	1,191.25	242.13	165.71
UTU93493	2,296.41	118.50	43.79
UTU93494	1,870.42	9.13	–
UTU93495	1,958.64	12.96	0.09
UTU93496	1,950.87	15.13	0.25
UTU93497	1,989.18	14.94	1.12
UTU93498	1,299.12	20.46	3.72
UTU93499	2,550.83	6.22	–
UTU93500	1,866.85	28.88	22.11
UTU93501	2,550.14	–	–
UTU93502	1,908.92	8.21	0.10
UTU93503	2,556.38	0.29	–
UTU93504	1,906.69	8.19	1.60
UTU93505	1,945.32	5.33	–
UTU93506	1,948.62	2.78	–
UTU93507	1,981.92	0.31	–
UTU93508	1,234.47	2.41	–
UTU93509	2,213.98	240.24	102.22
UTU93510	1,842.14	72.10	4.06
UTU93511	2,477.85	13.12	–
UTU93512	1,578.38	227.35	111.22
UTU93513	2,241.61	248.12	67.58
UTU93514	1,791.23	60.33	3.88
UTU93518	1,320.68	–	–
UTU93519	2,547.04	9.33	0.35
UTU93520	1,862.72	52.63	1.19
UTU93521	2,508.58	35.62	9.05
UTU93523	2,543.49	11.68	–
UTU93524	1,855.79	58.70	2.64
UTU93525	1,874.18	0.23	–
UTU93526	2,467.58	1.20	–

Lease	Acres of Slopes < 20%	Acres of Slopes 20%–40%	Acres of Slopes > 40%
UTU93527	2,421.94	4.69	–
UTU93530	2,467.94	43.63	4.45
Grand Total	**118,579.39**	**2,207.69**	**761.91**

Should the proposed development of leases occur, additional site-specific analysis would be required. It is expected that reclamation procedures would be required to ensure long-term impacts to soils are minimized. Reclamation procedures would include re-vegetation (utilizing appropriate seed mixes based on the ecological site, elevation, and topography), topsoil preservation, road reclamation, and noxious weed controls. SOPs, BMPs, and site-specific design features including reclamation will be applied as COAs at the APD stage. Protection of physical and biological soil health would be further analyzed in additional site-specific NEPA at the APD stage when site specific details are known; therefore, no additional detailed analysis for leasing is required at this time.

Lease Stipulations:

UT-S-97 *Fragile Soils/Slopes for Slopes Greater Than 40%* is attached to all leases.

UT-S-101 *CSU – Fragile Soils/Slopes 20%–40%* is attached to all leases.

AIB-8 Vegetation

General Vegetation

How would potential development of the leases affect general vegetation?

Although leasing itself does not cause any ground disturbing activities, the potential for future development of any subsequently issued lease could result in new surface disturbance, increased erosion, and potential loss of vegetation within the 59 leases. The 59 leases cover a total of 121,679.70 acres. For any proposed future developments, site-specific NEPA analysis would be conducted to identify and mitigate impacts to the USFWS Area of Influence (AOI) and BLM sensitive plant species described in the section below. Table 3-4 provides the acreage of the different ecological systems or land cover types within the leases (Lowry et al. 2005).

Table 3-4. Vegetation Types and Acreage

Land Cover Types	Acres in Lease Area	Acres in HUC-10 Watershed
Colorado Plateau Blackbrush–Mormon tea Shrubland	60,804.44	402,593.75
Colorado Plateau Mixed Bedrock Canyon and Tableland	4,576.97	253,980.35
Colorado Plateau Pinyon-Juniper Shrubland	737.69	68,604.46
Colorado Plateau Pinyon-Juniper Woodland	149.93	26,417.91
Inter-Mountain Basins Active and Stabilized Dune	30,395.34	151,459.16
Inter-Mountain Basins Big Sagebrush Shrubland	33.68	22,159.87
Inter-Mountain Basins Greasewood Flat	5.7	18.530.39

Land Cover Types	Acres in Lease Area	Acres in HUC-10 Watershed
Inter-Mountain Basins Mat Saltbush Shrubland	30.46	85,378.10
Inter-Mountain Basins Mixed Salt Desert Scrub	216.23	34,554.40
Inter-Mountain Basins Semi-Desert Grassland	10,333.35	33,260.84
Inter-Mountain Basins Semi-Desert Shrub Steppe	3,203.82	37,690.05
Inter-Mountain Basins Shale Badland	30.61	47,099.73
Invasive Annual and Biennial Forbland	178.76	4,589.74
Invasive Southwest Riparian Woodland and Shrubland	42.25	13,497.27
Open Water	5.15	4,754.52
Rocky Mountain Lower Montane Riparian Woodland and Shrubland	19.98	2000.30
Southern Colorado Plateau Sand Shrubland	10,784.61	42,622.31
Total acreage	**121,548.97**	**1,230,662.76**

Source: Southwest Regional Gap Analysis Project (Lowry et al. 2005).

Note: Due to variability in GIS data, approximately 130.7 acres of the 59 leases was not covered by land cover mapping.

Based on the acreage of wetlands within the leases in comparison to the HUC-10 watershed, significant impacts are not anticipated. After leasing has occurred, there is an expectation that exploration or development could occur, should the lessee submit an APD. Any activity that involves surface disturbance or direct resource impacts would only be authorized following a site-specific NEPA analysis. Any applicable lease stipulations and notices were provided to the buyers prior to the sale, which allows for the opportunity to adjust at the site-specific level and ensures impacts will be addressed. Reclamation provisions and procedures including re-vegetation (using appropriate seed mix based on a site's ecology, elevation, and topography) would be a part of the APD analysis. Future development proposals on the leases would be subject to the standard lease terms, and all applicable laws, regulations, and Onshore Orders in existence at the time of lease issuance.

Special Status Plant Species

How would potential development of the leases affect BLM sensitive or federally listed plant species?

Within the leases there are four BLM sensitive plant species with potential habitat and four federally listed species with potential habitat; the species and corresponding leases on which potential habitat is present are listed below. The applicable lease stipulations and notices serve to mitigate or avoid potential impacts to designated plant species. Buyers were notified of lease notices and the presence of threatened and endangered plant species prior to the time of sale. Additionally, the lease notices provide notice of the standard avoidance and minimization measures that will be expected during the development stage. Additional site-specific analysis, including the development of additional site-specific minimization measures, would be conducted when an APD is received.

While leasing does not generate direct impacts, it is expected that exploration or development could occur and result in impacts to plant community structures, species composition, and extent of native habitat types. To account for the potential discovery of populations of plant species that are either currently listed or that may be listed in the future, Lease Notice T&E-5 *Listed Plant Species* and Stipulation HQ-TES-1: Threatened & Endangered Species Act is attached to all leases. Additional site-specific investigations and potential mitigation measures would be analyzed at the APD stage. The BLM may also require

modifications to or disapprove of a proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat (see Appendices B and C).

Currently, the BLM has received and approved APDs for helium production on three of the 59 leases UTU93475, UTU93476, and UTU93479. Construction of the proposed facilities would modify community structure, species composition, and extent of cover types on approximately 14 acres of native vegetation until reclamation is complete. In most cases, this means returning the land to a condition approximate or equal to that which existed prior to the disturbance. The lessee/operator shall provide a reclamation plan prior to construction in order to achieve successful reclamation in the future. Reclamation is required of any disturbed surface that is not necessary for continued production operations. Additional reclamation measures may be required based on existing conditions at the time of final abandonment. The lessee/operator would minimize disturbance to vegetative communities by including the placement of well pads in flat topography to minimize cuts and fills, closed-loop drilling to minimize pad size, rig matting to minimize compaction of soils for better reclamation, and interim and final reclamation to minimize vegetative community disturbance length of time (BLM 2021d). The following lease stipulations and notices are attached to these leases to avoid and minimize impacts to special-status plant species:

- HQ-TES-1: Threatened & Endangered Species Act
- UT-LN-49: Utah Sensitive Species
- UT-LN-51: Special Status Plants: Not Federally Listed
- T&E-5: Listed Plant Species
- T&E-13: Barneby Reed-Mustard (*Schoenocrambe barnebyi*)
- T&E-17: San Rafael Cactus (*Pediocactus despainii*)
- T&E-19: Jones Cycladenia (*Cycladenia humilis var. jonesii*)

BLM and Utah Sensitive Plant Species

GIS reviews have identified that potential habitat of four BLM sensitive species are present on 22 leases, as described below. However, the leases have not been thoroughly surveyed for BLM sensitive plant species. Project development and activities could impact sensitive species by loss of habitat or individual plant species. However, with lease stipulation HQ-TES-1, which applies to all leases, the BLM would not approve any ground-disturbing activity that may affect listed species or critical habitat until it completes its obligations under the applicable requirements of the ESA. The BLM may also require modifications to or disapprove of a proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed plant species or the destruction or adverse modification of a designated or proposed critical habitat. Applying the identified T&E lease notices—which were developed through formal ESA Section 7 consultation with the USFWS during development of the applicable land use plan—would mitigate potential impacts from mineral development on the leases and adjacent lands.

Project development and activities could impact sensitive plant species by loss of habitat or individual plant species. Lease Notice T&E-5 Listed Plant Species is attached to all leases and requires site inventories to be completed to determine habitat suitability or the presence of plant species. Additional lease stipulations and notices impose avoidance and minimization measures for BLM and Utah sensitive plant species: LN-49, LN-51, and T&E-5. These lease notices notify the lessee/operator that potential habitat exists within the lease lands that may require siting modifications and mitigation measures to avoid and minimize impacts to BLM sensitive plant species. Strategies for avoidance and minimizing impacts include but are not limited to modification to siting or design of facilities, timing of operations,

and specification of interim and final reclamation measures. BLM regulations at 43 CFR 3101.1-2 allow for the relocation of proposed oil and gas leasing operations up to 200 m and/or timing limitations up to 60 days in order to provide additional protection, ensuring that proposed operations minimize adverse impacts to resources, uses, and users. The full text and details of the lease stipulations and lease notices are provided in Appendix C.

Implementation of avoidance and mitigation measures are not anticipated to fully avoid impacts, and loss of individuals and habitats is still possible based on the RFDS.

Smith's wild buckwheat (*Eriogonum smithii*) has potential habitat located in the following leases: UTU93472, UTU93473, UTU93485, UTU93489, UTU93491, UTU93492, UTU93493, UTU93494, UTU93504, UTU93507, UTU93508, UTU93509, UTU93510, UTU93511, UTU93512, UTU93513, and UTU93514.

Entrada rushpink (*Lygodesmia grandiflora* var. *entrada*) has potential habitat located in the following leases: UTU93469, UTU93475, UTU93479, and UTU93501.

Paria spurge (*Euphorbia nephradenia*) has potential habitat located in the following leases: UTU93470, UTU93492, UTU93513, and UTU93514.

Additional current or future BLM sensitive plant species may be present within the leases. Therefore, additional site-specific analysis is necessary during APD review.

Lease Notices:

UT-LN-49 *Utah Sensitive Species* is attached to all leases (see Appendices B and C).

UT-LN-51 *Special Status Plants: Not Federally Listed* is attached to all leases (see Appendices B and C). Modifications to the surface use plan of operations may be required in order to protect the special status plants and/or habitat from surface disturbing activities in accordance with Section 6 of the lease terms, Endangered Species Act, and 43 CFR 3101.1-2.

Federally Listed Plant Species

The USFWS AOI modeled habitat data were reviewed in September 2023. There is potential habitat for five federally listed plant species located within the leases and the USFWS AOI, as described below.

Barneby reed-mustard (*Schoenocrambe barnebyi*) intersects the USFWS AOI in the following leases: UTU93468, UTU93469, UTU93470, UTU93471, UTU93472, UTU93473, UTU93474, UTU93477, UTU93478, and UTU93481. Additionally, modeled habitat outside the current USFWS AOI is found in leases UTU93466, UTU93473, UTU93474, UTU93477, and UTU93478.

San Rafael cactus (*Pediocactus despainii*) intersects the USFWS AOI in the following leases: UTU93466, UTU93468, UTU93470, UTU93473, UTU93474, UTU93475, UTU93476, UTU93478, UTU93479, UTU93480, UTU93481, UTU93482, UTU93484, UTU93489, UTU93495, UTU93496, UTU93497, UTU93498, UTU93499, UTU93500, UTU93501, UTU93502, UTU93503, UTU93504, UTU93506, UTU93507, UTU93508, UTU93511, UTU93518, UTU93519, UTU93520, UTU93521, UTU93523, and UTU93524.

Jones cycladenia (*Cycladenia humilis* var. *jonesii*) intersects the USFWS AOI in the following leases: UTU93466, UTU93468, UTU93474, UTU93534, and UTU93713. Additionally, modeled habitat outside the current USFWS AOI is found in leases UTU93466 and UTU93474.

Navajo sedge (*Carex specuicola*) intersects the USFWS AOI in Lease UTU93474. Additionally, modeled habitat outside the current USFWS AOI is found in Lease UTU93713.

Ute ladies'-tresses (*Spiranthes diluvialis*) intersects the USFWS AOI in the following leases: UTU93490, UTU93492, UTU93493, UTU93512, UTU93513, UTU93514, and UTU93519. However, there are no wetlands present both within these leases or in the AOI that could support Ute ladies'-tresses. Therefore, there is no potential habitat for the species within the leases.

Project development and activities could impact plant species by contributing to the loss of habitat or individual plant species. There is a potential for the loss of individuals and habitat based on the RFDS. The lease stipulations and lease notice aim to reduce impacts by modifying the siting and/or the timing of activities. HQ-TES-1 serves to provide the BLM with the authority to require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. The BLM would not approve any ground-disturbing activity until it completes its obligations under applicable requirements of the ESA as amended (16 USC 1531 et seq.), including completion of any required procedure for conference or consultation. BLM regulations at 43 CFR 3101.1-2 allow for the relocation of proposed oil and gas leasing operations up to 200 m and/or timing limitations up to 60 days in order to provide additional protection, ensuring that proposed operations minimize adverse impacts to resources, uses, and users. Additionally, Lease Notice T&E-5 *Listed Plant Species* is attached to all leases and requires site inventories to be completed to determine habitat suitability or the presence of plant species. Table 3-5 displays the acreage of potential habitat for federally protected plant species within the leases.

Table 3-5. Acres of Potential Habitat for Federally Protected Plant Species

Leases	*Carex specuicola*	*Cycladenia humilis* var. *jonesii*	*Pediocactus despainii*	*Schoenocrambe barnebyi*	Total Acres of all Species within Each Parcel
UTU93466		217.31	1,006.52	0.01	1,223.84
UTU93468			411.67		411.67
UTU93470			1.42		1.42
UTU93473			94.72	25.87	120.59
UTU93474		374.67	2,022.22	0.24	2,397.13
UTU93475			1,907.39		1,907.39
UTU93476			1,905.64		1,905.64
UTU93477			1,863.82	49.22	1,913.04
UTU93478			894.01	279.49	1,173.50
UTU93479			2,209.64		2,209.64
UTU93480			447.03		447.03
UTU93481			2,082.49		2,082.49
UTU93482			583.08		583.08
UTU93484			49.76		49.76
UTU93485			125.48		125.48

Leases	*Carex specuicola*	*Cycladenia humilis* var. *jonesii*	*Pediocactus despainii*	*Schoenocrambe barnebyi*	Total Acres of all Species within Each Parcel
UTU93489			83.47		83.47
UTU93495			1,971.70		1,971.70
UTU93496			1,966.26		1,966.26
UTU93497			2,005.24		2,005.24
UTU93498			1,323.30		1,323.30
UTU93499			2,372.52		2,372.52
UTU93500			1,904.51		1,904.51
UTU93501			2,477.38		2,477.38
UTU93502			963.23		963.23
UTU93503			1,610.14		1,610.14
UTU93504			1,666.63		1,666.63
UTU93506			787.51		787.51
UTU93507			1,282.83		1,282.83
UTU93508			595.23		595.23
UTU93511			1,416.07		1,416.07
UTU93518			1,308.74		1,308.74
UTU93519			846.85		846.85
UTU93520			1,685.84		1,685.84
UTU93521			396.60		396.60
UTU93523			1,237.08		1,237.08
UTU93524			0.27		0.27
UTU93534		320.71	167.70		488.41
UTU93713	1,269.49	2.48			1,271.97
Total acres	**1,269.49**	**915.16**	**43,673.99**	**354.84**	**46,213.48**

Lease Notices:

UT-LN-126 *Navajo sedge* is attached to UTU93713.

T&E-5 *Listed Plant Species* is attached to all leases.

T&E-13 *Barneby Reed-Mustard* is attached to UTU93468, UTU93469, UTU93470, UTU93471, UTU93472, UTU93473, UTU93474, UTU93475, UTU93476, UTU93477, UTU93478, UTU93481, UTU93496, and UTU93497.

T&E-17 *San Rafael Cactus* is attached to UTU93466, UTU93468, UTU93473, UTU93474, UTU03475, UTU03476, UTU93477, UTU93478, UTU93479, UTU93480, UTU93481, UTU93482, UTU93484, UTU93485, UTU93489, UTU93495, UTU93496, UTU93497, UTU93498, UTU93499, and UTU93500.

T&E-19 *Jones Cycladenia* is attached to all leases except for UTU93483 and UTU93525.

T&E-22 *Ute ladies'-tresses* is attached to UTU93713.

Lease Stipulations:

HQ-TES-1 *Threatened & Endangered Species Act* is attached to all leases.

Invasive Species/Noxious Weeds

How would potential development of the leases contribute to the spread of invasive species and noxious weeds?

On February 3, 1999, President Clinton issued EO 13112 establishing the National Invasive Species Council. EO 13112 requires federal agencies to promote activities in a manner that avoids the introduction and spread of invasive species. Invasive species affect the native plant and animal communities. While leasing does not generate any direct impacts to invasive or noxious weed species, future surface-disturbing activities have the potential to introduce and spread invasive species and noxious weeds. In 1996, the BLM created *Partners Against Weeds: An Action Plan for the Bureau of Land Management* (BLM 1996), which provides strategies to prevent and control the spread of noxious weeds. Furthermore, additional control and procedural information is documented in the 2007 Programmatic EIS and its Record of Decision: *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States* (BLM 2007). BLM's implementation of elements of these plans can be a resource for developing mitigation measures and would help mitigate the spread of invasive species and noxious weeds during future developments.

Noxious and invasive weed species may be present on the leases. Known noxious weeds present in Emery County, Utah, that may be present on the leases include Russian olive (*Elaeagnus angustifolia*), oxeye daisy (*Leucanthemum vulgare*), black henbane (*Hyoscyamus niger*), musk thistle (*Carduus nutans*), perennial pepperweed (*Lepidium latifolium*), poison hemlock (*Conium maculatum*), puncturevine (*Tribulus terrestris*), Russian knapweed (*Acroptilon repens*), jointed goatgrass (*Aegilops cylindrica*), saltcedar (*Tamarix ramosissima*), scotch thistle (*Onopordum acanthium*), and houndstongue (*Cynoglossum officinale*) (Lowry et al. 2017). The BLM coordinates with county and local governments to conduct a program for the control of invasive species.

The lessee/operator is given notice that lands in this lease have been identified as containing or are near areas containing noxious weeds. Soil disturbance from development is an example of a potential increase in the establishment of new noxious and invasive weed populations. All disturbed areas and piles of topsoil would be reseeded with weed-free native seed mix, where preferable, the first fall after the disturbance is made to provide competition against weeds. In some instances, non-native seed can be useful for reclamation. UT-LN-52 *Noxious Weeds* is attached to all leases and would require the operator to implement measures to mitigate the spread of invasive species and noxious weeds.

Other procedures, such as requiring the use of certified weed-free seed, herbicide application, and vehicle/equipment wash stations, would be applied as necessary at the APD stage. Additional control measures and treatment would be implemented during any ground disturbing activity and as part of regular operations. BMPs, SOPs, and site-specific mitigation may be applied at the APD stage as COAs. SOP and mitigation measures for vegetation treatment, herbicide use, and prevention measures for

noxious and invasive plants are identified in the Record of Decision and Programmatic EIS, *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States* and other associated documents. These expectations are required for all leases. Negligible impacts would be expected to result from leasing and exploration.

Lease Notices:

UT-LN-52 *Noxious Weeds* is attached to all leases.

Lease Stipulations:

UT-S-305 *CSU Noxious Weed* is attached to all leases.

AIB-9 Woodland/Forestry

How would potential development of the leases affect woodlands and forest resources?

Scattered sparse woodlands exist within 14 leases, but not in quantities sufficient to establish public harvest areas. The leases and acreage of woodland habitats are listed below. There are no other special designations, such as natural areas, research natural areas, or outstanding natural areas, within the leases. The leases are within Ecoregion 20 – Colorado Plateaus, which is characterized by benches, mesas, buttes, salt valleys, cliffs, and canyons that are formed in and underlain by thick layers of sedimentary rock. Pinyon-juniper woodlands dominate higher elevations. Exploration or development would not limit use or access to any established wood sale areas. BMPs, SOPs, and site-specific mitigation may be applied at the APD stage as COAs. As per the BLM Utah Permanent Instruction Memorandum No. UTIM-2022-005, in accordance with 43 CFR8365.1-5, no permit or contract is required for a reasonable amount of personal, non-commercial, recreation-related uses of conifer and native seeds, boughs, greenery, flowers, fuelwood, and other forest products. Table 3-6 provides the acreage of woodland vegetation by habitat type and lease.

Table 3-6. Woodland Vegetation and Acreage by Lease

Lease	Woodland Habitats	Acres
UTU93475	Invasive Southwest Riparian Woodland and Shrubland	8.59
UTU93477	Rocky Mountain Lower Montane Riparian Woodland and Shrubland	1.25
UTU93478	Rocky Mountain Lower Montane Riparian Woodland and Shrubland	5.87
UTU93491	Colorado Plateau Pinyon-Juniper Woodland	1.56
UTU93492	Colorado Plateau Pinyon-Juniper Woodland	9.78
	Rocky Mountain Lower Montane Riparian Woodland and Shrubland	2.45
UTU93493	Colorado Plateau Pinyon-Juniper Woodland	108.53
	Rocky Mountain Lower Montane Riparian Woodland and Shrubland	9.34
UTU93495	Invasive Southwest Riparian Woodland and Shrubland	0.74
UTU93498	Invasive Southwest Riparian Woodland and Shrubland	1.20
UTU93506	Colorado Plateau Pinyon-Juniper Woodland	0.89
UTU93509	Colorado Plateau Pinyon-Juniper Woodland	6.97

Lease	Woodland Habitats	Acres
UTU93512	Colorado Plateau Pinyon-Juniper Woodland	13.05
UTU93513	Colorado Plateau Pinyon-Juniper Woodland	4.46
UTU93533	Colorado Plateau Pinyon-Juniper Woodland	4.70
UTU93534	Invasive Southwest Riparian Woodland and Shrubland	31.72
	Rocky Mountain Lower Montane Riparian Woodland and Shrubland	1.08
Total acreage		**212.16**

Source: Southwest Regional Gap Analysis Project (Lowry et al. 2005).

Surface disturbance associated with development of the leases may temporarily remove some forested or woodland surface vegetation within or adjacent to the leases. Impacts would be analyzed when an APD is submitted. Some impacts that could be expected at the APD level include the potential removal of forested or woodland surface vegetation within the well pad area and any needed access roads. However, given the small amount of woodland habitat on the 14 leases (less than 4%), it is likely that woodland habitat could be avoided through application of standard terms and conditions and siting. Lease UTU93493 has the most woodland habitat as compared to the other 13 leases. Measures such as implementing BMPs, proper reclamation, design features, stipulations, and restoration would be utilized to minimize impacts. After any wells are plugged and abandoned, revegetation would be needed to alleviate any identified impacts and to reduce the risk of infestation of weed species. Full revegetation can take between 60 to 90 years for these woodland species.

AIB-10 Wetlands/Riparian Zones

How would potential development of the leases impact wetlands and riparian zones?

Riparian and wetland areas may be present in all leases. According to the USFWS National Wetland Inventory (NWI), one freshwater pond, two rivers, palustrine wetlands, and intermittent streams exist within 5 miles of some leases: Leases UTU93495 and UTU93518 are within 5 miles of the San Rafael River. Lease UTU93519 is within 5 miles of the Green River, and Leases UTU93713 and UTU93534 are within 3 miles of the Green River. UTU93534 is also within 1 mile of an unnamed freshwater pond that covers 828.5 acres.

Wetlands documented on the NWI are present within 47 of the 59 leases. Within the leases, there is a total of 559.77 acres of wetlands. Table 3-7 provides the NWI data by the acreage and type of wetlands within the leases.

Table 3-7. National Wetlands Inventory Wetland Data by Lease (Acres)

Leases	L2UBFh*	L2USCh†	PEM1A‡	PSS1B∞	PSS1Ch§	PUBFx¶	PUSAx±	PUSE**	R4SBC††	R4SBJ‡‡	Total by Lease
UTU93466										13.33	**13.33**
UTU93468										2.24	**2.24**
UTU93469											**0**
UTU93470											**0**
UTU93471											**0**
UTU93472											**0**
UTU93473											**0**
UTU93474										5.66	**5.66**
UTU93475								0.82		15.40	**16.22**
UTU93476										16.22	**16.22**
UTU93477				0.03						24.14	**24.17**
UTU93478				2.91						4.73	**7.64**
UTU93479									0.89		**0.89**
UTU93480											**0**
UTU93481											**0**
UTU93482									8.49		**8.49**
UTU93483									1.93		**1.93**
UTU93484											**0**
UTU93485									5.08		**5.08**
UTU93486									5.54		**5.54**
UTU93487									0.52		**0.52**
UTU93489									27.62		**27.62**

Leases	**L2UBFh***	**L2USCh†**	**PEM1A‡**	**PSS1B∞**	**PSS1Ch§**	**PUBFx¶**	**PUSAx±**	**PUSE****	**R4SBC††**	**R4SBJ‡‡**	**Total by Lease**
UTU93491											**0**
UTU93492									26.02		**26.02**
UTU93493									16.19	0.72	**16.91**
UTU93494									0.66		**0.66**
UTU93495									8.01		**8.01**
UTU93496									1.97		**1.97**
UTU93497										0.22	**0.22**
UTU93498										2.63	**2.63**
UTU93499									2.94		**2.94**
UTU93500									10.01		**10.01**
UTU93501											**0**
UTU93502									0.76		**0.76**
UTU93503									15.46		**15.46**
UTU93504									3.50		**3.50**
UTU93505									14.00		**14.00**
UTU93506									14.17		**14.17**
UTU93507									9.04		**9.04**
UTU93508									5.49		**5.49**
UTU93509									41.63		**41.63**
UTU93510									13.57		**13.57**
UTU93511									27.21		**27.21**
UTU93512									10.94		**10.94**
UTU93513									26.32		**26.32**
UTU93514									30.65		**30.65**

Leases	**L2UBFh***	**L2USCh†**	**PEM1A‡**	**PSS1B∞**	**PSS1Ch§**	**PUBFx¶**	**PUSAx±**	**PUSE****	**R4SBC††**	**R4SBJ‡‡**	**Total by Lease**
UTU93518											**0**
UTU93519										12.13	**12.13**
UTU93520									4.38	2.87	**7.25**
UTU93521									3.08		**3.08**
UTU93523									0.75	1.42	**2.16**
UTU93524											**0**
UTU93525			1.22						0.40	8.52	**10.14**
UTU93526									15.62		**15.62**
UTU93527									3.89		**3.89**
UTU93530									26.06		**26.06**
UTU93533									33.83		**33.83**
UTU93534	19.54	0.69			1.93	0.02	0.55			2.64	**25.36**
UTU93713										2.59	**2.59**
Total by Wetland Type	**19.54**	**0.69**	**1.22**	**2.93**	**1.93**	**0.02**	**0.55**	**0.82**	**416.6**	**115.44**	
Total Acreage of Wetlands within Leases§		**559.77**									

Source: USFWS (2023).

* L2UBFh – Includes all wetlands and deepwater habitats with at least 25% cover of particles smaller than stones (less than 6–7 cm), and a vegetative cover less than 30%. These wetlands have been created or modified by a human-made barrier or dam that obstructs the inflow or outflow of water.

† L2USCh – Includes all wetland habitats having two characteristics: 1) unconsolidated substrates with less than 75% areal cover of stones, boulders, or bedrock; and 2) less than 30% areal cover of vegetation. These wetlands have been created or modified by a human-made barrier or dam that obstructs the inflow or outflow of water.

‡ PEM1A – The palustrine system includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 parts per thousand (ppt). Surface water is present for brief periods (from a few days to a few weeks) during the growing season, but the water table usually lies well below the ground surface for most of the season.

∞ PSS1B – The substrate is saturated at or near the surface for extended periods during the growing season, but unsaturated conditions prevail by the end of the season in most years. Surface water is typically absent but may occur for a few days after heavy rain.

§ PSS1Ch – The palustrine system includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppt. Includes areas dominated by woody vegetation less than 6 m (20 feet) tall. The species include true shrubs, young trees (saplings), and trees or shrubs that are small or stunted because of environmental conditions. These wetlands have been created or modified by a human-made barrier or dam that obstructs the inflow or outflow of water.

¶ PUBFx – The palustrine system includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppt. Includes all wetlands and deepwater habitats with at least 25% cover of particles smaller than stones (less than 6–7 cm), and a vegetative cover less than 30%. This modifier is used to identify wetland basins or channels that were excavated by humans.

± PUSAx – The palustrine system includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppt. Includes all wetland habitats having two characteristics: 1) unconsolidated substrates with less than 75% areal cover of stones, boulders, or bedrock; and 2) less than 30%areal cover of vegetation. This modifier is used to identify wetland basins or channels that were excavated by humans.

** PUSE – The palustrine system includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppt. Includes all wetland habitats having two characteristics: 1) unconsolidated substrates with less than 75% areal cover of stones, boulders, or bedrock; and 2) less than 30% areal cover of vegetation. Surface water is present for extended periods (generally for more than a month) during the growing season but is absent by the end of the season in most years. When surface water is absent, the substrate typically remains saturated at or near the surface.

†† R4SBJ – The riverine system includes intermittent streambeds with intermittent flooding.

‡‡ R4SBC – The intermittent riverine system includes streambed wetlands include channels in the estuarine system, intermittent portions of the riverine system, and all tidal channels of the riverine system that are completely dewatered at low tide. This wetland is seasonally flooded with surface water present for extended periods during the growing season but absent by the end of the season in most years. When surface water is absent, the depth to substrate saturation may vary considerably among sites and among years.

§§ Total acreage of wetlands within 48 leases. Leases relinquished by an agreement between North American Helium and SUWA are not included in the wetlands analysis.

Although leasing itself does not cause direct impacts to wetlands or riparian zones, surface disturbance associated with potential future development of the leases may impact the riparian and wetlands areas on or adjacent to the leases. Detailed impacts of the proposed developments cannot be addressed until site specific operations are proposed and the applicable water sources are analyzed.

If wells or other developments are proposed on the leases at a future time, impacts would be analyzed on a case-by-case basis when an APD is submitted. Thus, Stipulation UT-S-127 *NSO – Intermittent and Perennial Streams* and Lease Notice UT-LN-128 *Floodplain Management* are attached to all leases. Stipulation UT-S-127 specifies that no new surface disturbance (excluding fence lines) will be allowed in areas within the 100-year floodplain or 100 meters (330 feet) on either side from the centerline, whichever is greater, along all perennial and intermittent streams, streams with perennial reaches, and riparian areas.

Prior to approving an APD, hydrologic and engineering reviews would be conducted on all proposed down-hole activities, including hydraulic fracturing (if proposed). BLM will analyze future proposals associated with leases under additional site-specific NEPA and may apply any additional requirements as necessary to protect wetland and riparian areas within the vicinity of the leases at the APD stage. Lease Notice UT-LN-53, *Riparian Areas*, is applied to all leases to reduce impacts to wetlands/riparian zones by providing a buffer along the riparian corridor of NSO.

Any proposed developments on leases would be subject to the standard lease terms and all applicable laws, regulations, and Onshore Orders in existence at the time of lease issuance. The conditions, stipulations, and notices applied to floodplain and riparian resources would protect surface water resources.

Lease Notices:

UT-LN-128 *Floodplain Management* is attached to all leases.

UT-LN-53 *Riparian Areas* is attached to all leases.

Lease Stipulations:

UT-S-127 *NSO – Intermittent and Perennial Streams* is attached to all leases.

AIB-11 Wildlife

How would potential development of the leases impact wildlife species?

Non-designated Species (including invasive species)

Although leasing alone does not authorize surface disturbance that could impact wildlife, surface disturbance associated with future development of the leases may impact wildlife species. The BLM expects that under the RFDS there would be direct impacts to a maximum of 83.2 acres across the lease area under Alternative A. Oil and gas development is considered a level 3 threat to wildlife conservation targets as defined in Utah's Wildlife Action Plan (Utah Division of Wildlife Resources [UDWR] 2015). Level 3 threats comprise of specific categories of possible threats under broader Level 1 and Level 2 threats. Level 3 threats are also those where conservation actions can be most readily applicable. BLM may apply additional measures to protect wildlife species and their habitat within the vicinity of the leases at the APD stage in corroboration with the themes and objectives of the 2023 UDWR Strategic Plan (UDWR 2023). Analysis of site-specific impacts would consider the quantity and location of modeled and critical habitat. During the APD stage, BLM has limits on the constraints they can enforce for a potential applicant.

It is likely that short term impacts would occur during the construction and operation phases due to the presence of humans. Impacts would likely consist of effects to the soundscape from anthropogenic noise, and the disturbance of habitat. Some short-term impacts could also occur during initial phases of reclamation, including noise and temporary habitat loss but would be expected to subside following complete site reclamation. Future restoration projects in nearby areas, along with previously completed habitat restoration projects, could help offset any disturbance to wildlife habitat. Additionally, pre-disturbance surveys would be required depending on the timing, species, and habitats covered in an APD at the time of proposed development in accordance with standard terms and conditions of the lease. Surveys would inform the analysis of potential impacts on game and non-game species and their habitat. Avoidance, minimization, and mitigation measures would also be determined at the time of the APD. The BLM has the authority to attach COAs at the site-specific level to minimize significant adverse effects on resource values at the time operations are proposed.

Examples of potential mitigation measures include design modifications to avoid or minimize effects to sensitive habitats, limiting the number of well pads under simultaneous construction, seasonal restrictions, limiting the number of proposed roads, reclaiming old and/or unnecessary roads, minimizing truck traffic, noise-buffering measures, pre-development surveys, or use of special construction techniques to minimize surface disturbance to sensitive areas.

Lease UTU93534 has modeled habitat or is within 0.5 miles of modeled mule deer (*Odocoileus hemionus*) habitat. This lease contains a riparian zone and therefore Stipulation UT-S-127 *NSO – Intermittent and Perennial Streams* is applied to the riparian portion of the lease. This stipulation would protect riparian habitat from disturbance and, in doing so, would also minimize disturbance to mule deer habitat in the lease area.

All leases contain year-long crucial pronghorn (*Antilocapra americana*) habitat except for UTU93534. The leases are located within the UDWR San Rafael Desert big game management unit and the San Rafael Desert North big game management unit. Population estimates produced by the DWR suggest that in 2017, the San Rafael Desert management unit contained approximately 270 pronghorn, and the San Rafael North management unit contained approximately 1,040 pronghorn. (UDWR 2017). Together, the San Rafael Desert and San Rafael Desert North comprise 4,090,451 acres; therefore, the 83.2 potential acres of disturbance based on the RFD are unlikely to cause a significant reduction in useable habitat for this wide-ranging species.

Lease Notices:

None.

Lease Stipulations:

UT-S-127 *NSO – Intermittent and Perennial Streams* is attached to all leases.

BLM Sensitive and Federally Listed Species

BLM will analyze future proposals associated with leases under additional site-specific NEPA and may apply additional measures as necessary to protect designated species and their habitat within the vicinity of the leases at the APD stage. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will continue to consult with the USFWS for listed species. BLM will not approve any ground-disturbing activity until it completes its obligations under applicable requirements of the ESA, including completion of any required procedure for conference or consultation. If lease development would result in

significant impacts, even after notices, stipulations, and other mitigation measures are developed at the APD stage, an EIS would be required.

BLM Sensitive Species

There is potential habitat for five BLM sensitive species: 1) Townsend's big-eared bat (*Corynorhinus townsendii*), 2) monarch butterfly (*Danaus plexippus*), 3) kit fox (*Vulpes macrotis*), 4) white-tailed prairie dog (*Cynomys leucurus*), and 5) burrowing owl (*Athene cunicularia*) within the leasing area.

White-tailed prairie dog populations have remained relatively stable within their historic range since survey efforts in 2008 and were found not warranting ESA listing in 2010. There is some evidence that species abundance has declined due to control efforts and disease (UDWR 2015).

The individual home ranges of kit fox (*Vulpes macrotis*) in Utah are amongst the largest reported and have increased in the last decade, indicating a potential decline in population abundance (UWDR 2015). The 2014 habitat model for kit fox indicates a high probability of kit fox occurrence within all leases; and all leases were shown to have "good" or "very good" habitat (Crane 2023). Quality determinations for kit fox habitat were defined using ecological integrity indicator rankings developed by the UDWR and applied to the leasing area (Oliver and Tuhy 2010). However, no known kit fox dens have been observed on any of the leases, and the BLM has no recorded sightings within the leasing area. The closest kit fox sighting was located 1.38 miles from lease UTU 93534 (Kaitchuck 2023). Should additional sightings occur, Lease Notice UT-LN-49 *Utah Sensitive Species* is attached to all leases to mitigate impacts to kit fox.

Burrowing owl observations have been made on two leases (UTU93470 and UTU93520) and initial models indicate potential habitat is present on all leases; therefore, lease notice UT-LN-104 is attached to all leases to mitigate impacts to or protect the burrowing owl and/or its habitat from surface-disturbing activities. Population estimates by the UDWR suggest the burrowing owl population, despite imprecision, is increasing by 0.24%. However, distribution constriction of the species has been documented throughout the northern and eastern portions of the habitat range (UDWR 2015).

Additionally, potential habitat for Townsend's big-eared bat (*Corynorhinus townsendii*) can be found within all leases, but no populations are known to occur. The closest mine that could house bats is located 1.5 miles from lease UTU93474. One lease, UTU93713, contains suitable modeled habitat for Townsend's big-eared bat.

Potential habitat for monarch butterfly (*Danaus plexippus*) exists within all leases. Lease Notice UT-LN-156 *Pollinators and Pollinator Habitat* is attached to all leases, which requires avoiding disturbance to important pollinator plant species (such as milkweed) as well as minimizing pesticides that may harm pollinator habitat.

UT-LN-25: *White-tailed and Gunnison Prairie Dog* is attached to all leases advising the lessee that the lease contains white-tailed or Gunnison prairie dog habitat and that modifications to the surface use plan of operations may be required to protect these species from surface-disturbing activities. Lease Notice UT-LN-104 *Burrowing Owl* habitat is attached to all leases advising the lessee that the lease may contain Burrowing Owl habitat. Additionally, Lease Notice UT-LN-49 *Utah Sensitive Species* is attached to all leases. All lease notices will protect the species and their habitat during development and operations of leases through a combination of site plan design to avoid dens, nests, or roosts, buffers/setbacks from dens or nests during the birth and rearing of young.

Site-specific surveys for BLM sensitive species would be conducted at the time an APD is submitted, and stipulations would be added in the form of BMPs, lease notices, stipulations, or other measures as

necessary to protect species habitat. If lease development would still result in significant impacts, an EIS would be required at the APD stage.

Lease Notices:

UT-LN-25 *White-tailed and Gunnison Prairie Dog* is attached to all leases.

UT-LN-49 *Utah Sensitive Species* is attached to all leases.

UT-LN-56 *Pollinators and Pollinator Habitat* is attached to all leases.

UT-LN-104 *Burrowing Owl* is attached to all leases.

Lease Stipulations:

None.

Federally Listed Species

No known populations of federally listed animal species are located within the leases. However, four species intersect the USFWS AOI, as described below.

A small population of California condor (*Gymnogyps californianus*) have been established in northern Arizona and southern Utah since 1996 through the release of birds reared in captivity (UDWR 2015). All leases are within this experimental population range and have potential nesting/roosting habitat. There are no known condor nests located within the leases.

Modeled Mexican spotted owl (*Strix occidentalis lucida*) habitat intersects or is within 0.5 mile of the following 41 leases: UTU93471, UTU93472, UTU93474, UTU93475, UTU93476, UTU93477, UTU93478, UTU93482, UTU93485, UTU93489, UTU93491, UTU93492, UTU93493, UTU93495, UTU93496, UTU93497, UTU93498, UTU93499, UTU93500, UTU93501, UTU93502, UTU93503, UTU93504, UTU93505, UTU93508, UTU93509, UTU93510, UTU93511, UTU93512, UTU93513, UTU93514, UTU93519, UTU93520, UTU93521, UTU93523, UTU93524, UTU93527, UTU93530, UTU93533, UTU93534, and UTU93713.

The USFWS AOI for Southwestern willow flycatcher (*Empidonax traillii extimus*) intersects or is within 0.5 mile of the following 25 leases: UTU93485, UTU93486, UTU93489, UTU93495, UTU93496, UTU93499, UTU93500, UTU93501, UTU93502, UTU93503, UTU93504, UTU93505, UTU93506, UTU93507, UTU93509, UTU93510, UTU93511, UTU93512, UTU93513, UTU93514, UTU93518, UTU93519, UTU93520, UTU93534, UTU93713. Of these leases, UTU93495, UTU93505, UTU93506, UTU93509, UTU93510, UTU93512, UTU93519, UTU93534, and UTU93713 intersect or are within 1/2 mile of potential riparian or wetland habitats and will have associated stipulations attached. The only breeding population known to exist in Utah does not intersect with any of the leases (UDWR 2015).

The USFWS AOI for yellow-billed cuckoo (*Coccyzus americanus*) intersects or is within 0.5 mile of the following three leases: UTU93513, UTU93514, and UTU93534. However, only lease UTU93534 has riparian habitat that meets the size requirements to provide suitable habitat for this species.

In accordance with lease stipulation HQ-TES-1, which applies to all of the leases, the BLM would not approve any ground-disturbing activity that may affect listed species or critical habitat until it completes its obligations under the applicable requirements of the ESA. The BLM may also require modifications to or disapprove of a proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species, or to result in the destruction or adverse modification

of a designated or proposed critical habitat. Applying the identified T&E lease notices – which were developed through formal ESA Section 7 consultation with the USFWS during development of the applicable land use plan – would mitigate potential impacts from mineral development on the leases and adjacent lands. The application of the identified lease stipulations and notices to the leases, as well as the requirements outlined in the applicable land use plan, would adequately mitigate potential impacts to listed or candidate T&E species. At the lease development stage, site-specific ESA Section 7 consultation with USFWS would occur as necessary and would take into consideration infrastructure siting, habitat suitability determinations, survey results, and any additional site-specific considerations or avoidance measures.

In addition, all leases include the following lease notices that would protect the species and their habitat from impacts during future development and operations of the leases:

Lease Notices:

HQ-TES-1 *Threatened & Endangered Species Act* is attached to all leases.

T&E-11 *California Condor* is attached to all leases.

T&E-06 *Mexican Spotted Owl* is attached to UTU93471, UTU93472, UTU93474, UTU93475, UTU93476, UTU93477, UTU93478, UTU93482, UTU93485, UTU93489, UTU93491, UTU93492, UTU93493, UTU93495, UTU93496, UTU93497, UTU93498, UTU93499, UTU93500, UTU93501, UTU93502, UTU93503, UTU93504, UTU93505, UTU93508, UTU93509, UTU93510, UTU93511, UTU93512, UTU93513, UTU93514, UTU93519, UTU93520, UTU93521, UTU93523, UTU93524, UTU93527, UTU93530, UTU93533, UTU93534, and UTU93713.

T&E-07 *Southwestern Willow Flycatcher* is attached to UTU93495, UTU93505, UTU93506, UTU93509, UTU93510, UTU93512, UTU93519, UTU93534, and UTU93713.

T&E-27 *Yellow-Billed Cuckoo* is attached to UTU93534.

Lease Stipulations:

UT-S-269 *No Surface Occupancy – Mexican Spotted Owl Nests* is attached to UTU93471, UTU93472, UTU93474, UTU93475, UTU93476, UTU93477, UTU93478, UTU93482, UTU93485, UTU93489, UTU93491, UTU93492, UTU93493, UTU93495, UTU93496, UTU93497, UTU93498, UTU93499, UTU93500, UTU93501, UTU93502, UTU93503, UTU93504, UTU93505, UTU93508, UTU93509, UTU93510, UTU93511, UTU93512, UTU93513, UTU93514, UTU93519, UTU93520, UTU93521, UTU93523, UTU93524, UTU93527, UTU93530, UTU93533, UTU93534, and UTU93713.

Migratory Birds (including raptors)

How would potential development of the leases impact migratory birds?

The Migratory Bird Treaty Act prohibits the taking (i.e., killing, capturing, selling, trading, and transport) of protected migratory birds without prior authorization by the USFWS (16 USC 703-712). In addition, IM 2008-050 (BLM 2008b) requires the BLM to address the potential effects on migratory bird populations and their habitat and implement BMPs to avoid or minimize the impacts. This is executed through measures such as seasonal limitations during nesting seasons, conducting surveys for bird nests, and monitoring populations (BLM 2008b).

Although leasing alone does not cause direct impacts to migratory birds, surface disturbance associated with future development of the leases may impact migratory birds. The BLM would analyze future

proposals associated with leases under additional site-specific NEPA and may apply any additional requirements as necessary to protect designated species and their habitat within the vicinity of the leases at the APD stage. Additionally, for the listed species, the lease notices provide notice of the standard avoidance and minimization measures that will be required during the development stage.

A determination of existing raptor habitat on a lease would occur during the APD stage. Lease Notice UT-LN-44 states that if raptor habitat exists on a lease, surveys will be required to identify any nesting birds (see Appendix B). Lease Notice UT-LN-45 notifies the lessee that surveys for nesting migratory birds may be required during migratory bird breeding season whenever surface disturbance is proposed in association with fluid mineral exploration and development within priority habitats (see Appendix B). Based on these surveys, buffers, and timing, limitations may be applied. There is potential for raptor nest locations and migratory bird breeding habitats within selected leases. Lease notices are added to those leases to reduce any future development's impacts. Burrowing owl burrows have been documented on the corner of the following leases: UTU93482, UTU93504, UTU93507, and UTU93508. Additionally, peregrine falcon (*Falco peregrinus*) nests and Swainson's hawk (*Buteo swainsoni*) observations occur near these same four leases as well.

Lease Notices:

UT-LN-44 *Raptors* is attached to all leases.

UT-LN-45 *Migratory Birds* is attached to all leases.

UT-LN-104 *Burrowing Owl Habitat* is attached to all leases.

AIB-12 Wild Horses and Burros

How would potential development of the leases impact wild horses and burros?

Wild horses (*Equus ferus*) and burros (*Equus africanus asinus*) are managed under the Wild Free-Roaming Horses and Burros Act (WFRHBA) in order to sustain wild horse and burro populations "so as to achieve and maintain a thriving ecological balance" (BLM 2022c).

Under the WFRHBA, the BLM identified herd areas (HA) as places used as habitat by a herd of wild horses or burros at the time the Act was passed. To carry out its duties under this statute, the BLM periodically evaluates each HA to determine whether it has adequate resources to sustain healthy and diverse wild horse and burro populations. The areas that meet these criteria are designated as Herd Management Areas (HMAs), where horses or burros can be viably managed as a component of public lands (BLM 2016). BLM Utah manages 19 wild horse and burro HMAs in the state, covering approximately 2.4 million acres. The combined appropriate management level for all HMAs in Utah is 1,956 animals (BLM 2023a).

The 59 leases are within the Robbers Roost HA for wild horses and burros. This area was previously referred to as the Robbers Roost HMA; however, due to insufficient forage and water to maintain a genetically viable wild horse population, in 2008, the PFO RMP (BLM 2008a) identified this area as a location where the wild horse population would be allowed to decline to zero and thereafter no longer managed it as an HMA. The three designated HMAs named in the PFO RMP: Range Creek HMA, Muddy Creek HMA, and Sinbad HMA are outside the range of the leases.

Leasing alone does not authorize surface disturbance that could impact wild horses and burros. Surface disturbance associated with future development of the leases may impact wild horses and burros, although any wells that are constructed on the leases at a future time would be analyzed for impacts when an APD

is submitted. Short-term impacts would occur during the construction and operation phases due to the presence of humans, noise, and disturbance of habitat. Some short-term impacts could also occur during initial phases of reclamation but would be expected to subside following complete site reclamation. Due to the change in status from a management area to a herd area, and the allowance of the wild horse population to decline to zero, any impacts to wild horses or burros are deemed acceptable because the leasing area is no longer being managed for that resource.

AIB-13 Geology/Mineral Resources/Energy Production

How would potential development on the leases impact geology, mineral resources, and energy production?

Although leasing alone does not cause direct impacts to the geological setting, mineral resources, or energy production, surface disturbance associated with future development of the leases may result in impacts. The BLM would analyze future proposals associated with leases under additional site-specific NEPA and may apply any additional requirements as necessary to reduce geological impacts and collaborate with existing energy production. If oil and gas development occurs, non-renewable natural gas and/or oil would be extracted and delivered to market. Production would result in the irretrievable loss of these resources.

Oil and gas exploration could lead to an increased understanding of the geologic setting if subsurface data obtained through lease operations becomes public record. This information promotes an understanding of mineral resources as well as geologic interpretation. While conflicts could arise between oil and gas operations and other mineral operations, these could generally be mitigated under 43 CFR 3101.1-2 and the standard lease terms where siting and design of facilities may be modified to protect other resources.

Oil and gas development can be managed to avoid or be compatible with the development of other mineral resources. The leases are outside of known Coal Fields and there are no coal leases on or pending applications to lease the federal mineral estate underlying the surface, and no mining claims or Mineral Materials permits exist on any of the leases as of June 14, 2023, so no conflicts exist with the potential development of the oil and gas resources associated with these leases.

Helium-rich gas concentrations have been documented in the San Rafael Desert in central and eastern Utah in several rock types. Much of this helium is located at a depth of about 1,000 feet (Wiseman and Eckels 2020). Minor amounts of carbon dioxide, hydrogen sulfide, and methane are commonly found commingled with helium; in high concentrations, methane can be used on-site for power generation, which would require additional infrastructure, ROWs, and environmental review. The BLM has received APD packages on three leases (lease numbers UTU93475, UTU93476, and UTU93479) for helium production in the Price area. These APDs were approved on September 20, 2023. Continued high prices of helium on the global market may result in more APDs for helium extraction in the area (Wiseman and Eckels 2020).

Oil and gas wells produce a large amount of wastewater (refer to Section 3.3.11, Water Resources, for discussion of anticipated water production); the majority of this water has high salt brine content and must be disposed of in an environmentally safe manner. In Utah, the majority (95%) of this produced water is pumped into Class II injection wells. See Section 3.3.11, Water Resources, for more details about how development will affect water resources.

In certain parts of the country, water injection has caused some induced seismicity in the form of small earthquakes. Two major factors play a role in induced seismicity from water injection: the amount of water being injected and the local geology of the water injection site.

In Utah, most wells are drilled using hydraulic fracturing, and in this technique the majority of flow back water (water originally injected from the surface) is recycled (instead of injected underground) and used in future hydraulic fracturing completions. Therefore, the underground injection of hydraulic fracturing flowback in Utah is very limited and presents little potential for inducing seismicity. Additionally, the geology in Utah is different from that in other states experiencing induced seismicity. The injection zones in Utah are located stratigraphically thousands of feet above the basement rock that may contain large unknown faults. Therefore, it currently appears that induced seismicity from water injection is not a problem in the oil fields of Utah and there has been no reported induced seismicity in Utah attributable to water injected into Class II water disposal wells (personal communication, John Rogers, Utah Division of Oil, Gas and Mining, March 27, 2018).

AIB-14 Lands/Realty

How would potential development of the leases impact lands and realty?

Lands and Realty are discussed in the Price Field Office Proposed Resource Management Plan/Final EIS in terms of lands available for disposal or acquisition, availability of lands for ROWs, designation of utility corridors, and development of alternative energy sources while meeting other resource objectives (BLM 2008c). There are no Section 368 energy corridors or transmission lines which cross any of the leases, but there is one authorized ROW in proximity to six leases on the west edge of the leasing area along Highway 24. The leases closest to the ROW are UTU93466, UTU93468, UTU93469, UTU93471, UTU93472, and UTU93473; however, the ROW does not cross these leases and therefore, no impacts are expected.

At the leasing stage, it would be too speculative to identify the exact impacts on land and realty in the lease development; however, based on a review of relevant mapping and data tools, it is anticipated that lands and realty would not be impacted by the potential development of the 59 leases to the degree requiring detailed analysis in this EA, as these leases would have no effect on property boundaries. Notably, BLM has received and approved APDs for helium extraction on leases UTU93475, UTU93476, and UTU93479.

Any future development of the 59 leases would be subject to any existing land rights and interests (e.g., easements and water rights). Analysis performed at the time an APD is received for a lease would determine the location of any easements and water rights present. Any potential land use conflicts would be resolved via other means, including administrative or legal proceedings. Such resolutions would be independent from this NEPA review process. The leasing stage is not expected to have an impact on existing private and public property interests.

In accordance with WO IM 2011-122 (BLM 2011a), cadastral survey reviews were conducted to verify the legal land descriptions prior to lease issuance. Should development of these leases occur, stone survey monuments may be present and would need to be avoided, as well as any metal cap monuments that may be present. Detailed land surveys may be warranted at the APD stage on a case-by-case basis.

AIB-15 Livestock Grazing

How would potential development of the leases impact livestock grazing?

There are approximately 121,549 acres available for livestock grazing within the leases across seven allotments. All leases are fully encompassed in a grazing allotment. Because rangeland conditions correlate directly with forage health and grazing operations, the BLM manages all allotments for desired conditions of rangeland health. The BLM uses the Standards for Rangeland Health and Guidelines for Grazing Management for BLM Lands in Utah to determine desired conditions and vegetation

management and range improvements (BLM 1997). Range conditions are determined through monitoring, data analysis, and the history of allotments. The BLM predicts that demand for livestock forage and permits will remain stable due to steady demand in the area.

Surface disturbance associated with future development of the leases would involve vegetation removal and changes in forage conditions, altering the grazing availability for livestock in those disturbed areas. Future development of the leases would result in approximately 83.2 acres of new disturbance associated with reasonably foreseeable environmental trends and planned actions.

Reclamation provisions and procedures, including re-vegetation (utilizing appropriate seed mix based on the ecological site, elevation, and topography), road reclamation, range improvement project replacement and/or restoration (e.g., fences, troughs, and cattle guards), and noxious weed control measures, would be identified in future NEPA documents on a case-by-case basis and could offset surface disturbance impacts on livestock grazing. In addition, if any range improvement projects could be impacted by wells or associated infrastructure, well pads could be moved up to 200 meters to avoid rangeland improvements or vegetation monitoring plots as per 43 CFR 3101.1-2. Furthermore, BMPs, SOPs, and site-specific mitigation may be applied at the APD stage as COAs.

Leasing or production activities are not expected to cause changes to grazing permit terms and conditions. Any activity that may occur with the development of leases, such as those that involve surface disturbance or direct resource impacts, would have to be authorized as a lease operation through future NEPA analysis on a case-by-case basis at the APD stage, as they may interfere with livestock grazing practices. In addition, if any range improvement projects could be impacted by wells or associated infrastructure, well pads could be moved up to 200 meters to avoid rangeland improvements or vegetation monitoring plots per 43 CFR 3101.1-2. Additional BMPs, SOPs, and site-specific mitigation may be applied at the APD stage as COAs.

AIB-16 Areas of Critical Environmental Concern

How would potential development of the leases impact ACECs?

Lease UTU93534 is partially located within the Dry Lake Archaeological District ACEC, and that portion of the lease within the ACEC is subject to an NSO stipulation. More specifically, 876.31 of the 905.98 acres of the Lease UTU93534 is within the Dry Lake Archaeological ACEC, while 29.66 acres of the lease falls outside of the ACEC. Therefore, no surface-disturbing activity on nearly 877 acres would occur if this lease is developed. The 18,000-acre Dry Lake Archaeological District ACEC was designated as an ACEC for the protection of cultural resources. This ACEC is one of the most likely locations for finding Paleo-Indian sites, the rarest site type in Utah (BLM 2008a). The PFO RMP clarifies that the Dry Lake Archaeological District ACEC is open to oil and gas leasing, though lands within the ACEC boundary must be subject to an NSO stipulation (BLM 2008a).

The BLM would analyze future proposals to develop Lease UTU93534 under site-specific NEPA and may apply any additional requirements as necessary to reduce the impacts on the Dry Lake Archaeological District ACEC.

While the PFO planning area includes additional ACECs, (such as the Big Flat Tops, Bowknot Bend, Interstate 70, Muddy Creek, Rock Art, San Rafael Canyon, San Rafael Reef, Segers Hole, Nine Mile Canyon, Cleveland-Lloyd Dinosaur Quarry, Heritage Sites, and Uranium Mining Districts ACECs) (BLM 2008a), none of these ACECs overlap with any of the leases, so they will not be impacted if the leases are subsequently developed.

Lease Stipulations:

UT-S-319 *Cultural ACEC* is attached to lease UTU93534.

AIB-17 Human Health and Safety

How would potential development of the leases contribute risks to human health and safety concerns?

Within the 3.8 million-acre PFO area encompassing Carbon and Emery Counties, there are 1,322 existing active well bores of all well types across all land jurisdictions as of April 2023 (Utah Division of Oil, Gas and Mining 2023). This level of development has resulted in the following public health and safety–related risks: occasional fire starts; spills of hazardous materials, hydrocarbons, produced water, or hydraulic fracturing fluid (see Appendix D) and corresponding potential contamination of air, soil, or water; exposure to naturally occurring radioactive material (NORM) in drill cuttings or produced water (see Appendix D); traffic congestion and collisions from commercial vehicles and heavy use, especially along Highway 24; infrequent industrial accidents; presence of hydrogen sulfide (H_2S); or increased levels of fugitive dust (PM_{10} and $PM_{2.5}$), other criteria air pollutants (CAPs), volatile organic compounds (VOCs), and hazardous air pollutants (HAPs). See the air quality analysis in Section 3.3.1 (Air Quality) for projected levels of CAPs and HAPs and their effects on air quality standards.

HAPs are known or suspected to cause cancer or other serious health effects, such as compromises to immune and reproductive systems, birth defects, developmental disorders, or adverse environmental effects resulting from either chronic (long-term) and/or acute (short-term) exposure, and/or adverse environmental effects. Breathing ground-level ozone (O_3) can trigger a variety of health problems, including coughing and sore or scratchy throat; difficulty breathing deeply and vigorously and pain when taking deep breaths; inflammation and damage to the airways; increased susceptibility to lung infections; aggravation of lung diseases such as asthma, emphysema, and chronic bronchitis; and an increase in the frequency of asthma attacks. Some of these effects have been found even in healthy people, but effects are more serious in people with lung diseases such as asthma. Particulate matter, also known as particle pollution or PM, is a complex mixture of extremely small particles and liquid droplets. Smaller particles (PM2.5 or smaller) are associated with more negative health effects, including respiratory and cardiovascular problems, because they can become more deeply embedded in the lungs and may even get into the bloodstream.

The following links provide additional information on air pollution health effects from the six criteria air pollutants and HAPs:

- Ozone (https://www.epa.gov/ground-level-ozone-pollution) (EPA 2023a)
- Particulates (https://www.epa.gov/pm-pollution/particulate-matter-pm-basics) (EPA 2023b)
- Nitrogen dioxide (https://www.epa.gov/no2-pollution/basic-information-about-no2) (EPA 2023c)
- Carbon monoxide (https://www.epa.gov/co-pollution/basic-information-about-carbon-monoxide-co-outdoor-air-pollution#What%20is%20CO) (EPA 2023d)
- Lead (https://www.epa.gov/lead-air-pollution/basic-information-about-lead-air-pollution#health) (EPA 2023e)
- Sulfur dioxide (https://www.epa.gov/so2-pollution/sulfur-dioxide-basics#effects)(EPA 2023f)
- Hazardous air pollutants (https://www.epa.gov/haps/health-effects-notebook-hazardous-air-pollutants) (EPA 2023g)

The air quality analysis in Section 3.3.1 estimates the risk of cancer from HAPs and the risk of other health impacts based on exposure to CAPs. In addition to HAP and CAP levels, economic or social indicators can also influence the general health risks of a population, such as poverty status, educational attainment, or language proficiency. Headwaters Economics data for populations at risk (i.e., more likely to experience adverse health outcomes due to demographic or socioeconomic factors) show that most of the indicators for populations at risk are lower for the state of Utah compared with the nation as a whole (Headwaters Economics 2023a). Compared with the state of Utah, several of the indicators for populations at risk in Emery County are similar to state levels. However, certain indicators are noticeably higher than those of the state of Utah: these include people and families in poverty, households receiving public assistance, labor force participation, housing costs, mobile home occupancy, people that did not work, single female households, percentage of people with disabilities, and percentage of population without health insurance. The percentages of these populations at risk in Emery County exceed those within the state of Utah by 2.7% to 10.5% (Headwaters Economics 2023a).

Human health risk assessments cannot be performed until project-specific details are known so that frequency, timing, and levels of contact with potential stressors may be identified (EPA 2023h). However, each of the reasonably foreseeable environmental trends and planned actions have been, or will be, subject to relevant rules and regulations regarding public health and safety. Ongoing and future potential development would continue to present aggregate risks to human health as detailed above. When wells reach the end of their useful life and are properly plugged and reclaimed, they would no longer contribute to health and safety effects; however, depending on the level and duration of individual's exposure during well operation, some of the public health effects from air pollution may endure beyond the life of the wells (e.g., chronic respiratory problems such as asthma).

Future potential development on the leases is estimated to be 8 new wells. This is a 3.1% increase in addition to the 253 existing active wells in Emery County. When authorizing development, federal and state laws, regulations, and policy are applied to reduce effects or respond to incidents. These include the following:

- Federal, state, county, and municipal fire managers shall coordinate fire response and mitigation.
- Developers who install and operate oil and gas wells, facilities, and pipelines are responsible for complying with the applicable laws and regulations governing hazardous materials and for following all hazardous spill response plans and stipulations. The Utah Division of Oil, Gas and Mining requires similar spill response measures after release of hydrocarbons, produced water, or hydraulic fracturing fluids.
- All well pads, vehicles, and other workplaces must comply with worker safety laws as stipulated by the Occupational Safety and Health Administration (OSHA).
- Vehicular traffic and pipelines are regulated according to safety laws as stipulated by the Department of Transportation.
- Onshore Order No. 6 provides the requirements and standards for conducting oil and gas operations in an environment known to or expected to contain H_2S. Compliance with this Order will protect public health and safety and those personnel essential to maintaining control of the well.

See Section 3.3.11, Water Resources for further information regarding potential surface and groundwater effects and relevant regulations, stipulations, and lease notices offering protections to groundwater and surface water quality. Risks from hazardous or solid wastes would be mitigated by BMPs, SOPs, and site-specific COAs.

Hazardous materials are not known to exist on any lease. Hazardous materials associated with oil and gas operations, if not handled properly, have the potential to be spilled at the lease/drill site and would be handled during that stage of development. Such materials could include methanol, diesel fuel, unrefined petroleum, produced water, and acid. Spills during operation would be contained, reported, and cleaned up by the operator as written in the Spill Prevention, Control, and Countermeasure (SPCC) rule for wells. Stipulations UT-S-126 and UT-S-127, which are attached to all the leases, state that no surface-disturbing activities are allowed around natural springs, within 100-year floodplains, and along all perennial and intermittent streams, streams with perennial reaches, and riparian areas. These stipulations ensure that no development, and therefore no wastes that accompany development, would occur in relevant areas.

If wells are constructed on the leases at a future time, impacts would be analyzed when an APD is submitted. BLM would analyze future proposals associated with leases under an additional site-specific NEPA consultation. At the APD stage, additional site-specific NEPA would be completed and risks from hazardous materials and wastes would be mitigated by BMPs, SOPs, and site-specific design features or mitigation measures that may be applied at the APD stage as COAs.

Lease Notices:

UT-LN-128 *Floodplain Management* is attached to all leases.

Lease Stipulations:

UT-S-126 *NSO – Natural Springs* is attached to all leases.

UT-S-127 *NSO – Intermittent and Perennial Streams* is attached to all leases.

AIB-18 Wild and Scenic Rivers

What are the impacts of potential development of the leases on Wild and Scenic Rivers (WSRs)?

WSRs are administered in accordance with the Wild and Scenic Rivers Act (WSRA) of 1968 (16 USC 1271-1287). The WSRA requires selected rivers to be preserved in a free-flowing condition and protected for the benefit and enjoyment of present and future generations. To be included in the National Wild and Scenic River System, a river segment must meet requirements for eligibility and suitability. To be designated as eligible, a river segment must be considered free-flowing and meet one or more of the following outstanding remarkable values (ORVs): Scenic, Recreation, Geologic, Fish, Wildlife, Cultural, Historic, or Other. To be designated as suitable, a river segment undergoes a period of study where federal agencies consider multiple resource values, level of public support, and competing uses of the river corridor. All river segments that were found suitable in the PFO RMP were those with ORVs that centered around recreational opportunities. BLM manages all eligible, suitable, and/or designated WSRs in accordance with BLM Manual 6400 – Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, Planning, and Management.

Lease UTU93534 overlaps a segment of the Green River that was determined to be eligible, but not suitable, for WSR designation in the PFO RMP (BLM 2008a). Analysis of suitability and potential impacts to eligible rivers was included in the PFO RMP (BLM 2008a). The PFO RMP Record of Decision states, “Any eligible segment not determined to be suitable will receive no special protection specifically for its free-flowing values, outstandingly remarkable values, and tentative classifications” (BLM 2008a:140). Therefore, there are no expected impacts to WSRs.

3.3 ISSUES ANALYZED IN DETAIL

The issues identified for detailed analysis in this EA were developed in accordance with CEQ regulations and the guidelines set forth in the BLM NEPA Handbook H-1790-1 (BLM 2008d), using input from 2018 external scoping. Issues were retained for detailed analysis if that analysis is necessary to make a reasoned choice between alternatives or to determine significance, if there is disagreement about the best way to use a resource, or if there is conflict between resource impacts or uses.

3.3.1 Air Quality

Issue Statement: What type and quantity of air pollutants would be produced based on the assumptions for analysis? How would air pollutant emissions from subsequent development of the leases affect air quality resource values?

Air quality is determined by the quantity and chemistry of atmospheric pollutants in consideration of meteorological factors (i.e., weather patterns) and topography, both of which influence the dispersion and concentration of those pollutants. The presence of air pollutants is due to a number of different and widespread sources of emissions, therefore, the impact airshed analysis area for air quality is the San Rafael Swell, but air quality data is generally available at the county level so the analysis area also includes Carbon, Emery, and Wayne counties. For the purposes of this analysis, short-term effects to air quality are considered those that cease after well construction and completion (30–60 days); long-term effects are considered those associated with operation activities. Long-term effects would cease after well operation is discontinued.

The *Utah Bureau of Land Management Air Resource Management Strategy 2023 Monitoring Report* (AMR) (BLM 2022d, 2023d) discusses past, present, and foreseeable emissions and air quality data for counties in Utah using data through calendar year 2021. Information from the AMR is incorporated by reference to help describe the air quality–affected environment in airsheds where leases are located.

3.3.1.1 Affected Environment

The EPA has primary responsibility for regulating air quality, including six nationally regulated ambient air pollutants known as criteria air pollutants (CAPs): carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2) and lead (Pb). Ozone is not emitted directly into the air, but is created when its two primary components, volatile organic compounds (VOC) and oxides of nitrogen (NO_x), combine in the presence of sunlight. VOC and NO_x are often referred to as ozone precursors, which are, for the most part, emitted directly into the atmosphere. In Utah, the largest sources of CAPs and CAP precursors emitted by humans are area sources for PM_{10}, $PM_{2.5}$, and ammonia (NH_4); on-road sources for CO and NO_2; point sources for SO_2; and oil and gas sources for VOCs. The largest sources in individual counties may vary from those producing state total emissions.

The EPA has established National Ambient Air Quality Standards (NAAQS) for CAPs (incorporated by reference from Table 1 of the AMR (BLM 2022d, 2023d)). The NAAQS are protective of human health and the environment. Compliance with the NAAQS is typically demonstrated through monitoring of ground-level concentrations of atmospheric air pollutants. Areas where design values are below the NAAQS are designated as attainment or unclassifiable. Locations where monitored pollutant concentrations are higher than the NAAQS are designated nonattainment, and air quality is considered unhealthy (BLM 2023d). Certain air pollutants have been recognized to cause notable health problems and consequential damage to the environment, either directly or in reaction with other pollutants due to their presence in elevated concentrations in the atmosphere.

O_3 in the troposphere causes numerous adverse health effects; short-term exposures (lasting for a few hours) can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes (EPA 2023a). These health problems are particularly acute in sensitive receptors such as the sick, the elderly, and young children. NO_2 can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections (EPA 2023c). In terms of adverse health effects, CO competes with oxygen, often replacing it in the blood, reducing the blood's ability to transport oxygen to vital organs. The results of excess CO exposure can include dizziness, fatigue, and impairment of central nervous system functions (EPA 2023d). SO_2 is an irritant gas that attacks the throat and lungs and can cause acute respiratory symptoms and diminished ventilator function in children. When combined with particulate matter, SO_2 can injure lung tissue and reduce visibility and the level of sunlight. SO_2 can also yellow plant leaves and erode iron and steel (EPA 2023f). $PM_{2.5}$ and PM_{10} pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. $PM_{2.5}$ and PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections (EPA 2023b). Prolonged exposure to atmospheric lead poses a serious threat to human health. Health effects associated with exposure to lead include gastrointestinal disturbances, anemia, kidney disease, and in severe cases, neuromuscular and neurological dysfunction. Of particular concern are low-level lead exposures during infancy and childhood. Such exposures are associated with decrements in neurobehavioral performance, including intelligence quotient (IQ) performance, psychomotor performance, reaction time, and growth. Children are highly susceptible to the effects of lead (EPA 2023e).

Air pollutant concentrations are reported using design values. A design value is a statistic that describes the air quality status of a given location relative to the level of the NAAQS. Design values are used to designate and classify nonattainment areas, as well as to assess progress towards meeting the NAAQS. Design values that are representative for the airsheds in Utah are provided in Tables 17 through 21, of the AMR. It is assumed that counties without reported design values have air pollutant concentrations below the NAAQS and good air quality, since air monitoring is usually needed only when concentrations exceed 80% of the NAAQS (40 CFR 58.14 (i)(1)). As of March 31, 2023, Carbon and Emery Counties are classified as in attainment or unclassified (EPA 2023i).

On January 6, 2023, the EPA announced a proposal to strengthen the $PM_{2.5}$ standard to better protect human health and the environment. EPA is currently taking comments on the proposal to reduce the current standard from 12 micrograms per cubic meter ($\mu g/m^3$) to a level between 8 and 11 $\mu g/m^3$, to reflect the latest health data and scientific evidence to better protect communities.

Design values that are representative for where leases are located are provided in Table 3-8. Emery and Wayne Counties do not have reported design values, so the nearby Carbon County, Utah, and Mesa County, Colorado, design values are provided. Generally, counties without reported design values have good air quality and pollutant concentrations are below the NAAQS. The main pollutants of concern within the analysis area are $PM_{2.5}$ and O_3, as these are the pollutants with reported design values near or above the NAAQS.

Table 3-8. Criteria Pollutant Design Values (2020–2022)

Pollutant	Location	Averaging Time	Design Concentration	NAAQS
NO_2	Carbon County, Utah	1-hour Annual	17 ppb 2 ppb	100 ppb 53 ppb
O_3	Carbon County, Utah	8-hour	0.068 ppm	0.070 ppm

Pollutant	Location	Averaging Time	Design Concentration	NAAQS
$PM_{2.5}$	Mesa County, Colorado	24-hour Annual	18 µg/m^3 5.8 µg/m^3	35 µg/m^3 9 µg/m^3

Source: EPA (2022a).

Note: Concentrations in parts per million (ppm), parts per billion (ppb) or microgram per meter square (µg/m3). Design values are based on 3-year averages.

Every 3 years, the Utah Division of Air Quality (UDAQ) compiles statewide emission inventories to assess the level of pollutants released into the air from various sources (UDAQ 2023). The UDAQ has not yet released the 2020 statewide emission inventory. Triennially, the EPA publishes a comprehensive summary of air emissions data, known as the National Emissions Inventory (NEI). The NEI is based primarily upon data provided by state, local, and tribal air agencies for sources in their jurisdictions and supplemented by data developed by the EPA. The most recent NEI data that are available is from 2020. Table 3-9 provides the 2020 emissions for the five CAPs, VOCs and HAPs for Carbon County, Wayne and Emery County, Utah.

Table 3-9. National Emissions Inventory 2020 Emissions Data for Carbon, Wayne, and Emery Counties

County	NO_x	CO	PM_{10}	$PM_{2.5}$	SO_2	VOC	HAPs
Carbon County	1,363	5,187	3,257	464	76	8,903	1,238
Wayne County	362	1,708	885	140	1	5,065	1,049
Emery County	15,121	11,727	4,342	1,144	4,584	8,688	1,907

Source: EPA (2023j).

Note: all values in tons per year.

Hazardous Air Pollutants

Hazardous air pollutants (HAPs) are known or suspected to cause cancer or other serious health effects, or adverse environmental effects, and are also regulated by the EPA. Examples of listed HAPs emitted by the oil and gas industry include benzene, toluene, ethyl benzene, mixed xylenes, formaldehyde, normal-hexane, acetaldehyde, and methanol. A list of HAP point source emissions by county is published by UDAQ (2022). The 2020 emissions for common oil and gas related HAPs are listed for each FO in Table 5 of the AMR (BLM 2022d, 2023d).

The EPA Air Toxics Screening Assessment is used to evaluate impacts from existing HAP emissions in Utah (EPA 2023j). The EPA has determined that the total cancer risk in Utah is 17.8 in 1 million and is 10.29 in 1 million in Emery County, where leases are located. The oil and gas industry contributes less than 0.5% to total county cancer risk, with the industry cancer risk in Emery County 0.30 in 1 million. The EPA has determined that, for Utah counties with BLM managed lands, the total cancer risk is 9.34 to 22.92 in 1 million, incorporated by reference from Table 8 of the AMR (BLM 2022d, 2023d). The total cancer risk is within the acceptable range of risk published by the EPA of 100 in 1 million as discussed in the National Contingency Plan, 40 CFR 300.430.

The noncancer respiratory hazard index for the State of Utah is 0.23 and 0.10 for Emery County. Hazard index values less than one mean it is unlikely that air toxins will cause adverse noncancer health effects

over a lifetime of exposure. Oil and gas development and other foreseeable emission sources would contribute to HAP emissions and associated carcinogenic and noncancer risks.

Air Quality Related Values

The prevention of significant deterioration (PSD) regulations were developed and implemented to protect public health and welfare and to preserve, protect, and enhance the air quality in national parks, wilderness areas, monuments, and other areas of special value. The assessment applies to permitting for new or modified major stationary sources in attainment areas. As part of the PSD, EPA classifies airsheds as Class I or Class II. Class I areas are areas of special national or regional natural, scenic, recreational, or historic value for which the PSD regulations provide special protection. All other areas are designated Class II areas, which allow for moderate pollution increases and reasonable growth, while still applying stringent air quality constraints (National Park Service [NPS] 2020).

Within the state of Utah there are five Class I areas: Arches National Park, Bryce Canyon National Park, Canyonlands National Park, Capitol Reef National Park, and Zion National Park; however, the analysis area does not contain any Class I areas.

Class I areas are areas that are provided special protection for air quality under the Clean Air Act (CAA). They include federal lands like national parks, national wilderness areas, and national monuments. For Class I areas, there are no leases within 100 miles of the Bryce Canyon National Park. The closest leases to Canyonland National Park are UTU93525 and UTU93533, and they are 5 and 5.5 miles away, respectively. Lease UTU93519 is 31 miles away from Arches National Park. Leases UTU93471, UTU93472, and UTU93473 are within 31 and 33 miles of Capitol Reef National Park (EPA 2023k).

Leases UTU93475, UTU93476, and UTU93479 are likely to be explored for helium as reflected in the lessee's three APDs for these leases. Lease UTU93475 is located 18 miles from Canyonland National Park, 43 miles from Arches National Park, and 42 miles from Capitol Reef National Park. Lease UTU93476 is located 20 miles from Canyonland National Park, 45 miles Arches National Park, and 40 miles from Capitol Reef National Park. Lease UTU93479 is located 17 miles from Canyonland National Park, 44 miles from Arches National Park, and 41 miles from Capitol Reef National Park.

The AMR (BLM 2022d, 2023d) discusses past, present, and foreseeable emissions and air quality data for counties in Utah. Visual range for Class I areas in Utah varies from 153.5 to 177.1 miles depending on time of year and location. Visibility trends based on air monitoring data from four Utah monitoring sites for the clearest, haziest, and most impaired categories are incorporated by reference from the AMR (Figures 3 through 6 of the AMR). The difference between the haziest and most impaired days at Bryce Canyon National Park has increased, indicating episodic events have a greater impact on visibility. The haziest days at Bryce Canyon National Park have shown little improvement due to many years of large wildfire smoke episodes. Progress toward Regional Haze Rule goals is demonstrated by the marked improvement on the most impaired days at Bryce Canyon—those with high amounts of pollutants emitted by humans—over the same time frame. Visibility in all three categories (clearest, haziest, and most impaired) at Canyonlands and Capitol Reef National Parks improved over the respective period of record at each location.

The NPS monitors and evaluates deposition to determine which parks are most at risk from air pollution and where conditions are declining or improving. Nitrogen deposition conditions in Utah national parks are fair to poor with no trend for improving or worsening conditions, while sulfur deposition conditions are good and generally improving (see Table 22 of the AMR [BLM 2023d]).

Air Quality Design Considerations

Design constraints and mitigation measures for reducing air emissions at the APD stage could include requiring that new stationary and replacement internal combustion gas field engines, smaller than 300 horsepower, to not emit more than 2 g of nitrogen oxides (NO_x) per horsepower-hour (UT-S-01), or that engines are kept in good working order, use of Tier II or higher diesel engines, dust control, flaring and other best practices as described in UT-LN-96, using regional ozone formation controls (UT-LN-99), and air dispersion modeling (UT-LN-102), or a combination of all of these. Application of stipulations and notices listed in Appendix B would be adequate for the leasing stage to disclose potential future restrictions and to facilitate the reduction of potential impacts.

The BLM mitigates pollutants through lease stipulations and notices and further NEPA actions throughout the lease process. Stipulations and notices listed in Appendix B apply to the leases issued and notify the operator of what is required (stipulation) and what could potentially be required (notice) at the APD stage. Additional air quality control measures may be warranted and imposed at the APD stage as conditions of approval. The BLM would do this in coordination with the EPA, UDAQ, and other agencies that have jurisdiction on air quality. By applying stipulations and notices, leasing would have little impact on air quality. At the APD stage, further COAs could be applied based on the environmental analysis for the APD. These control measures are dependent on future regional modeling studies or other analysis or changes in regulatory standards. Application of these notices would be sufficient to notify the lease holder of additional air quality control measures that are necessary to ensure protection and maintenance of the NAAQS. Also, any future development in nonattainment areas would be subject to the conformity process of the CAA, which may require additional mitigation or offsets.

Regulatory agencies also require various mitigations measures for oil and gas well permits. State permit-by-rule requirements are identified in Utah Administrative Code R307-504-511. Well development in Indian Country would be subject to permitting requirements in the Federal Implementation Plan for the Indian Country Minor New Source Review Program for the Oil and Natural Gas Industry (80 *Federal Register* 51991).

3.3.1.2 Environment Effects

Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would affirm its previous leasing decisions for the 59 leases from the 2018 Lease Sales. Any potential effects to air quality from these leases would occur when the leases are developed. As previously explained, this analysis does not authorize or guarantee the number of wells analyzed herein. The drilling of wells on a lease would not be permitted until the BLM approves an APD. Any APD received would be subject to site-specific NEPA review. However, development assumptions have been made in this EA to inform the decision because a lease must be developed to keep it from expiring.

There are four general phases of post-lease development that would generate air pollutant emissions: 1) well development (well site construction, well drilling, well completion, and interim reclamation), 2) well production operations (extraction, separation, gathering, and final reclamation), 3) mid-stream (refining, processing, storage, and transport/distribution), and 4) end-use (combustion or other uses) of the fuels produced. While well development and production operation emissions (Phases 1 and 2) occur on-lease and the BLM has program authority over these activities, mid-stream and end-use emissions (Phases 3 and 4) typically occur off-lease where the BLM has no program authority.

During well development, there could be emissions from earth-moving equipment, vehicle traffic, drilling, and completion activities. NO_2, SO_2, and CO would be emitted from vehicle tailpipes. Fugitive

dust concentrations would increase with additional vehicle traffic on unpaved roads and from wind erosion in areas of soil disturbance. Drill rig and fracturing engine operations would result mainly in NO_2 and CO emissions, with lesser amounts of SO_2. These temporary emissions would be short-term during the drilling and completion phases.

During well production operations there could be continuous emissions from separators, condensate storage tanks, and daily tailpipe and fugitive dust emissions from operations traffic. During the operational phase of a well, NO_2, CO, VOC, and HAP emissions would result from the long-term use of storage tanks, pumps, separators, and other equipment. Additionally, road dust (PM_{10} and $PM_{2.5}$) would be produced by vehicles servicing the wells. This would be regulated by Utah Administrative Code R307-309 and R307-205, which require a Fugitive Dust Control Plan for new sources of fugitive dust one-quarter acre or greater that are located in a PM_{10} or $PM_{2.5}$ nonattainment or maintenance areas (UDAQ 2017).

Given that the BLM has received and approved APD packages on three leases for helium production, of the eight wells used for the RFDS, three were assumed to be helium and five were assumed to be oil and gas. Single well emissions estimates for well development and production operations are based on Uinta Basin typical development and production operations scenarios and these single well emissions and assumptions for analysis are input into the BLM Lease Sale Emissions Tool to provide the maximum year and average year emissions over the anticipated production life of leases (BLM 2022b). Table 3-10 shows the maximum year and average year emissions over the anticipated production life of leases for the three helium wells and five oil and gas wells. More emissions detail is provided in Appendix G. Actual development of individual leases may result in higher or lower emissions for various reasons including differences with geologic formations, proximity to existing support infrastructure, differences in pace of development, different development methods and control technology used by a lessee, and other reasons. A lessee has 10 years to establish production on a lease and if production is not attempted within the 10-year timeframe, the lease will be terminated with no development or emissions occurring.

Table 3-10. Estimated Annual Emissions from the Development of Leases

Activity	Field Office	County	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOC	HAPs
Maximum year*	PFO	Emery	7.79	2.57	33.35	30.79	0.038	63.24	5.77
Average year*	PFO	Emery	4.42	1.52	14.63	21.17	0.007	51.38	4.70
2020 NEI – Emery County*			4,342	1,114	15,121	11,727	4,584	8,668	1,907
Percent increase from 2020 NEI (max year)			0.18%	0.22%	0.22%	0.26%	0.001%	0.73%	0.30%
Utah R307-410-4 Thresholds			20	10	40	100	40	n/a	n/a

Source: BLM Lease Sale Emissions Tool (BLM 2022b).

* Values in tons per year. n/a – no threshold

Emissions associated with development of eight wells would range from a 0.001% increase in SO_2 to a 0.71% increase in VOC in Emery County. Emissions of CAPs would also occur outside the impact analysis area from transport, processing, distribution, and end-use of produced oil and gas. Because there are potentially tens to hundreds of thousands of mid-stream and downstream emissions sources, the BLM is not able to quantify air quality and health impacts from these sources. Generally crude oil from the well fields in Utah is trucked to the Price River Terminal in Wellington, Utah, for shipment to refineries, or trucked to refineries in Salt Lake City. Following construction of the approved Uinta Basin Railway, trains on the proposed rail line could transport crude oil produced in Utah to markets across the United States. Utah's refineries produce mostly motor gasoline, diesel fuel, and jet fuel. Pipelines carry refined products from Salt Lake City's refineries to markets in Utah, Idaho, Nevada, Wyoming, eastern Washington, and Oregon. Regarding natural gas, Utah is crossed by several interstate pipelines that transport natural gas from the Opal Hub in Wyoming, from the Piceance Basin in western Colorado, and from Utah's in-state production to markets in Utah, Nevada, Idaho, and Colorado. Downstream combustion, whether in stationary facilities and motor vehicles/airplanes are regulated by the EPA, other federal agencies, or delegated state agencies. This regulatory process is designed to avoid downstream impacts to regional and local air quality.

At the leasing stage it is not possible to accurately estimate potential air quality impacts by modeling due to the variation in emission control technologies as well as construction, drilling, and production technologies applicable to oil versus gas production and utilized by various operators. Should development on the leases be proposed, and prior to authorizing specific proposed projects on the subject leases, emission inventories would need to be developed. Nearfield air quality dispersion modeling, which may also be required at that time, includes direct and cumulative impact analysis for demonstrating compliance with the NAAQS, plus analysis of impacts to air quality related values (AQRVs) (i.e., deposition, visibility), particularly as they might affect nearby Class I areas (some national parks and wilderness areas) and Class II areas of interest. Utah Administrative Code R307-410-4 lists emissions thresholds for new or modified sources, and projects with proposed emissions increases below these thresholds would not violate NAAQS alone, including secondary standards for protection of the environment. The emissions listed in Table 3-10 are below the emissions thresholds in R307-410-4.

Air quality and AQRV impacts from the development of exploration and production wells were modeled in an air quality modeling analysis prepared in support of the oil and gas leasing EIS for the Dixie and Fishlake National Forests (U.S. Department of Agriculture 2010) and are incorporated by reference to provide an indication of what leases may need additional air quality analysis at the APD stage. The analysis evaluated maximum modeled air pollutant concentrations at various distances and elevations (above and below) from a well site and compared them to Class I and Class II increment thresholds. Generally, results predicted that air quality standards would be met if the Class I airsheds are at a distance of 34 miles or greater away from a production well or 3 miles or greater away from an exploratory well. Further modeling and analysis are recommended if the source is less than 34 or 3 miles, respectively. Results predicted no potential compliance problems for Class II airsheds. Similar results and recommendations are made about visibility standards. Leases UTU93475, UTU93476, and UTU93479 are likely to be explored for helium as there have been three APDs for these leases and the leases are much greater than 3.1 miles from any Class I area. Leases UTU93525 and UTU93533 are 5 and 5.5 miles away from Canyonlands National Park, respectively, but no APDs have been received for these leases. There are no leases located within 3 miles of a Class I area; therefore, no new significant impacts to air resources would occur at Arches National Park, Canyonlands National Park, or Capitol Reef National Park from exploration of the PFO leases. However, because all leases are located within 34 miles of Canyonlands National Park, results are uncertain and further modeling and analysis would be required at the APD stage to determine whether significant impacts to air resources would occur at Canyonlands National Park from development and production of the PFO leases.

While emissions from an individual well or well pad are too small to have a substantial impact on ground-level O_3 concentrations, they contribute with emissions from other regional oil and gas operations to produce a cumulative O_3 impact. Studies like the BLM's Air Resource Modeling Study (ARMS) (BLM 2020a) have demonstrated that oil and gas activity is a primary contributor to wintertime ozone NAAQS exceedances in the Uinta Basin, which is located approximately 50 miles north of the leases.

The CAA general conformity rule (40 CFR 93) provides federal agencies a method for determining if the emissions in a nonattainment area, from an action under consideration, will delay an area from attaining the NAAQS. This is done by showing that emissions are either de minimis or conform to a state or federal implementation plan. None of the leases are located within a nonattainment area and thus do not require a general conformity applicability assessment and is not applicable to this leasing action.

If exploration occurs, short-term impacts would be stabilized or managed rapidly (within 2 to 5 years) and long-term impacts are those that would substantially remain for more than 5 years.

Substantial air resource impacts are not anticipated from the development of the leases based on the emissions estimates contained in Table 3-10, air quality analysis for similar oil and gas development in the area, and considering the location of leases relative to population centers and Class I areas. No further analysis or modeling is warranted for the leasing decision. As identified in notice UT-LN-102, additional analysis or mitigation may be required when leases are developed to ensure no adverse impacts occur.

Under the No Action Alternative, the BLM would affirm its previous leasing decisions for the 59 leases from the 2018 Lease Sales. The leases include the standard lease terms and conditions for development of surface oil and gas leases. Given that all 59 leases would be affirmed, there is potential for oil and gas development on these leases. Potential impacts to air quality would only occur if the leases are developed, otherwise no new emissions of pollutants would occur.

Impacts of the Wilderness and Lands with Wilderness Characteristics Alternative

Under the Wilderness and Lands with Wilderness Characteristics Alternative, the BLM would cancel 48 leases (encompassing 75,494.99 acres) that contain identified LWCs, and one lease (encompassing 1,408.01 acres) within a designated wilderness area. However, under this alternative the BLM would still affirm 10 leases, which may allow for future mineral exploration and drilling activity. The leases closest to Class I areas, Leases UTU93525 and UTU93533, would be included in the 49 leases that could be cancelled, therefore potentially reducing air quality impacts. Of the 10 leases to be affirmed, the ones closest to Class I areas are Leases UTU93492 and UTU93485, located 13 miles and 14 miles, respectively, from Canyonlands National Park. Potential impacts to air quality would not occur unless these leases are developed.

Based on the RFDS, the 20.8 acres that could be developed under these alternative amounts to approximately 17% of the acreage of the No Action Alternative, which would equate to approximately 2 wells. Therefore, if the 2 wells are developed the impacts on air quality would be less than No Action Alternative. More emissions detail is provided in Appendix G. However, the three leases with APDs, Leases UTU93475, UTU93476, and UTU93479, would be cancelled under this alternative and therefore would not be developed. However, oil and gas production is typically more emissive than helium production; therefore, there is potential for alternatives that contain more oil and gas production to be more emissive than an alternative that has more wells but has helium and oil and gas production. However, since there would be 49 fewer leases under this alternative, the impacts on air quality would likely be less than under the No Action Alternative (see Table 3-10), as it is likely that fewer than eight wells would be developed.

Impacts of the Lease Cancellation Alternative

The Lease Cancellation Alternative would not result in any potential impacts to air quality, as the leases would be cancelled and no development would occur at this time. However, in the absence of a Land Use Plan Amendment closing the lands to leasing, they could be considered for inclusion in future lease sales.

3.3.1.3 Mitigation Measures and Residual Effects

Air quality design considerations and mitigation measures for reducing air emissions have been previously discussed in Section 3.3.1.1. There are no additional required design constraints or mitigation measures for air quality.

3.3.1.4 Cumulative Effects

This document incorporates by reference the projected changes to air quality and AQRVs that are evaluated in the BLM's Air Resource Modeling Study (ARMS) (BLM 2020a). This modeling study provides a reference for potential changes to the affected environment occurring from existing and foreseeable emissions producing activities, including oil and gas development, within the state of Utah and the Uinta Basin.

Emissions Trends

Past and present actions that have affected and would likely continue to affect air quality in the analysis area include surface disturbance resulting from oil and gas development and associated infrastructure, geophysical exploration, ranching and livestock grazing, range improvements, recreation (including off-highway vehicle [OHV] use), authorization of ROWs for utilities and other uses, and road development. Past and present actions that have affected and would likely continue to affect air quality are too numerous to list here but would include the development or conversion of power plants; the development of energy sources such as oil, gas, and coal; the development of highways and railways; and the development of various industries that emit pollutants. These types of actions and activities can reduce air quality through emissions of criteria pollutants (including fugitive dust), VOCs, and HAPs, as well as contribute to deposition impacts and to a reduction in visibility.

Emissions in the oil and gas sector roughly parallel oil and gas production. Future trends in oil and gas production growth for the Rocky Mountain region are used from the U.S. Energy Information Administration (EIA) 2023 Annual Energy Outlook (EIA 2023) to provide an estimate of the change in emissions from oil and gas sources in Utah. U.S. production of natural gas and petroleum and liquids is projected to rise amid growing demand for exports and industrial uses. U.S. natural gas production is projected to increase by 15% from 2022 to 2050. Similarly, oil and gas related CAP and HAP emissions from existing and foreseeable wells, plus development of leases, are anticipated to rise due to increasing production (UDAQ 2020).

Modeled Air Quality Projections

In 2017, the BLM initiated the regional ARMS to evaluate foreseeable changes to air quality and AQRVs (BLM 2020a). ARMS 2017 uses the best available information on oil and gas emissions and future development plans and incorporates the latest photochemical model improvements. However, even with these improvements, photochemical models still have trouble replicating wintertime ozone concentrations. This is due to the model having difficulty replicating meteorological conditions (temperature inversions and snow cover), and the need for improved estimates for VOC speciation profiles used as model inputs.

ARMS 2017 projected oil and gas emissions for low and high development scenarios using UDAQ's Uinta Basin Oil and Gas Emissions Model (BLM 2020a). Foreseeable emissions for non-oil and gas emissions sources are incorporated from the Intermountain Data Warehouse Western Air Quality Study air quality modeling dataset (Adelman et al. 2016). Compared to the base year, the low scenario shows a decline in oil and gas production, and the high scenario shows a production increase. Analysis of ARMS 2017 emissions projections indicate that it is very likely that the HIGH scenario overestimates oil and gas VOC and NO_x emissions for the future year estimates. Source apportionment is used in the modeling study to evaluate changes to air quality and AQRVs from all sources including biogenic sources, BLM Uinta Basin oil and gas sources, other oil and gas sources (including BLM authorized sources outside Duchesne and Uinta Counties), and non–oil and gas anthropogenic sources. Future year modeling results are compared with the NAAQS for criteria pollutants (O_3, $PM_{2.5}$, PM_{10}, NO_2, and SO_2) throughout the state of Utah. The contributions of BLM oil and gas development emissions to air quality and AQRVs at Utah Class I and Class II sites and at sensitive lakes are also compared against PSD increment concentrations, and visibility and deposition thresholds of concern. The model performed very well in simulating O_3 at some representative sites in Utah over the entire year but failed to capture wintertime O_3 exceedances associated with inversions in the Uinta Basin. To address the underestimation of winter O_3 concentration, the relative change in the modeled concentrations between the current and future year simulations are used to scale the observed current year ozone design value to obtain a projected future year design value.

The ARMS 2017 model shows potential exceedances of the O_3 NAAQS along the Wasatch Front, Uintah Basin, and portions of southern Utah. O_3 exceedances along the Wasatch Front are mainly due to non–oil and gas anthropogenic sources, exceedances in the Uinta Basin are mainly due to oil and gas sources (federal and non-federal), and exceedances in the southern part of the state are due to local and out-of-state non–oil and gas anthropogenic activities. Observed O_3 design values in southern Utah are below the NAAQS and continued monitoring is warranted so modeled exceedances do not become reality. Evaluation of the annual and 24-hour $PM_{2.5}$ and 24-hour PM_{10} NAAQS show exceedances only occurring due to exceptional events such as wildfires. The model showed no exceedances of the SO_2 or NO_2 NAAQS. The PSD analysis showed exceedance of the Class II NO_2 threshold (13.3 ppb) at the Uintah and Ouray Indian Reservation, primarily from non–BLM oil and gas development.

The ARMS 2017 impact analysis results indicate that air impacts of emissions from projected oil and gas development activities under BLM jurisdiction in Uintah and Duchesne Counties for both high and low development scenarios were strongly confined to the Uinta Basin and did not contribute to the long-range transport of impacts outside of the basin. This conclusion holds true for all pollutants. Emissions from BLM oil and gas development were not responsible for any violations of the NAAQS, PSD, visibility, and deposition thresholds of concern predicted by the 2025 high and low development scenarios in areas outside of the Uinta Basin. The contributions of BLM oil and gas development emissions to all air quality and AQRVs were minor in comparison to other emission sectors. The BLM oil and gas development emissions contributed 8.88% and 4.22% respectively to the total 2025 high and low simulated daily 8-hour maximum O_3 concentrations in the Uinta Basin and contributed less than 0.01% to simulated daily 8-hour maximum O_3 outside the Uinta Basin. The maximum contribution of BLM oil and gas development emissions to total $PM_{2.5}$ concentrations are less than 1% and were four times less than contributions from other oil and gas development activities that are not on BLM lands.

Air Quality Related Values

AQRVs were also analyzed in the ARMS 2017 modeling study. Future year projections (both high and low scenarios) show improvements of AQRVs at Class I, Class II, and sensitive lakes in Utah compared to 2011 base year emissions. Since the air quality impacts from Uinta Basin oil and gas development were well contained within the basin as discussed previously, this emission source sector was not responsible

for any exceedances of the 0.5 and 1.0 deciview (dv) visibility thresholds occurring at Class I national parks in Utah. Biogenic emissions and non–oil and gas emissions are the main contributors to dv exceedances in Utah national parks. Bryce Canyon and Capitol Reef National Parks experienced visibility improvements in the future year scenarios compared to base year for both the worst 20% and the best 20% visibility days. Arches and Canyonlands National Parks, which are located closer to oil and gas development distributions, experienced visibility improvement for the best 20% days but slight visibility worsening for the worst 20% days. Other oil and gas development activities, including BLM development outside the Uinta Basin, are projected to produce visibility impacts exceeding the 0.5 and 1.0 dv thresholds for 21 and 2 days, respectively, at Canyonlands National Park.

The ARMS 2017 future year simulated sulfur and nitrogen depositions at sensitive areas were substantially less than those simulated during the base year. The simulated total annual nitrogen depositions by both base year and future year were below the corresponding critical loads at all assessed areas. All of Class I areas, Class II areas, and sensitive lakes experienced nitrogen deposition improvements in future year compared to base year simulations. Similar conclusions are applicable to source impacts on total annual sulfur deposition. Base year and future year simulated sulfur depositions for all Class I, Class II and sensitive lakes were well below the critical load of 5 kilogram per hectare per year. The future year also resulted in improvements on sulfur deposition at all areas.

Studies have demonstrated that oil and gas activity is a primary contributor to wintertime ozone NAAQS exceedances in the Uinta Basin. While emissions from an individual well or well pad are too small to have a substantial impact on O_3 concentrations, they contribute with emissions from other regional oil and gas operations to produce a cumulative O_3 impact.

Hazardous Air Pollutants

It is not possible to determine the change in cumulative cancer risk in the county from potential new wells without performing air quality modeling. However, the current county level cancer risks of around 10 in 1 million is well below the level of concern (100 in 1 million), and the current oil and gas facilities contribute less than 1 in 1 million to the county level totals. An increase in HAPs emissions from eight wells would slightly increase the cumulative contribution to cancer risk from oil and gas facilities but would not result in a substantial change to existing cumulative HAPs impacts. In summary, the cumulative air quality in the impact analysis area is maintained at current levels or projected to improve. Atmospheric concentrations for CAPs are projected to be below the NAAQS or show improvement (i.e., decreasing concentrations). Visibility is projected to improve for the best 20% days at Canyonlands National Park, the closest Class I area to the leases, and deposition is estimated to remain below critical load criteria. Emissions of HAPs are not anticipated to substantially change the cancer and noncancer respiratory risks in the area of analysis.

3.3.2 Greenhouse Gas and Social Cost of Carbon

Issue Statement: How would proposed and potential development of the leases contribute to GHG emissions and climate change?

Future development of the leases under consideration could lead to emissions of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), the three most common GHGs associated with oil and gas development. These GHG emissions would be emitted if the leases are developed and from the downstream consumption of any fluid minerals that may be produced. However, the BLM cannot reasonably determine at the leasing stage whether, when, and in what manner a lease would be explored or developed. Until a lease holder submits an APD there is substantial uncertainty that exists regarding crucial factors that would affect actual GHG emissions and associated impacts, including, but not limited to, the future feasibility of developing the lease, well density, geological conditions, development type

(vertical, directional, or horizontal), hydrocarbon characteristics, specific equipment used during construction, drilling, production, abandonment operations, production and transportation, and potential regulatory changes over the 10-year primary lease term. Actual development on a lease may vary from what is analyzed in this EA and will be evaluated through site-specific NEPA analysis if an operator submits an APD or plan of development to the BLM.

For the purposes of this analysis, the BLM has evaluated the potential effects of the leasing action on climate change by estimating and analyzing potential GHG emissions from projected oil and gas development on the leases using estimates based on past oil and gas development and available information from existing development within the state.

Further discussion of climate change science and predicted impacts, as well as the reasonably foreseeable and cumulative GHG emissions associated with the BLM's oil and gas leasing actions, are included in the 2021 *BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends* (Annual GHG Report) (BLM 2022e). This report presents the estimated emissions of GHGs attributable to development and consumption of fossil fuels produced on lands and mineral estate managed by the BLM. The Annual GHG Report is incorporated by reference as an integral part of this analysis.

The BLM has prepared an *Analysis for Greenhouse Gas Emissions Related to Oil and Gas Leasing in Utah EA* (Utah EA) (DOI-BLM-UT-0000-2021-0001-EA) (BLM 2021c). The BLM published the Utah EA and the signed finding of no significant impact (FONSI) on January 14, 2021. Multiple leasing decisions regarding 226 suspended Utah leases were issued throughout 2021. The Utah EA informed BLM decisions relating to the suspended leases and sold, but not-yet-issued leases. In addition, it analyzed GHGs associated with all Utah lease sales from 2014 to 2019 (including lease sales that were not challenged in litigation), the GHGs from the PFO RMP and field development EISs, previous leasing decisions where development has not occurred, and future GHG emissions based on the RFDS. The Utah EA considers GHG emissions in context with emissions from other local, regional, and national federal leasing decisions. The Utah EA is incorporated by reference in this analysis as a point of comparison to the emissions calculated in this EA.

3.3.2.1 Affected Environment

Climate change is a global process that is affected by the sum total of GHGs in the Earth's atmosphere. The incremental contribution to global GHGs from a single proposed land management action cannot be accurately translated into its potential effect on global climate change or any localized effects in the area specific to the action. Currently, global climate models are unable to forecast local or regional effects on resources as a result of specific emissions. However, there are general projections regarding potential impacts on natural resources and plant and animal species that may be attributed to climate change resulting from the accumulation of GHG emissions over time. GHGs influence the global climate by increasing the amount of solar energy retained by land, waterbodies, and the atmosphere. GHGs can have long atmospheric lifetimes, which allows them to become well mixed and uniformly distributed over the entirety of the Earth's surface no matter their point of origin. Therefore, potential emissions resulting from the proposed alternatives can be compared to state, national, and global GHG emission totals to provide context and potential contribution to climate change impacts.

Table 3-11 shows the total estimated GHG emissions from fossil fuels at the global, national, and state scales over the years 2016-2020. Emissions are shown in Mt per year of carbon dioxide equivalent (CO_2e). Chapter 3 of the Annual GHG Report contains additional information on GHGs and an explanation of CO_2e. State and national energy-related CO_2 emissions include emissions from fossil fuel use across all sectors (residential, commercial, industrial, transportation, and electricity generation) and are released at the location where the fossil fuels are consumed.

Additional information on current state, national, and global GHG emissions, as well as the methodology and parameters for estimating emissions from BLM fossil fuel authorizations and cumulative GHG emissions, is included in the Annual GHG Report (see Chapters 4, 5, and 6).

Table 3-11. Global and U.S. Greenhouse Gas Emissions (2016–2020)

Scale	2016	2017	2018	2019	2020
Global	36,465.6	36,935.6	37,716.2	37,911.4	35,962.9
U.S.	5,077.0	5,005.5	5,159.3	5,036.0	4,535.3
Utah	72.0	72.0	73.8	74.5	71.4

Source: Annual GHG Report (BLM 2022f), Chapter 6, Tables 6-1 and 6-3; EPA (2023e) and EPA 2023n.

Note: all values in Mt of carbon dioxide equivalent.

The continued increase of anthropogenic GHG emissions over the past 60 years has contributed to global climate change impacts. A discussion of past, current, and projected future climate change impacts is described in Chapters 8 and 9 of the Annual GHG Report. These chapters describe currently observed climate impacts globally, nationally, and in each state and present a range of projected impact scenarios depending on future GHG emissions levels. These chapters are incorporated by reference in this analysis.

3.3.2.2 Environmental Effects

Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would affirm its decision to lease 59 leases from the 2018 Lease Sales. GHG emissions from the development of these leases would occur under the No Action Alternative. While the leasing action does not directly result in development that will generate GHG emissions, emissions from potential future development of the leases are reasonably foreseeable and can be estimated for the purposes of this lease sale. There are four general phases of post-lease development that would generate GHG emissions: 1) well development (well site construction, well drilling, and well completion), 2) well production operations (extraction, separation, gathering), 3) mid-stream (refining, processing, storage, and transport/distribution), and 3) end use (combustion or other uses) of the fuels produced. While well development and production operation emissions occur on-lease, and the BLM has program authority over these activities, mid-stream and end-use emissions typically occur off-lease where the BLM has no program authority.

Emissions inventories at the leasing stage are imprecise due to uncertainties, including the type of mineral development (oil, gas, or both), scale, and duration of potential development; types of equipment (drill rig engine tier rating, horsepower, fuel type); and the mitigation measures that a future operator may propose in their development plan. To estimate reasonably foreseeable on-lease emissions at the leasing stage, the BLM uses estimated well numbers based on state data for past lease development combined with per-well drilling, development, and operating emissions data from representative wells in the area. Given that the BLM has received and approved APD packages on three leases for helium production, of the eight wells used for the RFDS, three were assumed to be helium and five were assumed to be oil and gas. The amount of oil or gas that may be produced if the leases are developed is unknown. For purposes of estimating production and end-use emissions, potential wells are assumed to produce oil and gas in similar amounts as existing nearby wells. While the BLM has no authority to direct or regulate the end-use of the products, for the purposes of this analysis, the BLM assumes that all produced oil or gas would be combusted (such as for domestic heating or energy production). The BLM acknowledges that there may be additional sources of GHG emissions along the distribution, storage, and processing chains (commonly referred to as mid-stream operations) associated with production from the leases. These

sources may include emissions of CH_4 (a more potent GHG than CO_2 in the short term) from pipeline and equipment leaks, storage, and maintenance activities. These sources of emissions are highly speculative at the leasing stage; therefore, the BLM has chosen to assume that mid-stream emissions associated with the leases for this analysis will be similar to the national level emissions identified by the Department of Energy's National Energy Technology Laboratory (NETL) (NETL 2009, 2019).

The emission estimates calculated for this analysis were generated using the assumptions previously described above using the BLM Lease Sale Emissions Tool. Emissions are presented for each of the four phases of post-lease development described above.

- Well development emissions occur over a short period and may include emissions from heavy equipment and vehicle exhaust, drill rig engines, completion equipment, pipe venting, and well treatments such as hydraulic fracturing.
- Well production operations, mid-stream, and end-use emissions occur over the entire production life of a well, which is assumed to be 20 years for this analysis based on the productive life of a typical oil/gas field.
- Production emissions may result from storage tank breathing and flashing, truck loading, pump engines, heaters and dehydrators, pneumatic instruments or controls, flaring, fugitives, and vehicle exhaust.
- Mid-stream emissions occur from the transport, refining, processing, storage, transmission, and distribution of produced oil and gas. Mid-stream emissions are estimated by multiplying the estimated ultimate recovery (EUR) of produced oil and gas with emissions factors from NETL life cycle analysis of U.S. oil and natural gas. Additional information on emissions factors can be found in the Annual GHG Report (Chapter 4, Tables 4-7 and 4-9).
- For the purposes of this analysis, end-use emissions are calculated assuming all produced oil and gas is combusted for energy use. End-use emissions are estimated by multiplying the EUR of produced oil and gas with emissions factors for combustion established by the EPA (Tables C-1 and C-2 to Subpart C of 40 CFR 98). Additional information on emission factors and EUR factors can be found in the Annual GHG Report (Chapter 4).

Table 3-12 lists the estimated direct (well development and production operations) and indirect (mid-stream and end-use) GHG emissions in metric tons for the subject leases over the average 20-year production life of the lease. There is a lot of uncertainty in estimating the production life of a well and this is consistent with the RFDS, which is a 20-year, forward-looking estimation of oil and gas exploration and development. If the BLM were to assume a 30-year production life of the lease, the estimated direct and indirect GHG emissions would be 915,962 metric tons of CO_2e. This is an approximately 10% increase from the estimated direct and indirect CO_2e emissions for the subject leases using a 20-year production life of the lease (see Table 3-12).

Table 3-12. Estimated Life of Lease Emissions from Well Development, Well Production Operations, Mid-Stream, and End-Use

Activity	CO_2	CH_4	N_2O	CO_2e (100 years)	CO_2e (20 years)
Well development	9,434	2.07	0.069	9,515	9,624
Well production operations	159,745	369.62	0.320	170,848	190,327
Mid-stream	74,000	199.28	1.228	80,274	90,776

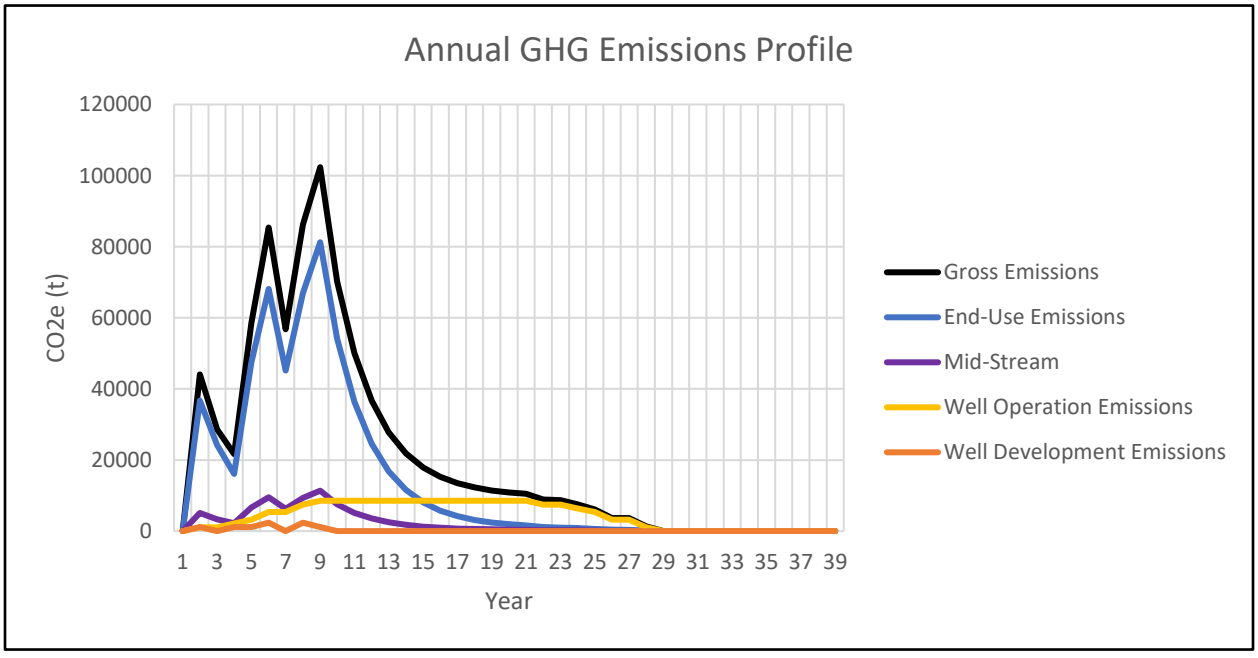
Activity	**CO_2**	**CH_4**	**N_2O**	**CO_2e (100 years)**	**CO_2e (20 years)**
End-use	559,341	21.52	4.215	561,133	562,266
Total	802,520	592.50	5.833	821,769	852,994

Source: BLM Lease Sale Emissions Tool (BLM 2022b).

Note: all values in metric tons.

The Utah EA analyzes GHG and how emissions relate to climate change at a lease sale scale for a 5-year period (2014–2018). It also analyzes the total potential GHG emissions from reasonably foreseeable oil and gas development for each FO planning area. Emissions calculations from the lease sales provides the decision-maker with estimates for the total potential GHG emissions based on the historical number of wells developed for a high development year (high scenario) and the average year (low scenario). In addition, the analysis compares the high and low scenarios with the RFDS for each BLM Utah FO planning area. For the PFO, 1,900 wells were assumed in the RFDS for the RMPs. Table 11 of the Utah EA provides the 2019 baseline annual GHG emissions from the 1,340 existing oil and gas wells in the PFO, showing 3,066,647 metric tons of carbon dioxide equivalent per year (CO_2e/year) for annual oil and gas emissions. Table 12 of the Utah EA shows the estimated emissions from construction and operating potential wells from oil and gas development in the PFO. For the 1,900 wells assumed to be developed, the single-well emissions for construction and operations were 679 metric tons of CO_2e and 428 metric tons of CO_2e/year, respectively. The construction emissions totaled 1,289,474 metric tons of CO_2e and operation emissions totaled 813,847 metric tons of CO_2e/year. Emissions listed in Table 3-12 are 8.5% of the construction and operation emissions listed in the Utah EA.

GHG emissions vary annually over the production life of a well due to declining production rates over time. Figure 3-1 shows the estimated GHG emissions profile over the production life of a typical lease, including well development, well production operations, mid-stream, end-use, and gross emissions.



Source: BLM Lease Sale Emissions Tool (BLM 2022b).

Note: t = metric tons.

Figure 3-1. Estimated annual greenhouse gas emissions profile over the life of a lease.

To put the estimated GHG emissions for this lease sale in a relatable context, potential emissions that could result from development of the leases for this sale can be compared to other common activities that generate GHG emissions and to emissions at state and national levels. The EPA GHG Equivalencies Calculator can be used to express the potential average year of GHG emissions on a scale relatable to everyday life (EPA 2023l). For instance, the projected average annual GHG emissions from potential development of the subject lease are equivalent to 6,627 gasoline-fueled passenger vehicles driven for 1 year, or the emissions that could be avoided by operating eight wind turbines as an alternative energy source or offset by the carbon sequestration of 36,606 acres of forest land.

Table 3-13 compares the estimated average annual lease sale emissions to existing federal fossil fuel (oil, gas, and coal) emissions and state and U.S. total GHG emissions from all sectors as reported in the EPA Inventory of U.S. GHG Emissions and Sinks: 1990–2020 (EPA 2022a).

Table 3-13. Comparison of Lease Sale Annual Emissions to Other Sources

Reference	Mt CO2e* (per year)	Average Year Percentage of Reference
Emissions from Leases (average year)	0.031	–
Utah onshore federal (oil and gas) †	12.68	0.243%
U.S. onshore federal (oil and gas) †	465.63	0.007%
U.S. federal – all (oil and gas) †	844.27	0.004%
U.S. federal (oil, gas, and coal) †	1,292.57	0.002%
Utah total (all sectors)‡	71.41	0.043%
U.S. total (all sectors)‡	5,981.40	0.001%

* Estimates are based on 100 Global Warming Potential values.

† Federal values come from the Annual GHG Report, Tables ES-1 and ES-2. U.S Federal – All includes offshore oil and gas production (BLM 2022e).

‡ Values comes from the EPA Inventory of U.S. GHG Emissions and Sinks: 1990–2020 (EPA 2022a) and use the Intergovernmental Panel on Climate Change (2007) Fourth Assessment Report Global Warming Potential values.

Table 3-14 compares emission estimates over the 20-year life of the lease compared to the 20-year projected federal emissions in the state and nation from existing wells, the development of approved APDs, and emissions related to reasonably foreseeable lease actions.

Table 3-14. Comparison of the Life of Lease Emissions to Other Federal Oil and Gas Emissions

Reference	Mt CO_2e (100 years)	Life of Lease Percentage of Reference
Lease sale emissions (life of lease)	0.822	100.000%
Utah reasonably foreseeable short-term federal (oil and gas)*	187.84	0.437%
Utah EIA projected long-term federal (oil and gas) †	536.32	0.153%

Reference	Mt CO_2e (100 years)	Life of Lease Percentage of Reference
U.S. short-term federal (oil and gas)	4,614.81	0.018%
U.S. long-term federal (oil and gas)	13,560.24	0.006%

Source: BLM Lease Sale Emissions Tool (BLM 2022b); and Annual GHG Report (BLM 2022e), Tables 5-17 and 5-18.

* Short-term foreseeable is estimated federal emissions from existing producing wells, approved APDs, and 1 year of leasing.

† Long-term foreseeable are estimated federal emissions to meet EIA projected energy demand.

Compared to emissions from other existing and foreseeable short-term federal oil and gas development, the life of lease emissions for Alternatives A and B is between 0.15% to 0.44% of federal fossil fuel authorization emissions in the state and between 0.006% to 0.18% of federal fossil fuel authorization emissions in the nation. If foreseeable long-term federal oil and gas development and production remains a constant percentage of EIA projected energy demand, then the estimated emissions from the life of leases in the proposed alternative is between 0.006% and 0.18% of federal emissions in the nation over the next 20 years. In summary, potential GHG emissions from the proposed alternatives could result in GHG emissions of 0.781 metric tons of CO_2e over the life of the lease.

As detailed in the Annual GHG Report (BLM 2022e), which the BLM has incorporated by reference, the BLM also looked at other tools to inform its analysis, including the MAGICC model (see Section 7.0 of the Annual GHG Report). This model run suggests that "30-plus years of projected federal emissions would raise average global surface temperatures by approximately 0.0158 °C, or 1% of the lower carbon budget temperature target" (BLM 2022e:71). As this is an assessment of what the BLM has projected could come from the entire federal fossil fuel program, including the projected emissions from the proposed alternative, over the next 30 years, the reasonably foreseeable lease sale emissions contemplated in this EA are not expected to substantially affect the rate of change in climate effects, bring forth impacts that are not already identified in existing literature, or cause a change in the magnitude of impacts from climate change at the state, national, or global scales.

Monetized Impacts from No Action Alternative Greenhouse Gas Emissions

The social cost of carbon dioxide, social cost of nitrous oxide, and social cost of methane—together, the SC-GHG—are estimates of the monetized damages associated with incremental increases in GHG emissions in a given year.

On January 20, 2021, President Biden issued EO 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis. Section 1 of EO 13990 establishes an administration policy to, among other things, listen to the science; improve public health and protect our environment; ensure access to clean air and water; reduce GHG emissions; and bolster resilience to the impacts of climate change. Section 2 of the EO calls for federal agencies to review existing regulations and policies issued between January 20, 2017, and January 20, 2021, for consistency with the policy articulated in the EO and to take appropriate action.

Consistent with EO 13990, the CEQ rescinded its 2019 *Draft National Environmental Policy Act Guidance on Considering Greenhouse Gas Emissions* and has begun to review for update its *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews* issued on August 5, 2016 (2016 GHG Guidance). While CEQ works on updated guidance, it has instructed agencies to consider and use all tools and resources available to them in assessing GHG emissions and climate change effects, including the 2016 GHG Guidance.

Regarding the use of SC-CO_2 or other monetized costs and benefits of GHGs, the 2016 GHG Guidance noted that NEPA does not require monetizing costs and benefits (CEQ 2016). It also noted that "the weighing of the merits and drawbacks of the various alternatives need not be displayed using a monetary cost-benefit analysis and should not be when there are important qualitative considerations" (CEQ 2016).

Section 5 of EO 13990 emphasized how important it is for federal agencies to "capture the full costs of greenhouse gas emissions as accurately as possible, including by taking global damages into account" and established the Interagency Working Group on Social Cost of Greenhouse Gases, United States Government (IWG). In February 2021, the IWG published *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide: Interim Estimates under Executive Order 13990* (Technical Support Document) (IWG 2021). This interim report updated previous guidance from 2016. The final report is still pending.

In accordance with this direction, this subsection provides estimates of the monetary value of changes in GHG emissions that could result from selecting each alternative. Such analysis should not be construed to mean a cost determination is necessary to address potential impacts of GHGs associated with specific alternatives. These numbers were monetized; however, they do not constitute a complete cost-benefit analysis, nor do the SC-GHG numbers present a direct comparison with other impacts analyzed in this document. For instance, the BLM's overall economic analysis for this lease sale does not monetize most of the major costs or benefits and does not include all revenue streams from the proposed alternatives but seeks to quantify certain impacts related to employment numbers and labor income. The SC-GHG is provided only as a useful measure of the benefits of GHG emissions reductions to inform agency decision-making.

For federal agencies, the best currently available estimates of the SC-GHG are the interim estimates of the SC-CO_2, SC-CH_4, and SC-N_2O developed by the IWG on the SC-GHG. Select estimates are published in the Technical Support Document (IWG 2021), and the complete set of annual estimates are available on the U.S. Office of Management and Budget's website (U.S. Office of Management and Budget 2021).

The IWG's SC-GHG estimates are based on complex models describing how GHG emissions affect global temperatures, sea level rise, and other biophysical processes; how these changes affect society through, for example, agricultural, health, or other effects; and monetary estimates of the market and nonmarket values of these effects. One key parameter in the models is the discount rate, which is used to estimate the present value of the stream of future damages associated with emissions in a particular year. A higher discount rate assumes that future benefits or costs are more heavily discounted than benefits or costs occurring in the present (i.e., future benefits or costs are a less significant factor in present-day decisions). The current set of interim estimates of the SC-GHG have been developed using three different annual discount rates: 2.5%, 3%, and 5% (IWG 2021).

As expected with such a complex model, there are multiple sources of uncertainty inherent in the SC-GHG estimates. Some sources of uncertainty relate to physical effects of GHG emissions, human behavior, future population growth and economic changes, and potential adaptation (IWG 2021). To better understand and communicate the quantifiable uncertainty, the IWG method generates several thousand estimates of the social cost for a specific gas, emitted in a specific year, with a specific discount rate. These estimates create a frequency distribution based on different values for key uncertain climate model parameters. The shape and characteristics of that frequency distribution demonstrate the magnitude of uncertainty relative to the average or expected outcome.

To further address uncertainty, the IWG recommends reporting four SC-GHG estimates in any analysis. Three of the SC-GHG estimates reflect the average damages from the multiple simulations at each of the three discount rates. The fourth value represents higher-than-expected economic impacts from climate change. Specifically, it represents the 95th percentile of damages estimated, applying a 3% annual

discount rate for future economic effects. This low probability, high damage scenario represents an upper boundary of damages within the 3% discount rate model. The estimates below follow the IWG recommendations.

The SC-GHG associated with estimated emissions from future potential development of the leases are reported in Table 3-15. These estimates represent the present value (from the perspective of 2021) of future market and nonmarket costs associated with CO_2, CH_4, and N_2O emissions from potential well development and operations and potential end-use, as described in Subsection 1.2.1. Estimates are calculated based on IWG estimates of social cost per metric ton of emissions for a given emissions year and the BLM's estimates of emissions in each year. They are rounded to the nearest $1,000. The estimates assume that well operations, mid-stream, and end-use emissions occur over the entire production life of a well, which is assumed to be 20 years based on the productive life of a typical oil/gas field. However, as discussed in Section 3.3.2.2, if the leases are developed, the additional minerals (oil/gas, etc.) would be added to the global market and there would be no net impact (and perhaps even a reduction) in emissions because, rather than burning carbon-intensive materials for energy, less-intensive natural gas would be used.

Table 3-15. Social Cost of Greenhouse Gases Associated with Future Potential Development of the Proposed Alternative

Development Phases	Average Value, 5% Discount Rate	Average Value, 3% Discount Rate	Average Value, 2.5% Discount Rate	95th Percentile Value, 3% Discount Rate
Development and operations	$2,182,000	$8,266,000	$12,490,000	$25,011,000
End-use	$8,699,000	$31,803,000	$47,703,000	$96,163,000
Total	**$10,881,000**	**$40,069,000**	**$60,193,000**	**$121,174,000**

Source: BLM (2021e).

Impacts of the Wilderness and Lands with Wilderness Characteristics Alternative

Under the Wilderness and Lands with Wilderness Characteristics Alternative, the BLM would cancel 48 leases (encompassing 75,494.99 acres) that contain identified LWCs and one lease (encompassing 1,408.01 acres) within a designated wilderness area. However, the affirming of the other 10 leases opens up the potential for mineral exploration and drilling activity. Potential impacts to GHG and climate change would not occur unless these leases would be developed.

Based on the RFDS, the 20.8 acres associated with the Wilderness and Lands with Wilderness Characteristics Alternative is approximately 17% of the acreage of No Action Alternative, which would equate to approximately 2 wells. Therefore, if the 2 wells are developed the types of impacts would be less than described under the No Action Alternative if all eight wells were developed. More emissions detail is provided in Appendix G. However, the three leases with APDs, Leases UTU93475, UTU93476, and UTU93479, are not included in the 10 leases and therefore would not be developed. Since there are 49 fewer leases under this alternative, the impacts on GHG and climate change would likely be less than under the no action alternative (see Table 3-12), as it is likely that fewer than eight wells would be developed. The estimated direct (well development and production operations) and indirect (mid-stream and end-use) GHG emissions for the eight wells is 852,994 in metric tons over the average 20-year production life of the lease. SC-GHG associated with estimated emissions from future potential development of the leases range from $10,881,000 to $121,174,000. Since there are 49 fewer leases under

this alternative, the impacts on GHGs and climate change would likely be less than under the No Action Alternative, as it is likely that fewer than eight wells would be developed.

Impacts of the Lease Cancellation Alternative

The Lease Cancellation Alternative would not result in any potential impacts to GHGs and climate change, as the leases would be cancelled and not developed at this time. Since no leases would be developed under this alternative, the impacts on GHGs and climate change would be less than under the No Action Alternative and the Wilderness and Lands with Wilderness Characteristics Alternative.

The BLM does not have a model to estimate energy market substitutions at a spatial resolution needed for this production scenario. Reductions in oil and natural gas produced from federal leases may be partially offset by non-federal production (state and private) in the United States, in which the indirect GHG emissions would be similar, or overseas, in which case the GHG emissions would likely be higher, as there are generally less regulatory requirements for production and the produced energy would need to be physically transported into the United States. There may also be substitution of other energy resources to meet energy demand. These substitution patterns will be different for oil and gas. The change in emissions from energy substitution compared to the No Action Alternative could range from a 98.5% decrease if hydroelectricity is substituted to a 110.7% increase if coal is substituted; see Table 10-3 in Section 10.0 of the Annual GHG Report (BLM 2022e).

Oil is primarily used for transportation, while natural gas is primarily used for electricity production and manufacturing, and to a lesser degree by residential and commercial users (EIA 2023). Coal and renewable energy sources are stronger substitutes for natural gas in electricity generation. The effect of substitution between different fuel sources on indirect GHG emissions depends on the replacement energy source. For example, coal is a relatively more carbon intense fuel than natural gas and hydroelectricity is the least carbon intense fuel (see Table 10-3 of the Annual GHG Report [BLM 2022e]). In the transportation sector, alternatives to oil are likely to be less carbon intensive. Finally, substitution across energy sources or oil and gas production from other locations may not fully meet the energy needs that would otherwise have been realized through production from these leases. Price effects may lower the market equilibrium quantity demanded for some fuel sources. This would lead to a reduction in indirect GHG emissions. These three effects are likely to occur in some combination under the lease cancellation alternative, but the relative contribution of each is unknown. Over the past decade the increasing mix of natural gas has contributed to lower emissions as it has replaced energy produced from coal. In 2022, high prices for natural gas and demand exceeding supply have resulted in some countries reactivating or delaying planned closures of coal-fired power plants (Kartit 2022). In the future, renewable energy is anticipated to become a larger part of the U.S. energy mix and reducing energy related carbon emissions. It has been estimated that with a 35% integration of wind and solar energy into the Western United States electric grid there would be an additional 25 to 45% reduction in carbon emissions (BLM 2022e). Regardless, GHG emissions under the lease cancellation alternative are not expected to be zero. Further discussion of past, present, and projected global and state GHG emissions can be found in Chapter 6 of the 2021 Annual GHG report (BLM 2022e).

3.3.2.3 Mitigation Measures and Residual Effects

GHG emissions contribute to changes in atmospheric radiative forcing, resulting in climate change impacts. GHGs act to contain solar energy loss by trapping longer wave radiation emitted from the Earth's surface and act as a positive radiative forcing component. The buildup of these gases has contributed to the current changing state of the climate equilibrium toward warming. Chapters 8 and 9 of the Annual GHG Report provide a detailed discussion of climate change science, trends, and impacts. The relationship between GHG emissions and climate impacts is complex, but a project's potential to contribute to climate change is reduced as its net emissions are reduced. When net emissions approach

zero, the project has little or no contribution to climate change. Net-zero emissions can be achieved through a combination of controlling and offsetting emissions. Emission controls (e.g., vapor recovery devices, no-bleed pneumatics, leak detection and repair, etc.) can substantially limit the amount of GHGs emitted to the atmosphere, while offsets (e.g., sequestration, low carbon energy substitution, plugging abandoned or uneconomical wells, etc.) can remove GHGs from the atmosphere or reduce emissions in other areas. Chapter 10 of the Annual GHG Report provides a more detailed discussion of GHG mitigation strategies (BLM 2022e).

Several federal agencies work in concert to implement climate change strategies and meet U.S. emissions reduction goals while supporting U.S. oil and gas development and operations. The EPA is the federal agency charged with regulation of air pollutants and establishing standards for protection of human health and the environment. The EPA has issued regulations that will reduce GHG emissions from any development related to the proposed leasing action. These regulations include the Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015 (49 CFR 60, Subpart OOOOa), which imposes emission limits, equipment design standards, and monitoring requirements on oil and gas facilities. A detailed discussion of existing regulations and EOs that apply to BLM management of federal lands as well as current federal and state regulations that apply to oil and gas development and production can be found in Chapter 2 of the Annual GHG Report (BLM 2022e).

Oil and gas sources operating on lands under state jurisdiction within the State of Utah are required to register with UDAQ in accordance with Utah Administrative Code R307-505. The registration process will help UDAQ identify oil and gas facilities on state lands, thereby increasing the resolution of oil and gas emissions inventories and allowing for more comprehensive compliance assessments.

The majority of GHG emissions resulting from federal fossil fuel authorizations occur outside of the BLM's authority and control (these include mid-stream and end-use emissions). These emissions are referred to as indirect emissions and generally occur off-lease during the transport, distribution, refining, and end-use of the produced federal minerals. The BLM's regulatory authority is limited to those activities authorized under the terms of the lease, which primarily occur in the upstream portions of natural gas and petroleum systems. This decision authority is applicable when development is proposed on public lands, and the BLM assesses the specific location, design, and plan of development. In carrying out its responsibilities under NEPA, the BLM has developed BMPs designed to reduce emissions from field production and operations. BMPs may include limiting emissions from stationary combustion sources, mobile combustion sources, fugitive sources, and process emissions that may occur during development of the leases. Analysis and approval of future development may include the application of BMPs within BLM's authority, included as COAs, to reduce or mitigate GHG emissions. A stipulation for Air Quality (UT-S-01), and Lease Notices for Regional Ozone Formation Controls (UT-LN-99) and Air Quality Analysis (UT-LN-102) apply to all leases. Additional measures proposed at the project development stage may be incorporated as applicant-committed measures by the project proponent or added to necessary air quality permits. Additional information on mitigation strategies, including emissions controls and offset options, are provided in Chapter 10 of the Annual GHG Report (BLM 2022e).

3.3.2.4 Cumulative Effects

The analysis of GHGs presented in this EA includes estimated emissions for the leases from the development, production, and end-use of federal fossil fuels. An assessment of GHG emissions from the BLM's fossil fuel authorizations, including coal and oil and gas leasing and development, is included in the Annual GHG Report (see Chapter 5) (BLM 2022e). The Annual GHG Report includes estimates of reasonably foreseeable GHG emissions related to BLM lease sales anticipated during the calendar year, as well as the best estimate of emissions from ongoing production and development of leases sold in

previous lease sales. It provides an estimate of cumulative GHG emissions from the BLM fossil fuel leasing program based on actual production and statistical trends.

The Annual GHG Report provides an estimate of short-term and long-term GHG emissions from activities across the BLM's oil and gas program. The short-term methodology presented in the Annual GHG Report includes a trends analysis of 1) leased federal lands that are held-by-production, 2) approved APDs, and 3) leased lands from competitive lease sales occurring over the next annual reporting cycle (12 months) to provide a 30-year projection of potential emissions from federal lease actions over the next 12 months. The long-term methodology uses oil and gas production forecasts from the EIA to estimate GHG emissions out to 2050 that could occur from past, present, and future development of federal oil and gas. For both methodologies, the emissions are calculated using life-cycle-assessment emissions and data factors. These analyses are the basis for projecting GHG emissions from leases that are likely to go into production during the analysis period of the Annual GHG Report and represent both a hard look at GHG emissions from fossil fuel leasing and the best available estimate of reasonably foreseeable cumulative emissions related to any one lease sale or set of quarterly lease sales.

Table 3-16 shows the aggregate GHG emissions estimate that would occur from federal leases, existing and foreseeable, between the years 2022 and 2050, using the methodology described above. A detailed explanation of the short-term and long-term methodologies are provided in Sections 4.6 and 4.7 of the Annual GHG Report.

Table 3-16. GHG Emissions from Past, Present, and Foreseeable Federal Onshore Lease Development (Mt CO_2e)

State	Existing Wells (report year)*	Existing Wells (projected) †	Approved APDs‡	Leasing§	Short-Term Totals	Long-Term Totals
AL	0.59	9.11	0	0.23	9.34	23.51
AK	1.6	25.29	33.97	77.64	136.9	63.23
AZ	0	0	0	0	0	0.00
AR	0.58	8.88	0.23	0.23	9.34	20.88
CA	5.27	44.49	6.94	0.06	51.49	200.57
CO	45.67	197.26	25.89	19.95	243.1	1,649.96
ID	0	0.03	0	0.14	0.17	0.06
IL	0	0.09	0	0.22	0.31	0.27
IN	0	0	0	0	0	0.00
KS	0.24	3.26	0	0.06	3.32	10.01
KY	0.01	0.15	0	0.04	0.19	0.38
LA	1.88	24.2	13.74	5.35	43.29	71.09
MD	0	0	0	0	0	0.00
MI	0.07	1.73	0	0.22	1.95	2.97
MS	0.13	2.15	0.37	0.37	2.89	5.49
MT	2.97	44.76	0.95	13.11	58.82	93.01
NE	0.01	0.17	0	0.04	0.21	0.40

State	Existing Wells (report year)*	Existing Wells (projected) †	Approved APDs‡	Leasing§	Short-Term Totals	Long-Term Totals
NV	0.12	1.55	0.11	1.08	2.74	4.72
NM	245.71	1,441.67	433.35	64.5	1,939.52	7,149.88
NY	0	0.01	0	0	0.01	0.02
ND	36.31	307.63	68.65	3.35	379.63	1,112.07
OH	0.1	0	0	0.37	0.37	6.35
OK	1.37	0.96	1.64	0.21	2.81	50.79
OR	0	0	0	0	0	0.00
PA	0	0.04	0	0.42	0.46	0.16
SD	0.11	2.01	0.15	0.15	2.31	3.99
TN	0	0	0	0	0	0.00
TX	2.67	38.03	11.1	0.42	49.55	79.25
UT	12.68	133.87	18.68	35.29	187.84	489.63
VA	0.01	0.12	0	0.03	0.15	0.30
WV	0	0.04	0	0.41	0.45	0.17
WY	107.53	1,010.09	184.85	292.71	1,487.65	4,000.90
Total onshore federal	465.63	3,297.59	800.62	516.6	4,614.81	15,040.03

Source: BLM (2022e).

* Sum of Tables 5-3 and 5-6 in the Annual GHG Report.

† Sum of Tables 5-5 and 5-8 in the Annual GHG Report.

† Sum of Tables 5-10 and 5-12 in the Annual GHG Report.

§ Sum of Tables 5-14 and 5-16 in the Annual GHG Report.

The most recent Short-Term Energy Outlook (STEO) published by the EIA (2023) predicts that the world's oil and gas supply and consumption will increase over the next 18 to 24 months. The latest STEO projections are adequate to use for the No Action Alternative discussion as the global forecast models used for the STEO are not dependent on whether the BLM issues onshore leases but are based on foreseeable short-term global supply and demand and include oil and gas development/operations on existing U.S. onshore leases. The most recent STEO includes the following projections for the next 2 years:

- Global liquid fuels consumption is projected to be 100.9 million barrels per day (bpd) in 2023 and increase by 1.8 million bpd in 2024.
- U.S. crude oil production averaged 11.9 million bpd in 2022. Production is expected to average 12.4 million bpd in 2023 and 12.6 million bpd in 2024.
- Natural gas production is expected to average 101.7 billion cubic feet per day (bcf/d) in 2024, 1% more than in 2022.

- U.S. liquid natural gas export capacity increases will contribute to liquid natural gas exports of 12 bcf/d in 2023, up from 14% from 2022. Liquid natural gas exports are predicted to increase by an average bcf/d by 5% in 2024.
- Coal production is expected to total 550 million short tons (MMst) in 2023. After increasing in both 2021 and 2022, U.S. coal production is expected to decline by 7% from more than 590 MMst in 2022 to about 550 MMst in 2023, with a further 9% decline to around 500 MMst in 2024.
- Generation from renewable sources will make up an increasing share of total U.S. electricity generation, increasing from 8% in 2023 to 9% in 2024.

Based on recent domestic and international events that have resulted in abrupt changes to the global oil and gas supply, other EIA studies and recent U.S. analyses (associated with weather impacts, etc.) regarding short-term domestic supply disruptions and shortages or sudden increases in demand demonstrate that reducing domestic supply (in the near term under the current supply and demand scenario) will likely lead to the import of more oil and natural gas from other countries, including countries with lower environmental and emission control standards than the United States (EIA 2023). Current global supply disruptions have also led to multiple releases from the U.S. Strategic Petroleum Reserve to meet consumer demand and curb price surges (EIA 2022).

The 2023 Annual Energy Outlook (EIA 2023) projects energy consumption increases through 2050 as population and economic growth outweighs efficiency gains. In the 2023 Annual Energy Outlook, crude oil production is forecast to rise in 2023 and 2024 to record high levels, then initially decline but begin to increase starting in 2030 because of changing trends in domestic crude oil production, then remaining relatively flat through 2050. However, renewable energy will be the fastest-growing U.S. energy source through 2050. Energy-related CO_2 emissions are expected to decrease from 2023 to 2050 because of a transition away from more carbon-intensive coal to less carbon-intensive natural gas and renewable energy for electricity generation. CO_2 emissions are expected to trend upward as increasing energy consumption, resulting from population and economic growth, outpaces continuing reductions in energy intensity and CO_2 intensity. Given these forecasts, if the leases are developed, the additional minerals (oil/gas, etc.) would be added to the global market, and there would be no net impact (and perhaps even a reduction) in emissions because rather than burning carbon-intensive materials for energy, they would be using the less carbon-intensive natural gas. Further discussion of past, present, and projected global and state GHG emissions can be found in Chapter 6 of the 2021 Annual GHG Report (BLM 2022e).

EO 14008, Tackling the Climate Crisis at Home and Abroad (January 27, 2021), directs the executive branch to establish policies or rules that put the United States on a path to achieve carbon neutrality, economywide, by no later than 2050. This goal is consistent with Intergovernmental Panel on Climate Change's (IPCC's) recommendation to reduce net annual global CO emissions between 2020 and 2030 in order to reach carbon neutrality by mid-century. Federal agencies are still in the process of developing policies that align with a goal of carbon neutrality by 2050. In the short term, the order has a stated goal of reducing economy-wide GHG emissions by 50% to 52% relative to 2005 emissions levels no later than 2030.

Carbon budgets are an estimate of the amount of additional GHGs that could be emitted into the atmosphere over time to reach carbon neutrality while still limiting global temperatures to no more than 1.5°C or 2°C above preindustrial levels. The IPCC *Special Report on Global Warming of 1.5ºC* is the most widely accepted authority on the development of a carbon budget to meet the goals of the Paris Agreement. None of the global carbon budgets or pledges that countries have committed to stay within as part of the Paris Agreement are binding. Carbon budgets were originally envisioned as being a convenient tool to simplify communication of a complex issue and to assist policymakers considering options for

reducing GHG emissions on a national and global scale. Carbon budgets have not yet been established on a national or subnational scale, primarily due to the lack of consensus on how to allocate the global budget to each nation, and given this, the global budgets that limit warming to 1.5ºC or 2.0ºC are not useful for BLM decision making, particularly at the lease sale stage, as it is unclear what portion of the budget applies to emissions occurring in the United States.

However, stakeholders and members of the public have requested that the BLM consider comparing its predicted emissions in the context of global carbon budgets. Table 7-4 in the Annual GHG Report provides an estimate of the potential emissions associated with BLMs fossil fuel authorizations in relation to IPCC carbon budgets. Total federal fossil fuel authorizations including coal, natural gas, and oil represents approximately 1.75% of a suggested global carbon budget of 400 to 500 gigatonnes of CO_2 needed to limit global warming to 1.5ºC (0.91% for only federal oil and gas).

While continued fossil fuel authorizations will occur over the next decade to support energy demand and remain in compliance with the leasing mandates in the IRA passed in 2022, the U.S. Energy Information Administration International Energy Outlook expects renewable energy consumption to double between 2020 and 2050, with nearly equal liquid fuels consumption by 2050. The United States has committed to the expansion of renewable energy through infrastructure investments in clean energy transmission and grid upgrades include in the Bipartisan Infrastructure Investment and Jobs Act as well as clean energy investments and incentives included in the Inflation Reduction Act.

3.3.3 Socioeconomics and Environmental Justice

Issue Statement: What are the potential impacts to social and economic conditions and EJ?

3.3.3.1 Affected Environment

Socioeconomic assessments evaluate the social and economic characteristics of communities which could be affected by proposed alternatives. This analysis describes and evaluates the socioeconomic and EJ impacts of the proposed and potential development of 59 oil and gas leases in Emery County, Utah.

Data were obtained from the U.S. Department of Labor, the U.S. Geological Survey Gap Analysis Program, the Bureau of Labor Statistics, local area unemployment statistics, the U.S. Department of Commerce, and the U.S. Census Bureau, as compiled by the Headwaters Economics Socioeconomic Profiles Tool developed for the BLM (Headwaters Economics 2023b). The analysis area for socioeconomic and EJ analysis is lands administered by the PFO.

Socioeconomic analysis performed as part of the *BLM Utah 2022 First Competitive Oil and Gas Lease Sale* (DOI-BLM-UT-0000-2021-0007-EA; 2022 First Competitive EA) (BLM 2022c) analyzed the impact of oil and gas leases in Emery, Uintah, and Grand Counties. Noting that Emery County is bordered to the northeast by Uintah County and to the east by Grand County, this analysis assumes the results of the 2022 First Competitive EA are generally applicable and this EA hereby incorporates several of the modeling results generated in that EA. This analysis method is typically referred to as "benefits transfer."

For EJ analysis, demographic data is used to identify minority and low-income populations, including Tribes, and evaluate whether actions considered could have disproportionately high and adverse human health or environmental effects to those populations.

Socioeconomics

Landownership

There are 3,812,589 total acres within the analysis area. Of those, 2,730,041 acres (71.6 %), are federally owned lands, and 2,485,592 acres are managed by the BLM. A total of 606,960 acres within the analysis area are privately owned, 54 acres are Tribal lands, and 475,533 acres are owned by the State of Utah, Emery County, cities, or other non-federal agencies.

Population, Employment, and Income

The total population in the analysis area was 30,339 in 2021, representing a decrease of 2.9% from 2000 to 2021. The largest contributor to this change in total population was net migration. The number of employed workers in the study area in 2021 was 16,572. In 2021, the average annual unemployment rate was 3.9%; 84.6% of workers aged 16 and over within the analysis area worked in their county of residence. Per capita income in the analysis area in 2021 was $43,724 (denominated in 2021 dollars), which was an increase of 35.2% relative to 2020 (Headwaters Economics 2023b).

Poverty, Ethnicity, and Other Demographic Indicators

In 2021, the total number of people living in poverty in the southeastern analysis area, as defined by the U.S. Census Bureau, was 4,457 (15%) of the population. In the same year, there were 854 families living in poverty (11%). In 2021, the majority of the total population, 27,765 persons (92.4%), identified as White. Out of all persons living within the socioeconomic analysis area in 2021, 4,510 (15%) self-identified as being a member of a minority group. Of the total population, 3,392 (11.3%) self-identified as Hispanic or Latino. Of the remaining total, 173 (0.6%) self-identified as American Indian, 281 (0.9%) identified as Black or African American, 96 (0.3%) identified as Asian, 104 (0.3%) identified as Native Hawaiian or other Pacific Islander, 434 (1.4%) identified as other races not listed, and 1,194 (4%) identified as two or more races. The total number of housing units in 2021 was 13,722, of which 81.7% were occupied and 6.9% were seasonal, recreational, or occasionally occupied properties. Of those living within the analysis area aged 25 or older, 16.2% had earned a bachelor's degree or higher in 2021 (Headwaters Economics 2023b).

Jobs by Industry

In 2021, there were approximately 3,667 total jobs in non-services industries in the analysis area. In the same year there were an estimated 7,832 jobs in services related industries and approximately 3,052 additional jobs in the government sector. This total includes federal, state, county, and local government jobs. In 2021, the industries employing the largest numbers of employees in the analysis area were government (primarily state, county, and local government); construction and manufacturing; and trade, accommodation, and food services (Headwaters Economics 2023b).

Wages by Industry

Within the analysis area, the average annual wage for all reported jobs was $45,022 in 2021. The highest paying industries, on average, were mining, government, manufacturing, and information services (Headwaters Economics 2023b).

Non-labor Income

Non-labor income, which includes dividends, interest payments, rent, age-related transfer payments, hardship-related payments, and other transfer payments, can be important in local economies. Where non-

labor income is a relatively high percentage of all income, it is likely that there are a higher number of retirees in comparison to other regions. In 2021, total non-labor income within the analysis area was $617,009,000, representing 46.5% of all income measured in 2021 dollars. The highest category of non-labor income in the same year was age-related transfer payments with $214,473,000 in total income, or 16.2% (Headwaters Economics 2023b).

Federal Land Payments

In fiscal year 2021, a total of $2,989,646 (2021 dollars) was paid by federal land management agencies to state and local governments. Of those payments, $2,593,692 were payments in lieu of taxes, and $96,915, or 3.2% of the total, were from the BLM (Headwaters Economics 2023b). Revenues generated from both competitive and non-competitive oil and gas lease sales directly impact socioeconomic resources in the analysis area via generation of revenue from the lease sales. Oil production from federal lands is subject to a 12.5% royalty payment to the federal government, half of which is provided to the state government for distribution to counties. The sale of the 59 leases totaled $3,247,652.50 in 2018. Revenues generated from rents on oil and gas leases leased but not producing in the analysis area total $182,539.50 for calendar year 2022.

Environmental Justice

In 1994, President Clinton issued EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which requires federal agencies to consider EJ to be part of its mission. Its intent is to promote fair treatment of people of all races and income levels, so no person or group of people bears a disproportionate share of the negative effects from the country's domestic and foreign programs. Specific to the NEPA process, the EO requires that proposed projects be evaluated for "disproportionately high adverse human health and environmental effects on minority populations and low-income populations." Additionally, EO 14096 Revitalizing Our Nation's Commitment to Environmental Justice for All was issued on April 26, 2023, to promote a "whole of government approach" to environmental justice and supplement EO 12898.

The CEQ EJ guidelines for evaluating the potential environmental effects of projects under NEPA require specific identification of minority populations. This analyses used three criteria for identifying EJ communities: 1) the percentage of a Census block group's population self-identifying as something other than "White-alone not Hispanic" (referred to as minority) exceeds 50%, or, if the percentage is 10% greater than the same measure in the county; 2) the percentage of a block group's residents self-identifying as American Indian or Alaska Native Alone exceeds the county; or 3) the percentage of a block group's residents whose income is less than two times (200%) the poverty level or is greater than the same measure in the county.

The BLM defines low-income populations as individuals or groups of people whose income is less than or equal to twice (200% of) the federal poverty threshold, as identified by the U.S. Census Bureau, or if the population of the community experiencing poverty is at or above 50%. Minority populations include the following population groups: American Indian or Alaska Native, Asian, Native Hawaiian or other Pacific Islander, Black or African American, some other race (other than White), a combination of two or more races, or Hispanic. Except for White non-Hispanics, all other racial and ethnic groups are considered minorities; therefore, the total minority population of an area is calculated by subtracting the White non-Hispanic population from the total population. A minority community of concern is present if the percentage of the population self-identifying as white alone, not Hispanic is equal or greater than 50% of the population or meets the meaningfully greater threshold, calculated by comparing the minority group population with 110% of the reference area minority population. Members of Tribal populations include all persons having origins in any of the original peoples of North America and South America (including Central America) and who maintain Tribal affiliation or community attachment. Any

American Indian or Alaska Native population qualifies as a Tribal population, and membership in a federally recognized Tribe is not required. All Tribal populations qualify as EJ populations, regardless of the percentage of the analysis area population they constitute. In addition, dispersed Tribal populations can also constitute EJ populations if they do not reside within the analysis area but depend on cultural resources or places on BLM-managed land within the analysis area (BLM 2022f).

Pursuant to BLM Guidance for Environmental Justice Baseline Analysis, which conforms with BLM IM 2022-059 *Environmental Justice Implementation*, September 2022 (BLM 2022g), non-metropolitan (non-metro) reference percentages were incorporated to provide additional context to the data presented below. The non-metro reference percentages are as follows, in Table 3-17.

Table 3-17. Non-Metropolitan Reference Percentages

Geography	Percentages
*Low-Income Reference Percentages for the Great Basin Zone**	
Utah (state)	24.7
Utah (non-metro)	31.2
Minority Reference Percentages for the Great Basin Zone	
Utah (state)	22.1
Utah (Meaningfully Greater Analysis)	24.3
Utah non-metro	16.7
Utah non-metro (Meaningfully Greater Analysis)	18.4
Tribal Reference Percentages for the Great Basin Zone	
Utah (state)	2.0
Utah (non-metro)	5.0

Source: BLM (2022h).

* The Great Basin Zone, as defined in the Environmental Justice Baseline Analysis Guidance (BLM 2022h), includes Idaho, Nevada, and Utah.

Within the analysis area, all three EJ population types are present in one or more census block groups, based on analyses completed using the U.S. Census Bureau data tables (2021a, 2022b) (Table 3-17, p. 3-62) and the EPA's EJScreen Mapping tool. All of the leases are located in Census Tract 9765, Block Group 3, in the southeast portion of Emery County near the southern border with Wayne County (Figure 3-2). This area is sparsely populated, with approximately 814 residents in an area of 2589.38 square miles. This Census Tract and Block Group meet two of the previously identified CEQ criteria for EJ communities: Criteria 1 (percentage of minority residents), and Criteria 3 (percentage of low-income residents) as well as two of the Great Basin Zone non-metro reference percentages. Communities which meet any of the EJ Criteria are more likely to be disproportionately exposed to environmental harms or have an increased vulnerability to such hazards (Foresight Design Initiative 2017), and may require unique approaches to public participation, community representation, and recognition of interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of a proposed action (EPA 2023m).

To provide context for the potential hazards that the identified EJ Communities may face, the EPA's EJScreen Mapping tool standard report was reviewed for Census Tract 9765, Block Group 3. This report provides the EJ Indices for the block group as a percentile of the state of Utah, and as a national percentile (EPA 2022b). EJ Indices combine demographic factors with a single environmental factor to characterize

exposure or risk to certain variables which may impact vulnerable populations. The EJ Index is higher in block groups with larger numbers of mainly low-income and/or people of color residents with a higher environmental indicator value (EPA 2022c).

The national and state percentiles included in the standard report represent what percentage of the United States or state population has an equal or lower value, or less potential for exposure, risk, or proximity to certain facilities, or a lower percentage minority population, as compared to that block group (EPA 2022d). EJ Indices combine demographic factors with a single environmental factor, although the index does not combine various environmental factors into a cumulative score. Each environmental indicator has its own EJ Index. The EJ Index is higher in block groups with larger numbers of mainly low-income and/or people of color residents with a higher environmental indicator value (EPA 2022c). According to the Standard Report for Census Tract 9765, Block Group 3, the population in this area is above the 50th percentile in the state for lead paint[1] (90th percentile) and underground storage tanks[2] (52nd percentile). This population is also above the 50th percentile nationally for ozone[3] (87th percentile), lead paint (73rd percentile), and wastewater discharge[4] (61st percentile). This means that residents in this block group are more likely to be exposed to risks from underground storage tanks than most residents of the state. Additionally, residents in this block group are more likely to be exposed to lead paint than most residents of either the state or the nation as a whole. As noted in Section 3.2, AIB-18, no significant impacts from hazardous wastes are anticipated which could contribute to this block group's already high exposure to underground storage tanks and wastewater discharge. It is unlikely that additional lead exposure would occur during development of any lease.

While this block group scored high nationally for wastewater discharge and ozone (61st percentile and 87th percentile, respectively), the same group had lower state percentile scores (32nd percentile and 44th percentile, respectively), meaning that the majority of residents in this block group are less likely to be exposed to risks from wastewater discharges or ozone than the average resident of the state.

This block group scored below the 50th percentile in the state for particulate matter (7th percentile), diesel particulate matter (4th percentile), air toxics cancer risk and air toxics respiratory risk (no score), traffic proximity (14th percentile), superfund proximity (29th percentile), RMP Facility proximity (no score), and hazardous waste proximity (4th percentile). This means that residents in this block group are less likely to be exposed to the above indices than most residents of the state.

This block group scored below the 50th percentile nationally for particulate matter, diesel particulate matter, RMP Facility proximity, and hazardous waste proximity (no score); air toxics cancer risk (2nd percentile), air toxics respiratory index (1st percentile), traffic proximity (19th percentile), superfund proximity (4th percentile), and underground storage tanks (43rd percentile). This means that residents in this block group are less likely to be exposed to the above indices than most residents of the nation.

[1] The lead paint indicator is based solely on the age of the housing stock in a selected block group and highlights homes bult prior to 1960 because lead paint was commonly used during that time. This indicator does not take into account any remediation of lead paint which has occurred, such as through government programs to reduce lead or general home renovations (EPA 2022d).

[2] The intent of this indicator is to include facilities, such as treatment, storage, and disposal facilities, which were important in early EJ research and community action but are not covered in another environmental indicator (EPA 2022d).

[3] The indicator for ozone is reported in parts per billion (ppb) and are intended to highlight potential exposure. EJScreen uses distance weighted proximity as a proxy for the potential impact of specific types of facilities (EPA 2022d).

[4] The wastewater discharge indicator takes the pollutant discharge information reported from facilities to the EPA and assigns it to the streams and rivers which receive those discharges. This mapping process includes toxicity-weighted results, or giving more weight to the pollutants which have greater impact on human health. It also must account for dilution as these pollutants move downstream. The indicator ranks Census block groups based on the proximity to these stream segments and the toxicity-weighted pollutant discharge (EPA 2022d).

The EPA's EJScreen Mapping tool does not calculate or display Tribal communities, although the percentage of a block group's residents self-identifying as American Indian or Alaska Native Alone is one of the criteria to be used for EJ analysis, according to the CEQ. As noted in Table 3-18, Census Tract 9762, Block Group 2 and Block Group 3 meet the CEQ criteria for tribal communities. The table below includes the percentage of the population who identify as American Indian or Alaska Native alone, and in parenthesis, the percentage of the population who identify as American Indian or Alaska Native alone or in combination with one or more races. While these block groups have a high percentage of residents who identify as American Indian or Alaska Native alone, none of the leases are located in these areas.

Should separate present and/or future actions undertaken by federal or non-federal entities be found to affect EJ populations within the analysis area, effects that could follow as a result of exploration, development, or production following any of the identified alternatives, could potentially compound those impacts.

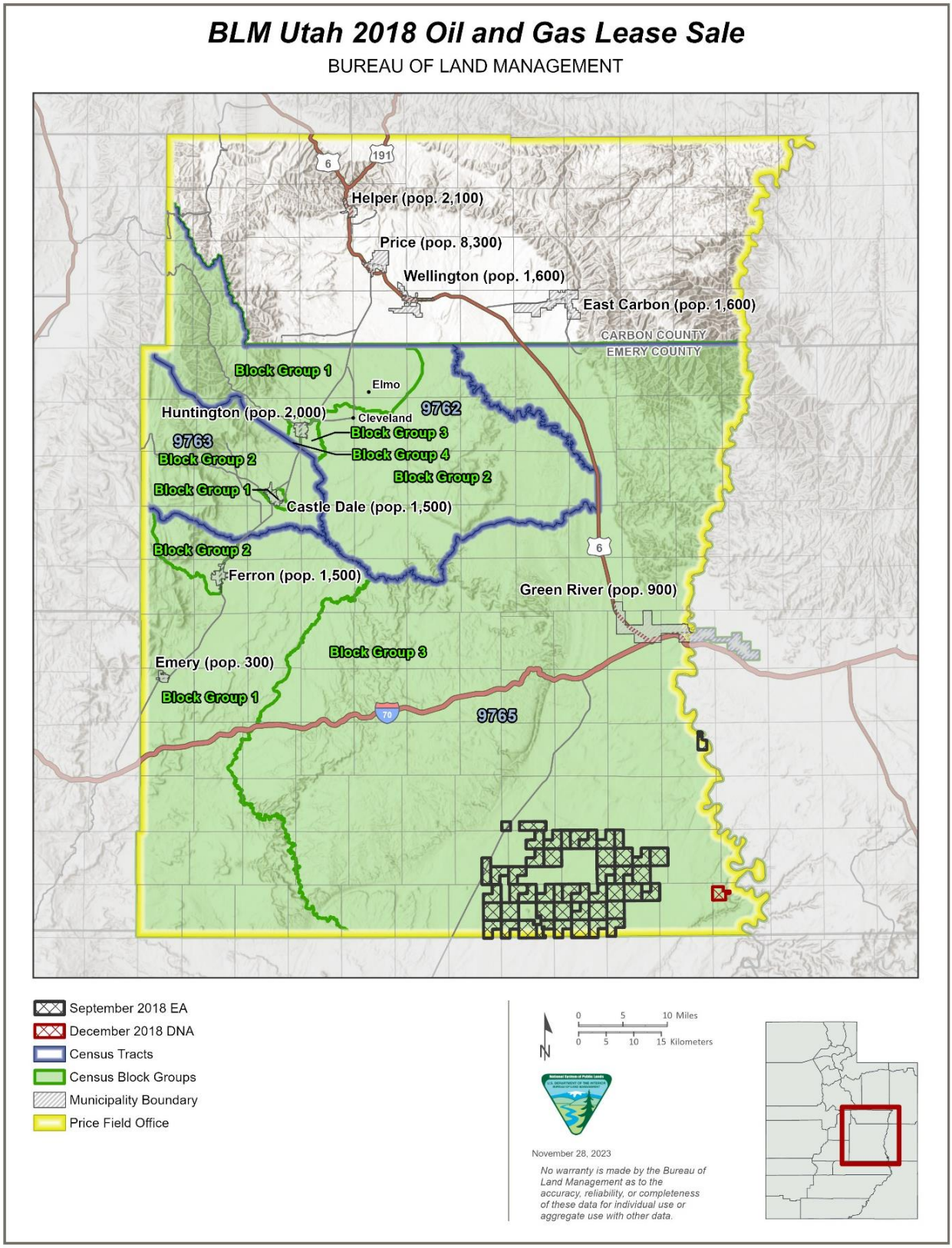


Figure 3-2. Environmental justice and socioeconomic analysis area.

Table 3-18. Environmental Justice Block Groups in Emery County by Race, Ethnicity, and Poverty

Geographic Area	Total Population	White Alone Not Hispanic (%)	Black or African American (%)	American Indian and Alaska Native (%)*	Asian (%)	Native Hawaiian and Other (%) Pacific Islander	Some Other Race (%)	Two or More Races (%)	Hispanic or Latino (%)	Total Racial Minority (%)	Percentage Below 200% of the Poverty Line	EJ Community? Y/N
Utah	3,231,370	77.3	1.1	0.8 (1.7)	2.3	0.9	0.3	3.0	14.4	22.7	24.7	N/A
Emery County	9,839	90.5	0.1	0.7 (1.69)	0.0	0.4	0.1	1.8	6.5	9.5	31.9	N/A
Census Tract 9672, Block Group 1	964	93.3	0.0	0.0 (0.0)	0.0	3.9	0.0	0.0	2.8	6.7	16.9	N
Census Tract 9762, Block Group 2	940	93.4	0.0	2.1† (0.0)	0.0	0.0	0.0	0.6	3.8	6.6	24.1	Y
Census Tract 9762, Block Group 3	1,205	76.7	0.0	3.8† (0.0)	0.0	0.0	0.0	9.7	9.8	23.3†	34.7†	Y
Census Tract 9762, Block Group 4	1,089	93.1	0.0	0.0 (0.0)	0.0	0.0	0.0	0.0	6.9	6.9	41.5†	Y
Census Tract 9763, Block Group 1	1,375	96.7	0.0	0.0 (0.0)	0.0	0.0	0.7	0.0	2.6	3.3	42.5†	Y
Census Tract 9763, Block Group 2	1,274	95.1	0.0	0.0 (0.0)	0.0	0.0	0.0	1.8	3.1	4.9	13.3	N
Census Tract 9765, Block Group 1	1,084	93.7	0.6	0.0 (0.0)	0.0	0.0	0.0	2.7	3.0	6.3	36.5†	Y
Census Tract 9765, Block Group 2	1,086	98.6	0.0	0.0 (0.0)	0.0	0.0	0.0	0.2	1.2	1.4	30.6	N
Census Tract 9765, Block Group 3	822	67.9	0.0	0.0 (0.0)	0.0	0.0	0.0	0.0	32.1	32.1†	48.9†	Y

Source: U.S. Census Bureau (2021a, 2021b, 2021c).

*Percentages in parenthesis represent the percentage of the population who identify as American Indian and Alaska Native alone or in combination with one or more other races.

†Percentages with a double asterisk meet both the CEQ EJ Community criteria as well as the BLM non-metro criteria.

3.3.3.2 Environmental Effects

Socioeconomics

Regional economic effects are typically measured in direct, indirect, and induced impacts. Direct impacts measure the economic impact of operating expenditures made by one or more economic enterprises within the analysis area on labor, materials, supplies, and productive capital. Indirect effects measure the purchase of goods and services, and the hiring of labor to meet demand for inputs that are purchased within the analysis area in support of the economic activities accounted for in the direct impacts described above. Induced effects measure the economic impact that occurs because of household purchases of goods and services by employees of the economic enterprise(s) accounted for in direct impacts. Induced effects do not represent cumulative effects. Cumulative effects are described in 3.3.3.4, below.

Employment

The 2022 First Competitive EA utilized 2019 IMPLAN modeling data to calculate the direct, indirect, and induced effect of oil and gas development on socioeconomic resources in Grand, Emery, and Uintah Counties, and included a multiplier on economic effects. Multipliers express the total size of the economic impact and are calculated by dividing the total effects by direct effects. As an example, an employment multiplier of 1.4 means that for each direct job supported by a specific change in economic activity, there are an additional 0.4 jobs in indirect and induced employment. Direct jobs represent positions created directly by a commercial enterprise; indirect jobs are those created as a result of spending on goods and services by the commercial enterprise or its employees.

The 2022 First Competitive EA analyzed the employment effects from the potential development of six oil and gas leases in the Vernal, Price, and Moab FOs. According to the 2022 First Competitive EA, employment effects from the potential development of the one oil and gas lease in the PFO could support 0.3 job directly (initial lease development), and less than 0.1 jobs indirectly (ongoing support). While this analysis considers 59 leases, the RFDS (as noted in Section 3.1.1) anticipates the potential development of eight wells, although it is anticipated that the wells drilled would be dry and would not produce oil and gas in paying quantities. Therefore, it is reasonable to extrapolate that should all eight wells be developed, approximately 2.4 direct jobs and less than 0.1 indirect job could be supported.

The development of leases typically occurs in three phases and associated activities: implementation, production, and reclamation. Each of these phases may indirectly impact communities in the analysis area via jobs, income, and tax revenues.

Pre-drilling exploration work is typically performed by in-house scientists and technicians employed by oil and gas companies; however, local contractors could be employed in subsequent oil and gas exploration and development activities, such as work associated with the implementation phase. Activities associated with the implementation phase could include pad construction, well drilling, development of new access roads or upgrades of existing roads, and installation of pipelines. As noted in Appendix D, drilling activities on a well typically occur 24 hours per day, seven days per week, and would require approximately 20 workers. Depending on the depth and complexity of the well, drilling could last from a few days to 1 week. These workers could spend a portion of their salary in local or regional economies for the duration of their work. However, as noted above, analysis using the RFDS anticipates approximately 2.4 direct jobs and less than 0.1 indirect job if eight wells were to be developed.

Activities associated with the production phase involve the addition of machinery such as engines for pumping oil, compressors for moving gas through pipelines, and vents for storage tanks. Local trucking companies could be hired to haul produced fluids or other project materials to and from the wells, and technicians would perform regular monitoring of the wells. As stated above, in-house scientists may be

utilized to perform monitoring work; however, qualified local drivers could be contracted for materials transport.

The reclamation phase includes plugging wells and reclaiming the well pad and other associated disturbances such as roads and pipelines. Similar to the implementation phase, local contractors could be employed to perform construction activities associated with the plugging and reclamation of wells.

During each of the three phases, the potential for local socioeconomic impacts may increase if most of the work is supplied by local contractors and if local businesses are visited for the purchase of supplies, meals, rooms, and other items. However, given the production estimates in the RFDS (see Section 3.1.1), positive indirect impacts to socioeconomics may be minor, although the payments made at the time of auction ($3,247,652.50 in 2018), annual rent fees (10 years), and royalties (when production occurs) could provide income to county governments for schools and other expenditures.

Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would affirm its decision to lease the 59 leases from the 2018 Lease Sales and would retain the bonus bids, advanced rental fees, and filing fees paid for these leases. As noted above, the sale of the 59 leases in 2018 totaled $3,247,652.50. APDs for helium production have been approved for three of these leases (UTU93475, UTU93476, and UTU93479). As noted in Section 3.1.1, the RFDS anticipates a maximum of eight wells to be drilled in the PFO. Using this assumption, it was calculated that approximately 2.4 jobs could be supported with development of eight wells. Because the No Action Alternative contemplates affirming 59 leases, the number of jobs could be higher if more than eight wells were developed (approximately 17 direct jobs). However, as noted in the RFDS, this scenario is unlikely to occur, and as such, impacts to employment, and by extension, revenues and related socioeconomic conditions, are not anticipated to be greatly affected by affirming the 2018 lease decisions. The No Action Alternative would not be expected to induce substantial growth or concentration of population, displace many people, cause substantial reduction in employment, reduce wage and salary earnings, cause a substantial net increase in county expenditures, or create a substantial demand for public services. As described above, some economic benefits could be seen in the region if all 59 leases are further explored and developed.

Impacts of the Wilderness and Lands with Wilderness Characteristics Alternative

Under the Wilderness and Lands with Wilderness Characteristics Alternative, the BLM would cancel 48 LWC leases and the one lease located within the wilderness boundary and affirm the remaining 10 leases. BLM has not received any APDs for these 10 remaining leases; BLM received and approved three APDs for helium production on leases located on LWCs (UTU93475, UTU93476, and UTU93479). The entire acreage of the three leases with approved APDs are within LWCs and as such would be cancelled under this alternative.

The Wilderness and Lands with Wilderness Characteristics Alternative would allow for the potential exploration and development on 10 leases instead of the 59 contemplated under the No Action Alternative. As such, impacts to population growth, population density, employment, wages, or public services would be expected to be less. Under this alternative, the BLM would refund the $3,004,475 in bonus bids and $151,365 in advanced rental fees received for the 48 leases which would be cancelled. The filing fees paid for these leases are non-refundable. As noted in Section 3.1.1, the RFDS anticipates a maximum of two wells to be drilled in the PFO under the RFDS scenario for Alternative B. Using this assumption, it was calculated that approximately 0.6 jobs could be supported with development of two wells. Development of 10 wells could lead to approximately 3 jobs, however, as noted in Section 3.1.1, this scenario is unlikely to occur.

Impacts of the Lease Cancellation Alternative

Under the Lease Cancellation Alternative, the BLM would cancel all 59 leases and refund the total sale of the leases, minus filing fees. This alternative is not expected to induce substantial growth or concentration of population, displace many people, cause substantial reduction in employment, reduce wage and salary earnings, cause a substantial net increase in county expenditures, or create a substantial demand for public services. As this alternative contemplates cancelling all 59 leases, no economic benefits from exploration or development of wells would be seen under this alternative, and the potential 2.4 direct and 0.1 indirect jobs contemplated in Section 3.1.1 would not occur.

Environmental Justice

As stated above, minority, low-income and Tribal populations are known to exist within the leases. For this reason, future site development and production on the leases would require an additional EJ assessment to evaluate potential disproportionate adverse impacts on any EJ population(s) present in the area. As shown in Figure 3-2, above, no major population centers are located in the vicinity of the leases. The approximate population of Census Tract 9765, Block Group 3, is 814 residents over an area of 2,589.38 square miles. The closest town to the leases is Green River, located 12 miles north. A majority of the lands in the vicinity of the leases are federally managed and interspersed with state lands; within a ten-mile buffer of the leases, 98.6% of lands are managed by federal or state entities. One private parcel is located near lease number UTU93469; it is unknown whether this private parcel contains any permanent residences.

As noted above, Census Tract 9765, Block Group 3 meets the EJ criteria for low income and minority populations. These characteristics can contribute to residents' experiences of other resources, and exacerbate adverse effects associated with those resources, such as changes in the characteristics of the landscape, access to quality recreation, noise, and light pollution. Members of EJ communities may lack the financial ability to travel further to experience quality recreation sites, access to clear night skies or quiet landscapes, or to relocate if adverse conditions occur in their communities. While access to recreation, quiet, and open spaces are not criteria which identify EJ communities, research has shown that EJ communities experience disproportionate barriers or constraints in their experience of public or outdoor recreation, housing, and even the effects of climate change, due to elements such as historic discrimination, economic and other related disadvantages, cultural differences, personal or institutional forms of discrimination, exposure to air and water contaminants, and limitations in resources for adaptation and resiliency (American Public Health Association 2019; Bustam et al. 2011).

The impacts of the proposed range of alternatives to resources such as recreation, noise, night skies, open space, air quality, and greenhouse gas emissions is discussed in Sections 3.3.1, 3.3.2, and 3.3.4 through 3.3.9 of this EA; these impacts could contribute to adverse effects on EJ communities. However, at the leasing stage, there is insufficient detail to provide more specific analysis.

Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would affirm its previous decision to lease the 59 leases. If development occurs at any of these locations, some impacts to EJ communities could occur, such as an increase in air pollutants (see Section 3.3.1, above), an increase in GHG emissions (see Section 3.3.2, above), or impacts to recreation, night skies, or noise (Sections 3.3.9, 3.3.8, and 3.3.6, respectively). However, at the leasing stage, the specific impacts are unknown. All leases have the Stipulation UT-S-01 *Air Quality* and Lease Notice UT-LN-102 *Air Quality Analysis* attached, which would mitigate air quality impacts.

Impacts of the Wilderness and Lands with Wilderness Characteristics Alternative

Under the Wilderness and Lands with Wilderness Characteristics Alternative, the development potential and probability of development would be less than the No Action Alternative, as under this alternative, the BLM would cancel the 48 LWC leases and the one lease within a wilderness area. Should any of the remaining 10 leases be developed, increases in air pollution and GHG emissions could still occur, as well as impacts to recreation, night skies, or noise (Sections 3.3.9, 3.3.8, and 3.3.6, respectively), although specific impacts are unknown at this time. All leases have the Stipulation UT-S-01 *Air Quality* and Lease Notice UT-LN-102 *Air Quality Analysis* attached, which would mitigate air quality impacts.

Impacts of the Lease Cancellation Alternative

Under the Lease Cancellation Alternative, the BLM would cancel all 59 leases and no development would occur at this time; however, these leases may be sold in a future lease sale unless an amendment to the RMP is developed. Therefore, no impacts to EJ communities would be expected to occur.

3.3.3.3 Mitigation Measures and Residual Effects

Socioeconomics

There are no required design constraints or mitigation measures under socioeconomics.

Environmental Justice

No disproportionate adverse impacts to EJ populations are anticipated as a direct effect of the selection of any of the proposed alternatives. The EJ EO requires the BLM to minimize or mitigate any disproportionate adverse impacts to EJ populations. Should such adverse impacts be anticipated due to future exploration and development activities in connection with any leases, these potential effects and any need for minimization or mitigation would be evaluated at the APD stage through separate NEPA analysis. Lease notices, stipulations, or other mitigation measures included for recreation, night skies, noise, LWCs, and visual resources may mitigate for any indirect impacts to EJ communities which could occur under the range of proposed alternatives.

3.3.3.4 Cumulative Effects

According to the RFDS (Section 3.1.1), and the analysis completed in the 2022 First Competitive EA, the direct, indirect, and cumulative economic impacts from the act of leasing and subsequent potential oil and gas development in Emery County are expected to be minor. Oil and gas development affect employment and labor income generated by 1) payments to counties associated with the leasing and rent of federal minerals, 2) royalty payments associated with production of federal oil and gas, and 3) economic activity generated from drilling and associated activities. The magnitude of these types of economic effects is based upon the level and pace of development, which, while unknown at this time, can be reasonably foreseen to involve the development of between three and eight wells, contributing between 2.4 and 0.9 direct jobs, and 0.1 indirect job.

The pace and scale of oil and gas development can often concern local communities (Resources for the Future 2023). Rapid development can drive important social changes due to the influx of people to these areas who find employment in the oil and gas industry and ancillary service industries. Rapid population growth for unprepared communities can cause stress on community resources, such as educational infrastructure, roads and utilities, emergency services, and community cohesion. Should oil and gas leasing and subsequent development occur, impacts to people living near or using the area in the vicinity of the lease would potentially occur. Oil and gas exploration, drilling, or production could potentially inconvenience these people through increased traffic and traffic delays, noise, and visual impacts. These

impacts would be particularly noticeable in rural areas in which oil and gas development has not occurred previously. However, as noted in the RFDS prepared for the Proposed PFO RMP/final EIS, the PFO has a long history of oil and gas activity, with drilling peaking in 2000 with 177 wells and reducing to 57 wells in 2003 (BLM 2005).

The level of inconvenience felt by local communities would depend on the activity affected, traffic patterns within the area, noise levels, the length of time and season in which these activities occurred, and other factors. Creation of new access roads would potentially allow increased public access and exposure of private property to vandalism. For leases in which the surface is privately owned and the mineral estate is federally owned, surface owner agreements, standard lease stipulations, and BMPs would potentially address many of the concerns of private surface owners. EO 12898 requires the analysis of disproportionately high and adverse human health effects and environmental effects on EJ populations. Based upon U.S. Census Bureau data, Emery County met the criteria for minority EJ populations due to the percentage of residents identifying themselves as belonging to a race other than white and/or of Hispanic origin. The BLM considers all input from persons or groups regardless of age, income status, race, or other social or economic characteristics.

As noted in this analysis (see Section 3.3.2, Greenhouse Gas and Social Cost of Carbon), the act of leasing itself does not contribute direct impacts to climate change. However, the U.S. Department of Health and Human Services recognizes that climate change adds to the cumulative stresses experienced by EJ communities, whose communities may have faced obstacles in accessing clean air, safe drinking water, nutritious food and safe shelter, and who may have been disproportionately exposed to pollution and associated harm that could seriously damage their health (U.S. Department of Health and Human Services 2022).While emissions inventories at the leasing stage are imprecise due to uncertainties, including the type of mineral development (oil, gas, or both), scale, and duration of potential development; types of equipment (drill rig engine tier rating, horsepower, fuel type); and the mitigation measures that a future operator may propose in their development, However, this EA did attempt to estimate the emissions, calculating that approximately 187 million tons of CO_2e emissions could be expected to occur, based on past, present, and reasonably foreseeable future federal lease development. It is not possible to distinguish the role of the particular leases in this EA in those estimated emissions, although the addition of any greenhouse gases could contribute to cumulative impacts on EJ communities, including those identified in this EA.

3.3.4 Lands with Wilderness Characteristics

Issue Statement: How would proposed and potential development of the leases impact the apparent naturalness, size, and opportunities for solitude and primitive recreation experience of lands determined to possess wilderness characteristics in the short and long term?

3.3.4.1 Affected Environment

BLM Manual 6310 defines LWCs as areas that have been inventoried and determined to possess 5,000 acres or more of public lands with apparent naturalness that provide outstanding opportunities for solitude and/or primitive, unconfined recreation. LWCs may also possess supplemental values of ecological, geological, or other features of scientific, educational, scenic, or historical value. An LWC determination is not a land use allocation per se and does not convey any special protective status unless an RMP decision has specifically established that a particular LWC unit will be managed to protect and preserve its wilderness characteristics. There are currently five inventoried LWCs in the PFO that overlap 48 of the 59 leases: UT-020-SRD-Sweetwater Reef A, UT-020-SRD-007, UT-020-SRD-San Rafael River B, UT-020-SRD-San Rafael River D, and UT-020-SRD-San Rafael River E. These five LWCs were identified as LWC after the publication of the 2008 RMP, and no management direction has yet been decided. These five LWCs also comprise the analysis area for this section. There is a total of 75,494.99

acres of overlap between the leases and these five LWC units. However, based on the RFDS, which anticipates development of eight wells, BLM anticipates that there could be direct impacts to 83.2 acres of LWCs.

Table 3-19 shows the acreage of LWC units that overlap lease areas and the amount of acreage in each unit that lies within the potential lease area.

Table 3-19. Designated Lands with Wilderness Characteristics Unit Acreage and Lease Overlap Area

LWC Unit Name	Total Acreage of Unit	Acres in Lease Area	Percentage of Total LWC Unit Area
UT-020-SRD-Sweetwater Reef A	69,347.70	37,427.34	54.97
UT-020-SRD-007	8,694.30	349.22	4.02
UT-020-SRD-San Rafael River B	24,250.53	101.20	0.42
UT-020-SRD-San Rafael River D	66,849.40	29,055.81	43.46
UT-020-SRD-San Rafael River E	9,201.04	8,561.41	93.05

All of the LWC units listed above in Table 3-19 were identified by BLM after the completion of the 2008 PFO RMP and have therefore not been analyzed in a land use planning process. This means that 48 leases overlap LWC areas that have not been analyzed in an RMP. Management has not yet been determined for the identified LWCs listed in Table 3-19.

Table 3-20 breaks down acres of each lease with areas determined through inventories to either possess or not possess LWC. Any units listed below in Table 3-20 that are not listed above in Table 3-19 were considered for but not identified as LWCs by the BLM during or after the RMP was finalized (except for Labyrinth Canyon which, since 2019, has been a designated wilderness area). Note that in this table, units tagged as "Other" refer to acres or units that are not identified as LWC and/or were not inventoried for LWC. Of the 59 leases, 12 entirely contain LWCs, 36 partially contain LWCs, and 11 do not contain LWCs. There are three leases with approved APDs (UTU93475, UTU93476, and UTU93479), all of which overlap entirely with the UT-020-SRD-San Rafael River D LWC unit (Table 3-20).

Table 3-20. Acres of Overlap of Each Lease with All Candidate and Lands with Wilderness Characteristics Areas

Lease Name LWC Unit Name*	Acres Not in LWC	Acres in LWC	Total Acres
UTU93466	704.81	1,262.21	1,967.01
UT-020-SRD-San Rafael River D	–	1,172.55	1,172.55
UT-020-SRD-San Rafael River E	–	89.66	89.66
Other	704.81	–	704.81
UTU93468	188.82	1,722.95	1,911.78
UT-020-SRD-San Rafael River D	–	285.88	285.88
UT-020-SRD-San Rafael River E	–	1,437.07	1,437.07

Lease Name **LWC Unit Name***	**Acres Not in LWC**	**Acres in LWC**	**Total Acres**
UT-050-16-02 Blackburn Draw	2.01	–	2.01
Other	186.82	–	186.82
UTU93469	1,880.34	36.62	1,916.96
UT-020-SRD-San Rafael River E	–	36.62	36.62
UT-050-16-02 Blackburn Draw	1,157.20	–	1,157.20
Other	723.15	–	723.15
UTU93470	571.37	1,346.90	1,918.26
UT-020-SRD-010	42.26	–	42.26
UT-020-SRD-San Rafael River E	–	1,346.90	1,346.90
UT-050-16-02 Blackburn Draw	519.51	–	519.51
Other	9.60	–	9.60
UTU93471	1,945.54	–	1,945.54
UT-020-SRD-010	532.59	–	532.59
UT-050-16-02 Blackburn Draw	1,405.16	–	1,405.16
Other	7.80	–	7.80
UTU93472	2,554.98	–	2,554.98
UT-020-SRD-010	51.76	–	51.76
UT-050-16-02 Blackburn Draw	2,501.11	–	2,501.11
Other	2.11	–	2.11
UTU93473	1,917.32	–	1,917.32
UT-050-16-02 Blackburn Draw	1,914.75	–	1,914.75
Other	2.56	–	2.56
UTU93474	2,333.60	222.58	2,556.19
UT-020-SRD-008 B	210.86	–	210.86
UT-020-SRD-008 C	1,505.97	–	1,505.97
UT-020-SRD-San Rafael River D	–	222.58	222.58
UT-020-SRD-San Rafael River G	152.02	–	152.02
Other	464.76	–	464.76
UTU93475	0.00	1,967.32	1,967.32
UT-020-SRD-San Rafael River D	–	1,967.32	1,967.32
Other	0.00	–	0.00
UTU93476	0.00	1,969.40	1,969.40
UT-020-SRD-San Rafael River D	–	1,969.40	1,969.40
Other	0.00	–	0.00

Lease Name **LWC Unit Name***	**Acres Not in LWC**	**Acres in LWC**	**Total Acres**
UTU93477	9.16	2,006.82	2,015.97
UT-020-SRD-008 C	7.99	–	7.99
UT-020-SRD-San Rafael River D	–	2,006.82	2,006.82
Other	1.17	–	1.17
UTU93478	1.83	1,316.01	1,317.83
UT-020-SRD-San Rafael River D	–	1,316.01	1,316.01
Other	1.83	–	1.83
UTU93479	–	2,557.70	2,557.70
UT-020-SRD-San Rafael River D	–	2,557.70	2,557.70
UTU93480	2.67	1,915.85	1,918.52
UT-020-SRD-San Rafael River D	–	1,507.60	1,507.60
UT-020-SRD-San Rafael River E	–	408.25	408.25
Other	2.67	–	2.67
UTU93481	4.99	2,547.08	2,552.07
UT-020-SRD-San Rafael River D	–	866.13	866.13
UT-020-SRD-San Rafael River E	–	1,680.96	1,680.96
Other	4.99	–	4.99
UTU93482	341.69	1,576.42	1,918.11
UT-020-SRD-011	149.91	–	149.91
UT-020-SRD-San Rafael River D	–	1,567.09	1,567.09
UT-020-SRD-San Rafael River E	–	9.33	9.33
UT-020-SRD-San Rafael River H	185.69	–	185.69
Other	6.08	–	6.08
UTU93483	280.68	2,276.73	2,557.42
UT-020-SRD-010	189.37	–	189.37
UT-020-SRD-011	80.94	–	80.94
UT-020-SRD-San Rafael River D	–	512.16	512.16
UT-020-SRD-San Rafael River E	–	1,764.58	1,764.58
Other	10.38	–	10.38
UTU93484	128.57	1,788.05	1,916.62
UT-020-SRD-010	124.66	–	124.66
UT-020-SRD-San Rafael River E	–	1,788.05	1,788.05
Other	3.91	–	3.91

Lease Name **LWC Unit Name***	**Acres Not in LWC**	**Acres in LWC**	**Total Acres**
UTU93485	1,951.10	–	1,951.10
UT-020-SRD-011	1,949.94	–	1,949.94
Other	1.16	–	1.16
UTU93486	1,947.70	–	1,947.70
UT-020-SRD-010	1,356.41	–	1,356.41
UT-020-SRD-011	586.39	–	586.39
Other	4.90	–	4.90
UTU93487	1,979.27	–	1,979.27
UT-020-SRD-010	1,979.27	–	1,979.27
Other	0.00	–	0.00
UTU93489	2,136.88	303.02	2,439.91
UT-020-SRD-Sweetwater Reef A	–	303.02	303.02
UT-020-SRD-011	1,224.64	–	1,224.64
UT-050-16-01 Flat Tops	901.33	–	901.33
Other	10.92	–	10.92
UTU93491	2,516.21	–	2,516.21
UT-020-SRD-010	1,892.05	–	1,892.05
UT-050-16-01 Flat Tops	168.57	–	168.57
UT-050-16-02 Blackburn Draw	446.39	–	446.39
Other	9.20	–	9.20
UTU93492	1,599.09	–	1,599.09
UT-050-16-01 Flat Tops	1,595.88	–	1,595.88
Other	3.20	–	3.20
UTU93493	2,458.69	–	2,458.69
UT-050-16-01 Flat Tops	2,098.20	–	2,098.20
UT-050-16-02 Blackburn Draw	354.22	–	354.22
Other	6.27	–	6.27
UTU93494	1,879.55	–	1,879.55
UT-050-16-01 Flat Tops	142.75	–	142.75
UT-050-16-02 Blackburn Draw	1,733.70	–	1,733.70
Other	3.10	–	3.10
UTU93495	852.78	1,118.92	1,971.70
UT-020-SRD-009	844.30		844.30
UT-020-SRD-San Rafael River D	–	1,118.92	1,118.92

Lease Name **LWC Unit Name***	**Acres Not in LWC**	**Acres in LWC**	**Total Acres**
Other	8.48	–	8.48
UTU93496	0.00	1,966.26	1,966.26
UT-020-SRD-San Rafael River D	–	1,966.26	1,966.26
Other	0.00	–	0.00
UTU93497	0.00	2,005.24	2,005.24
UT-020-SRD-San Rafael River D	–	2,005.24	2,005.24
Other	0.00	–	0.00
UTU93498	0.00	1,323.30	1,323.30
UT-020-SRD-San Rafael River D	–	1,323.30	1,323.30
Other	0.00	–	0.00
UTU93499	2,371.78	185.27	2,557.04
UT-020-SRD-Sweetwater Reef A	–	5.57	5.57
UT-020-SRD-009	2,366.40	–	2,366.40
UT-020-SRD-San Rafael River D	–	179.70	179.70
Other	5.37	–	5.37
UTU93500	176.16	1,741.69	1,917.84
UT-020-SRD-Sweetwater Reef A	–	167.32	167.32
UT-020-SRD-009	169.79	–	169.79
UT-020-SRD-San Rafael River D	–	1,574.37	1,574.37
Other	6.36	–	6.36
UTU93501	0.00	2,550.13	2,550.14
UT-020-SRD-San Rafael River D	–	2,550.13	2,550.13
Other	0.00	–	0.00
UTU93502	823.41	1,093.82	1,917.23
UT-020-SRD-Sweetwater Reef A	–	1,093.82	1,093.82
UT-020-SRD-009	818.92	–	818.92
Other	4.49	–	4.49
UTU93503	3.52	2,553.15	2,556.67
UT-020-SRD-Sweetwater Reef A	–	2,182.12	2,182.12
UT-020-SRD-San Rafael River D	–	371.03	371.03
Other	3.52	–	3.52
UTU93504	148.20	1,768.27	1,916.47
UT-020-SRD-Sweetwater Reef A	–	22.05	22.05
UT-020-SRD-011	144.22	–	144.22

Lease Name **LWC Unit Name***	**Acres Not in LWC**	**Acres in LWC**	**Total Acres**
UT-020-SRD-San Rafael River D	–	1,746.22	1,746.22
Other	3.98	–	3.98
UTU93505	–	1,950.64	1,950.64
UT-020-SRD-Sweetwater Reef A	–	1,950.64	1,950.64
UTU93506	–	1,951.41	1,951.41
UT-020-SRD-Sweetwater Reef A	–	1,951.41	1,951.41
UTU93507	331.74	1,650.49	1,982.23
UT-020-SRD-Sweetwater Reef A	–	1,650.49	1,650.49
UT-020-SRD-011	327.27	–	327.27
Other	4.47	–	4.47
UTU93508	902.85	334.03	1,236.88
UT-020-SRD-Sweetwater Reef A	–	334.03	334.03
UT-020-SRD-011	897.62	–	897.62
Other	5.23	–	5.23
UTU93509	0.28	2,556.16	2,556.44
UT-020-SRD-Sweetwater Reef A	–	2,556.16	2,556.16
Other	0.28	–	0.28
UTU93510	–	1,918.31	1,918.31
UT-020-SRD-Sweetwater Reef A	–	1,918.31	1,918.31
UTU93511	24.38	2,466.58	2,490.96
UT-020-SRD-Sweetwater Reef A	–	2,466.58	2,466.58
UT-020-SRD-011	6.91	–	6.91
UT-050-16-01 Flat Tops	15.60	–	15.60
Other	1.87	–	1.87
UTU93512	3.82	1,913.13	1,916.95
UT-020-SRD-Sweetwater Reef A	–	1,913.13	1,913.13
Other	3.82	–	3.82
UTU93513	312.55	2,244.75	2,557.31
UT-020-SRD-Sweetwater Reef A	–	2,244.75	2,244.75
UT-050-16-03 Cowpatty Ranch	304.04	–	304.04
Other	8.52	–	8.52
UTU93514	875.08	980.35	1,855.43
UT-020-SRD-Sweetwater Reef A	–	980.35	980.35
UT-050-16-01 Flat Tops	869.31	–	869.31

Lease Name **LWC Unit Name***	**Acres Not in LWC**	**Acres in LWC**	**Total Acres**
Other	5.77	–	5.77
UTU93518	1,051.27	269.40	1,320.68
UT-020-SRD-009	1,048.57	–	1,048.57
UT-020-SRD-San Rafael River D	–	269.40	269.40
Other	2.70	–	2.70
UTU93519	1,058.85	1,497.87	2,556.72
UT-020-SRD-Sweetwater Reef A	–	1,497.87	1,497.87
UT-020-SRD-San Rafael River F	1,052.52	–	1,052.52
Other	6.33	–	6.33
UTU93520	1,590.89	325.66	1,916.55
UT-020-SRD-Sweetwater Reef A	–	224.46	224.46
UT-020-SRD-009	106.46	–	106.46
UT-020-SRD-San Rafael River B	–	101.20	101.20
UT-020-SRD-San Rafael River F	1,475.97	–	1,475.97
Other	8.47	–	8.47
UTU93521	2,550.96	2.29	2,553.25
UT-020-SRD-Sweetwater Reef A	–	2.29	2.29
UT-020-SRD-009	2,515.21	–	2,515.21
UT-020-SRD-San Rafael River F	34.15	–	34.15
Other	1.59	–	1.59
UTU93523	18.31	2,536.86	2,555.17
UT-020-SRD-Sweetwater Reef A	–	2,536.86	2,536.86
UT-020-SRD-San Rafael River F	16.22	–	16.22
Other	2.09	–	2.09
UTU93524	1,650.40	266.72	1,917.13
UT-020-SRD-Sweetwater Reef A	–	266.72	266.72
UT-020-SRD-009	1,645.06	–	1,645.06
UT-020-SRD-San Rafael River F	0.20	–	0.20
Other	5.14	–	5.14
UTU93525	–	1,874.41	1,874.41
UT-020-SRD-Sweetwater Reef A	–	1,874.41	1,874.41
UTU93526	0.19	2,468.59	2,468.79
UT-020-SRD-Sweetwater Reef A	–	2,468.59	2,468.59
Other	0.19	–	0.19

Lease Name **LWC Unit Name***	**Acres Not in LWC**	**Acres in LWC**	**Total Acres**
UTU93527	5.86	2,420.77	2,426.63
UT-020-SRD-Sweetwater Reef A	–	2,420.77	2,420.77
UT-020-SRD-009	0.34	–	0.34
Other	5.53	–	5.53
UTU93530	1.05	2,514.96	2,516.02
UT-020-SRD-Sweetwater Reef A	–	2,514.96	2,514.96
Other	1.05	–	1.05
UTU93533	–	1,880.67	1,880.67
UT-020-SRD-Sweetwater Reef A	–	1,880.67	1,880.67
UTU93534	556.75	349.22	905.98
Unknown	551.92		551.92
UT-020-SRD-007	–	349.22	349.22
Other	4.83	–	4.83
UTU93713	1,408.01	–	1,408.01
UT-020-SRD-Labyrinth Canyon B	1,379.74	–	1,379.74
Other	28.27	–	28.27
Total	**46,053.99**	**75,494.99**	**121,548.98**

*In this table, "Other" refers to acres or units that are not identified as LWC and/or were not inventoried for LWC.

3.3.4.2 Environmental Effects

Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would affirm its leasing decisions for the 59 leases. Three APDs, all in the UT-020-SRD-San Rafael River D LWC unit, were approved on September 20, 2023. Notably, BLM has not yet determined management for the LWC units identified after the publication of the RMP. Leasing itself does not directly impact the naturalness of LWCs, nor the outstanding opportunities for solitude and primitive recreation on such lands. However, the issuance of leases allows for mineral exploration and development activities to occur. Such mineral development in leased areas intersecting LWCs could cause indirect or direct impacts to wilderness characteristics, such as size, naturalness, solitude, and recreational opportunities in LWC areas. Approximately 62% the total acreage of all 59 leases would overlap with an LWC unit. The presence of new oil and gas infrastructure on relatively undisturbed public lands would change the character of such areas. Depending on topography, vegetation removal, grading, and the development of well pads could reduce the apparent naturalness and scenic qualities in LWC areas and reduce the quality of solitude or primitive recreational experiences. Additionally, mineral exploration and development would result in the construction or improvement of access roads, increased traffic, use of heavy machinery, and presence of workers on the landscape, all of which would produce increased levels of noise, alter the viewshed, depreciate apparent naturalness, and reduce opportunities for solitude and primitive recreation. The use of hazardous materials in mineral development sites could also harm vegetation, water resources, and wildlife in LWCs, further altering the naturalness of such lands.

The degree of the intensity of such impacts to wilderness characteristics would be influenced by the location of surface-disturbing activities, existing vehicle access to the lease, the size of the drill pad area and any associated temporary or permanent disturbance, surrounding landforms and topography, vegetation type, season of development, and reclamation processes and their duration. Areas with more terrain variation and elevation differences will offer more topographic screening of the sights and sounds of lease development. Flatter, more open areas will allow sights and sounds to be more noticeable at a greater distance from the well pad or access road. Likewise, larger vegetation, such as trees and large shrubs can help to visually screen or absorb the sounds of development more effectively. Within the lease area, the shoulder seasons of spring and fall see the most public visitation. Development during the months of moderate temperatures will likely be most noticeable and disturbing to visitors.

The highest degree of noticeable visual and auditory impacts from leasing development would be temporary and localized to the construction area and access routes, occurring during the construction, drilling, and interim reclamation phase (30-60 days). Following this period of intense activity, removal of equipment and interim reclamation of the well pad would be expected to mitigate some impacts to wilderness characteristics, with the exception of apparent naturalness within the vicinity of new developments. The long-term impacts of new surface disturbances in LWCs are two-fold: first, native vegetation in the disturbed areas may take decades to fully recover in the high desert environment even with reseeding efforts and may be hindered by grazing, invasive species, and climate change; second, improved or new access routes may increase the overall level of OHV traffic and dispersed recreation use in a given area, thereby contributing to diminishing outstanding solitude or primitive recreation opportunities and creating more impacts to naturalness from route proliferation, campsite expansion, trash, wildfires, invasive weeds, vegetation loss, and soil disturbances. Additionally, if any leases result in production wells, direct impacts including increased noise levels, changes to the viewshed, reduced naturalness, and consistent presence of workers could reasonably last for roughly 20 years into the future. Although BLM can attempt to close newly created routes or sites to public access with signs and fencing, in the open, remote environment of the lease area, enforcement and compliance can often be challenging and unsuccessful.

Per BLM Manual 6310, wilderness inventory boundaries are created by rights-of-way and constructed or improved roads (BLM 2021f). Construction or improvements of vehicle access routes to leases could potentially split or bisect a LWC unit by creating a new wilderness inventory boundary. This may result in a portion of the unit that no longer meets size criteria for LWCs thus producing a long-term loss of LWC acreage. There is potential for impacts to any portion of the 75,494.99 acres of LWCs that overlap leases through the development of those leases. However, as previously mentioned, based on the RFDS, which anticipates development of only eight wells, BLM expects that there would only be direct impacts to a maximum of 83.2 acres of LWCs. It is possible that indirect impacts would extend beyond the discrete bounds of physical disturbance. Noise from construction work and traffic may permeate into LWC areas, reducing the feeling of solitude and the naturalness of the area. The presence of workers would also reduce the feeling of solitude and may contribute to the span of noise pollution. Light pollution may also be a factor and may alter the appearance of the night sky in LWC areas near development activity.

Notably, all leases have NSO stipulations for slopes greater than 40%, intermittent and perennial streams, natural springs, and most leases have NSO stipulations for Mexican spotted owl nest sites. Most leases also have CSU stipulations for fragile slopes or slopes between 20% and 40% (for stipulation information, see Appendix B). This would limit development in those LWC areas overlapping leases that meet such criteria. Where applicable, these NSO stipulations would essentially eliminate impacts to LWC areas as no development could occur on the surface. However, the NSO stipulations only apply to areas meeting the criteria described above (slopes, perennial streams and natural springs, and Mexican spotted

owl nest sits). CSU stipulations would impose mitigations on development activity, thereby reducing the severity of development impacts but not removing all impacts to LWCs entirely.

Potential impacts of oil and gas development on designated LWCs were disclosed in the Price Field Office Proposed Resource Management Plan/Final EIS:

> Construction and operation of oil and gas wells and associated support facilities, including roads, surface and buried pipelines, powerlines, compressor stations, and other permanent structures, would create soil and vegetation disturbance and visual intrusions. The affected portions of non-WSA lands with wilderness characteristics would no longer appear natural. In addition to site-specific surface disturbance, the cumulative number of wells and density of spacing would change the natural appearance of the landscape to an industrial landscape. The noise of construction and operation of producing wells, including the presence of work crews, vehicles, and equipment, would degrade the quality of opportunities for solitude and primitive and unconfined recreation in proximity to industrial development. The sights and sounds of development would diminish with distance from the intrusions and activities; however, it is expected that sights and sounds from development would reduce the quality of opportunities for solitude and primitive and unconfined recreation up to a half-mile beyond the direct loss of natural appearance. Given the number and spacing of industrial facilities, the quality of opportunities for solitude and primitive recreation could be degraded throughout the areas with wilderness characteristics. (BLM 2008c:4–190)

Impacts to wilderness characteristics for any LWC units that were not analyzed during the RMP process are expected to be similar to those listed under the analyzed LWCs. Potential impacts would not necessarily immediately exclude an LWC unit from a future RMP decision protecting LWCs. However, impacts could potentially reduce the size, apparent naturalness, outstanding solitude, and/or primitive recreation of a given area below the threshold to qualify as LWC. If an updated LWC inventory post-lease development were to determine the area no longer possessed LWC, then that unit would not be considered in future RMP decisions for LWC management

Impacts of the Wilderness and Lands with Wilderness Characteristics Alternative

Under the Wilderness and Lands with Wilderness Characteristics Alternative, the BLM would cancel the 49 leases in LWC or wilderness areas, an area equivalent to 76,903 acres, thereby essentially eliminating all impacts listed under the No Action Alternative. No development would occur within the boundaries of these areas and their sizes would not be impacted or reduced to a level at which they no longer meet the 5,000-acre minimum. Impacts to apparent naturalness, outstanding solitude or primitive recreation, and supplemental values would not occur.

Impacts of the Lease Cancellation Alternative

The Lease Cancellation Alternative would not result in any potential impacts to LWCs, as the leases would be cancelled and not developed at this time.

3.3.4.3 Mitigation Measures and Residuals Effects

There are no required design constraints or mitigation measures for LWCs.

3.3.4.4 Cumulative Effects

Cumulative impact analysis for LWCs was limited to the following units: Sweetwater Reef A, UT-020-SRD-007, San Rafael River D, and San Rafael River E. This area was chosen because these are the LWCs that would be directly impacted by the affirmation of the leases. Past, present, and reasonably foreseeable actions that have affected and will likely continue to affect wilderness characteristics in the planning area

include oil and gas development, range improvements, increasing recreational demands on public lands, OHV use, issuance of ROWs, and ongoing travel management planning for the PFO. These activities could introduce sights, noises, and infrastructure in or adjacent to LWCs, which could impair the feeling of solitude and degrade naturalness. Increasing visitor use in the planning area will likely intensify use of BLM-administered lands, including LWCs, potentially impacting wilderness characteristics by reducing opportunities for solitude. As part of the travel management process, the BLM may designate additional routes as closed or open to motor vehicles. Use of these designated travel routes by OHVs and other vehicles in LWCs would also introduce sights and noises that could impair the feeling of solitude and degrade naturalness. Any of these actions could also result in surface-disturbing activities that could affect the size of LWC units by reducing or eliminating portions of the LWC units. Some units could be bisected by new rights of way, or unauthorized surface disturbance could result in the degradation of wilderness characteristics. This could result in some areas, or entire LWC units, no longer meeting the minimum size criterion (5,000 acres) or no longer possessing sufficient naturalness or outstanding opportunities for solitude or primitive recreation to qualify as LWC.

Oil and gas development typically have a large footprint of road construction and surface disturbance, and therefore can cause a large impact to wilderness characteristics over course of operations. However, as noted in the RFDS, it is anticipated that only eight wells would be developed, with a maximum disturbance area of 83.2 acres.

3.3.5 Wilderness

Issue Statement: How would proposed and potential development of issued leases impact undeveloped, untrammeled, natural, and outstanding areas of solitude or primitive, unconfined recreation in designated Wilderness areas?

3.3.5.1 Affected Environment

Wilderness areas, which are designated by Congress using the powers granted under the Wilderness Act of 1964, are undeveloped, intact areas of public land managed to preserve the integrity of their wilderness character. There is one such area in the PFO that overlaps one lease: Labyrinth Canyon Wilderness. Labyrinth Canyon Wilderness has an area of 54,643 acres, 1,397.74 acres (2.6%) of which overlap with Lease UTU93713. A road that runs through a portion of the lease (28.27 acres) was not included within the wilderness boundary. Labyrinth Canyon Wilderness was designated as wilderness on March 12, 2019, under the John D. Dingell, Jr. Conservation, Management, and Recreation Act, and per the Wilderness Act of 1964, all mineral estate within the established boundary of the wilderness area is subsequently withdrawn under all laws pertaining to mineral leasing (Public Law [PL] 116-9, Public Law [PL] 88-577). This lease was issued on February 8, 2019, prior to the wilderness designation, and as such, qualifies as a valid existing right under the provisions of the Wilderness Act. The Labyrinth Canyon Wilderness is located in Emery County, Utah, between the Green River Road and the right or west bank of the Green River, from its confluence with the San Rafael River south to the Emery and Wayne County line. The wilderness area includes a vast scenic landscape of high, flat sagebrush-covered ridges and mesas combined with slick rock escarpments and sandstone canyons that flow east into the Green River. Visitation is lower than at many other surrounding areas of public lands such as Moab or the San Rafael Swell, providing outstanding opportunities for experiencing solitude. Outstanding primitive recreation opportunities include camping, hiking, backpacking, climbing, and canyoneering. In particular, the road that provides access to Lease UTU93713 is also used by recreationists to access a popular, highly scenic camping location and trailhead for Fivehole or Colonnade Arch overlooking the Green River. Supplemental values include outstanding scenery, Colorado Plateau geology, cultural sites, riparian areas, and wildlife habitat. Table 3-21 shows the number of acres of wilderness units overlapping leases.

Table 3-21. Acreage of Overlap Between Leases and Designated Wilderness Units

Lease Unit Wilderness Area Unit Name	Acreage not in Wilderness Area	Acreage in Labyrinth Canyon Wilderness Area	Total Acres
UTU93713	28.27	1,379.74	1,408.01

3.3.5.2 Environmental Effects

Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would affirm, among others, its leasing decision for lease UTU93713 located within the Labyrinth Canyon Wilderness. Affirming the lease would not itself directly impact the naturalness of the wilderness area. However, the issuance of leases allows for mineral exploration and development activities to occur. Such mineral development in leased areas intersecting or adjacent to wilderness would likely cause indirect or direct impacts to wilderness character within the vicinity of the lease. The presence of new oil and gas infrastructure on relatively undisturbed public lands would change the character of the wilderness area. Vegetation removal, grading, and the development of well pads would degrade the qualities of naturalness and undeveloped character of the wilderness. Additionally, mineral exploration and development would result in road upgrades, increased vehicle traffic, use of heavy machinery, and presence of workers during drilling and reclamation operations, all of which would produce increased levels of mechanical noise and presence of humans, degrading outstanding opportunities to experience solitude and primitive recreation in both the short and long term. The use of hazardous materials in mineral development sites could also harm vegetation, riparian areas, and wildlife habitat in the wilderness, further altering naturalness and supplemental values. Noise and light pollution from construction and operational activities within the Labyrinth Canyon Wilderness would have effects on the natural soundscape and quality of night skies that could range beyond the immediate vicinity of construction and operational activities, permeating more remote regions of the wilderness area.

Although Lease UTU93713 overlaps 1,379.74 acres of wilderness, as shown above in Table 3-21, the RFDS makes clear that at most, only one of the eight wells accounted for in the RFDS is likely to be developed on this (or any other) lease. The single well would likely result in 10.4 acres of direct disturbance to the Labyrinth Canyon Wilderness. Per BLM Manual 6340, *Management of Designated Wilderness Areas*, mineral leases existing prior to the date of an area's designation as wilderness can be operated under the original terms and conditions.

Lease UTU93713 is located almost entirely on a high, flat, sandy, sagebrush plateau with slopes of less than 5% within the Labyrinth Canyon Wilderness. The elevation and slope aspect at UTU93713 offers some topographic screening of potential impacts from other parts of the wilderness, especially looking from the north or east. Potential impacts within UTU93713 would be most visible from locations to the south or west. The majority of potential road upgrades and pipeline development could occur within the 200-foot width of the cherry-stem road (defined as a dead-end road which extends into a wilderness inventory unit but is excluded from the unit [BLM 2021f]), which lies outside the wilderness boundary and provides existing access to the lease. However, during exploration, a well pad of approximately 4 acres in size is likely to be constructed on lands within the wilderness area immediately adjacent to the road. The ultimate amount of potential surface disturbance within the wilderness would depend on the results of exploration and any subsequent developments or reclamation. The black sagebrush vegetation dominant within the lease is likely to take decades to fully return to natural conditions prior to disturbance. Reseeding and revegetation efforts are likely to be hindered by grazing, invasive species, and climate change. A long-term impact from lease exploration, regardless of outcome, would be the

existence of a capped well. The well head and casing below ground would be a permanent degradation of the undeveloped quality of the wilderness area and withdrawn mineral estate.

Currently, the access route to UTU93713 requires high clearance vehicles to navigate safely over several sections of slick rock. It is likely that the access road to lease UTU93713 would need to be improved and widened to allow for heavy machinery access and/or pipeline construction. These potential upgrades to the route could increase OHV use and visitation to this area of the wilderness, particularly the trailhead for Fivehole or Colonnade Arch. Increased traffic and visitation could degrade outstanding opportunities for solitude and natural, undeveloped qualities of wilderness character within this part of the Labyrinth Canyon Wilderness.

Impacts of the Wilderness and Lands with Wilderness Characteristics Alternative

Under the Wilderness and Lands with Wilderness Characteristics Alternative, the BLM would cancel Lease UTU93713 that overlaps designated wilderness. This alternative would essentially remove all direct impacts to the Labyrinth Canyon Wilderness, as Lease UTU93713 would be cancelled and not developed.

Impacts of the Lease Cancellation Alternative

The Lease Cancellation Alternative would not result in any potential impacts to the Labyrinth Canyon Wilderness, as Lease UTU93713 would be cancelled and not developed. If cancelled, Lease UTU93713 would not be available for future leasing.

3.3.5.3 Mitigation Measures and Residual Effects

There are no required design constraints or mitigation measures for wilderness areas.

3.3.5.4 Cumulative Effects

The CIAA for wilderness includes the Labyrinth Canyon Wilderness. This area was chosen because it represents the wilderness areas that would be directly impacted by the affirmation of the leases. Past, present, and reasonably foreseeable actions in the vicinity of Labyrinth Canyon Wilderness that have affected and will likely continue to affect wilderness areas including potential well development as noted in the RFDS, increasing recreational demands on public lands, OHV use, issuance of ROWs, and ongoing travel management planning for the PFO. These activities could introduce sights, noises, and infrastructure in or adjacent to the wilderness area, which could impair the feeling of solitude and degrade naturalness. Increasing visitor use in the planning area will likely intensify use of BLM-administered lands, including wilderness areas, potentially reducing opportunities for solitude.

3.3.6 Soundscapes

Issue Statement: How would proposed and potential development of issued leases affect the visitor experience with regard to natural soundscapes on public lands and nearby National Parks?

3.3.6.1 Affected Environment

The acoustic environment, or soundscape, is the combination of all sounds in a given area. These include natural sounds, such as from wind and water and those sounds caused by insects, birds, other wildlife, and humans. Human-caused sounds are considered noise because they have the potential to affect the natural acoustical environment and the noise-sensitive resources in that environment. The surrounding communities, wilderness areas, and parks have soundscapes which enrich visitor's experience of the natural park environment and allow wildlife to better hear and communicate for survival. In the United States, noise is regulated as a nuisance by local counties and municipalities. National parks employ

science research, BMPs, and quiet technologies to reduce disruptive sound levels and optimize the natural soundscape environment. Each national park has a unique soundscape, and these sounds are central to a visitor's experience in a park (NPS 2017).

Canyonlands National Park and Goblin Valley State Park are located 5 miles from the nearest of the leases, and the town of Hanksville, Utah, is located 9.2 miles from the nearest of the leases. The Labyrinth Canyon Wilderness overlaps with Lease UTU93713. Communities surrounding the leases are rural. Rural background noise in wilderness and rural areas are about 40 dBA (EPA 1978). The EPA guideline for residential noise is 55 dBA (EPA 1974). Sound levels in national parks and wilderness areas can vary greatly, ranging from among the quietest ever monitored to extremely loud. Table 3-22 provides some examples of sound pressure levels measured in national parks (NPS 2018).

Table 3-22. National Park Service Measured Sound Pressure Levels

Sound Level (dBA)	Sound Source	Location
0	Threshold of human hearing	
10	Volcano crater	Haleakala National Park
20	Leaves rustling	Canyonlands National Park
40	Crickets at 5 meters	Zion National Park
60	Conversational speech at 5 meters	Whitman Mission National Historic Site
80	Cruiser motorcycle at 15 meters	Blue Ridge Parkway
100	Thunder	Arches National Park
120	Military jet at 100 meters at ground level	Yukon-Charley Rivers National Park
126	Cannon fire at 150 meters	Vicksburg National Military Park

Noise levels are expressed in A-weighted decibels (dBA), which is a measure of sound as the human ear experiences it. The table above shows that, for instance, the measured sound level at Canyonlands National Park for rustling leaves was 20 dBA. The NPS provides a national soundscape map showing the typical noise level in particular areas across the United States. The NPS national soundscape map shows an L50, the noise level exceeded for 50% of the measurement duration, of approximately 30 dBA for the leases (NPS 2021). Rural background noise in wilderness and rural areas is about 40 dBA (EPA 1978).

3.3.6.2 Environmental Effects

Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would affirm its previous leasing decisions for the 59 leases. The leases include the standard lease terms and conditions for development of surface oil and gas leases. Given that all 59 leases would be affirmed, there is a potential for oil and gas development, thus the potential for impacts to the soundscape. There are no county noise ordinances in Emery County that quantify a noise threshold; however, a 10dBA or greater increase above background noise levels is generally accepted as sufficient to cause noise pollution (BLM 2022c).

There are differences in noise levels associated with each stage of drilling and production, including the construction of the well pad and access roads, drilling, completion, and production. The BLM published typical noise levels from oil and gas activity are presented in Table 3-23. The sound levels shown are measured at a distance of 50 feet. Also, in the course of developing the *September 2018 Oil and Gas*

Lease Sale Environmental Assessment, a sound model was produced to see how noise levels associated with future mineral resource development would impact recreationists at the Canyonlands National Park Horseshoe Canyon Unit (Unit) near the two closest leases to the Unit at that time. This sound model demonstrated that a pump jack during drill pad operations generated, on average, 82 dB at 400 megahertz (MHz) measured at a distance of 50 feet, which confirms the pump jack operation noise levels in Table 3-23. No additional research regarding oil and gas development noise levels have been completed for the lease areas since the 2018 analysis therefore these assumptions are currently still applicable.

Table 3-23. Noise Levels Associated with Oil and Gas Activity

Noise Source	Sound Level and 50 Feet
Well drilling	83 dBA
Pump jack operation	82 dBA
Produced water injection facilities	71 dBA

Source: BLM (2000).

Note: Sound levels are based on highest measured sound levels and are normalized to a distance of 50 feet from the source.

Using the highest noise level from the table above, the measured 83 dBA from a distance of 50 feet, and the inverse square law, the potential noise level can be estimated. At a distance of 5 miles (26,400 feet), which is the distance from either Canyonlands National Park or Goblin Valley State Park to the nearest lease, the potential noise level would be 28.5 dBA. The NPS national soundscape map shows background noise level of approximately 30 dB in the lease area (NPS 2021), and Canyonlands National Park has a measured background noise level of 20 dBA from rustling leaves. Therefore, the potential 28.5 dBA is below a 10-dBA increase over the measured Canyonlands National rural background noise and the NPS national soundscape map. Using the same methodology, the potential noise level at Hanksville, Utah, can also be estimated. At a distance of 9 miles (47,520 feet), which is the distance from Hanksville, Utah, to the nearest lease, the potential noise level would be 23.4 dBA. The NPS national soundscape map shows background noise level of approximately 30 dB in the lease area (NPS 2021), and rural background noise in wilderness and rural areas are about 40 dBA (EPA 1978). Therefore, the potential 23.4 dBA is below a 10-dBA increase over the rural background noise level and less than the NPS soundscape map background noise level. Based on these results, development would not result in any potential impacts to soundscapes.

Additionally, Lease UTU93713 overlaps acres of the Labyrinth Canyon Wilderness, which increases the potential for direct noise disturbance to the Labyrinth Canyon Wilderness. The sound levels in Table 3-23 and the 2018 sound model demonstrated that at a distance of 50 feet, there was a measured noise level of 82 dB. However, this is measured during the phase with the highest decibel level and would be short-lived (well construction and completion is assumed to last 30–60 days); typical noise levels would be expected to be lower. During construction, heavy equipment, including but not limited to bulldozers, graders, front-end loaders, and track hoes, is used to construct the pad and other features as needed for development. When construction of the well is complete, other associated equipment are moved on-site and erected. Usually, a conventional rotary drill is used. During production, high pressure pumps and a pump jack may be used. Many machines operate intermittently and the types of machines in use at a site change with the phase. Operations can produce low frequency noise that would occur for the potential 20-year life of the well.

All other leases under this alternative would be located at a greater distance and generate noise levels lower than the current background, and therefore would not result in any potential impacts to soundscapes. However, in the long term, the construction or improvements of vehicle access routes could

increase the level of public OHV use and associated visitation near developed leases, causing modest increases to noise levels in localized areas over time.

Impacts of the Wilderness and Lands with Wilderness Characteristics Alternative

Under the Wilderness and Lands with Wilderness Characteristics Alternative, the BLM would cancel 48 leases (encompassing 75,494.99 acres) that contain identified LWCs and one lease (encompassing 1,408.01 acres) within a designated wilderness area; however, the affirming of the other 10 leases would still allow for potential mineral exploration and drilling activity. Potential impacts to the soundscape would not occur unless these leases are developed; otherwise, the current soundscape would remain intact. Furthermore, the cancellation of leases in LWC or wilderness areas would equate to less direct noise impacts to these areas.

The leases closest to Class I areas, Leases UTU93525 and UTU93533, would be included in the 49 leases that could be cancelled, therefore potentially reducing soundscape impacts to the Canyonlands National Park. Under this alternative, the closest lease to Canyonlands National Park that would not be cancelled is Lease UTU93492, located 13 miles away. The closest lease to Goblin Valley State Park that would not be cancelled is UTU93471, which is 5 miles away. As discussed above, using the highest noise level from Table 3-23, the measured 83 dBA from a distance of 50 feet, and the inverse square law, the potential noise level at a distance of 5 miles (26,400 feet) which is the distance from Goblin Valley State Park to the nearest lease, would be 28.5 dBA. The NPS national soundscape map shows background noise level of approximately 30 dB in the lease area (NPS 2021), therefore, the potential 28.5 dBA is below a 10-dBA increase over the NPS national soundscape map. Hanksville, Utah, is located approximately 9 miles from the nearest of the 10 remaining leases; the additional distance would result in significantly less impact on soundscape. Using the same methodology, the potential noise level at Hanksville, Utah, can also be estimated. Using the measured 83 dBA from a distance of 50 feet, and the inverse square law, the potential noise level at a distance of 9 miles (47,520 feet), which is the distance from Hanksville, Utah, to the nearest lease would be 23.4 dBA. The NPS national soundscape map shows background noise level of approximately 30 dB in the lease area (NPS 2021), and rural background noise in wilderness and rural areas are about 40 dBA (EPA 1978). Therefore, the potential 23.4 dBA is below a 10-dBA increase over the rural background noise level and less than the NPS soundscape map background noise level, therefore development would not result in any potential impacts to soundscapes. The cancellation of leases in wilderness areas would remove potential noise impacts in these areas. The 10 leases affirmed under this alternative would be located at a distance where noise levels from lease development would decrease and be indistinguishable from background noise sources, and therefore would not result in any potential impacts to soundscapes.

Impacts of the Lease Cancellation Alternative

The Lease Cancellation Alternative would cancel the leases; thus no development of the leases would occur at this time and, therefore, there would be no potential impacts to soundscapes under this alternative.

3.3.6.3 Mitigation Measures and Residual Effects

There are no required design constraints or mitigation measures for soundscape.

3.3.6.4 Cumulative Effects

The region surrounding Canyonlands National Park and Goblin Valley State Park is relatively pristine. Table 3-22 shows that these natural noise sources can vary greatly, ranging from among the quietest ever monitored to extremely loud. Soundscape is primarily determined by the loudest noise source; however, when two noise sources are within 10dB of each other they cumulatively have the potential to add up to 3

dB to the soundscape. Aside from the one lease directly overlapping the Labyrinth Canyon Wilderness, there is no cumulative impact to National Parks and wilderness areas because noise levels decreased with distance to levels indistinguishable from background noise levels at those locations. However, the lease located within the Labyrinth Canyon Wilderness would have an effect on the soundscape, specifically with construction and drilling having the potential to temporarily but significantly increase noise levels, as shown in Table 3-23 and the 2018 sound model which demonstrated that at a distance of 50 feet, there was a measured noise level of 82 dB which is measured during the phase with the highest decibel level and would be short-lived (well construction and completion is assumed to last 30–60 days); typical noise levels would be expected to be lower. Operational noise levels would be expected to be significantly lower, but given the proximity, operational activities have the potential to produce noise levels above the background levels for the area.

3.3.7 Visual Resources

Issue Statement: How would proposed and potential development of leases affect inventoried visual resource values and management objectives?

3.3.7.1 Affected Environment

Visual resources on BLM lands are managed using four Visual Resource Management (VRM) classes: VRM Class I, II, III, and IV (BLM 1986). Oil and gas development is not compatible with VRM Class I designated areas, is often not compatible with VRM Class II designated areas, is generally compatible with VRM Class III designated areas, and is compatible with VRM Class IV designated areas (BLM 1986). Most of the lease area is classified as VRM III; however, lease UTU93713 has 313.2 acres of VRM Class II. The lease area is generally characterized by large, uniform land features, linear finger-like drainages, colors ranging from tans to olives with grays, and uniform texture. The lease area is bounded by the San Rafael Swell to the west and northwest and the Horseshoe Canyon NPS unit and the Green River to the southeast. These areas are known for unique visual features such as rare and unusual geologic formations composed of sandstone, limestone, and shale, colorful banding of sandstone cliffs, arches, spires, and dramatic canyons, prehistoric rock art, and prehistoric and historic structures (BLM 2018a). Table 3-23 depicts the VRM classes within and for the adjacent landscape of the lease area.

Key observation points (KOPs) were establised following BLM's Manual 8400, Visual Resource Management. All the KOPs depicted in Figure 3-3 are located in VRM Class III. Each point is associated with a geographic location and viewer type:

- KOP 1: BLM Road 1010 (Horse Bench) – Travel Route
- KOP 2: Five Hole Arch Trailhead – Recreation (not located on a lease)
- KOP 3: BLM Road 1010/1025 – Travel Route
- KOP 4: BLM Road 1010 Antelope Valley – Travel Route
- KOP 5: Utah State Route 24 – Travel Route

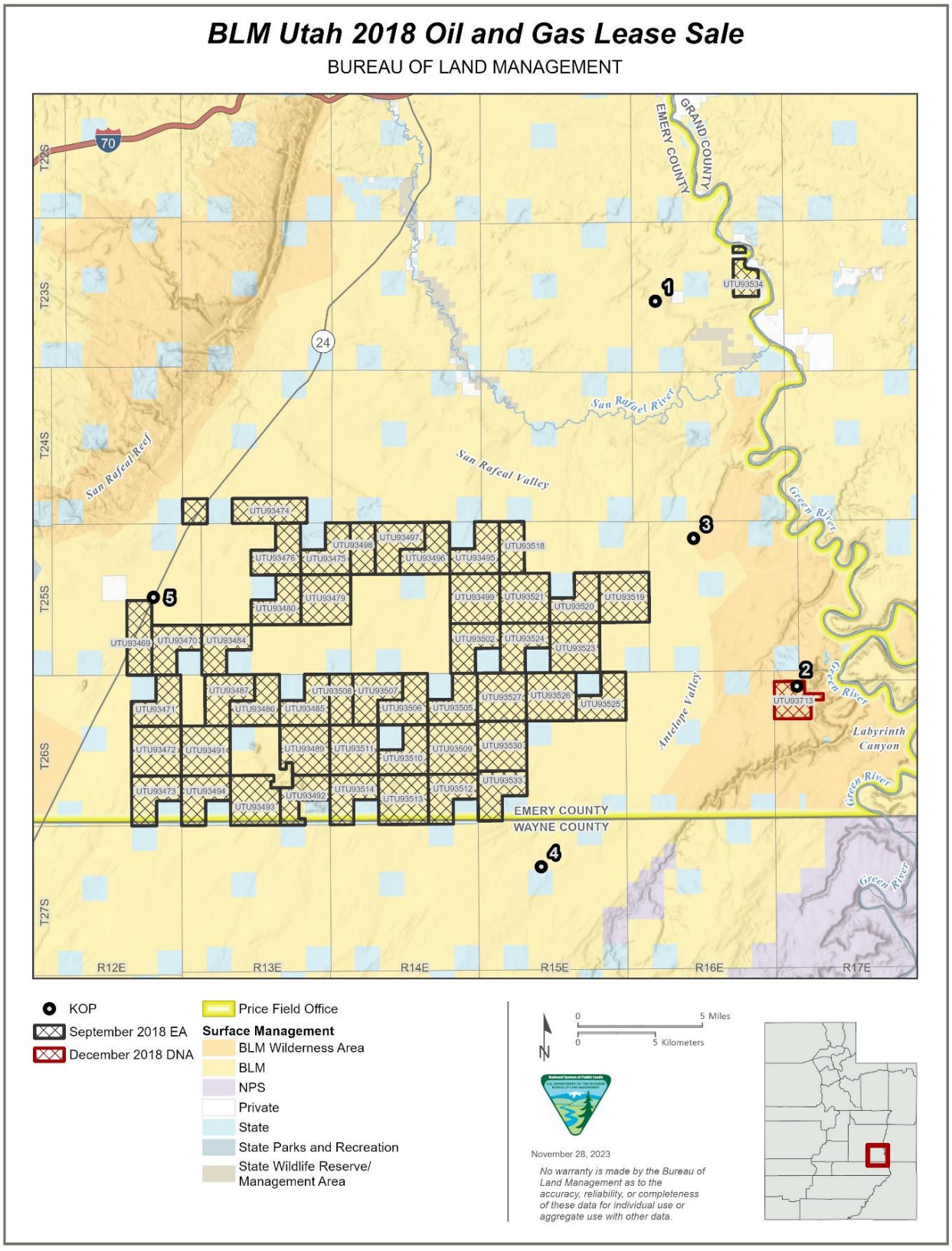


Figure 3-3. Key observation points of the lease area.

A visibility analysis was performed of the lease area. Utilizing feet, which represent heights of typical drilling infrastructure, areas of visibility were calculated for each VRM class visible from each of the five KOPs. A height of 6 feet was used for the typical viewer at the KOP. Figure 3-4 depicts the location of the VRM classes and leases. Figure 3-5 depicts the viewshed analysis, representing what a 6-foot-tall person would see if potential oil and gas equipment would be visible at varying heights of 0 feet (the existing topographic surface), 30 feet, and 50 feet in height.

3.3.7.2 Environmental Effects

Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would affirm its previous leasing decisions for all 59 leases. The leases include the standard lease terms and conditions for development of surface oil and gas leases. Given that all 59 leases would be affirmed, there is the potential for oil and gas development. Potential impacts to the visual resources would only occur if the leases were developed, otherwise the current landscape would remain intact.

While affirming the leases would not directly impact visual resources, it does convey an expectation that drilling, development, and production would eventually occur. These impacts would result from development in the form of oil wells/pads, pipelines, compressors, overhead distribution lines, constructed roads, and other linear features. These impacts would include modifications to the existing landscape's form, line, color, and texture, as well as to the overall experience of a visitor.

As noted in the RFDS, 83.2 surface acres could be disturbed from development of eight wells. Across the 121,679.70 acres encompassed by the 59 leases, 83.2 acres is a low number and would result in a low concentration across the leasing area in southern Emery County. Each well pad would be approximately 200'x400' in size, and the roads and overhead distribution lines and pipelines would create linear clearing and permanent disturbance in the landscape. Drilling at each well pad would create a temporary disturbance in the landscape of 30 to 60 days and operation would have an impact of approximately 30 to 50 years depending on climate conditions. Potential permanent oil and gas drilling equipment are anticipated to be 50 feet or less in height, and visibility of components of that height are analyzed in the viewshed analysis below. The density, intensity, and extent of the anticipated oil and gas development would create a low impact to visual resources.

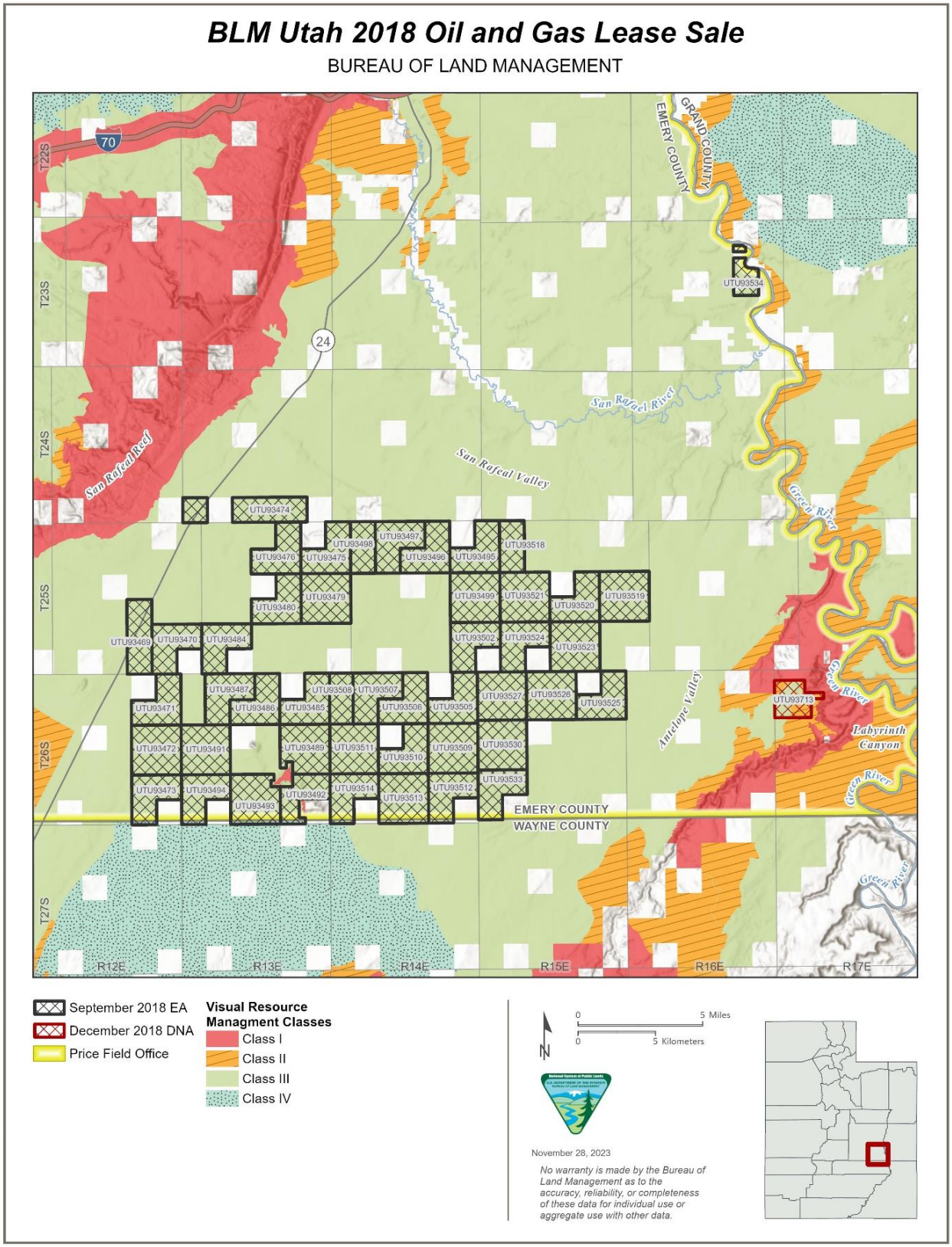


Figure 3-4. Visual Resource Management classes for the 2018 leases and adjacent landscape.

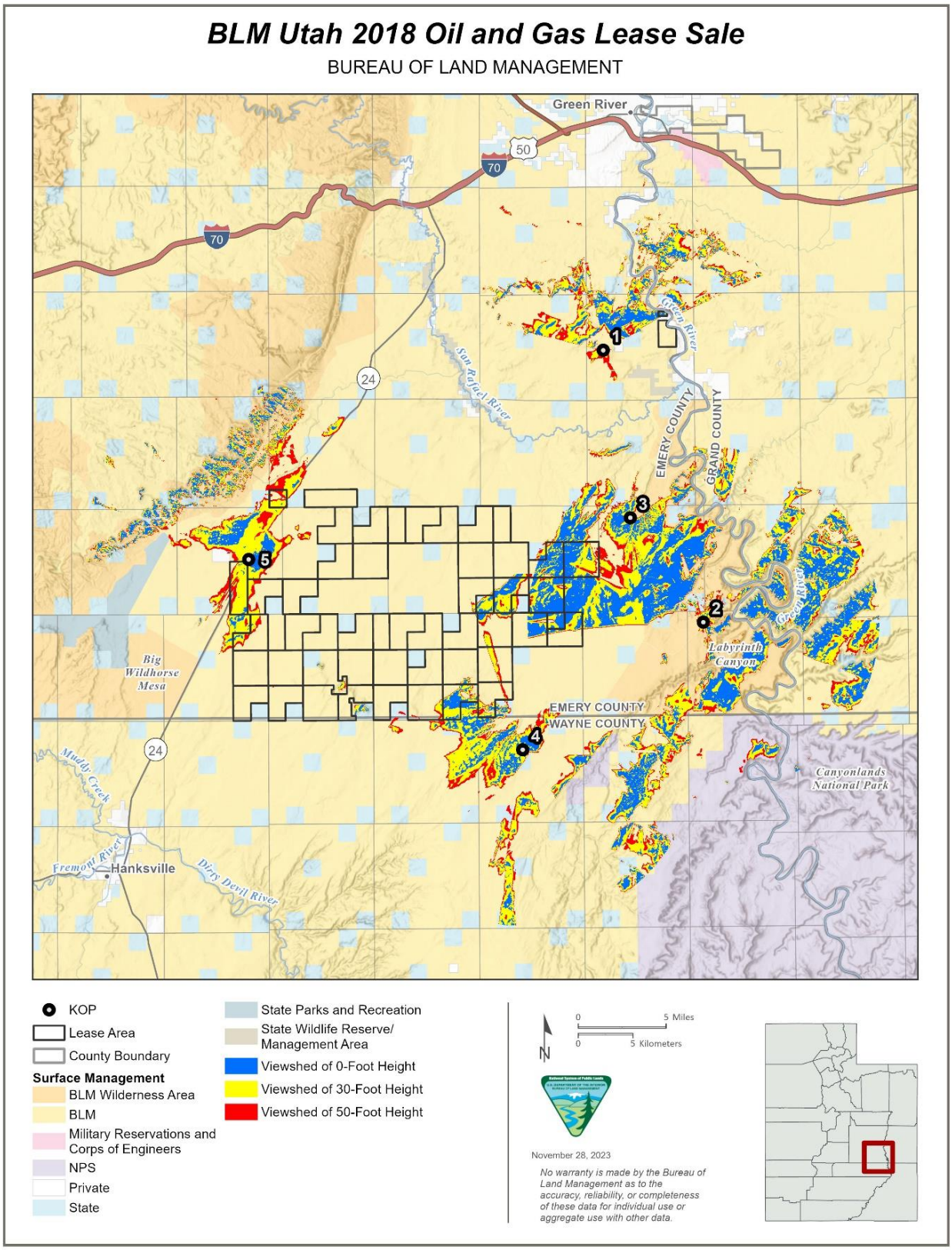


Figure 3-5. Viewshed analysis of lease area.

Table 3-24 quantifies the area (acres) and percentages of each VRM class that would be visible from each KOP for Alternative A.

Table 3-24. Visibility of Visual Resource Management Class Landscapes in the Lease Area

VRM Class	KOP 1	KOP 2	KOP 3	KOP 4	KOP 5
Class I	–	13.70 acres (<1%)	–	–	0.17 acres (<1%)
Class II	–	313.23 acres (0.4%)	–	–	–
Class III	60.27 acres (85%)	8,215.44 acres (96%)	336.02 acres (99%)	5,027.12 acres (99%)	7,100.63 acres (99%)
Not in VRM	10.30 acres (15%)	23.90 acres (<1%)	0.54 acre (1%)	27.99 acres (1%)	13.92 acres (<1%)
Total	**70.57 acres**	**8,566.27 acres**	**336.56 acres**	**5,055.11 acres**	**7,114.72 acres**

There is visibility from KOPs to VRM Class I and II areas, with 13.87 and 313.23 acres, respectively. Visibility to VRM Class I is less than 1% of the total area analyzed and VRM Class II is 0.4% of the leases evaluated. The leases that consist of the No Action Alternative are primarily located in VRM Class III, where oil and gas activities are consistent with visual resource objectives and would not create much change in the landscape. VRM Class I and II are located near the Green River; however, these areas could be seen from higher points of elevation, such as the San Rafael Reef, and development would impact the visual experience.

While small in area, the visibility of oil and gas activities under the No Action Alternative do not conform to VRM Class I objectives. Of note, the non-VRM lands are Utah Trust Lands Administration lands. BLM does not assign VRM classifications to non-BLM lands.

Development would be considered and assessed as cultural modifications, which may detract from the scenery in the form of a negative intrusion. Proposed development and modifications to the existing landscape would be allowable so long as it conforms to the VRM class objectives established in the PFO RMP (BLM 2008a). In addition, a variety of BMPs, design features such as camouflage, pattern colors on infrastructure, and vegetation, as well as LUP-approved stipulations for future mineral resource development would likely mitigate, limit, and/or prevent such impacts to visual resources. Further detailed analysis of the potential impacts to visual resources would be analyzed as appropriate when oil and gas development plans and permits to drill are submitted.

Table 3-25 identifies the leases that have VRM class lands visible from each KOP. Two leases, UTU93713 and UTU93493 have visibility of VRM Class I lands from KOP 2 and 5, respectively. Additionally, lease UTU93713 has 313.2 acres of Class II lands that are visible from KOP 2. Lease UTU93713 has a total of 326.93 acres of VRM Class I and II lands visible from KOP 2. VRM Class I and II areas are characterized by their unique form, line, color, and texture and are free from structures or development that impact their scenic quality.

Table 3-25. Visual Resource Management Classes by Lease Area

VRM Class	KOP 1	KOP 2	KOP 3	KOP 4	KOP 5
Class I	–	UTU93713	–	–	UTU93493
Class II	–	UTU93713	–	–	
Class III	UTU93534	UTU93519 UTU93520 UTU93523 UTU93525 UTU93526 UTU93713	UTU93519 UTU93520	–	UTU93466 UTU93468 UTU93469 UTU93470 UTU93471 UTU93474 UTU93477 UTU93478 UTU93481 UTU93493 UTU93494

* Note: VRM Class IV does not occur in the lease area.

Impacts of the Wilderness and Lands with Wilderness Characteristics Alternative

Under the Wilderness and Lands with Wilderness Characteristics Alternative, the BLM would cancel the 49 leases in LWC or wilderness areas, an area equivalent to 76,903 acres. However, the affirming of the other 10 leases creates the potential for mineral exploration and drilling activity. Potential impacts to the visual resources would not occur unless these leases are developed, otherwise the current landscape would remain intact.

Table 3-26 identifies the remaining 10 leases. Table 3-26 identifies the leases with VRM Class visibility from each KOP. Only three leases from KOP 5 have VRM Class visibility, with lease UTU93493 having 0.17 acres of Class I. Most of the visibility of the remaining 10 leases are VRM Class III from KOP 5.

Table 3-26. Lease Visibility of Lands from Each Key Observation Point

VRM Class	KOP 1	KOP 2	KOP 3	KOP 4	KOP 5
Class I	–	–	–	–	0.17 acre UTU93493
Class II	–	–	–	–	–
Class III	–	–	–	–	677.78 acres UTU93471 674.4 acres UTU93493 0.40 acre UTU93494
Total	–	–	–	–	**1,352.75 acres**

Of the 10 leases that would be affirmed under this alternative, lease UTU93493 has 0.17 acre of VRM Class I, which the activity of oil and gas development would not conform to the VRM class objectives. Development in other areas of the lease that are not classified as VRM I or II would be consistent with visual resource objectives and not create much change in the landscape. Lease UTU93493 is 2,458.69 acres and the VRM Class I visibility is less than 0.01% of the total lease area. The other nine leases do not have visibility from Class I or Class II lands, and oil and gas development is an allowed use in VRM Class III.

Impacts of the Lease Cancellation Alternative

The Lease Cancellation Alternative would not result in any potential impact to visual resources, as the leases would be cancelled and not developed at this time.

3.3.7.3 Mitigation Measures and Residual Effects

Lease UTU93493 has the potential to impact VRM Class I lands; however, the area of impact is less than 0.2 acres and BLM can impose a COA at the APD stage for a site layout to avoid the area of impact. Leases UTU93713 and UTU93493 have potential impacts to VRM Class I and II lands. Stipulation UT-S-160 *Visual Resources – VRM II* applies to lease UTU93713. The stipulation requires that surface-disturbing activities comply with BLM Manual Handbook 8431-1 to retain the existing character of the landscape. Temporary exceedance may be allowed during initial development phases.

3.3.7.4 Cumulative Effects

The CIAA for visual resources is the 59 leases ROWs), such as those contemplated in the RFDS. Alternatives A and B would contribute to these cumulative impacts by affirming any of the 59 leases. As stated in the PFO proposed RMP and final EIS, "impacts would be caused by surface disturbance from production, exploration, and construction of drilling and mining facilities." However, these projects would be required to conform to an area's VRM objectives and lease stipulations though design, camouflage (using vegetation or patterned paint color on permanent infrastructure), and/or topographic screening. These management actions would prevent their incremental impacts on visual resources from becoming dominant features on the landscape in sensitive VRM designations" (BLM 2008c:4-444–4445). When a plan of development is created, site-specific visual contrast analysis would be conducted as appropriate per BLM policy to determine if development is in compliance with VRM standards.

3.3.8 Night Skies

Issue Statement: How would proposed and potential development of leases affect dark night skies in the short and long term?

3.3.8.1 Affected Environment

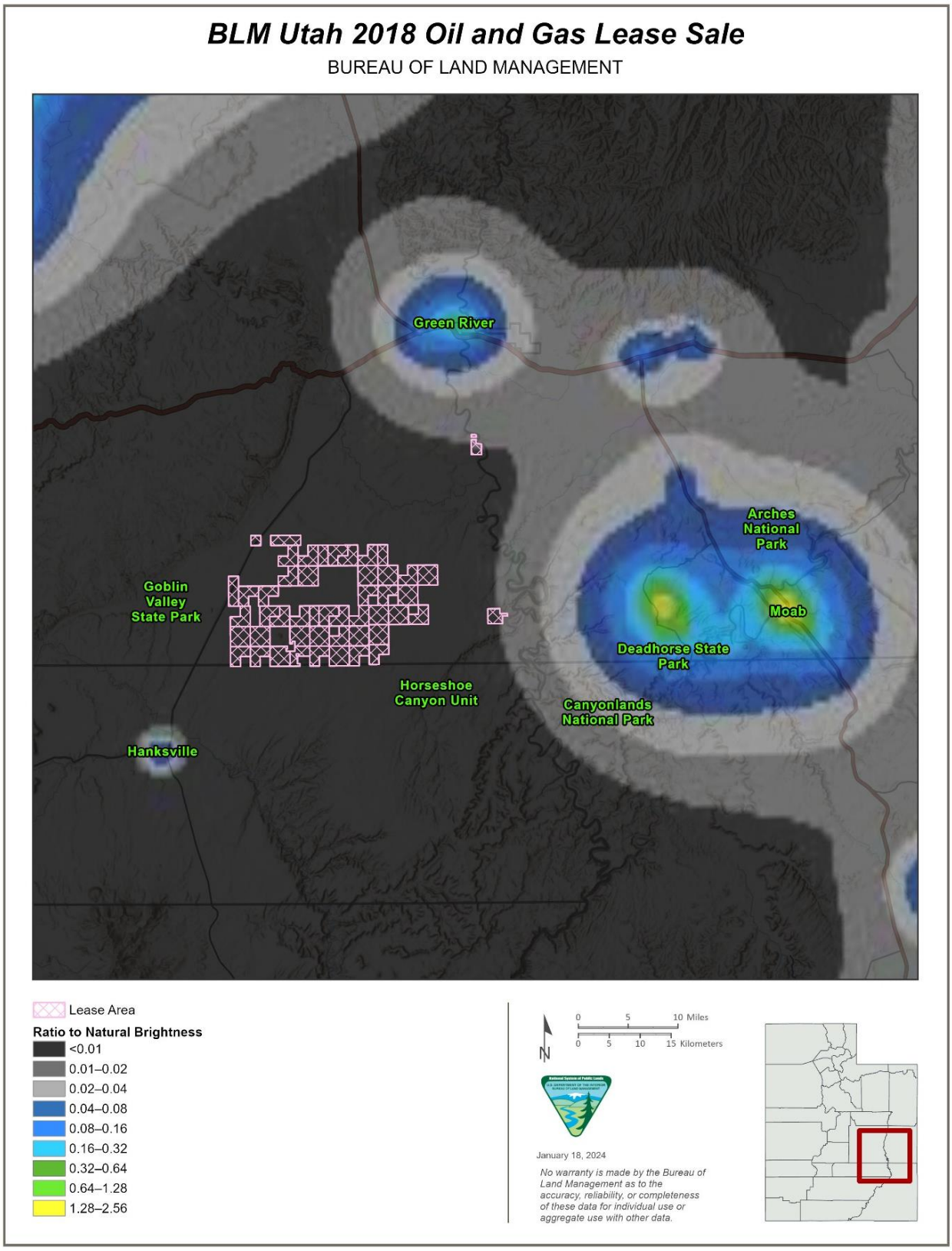
Night skies and astro tourism are gaining popularity in rural national and state parks as designated areas and programs focus on stars, the planets, and atmospheric phenomena. Night skies accentuate the solitude and wilderness experience that park and public lands visitors seek. Optimal night skies are free of scattered light or skyglow, which is generated by anthropogenic light from development, transportation, sports fields, or industrial operations. The scattering of artificial light in the atmosphere increases night sky luminance and erodes the visual appearance of stars and planets (BLM 2018a).

Canyonlands National Park Horseshoe Canyon Unit, Dead Horse State Park, and Goblin Valley State Park were identified as resources with designated areas that support night sky protection and experience an increase of tourism related to night skies. Canyonlands National Park is known to have one of the

darkest night skies; however, its proximity to Moab and views to Blanding and Monticello can affect night sky experiences (BLM 2018a).

One measure of night skies is the Sky Quality Index (SQI). It is an index of light pollution from skyglow with a range of 0 to 100, where 100 is a sky free from artificial skyglow. Using the most recent and best available data, the NPS's Night Sky Monitoring Database reports from 2008 indicate the SQI for Grand View Point Outlook in Canyonlands National Park is between 96 and 97, with over 3,800 stars visible during the June 25, 2011, observation period (NPS 2016a). These SQI values show that skies in this part of Canyonlands National Park, characterized by broad, sweeping views of the canyon landscape, retain their natural characteristics throughout most of the sky. The SQI data have limitations that "bright unshielded lights in the land portion of the mosaic will not be accurately measured for two reasons: they commonly are so bright their recorded luminescence exceeds the dynamic range of the detector so they become clipped or saturated at the maximum [analog to digital units] value, and the median filter will remove most of the light from these sources since they resemble stars or point sources" (NPS 2016a). The limitations of the SQI data indicate that point source lights from oil and gas development may not be completely accounted for.

Figure 3-6 depicts the existing artificial sky brightness from a model from The New World Atlas of Artificial Night Sky Brightness (Falchi et al. 2016a). The city of Moab, an oval area of yellow (brighter artificial lights), green, and blues to a gray buffer, directly affects both Arches National Park and Canyonlands National Park. Most of the leases are located outside the existing sky glow areas of Moab and Green River. The quality of the night sky within the project area is superior to most of the surrounding park units.



Source: Falchi et al. (2016b).

Figure 3-6. Depiction of artificial light and surrounding state and national parks.

3.3.8.2 Environmental Effects

Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would affirm its previous leasing decisions for the 59 leases. The leases include the standard lease terms and conditions for development of surface oil and gas leases. Given that all 59 leases would be affirmed, there is the potential for surface oil and gas development. Potential impacts to the night skies would only occur if the leases are developed; otherwise, the current night sky would remain intact.

Future potential development of the 59 leases could introduce additional artificial lighting that would contribute to skyglow and adversely affect night skies and visitor experience in an area otherwise not impacted by skyglow. The artificial lighting from the leases would contribute to skyglow and would be generally temporary, during the 30-to-60-day development phase, when exploration operations occur 24 hours a day. Headlights from traffic to and from each well pad site at night would occur during the development period. The artificial light during the development period is transient in nature and impacts vary based on conditions such as cloud cover (height, density of clouds), weather (precipitation events), particulate matter in the air, and wind speed or direction. For example, most artificial lighting would occur during the drilling, completion, and potential flaring of a well, which could last for approximately 30 to 60 days. Lighting from the other phases of development and production would occur from vehicle traffic or safety lighting. The source of artificial lighting could be affected by the type of bulb, fixture, shade, and direction of fixture. The NPS reports that the primary sources that contribute to an increase in night sky effects (skyglow) are cities (NPS 2016b). Contributions to skyglow from future potential development of the lease would be a small contribution to the existing sources. At the completion of well pad development, existing conditions would return at each lease unless flaring occurs.

While there are 59 leases, no more than eight wells are expected from development. Impacts from oil and gas leases would be threefold: 1) during pad development and initial drilling when operations may occur at night; 2) from lights during the operation and maintenance of the well pad; and 3) from flaring of gases.

Impacts of the Wilderness and Lands with Wilderness Characteristics Alternative

Under Alternative B, the BLM would cancel the 48 leases (encompassing 75,494.99 acres) that contain identified LWCs and one lease (encompassing 1,408.01 acres) within a designated wilderness area. The BLM would affirm its previous leasing decisions for the 10 remaining leases (encompassing 20,749.45 acres; see Table 2-1). However, the potential development on these remaining 10 leases creates the potential for mineral exploration and drilling activity. Potential impacts to night skies would not occur unless these leases are developed, and the current night skies would remain intact. The 10 leases under this alternative are located more than ten miles from Canyonlands National Park Island in the Sky Unit, and likely would not result in any potential impacts to night skies of the park, affecting the visitor experience. However, development on these leases could impact visitor experiences at Goblin Valley State Park, Canyonlands National Park Horseshoe Canyon Unit, and adjacent public lands. The affirming of the ten leases may potentially impact other areas where night skies are intact, creating a new impact.

Impacts of the Lease Cancellation Alternative

The Lease Cancellation Alternative would not result in any potential impacts to night skies as the leases would be cancelled and, therefore, no development would occur at this time.

3.3.8.3 Mitigation Measures and Residual Effects

While there are no specific lease stipulations that address night skies, mitigation measures could be applied as a COA at the APD stage and may include shaded or directional (downlit) lighting on structures, specific bulb type, and shrouded gas flare stacks.

3.3.8.4 Cumulative Effects

The region surrounding Canyonlands National Park Horseshoe Canyon Unit, Dead Horse State Park, and Goblin Valley State Park is relatively pristine. Due to topography, the CIAA for night skies is the leases and extends outside the lease boundaries. Past, present, and reasonably foreseeable actions that have affected and will likely continue to affect night skies include oil and gas development and issuance of ROWs. These activities could introduce artificial light, which could impair the feeling of solitude and degrade natural dark sky conditions at night. Increasing visitor use in the PFO area will likely intensify use of BLM-administered lands, potentially impacting night sky characteristics by increasing transient light pollution. Oil and gas development typically has a large footprint of road construction and surface disturbance, and therefore, an impact on night sky characteristics over the next 15 to 20 years. However, as noted in the RFDS, it is anticipated that only eight wells would be developed, with a maximum disturbance area of 83 acres. While the area of disturbance is less than 100 acres and would be distributed among the leases, the cumulative effect of artificial light on night skies would also be affected by the location and spacing of well pad sites, meteorological conditions and the type, kind, and placement of lighting resources, and location of ROWs.

3.3.9 Recreation

Issue Statement: How would proposed and potential development of the leases affect recreation access, sites, and user experience within SRMAs? How would proposed and potential development of the leases affect recreation sites, access, and user experience outside of SRMAs?

3.3.9.1 Affected Environment

An SRMA is an administrative unit where the existing or proposed recreation opportunities and recreation setting are recognized for their unique value, importance, and/or distinctiveness, especially as compared to other areas used for recreation. The PFO contains numerous opportunities for both developed and dispersed recreation; specific to this assessment, the analysis area is the leasing area. The leasing area is adjacent to the San Rafael Swell SRMA and the Labyrinth Canyon SRMA. Four leases partially overlap with the San Rafael Swell SRMA and two with the Labyrinth Canyon SRMA. The San Rafael Swell SRMA is 936,479 acres and the Labyrinth Canyon SRMA is 37,203 acres. Table 3-27 shows the leases that overlap with SRMAs and the acreage that overlaps with the designated SRMA (none of the six lease areas that overlap SRMAs are fully within a SRMA). There are no BLM designated recreation areas within the leases.

The Dingell Act was signed into law in 2019; Part II of the law is specific to Emery County, Utah (Emery County Public Land Management). This includes the establishment of the San Rafael Swell Recreation Area (216,995 acres), with the purpose of protection and conservation along with enhancement of recreation resources among other resources; this recreation area is not overlapped by the lease areas. The Dingell Act provides high-level guidance regarding the management of the area, including the appropriateness of motorized use, grazing, and non-motorized recreation use. The Dingell Act also required the establishment of the San Rafael Swell Recreation Area Advisory Council. The Dingell Act also included the designation of numerous additions to the National Wilderness Preservation System within Emery County; additionally, a 63-mile reach of the Green River was designated as a WSR. The Dingell Act also conveyed land from the BLM to the State of Utah for Goblin Valley State Park and set up land exchanges between the state and the federal government.

Table 3-27. Acreage of Overlap Between Leases and Special Recreation Management Areas

Lease Unit Special Recreation Management Unit	Acreage Overlap with Special Recreation Management Unit
UTU93534 (Labyrinth Canyon)	183.60
UTU93713 (Labyrinth Canyon)	884.13
Total for Labyrinth Canyon	**1,067.73**
UTU 93466 (San Rafael Swell)	679.07
UTU 93486 (San Rafael Swell)	169.07
UTU 93469 (San Rafael Swell)	696.29
UTU 93474 (San Rafael Swell)	436.72
Total for San Rafael Swell	**1,981.15**

Areas within the leases (both within and outside the SRMAs) area are classified under the Recreation Opportunity Spectrum (ROS) system. ROS is a widely used planning and management framework for classifying and defining recreation opportunity environments ranging from the primitive to the urban. This continuum recognizes variation among the landscape's physical, social, and operational characteristics. The ROS was developed as a tool to facilitate recreation inventory, evaluation, management, planning, and decision-making. The 59 leases are located within ROS classification semi-primitive motorized, semi-primitive non-motorized, and roaded-natural.

Recreational visitation within the leasing area was estimated by the PFO at 8,931 annual visits in FY22 and 9,114 visits in FY23 for the San Rafael Desert area which encompasses all leases except for UTU93713. This would be considered a light amount of visitor use in the San Rafael Desert. Lease UTU93713 is located within the Labyrinth Canyon Wilderness Area, which listed dispersed, non-river-based recreation at 10,053 visits in FY22 and 10,265 visits in FY23. For the size and accessibility of the Labyrinth Canyon Wilderness, this would be considered a moderate amount of use. Most recreational activities within the leases would include OHV use and mountain biking where permitted, dispersed camping, hiking, backpacking, canyoneering, hunting, and nature photography.

3.3.9.2 Environmental Effects

Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would affirm its previous decisions to offer and issue the 59 leases. The issuance of leases allows for mineral exploration and development activities to occur. Mineral development in leased areas could impact recreation both in areas designated as SRMAs and areas outside SRMAs. Implementation of this alternative would result in the affirming of leases that overlap with two designated SRMAs. The leases overlap about 2% of the San Rafael SRMA (1,918.15 acres out of 936,479 total acres) and just under 3% of the Labyrinth Canyon SRMA (1,067.73 acres out of 37,203 total acres). The presence of new oil and gas infrastructure on public lands would potentially change the recreational setting of these areas. The construction or improvements of vehicle access routes could increase the long-term level of public OHV use and dispersed recreation near developed leases. Visitors seeking recreational settings consistent with primitive or non-motorized characteristics would likely be displaced to other BLM lands that provide for the recreational outcomes they seek. The period of drilling, completion, and potential flaring of a well could last approximately 30 to 60 days and this would be a time when recreationists could be especially susceptible to displacement. Further, as discussed in Section 3.3.4, Lands with Wilderness Characteristics, recreational experiences dependent on wilderness or

wilderness-like experiences would be affected under this alternative. There is potential for impact portions of 75,494.99 acres of LWCs through the affirming of the 59 leases. However, based on the RFDS, development of only eight wells is anticipated, BLM expects that there would be direct impacts to a maximum of 83.2 acres of LWCs.

For areas not designated as SRMAs, if leases designated as semi-primitive non-motorized (under the ROS system) were to be developed, the ROS classification would shift from semi-primitive non-motorized to semi-primitive motorized. This would lead to a different recreational experience for people recreating in those areas that overlap with the semi-primitive non-motorized classification.

Impacts of the Wilderness and Lands with Wilderness Characteristics Alternative

Implementation of this alternative would result in the affirming of 10 leases, one of which overlaps with one designated SRMA. Lease UTU93486 overlaps about 0.2% of the San Rafael SRMA (169.07 acres out of 936,479 total acres) and none within the Labyrinth Canyon SRMA. As such, the impact to SRMAs is approximately 94% less under this alternative as compared to the No Action Alternative (3048.88 acres under the No Action Alternative versus 169.07 acres under this alternative). The presence of the lease on the SRMA has the potential to effect recreation outcomes in a relatively small portion of the San Rafael SRMA as oil and gas development may occur in dispersed recreation areas or the presence of the development may create noise or visual impacts that could indirectly affect recreational experiences for certain users. Generally, recreationists who seek out experiences and settings consistent with non-motorized or primitive values would likely be displaced to other areas within the SRMA or other BLM lands that provide the appropriate setting. Impacts to LWCs and soundscapes are addressed in Sections 3.3.4 and 3.3.6, respectively.

Similar to the No Action Alternative, for areas not designated as SRMAs, the ROS classification would shift from semi-primitive non-motorized to semi-primitive motorized for areas designated as semi-primitive. The construction or improvements of vehicle access routes could increase the long-term level of public OHV use and dispersed recreation near developed leases. This would lead to a different recreational experience for people recreating in those areas that overlap with the semi-primitive non-motorized classification. If a recreationist is seeking a more primitive, non-motorized type of recreational experience, the development of these areas (similar to areas under a SRMA) could lead to their displacement to other areas offering the experience they seek.

Impacts of the Lease Cancellation Alternative

The Lease Cancellation Alternative would not result in any potential impacts to recreation as the leases would be cancelled and not developed at this time.

3.3.9.3 Mitigation Measures and Residual Effects

Mitigation measures to account for any impacts or residual effects could be implemented in the APD stage and include locating oil and gas infrastructure outside of designated SRMAs in cases where there is partial overlap between leases and SRMAs. Mitigation would be necessary or warranted in the case where infrastructure could be located outside of SRMAs.

3.3.9.4 Cumulative Effects

The CIAA for recreation consists of the San Rafael Swell SRMA and the Labyrinth Canyon SRMA. The past, present, and foreseeable future actions with the potential to contribute to surface disturbance include development of new and existing mineral rights (leases) and/or realty actions (e.g., pipelines and road ROWs), such as those contemplated in the RFDS. Additionally, it is anticipated that the current grazing patterns and recreation activities will continue to occur throughout the CIAA. All of the past, present, and

reasonably foreseeable future actions listed above could displace recreationists or affect recreation by a loss or transformation of recreation opportunities. It can be anticipated that the future development of oil and gas, as described in the RFDS, could create noise and light pollution and increase traffic in the region. These actions could degrade resources important to recreationists in the San Rafael Swell SRMA and the Labyrinth Canyon SRMA (e.g., semi-primitive, non-motorized experience). Livestock grazing has and will continue to occur throughout the CIAA. In order to minimize conflict between livestock grazing and recreationists, grazing is prohibited from occurring within developed recreation sites. Although livestock grazing and recreation are generally compatible uses of public lands, the addition of the ground disturbing activities and the associated impacts of the other reasonably foreseeable future actions may increase the likelihood of displacing recreationists.

3.3.10 Transportation and Access

Issue Statement: How would proposed and potential development of leases impact public access and travel on existing TMP-designated routes?

3.3.10.1 Affected Environment

The PFO Travel Management Areas (TMAs) and associated plans: San Rafael Swell TMA (DOI-BLM-UT-G020-2019-0019-EA), and San Rafael Desert TMA (DOI-BLM-UT-G020-2018-0004-EA) include the lease areas; Henry Mountains TMA is south of the area in Wayne County (Figure 3-7). The San Rafael Swell and San Rafael Desert TMAs include a combined 1,533 miles of "open" motorized routes through the lease areas. Generally, routes are managed as maintenance level 1 and maintenance level 3 in the lease areas, i.e., not surfaced annually. The lease areas include approximately 9 miles of gravel roads, 495 miles of natural surface roads, 4 miles of natural surface (improved roads), 8 miles of solid (slickrock), and 945 miles of unknown or not designated routes. Transportation and access within the PFO planning area that is not within a TMA is managed according to the PFO 2008 RMP (BLM 2008a). The existing routes within the three TMAs are currently utilized by motorized vehicles, including OHVs, jeeps, motorcycles, and aircraft, as well as non-motorized uses, including mountain biking, hiking, and equestrian use. All leases except four have existing motorized access.

The State of Utah manages and maintains the major interstates and highways. BLM, Carbon County, and Emery County coordinate in development, maintenance, and management of local roads within the PFO. BLM policy is to develop and maintain roads that provide access for BLM personnel for resource management purposes. FO personnel identify which roads require maintenance from year to year. These assessments, combined with the experience as expressed by the BLM operations staff and management needs determine which roads will be maintained and improved.

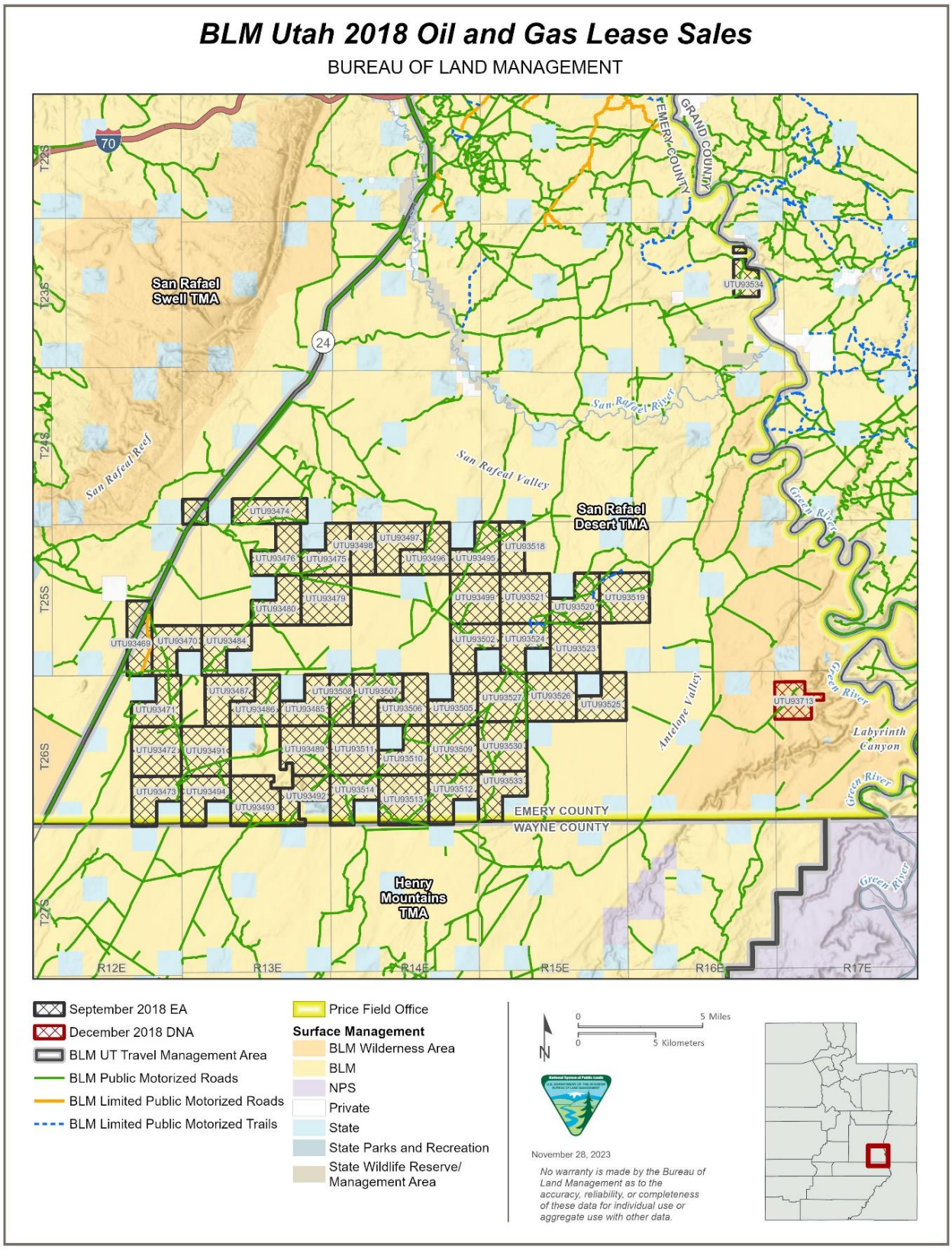


Figure 3-7. Travel management areas and lease areas.

There are several actively used backcountry airstrips located within the PFO. Some of these airstrips are maintained by volunteer groups. By policy, the BLM will not close backcountry airstrips without consultation and coordination with the Federal Aviation Administration and Utah Division of Aeronautics.

3.3.10.2 Environmental Effects

Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would affirm its previous decisions to lease the 59 leases from the 2018 Lease Sales. The development of these 59 leases may impact the current transportation network and access to BLM lands.

New route development, construction, use, and operation and maintenance would be coordinated with lease holders by the BLM. Development of a given lease could temporarily concentrate OHV use, increase traffic, or close routes/access for public safety—each resulting in changes to vehicle movement. Changes to the existing BLM transportation system from oil and gas (or helium) development activities would result in site-specific impacts to public route use and access. Public lands users may be required to travel farther or shorter distances or alter their mode of transportation to gain public access. Some changes may be beneficial, long-term changes to vehicle movement; this will be influenced by route popularity and integration into the existing route system.

Upgraded or new access routes may increase the overall long-term future level of OHV traffic and dispersed recreation use near a developed lease, thereby potentially increasing resource impacts from route proliferation, campsite expansion, trash, wildfires, invasive weeds, vegetation loss, and soil disturbances. Although BLM can attempt to close newly created routes or well sites to public access with signs and fencing, in the open, remote environment of the leasing area, enforcement and compliance can often be challenging and unsuccessful. New route development to the four leases with no current motorized access may require amendments to TMAs or the PFO RMP (BLM 2008a) to incorporate the new route into the transportation system, including additional environmental analysis, regardless of whether the public would be allowed to use the new route.

Table 3-28 shows the number of leases that could be developed in each affected TMA. Note that several leases occur within more than one TMA.

Table 3-28. Leases within Travel Management Areas

Travel Management Area	Number of Leases*
San Rafael Swell	4
San Rafael Desert	59
Not within a TMA	8

* Some leases overlap more than one TMA.

Impacts of the Wilderness and Lands with Wilderness Characteristics Alternative

New route development under this alternative would have the same impacts as described under the No Action alternative, except there would be commensurately less impacts associated with the decreased number of leases (10) as compared to the No Action Alternative (Table 3-29).

Table 3-29. Leases within Travel Management Areas, Wilderness and Lands with Wilderness Characteristics Alternative

Travel Management Area	Number of Leases*
San Rafael Swell	0
San Rafael Desert	10

* Some leases overlap more than one TMA.

Impacts of the Lease Cancellation Alternative

The Lease Cancellation Alternative would not result in any potential impacts to transportation and access as the leases would be cancelled and not developed.

3.3.10.3 Mitigation Measures and Residual Effects

Mitigation measures to account for any impacts or residual effects could include locating oil and gas infrastructure so that new road construction would not be required.

In the event that new road construction is required to access any of the 59 leases, the BLM would require the new road construction to follow applicable new route criteria as defined in these TMPs:

- San Rafael Swell TMP/EA
- San Rafael Desert TMP/EA

BLM Engineering staff would be involved early in the process of planning, locating, designing, and constructing new routes, and with choosing and applying associated BMPs. New routes and changes to the network require application of appropriate NEPA review. The route evaluation process and NEPA review (which may be done concurrently) must occur prior to the implementation or construction of a new route.

The BLM's travel management manual (BLM 2016c) provides broad guidelines on how to appropriately add new routes to a BLM travel network. All new roads, primitive roads, and trails would meet the standards for design, construction, and maintenance found in BLM manuals and handbooks (e.g., "Appendix 8: Trail Planning and Standards" in the BLM travel management handbook [BLM 2012]). Among other guidance, all new TMA routes would meet the standards for design, construction, and maintenance found in the BLM's Roads Design Handbook (BLM 2011b) and Primitive Roads Design Handbook.

Residual effects would likely include an increase in OHV traffic and recreation visitor use as a result of new route construction or road upgrades for drilling operations.

3.3.10.4 Cumulative Effects

The CIAA for transportation and access consists of the PFO. The past, present, and foreseeable future actions with the potential to contribute to changes to the transportation system and access include development of new and existing mineral rights (leases) and/or realty actions (e.g., road ROWs) such as those contemplated in the RFDS. The affirming of the 59 leases from the 2018 Lease Sales would contribute to these cumulative impacts. All of the past, present, and reasonably foreseeable future actions listed above could alter the transportation system by adding more roads and access opportunities.

3.3.11 Water Resources

How would potential development of the leases impact the availability and quality of groundwater and surface water resources?

3.3.11.1 Affected Environment

The leases are located within four Hydrological Unit Code (HUC) 8 watersheds: San Rafael Watershed (HUC8-14060009), Lower Green Watershed (HUC8-14060008), Muddy Watershed (HUC8-14060002), and the Dirty Devil Watershed (HUC8-14060004) (Figure 3-8). Specific leases are located in eight different HUC 10 watersheds as shown in Table 3-30. To assess environmental consequences to water resources, the analysis area is defined as the eight HUC 10 watersheds, as listed in Table 3-30.

Surface Water Resources

A review of National Hydrography Dataset (NHD) data identified 204.96 miles of intermittent steams and 20.11 miles of connector channels and artificial paths within the lease boundaries (Table 3-30; Figure 3-9). A review of the NWI data identified 532.05 acres of Riverine wetlands, 1.22 acres of Freshwater Emergent wetlands,4.86 acres of Freshwater Forested/Shrub wetlands,1.39 acres of Freshwater ponds, and 20.23 acres of lakes (see Table 3-30; Figure 3-9). Wetlands in the NWI dataset may overlap or surround other surface water features in the NHD dataset depending on site-specific delineation; therefore, acreage of wetlands may be included in other surface water features presented in Table 3-30. No perennial or ephemeral streams were identified in the NHD data. Most intermittent streams within the analysis area drain toward the San Rafael River. Ephemeral and intermittent streams provide the same ecological and hydrological functions as perennial streams by moving water, nutrients, and sediment throughout the watershed (EPA 2008).

Table 3-30. National Hydrography Dataset and National Wetland Inventory Surface Water Features within Analysis Area

HUC-10 Watershed	Leases within Watershed	Water Features Present in Watershed	Acres or Miles*
Cottonwood Wash	UTU93477, UTU93466, UTU93468, UTU93474, UTU93475, UTU93476, UTU93477, UTU93478, UTU93479, UTU93482, UTU93483, UTU93486, UTU93487, UTU93497, UTU93498	Connector channel	0.55 miles
		Freshwater Forested/Shrub Wetland	2.93 acres
		Freshwater Pond	0.82 acres
		Intermittent stream/rivers	23.85 miles
		Riverine wetland	101.93 acres
Taylor Canyon-Green River	UTU93713	Intermittent stream/rivers	0.53 miles
		Riverine wetland	0.85 acres
Upper Dirty Devil River	UTU93472, UTU93492, UTU93493, UTU93494	Intermittent stream/rivers	14.74 miles
		Riverine wetland	25.96 acres

HUC-10 Watershed	Leases within Watershed	Water Features Present in Watershed	Acres or Miles*
Dugout Creek	UTU93485, UTU93489, UTU93492, UTU93493, UTU93495, UTU93496, UTU93499, UTU93500, UTU93501, UTU93502, UTU93503, UTU93504, UTU93506, UTU93506, UTU93507, UTU93508, UTU93509, UTU93510, UTU93511, UTU93512, UTU93513, UTU93514, UTU93520, UTU93521, UTU93527, UTU93530	Connector channel†	13.09 miles
		Intermittent stream/rivers	106.91 miles
		Riverine wetland	278.95 acres
Horseshoe Canyon	UTU93713	Intermittent stream/rivers	1.09 miles
		Riverine wetland	1.74 acres
Moonshine Wash	UTU93509, UTU93512, UTU93519, UTU93520, UTU93521, UTU93523, UTU93525, UTU93526, UTU93527, UTU93530, UTU93533	Connector channel†	4.83 miles
		Freshwater Emergent Wetland	1.22 acres
		Intermittent stream/rivers	57.28 miles
		Riverine wetland	118.87 acres
Robbers Roost Canyon	UTU93512, UTU93513	Intermittent stream/rivers	0.14 miles
		Riverine wetland	0.35 acres
Lower San Rafael River	UTU93521	Connector channel†	0.31 miles
		Riverine wetland	0.75 acres
Salt Wash-Green River	UTU93534	Artificial Path	0.33 miles
		Connector channel†	0.99 miles
		Freshwater Forested/Shrub Wetland	1.93 acres
		Freshwater pond	0.57 acres
		Intermittent stream/rivers	0.42 miles
		Lake	20.23 acres
		Riverine wetland	2.64 acres

Note: Previously mapped surface water features have been identified based on analysis of the U.S. Geological Survey's (USGS's) NHD and the USFWS's NWI. Additional surface water features may be identified during site-specific analysis at the lease development stage, and the lessee would be required to follow applicable standard terms and conditions, as well as COAs as determined by the BLM.

* Wetlands may overlap or surround other surface water features depending on site-specific delineation; therefore, acreage of wetlands may be included in other surface water features presented in this table.

† Connector channels are used to complete the stream network through NHD waterbodies and NHD areas where there is no obvious channel. Isolated NHD waterbody features may not contain artificial paths.

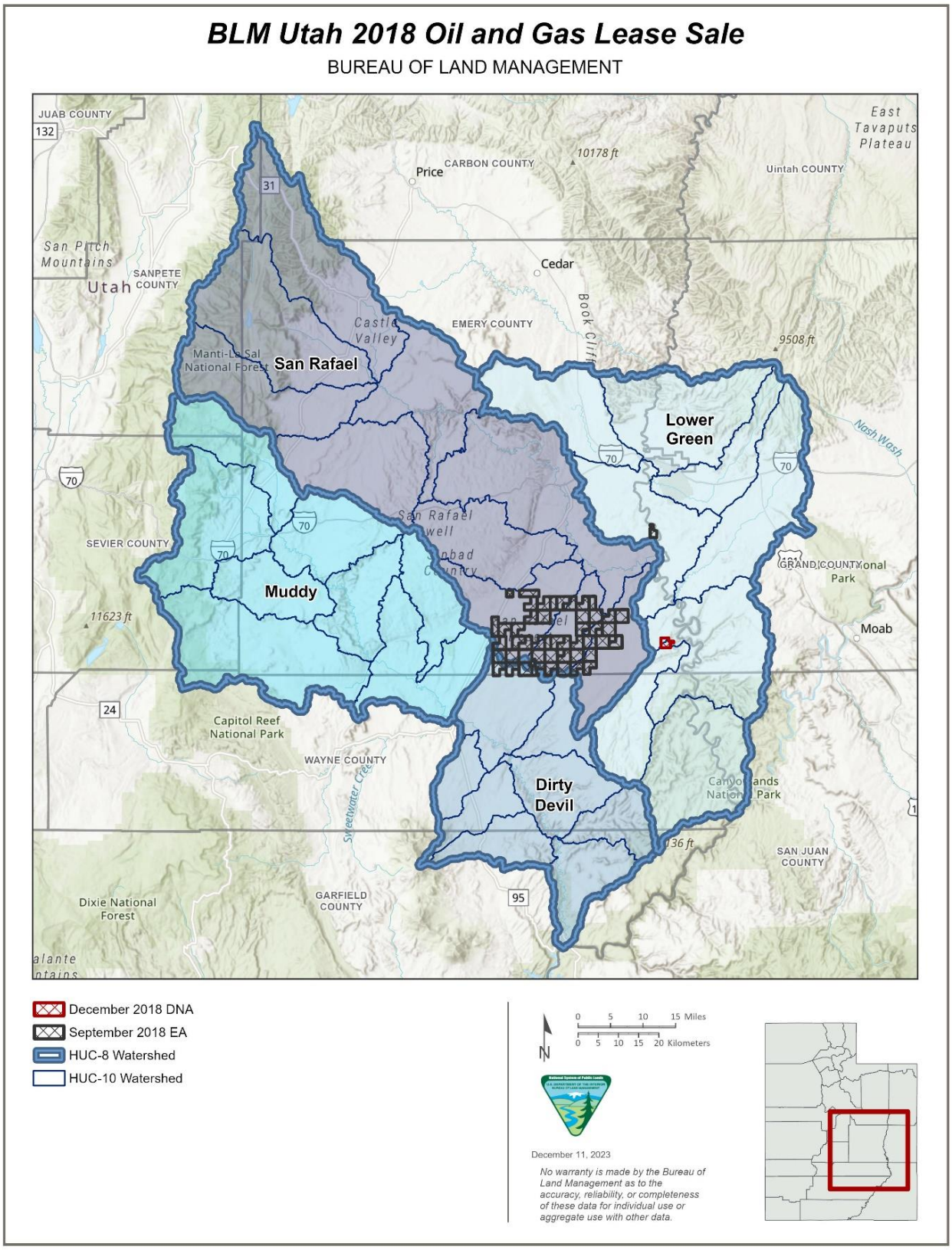


Figure 3-8. HUC-8 and HUC-10 watershed boundaries within analysis area.

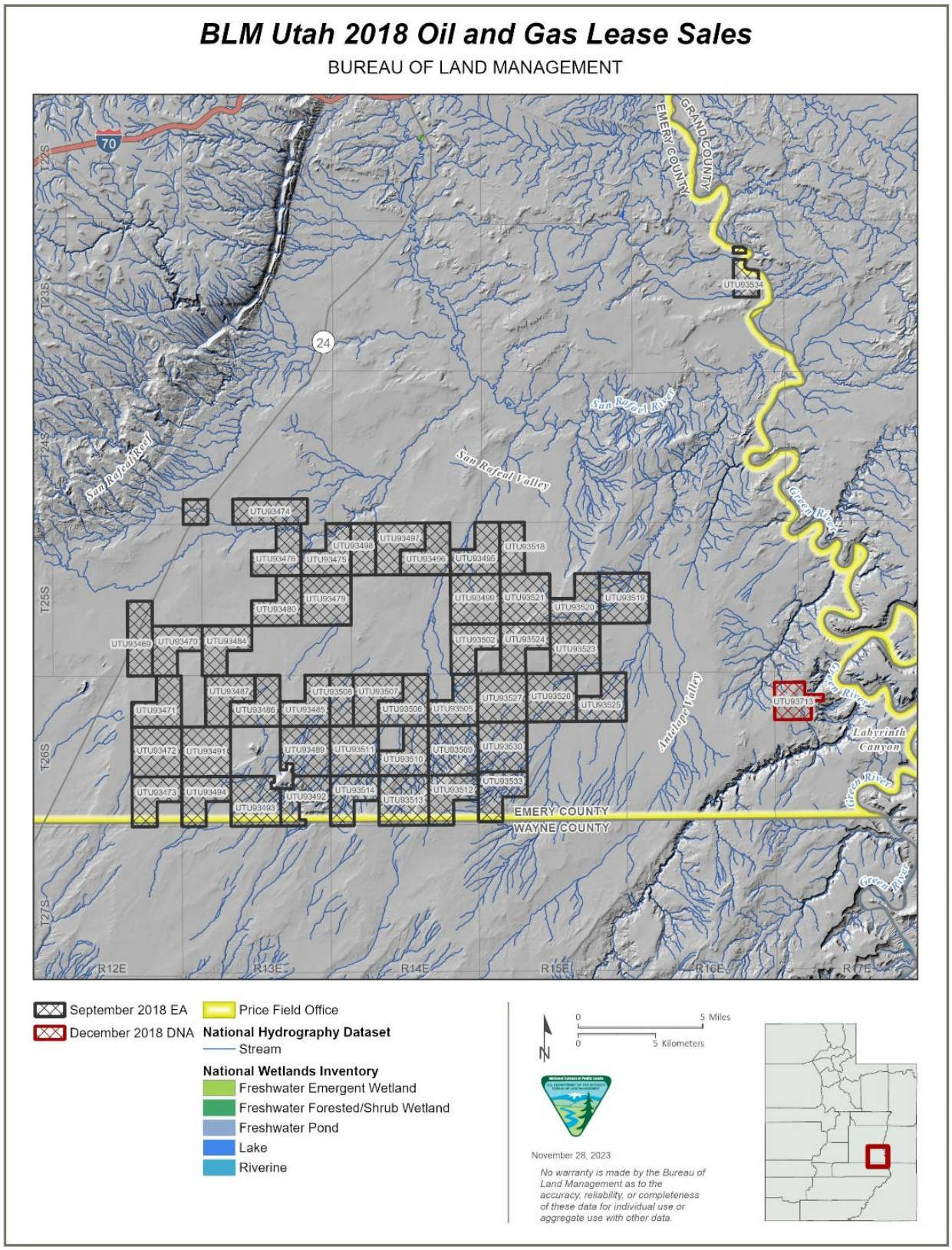


Figure 3-9. National Hydrography Dataset and National Wetland Inventory in leasing area.

The segment of the San Rafael River within 3 miles of leases UTU93498, UTU93497, UTU93496, UTU93495, and UTU93518 is impaired for aquatic life beneficial use (3C) due to O/E Bioassessment (a standard that compares the Observed (O) macroinvertebrate composition to the Expected (E) macroinvertebrate composition in the same environment without human influence) and total dissolved solids. There is an EPA-approved total maximum daily load (TMDL) for this reach that contains recommended projects, buffers, and BMPs to improve water quality conditions (Utah Division of Water Quality [UDWQ] 2004). Oil and gas development is not specifically identified as an issue in the TMDL; however, types of impacts that could occur from oil and gas development (i.e., travel, ground disturbance, etc.) are identified as potential issues that can be mitigated through appropriate BMPs. The 2008 PFO RMP Appendix 19 outlines the hydrologic modification standards for roads that would be implemented during the APD stage which would include channel alteration permits (if applicable), development of culverts for water conveyance, and other BMPs to reduce channel modification. Adequate minimum stream buffers is included as a stipulation (UT-S-127 NSO – *Intermittent and Perennial Streams*) and stipulates setbacks and buffers from the centerline of intermittent and perennial streams The BLM would implement additional COAs during the permit stage.

Lease UTU93534 is located on the west bank of the Green River. The Green River was not listed as impaired on the most recent Utah 303(d) list (UDWQ 2022). However, an area of the lease property line is proximate to the west bank of the river, which could increase sensitivity for impacts to water quality through increased sedimentation and higher risk of pollutants directly discharging into surface waters.

Groundwater Resources

There are five geologic units that are considered major aquifers in the area due to their large areal extent or thickness. These units include the Entrada, Navajo, and Wingate Sandstones, the Coconino Sandstone, and lateral facies equivalents in the Cutler Formation. Groundwater in the area occurs under confined, perched, and unconfined conditions. Most water in the unconsolidated deposits are unconfined, and in several areas, one or more of the major sandstone aquifers are partly or completely drained. Confined conditions mainly occur off the flanks of the San Rafael Swell where the major aquifers are buried. Groundwater levels vary greatly across the area based on depth of the aquifer contained formation and range from shallow (0.15 feet) to depths below 300 feet (USGS 1984).

The Carmel Formation has a special importance to the groundwater hydrology of the northern San Rafael Swell area due to its ability to receive recharge directly and because its formation location overlies the Navajo Sandstone that can supply and receive water between the two formations. Groundwater in the northern San Rafael Swell area is derived from precipitation and from consequent flow in upland tributaries to the Price and San Rafael Rivers, primarily during winter (USGS 1984). Much of the groundwater is discharged locally within the area and the water can move from one aquifer to another; however, most residual recharge water moves to the principal drainage channels that are mostly deeply incised into the aquifer. A small amount of groundwater flows out of the area into the low Dirty Devil River basin, and a part ultimately reaches the Green River. The Navajo Sandstone is regionally the highest quality aquifer in the area due to its shallowness, permeable nature, and fresh water (USGS 1984). Groundwater from the Navajo Sandstone is used moderately by municipal, mining, and agricultural interests (USGS 1987).

The EPA defines a sole-source aquifer as one where 1) the aquifer supplies at least 50% of the drinking water for its service area and 2) there are no reasonably available alternative drinking water sources should the aquifer become contaminated (EPA 2023l). No sole-source aquifers were identified within the analysis area through review of the EPA's Sole Source Aquifers Interactive Map and UDEQ's Utah Environmental Interactive Map (EPA 2023o; UDEQ 2023). Groundwater quality protection for oil and gas leasing, exploration, and development is outlined in IM No. UT 2020-055: Protection of Ground

Water Associated with Oil and Gas Leasing, Exploration and Development. The purpose of this IM is to clarify the process for the protection of usable groundwater zones (< 10,000 mg/L of Total Dissolved Solids, as defined in Onshore Oil and Gas Order No. 2) associated with oil and gas exploration and development activities. There were no surface or groundwater protection zone layers identified in UDEQ's Utah Environmental Interactive Map (UDEQ 2023).

Water Rights

Waters in the PFO drainage basins are fully appropriated for irrigation and industry (Utah Division of Water Rights 2023). New appropriations are limited to small amounts of beneficial use, not to exceed 0.015 cubic feet per second, and can only be approved for domestic water for one family, stock watering, or irrigation for 0.25 acre of land or less. Water rights can still be obtained for stock ponds less than 3 acre-feet. Water sources and necessary water rights from state permitted sources are managed by Utah water appropriation policy for each water basin. Some temporary (1 year) or fixed time period water rights for drilling operations or road dust control are still available. Based on a review of the Utah Division of Water Rights interactive map, there are currently 28 water rights that intersect the leases that are primarily used for stock watering. Only one of the three leases (UTU93475) that have a recently approved APD intersect a water right, which is owned by the BLM PFO and is a point to point diversion that is limited to stock water use (Utah Division of Water Rights 2023).

3.3.11.2 Environmental Effects

Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would affirm its previous leasing decisions for the 59 leases from the 2018 Lease Sales. As previously explained, this analysis does not authorize or guarantee the number of wells analyzed herein; however, as noted in Section 3.1.1, the RFDS estimates 8 potential wells could be developed under this alternative. The drilling of wells on a lease would not be permitted until the BLM approves an APD, and any APD received would be subject to site-specific NEPA review. Potential impacts to water resources would occur only if the leases are developed; otherwise, no impact on water resources would occur. However, development assumptions have been made in this EA to inform the decision because a lease must be developed to keep it from expiring.

If the leases are developed, wells within the leases would likely be developed using hydraulic fracturing techniques. However, the specific drilling technique would not be specified until an APD is received. FracFocus is an online database available to the public (FracFocus 2023). Previously, the public has expressed the following concerns:

- Spills could occur during the management of hydraulic fracturing fluids and chemicals or produced water (anticipated 444,013 bbl of produced water for the leases) that result in large volumes or high concentrations of chemicals reaching groundwater resources.
- The injection of hydraulic fracturing fluids into wells with inadequate mechanical integrity would allow gases or liquids to move to groundwater resources.
- There could be discharge of inadequately treated hydraulic fracturing wastewater to surface water resources.

Given that the BLM has received and approved APD packages on three leases for helium production, of the eight wells used for the RFDS, three were assumed to be helium and five were assumed to be oil and gas. North American Helium has secured municipal water from Green River, Utah, for development and life project supply (BLM 2023b). Water will be necessary for drilling completion operations, flowline

testing, and dust suppression. Final water sources and water quantity will be defined in the APD stage for any other wells drilled.

Future potential development of the leases could result in oil and gas activities, including well pad construction, drilling, completion of vertical wells, and access road construction and maintenance. These actions could impact surface water resources through disturbing vegetation, soil, and mineral substrate, which could create dust and increase runoff rates during precipitation events. The disturbed areas would be more susceptible to erosion, which could create sedimentation issues in streams. Sedimentation would most likely occur during construction of stream crossings for access roads and flowlines, and where disturbances are nearest to streams. Effects would continue until disturbed areas are stabilized though implementation of appropriate BMPs to mitigate sedimentation during construction. All leases require implementation of Stipulation UT-S-127 NSO – *Intermittent and Perennial Streams*, which stipulates setbacks and buffers from the centerline of intermittent and perennial streams, and Lease Notice UT-LN-128 *Floodplain Management*, which avoids adverse impacts to floodplains by developing facilities outside the 100-year floodplain, or minimizing or mitigating impacts by modification of surface use plans within floodplains present within the lease. Additionally, stipulations related to slope and erosion control as described in AIB-7 Soils would further protect against alterations to hydrological conditions. UT-S-126 *No Surface Occupancy - Natural Springs* would protect existing natural springs by providing a surface buffer to protect the integrity and flow patterns of spring systems. The conditions, stipulations, and notices applied to floodplain and riparian resources would protect surface water quality. If wells are constructed on the leases in the future, impacts would be analyzed when an APD is submitted, and site-specific mitigation design features may be applied at the APD stage to reduce or eliminate changes in runoff from surface disturbance.

Surface management includes the use of water to control fugitive dust from roads. The source, volume of water, and transportation methods involved will be identified in the drilling plan per Onshore Order #1. This water is from state permitted sources with valid water rights as managed by Utah Water Appropriation Policy for each water basin.

Development of oil and gas wells could increase the risk of spills that could introduce contaminants to surface water resources. The risk would be dependent on the proximity of development activities to surface water and the measures applied to address the possibility of spills reaching surface water bodies. Types of chemical additives used in well completion activities may include acids, hydrocarbons, thickening agents, gelling agents, lubricants, and other additives that are operator and location specific. The largest components in hydraulic fracturing fluid are water and sand.

Water produced along with oil and gas is often highly saline and may contain low concentrations of different chemical constituents (typically 0.3% by mass and never exceeding 2%) (EPA 2015), depending on the fracturing techniques used, and natural contaminants that may be present in the rock material. A typical oil/gas well uses approximately 20 to 25 unique chemicals during the hydraulic fracturing process, but in some cases, more than 60 distinct chemicals could be used. The five most commonly reported chemicals used in oil and gas projects are methanol; hydrotreated light petroleum distillates; hydrochloric acid; water; and isopropanol (EPA 2015). This water is usually disposed of deep underground or is treated and reused, with some allowed to partially evaporate in surface pits. During the production phase, the amount of water produced by a well can vary from close to zero to over 100 barrels of water per barrel of oil. Nationally, an average of about 10 barrels of water are produced per barrel of oil (Allison and Mandler 2018).

Leasing itself does not have a direct impact on the hydrologic conditions of the leases because the issuance of a lease does not include authorization of surface-disturbing activity. During the permitting stage, however, development of an appropriate stormwater pollution prevention plan as part of the

General Construction Permit for disturbances greater than 1 acre would be required by the State of Utah, and the appropriate Storm Water Discharge Permit (administered by the Utah Pollutant Discharge Elimination System) would be required from the UDWQ. Additionally, during the APD stage potential impacts to waters of the United States (WOTUS) would be analyzed in further detail. This would include an aquatic resource delineation of the area that would identify perennial, intermittent, or ephemeral streams and wetlands that were not captured in NHD or NWI datasets. Section 404 of the Clean Water Act requires U.S. Army Corps of Engineers authorization for the discharge of dredged or fill material into WOTUS. If streams or wetlands are found, coordination with the U.S. Army Corps of Engineers would be needed to determine if the waters are jurisdictional WOTUS and to identify any associated permitting requirements. Activities for which permits may be required include, but are not limited to, land clearing involving relocation of soil, road construction, mining, and utility line or pipeline construction. Additionally, any proposed developments on leases would be subject to the standard lease terms and all applicable laws, regulations, and Onshore Orders in existence at the time of lease issuance. If the company plans on affecting these waters directly, a Stream Alteration Permit would be required, and additional NEPA analysis would be required to review those potential changes. Considering existing knowledge regarding resource values on the subject leases, which is based upon the analysis in the PFO RMP (BLM 2008a) and resource specialist knowledge, significant impacts beyond those already addressed in the Record of Decision for the PFO RMP are not anticipated to occur as a result of leasing these leases.

Further stipulations or lease notices may apply to other water resources that indirectly impact hydrologic conditions, such as stream channels and riparian areas. The stipulations, lease notices, SOPs, BMPs, and COAs implemented during the leasing process would limit or reduce the impacts to hydrologic conditions both directly and indirectly.

Water obtained from aquifers and surface water could result in the drawing down of the water table and reduction of available water resources for wildlife, vegetation, springs, streams, or public consumption, particularly in areas that are experiencing drought. Existing groundwater and surface water flow patterns could be affected by water used for activities on leases. The specific quantity of water required for downhole oil and gas operations depends on local geology and would be evaluated in detail at the ADP stage. The BLM requires that water resources for production originate from a source with a valid existing water right. All surface water and connected groundwater depletions within Colorado River Basin watersheds are subject to the Colorado River Endangered Fish Recovery Program.

The leases were analyzed for any overlapping drinking water protection zones for surface and groundwater sources. There were no leases within drinking water protection zones as defined by the State of Utah Division of Drinking Water based on data from UDEQ's Utah Environmental Interactive Map (UDEQ 2023). Water resource protection is provided by Onshore Orders #2 and #7. All activities with potential to impact surface or ground water flows are analyzed at the APD stage when development information is present. If wells are constructed on the leases at a future time, impacts would be analyzed when an APD is submitted. The BLM would analyze future proposals associated with leases under additional site-specific NEPA and may apply any additional requirements as necessary to protect groundwater quality within the vicinity of the leases at the APD stage.

Well bores would be cased, cemented, and pressure tested to ensure integrity. The appropriate selection of casing materials and cementing schedule would be required and reviewed by the BLM for the prevention of intermixing or water quality degradation of identified usable water formations. This would eliminate the intermixing of groundwater encountered from various aquifers encountered during the drilling process.

Water use for development of the leases assumes the water would primarily be imported and purchased from the nearest municipality based on previous oil and gas development in the area and would be finalized during the APD stage. Water uses associated with development of the leases would occur during well construction and completion period (such as hydraulic fracturing), the operation period (e.g., water use associated with dust control), and during interim and final reclamation.

It is estimated that a total of 4 to 32 acre-feet of water would be needed to drill the proposed eight exploratory wells and to suppress dust (BLM 2020b; Dalebout, 2023, November 29, 2023). If a well is successful and further development is warranted, it is estimated that up to 3 acre-feet per year would be used for operations, and 1 acre-foot per year for road maintenance (BLM 2020b). These values are estimates and can be highly variable and based on unknown factors that are not presented until the APD stage. It is expected that no water wells would be drilled on the Leases, and it is assumed that water would be sourced and imported from the nearest municipality from existing water rights, which could reduce impacts to local aquifers by preventing depletion and drawdown of groundwater resources. These assumptions are based on typical development and production operations scenarios within the project area (BLM 2020b). Actual development of individual leases may result in higher or lower water use for various reasons such as differences with geologic formations, proximity to existing support infrastructure, differences in pace of development, different development methods and control technology used by a lessee, and other reasons. Final water sources and water quantity will be defined in the APD stage. A lessee has 10 years to establish production on a lease, and if production is not established within the 10-year time frame, the lease will be terminated with no development occurring; therefore, there would be no impact on water resources (BLM 2020b).

Impacts of the Wilderness and Lands with Wilderness Characteristics Alternative

Under the Wilderness and Lands with Wilderness Characteristics Alternative, the BLM would cancel 48 leases (encompassing 75,494.99 acres) that contain identified LWCs and one lease (encompassing 1,408.01 acres) within a designated wilderness area. The leases nearest to the San Rafael River (UTU93498, UTU93497, UTU93496, UTU93495, and UTU93518) and to the Green River (UTU93534) would be cancelled under this alternative. This would leave 10 leases available for potential mineral exploration and drilling activities. On the 10 remaining leases there are 54.72 acres of riverine wetlands and 26.22 miles of intermittent stream/rivers identified in the NWI and NHD that could be impacted by development. Potential impacts to water resources would not occur on these remaining 10 leases unless these leases are developed.

If the 10 leases are developed under this alternative, the types of potential impacts on water resources would be similar as described under the No Action Alternative. However, the three leases with APDs, (leases UTU93475, UTU93476, and UTU93479), are not included in the 10 leases and therefore would not be developed. As there would be 49 fewer leases under this alternative, potential impacts on water resources would likely be less than under the No Action Alternative (see Table 2-1), as it is likely that only 2 wells would be developed. It is estimated that a total of 1 to 8 acre-feet of water would be needed to drill the proposed two exploratory wells and to suppress dust under this alternative (BLM 2020b; Dalebout 2023).

Impacts of the Lease Cancellation Alternative

The Lease Cancellation Alternative would not impact water resources by removing the potential water use for development because the leases would be cancelled and not developed.

3.3.11.3 Mitigation Measures and Residual Effects

Water use and groundwater and surface water quality considerations and mitigation measures for reducing impacts to water resources have been previously discussed above. All leases require implementation of Stipulation UT-S-127 NSO – *Intermittent and Perennial Streams*, Stipulation UT-S-126 *No Surface Occupancy-Natural Springs*, and Lease Notice UT-LN-128 *Floodplain Management*, which stipulate setbacks and buffers from the centerline of intermittent and perennial streams. Additionally, stipulations related to slope and erosion control as described in AIB-7 Soils would further protect against alterations to hydrological conditions. UT-S-126 *No Surface Occupancy-Natural Springs* would protect existing natural springs. Any additional required design constraints or mitigation measures would be determined at the APD stage as COAs.

3.3.11.4 Cumulative Effects

The following discusses the potential changes to water resources in the affected environment occurring from existing and foreseeable surface and groundwater disturbance activities, including oil and gas development. Past and present actions that have affected and would likely continue to affect surface and groundwater quality in the analysis area include surface disturbance resulting from oil and gas development and associated infrastructure, geophysical exploration, improper livestock grazing, range improvements, recreation (including OHV use), authorization of ROWs for utilities and other uses, and road development. These types of actions and activities can impact water quality through discharge of pollutants including sediments from development and chemicals used in oil and gas projects.

If the estimated eight wells in the RFDSs are developed, an estimated use of 4 to 32 acre-feet of water would be used per year. This calculation is based on a factor of 0.5 to 4 acre-feet per vertical well, which is considered a reasonable current estimate of water use associated with drilling and completion of a single vertical well within the analysis area (BLM 2020b). If more water-intensive stimulation methods (e.g., slick water fracturing) are implemented or if laterals become longer, water use could increase. Alternatively, water use estimates could be lower if produced water is reused or recycled, or if less water-intensive stimulation methods are used (e.g., nitrogen, liquid nitrogen) in hydraulic fracturing.

The total effect of this use on groundwater aquifer levels is unknown and would be identified during the APD stage. Other projects in the area include shallow livestock water wells that are likely not in the same aquifer as oil and gas (Truman 2023). With minimal project activities other than this proposed lease sale within the analysis area, it is expected that there would be minimal and short-term cumulative effects on water resources.

CHAPTER 4. CONSULTATION AND COORDINATION

4.1 ENDANGERED SPECIES ACT CONSULTATION

The effects of oil and gas leasing development on threatened and endangered species were analyzed through Section 7 consultation as part of the 2008 PFO RMP, including the November 2018 re-initiation that added Ute ladies'-tresses, Navajo sedge, and California condor, and the May 2020 re-initiation that added yellow-billed cuckoo.

During consultation, Lease Notices to inform lease holders of the potential of threatened and endangered species, which may be impacted by oil and gas developments were attached to leases as appropriate. The proposed alternatives are in compliance with threatened and endangered species management outlined in accordance with the requirements under the FLPMA and the NEPA. These notices are found in Appendix B of this EA.

While federal regulations and policies require the BLM to make its public land and resources available on the basis of multiple use principles, it is BLM policy to conserve and protect special status species and their habitats and to ensure that actions authorized by the BLM do not contribute to special status species becoming listed as threatened and endangered by the USFWS.

For lease sales conducted within the range of listed species covered by the referenced consultation actions, the BLM regularly corresponds with the USFWS to ensure that the proposed alternatives do not exceed the impacts analyzed in the existing consultations.

2018 Lease Sales Coordination and Consultation Timeline:

- On April 3, 2018, the BLM issued a memorandum to the Utah FO of the USFWS, enclosing the September 2018 parcels to be offered at the lease sale.
- On April 12, 2018, the memorandum was followed up with an email transmitting GIS shape files of the leases to the USFWS from the BLM.
- On June 4, 2018, the BLM sent an email to the USFWS with biological and botany reports and a summarized report in a memorandum attached. The memo requested the USFWS to provide written agreement with the BLM's finding that leasing the leases would result in a finding of "may affect, but is not likely to adversely affect."
- One June 28, 2018, the USFWS responded to the BLM in written agreement with its finding for the leases within the PFO for the September Lease Sale for all species except Colorado River endangered fish species.
- On July 2, 2018, the BLM emailed the USFWS the list of leases in the December 2018 lease sale and the associated geospatial data.
- On August 3, 2018, the USFWS agreed with the determination of "may affect, but is not likely to adversely affect" for the September Lease Sale for Colorado River endangered fish species.
- On October 11, 2018, the BLM emailed the USFWS the final species-by-lease determinations and associated notices and stipulations that would be attached.
- On November 16, 2018, the USFWS agreed with the determination of "may affect, but is not likely to adversely affect" and concluded coordination for species covered under existing programmatic consultations.

- On November 20, 2018, the BLM requested re-initiation of informal Section 7 consultation on multiple land use plans for the December 2018 lease sale to add geographic areas of species not originally considered. This included informal consultation for Ute ladies'-tresses and Navajo sedge and informal conference for the California condor Experimental population.
- On November 28, 2018, the USFWS concurred with the BLM's determinations and concluded Informal Section 7 Consultation.

2023 EA Coordination Timeline

To account for changes in the AOIs of species between 2018 and 2023 the BLM re-engaged coordination with the USFWS.

- On July 6, 2023, the BLM emailed the USFWS with the geospatial data and its species by lease determinations of "may affect, but is not likely to adversely affect."
- On September 25, 2023, the USFWS concurred with the BLM's determinations and concluded coordination.

The BLM has received and approved APDs for helium production on three leases: UTU93475, UTU93476, and UTU93479. These APDs underwent a separate environmental review (BLM 2023c). BLM specialists determined there was no suitable habitat for any federally listed species in the proximity to the surface disturbance. Therefore, additional consultation was not required for those three APDs. When or if additional APDs are submitted to develop leases, further evaluation and Section 7 consultation with USFWS would occur, as required.

4.2 TRIBAL CONSULTATION

Tribal consultation for leasing actions is done on a government-to-government basis.

September 2018 Lease Sale

For the September 2018 Lease Sale, BLM PFO notified and initiated consultation on March 28, 2018, pursuant to NEPA, NHPA, American Indian Religious Freedom Act (AIRFA), and EO 13007, with the Paiute Indian Tribe of Utah, the Hopi Tribe, Southern Ute Indian Tribe, Kaibab Band of Paiute Indians, Jicarilla Apache Nation, San Juan Southern Paiute Tribe, Pueblo of Laguna, Pueblo of Zia, Uinta Ouray Ute Indian Tribe, Navajo Nation, Northwest Band of Shoshone, Shoshone-Bannock Tribes (Fort Hall), Ute Mountain Ute Tribe, Pueblo of Jemez, and the Pueblo of Santa Clara. BLM received responses from the Hopi Tribe and Southern Ute Indian Tribe requesting to consult through the NHPA Section 106 process for the Lease Sale.

- On April 9, 2018, BLM PFO received a response from the Hopi Tribe requesting additional information and continued Tribal consultation on the proposed lease sale undertaking as part of the NHPA Section 106 process.
- On May 2, 2018, BLM PFO received a response from the Southern Ute Indian Tribe requesting additional information on the proposed lease sale undertaking as part of the NHPA Section 106 process. They additionally deferred and concurred with recommendations from resident Tribes of Utah.[1]
- On May 25, 20238, the Southern Ute Indian Tribe requested additional information as part of the Section 106 Tribal consultation efforts and a copy of the Ute Indian Tribe's statement on the lease

[1] No resident Tribes of Utah provided comments on the September 2018 lease sale.

sale. They shared that the Southern Ute Indian Tribe would concur with the recommendations and support the Ute Indian Tribe's input.[2]

- On May 30, 2018, BLM provided draft Section 106 cultural resource literature review reports to the Hopi Tribe and Southern Ute Indian Tribe for their reviews and comments.
- On June 9, 2018, BLM held a consulting party meeting at the PFO for all Tribes and consulting parties participating in the Section 106 process for the lease sale.
- On July 23, 2018, the Hopi Tribe provided comments following their review of the draft Section 106 cultural resource literature review report and disagreed with BLM's finding of "no adverse effect" to historic properties ((36 CFR 800.5 (b)).
- On July 26, 2023, the BLM notified the following Tribes about the 30-day public comment period for the EA: Hopi Tribe, Jicarilla Apache Nation, Navajo Nation, Piute Indian Tribe of Utah, Pueblo of Acoma, Pueblo of Jemez, Pueblo of Laguna, Pueblo of Santa Clara, Pueblo of Zia, Santo Domingo Pueblo, Shoshone-Bannock Tribes of the Fort Hall Reservation, Southern Ute Indian Tribe, Ute Indian Tribe of the Uintah and Ouray Reservation, Ute Mountain Ute Tribe, and White Mesa Community of the Ute Mountain Ute Tribe. The BLM provided information about how to participate and how to provide comments via ePlanning.

Due to the Hopi Tribe's disagreement with the BLM's finding of "no adverse effect" to historic properties and additional disagreement from multiple Section 106 consulting parties, the BLM requested the ACHP review the BLM's finding of "no adverse effect" to historic properties. On September 10, 2018, the ACHP provided the BLM with the results of their review and concluded that BLM had correctly applied the Criteria of Adverse Effect, pursuant to 36 CFR 800.5(a)(1), and agreed with BLM's finding of "no adverse effect" for the September 2018 Lease Sale. This concluded the Section 106 process for the Lease Sale. This information was shared with consulting parties and both the Hopi Tribe and Southern Ute Indian Tribe.

Consultation with the Hopi Tribe and Southern Ute Indian Tribe concluded for the September 2018 Lease Sale on September 10, 2018, with the conclusion of the NHPA Section 106 process. See Chapter 4.3 for additional details of the NHPA Section 106 process for the September 2018 lease sale.

December 2018 Lease Sale

For the December 2018 Lease Sale, BLM PFO notified and initiated consultation on June 25, 2018, pursuant to NEPA, NHPA, AIRFA, and EO 13007, with the Paiute Indian Tribe of Utah, Uintah Ouray Ute Indian Tribe, the Hopi Tribe, Navajo Nation, Southern Ute Indian Tribe, Northwest Band of Shoshone, Kaibab Band of Paiute Indians, Shoshone-Bannock Tribes (Fort Hall), Pueblo of Jemez, Pueblo of Laguna, Ute Mountain Ute Tribe, Jicarilla Apache, Pueblo of Santa Clara, Pueblo of Zia, and San Juan Southern Paiute Tribe. BLM received responses from the Hopi Tribe and Southern Ute Indian Tribe requesting to consult and consultation occurred throughout the NEPA and NHPA Section 106 processes for the Lease Sale.

- In a letter dated July 16, 2018, the Hopi Tribe responded to BLM's notification about the statewide December 2018 lease sale, which included leases in the PFO. This letter requested the cancelation of the entire lease sale. The Hopi Tribe did not specify consultation for the December 2018 lease sale pursuant to NEPA, NHPA, AIRFA, or EO 13007.

[2] The Ute Indian Tribe choose not to consult on the September 2018 lease sale.

- In a letter dated August 8, 20218, the Southern Ute Indian Tribe requested to consult under the NHPA Section 106 process for the entirety of the statewide December 2018 lease sale. They additionally requested to review the cultural resources literature review upon its completion.
- On September 5, 2018, the draft Section 106 cultural resources literature review was provided to the Southern Ute Indian Tribe for their review and comment. BLM received no additional responses or comments from the Southern Ute Indian Tribe after providing the draft report.

Due to disagreement from multiple consulting parties and Tribes regarding BLM's determination that the statewide lease sale NHPA Section 106 undertaking would result in a "no adverse effect" to historic properties, BLM requested the ACHP to review BLM's finding of "no adverse effect"; however, the ACHP did not provide a response. As a result, pursuant to 36 CFR 800.5(c)(3)(i), BLM Utah's NHPA Section 106 responsibilities regarding the December 2018 Lease Sale were fulfilled, and BLM reaffirmed the finding of "No Adverse Effect," pursuant to 36 CFR 800.5(c)(3)(ii)(B). This information was shared with consulting parties and Tribes.

Consultation with the Southern Ute Indian Tribe concluded for the December 2018 Lease Sale on February 8, 2018, with the conclusion of the NHPA Section 106 process and issuance of leases. See Chapter 4.3 for additional details of the NHPA Section 106 process for the December 2018 lease sale.

The BLM has received and approved APDs for helium production on three leases: UTU93475, UTU93476, and UTU93479. These APDs underwent new environmental review and Tribal consultation as directed by regulation and policy. When or if additional APDs or other future potential developments are proposed, they will be subject to additional Tribal consultation pursuant to NEPA, NHPA, AIRFA, and EO 13007 as directed by regulation and current policy.

4.3 STATE HISTORIC PRESERVATION OFFICE AND TRIBAL HISTORIC PRESERVATION OFFICE CONSULTATION

The BLM prepared comprehensive literature reviews and analysis of cultural resources for both the September and December 2018 lease sales as part of its reasonable and good faith effort to identify historical properties and any potential adverse effects these undertakings may have on historic properties, as required by the NHPA, 54 USC 306108 (commonly and hereafter referred to as Section 106).

The ACHP document titled *Meeting the "Reasonable and Good Faith" Identification Standards in Section 106 Review* outlines the steps to determine when a reasonable and good faith identification effort has been met (ACHP 2018). The ACHP states that prior to beginning the identification stage in the Section 106 process, the regulations require the federal agency to do the following:

- "Determine and document the APE [Area of Potential Effect] in order to define where the agency will look for historic properties that may be directly or indirectly affected by the undertaking;
- Review existing information on known and potential historic properties within the APE, so the agency will have current data on what can be expected, or may be encountered, within the APE;
- Seek information from others who may have knowledge of historic properties in the area. This includes the State Historic Preservation Officer/Tribal Historic Preservation Officer and as appropriate, Indian tribes or Native Hawaiian organizations who may have concerns about historic properties of religious and cultural significance to them within the APE" (ACHP n.d.).

Following these initial steps, the regulations set out factors the agency must consider in determining what is a "reasonable and good faith effort" to identify historic properties:

> Take into account past planning, research, and studies; the magnitude and nature of the undertaking and the degree of federal involvement; the nature and extent of potential effects on historic properties; and the likely nature and location of historic properties within the APE. The Secretary of the Interior's standards and guidelines for identification provide guidance on this subject. The agency official should also consider other applicable professional, state, tribal, and local laws, standards, and guidelines. The regulations note that a reasonable and good faith effort may consist of or include 'background research, consultation, oral history interviews, sample field investigation, and field survey.'

For lease sales, the BLM's identification process includes completing a comprehensive literature review, which consists of a review and analysis of available cultural resource records and information for each parcel included in the undertaking APE as well as the surrounding area, and proactively seeking information from others who may have knowledge of historic properties in the area.

September 2018 Lease Sale

As part of the Section 106 process for the September 2018 Lease Sale, the BLM notified and initiated consultation with the Paiute Indian Tribe of Utah, The Hopi Tribe, Southern Ute Indian Tribe, Kaibab Band of Paiute Indians, Jicarilla Apache Nation, San Juan Southern Paiute Tribe, Pueblo of Laguna, Pueblo of Zia, Uinta Ouray Ute Indian Tribe, Navajo Nation, Northwest Band of Shoshone, Shoshone-Bannock Tribes (Fort Hall), Ute Mountain Ute Tribe, Pueblo of Jemez, and the Pueblo of Santa Clara. See Chapter 4.2 for additional information about Tribal consultation.

BLM PFO additionally sent invitations to the following potential consulting parties: Emery County, Emery County Public Lands Administration, SUWA, Utah Professional Archaeological Council (UPAC), Utah Statewide Archaeological Society, State Institutional Trust Lands Administration, Public Lands Policy Coordinating Office (PLPCO), Utah Rock Art Research Association (URARA) in association with Johnathan Bailey, and the Southwest Utah Group of the National Park Service. As part of the invitation letters, BLM requested information for this undertaking, cultural resources, and potential effects to historic properties as a result of this lease sale. BLM received consulting party requests from the URARA, PLPCO, SUWA, and UPAC. BLM accepted these requests for consulting party status. On June 20, 2018, a consulting party meeting was held about the lease sale.

BLM reached a finding of "No Adverse Effect" to historic properties (36 CFR 800.5 (b)) for the September 2018 Lease Sale and sought concurrence with the Utah SHPO in July 2018. BLM received SHPO concurrence on BLM's finding of No Adverse Effect on July 23, 2018.

Due to disagreement from multiple consulting parties and Tribes regarding BLM's determination that the lease sale undertaking would result in "no adverse effect" to historic properties, BLM requested the ACHP to review BLM's finding of "no adverse effect." On September 10, 2018, the ACHP provided BLM the results of their review and concluded that BLM had correctly applied the Criteria of Adverse Effect, pursuant to 36 CFR 800.5(a)(1), and agreed with BLM's finding of "no adverse effect" for the September 2018 Lease Sale and thereby concluding the Section 106 process for the Lease Sale. This information was shared with consulting parties and Tribes.

December 2018 Lease Sale

As part of the Section 106 process for the statewide December 2018 Lease Sale, the BLM notified and initiated consultation for the PFO proposed parcels with the Paiute Indian Tribe of Utah, Uintah Ouray Ute Indian Tribe, the Hopi Tribe, Navajo Nation, Southern Ute Indian Tribe, Northwest Band of Shoshone, Kaibab Band of Paiute Indians, Shoshone-Bannock Tribes (Fort Hall), Pueblo of Jemez,

Pueblo of Laguna, Ute Mountain Ute Tribe, Jicarilla Apache, Pueblo of Santa Clara, Pueblo of Zia, San Juan Southern Paiute. See Chapter 4.2 for additional information about Tribal consultation.

BLM State Office additionally sent invitations to the following potential consulting parties as part of the statewide December 2018 Lease Sale: SUWA, UPAC, Emery County Public Lands Administration, Utah Statewide Archaeological Society, URARA, Utah School and Institutional Trust Lands Administration, PLPCO, Emery County Commission, Sevier County Commissioner, Old Spanish Trail Association, Friends of Cedar Mesa, Grand County Historic Preservation Commission, Uintah County Public Lands, Ashley National Forest, Daggett County Public Lands Advisory Committee, The Church of Jesus Christ of Latter Day Saints (LDS) Church History, Daughters of Utah Pioneers, Sons of Utah Pioneers, Uintah-Wasatch-Cache National Forest, Bureau of Indian Affairs, Daggett County Commissioner, UDWR, San Juan County, Rich County, National Trust for Historic Preservation, Region 4 of the USFS, and Timpanogos Cave National Monument. As part of the invitation letters, BLM requested information for this undertaking, cultural resources, and potential effects to historic properties as a result of this lease sale.

BLM received consulting party requests from the URARA, SUWA, National Trust for Historic Preservation, Friends of Cedar Mesa, Old Spanish Trail Association, UPAC, Grand County Historical Preservation Commission, and National Park Service. BLM accepted these requests for consulting party status. Due to the statewide nature of the lease sale, not all of the consulting parties provided information related to the lease parcels located in the PFO being re-analyzed in this EA. On September 20, 2018, a consulting party meeting was held about the December 2018 Lease Sale.

BLM reached a finding of "No Adverse Effect" to historic properties (36 CFR 800.5 (b)) for the statewide December 2018 Lease Sale and sought concurrence with the Utah SHPO in October 2018. BLM received SHPO concurrence on BLM's finding of No Adverse Effect on October 25, 2018.

Due to disagreement from multiple consulting parties and Tribes regarding BLM's determination that the statewide lease sale undertaking would result in a "no adverse effect" to historic properties, BLM requested the ACHP to review BLM's finding of "no adverse effect;" however, the ACHP declined to provide an opinion. As a result, pursuant to 36 CFR 800.5(c)(3)(i), BLM Utah's NHPA Section 106 responsibilities regarding the December 2018 Lease Sale were fulfilled, and BLM reaffirmed the finding of "No Adverse Effect," pursuant to 36 CFR 800.5(c)(3)(ii)(B). BLM issued leases sold as part of the December 2018 lease sale on February 8, 2019. This information was shared with consulting parties and Tribes.

CHAPTER 5. LIST OF PREPARERS

Table 5-1. List of Preparers

Name	Area of Expertise	Organization
Tylia Varilek	Archaeologist, Contracting Officers Representative, Cultural Resources, Native American Religious Concerns	BLM Utah State Office (USO)
Dave Cook	Wildlife Biologist, Migratory Birds, Sensitive Wildlife Species, Fish and Wildlife (excluding USFWS designated species)	BLM USO
Nathan Packer	Natural Resource Specialist, Project Manager	BLM USO
Jared Dalebout	Hydrologist, Water Use/Consumption	BLM USO
Jared Reese	Wildlife Biologist, Greater Sage-Grouse	BLM USO
Christine Fletcher	Greater Sage-Grouse Plan Implementation Coordinator	BLM USO
Aaron Roe	Botanist, Threatened, Endangered, Candidate, or Proposed Animal Species, Sensitive Plant Species or Proposed Plant Species	BLM USO
Erik Vernon	Air Quality Specialist, GHGs	BLM USO
Ray Kelsey	National Conservation Lands Program Lead, ACECs, National Historic Trails, Recreation, Travel and Transportation, Visual Resources, WSRs, Wilderness/WSAs/LWCs	BLM USO
Angela Wadman	Branch Chief, Fluid Minerals Branch Chief	BLM USO
Melinda Moffitt	Litigation Coordinator	BLM USO
Andrew Abbondanza	Land Law Examiner	BLM USO
April Crawley	NEPA Reviewer	BLM USO
Tiera Arbogast	NEPA Reviewer	BLM USO
Jason Burgess-Conforti	Soils	BLM USO
Cassie Mellon	Fisheries and Riparian	BLM USO
Chad Ricklefs	Project Manager	SWCA Environmental Consultants (SWCA)
Emily Waters	Assistant Project Manager; NEPA Writer: Socioeconomics	SWCA
Erin Degutis	NEPA Writer: Visuals and Night Sky	SWCA
Emma Clinton	NEPA Writer: Wilderness, LWCs	SWCA
Ryan Rausch	NEPA Writer: Transportation and Access	SWCA
Erin Wielenga	NEPA Writer: GHG and Social Cost of Carbon, Air Quality, Soundscapes	SWCA
Bill Spain	NEPA Writer: Recreation	SWCA

Name	Area of Expertise	Organization
Bryan Klyse	NEPA Reviewer	SWCA
Rachel Johnson	GIS Analyst	SWCA

CHAPTER 6. REFERENCES

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Appendix A. Lease List and Map

Lease Number	Status	Acres
UTU93466	Relinquished	1,967.64
UTU93468	Partially relinquished	1,910.00
UTU93469	Sold	1,920.00
UTU93470	Sold	1,920.00
UTU93471	Sold	1,952.60
UTU93472	Sold	2,560.00
UTU93473	Sold	1,920.00
UTU93474	Sold	2,555.12
UTU93475	Sold	1,969.20
UTU93476	Sold	1,970.28
UTU93477	Relinquished	2,019.64
UTU93478	Relinquished	1,319.99
UTU93479	Sold	2,560.00
UTU93480	Sold	1,920.00
UTU93481	Partially relinquished	2,555.40
UTU93482	Relinquished	1,920.00
UTU93483	Partially relinquished	2,560.00
UTU93484	Sold	1,918.96
UTU93485	Sold	1,951.12
UTU93486	Sold	1,950.48
UTU93487	Sold	1,982.36
UTU93489	Sold	2,440.00
UTU93491	Sold	2,520.28
UTU93492	Sold	1,600.00
UTU93493	Sold	2,460.00
UTU93494	Sold	1,882.16
UTU93495	Sold	1,974.48
UTU93496	Sold	1,968.74
UTU93497	Sold	2,014.60
UTU93498	Sold	1,324.84
UTU93499	Sold	2,560.00
UTU93500	Relinquished	1,920.00
UTU93501	Relinquished	2,556.96

Lease Number	Status	Acres
UTU93502	Sold	1,920.00
UTU93503	Relinquished	2,560.00
UTU93504	Relinquished	1,919.04
UTU93505	Sold	1,953.00
UTU93506	Sold	1,952.00
UTU93507	Sold	1,983.00
UTU93508	Sold	1,238.00
UTU93509	Sold	2,560.00
UTU93510	Sold	1,920.00
UTU93511	Sold	2,492.00
UTU93512	Sold	1,920.00
UTU93513	Sold	2,560.00
UTU93514	Sold	1,855.00
UTU93518	Sold	1,322.23
UTU93519	Sold	2,560.00
UTU93520	Sold	1,920.00
UTU93521	Sold	2,556.12
UTU93523	Sold	2,560.00
UTU93524	Sold	1,918.84
UTU93525	Sold	1,874.52
UTU93526	Sold	2,471.00
UTU93527	Sold	2,429.84
UTU93530	Sold	2,519.88
UTU93533	Sold	1,883.36
UTU93534	Sold	896.97
UTU93713	Sold	1,410.00

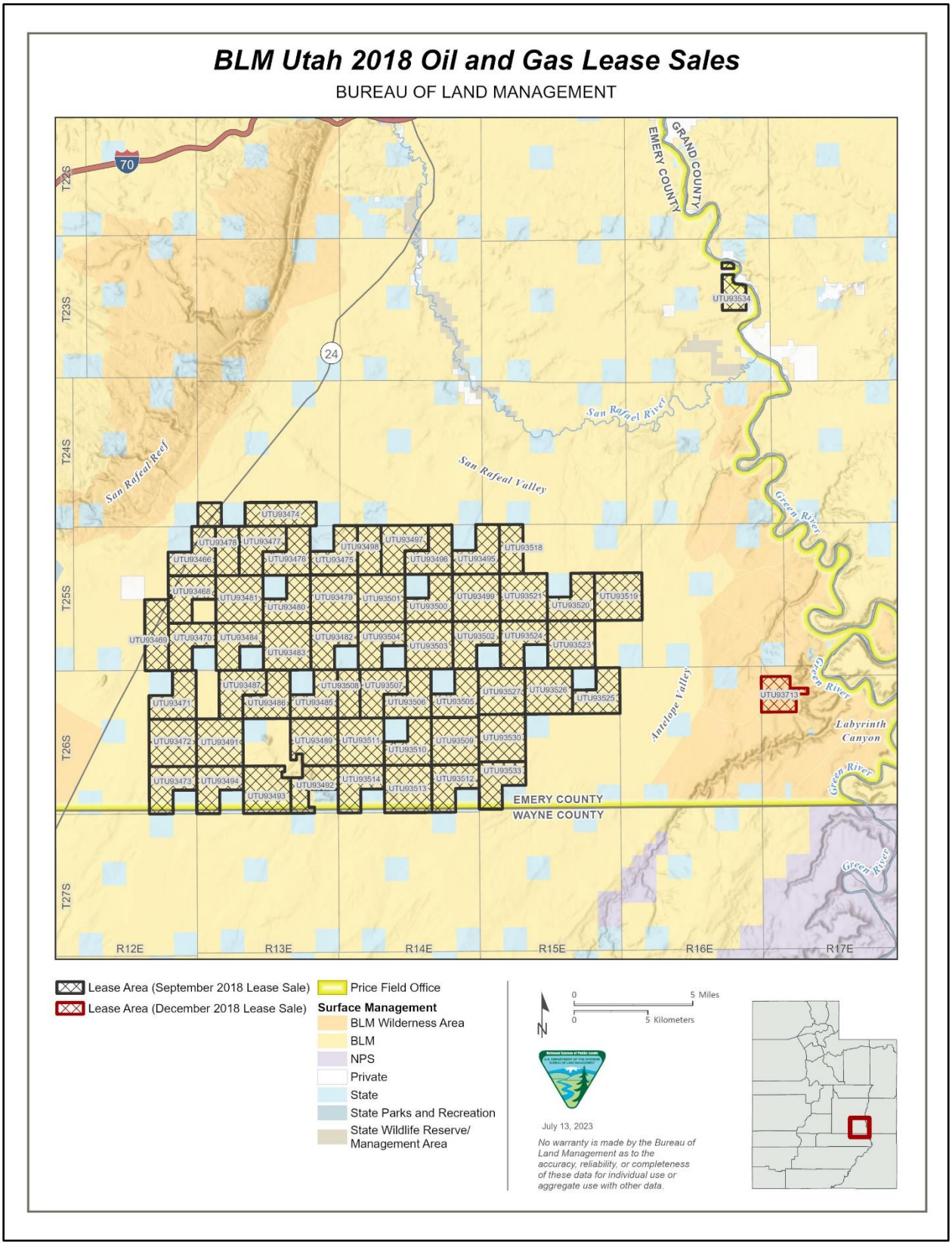

Figure A-1. Map of current leases.

Appendix B. Stipulation and Notice List

Items with an asterisk (*) are new notices added since the September 2018 EA (BLM 2018a) and December 2018 DNA (BLM 2018b).

In addition to the lease-specific Stipulations and Notices listed below, the stipulations and notices presented in this table would be applied to **ALL** leases:

Stipulations	**Notices**
HQ-CR-1: Cultural Resources Protection (Handbook H-3120-1)	HQ-MLA-1: Notice to Lessee (MLA)
HQ-TES-1: Threatened & Endangered Species Act (Handbook H-3120-1)	

UTU93466

(UT0918 – 038)

Township (T.) 25 South (S.), Range (R.) 12 East (E.), Salt Lake Meridian (SLM)

Sections (Secs.) 1, 11 and 12: All

1,967.64 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird

UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
UT-LN-157:	San Rafael Swell SRMA
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93468

(UT0918 – 040)

T. 25 S., R. 12 E., SLM

Sec. 13: All

Sec. 14: N2, N2SW, E2SWSW, N2NWSWSW, S2SWSWSW, SESW, SE

Sec. 23: All

1,910.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%

UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
UT-LN-157:	San Rafael Swell SRMA
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-11:	California Condor
*T&E-13:	Barneby Reed-Mustard (*Schoenocrambe barnebyi*)
*T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93469

(UT0918 – 041)

T. 25 S., R. 12 E., SLM

Secs. 22, 27 and 34: All

1,920.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat

*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
UT-LN-157:	San Rafael Swell SRMA
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-11:	California Condor
*T&E-13:	Barneby Reed-Mustard (*Schoenocrambe barnebyi*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93470

(UT0918 – 042)

T. 25 S., R. 12 E., SLM
Secs. 25, 26 and 35: All

1,920.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird

UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-11:	California Condor
*T&E-13:	Barneby Reed-Mustard (*Schoenocrambe barnebyi*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93471

(UT0918 – 043)

T. 26 S., R. 12 E., SLM

Secs. 1, 11 and 12: All

1,952.60 Acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%

UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
*T&E-13:	Barneby Reed-Mustard (*Schoenocrambe barnebyi*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93472

(UT0918 – 044)

T. 26 S., R. 12 E., SLM

Secs. 13, 14, 23 and 24: All

2,560.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%t
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis

*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
*T&E-13:	Barneby Reed-Mustard (*Schoenocrambe barnebyi*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93473

(UT0918 – 045)

T. 26 S., R. 12 E., SLM

Secs. 25, 26 and 35: All

1,920.00 acres

Emery County, Utah (1,838.56 acres)

Price Field Office

Wayne County, Utah (81.35 acres)

Richfield Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-11:	California Condor
*T&E-13:	Barneby Reed-Mustard (*Schoenocrambe barnebyi*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93474

(UT0918 – 046)

T. 24 S., R. 13 E., SLM

Secs. 31, 33, 34 and 35: All

2,555.12 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
UT-LN-157:	San Rafael Swell SRMA
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species

*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
*T&E-13:	Barneby Reed-Mustard (*Schoenocrambe barnebyi*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93475

(UT0918 – 047)

T. 25 S., R. 13 E., SLM

Secs. 1, 11 and 12: All

1,969.20 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed

*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
*T&E-13:	Barneby Reed-Mustard (*Schoenocrambe barnebyi*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93476

(UT0918 – 048)

T. 25 S., R. 13 E., SLM
Secs. 3, 9 and 10: All

1,970.28 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%

UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
*T&E-13:	Barneby Reed-Mustard (*Schoenocrambe barnebyi*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93477

(UT0918 – 049)

T. 25 S., R. 13 E., SLM

Secs. 4, 5 and 8: All

2,019.64 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls

UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
*T&E-13:	Barneby Reed-Mustard (*Schoenocrambe barnebyi*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93478

(UT0918 – 050)

T. 25 S., R. 13 E., SLM
Secs. 6 and 7: All

1,319.99 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
*T&E-13:	Barneby Reed-Mustard (*Schoenocrambe barnebyi*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93479

(UT0918 – 051)

T. 25 S., R. 13 E., SLM

Secs. 13, 14, 23 and 24: All

2,560.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species

*T&E-11:	California Condor
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93480

(UT0918 – 052)

T. 25 S., R. 13 E., SLM

Secs. 15, 21 and 22: All

1,920.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources

*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93481

(UT0918 – 053)

T. 25 S., R. 13 E., SLM

Secs. 17, 18, 19 and 20: All

2,555.40 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-11:	California Condor
*T&E-13:	Barneby Reed-Mustard (*Schoenocrambe barnebyi*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93482

(UT0918 – 054)

T. 25 S., R. 13 E., SLM

Secs. 25, 26 and 35: All

1,920.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species

*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93483

(UT0918 – 055)

T. 25 S., R. 13 E., SLM

Secs. 27, 28, 33 and 34: All

2,560.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas

*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-11:	California Condor

UTU93484

(UT0918 – 056)

T. 25 S., R. 13 E., SLM
Secs. 29, 30 and 31: All

1,918.96 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors

UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93485

(UT0918 – 057)

T. 26 S., R. 13 E., SLM
Secs. 1, 11, 12: All

1,951.12 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%

UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed
HQ-CR-1:	Cultural Resource Protection

Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93486

(UT0918 – 058)

T. 26 S., R. 13 E., SLM

Secs. 3, 9 and 10: All

1,950.48 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat

*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93487

(UT0918 – 059)

T. 26 S., R. 13 E., SLM

Secs. 4, 5 and 8: All

1,982.36 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed
HQ-CR-1:	Cultural Resource Protection

Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species

UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93489

(UT0918 – 061)

T. 26 S., R. 13 E., SLM
Secs. 13 and 14: All
Sec. 23: N2, NWSW, SE
Sec. 24: All.

2,440.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs

UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-269:	NSO – Mexican Spotted Owl
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93491

(UT0918 – 063)

T. 26 S., R. 13 E., SLM

Secs. 17, 18, 19 and 20: All

2,520.28 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis

*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93492

(UT0918 – 064)

T. 26 S., R. 13 E., SLM

Sec. 25: All

Sec. 26: NE, SW, N2SE, W2SWSE, E2SESE

Sec. 35: W2NE, W2, W2SE, SESE

1,600.00 acres

Emery County, Utah (1,494.96 acres)

Price Field Office

Wayne County, Utah (105.04 acres)

Richfield Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-269:	NSO – Mexican Spotted Owl
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93493

(UT0918 – 065)

T. 26 S., R. 13 E., SLM

Sec. 27: NWNE, W2SWNE, W2, SE

Secs. 28, 33 and 34: All

2,460.00 acres

Emery County, Utah (2,249.92 acres)

Price Field Office

Wayne County, Utah (210.08 acres)

Richfield Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat

T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93494

(UT0918 – 066)

T. 26 S., R. 13 E., SLM

Secs. 29, 30 and 31: All

1,882.16 acres

Emery County, Utah (1,777.15 acres)

Price Field Office

Wayne County, Utah (105.01 acres)

Richfield Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species

UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93495

(UT0918 – 067)

T. 25 S., R. 14 E., SLM
Secs. 1, 11 and 12: All

1,974.48 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams

*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-07:	Southwestern Willow Flycatcher
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93496

(UT0918 – 068)

T. 25 S., R. 14 E., SLM

Secs. 3, 9 and 10: All

1,968.74 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
UT-LN-52:	Noxious Weeds
UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls

UT-LN-102:	Air Quality Analysis
UT-LN-104:	Burrowing Owl Habitat
UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
*T&E-13:	Barneby Reed-Mustard (*Schoenocrambe barnebyi*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93497

(UT0918 – 069)

T. 25 S., R. 14 E., SLM
Secs. 4, 5 and 8: All

2,014.60 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
*T&E-13:	Barneby Reed-Mustard (*Schoenocrambe barnebyi*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93498

(UT0918 – 070)

T. 25 S., R. 14 E., SLM

Secs. 6 and 7: All

1,324.84 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin

T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93499

(UT0918 – 071)

T. 25 S., R. 14 E., SLM

Secs. 13, 14, 23 and 24: All

2,560.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed
HQ-CR-1:	Cultural Resource Protection

Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species

UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93500

(UT0918 – 072)

T. 25 S., R. 14 E., SLM

Secs. 15, 21 and 22: All

1,920.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%

UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

UTU93501

(UT0918 – 073)

T. 25 S., R. 14 E., SLM

Secs. 17, 18, 19 and 20: All

2,556.96 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls

UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93502

(UT0918 – 074)

T. 25 S., R. 14 E., SLM

Secs. 25, 26 and 35: All

1,920.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
T&E-06:	Mexican Spotted Owl
T&E-11:	California Condor
T&E-17:	San Rafael Cactus (*Pediocactus despainii*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93503

(UT0918 – 075)

T. 25 S., R. 14 E., SLM

Secs. 27, 28, 33 and 34: All

2,560.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species

*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93504

(UT0918 – 076)

T. 25 S., R. 14 E., SLM
Secs. 29, 30 and 31: All

1,919.04 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds

*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93505

(UT0918 – 077)

T. 26 S., R. 14 E., SLM
Secs. 1, 11 and 12: All

1,953.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams

*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-07:	Southwestern Willow Flycatcher
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93506

(UT0918 – 078)

T. 26 S., R. 14 E., SLM

Secs. 3, 9 and 10: All

1,952.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat

T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-07:	Southwestern Willow Flycatcher
*T&E-11:	California Condor
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93507

(UT0918 – 079)

T. 26 S., R. 14 E., SLM

Secs. 4, 5 and 8: All

1,983.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed

*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-11:	California Condor
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93508

(UT0918 – 080)

T. 26 S., R. 14 E., SLM
Secs. 6 and 7: All

1,238.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams

*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93509

(UT0918 – 081)

T. 26 S., R. 14 E., SLM

Secs. 13, 14, 23 and 24: All

2,560.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management

UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-07:	Southwestern Willow Flycatcher
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93510

(UT0918 – 082)

T. 26 S., R. 14 E., SLM

Secs. 15, 21 and 22: All

1,920.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird

UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-07:	Southwestern Willow Flycatcher
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93511

(UT0918 – 083)

T. 26 S., R. 14 E., SLM

Secs. 17, 18, 19 and 20: All

2,492.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%

UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93512

(UT0918 – 084)

T. 26 S., R. 14 E., SLM

Secs. 25, 26 and 35: All

1,920.00 acres

Emery County, Utah (1,814.60 acres)

Price Field Office

Wayne County, Utah (105.40 acres)

Richfield Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources

*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-07:	Southwestern Willow Flycatcher
*T&E-11:	California Condor
T&E-15:	Wright Fishhook Cactus (*Sclerocactus wrightiae*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93513

(UT0918 – 086)

T. 26 S., R. 14 E., SLM

Secs. 29, 30 and 31: All

1,855.00 acres

Emery County, Utah (1,712.54 acres)

Price Field Office

Wayne County, Utah (142.46 acres)

Richfield Field Office

(UT0918 – 085)

T. 26 S., R. 14 E., SLM

Secs. 27, 28, 33 and 34: All

2,560.00 acres

Emery County, Utah (2,348.22 acres)

Price Field Office

Wayne County, Utah (211.78 acres)

Richfield Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
T&E-15:	Wright Fishhook Cactus (*Sclerocactus wrightiae*)

T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93514

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
UT-LN-52:	Noxious Weeds
UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
UT-LN-104:	Burrowing Owl Habitat
UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
T&E-06:	Mexican Spotted Owl
T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93518

(UT0918 – 090)

T. 25 S., R. 15 E., SLM

Secs. 6 and 7: All

1,322.23 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin

T&E-05:	Listed Plant Species
*T&E-11:	California Condor
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93519

(UT0918 – 091)

T. 25 S., R. 15 E., SLM

Secs. 13, 14, 23 and 24: All

2,560.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls

UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-07:	Southwestern Willow Flycatcher
*T&E-11:	California Condor
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93520

(UT0918 – 092)

T. 25 S., R. 15 E., SLM

Secs. 15, 21 and 22: All

1,920.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird

UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93521

(UT0918 – 093)

T. 25 S., R. 15 E., SLM

Secs. 17, 18, 19 and 20: All

2,556.12 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting

UT-S-305: CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25: White-Tailed and Gunnison Prairie Dog
UT-LN-44: Raptors
UT-LN-45: Migratory Bird
UT-LN-49: Utah Sensitive Species
UT-LN-51: Special Status Plants: Not Federally Listed
*UT-LN-52: Noxious Weeds
*UT-LN-53: Riparian Areas
UT-LN-72: High Potential Paleontological Resources
*UT-LN-96: Air Quality Mitigation Measures
UT-LN-99: Regional Ozone Formation Controls
UT-LN-102: Air Quality Analysis
*UT-LN-104: Burrowing Owl Habitat
*UT-LN-128: Floodplain Management
UT-LN-156: Pollinators and Pollinator Habitat
T&E-03: Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05: Listed Plant Species
*T&E-06: Mexican Spotted Owl
*T&E-11: California Condor
*T&E-17: San Rafael Cactus (*Pediocactus despainii*)
T&E-19: Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93523

(UT0918 – 095)

T. 25 S., R. 15 E., SLM
Secs. 27, 28, 33 and 34: All

2,560.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01: Air Quality

UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93524

(UT0918 – 096)

T. 25 S., R. 15 E., SLM

Secs. 29, 30 and 31: All

1,918.84 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
*T&E-17:	San Rafael Cactus (*Pediocactus despainii*)

T&E-19: Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93525

(UT0918 – 097)

T. 26 S., R. 15 E., SLM
Secs. 1, 11 and 12: All

1,874.52 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01: Air Quality
UT-S-97: NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101: CSU – Fragile Soils/Slopes 20%–40%
UT-S-126: NSO – Natural Springs
UT-S-127: NSO – Intermittent and Perennial Streams
UT-S-285: TL – Migratory Bird Nesting
UT-S-305: CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25: White-Tailed and Gunnison Prairie Dog
UT-LN-44: Raptors
UT-LN-45: Migratory Bird
UT-LN-49: Utah Sensitive Species
UT-LN-51: Special Status Plants: Not Federally Listed
*UT-LN-52: Noxious Weeds
*UT-LN-53: Riparian Areas
*UT-LN-96: Air Quality Mitigation Measures
UT-LN-99: Regional Ozone Formation Controls
UT-LN-102: Air Quality Analysis
*UT-LN-104: Burrowing Owl Habitat
*UT-LN-128: Floodplain Management
UT-LN-156: Pollinators and Pollinator Habitat
T&E-03: Endangered Fish of the Upper Colorado River Drainage Basin

T&E-05:	Listed Plant Species
*T&E-11:	California Condor

UTU93526

(UT0918 – 098)

T. 26 S., R. 15 E., SLM

Secs. 3, 4, 9 and 10: All

2,471.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
8UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management

UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93527

(UT0918 – 099)

T. 26 S., R. 15 E., SLM

Secs. 5, 6, 7 and 8: All

2,429.84 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures

UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93530

(UT0918 – 102)

T. 26 S., R. 15 E., SLM

Secs. 17, 18, 19 and 20: All

2,519.88 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species

UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93533

(UT0918 – 105)

T. 26 S., R. 15 E., SLM

Secs. 29, 30 and 31: All

1,883.36 acres

Emery County, Utah (1,856.75 acres)

Price Field Office

Wayne County, Utah (26.61 acres)

Richfield Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
*UT-S-269:	NSO – Mexican Spotted Owl Nests

UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
*UT-LN-52:	Noxious Weeds
*UT-LN-53:	Riparian Areas
UT-LN-72:	High Potential Paleontological Resources
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
*UT-LN-104:	Burrowing Owl Habitat
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
*T&E-06:	Mexican Spotted Owl
*T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)

UTU93534

(UT0918 – 106)

T. 23 S., R. 16 E., SLM

Sec. 11: Lots 3, 9–11, 14, NWNW, W2SW

Sec. 14: All

896.97 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils/Slopes for Slopes Greater Than 40%
UT-S-101:	CSU – Fragile Soils/Slopes 20%–40%
UT-S-126:	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-169:	CSU – Cultural Resource Inventories
*UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-285:	TL – Migratory Bird Nesting
UT-S-305:	CSU – Noxious Weed
UT-S-319:	NSO – Cultural ACEC

HQ-CR-1: Notices

UT-LN-25:	White-Tailed and Gunnison Prairie Dog
UT-LN-44:	Raptors
UT-LN-45:	Migratory Bird
UT-LN-49:	Utah Sensitive Species
UT-LN-51:	Special Status Plants: Not Federally Listed
UT-LN-52:	Noxious Weeds
UT-LN-53:	Riparian Areas
*UT-LN-96:	Air Quality Mitigation Measures
UT-LN-99:	Regional Ozone Formation Controls
UT-LN-102:	Air Quality Analysis
UT-LN-104:	Burrowing Owl Habitat
UT-LN-113:	Western Yellow-billed Cuckoo
UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
T&E-06:	Mexican Spotted Owl
T&E-07:	Southwestern Willow Flycatcher
T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
T&E-27:	Yellow-billed Cuckoo

UTU93713

(UT1218 – 257)

T. 26 S., R. 17 E., SLM

Sec. 5: W2SW, unsurveyed

Sec. 6: S2, unsurveyed

Sec. 7: All, unsurveyed

Sec. 8: N2NE, W2, unsurveyed

1,410.00 acres

Emery County, Utah

Price Field Office

Stipulations

UT-S-01:	Air Quality
UT-S-97:	NSO – Fragile Soils Slopes greater than 40%
UT-S-101:	CSU – Fragile Soils /Slopes 20%–40%
UT-S-126	NSO – Natural Springs
UT-S-127:	NSO – Intermittent and Perennial Streams
UT-S-160:	CSU – Visual Resources –VRM II
UT-S-169:	CSU – Cultural Resource Inventories
UT-S-176:	CSU – Fossil Resources (Preconstruction Surveys)
UT-S-177:	CSU – Fossil Resources
UT-S-260:	TL – Raptor Habitat
UT-S-269:	NSO – Mexican Spotted Owl Nests
UT-S-305:	CSU – Noxious Weed
UT-S-343:	CSU – Fossil Resource Assessment

HQ-CR-1: Notices

*UT-LN-25:	White-Tailed and Gunnison Prairie Dog
*UT-LN-49:	Utah Sensitive Species
*UT-LN-51:	Special Status Plants: Not Federally Listed
UT-LN-52:	Noxious Weeds
UT-LN-53	Riparian Areas
*UT-LN-104:	Burrowing Owl Habitat

UT-LN-126:	Navajo Sedge
*UT-LN-128:	Floodplain Management
UT-LN-156:	Pollinators and Pollinator Habitat
T&E-03:	Endangered Fish of the Upper Colorado River Drainage Basin
T&E-05:	Listed Plant Species
T&E-06:	Mexican Spotted Owl
*T&E-07:	Southwestern Willow Flycatcher
T&E-11:	California Condor
T&E-19:	Jones Cycladenia (*Cycladenia humilis* var. *jonesii*)
T&E-22:	Ute Ladies'-Tresses (*Spiranthes diluvialis*)

Appendix C. Full Text Stipulations and Notices

Table C-1. Standard Lease Stipulations and Notices (from H-3120 – Competitive Leasing Handbook)*

Stipulation or Notice	Description/Purpose
HQ-CR-1	**CULTURAL RESOURCE PROTECTION** This lease may be found to contain historic properties and/or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O. 13007, or other statutes and executive orders. The BLM will not approve any ground disturbing activities that may affect any such properties or resources until it completes its obligations under applicable requirements of the NHPA and other authorities. The BLM may require modification to exploration or development proposals to protect such properties or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized or mitigated.
HQ-TES-1	**THREATENED AND ENDANGERED SPECIES ACT** The lease area may now or hereafter contain plants, animals or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that would contribute to a need to list such species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. 1531 et seq. including completion of any required procedure for conference or consultation.
HQ-MLA-1	**NOTICE TO LESSEE – MINERAL LEASING ACT SECTION 2(A)(2)(A)** Provisions of the Mineral Leasing Act (MLA) of 1920, as amended by the Federal Coal Leasing Amendments Act of 1976, affect an entity's qualifications to obtain an oil and gas lease. Section 2(a)(2)(A) of the MLA, 30 U.S.C. 201(a)(2)(A), requires that any entity that holds and has held a Federal Coal Lease for 10 years beginning on or after August 4, 1976, and which is not producing coal in commercial quantities from each such lease, cannot qualify for the issuance of any other lease granted under the MLA. Compliance by coal lessees with Section 2(a)(2)(A) is explained in 43 CFR 3472. In accordance with the terms of this oil and gas lease with respect to compliance by the initial lessee with qualifications concerning Federal coal lease holdings, all assignees and transferees are hereby notified that this oil and gas lease is subject to cancellation if: (1) the initial lessee as assignor or as transferor has falsely certified compliance with Section 2(a)(2)(A) because of a denial or disapproval by a State Office of a pending coal action, i.e., arms-length assignment, relinquishment, or logical mining unit, the initial lessee as assignor or as transferor is no longer in compliance with Section 2(a)(2)(A). The assignee or transferee does not qualify as a bona fide purchaser and, thus, has no rights to bona fide purchaser protection in the event of cancellation of this lease due to noncompliance with Section 2(a)(2)(A). Information regarding assignor or transferor compliance with Section 2(a)(2)(A) is contained in the lease case file as well as in other Bureau of Land Management records available through the State Office issuing this lease.

*These stipulations are attached to all leases issued

Table C-2. Utah Lease Stipulations

Stipulation or Notice	Description/Purpose
UT-S-01	**AIR QUALITY** All new and replacement internal combustion gas field engines of less than or equal to 300 design-rated horsepower shall not emit more than 2 grams of NO_x per horsepower-hour. **Exception:** This requirement does not apply to gas field engines of less than or equal to 40 design-rated horsepower. **Modification**: None **Waiver**: None **AND** All new and replacement internal combustion gas field engines of greater than 300 design rated horsepower must not emit more than 1.0 gram of NO_x per horsepower-hour. **Exception**: None **Modification**: None **Waiver**: None
UT-S-97	**NO SURFACE OCCUPANCY – FRAGILE SOILS/SLOPES GREATER THAN 40 PERCENT** No surface occupancy on slopes greater than 40 percent. Exception: If after an environment analysis the authorized officer determines that it would cause undue or unnecessary degradation to pursue other placement alternatives; surface occupancy in the area may be authorized. In addition, a plan from the operator and BLM's approval of the plan shall be required before construction and maintenance could begin. The plan would have to include: An erosion control strategy GIS modeling Proper survey and design by a certified engineer Modification: None Waiver: None
UT-S-101	**CONTROLLED SURFACE USE – FRAGILE SOILS/SLOPES 20-40 PERCENT** In surface disturbing proposals regarding construction on slopes of 20 percent to 40 percent, include an approved erosion control strategy and topsoil segregation/restoration plan. Such construction must be properly surveyed and designed by a certified engineer and approved by the BLM prior to project implementation, construction, or maintenance. **Exception:** If after an environment analysis the authorized officer determines that it would cause undue or unnecessary degradation to pursue other placement alternatives; surface occupancy in the area may be authorized. In addition, a plan from the operator and BLM's approval of the plan would be required before construction and maintenance could begin. The plan must include: An erosion control strategy GIS modeling Proper survey and design by a certified engineer **Modification:** Modifications also may be granted if a more detailed analysis is conducted and shows that impacts can be mitigated, e.g., Order I soil survey conducted by a qualified soil scientist, finds that surface disturbance activities could occur on slopes between 20 and 40 percent while adequately protecting areas from accelerated erosion. **Waiver**: None

Stipulation or Notice	Description/Purpose
UT-S-126	**NO SURFACE OCCUPANCY – NATURAL SPRINGS** No surface disturbance or occupancy will be maintained around natural springs to protect the water quality of the spring. The distance would be based on geophysical, riparian, and other factors necessary to protect the water quality of the springs. If these factors cannot be determined, a 660-foot buffer zone would be maintained. Exception: An exception could be authorized if (a) there are no practical alternatives, (b) impacts could be fully mitigated, or (c) the action is designed to enhance the riparian resources. Modification: None Waiver: None
UT-S-127	**NO SURFACE OCCUPANCY – INTERMITTENT AND PERENNIAL STREAMS** No new surface disturbance (excluding fence lines) will be allowed in areas within the 100-year floodplain or 100 meters (330 feet) on either side from the centerline, whichever is greater, along all perennial and intermittent streams, streams with perennial reaches, and riparian areas. Exception: The authorized officer could authorize an exception if it could be shown that the project as mitigated eliminated the need for the restriction. An exception could be authorized if (a) there are no practical alternatives, (b) impacts could be fully mitigated, or (c) the action is designed to enhance the riparian resources. Modification: None Waiver: None
UT-LN-25	**WHITE-TAILED AND GUNNISON PRAIRIE DOG** The lessee/operator is given notice that this lease parcel has been identified as containing white-tailed or Gunnison prairie dog habitat. Modifications to the Surface Use Plan of Operations may be required in order to protect white-tailed or Gunnison prairie dog from surface disturbing activities in accordance with the Endangered Species Act and 43 CFR 3101.1-2.
UT-LN-44	**RAPTORS** Appropriate seasonal and spatial buffers shall be placed on all known raptor nests in accordance with Utah Field Office Guidelines for Raptor Protection from Human and Land use Disturbances) and Best Management Practices for Raptors and their Associated Habitats in Utah. All construction related activities will not occur within these buffers if pre- construction monitoring indicates the nests are active, unless a site-specific evaluation for active nests is completed prior to construction and if a BLM wildlife biologist, in consultation with USFWS and UDWR, recommends that activities may be permitted within the buffer. The BLM will coordinate with the USFWS and UDWR and have a recommendation within 3-5 days of notification. Any construction activities authorized within a protective (spatial and seasonal) buffer for raptors will require an on-site monitor. Any indication that activities are adversely affecting the raptor and/or its young the on-site monitor will suspend activities and contact the BLM authorized officer immediately. Construction may occur within the buffers of inactive nests. Construction activities may commence once monitoring of the active nest site determines that fledglings have left the nest and are no longer dependent on the nest site. Modifications to the Surface Use Plan of Operations may be required in accordance with section 6 of the lease terms and 43CFR3101.1-2.

Stipulation or Notice	Description/Purpose
UT-LN-45	**MIGRATORY BIRDS** The lessee/operator is given notice that surveys for nesting migratory birds may be required during migratory bird breeding season whenever surface disturbances and/or occupancy is proposed in association with fluid mineral exploration and development within priority habitats. Surveys should focus on identified priority bird species in Utah. Field surveys will be conducted as determined by the authorized officer of the Bureau of Land Management. Based on the result of the field survey, the authorized officer will determine appropriate buffers and timing limitations.
UT-LN-49	**UTAH SENSITIVE SPECIES** The lessee/operator is given notice that no surface use or otherwise disruptive activity would be allowed that would result in direct disturbance to populations or individual special status plant and animal species, including those listed on the BLM sensitive species list and the Utah sensitive species list. The lessee/operator is also given notice that lands in this parcel have been identified as containing potential habitat for species on the Utah Sensitive Species List. Modifications to the Surface Use Plan of Operations may be required in order to protect these resources from surface disturbing activities in accordance with Section 6 of the lease terms, Endangered Species Act, Migratory Bird Treaty Act and 43 CFR 3101.1-2.
UT-LN-51	**SPECIAL STATUS PLANTS: NOT FEDERALLY LISTED** The lessee/operator is given notice that lands in this lease have been identified as containing special status plants, not federally listed, and their habitats. Modifications to the Surface Use Plan of Operations may be required in order to protect the special status plants and/or habitat from surface disturbing activities in accordance with Section 6 of the lease terms, Endangered Species Act, and 43 CFR 3101.1-2.
UT-LN-52	**NOXIOUS WEEDS** The lessee/operator is given notice that lands in this lease have been identified as containing or is near areas containing noxious weeds. Best management practices to prevent or control noxious weeds may be required for operations on the lease. Modifications to the Surface Use Plan of Operations may be required in accordance with section 6 of the lease terms and 43 CFR 3101.1-2.
UT-LN-53	**RIPARIAN AREAS** The lessee/operator is given notice that this lease has been identified as containing riparian areas. No surface use or otherwise disruptive activity allowed within 100 meters of riparian areas unless it can be shown that (1) there is no practicable alternative; (2) that all long-term impacts are fully mitigated; or (3) that the construction is an enhancement to the riparian areas. Modifications to the Surface Use Plan of Operations may be required in accordance with section 6 of the lease terms and 43 CFR 3101.1-2.
UT-LN-72	**HIGH POTENTIAL PALEONTOLOGICAL RESOURCES** The lessee/operator is given notice that lands in this lease have been identified as having high potential for paleontological resources. Surveys will be required and modifications to the Surface Use Plan of Operations may be required in order to protect paleontological resources from surface disturbing activities in accordance with Section 6 of the lease terms and 43 CFR 3101.1-2. In addition, monitoring may be required during surface disturbing activities.

Stipulation or Notice	Description/Purpose
UT-LN-96	**AIR QUALITY MITIGATION MEASURES** The lessee is given notice that the BLM, in coordination with the EPA and the UDAQ, among others, has developed the following air quality mitigation measures that may be applied to any development proposed on this lease. Integration of and adherence to these measures may help minimize adverse local or regional air quality impacts from oil and gas development (including but not limited to construction, drilling, and production) on regional ozone formation. • All internal combustion equipment would be kept in good working order. • Water or other approved dust suppressants would be used at construction sites and along roads, as determined appropriate by the authorized officer. • Open burning of garbage or refuse would not occur at well sites or other facilities. • Drill rigs would be equipped with Tier II or better diesel engines. • Vent emissions from stock tanks and natural gas triethylene glycol dehydrators would be controlled by routing the emissions to a flare or similar control device, which would reduce emissions by 95% or greater. • Low-bleed or no-bleed pneumatics would be installed on separator dump valves and other controllers. • During completion, flaring would be limited as much as possible. Production equipment and gathering lines would be installed as soon as possible. • Well site telemetry would be used as feasible for production operations. • Stationary internal combustion engine would comply with the following standards: 2g NO_x/bhp-hr for engines <300HP; and 1g NO_x/bhp-hr for engines >300HP. Additional site-specific measures may also be employed to avoid or minimize effects to local or regional air quality. These additional measures will be developed and implemented in coordination with the EPA, the UDAQ, and other agencies with expertise or jurisdiction as appropriate based on the size of the project and magnitude of emissions.
UT-LN-99	**REGIONAL OZONE FORMATION CONTROLS** To mitigate any potential impact that oil and gas development emissions may have on regional ozone formation, the following BMPs would be required for any development projects: • Tier II or better drilling rig engines • Stationary internal combustion engine standard of 2g NO_x/bhp-hr for engines <300HP and 1g NO_x/bhp-hr for engines >300HP • Low-bleed or no-bleed pneumatic pump valves • Dehydrator VOC emission controls to +95% efficiency • Tank VOC emission controls to +95% efficiency
UT-LN-102	**AIR QUALITY ANALYSIS** The lessee/operator is given notice that prior to project-specific approval, additional air quality analyses may be required to comply with NEPA, FLPMA, and/or other applicable laws and regulations. Analyses may include dispersion modeling and/or photochemical modeling for deposition and visibility impacts analysis, control equipment determinations, and/or emission inventory development. These analyses may result in the imposition of additional project-specific air quality control measures.

Stipulation or Notice	Description/Purpose
UT-LN-104	**BURROWING OWL HABITAT** The lessee/operator is given notice that lands in this lease have been identified as containing Burrowing Owl Habitat. Modification to the Surface Use Plan of Operations may be required in order to protect the Burrowing Owl and/or habitat from surface disturbing activities in accordance with Section 6 of the lease terms, Endangered Species Act, and 43 CFR 3101.1-2.
UT-LN-126	**NAVAJO SEDGE** In areas that contain habitat for Navajo sedge, actions will be avoided or restricted if that area is known or suspected to be habitat for Navajo sedge and the action may cause stress or disturbance to the plant. The following avoidance and minimization measures have been designed to ensure activities carried out on the lease are in compliance with the Endangered Species Act. Integration of, and adherence to these measures will facilitate review and analysis of any submitted permits under the authority of this lease. Following these measures could reduce the scope of Endangered Species Act, Section 7 consultation at the permit stage. 1. Site inventories: a. Must be conducted to determine habitat suitability, b. Are required in known or potential habitat for all areas proposed for surface disturbance prior to initiation of project activities, at a time when the plant can be detected, and during appropriate flowering periods, c. Documentation should include, but not be limited to individual plant locations and suitable habitat distributions, and d. All surveys must be conducted by qualified individuals. 2. Lease activities will require monitoring throughout the duration of the project. To ensure desired results are being achieved, minimization measures will be evaluated and, if necessary, Section 7 consultation reinitiated. 3. Project activities must be designed to avoid direct disturbance to populations and to individual plants: a. Designs will avoid concentrating water flows or sediments into plant occupied habitat. b. Construction will occur down slope of plants and populations where feasible; if well pads and roads must be sited upslope, buffers of 100 feet minimum between surface disturbances and plants and populations will be incorporated. c. Where populations occur within 200 feet of well pads, establish a buffer or fence the individuals or groups of individuals during and post-construction. d. Areas for avoidance will be visually identifiable in the field, e.g., flagging, temporary fencing, rebar, etc. e. For surface pipelines, use a 10-foot buffer from any plant locations: f. If on a slope, use stabilizing construction techniques to ensure the pipelines don't move towards the population. 4. For riparian/wetland-associated species, e.g., Navajo Sedge, avoid loss or disturbance of riparian habitats: a. Ensure that water extraction or disposal practices do not result in change of hydrologic regime. 5. Limit disturbances to and within suitable habitat by staying on designated routes. 6. Limit new access routes created by the project. 7. Place signing to limit ATV travel in sensitive areas. 8. Implement dust abatement practices near occupied plant habitat. 9. All disturbed areas will be re-vegetated with native species comprised of species indigenous to the area.

Stipulation or Notice	Description/Purpose
	10. Post construction monitoring for invasive species will be required. 11. Where technically and economically feasible, use directional drilling or multiple wells from the same pad to reduce surface disturbance and eliminate drilling in plant habitat. Ensure that such directional drilling does not intercept or degrade alluvial aquifers. Additional measures to avoid or minimize effects to the species may be developed and implemented in consultation with the U.S. Fish and Wildlife Service between the lease sale stage and lease development stage to ensure continued compliance with the ESA.
UT-LN-128	**FLOODPLAIN MANAGEMENT** The lessee/operator is given notice that, in accordance with Executive Order 11988, to avoid adverse impact to floodplains 1) facilities should be located outside the 100-year floodplain, or 2) would be minimized or mitigated by modification of surface use plans within floodplains present within the lease.
UT-LN-156	**POLLINATORS AND POLLINATOR HABITAT** In order to protect pollinators and pollinator habitat, in accordance with BLM policy outlined in Instruction Memorandum No. 2016-013, Managing for Pollinators on Public Lands, and Pollinator-Friendly Best Management Practices for Federal Lands (2015), the following avoidance, minimization, and mitigation measures would apply to this parcel: 1. Give a preference for placing well pads in previously disturbed areas, dry areas that do not support forbs, or areas dominated by nonnative grasses. 2. Utilize existing well pads where feasible. 3. Avoid disturbance to native milkweed patches within Monarch migration routes to protect Monarch butterfly habitat. 4. Avoid disturbance of riparian and meadow sites, as well as small, depressed areas that may function as water catchments and host nectar- producing species, to protect Monarch butterfly habitat and nectaring sites. 5. Minimize the use of pesticides that negatively impact pollinators. 6. During revegetation treatments: a. Use minimum till drills where feasible. b. Include pollinator-friendly site-appropriate native plant seeds or seedlings in seed mixes. c. Where possible, increase the cover and diversity of essential habitat components for native pollinators by: • Using site-appropriate milkweed seeds or seedlings within Monarch migration routes through priority sage-grouse habitat. • Using seed mixes with annual and short-lived perennial native forbs that will bloom the first year and provide forage for pollinators. • Using seed mixes with a variety of native forb species to ensure different colored and shaped flowers to provide nectar and pollen throughout the growing season for a variety of pollinators. • Seeding forbs in separate rows from grasses to avoid competition during establishment. Avoiding seeding non-native forbs and grasses that establish early and out compete slower-growing natives.

Stipulation or Notice	Description/Purpose
UT-S-160	**CONTROLLED SURFACE USE – VISUAL RESOURC–S - VRM II** Within VRM II areas, surface disturbing activities will comply with BLM Manual Handbook 8431-1 to retain the existing character of the landscape. Exception: Recognized utility corridors are exempt. Temporary exceedance may be allowed during initial development phases. Modification: None Waiver: None
UT-S-169	**CONTROLLED SURFACE USE – CULTURAL RESOURCE INVENTORIES** Cultural resources inventories (including point, area, and linear features) will be required for all federal undertakings that could affect cultural resources or historic properties in areas of both direct and indirect impacts. **Waiver of Inventory**: Although complete Class III inventories will be performed for most land use actions, an authorized officer could waive inventory for any part of an Area of Potential Effect when one or more of the following conditions exist: Previous natural ground disturbance has modified the surface so extensively that the likelihood of finding cultural properties is negligible. (Note: This is not the same as being able to document that any existing sites may have been affected by surface disturbance; ground disturbance must have been so extensive as to reasonably preclude the location of any such sites.) Human activity within the last 50 years has created a new land surface to such an extent as to eradicate locatable traces of cultural properties. Existing Class II or equivalent inventory data are sufficient to indicate that the specific environmental situation did not support human occupation or use to a degree that would make further inventory information useful or meaningful. Previous inventories must have been conducted according to current professionally acceptable standards. Records are available and accurate and document the location, methods, and results of the inventory. Class II "equivalent inventory data" includes an adequate amount of acreage distributed across the same specific environmental situation that is located within the study area. Inventory at the Class III level has previously been performed, and records documenting the location, methods, and results of the inventory are available. Such inventories must have been conducted according to current professionally acceptable standards. Natural environmental characteristics (such as recent landslides or rock falls) are unfavorable to the presence of cultural properties. The nature of the proposed action is such that no impact can be expected on significant cultural resources. Conditions exist that could endanger the health or safety of personnel, such as the presence of hazardous materials, explosive ordnance, or unstable structures.
UT-S-176	**CONTROLLED SURFACE USE – FOSSIL RESOURCES (PRECONSTRUCTION SURVEYS)** Preconstruction paleo surveys will be required prior to any surface disturbing activity in the Morrison, Cedar Mountain, Blackhawk, North Horn, or Chinle Formations. Exception: The authorized officer may grant an exception if the area has previously been inventoried within the last three (3) years. Modification: None

Stipulation or Notice	Description/Purpose
	Waiver: None
UT-S-177	**CONTROLLED SURFACE USE – FOSSIL RESOURCES** A BLM permitted paleontologist will be required to be on-site during surface disturbance in any Potential Fossil Yield Classification (PFYC) 4 or 5 areas. Exceptions: None Modification: None Waiver: None
UT-S-260	**TIMING LIMITATION – RAPTOR HABITAT** Raptor nesting complexes and known raptor nest sites will be closed seasonally from February 1 to July 15 within ½ mile of occupied nests. Exception: The authorized officer may grant an exception if the raptor nest in question is deemed to be inactive by May 31 and if the proposed activity would not result in a permanent structure or facility that would cause the subject nest to become unsuitable for nesting in future years. Modification: Season may be adjusted depending on climatic and range conditions. Distance may be adjusted if natural features provide adequate visual screening. Waiver: This stipulation may be waived if, in cooperation with the UDWR, it is determined that the site has been permanently abandoned or unoccupied for a minimum of 3 years.
UT-S-269	**NO SURFACE OCCUPANCY – MEXICAN SPOTTED OWL NESTS** No surface occupancy with½1/2 mile of known Mexican Spotted Owl (MSO) nests. Exception: The authorized officers may grant an exception if an environmental analysis demonstrates that the action would not impair the function or utility of the site for nesting or other owl-sustaining activities. Modification: The authorized officers may modify the NSO area in extent if an environmental analysis finds that a portion of the area is nonessential to site utility or function or if natural features provide adequate visual or auditory screening. Waiver: A waiver may be granted if the MSO is de-listed and the area is determined not necessary for the survival and recovery of the MSO.
UT-S-285	**TIMING LIMITATION – MIGRATORY BIRD NESTING** 4. Migratory bird nesting areas will be closed seasonally from April 15 to Augus1. Areas with migratory birds designated as BLM Special Status Species will have the highest priority. Exception: Upon review and monitoring, the authorized officer may grant exceptions because of climatic and/or habitat conditions if activities would not cause undue stress to migratory bird populations. Modification: Season may be adjusted depending on climatic and range conditions. Distance may be adjusted if natural features provide adequate visual screening. Waiver: None
UT-S-305	**CONTROLLED SURFACE USE – NOXIOUS WEED** Continue implementation of noxious weed and invasive species control actions in accordance with national guidance and local weed management plans, in cooperation with State, federal, affected counties, adjoining private landowners, and other partners or interests directly affected. Implement Standard Operating Procedures and Mitigation Measures for herbicide use as well as prevention measures for noxious and invasive plants

Stipulation or Notice	Description/Purpose
	identified in the Record of Decision Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic EIS and associated documents. Exception: None Modification: None Waiver: None
UT-S-319	**NO SURFACE OCCUPANCY – CULTURAL ACEC** NSO for cultural values within areas of critical environmental concern (ACEC) to retain the cultural character and context of the area. Exception: The AO may grant an oil and gas exception if it is determined that no other economic and technical feasible access is available to reach and drain the fluid mineral resources of the area. A block cultural survey must be completed and a treatment plan developed and submitted to BLM and the State Historic Preservation Office (SHPO) for their approval. The plan must contain measures to mitigate surface disturbance and reduce visual intrusion. Modification: None Waiver: None
UT-S-343	**CONTROLLED SURFACE USE – FOSSIL RESOURCE ASSESSMENT** An assessment of fossil resources would be required on a case-by-case basis, mitigating as necessary before and/or during surface disturbance. Exception: The AO may grant an exception if the area has previously been inventoried and an assessment completed. Modification: None Waiver: None

Table C-3. Utah Threatened and Endangered Species Notices

Notice	Description/Purpose
T&E-03	**ENDANGERED FISH OF THE UPPER COLORADO RIVER DRAINAGE BASIN** The Lessee/Operator is given notice that the lands in this parcel contain Critical Habitat for the Colorado River fish (bonytail, humpback chub, Colorado pike minnow, and razorback sucker) listed as endangered under the Endangered Species Act, or these parcels have watersheds that are tributary to designated habitat. Critical habitat was designated for the four endangered Colorado River fishes on March 21, 1994 (59 FR 13374–13400). Designated critical habitat for all the endangered fishes includes those portions of the 100-year floodplain that contain primary constituent elements necessary for survival of the species. Avoidance or use restrictions may be placed on portions of the lease. The following avoidance and minimization measures have been designed to ensure activities carried out on the lease are in compliance with the Endangered Species Act. Integration of and adherence to these measures will facilitate review and analysis of any submitted permits under the authority of this lease. Following these measures could reduce the scope of Endangered Species Act, Section 7 consultation at the permit stage. Current avoidance and minimization measures include the following:

Notice	Description/Purpose
	Surveys will be required prior to operations unless species occupancy and distribution information is complete and available. All surveys must be conducted by qualified individual(s). Lease activities will require monitoring throughout the duration of the project. To ensure desired results are being achieved, minimization measures will be evaluated and, if necessary, Section 7 consultation reinitiated. Water production will be managed to ensure maintenance or enhancement of riparian habitat. Avoid loss or disturbance of riparian habitats. Where technically and economically feasible, use directional drilling or multiple wells from the same pad to reduce surface disturbance and eliminate drilling in suitable riparian habitat. Ensure that such directional drilling does not intercept or degrade alluvial aquifers. Conduct watershed analysis for leases in designated critical habitat and overlapping major tributaries in order to determine toxicity risk from permanent facilities. Implement Appendix B (Hydrologic Considerations for Pipeline Crossing Stream Channels, Technical Note 423). Drilling will not occur within 100 year floodplains of rivers or tributaries to rivers that contain listed fish species or critical habitat. In areas adjacent to 100-year flood plains, particularly in systems prone to flash floods, analyze the risk for flash floods to impact facilities, and use closed loop drilling, and pipeline burial or suspension according to Appendix B (Hydrologic Considerations for Pipeline Crossing Stream Channels, Technical Note 423, to minimize the potential for equipment damage and resulting leaks or spills. Water depletions from *any* portion of the Upper Colorado River drainage basin above Lake Powell are considered to adversely affect or adversely modify the critical habitat of the four resident endangered fish species, and must be evaluated with regard to the criteria described in the Upper Colorado River Endangered Fish Recovery Program. Formal consultation with USFWS is required for all depletions. All depletion amounts must be reported to BLM. Additional measures to avoid or minimize effects to the species may be developed and implemented in consultation with the U.S. Fish and Wildlife Service between the lease sale stage and lease development stage to ensure continued compliance with the ESA.
T&E-05	**LISTED PLANT SPECIES** The Lessee/Operator is given notice that the lands in this parcel contain suitable habitat for federally listed plant species under the Endangered Species Act. The following avoidance and minimization measures have been developed to facilitate review and analysis of any submitted permits under the authority of this lease: Site inventories: Must be conducted to determine habitat suitability, Are required in known or potential habitat for all areas proposed for surface disturbance prior to initiation of project activities, at a time when the plant can be detected, and during appropriate flowering periods, Documentation should include, but not be limited to individual plant locations and suitable habitat distributions, and All surveys must be conducted by qualified individuals.

Notice	Description/Purpose
	Lease activities will require monitoring throughout the duration of the project. To ensure desired results are being achieved, minimization measures will be evaluated and, if necessary, Section 7 consultation reinitiated. Project activities must be designed to avoid direct disturbance to populations and to individual plants: Designs will avoid concentrating water flows or sediments into plant occupied habitat. Construction will occur down slope of plants and populations where feasible; if well pads and roads must be sited upslope, buffers of 300 feet minimum between surface disturbances and plants and populations will be incorporated. Where populations occur within 300 ft. of well pads, establish a buffer or fence the individuals or groups of individuals during and post- construction. Areas for avoidance will be visually identifiable in the field, e.g., flagging, temporary fencing, rebar, etc. For surface pipelines, use a 10-foot buffer from any plant locations: If on a slope, use stabilizing construction techniques to ensure the pipelines don't move towards the population. For riparian/wetland-associated species, e.g., Ute ladies'-tresses, avoid loss or disturbance of riparian habitats. Ensure that water extraction or disposal practices do not result in change of hydrologic regime. Limit disturbances to and within suitable habitat by staying on designated routes. Limit new access routes created by the project. Place signing to limit ATV travel in sensitive areas. Implement dust abatement practices near occupied plant habitat. All disturbed areas will be re-vegetated with native species comprised of species indigenous to the area. Post construction monitoring for invasive species will be required. Where technically and economically feasible, use directional drilling or multiple wells from the same pad to reduce surface disturbance and eliminate drilling in plant habitat. Ensure that such directional drilling does not intercept or degrade alluvial aquifers. Lease activities will require monitoring throughout the duration of the project. To ensure desired results are being achieved, minimization measures will be evaluated and, if necessary, Section 7 consultation reinitiated. Additional measures to avoid or minimize effects to the species may be developed and implemented in consultation with the U.S. Fish and Wildlife Service between the lease sale stage and lease development stage to ensure continued compliance with the Endangered Species Act.
T&E-06	**MEXICAN SPOTTED OWL** The Lessee/Operator is given notice that the lands in this parcel contain suitable habitat for Mexican spotted owl, a federally listed species. The Lessee/Operator is given notice that the lands in this lease contain Designated Critical Habitat for the Mexican spotted owl, a federally listed species. Critical habitat was designated for the Mexican spotted owl on August 31, 2004 (69 FR 53181–53298). Avoidance or use restrictions may be placed on portions of the lease. Application of appropriate measures will depend whether the action is temporary or permanent, and whether it occurs within or outside the owl nesting season. A temporary action is completed prior to the following breeding season leaving no permanent structures and resulting in no permanent habitat loss. A permanent action

Notice	Description/Purpose
	continues for more than one breeding season and/or causes a loss of owl habitat or displaces owls through disturbances, i.e. creation of a permanent structure. The following avoidance and minimization measures have been designed to ensure activities carried out on the lease are in compliance with the Endangered Species Act. Integration of, and adherence to these measures, will facilitate review and analysis of any submitted permits under the authority of this lease. Following these measures could reduce the scope of Endangered Species Act, Section 7 consultation at the permit stage. Current avoidance and minimization measures include the following: Surveys will be required prior to operations unless species occupancy and distribution information is complete and available. All Surveys must be conducted by qualified individual(s). Assess habitat suitability for both nesting and foraging using accepted habitat models in conjunction with field reviews. Apply the conservation measures below if project activities occur within 0.5 mile of suitable owl habitat. Determine potential effects of actions to owls and their habitat. Document type of activity, acreage and location of direct habitat impacts, type and extent of indirect impacts relative to location of suitable owl habitat. Document if action is temporary or permanent. Lease activities will require monitoring throughout the duration of the project. To ensure desired results are being achieved, minimization measures will be evaluated and, if necessary, Section 7 consultation reinitiated. Water production will be managed to ensure maintenance or enhancement of riparian habitat. Where technically and economically feasible, use directional drilling or multiple wells from the same pad to reduce surface disturbance and eliminate drilling in canyon habitat suitable for Mexican spotted owl nesting. For all temporary actions that may impact owls or suitable habitat: If the action occurs entirely outside of the owl breeding season (March 1 – August 31), and leaves no permanent structure or permanent habitat disturbance, action can proceed without an occupancy survey. If action will occur during a breeding season, survey for owls prior to commencing activity. If owls are found, activity must be delayed until outside of the breeding season. Rehabilitate access routes created by the project through such means as raking out scars, re-vegetation, gating access points, etc. For all permanent actions that may impact owls or suitable habitat: Survey two consecutive years for owls according to accepted protocol prior to commencing activities. If owls are found, no actions will occur within 0.5 mile of identified nest site. If nest site is unknown, no activity will occur within the designated Protected Activity Center (PAC). Avoid drilling and permanent structures within 0.5 mi of suitable habitat unless surveyed and not occupied. Reduce noise emissions (e.g., use hospital-grade mufflers) to 45 dBA at 0.5 mile from suitable habitat, including canyon rims. Placement of permanent noise-generating facilities should be determined by a noise analysis to ensure noise does not encroach upon a 0.5 mile buffer for suitable habitat, including canyon rims. Limit disturbances to and within suitable habitat by staying on approved routes. Limit new access routes created by the project.

Notice	Description/Purpose
	Additional measures to avoid or minimize effects to the species may be developed and implemented in consultation with the U.S. Fish and Wildlife Service between the lease sale stage and lease development stage to ensure continued compliance with the Endangered Species Act.
T&E-07	**SOUTHWESTERN WILLOW FLYCATCHER** The Lessee/Operator is given notice that the lands in this parcel contains riparian habitat that falls within the range for southwestern willow flycatcher (*Empidonax traillii extimus*), a federally listed species. Avoidance or use restrictions may be placed on portions of the lease. Application of appropriate measures will depend whether the action is temporary or permanent, and whether it occurs within or outside the nesting season. A temporary action is completed prior to the following breeding season leaving no permanent structures and resulting in no permanent habitat loss. A permanent action continues for more than one breeding season and/or causes a loss of habitat or displaces flycatchers through disturbances, i.e., creation of a permanent structure. The following avoidance and minimization measures have been designed to ensure activities carried out on the lease are in compliance with the Endangered Species Act. Integration of, and adherence to these measures, will facilitate review and analysis of any submitted permits under the authority of this lease. Following these measures could reduce the scope of Endangered Species Act, Section 7 consultation at the permit stage. Current avoidance and minimization measures include the following: Surveys will be required prior to operations unless species occupancy and distribution information is complete and available. All Surveys must be conducted by qualified individual(s), and be conducted according to protocol. Lease activities will require monitoring throughout the duration of the project. To ensure desired results are being achieved, minimization measures will be evaluated and, if necessary, Section 7 consultation reinitiated. Water production will be managed to ensure maintenance or enhancement of riparian habitat. Where technically and economically feasible, use directional drilling or multiple wells from the same pad to reduce surface disturbance and eliminate drilling in suitable riparian habitat. Ensure that such directional drilling does not intercept or degrade alluvial aquifers. Drilling activities will maintain a 300-foot buffer from suitable riparian habitat year long. Drilling activities within 0.25 mile of occupied breeding habitat will not occur during the breeding season of May 1 to August 15. Ensure that water extraction or disposal practices do not result in change of hydrologic regime that would result in loss or degradation of riparian habitat. Re-vegetate with native species all areas of surface disturbance within riparian areas and/or adjacent uplands. Additional measures to avoid or minimize effects to the species may be developed and implemented in consultation with the U.S. Fish and Wildlife Service between the lease sale stage and lease development stage to ensure continued compliance with the ESA.
T&E-11	**CALIFORNIA CONDOR** The Lessee/Operator is given notice that the lands located in this parcel contain potential habitat for the California Condor, a federally listed species. Avoidance or use restrictions may be placed on portions of the lease if the area is known or suspected to be used by condors. Application of appropriate measures will depend on whether the action is temporary or permanent, and whether it occurs within or outside potential habitat. A temporary action is completed prior to the following important season of use, leaving no

Notice	Description/Purpose
	permanent structures and resulting in no permanent habitat loss. This would include consideration for habitat functionality. A permanent action continues for more than one season of habitat use, and/or causes a loss of condor habitat function or displaces condors through continued disturbance (i.e., creation of a permanent structure requiring repetitious maintenance, or emits disruptive levels of noise). The following avoidance and minimization measures have been designed to ensure activities carried out on the lease are in compliance with the Endangered Species Act. Integration of, and adherence to these measures will facilitate review and analysis of any submitted permits under the authority of this lease. Following these measures could reduce the scope of Endangered Species Act, Section 7 consultation at the permit stage. Current avoidance and minimization measures include the following: Surveys will be required prior to operations unless species occupancy and distribution information is complete and available. All Surveys must be conducted by qualified individual(s) approved by the BLM, and must be conducted according to approved protocol. If surveys result in positive identification of condor use, all lease activities will require monitoring throughout the duration of the project to ensure desired results of applied mitigation and protection. Minimization measures will be evaluated during development and, if necessary, Section 7 consultation may be reinitiated. Temporary activities within 1.0 mile of nest sites will not occur during the breeding season. Temporary activities within 0.5 miles of established roosting sites or areas will not occur during the season of use, August 1 to November 31, unless the area has been surveyed according to protocol and determined to be unoccupied. No permanent infrastructure will be placed within 1.0 mile of nest sites. No permanent infrastructure will be placed within 0.5 mile of established roosting sites or areas. Remove big game carrion 100 feet from lease roadways occurring within foraging range. Where technically and economically feasible, use directional drilling or multiple wells from the same pad to reduce surface disturbance and eliminate drilling in suitable habitat. Utilize directional drilling to avoid direct impacts to large cottonwood gallery riparian habitats. Ensure that such directional drilling does not intercept or degrade alluvial aquifers. Re-initiation of Section 7 consultation with the Service will be sought immediately if mortality or disturbance to California condors is anticipated as a result of project activities. Additional site-specific measures may also be employed to avoid or minimize effects to the species. These additional measures will be developed and implemented in consultation with the U.S. Fish and Wildlife Service to ensure continued compliance with the ESA. Additional measures may also be employed to avoid or minimize effects to the species between the lease sale and lease development stages. These additional measures will be developed and implemented in consultation with the U.S. Fish and Wildlife Service to ensure continued compliance with the Endangered Species Act.
T&E-13	**BARNEBY REED MUSTARD *(Schoenocrambe barnebyi)*** In order to minimize effects to the federally threatened Barneby Reed Mustard, the Bureau of Land Management (BLM), in coordination with the U.S. Fish and Wildlife Service (Service), has developed the following avoidance and minimization measures. Implementation of these measures will help ensure the activities carried out during oil and gas development (including but not limited to drilling, production, and maintenance

Notice	Description/Purpose
	operations) are in compliance with the endangered Species Act (ESA). For the purposes of this document, the following terms are so defined: *Potential habitat* is defined as areas which satisfy the broad criteria of the species habitat description; usually determined by preliminary, in-house assessment. *Suitable habitat* is defined as areas which contain or exhibit the specific components or constituents necessary for plant persistence; determined by field inspection and/or surveys; may or may not contain Barneby Reed Mustard; habitat descriptions can be found in Federal Register Notice and species recovery plan links at <http:www.fws.gov/endangered/wildlife.html>. *Occupied habitat* is defined as areas currently or historically known to support Barneby Reed Mustard; synonymous with "known habitat." The following avoidance and minimization measures should be included in the Plan of Development: Pre-project habitat assessments will be completed across 100% of the project disturbance area within potential habitat[1] prior to any ground disturbing activities (including ATV use) to determine if suitable Barneby Reed Mustard habitat is present. Site inventories will be conducted within suitable habitat to determine occupancy. Where standard surveys are technically infeasible and otherwise hazardous due to topography, slope, etc. suitable habitat will be assessed and mapped for avoidance (hereafter, "avoidance areas"); in such cases, in general, 300-foot buffers will be maintained between surface disturbance and avoidance areas. However, site-specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat. Where conditions allow, inventories: Must be conducted by qualified individuals(s) and according to BLM and Service accept survey protocols, Will be conducted in suitable and occupied habitat for all areas proposed for surface disturbance prior to initiation of project activities and within the same growing season, at a time when the plant can be detected (usually April 15 to June 5, however, surveyors should verify that the plant is flowering by contacting a BLM or USFWS botanist or demonstrating that the nearest known population is in flower), Will occur within 300 feet from the centerline of the proposed right-of-way for surface pipelines or roads; and within 300 feet from the perimeter of disturbance for the proposed well pad including the well pad, Will include, but not be limited to, plant species lists and habitat characteristics, and Will be valid until April 15 the following year. Design project infrastructure to minimize impacts within suitable habitat: Where standard surveys are technically infeasible, infrastructure and activities will avoid all suitable habitat (voidance areas) and incorporate 300-foot buffers, in general; however, site-specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat, Reduce well pad size to the minimum needed, without compromising safety, Where technically and economically feasible, use directional drilling or multiple wells from the same pad, Limit new access routes created by the project, Roads and utilities should share common rights-of-way where possible, Reduce the width of rights-of-way and minimize the depth of excavation needed for the roadbed; where feasible, use the natural ground surface for the road within habitat, Place signing to limit off-road travel in sensitive areas, and Stay on designated routes and other cleared/approved areas, All disturbed areas will be revegetated with native species comprised of species indigenous to the area and non-native species that are not likely to invade other areas.

Notice	Description/Purpose
	Within occupied habitat, project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants: Follow the above recommendations (3.) for project design within suitable habitats, To avoid water flow and/or sedimentation into occupied habitat and avoidance areas, silt fences, hay bales, and similar structures or practices will be incorporated into the project design; appropriate placement of fill is encouraged, Construction of roads will occur such that the edge of the right of way is at least 300 feet from any plant and 300 feet from avoidance areas, Roads will be graveled with occupied habitat; the operator is encouraged to apply water for dust abatement to such areas from April 15 to June 5 (flowering period); dust abatement applications will be comprised of water only, The edge of the well pad should be located at least 300 feet away from plants and avoidance areas, in general; however, site-specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat, Surface pipelines will be laid such that a 300-foot buffer exists between the edge of the right of way and plants and 300 feet between the edge of right of way and avoidance areas; use stabilizing and anchoring techniques when the pipeline crossed suitable habitat to ensure pipelines don't move towards the population; site-specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat, Construction activities will not occur from April 15 through June 5 within occupied habitat, Before and during construction, areas for avoidance should be visually identifiable in the field, e.g., flagging temporary fencing, rebar, etc., Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat, and Minimize the disturbed area of producing well locations through interim and final reclamation. Reclaim well pads following drilling to the smallest area possible. Occupied Barneby Reed Mustard habitats within 300 feet of the edge of the surface pipelines' rights-of-way, 300 feet of the edge of the roads' rights-of-way, and 300 feet from the edge of the well pad shall be monitored for a period of three years after ground disturbing activities. Monitoring will include annual plant surveys to determine plant and habitat impacts relative to project facilities. Annual reports shall be provided to the BLM and the Service. To ensure desired results are being achieved, minimization measures will be evaluated and may be changed after a thorough review of the monitoring results and annual reports during annual meetings between the BLM and the Service. Re-initiation of section 7 consultation with the Service will be sought immediately if any loss of plants or occupied habitat for the Barneby Reed Mustard is anticipated as a result of project activities. Additional site-specific measures may also be employed to avoid or minimize effects to the species. These additional measures will be developed and implemented in consultation with the U.S. Fish and Wildlife Service to ensure continued compliance with the ESA.
T&E-15	**WRIGHT FISHHOOK CACTUS (*SCLEROCACTUS WRIGHTIAE*)** In order to minimize effects to the federally threatened Wright Fishhook Cactus, the Bureau of Land Management (BLM), in coordination with the U.S. Fish and Wildlife Service (Service), has developed the following avoidance and minimization measures. Implementation of these measures will help ensure the activities carried out during oil and gas development (including but not limited to drilling, production, and maintenance operations) are in compliance with the endangered Species Act (ESA). For the purposes of this document, the following terms are so defined: *Potential habitat* is defined as areas

Notice	Description/Purpose
	which satisfy the broad criteria of the species habitat description; usually determined by preliminary, in-house assessment. *Suitable habitat* is defined as areas which contain or exhibit the specific components or constituents necessary for plant persistence; determined by field inspection and/or surveys; may or may not contain Wright Fishhook Cactus; habitat descriptions can be found in Federal Register Notice and species recovery plan links at <http:www.fws.gov/endangered/wildlife.html>. *Occupied habitat* is defined as areas currently or historically known to support Wright Fishhook Cactus; synonymous with "known habitat." The following avoidance and minimization measures should be included in the Plan of Development: Pre-project habitat assessments will be completed across 100% of the project disturbance area within potential habitat[1] prior to any ground disturbing activities (including ATV use) to determine if suitable Wright Fishhook Cactus habitat is present. Site inventories will be conducted within suitable habitat to determine occupancy. Where standard surveys are technically infeasible and otherwise hazardous due to topography, slope, etc. suitable habitat will be assessed and mapped for avoidance (hereafter, "avoidance areas"); in such cases, in general, 300-foot buffers will be maintained between surface disturbance and avoidance areas. However, site-specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat. Where conditions allow, inventories: Must be conducted by qualified individuals(s) and according to BLM and Service accept survey protocols, Will be conducted in suitable and occupied habitat for all areas proposed for surface disturbance prior to initiation of project activities and within the same growing season, at a time when the plant can be detected (usually April 15 to June 5th, however, surveyors should verify that the plant is flowering by contacting a BLM or USFWS botanist or demonstrating that the nearest known population is in flower), Will occur within 300 feet from the centerline of the proposed right-of- way for surface pipelines or roads; and within 300 feet from the perimeter of disturbance for the proposed well pad including the well pad, Will include, but not be limited to, plant species lists and habitat characteristics, and Will be valid until April 15 the following year. Design project infrastructure to minimize impacts within suitable habitat: Where standard surveys are technically infeasible, infrastructure and activities will avoid all suitable habitat (voidance areas) and incorporate 300-foot buffers, in general; however, site-specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat, Reduce well pad size to the minimum needed, without compromising safety, Where technically and economically feasible, use directional drilling or multiple wells from the same pad, Limit new access routes created by the project, Roads and utilities should share common rights-of-way where possible, Reduce the width of rights-of-way and minimize the depth of excavation needed for the roadbed; where feasible, use the natural ground surface for the road within habitat, Place signing to limit off-road travel in sensitive areas, and Stay on designated routes and other cleared/approved areas, All disturbed areas will be revegetated with native species comprised of species indigenous to the area and non-native species that are not likely to invade other areas.

Notice	Description/Purpose
	Within occupied habitat, project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants: Follow the above recommendations (3.) for project design within suitable habitats, To avoid water flow and/or sedimentation into occupied habitat and avoidance areas, silt fences, hay bales, and similar structures or practices will be incorporated into the project design; appropriate placement of fill is encouraged, Construction of roads will occur such that the edge of the right of way is at least 300 feet from any plant and 300 feet from avoidance areas, Roads will be graveled with occupied habitat; the operator is encouraged to apply water for dust abatement to such areas from April 15 to June 5th (flowering period); dust abatement applications will be comprised of water only, The edge of the well pad should be located at least 300 feet away from plants and avoidance areas, in general; however, site-specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat, Surface pipelines will be laid such that a 300-foot buffer exists between the edge of the right of way and plants and 300 feet between the edge of right of way and avoidance areas; use stabilizing and anchoring techniques when the pipeline crossed suitable habitat to ensure pipelines don't move towards the population; site-specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat, Construction activities will not occur from April 15 through June 5th within occupied habitat, Before and during construction, areas for avoidance should be visually identifiable in the field, e.g., flagging temporary fencing, rebar, etc. Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat, and Minimize the disturbed area of producing well locations through interim and final reclamation. Reclaim well pads following drilling to the smallest area possible. Occupied Wright Fishhook Cactus habitats within 300 feet of the edge of the surface pipelines' rights-of-way, 300 feet of the edge of the roads' right-of- ways, and 300 feet from the edge of the well pad shall be monitored for a period of three years after ground disturbing activities. Monitoring will include annual plant surveys to determine plant and habitat impacts relative to project facilities. Annual reports shall be provided to the BLM and the Service. To ensure desired results are being achieved, minimization measures will be evaluated and may be changed after a thorough review of the monitoring results and annual reports during annual meetings between the BLM and the Service. Re-initiation of section 7 consultation with the Service will be sought immediately if any loss of plants or occupied habitat for the Wright Fishhook Cactus is anticipated as a result of project activities. Additional site-specific measures may also be employed to avoid or minimize effects to the species. These additional measures will be developed and implemented in consultation with the U.S. Fish and Wildlife Service to ensure continued compliance with the ESA.
T&E-17	**SAN RAFAEL CACTUS (*PEDIOCACTUS DESPAINII*)** In order to minimize effects to the federally threatened San Rafael Cactus, the Bureau of Land Management (BLM), in coordination with the U.S. Fish and Wildlife Service (Service), has developed the following avoidance and minimization measures. Implementation of these measures will help ensure the activities carried out during oil and gas development (including but not limited to drilling, production, and maintenance operations) are in compliance with the endangered Species Act (ESA). For the purposes of this document, the following terms are so defined: *Potential habitat* is defined as areas

Notice	Description/Purpose
	which satisfy the broad criteria of the species habitat description; usually determined by preliminary, in-house assessment. *Suitable habitat* is defined as areas which contain or exhibit the specific components or constituents necessary for plant persistence; determined by field inspection and/or surveys; may or may not contain San Rafael Cactus; habitat descriptions can be found in Federal Register Notice and species recovery plan links at <http:www.fws.gov/endangered/wildlife.html>. *Occupied habitat* is defined as areas currently or historically known to support San Rafael Cactus; synonymous with "known habitat." The following avoidance and minimization measures should be included in the Plan of Development: Pre-project habitat assessments will be completed across 100% of the project disturbance area within potential habitat[1] prior to any ground disturbing activities (including ATV use) to determine if suitable San Rafael Cactus habitat is present. Site inventories will be conducted within suitable habitat to determine occupancy. Where standard surveys are technically infeasible and otherwise hazardous due to topography, slope, etc. suitable habitat will be assessed and mapped for avoidance (hereafter, "avoidance areas"); in such cases, in general, 300-foot buffers will be maintained between surface disturbance and avoidance areas. However, site-specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat. Where conditions allow, inventories: Must be conducted by qualified individuals(s) and according to BLM and Service accept survey protocols, Will be conducted in suitable and occupied habitat for all areas proposed for surface disturbance prior to initiation of project activities and within the same growing season, at a time when the plant can be detected (usually April 15 to June 5th, however, surveyors should verify that the plant is flowering by contacting a BLM or USFWS botanist or demonstrating that the nearest known population is in flower), Will occur within 300 feet from the centerline of the proposed right-of- way for surface pipelines or roads; and within 300 feet from the perimeter of disturbance for the proposed well pad including the well pad, Will include, but not be limited to, plant species lists and habitat characteristics, and Will be valid until April 15 the following year. Design project infrastructure to minimize impacts within suitable habitat: Where standard surveys are technically infeasible, infrastructure and activities will avoid all suitable habitat (voidance areas) and incorporate 300-foot buffers, in general; however, site-specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat, Reduce well pad size to the minimum needed, without compromising safety, Where technically and economically feasible, use directional drilling or multiple wells from the same pad, Limit new access routes created by the project, Roads and utilities should share common rights-of-way where possible, Reduce the width of rights-of-way and minimize the depth of excavation needed for the roadbed; where feasible, use the natural ground surface for the road within habitat, Place signing to limit off-road travel in sensitive areas, and Stay on designated routes and other cleared/approved areas, All disturbed areas will be re-vegetated with native species comprised of species indigenous to the area and non-native species that are not likely to invade other areas.

Notice	Description/Purpose
	Within occupied habitat, project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants: Follow the above recommendations (3.) for project design within suitable habitats, To avoid water flow and/or sedimentation into occupied habitat and avoidance areas, silt fences, hay bales, and similar structures or practices will be incorporated into the project design; appropriate placement of fill is encouraged, Construction of roads will occur such that the edge of the right of way is at least 300 feet from any plant and 300 feet from avoidance areas, Roads will be graveled with occupied habitat; the operator is encouraged to apply water for dust abatement to such areas from April 15 to June 5th (flowering period); dust abatement applications will be comprised of water only, The edge of the well pad should be located at least 300 feet away from plants and avoidance areas, in general; however, site-specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat, Surface pipelines will be laid such that a 300-foot buffer exists between the edge of the right of way and plants and 300 feet between the edge of right of way and avoidance areas; use stabilizing and anchoring techniques when the pipeline crossed suitable habitat to ensure pipelines don't move towards the population; site-specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat, Construction activities will not occur from April 15 through June 5th within occupied habitat, Before and during construction, areas for avoidance should be visually identifiable in the field, e.g., flagging temporary fencing, rebar, etc., Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat, and Minimize the disturbed area of producing well locations through interim and final reclamation. Reclaim well pads following drilling to the smallest area possible. Occupied San Rafael Cactus habitats within 300 feet of the edge of the surface pipelines' rights-of-way, 300 feet of the edge of the roads' right-of- ways, and 300 feet from the edge of the well pad shall be monitored for a period of three years after ground disturbing activities. Monitoring will include annual plant surveys to determine plant and habitat impacts relative to project facilities. Annual reports shall be provided to the BLM and the Service. To ensure desired results are being achieved, minimization measures will be evaluated and may be changed after a thorough review of the monitoring results and annual reports during annual meetings between the BLM and the Service. Re-initiation of section 7 consultation with the Service will be sought immediately if any loss of plants or occupied habitat for the San Rafael Cactus is anticipated as a result of project activities. Additional site-specific measures may also be employed to avoid or minimize effects to the species. These additional measures will be developed and implemented in consultation with the U.S. Fish and Wildlife Service to ensure continued compliance with the ESA.
T&E-19	**JONES CYCLADENIA (*CYCLADENIA HYMILIS VAR JONESII*)** In order to minimize effects to the federally threatened Jones Cycladenia, the Bureau of Land Management (BLM), in coordination with the U.S. Fish and Wildlife Service (Service), has developed the following avoidance and minimization measures. Implementation of these measures will help ensure the activities carried out during oil and gas development (including but not limited to drilling, production, and maintenance operations) are in compliance with the endangered Species Act (ESA). For the purposes of this document, the following terms are so defined: *Potential habitat* is defined as areas

Notice	Description/Purpose
	which satisfy the broad criteria of the species habitat description; usually determined by preliminary, in-house assessment. *Suitable habitat* is defined as areas which contain or exhibit the specific components or constituents necessary for plant persistence; determined by field inspection and/or surveys; may or may not contain Jones Cycladenia; habitat descriptions can be found in Federal Register Notice and species recovery plan links at <http:www.fws.gov/endangered/wildlife.html>. *Occupied habitat* is defined as areas currently or historically known to support Jones Cycladenia; synonymous with "known habitat." The following avoidance and minimization measures should be included in the Plan of Development: Pre-project habitat assessments will be completed across 100% of the project disturbance area within potential habitat[1] prior to any ground disturbing activities (including ATV use) to determine if suitable Jones Cycladenia habitat is present. Site inventories will be conducted within suitable habitat to determine occupancy. Where standard surveys are technically infeasible and otherwise hazardous due to topography, slope, etc. suitable habitat will be assessed and mapped for avoidance (hereafter, "avoidance areas"); in such cases, in general, 300-foot buffers will be maintained between surface disturbance and avoidance areas. However, site-specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat. Where conditions allow, inventories: Must be conducted by qualified individuals(s) and according to BLM and Service accept survey protocols, Will be conducted in suitable and occupied habitat for all areas proposed for surface disturbance prior to initiation of project activities and within the same growing season, at a time when the plant can be detected (usually April 15 to June 5th, however, surveyors should verify that the plant is flowering by contacting a BLM or USFWS botanist or demonstrating that the nearest known population is in flower), Will occur within 300 feet from the centerline of the proposed right-of- way for surface pipelines or roads; and within 300 feet from the perimeter of disturbance for the proposed well pad including the well pad, Will include, but not be limited to, plant species lists and habitat characteristics, and Will be valid until April 15 the following year. Design project infrastructure to minimize impacts within suitable habitat: Where standard surveys are technically infeasible, infrastructure and activities will avoid all suitable habitat (voidance areas) and incorporate 300-foot buffers, in general; however, site-specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat, Where standard surveys are technically infeasible, infrastructure and activities will avoid all suitable habitat (voidance areas) and incorporate 300-foot buffers, in general; however, site-specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat, Reduce well pad size to the minimum needed, without compromising safety, Where technically and economically feasible, use directional drilling or multiple wells from the same pad, Limit new access routes created by the project, Roads and utilities should share commons rights-of-way where possible, Reduce the width of rights-of-way and minimize the depth of excavation needed for the roadbed; where feasible, use the natural ground surface for the road within habitat, Place signing to limit off-road travel in sensitive areas, and Stay on designated routes and other cleared/approved areas,

Notice	Description/Purpose
	All disturbed areas will be re-vegetated with native species comprised of species indigenous to the area and non-native species that are not likely to invade other areas. Within occupied habitat, project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants: Follow the above recommendations (3.) for project design within suitable habitats, To avoid water flow and/or sedimentation into occupied habitat and avoidance areas, silt fences, hay bales, and similar structures or practices will be incorporated into the project design; appropriate placement of fill is encouraged, Construction of roads will occur such that the edge of the right of way is at least 300 feet from any plant and 300 feet from avoidance areas, Roads will be graveled with occupied habitat; the operator is encouraged to apply water for dust abatement to such areas from April 15 to June 5th (flowering period); dust abatement applications will be comprised of water only, The edge of the well pad should be located at least 300 feet away from plants and avoidance areas, in general; however, site-specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat, Surface pipelines will be laid such that a 300-foot buffer exists between the edge of the right of way and plants and 300 feet between the edge of right of way and avoidance areas; use stabilizing and anchoring techniques when the pipeline crossed suitable habitat to ensure pipelines don't move towards the population; site-specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat, Construction activities will not occur from April 15 through June 5th within occupied habitat, Before and during construction, areas for avoidance should be visually identifiable in the field, e.g., flagging temporary fencing, rebar, etc., Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat, and Minimize the disturbed area of producing well locations through interim and final reclamation. Reclaim well pads following drilling to the smallest area possible Occupied Jones Cycladenia habitats within 300 feet of the edge of the surface pipelines' rights-of-way, 300 feet of the edge of the roads' rights-of-way, and 300 feet from the edge of the well pad shall be monitored for a period of three years after ground disturbing activities. Monitoring will include annual plant surveys to determine plant and habitat impacts relative to project facilities. Annual reports shall be provided to the BLM and the Service. To ensure desired results are being achieved, minimization measures will be evaluated and may be changed after a thorough review of the monitoring results and annual reports during annual meetings between the BLM and the Service. Re-initiation of section 7 consultation with the Service will be sought immediately if any loss of plants or occupied habitat for the Jones Cycladenia is anticipated as a result of project activities. Additional site-specific measures may also be employed to avoid or minimize effects to the species. These additional measures will be developed and implemented in consultation with the U.S. Fish and Wildlife Service to ensure continued compliance with the ESA.
T&E-22	**UTE LADIES'-TRESSES (*SPIRANTHES DILUVIALIS*)** The Lessee/Operator is given notice that the lands in this parcel contain suitable habitat for Ute ladies'-tresses under the Endangered Species Act (ESA). The following avoidance and minimization measures have been developed to facilitate review and analysis of any submitted permits under the authority of this lease. In order to minimize effects to the federally threatened Ute ladies'-tresses, the BLM in coordination with the USFWS,

Notice	Description/Purpose
	developed the following avoidance and minimization measures. Integration of and adherence to these measures will help ensure the activities carried out during oil and gas development (including but not limited to drilling, production, and maintenance) are in compliance with the ESA. Ute ladies'-tresses habitat is provided some protection under Executive Orders 11990 (wetland protection) and 11988 (floodplain management), as well as section 404 of the Clean Water Act. For the purposes of this document, the following terms are so defined: Potential habitat is defined as areas which satisfy the broad criteria of the species habitat description; usually determined by preliminary, in-house assessment. Suitable habitat is defined as areas which contain or exhibit the specific components or constituents necessary for plant persistence; determined by field inspection and/or surveys; may or may not contain Ute ladies'-tresses. Habitat descriptions can be found in Recovery Plans and Federal Register Notices for the species at <http://www.fws.gov/endangered/wildlife.html>. Occupied habitat is defined as areas currently or historically known to support Ute ladies'-tresses; synonymous with "known habitat. Although plants, habitat, or populations may be afforded some protection under these regulatory mechanisms, the following conservation measures should be included in the Plan of Development: Pre-project habitat assessments will be completed across 100% of the project disturbance area, including areas where hydrology might be affected by project activities, within potential habitat prior to any ground disturbing activities to determine if suitable Ute ladies'-tresses habitat is present. Within suitable habitat, site inventories will be conducted to determine occupancy. Inventories: Must be conducted by qualified individual(s) and according to BLM and USFWS accepted survey protocols, Will be conducted in suitable and occupied habitat for all areas proposed for surface disturbance or areas that could experience direct or indirect changes in hydrology from project activities, Will be conducted prior to initiation of project activities and within the same growing season, at a time when the plant can be detected, and during appropriate flowering periods (usually August 1 and August 31 in the Uintah Basin; however, surveyors should verify that the plant is flowering by contacting a BLM or USFWS botanist or demonstrating that the nearest known population is in flower), Will occur within 300 feet from the edge of the proposed right-of-way for surface pipelines or roads; and within 300 feet from the perimeter of disturbance for the proposed well pad including the well pad, Will include, but not be limited to, plant species lists, habitat characteristics, source of hydrology, and estimated hyroperiod, and Will be valid until August 1 the following year. Design project infrastructure to minimize direct or indirect impacts to suitable habitat both within and downstream of the project area: Alteration and disturbance of hydrology will not be permitted, Reduce well pad size to the minimum needed, without compromising safety, Limit new access routes created by the project, Roads and utilities should share common rights-of-way where possible, Reduce width of rights-of-way and minimize the depth of excavation needed for the roadbed, Construction and right-of-way management measures should avoid soil compaction that would impact Ute ladies' tresses habitat,

Notice	Description/Purpose
	Off-site impacts or indirect impacts should be avoided or minimized (i.e., install berms or catchment ditches to prevent spilled materials from reaching occupied or suitable habitat through either surface or groundwater), Place signing to limit off-road travel in sensitive areas, Stay on designated routes and other cleared/approved areas, and All disturbed areas will be re-vegetated with species approved by USFWS and BLM botanists. Within occupied habitat, project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants: Follow the above (#3) recommendations for project design within suitable habitats, Buffers of 300 feet minimum between right of way (roads and surface pipelines) or surface disturbance (well pads) and plants and populations will be incorporated, Surface pipelines will be laid such that a 300-foot buffer exists between the edge of the right of way and the plants, using stabilizing and anchoring techniques when the pipeline crosses habitat to ensure the pipelines don't move towards the population, Before and during construction, areas for avoidance should be visually identifiable in the field (e.g., flagging, temporary fencing, rebar, etc.), Where technically and economically feasible, use directional drilling or multiple wells from the same pad, Designs will avoid altering site hydrology and concentrating water flows or sediments into occupied habitat, Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat, with berms and catchment ditches to avoid or minimize the potential for materials to reach occupied or suitable habitat, and Minimize the disturbed area of producing well locations through interim and final reclamation. Reclaim well pads following drilling to the smallest area possible. Occupied Ute ladies'-tresses habitats within 300 feet of the edge of the surface pipelines' rights-of-way, 300 feet of the edge of the roads' rights-of-way, and 300 feet from the edge of the well pad shall be monitored for a period of three years after ground disturbing activities. Monitoring will include annual plant surveys to determine plant and habitat impacts relative to project facilities. Habitat impacts include monitoring any changes in hydrology due to project related activities. Annual reports shall be provided to the BLM and the USFWS. To ensure desired results are being achieved, minimization measures will be evaluated and may be changed after a thorough review of the monitoring results and annual reports during annual meetings between the BLM and the Service. Re-initiation of section 7 consultation with the USFWS will be sought immediately if any loss of plants or occupied habitat for the Ute ladies'-tresses is anticipated as a result of project activities. Additional site-specific measures may also be employed to avoid or minimize effects to the species. These additional measures will be developed and implemented in consultation with the USFWS to ensure continued compliance with the ESA.
T&E-27	**YELLOW-BILLED CUCKOO** The lessee/operator is given notice that the lands in or adjacent to this parcel contain potentially suitable habitat that falls within the range for western yellow-billed cuckoo, a Federally listed species. Avoidance or use restrictions may be placed on portions of the lease. Application of appropriate measures will depend whether the action is temporary or permanent, and whether it occurs within or outside the breeding and nesting season. A temporary action is completed prior to the following breeding season, leaving no permanent structures and resulting in no permanent habitat loss. A permanent action could

Notice	Description/Purpose
	continue for more than one breeding season and/or cause a loss of habitat or displace western yellow-billed cuckoos through disturbances. The following avoidance and minimization measures have been designed to ensure activities carried out on the lease are in compliance with the Endangered Species Act (ESA). Integration of and adherence to these measures will facilitate review and analysis of any submitted permits under the authority of this lease. Following these measures could reduce the scope of ESA, Section 7 consultation at the permit stage. Avoidance and minimization measures include the following: Habitat suitability within the parcel and/or within a 0.5-mile buffer of the parcel will be identified prior to lease development to identify potential survey needs. Habitat suitability should be determined in accordance with *Guidelines for the identification of suitable habitat for WYBCU in Utah.* Protocol Breeding Season Surveys will be required in suitable habitats prior to operations unless species occupancy and distribution information is complete and available. All Surveys must be conducted by permitted individual(s), and be conducted according to protocol. For all temporary actions that may impact cuckoo or suitable habitat: If action occurs entirely outside of the cuckoo breeding season (June 1 to August 31), and leaves no structure or habitat disturbance, action can proceed without a presence/absence survey. If action is proposed between June 1 to August 31, presence/absence surveys for cuckoo will be conducted prior to commencing activity. If cuckoo are detected, activity should be delayed until September 1. Eliminate access roads created by the project through such means as raking out scars, revegetation, gating access points, etc. For all permanent actions that may impact cuckoo or suitable habitat: Protocol level surveys by permitted individuals will be conducted prior to commencing activities. If cuckoos are detected, no activity will occur within 0.25-mile of occupied habitat. Avoid drilling and permanent structures within 0.25-mile of suitable habitat unless absence is determined according to protocol level survey conducted by permitted individual(s). Ensure noise levels at 0.25-mile from suitable habitat do not exceed baseline conditions. Placement of permanent noise-generating facilities should be determined by a noise analysis to ensure noise does not encroach upon the 0.25-mile buffer for suitable habitat. Temporary or permanent actions will require monitoring throughout the duration of the project to ensure that western yellow-billed cuckoo or its habitat is not affected in a manner or to an extent not previously considered. Avoidance and minimization measures will be evaluated throughout the duration of the project. Water produced as by-product of drilling or pumping will be managed to ensure maintenance or enhancement of riparian habitat. Where technically or economically feasible, use directional drilling or multiple wells from the same pad to reduce surface disturbance and eliminate drilling is suitable habitat. Ensure that such directional drilling does not intercept or degrade alluvial aquifers. Ensure that water extraction or disposal practices do not result in a change of hydrologic regime that would result in loss or degradation of riparian habitat Re-vegetate with native species all areas of surface disturbance within riparian areas and/or adjacent uplands.

Notice	Description/Purpose
	Additional measures to avoid or minimize effects to the species may be developed and implemented in consultation with the U.S. Fish and Wildlife Service between the lease sale stage and lease development stage to ensure continued compliance with the ESA.

Appendix D. Summary of the Typical Phases of Oil and Gas Development

Introduction

The phases of oil and gas development include construction, drilling operations, completion operations, hydraulic fracturing, and production. During the construction activity phase, the area is cleared of vegetation and the pad is constructed. Throughout the drilling operation phase, equipment is moved on-site and used to install the drill rig and other associated infrastructure. At this stage, the well is drilled. Well completion follows well drilling. Well completion includes setting the casing to depth, cementing the casing,[1] and perforating the casing in target zones. If a well is going to be drilled directionally,[2] horizontally,[3] or vertically[4] this phase may be followed by hydraulic fracturing which involves pumping fracturing fluid into a formation at a calculated, predetermined rate and pressure to generate fractures or cracks in the target formation. The production phase begins when the well starts producing. The well abandonment and reclamation phases occur after the productive life of the well has concluded. Well abandonment and reclamation involve plugging wells and reclaiming the surface according to BLM guidelines and requirements.

Construction Activities

First, new construction areas need to be cleared of all vegetation. Clearing of the proposed well pad and access road are typically limited to the smallest area possible to provide safe and efficient work areas for all phases of construction. All clearing activities are accomplished by cutting, mowing, and/or grading vegetation, as necessary. Cut vegetation may be mulched and spread on-site or hauled to a commercial waste disposal facility.

Next, heavy equipment, including but not limited to, bulldozers, graders, front-end loaders, and/or track hoes are used to construct the pad, along with other features, as needed for development. Other features may include, but are not limited to, an access road, reserve pit, pipeline, and/or fracturing pond. Cut and fills may be required to level the pad or road surfaces. Reserve pits, if authorized, are lined using an impermeable liner or other lining mechanism (i.e., bentonite or clay) to prevent fluids from leaching into the soil. Access roads may have cattle guards, gates, drainage control, or pull-outs installed, among a host of other features that may be necessary based on the site-specific situation. Long-term surface

[1] According to BLM regulations from 43 CFR 3160: Onshore Order No. 2, casing and cementing programs are conducted to protect and/or isolate all usable water zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. The casing setting depth is calculated to position the casing seat opposite a competent formation which will contain the maximum pressure to which it will be exposed during normal drilling operations. Determination of casing setting depth is based on all relevant factors, including presence/absence of hydrocarbons; fracture gradients; usable water zones; formation pressures; lost circulation zones; other minerals; or other unusual characteristics. Any isolating medium other than cement shall receive approval prior to use. The deepest casing may not be cemented and may remain open hole depending on the type of formation it is located in.

[2] Vertical drilling is the process of drilling a well from the surface vertically to a subsurface location where the target oil or gas reservoir is located (U.S. Department of Energy 2015).

[3] Horizontal drilling is the process of drilling a well from the surface to a subsurface location just above the target oil or gas reservoir called the "kickoff point," then deviating the well bore from the vertical plane around a curve to intersect the reservoir at the "entry point" with a near-horizontal inclination and remaining within the reservoir until the desired bottom hole location is reached (North Dakota Department of Mineral Resources 2008).

[4] Directional drilling is the process of controlling the direction and deviation of drilling a well from the surface to a subsurface location without disturbing the land directly above the target oil or gas reservoir (U.S. Department of Energy 2015).

disturbances such as pads and roads are typically surfaced with a layer of crushed rock. Areas not needed for long-term development are reclaimed by recontouring the surface and re-establishing vegetation.

A pipeline, if needed, is laid within a right-of-way that is first cleared of vegetation. A backhoe, or similar piece of equipment, digs a trench to a depth at least 36 inches below ground surface. After the trench is dug, the pipeline is assembled by welding pieces of pipe together to fit the contour of the pipeline's path. Once inspected, the pipe can be lowered into the trench and covered with stockpiled subsoil originally removed from the trench. Each pipeline undergoes hydrostatic testing prior to natural gas being pumped through the pipeline. This ensures the pipeline is strong enough and absent any leaks. Table D-1 includes some of the common wastes (hazardous and nonhazardous) that are produced during construction.

Drilling Operations

When construction of the well-pad is complete, the drilling rig and associated equipment are moved on-site and erected. Usually, a conventional rotary drill rig is used. The drill rig must be capable of withstanding all the anticipated conditions that may be encountered while drilling. Wells may be drilled directionally, horizontally, or vertically based on the target formation. The depth of the well is entirely dependent on the target formation depth and may be several hundred feet deep to over 20,000 feet deep.

When a conventional reserve pit [5]system is used, drilling fluid or mud is circulated through the drill pipe to the bottom of the hole, through the bit, up the bore of the well, and finally to the surface. When drilling mud emerges from the hole, it enters the reserve pit where it remains until all fluids are evaporated and the solids can be buried.

A closed-loop system operates in a similar fashion except that when the drilling mud emerges from the hole, it passes through equipment used to screen and remove drill cuttings (rock chips) and sand-sized solids rather than going into a pit. When the solids have been removed, the drilling mud is placed into holding tanks, and from the tank, used again.

In either situation the drilling mud is maintained at a specific weight and viscosity to cool the bit, seal off any porous zones (thereby protecting aquifers and preventing damage to producing zone productivity), control subsurface pressure, lubricate the drill string, clean the bottom of the hole, and bring the drill cuttings to the surface. Water-based or oil-based muds can be used. This choice is dependent on the site-specific conditions.

Once a well has been drilled, completion operations begin. Well completion involves setting casing to depth and perforating the casing in target zones.

Wells are often treated during completion to improve the recovery of hydrocarbons by increasing the rate and volume of hydrocarbons moving from the natural oil and gas reservoir into the wellbore. These processes are known as well-stimulation treatments, which create new fluid passageways in the producing formation or remove blockages within existing passageways. They include fracturing, acidizing, and other mechanical and chemical treatments often used in combination. The results from different treatments are additive and complement each other.

Hydraulic Fracturing

Hydraulic fracturing is a formation stimulation practice used to create additional permeability in a producing formation, thus allowing oil and/or gas to flow more readily toward and into the wellbore.

[5] A conventional reserve pit is a lined earthen pit excavated adjacent to a well pad and is commonly used for the disposal of drilling muds and fluids in gas or oil fields (USFWS 2009).

Hydraulic fracturing can be used to overcome natural barriers, such as naturally low permeability or reduced permeability resulting from near wellbore damage to the flow of fluids (gas or water) to the wellbore (Groundwater Protection Council 2017). The process has been a method for additional oil and gas recovery since the 1900s; however, with the advancement of technology, in both hydraulic fracturing and horizontal drilling, it is more commonly used than previous hydraulic fracturing and horizontal drilling technologies.

Hydraulic fracturing uses high pressure pumps to pump fracturing fluid into a formation at a calculated, predetermined rate and pressure to generate fractures or cracks in the target formation. For shale developments (within Mancos shale geologic formations, for example), fracture fluids are primarily water-based fluids mixed with additives that help the water to carry "proppants" into the fractures. Proppants, which may be made up of sand, walnut hulls, or other small particles, are needed to "prop" open the fractures once the pumping of fluids has stopped. Once the fracture has initiated, additional fluids are pumped into the wellbore to continue the development of the fracture and to carry the proppant deeper into the formation. Additional fluids are needed to maintain the downhole pressure necessary to accommodate the increasing length of opened fracture in the formation.

Hydraulic fracturing increases the flow rate and volume of reservoir fluids that move from the producing formation into the wellbore. The fracturing fluid is typically more than 99% water and sand, with small amounts of readily available chemical additives used to control the chemical and mechanical properties of the water and sand mixture. Because the fluid is composed mostly of water, large volumes of water are usually needed to perform hydraulic fracturing but depends on the area being fractured. However, in some cases, water is recycled or produced water is used.

The predominant fluids currently being used for fracture treatments in the shale gas plays are water-based fracturing fluids mixed with friction-reducing additives, also known as slick water (Groundwater Protection Council 2017). The number of chemical additives used in a typical fracture treatment varies depending on the conditions of the specific well that is to be fractured. A typical fracture treatment uses very low concentrations of between three and 12 additive chemicals, depending on the characteristics of the water and the shale formation being fractured. Each component serves a specific, engineered purpose, from limiting the growth of bacteria to preventing corrosion of the well casing. The makeup of fracturing fluid varies from one geologic basin or formation to another. Because the makeup of each fracturing fluid varies to meet the specific needs of each area, there is no one-size-fits-all formula for the volumes for each additive. In classifying fracture fluids and their additives, it is important to realize that service companies that provide these additives have developed a number of compounds with similar functional properties to be used for the same purpose in different well environments. The difference between additive formulations may be as small as a change in concentration of a specific compound (Groundwater Protection Council 2017).

Before operators or service companies perform a hydraulic fracturing treatment, a series of tests are performed. These tests are designed to ensure that the well, including casing and cement, well equipment, and fracturing equipment are in proper working order and would safely withstand the application of the fracture treatment pressures and pump flow rates.

Hydraulic fracturing of horizontal shale gas wells is commonly performed in stages. Lateral lengths in horizontal wells for development may range from 1,000 feet to more than 5,000 feet. Depending on the lengths of the laterals, treatment of wells may be performed by isolating smaller portions of the lateral. The fracturing of each portion of the lateral wellbore is called a stage. Stages are fractured sequentially beginning with the section at the farthest end of the wellbore, moving up hole as each stage of the treatment is completed until the entire lateral well has been stimulated. During drilling, the BLM is on location during the casing and cementing of the surface casing, which is often the string of casing that

protects groundwater, along with other critical casing and cementing intervals. Before hydraulic fracturing takes place, all surface casing and some deeper, intermediate zones are required to be cemented from the bottom of the cased hole to the surface. The cemented well is pressure tested to ensure there are no leaks and in some cases a cement bond log is run to ensure the cement has bonded to the casing and the formation. If the fracturing of the well is considered to be a "non-routine" fracturing job for the area, the BLM would always be on-site during those operations as well as when abnormal conditions develop during the drilling or completion of a well.

Some soils and geologic formations contain low levels of radioactive material. This naturally occurring radioactive material (NORM) emits low levels of radiation, to which everyone is exposed on a daily basis. When NORM is associated with oil and natural gas production, it begins as small amounts of uranium and thorium within the rock. These elements, along with some of their decay elements, notably Radium-226 and Radium-228, can be brought to the surface in drill cuttings and produced water. Radon-222, a gaseous decay element of radium, can come to the surface along with shale gas. When NORM is brought to the surface, it remains in the rock pieces of the drill cuttings, remains in solution with produced water, or, under certain conditions, precipitates out in scales or sludges. The radiation is weak and cannot penetrate dense materials such as the steel used in pipes and tanks. The EPA has found that Utah has very low levels of NORM associated with oil and gas production waste (EPA 2023).

Production Operations

Production equipment used during the life of the well may include a three-phase separator-dehydrator, flowlines, a meter run, tanks for condensate, produced oil and water, and heater treater. A pumpjack may be required if the back pressure of the well is too high. Production facilities are arranged to facilitate safety and maximize reclamation opportunities. All permanent aboveground structures not subject to safety considerations are painted a standard BLM environmental color or as landowner specified.

Workovers may be performed multiple times over the life of the well. Because oil and gas production usually declines over the years, operators perform workover operations, which involve cleaning, repairing, and maintaining the well for the purposes of increasing or restoring production.

Abandonment and Reclamation

Well abandonment (whether dry hole or depleted producer) and reclamation of location, access road, and other facilities requires BLM approval. After approval, wellbores are plugged with cement as necessary to prevent fluid or pressure mitigation and to protect and isolate mineral and water resources. Wellheads are removed, and both the surface casing and the production casing are cut off below ground in compliance with federal and state regulations. The well pad, reserve pit and access are reclaimed according to BLM guidelines. This may include backfilling the pit, recontouring the surface to blend with natural surroundings and redistributing topsoil. All surfaces are then reseeded per BLM and state requirements specified in the Application for Permit to Drill (APD) approval.

Common Wastes

Table D-1 includes some of the common wastes (hazardous and nonhazardous) that are produced during oil and gas development.

Table D-1. Common Wastes Produced during Oil and Gas Development

Phase	Waste	
Construction, well drilling and completion (including hydraulic fracturing)	Domestic wastes (i.e., food scraps, paper, etc.)	
	Excess construction materials	Woody debris
	Used lubricating oils	Paints
	Solvents	Sewage
	Drilling muds, including additives (i.e., chromate and barite) and cuttings; Well drilling, completion, workover, and stimulation fluids (i.e., oil derivatives such as polycyclic aromatic hydrocarbons (PAHs), spilled chemicals, suspended and dissolved solids, phenols, cadmium, chromium, copper, lead, mercury, nickel)	
	Equipment, power unit and transport maintenance wastes (i.e., batteries; used filters, lubricants, oil, tires, hoses, hydraulic fluids; paints; solvents)	
	Fuel and chemical storage drums and containers	
	Cementing wastes	Rig wash
	Production testing wastes	Excess drilling chemicals
	Excess construction materials	Processed water
	Scrap metal	Contaminated soil including hazardous and non-hazardous materials (potential)
	Sewage	Domestic wastes
Production	Power unit and transport maintenance wastes (i.e., batteries; used filters, lubricants, filters, tires, hoses, coolants, antifreeze; paints; solvents, used parts)	
	Discharged produced water	
	Production chemicals	
	Workover wastes (e.g., brines)	
Abandonment / reclamation	Construction materials	
	Decommissioned equipment	
	Contaminated soil (potential)	
	Equipment or wastes that could contain hazardous and nonhazardous materials	

References Cited in Appendix D

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Appendix E. Public Comments and BLM's Responses

As detailed in Table E-1 below, the BLM assigned unique codes for all individuals, entities, and organizations who submitted comments during the comment period. The BLM evaluated all comments received and parsed them into substantive or nonsubstantive comments according to the BLM's NEPA Handbook (BLM 2008d:66). The agency then identified resource/topic areas for each of the substantive comments. The commenter codes and resource/topic areas are used in Table E-1 for responding to all substantive comments. Substantive comments are contained in Table E-2 and are representative of topics raised; single responses are provided for similarly stated comments.

Substantive comments meet the following criteria:

1. Question, with reasonable basis, the accuracy of the information in the analysis;
2. Question, with reasonable basis, the adequacy of, methodology for, or assumptions used for the analysis;
3. Present new information relevant to the analysis;
4. Present reasonable alternatives other than those analyzed; or
5. Cause changes or revisions in one or more of the alternatives.

Nonsubstantive comments generally:

1. Express opposition to or support for the proposed action or alternatives or agree or disagree with BLM policy or resource decisions without reasoning, justification, or supporting data;
2. Did not pertain to the project area or the project; or,
3. Took the form of vague or open-ended questions and did not warrant a specific response.

Similarly, comments that merely cited other comments or sources without providing reasoning or additional explanation were considered nonsubstantive.

The BLM received the following nonsubstantive comments during the comment period on the EA:

- Commenters expressed general opposition to the development and leasing and its impacts on climate change and public lands.
- They also expressed a preference for renewable energy developments and designating more conservation areas. They reference other out-of-scope BLM rulemaking efforts and requested the end of leasing for fossil fuel development in general.

The BLM classified these as nonsubstantive based on the following criteria:

- Support of or opposition to certain alternatives or favoring one alternative over another.
- Support of or opposition to the lease sale generally or the sale of specific parcels.
- Opposition to BLM Oil and Gas Leasing Program policies, BLM climate change policies, implementation of various Executive Orders, and/or BLM management generally.
- Various vague and open-ended statements regarding oil and gas leasing, renewable energy development, and the oil and gas industry.

While the BLM does not provide specific responses to each of these comments because they do not meet the criteria for being substantive, the agency thanks these commenters for their feedback. The BLM

received a total of 17 comment letters containing 69 individual comments;[1] six of those comment letters contained 50 individual comments that were substantive. Substantive comments were grouped and summarized in Table E-2.

[1] While the BLM received a total of 17 comment letters, each letter may contain multiple comments. Therefore, the number of comments received is often higher than the number of letters submitted.

Table E-1. Public Submissions with Assigned Commenter Codes and Resource/Topic Areas

Name	Organization	Commenter Code	Resource/Topic Area
Chris Ramias	N/A	1-500344198	Recreation
Harry Tipton	NTEC Helium, LLC	1-500349660	Additional Information; Other Relevant Plans; AIB; APD; RFDS
Judy Ostendorf	EPA	1-500349683	Air Quality, RFDS, Water Resources
Sindy Smith	State of Utah, Public Lands Policy Coordinating Office	1-500349730	Other Relevant Plans
Landon Newell	SUWA	1-500349731	AIB; APD; Consultation; MLP; RFDS; Settlement Agreement; Water Resources; Wilderness; Wildlife
Kimberly Hartwig	NPS	EMAIL-1	Water resources; geology; air quality.

Table E-2. Comment Summary and BLM Responses

Letter Number	Resource/ Topic	Comment	Addressed in the EA, Section	Comment Response
1-500349660	Additional Information	The commenter believes BLM's assessment of the area's helium potential is out of date and submitted the following reports for the BLM's review and incorporation into the Final EA: • *Analysis of Natural Gases, 2002 – 2004*. BLM Technical Note 418 (Gage and Driskill 2005) • *Helium Resources of the United States – 2007*. BLM Technical Note 429 (Pacheco and Ali 2008) • *National Assessment of Helium Resources Within Known Natural Gas Reservoirs* Scientific Investigations Report 2021–5085 (Brennan et al. 2021) • *Proven and hypothetical helium resources in Utah: Utah Geological Survey* Miscellaneous Publication 174 (Wiseman and Eckels 2020)	3.1.1; AIB-13	The BLM appreciates these comments and has reviewed the newer helium reference material provided. Applicable information from these references was incorporated into the Final EA.
1-500349660	Helium	Helium was not analyzed in the mineral and energy section of the EA (AIB-13). Additionally, the BLM has received three APDs for helium development.	AIB-13	Additional discussion of helium potential was added to AIB-13 and Section 3.2 of the EA.
1-500349731	AIB	The AIB section rationale is inadequate, particularly because the AIB sections do not contain any cumulative impacts analysis and the commenter feels that this approach violates NEPA. The BLM must correct these deficiencies by analyzing all reasonably foreseeable direct, indirect, and cumulative impacts now, at the leasing stage. Additionally, BLM did not analyze the direct, indirect, and cumulative impacts of leasing to cultural, paleontological, riparian, soils,	AIB-1–AIB-18	As noted in the EA, 18 issues were identified, considered, and eliminated from detailed analysis. However, these issues were analyzed in brief (AIB) in Section 3.2, subsections AIB-1 through AIB-18. The reasons for eliminating the issues from detailed analysis vary; typically, stipulations and lease notices would avoid, minimize, or mitigate adverse impacts. The AIB subsections include a concise discussion regarding the affected area and degree of effects of the impact related to each issue. The subsections provide background for

Letter Number	Resource/ Topic	Comment	Addressed in the EA, Section	Comment Response
		water, vegetation, wildlife, special status plant and wildlife species, or special designations.		not analyzing the issue in detail. Analysis of cumulative impacts associated with the issues analyzed in brief is not required because they are not related to a significant (or potentially significant) impact. See Section 6.4.1 of the BLM NEPA Handbook (BLM 2008d). By contrast, resources and issues analyzed in detail include an analysis of cumulative impacts. Additionally, analysis of each alternative considers the RFDS and potential changes in impacts based on the alternative selected.
1-500349731	AIB	The commenter believes the BLM did not analyze all the resources referred to in the settlement agreement under the NEPA hard look mandate and unlawfully deferred NEPA analysis to the APD stage.	AIB-1–AIB-18	The settlement agreement requires this EA to "include an assessment" of various resources. The BLM assessed each of the enumerated resources and considered them in varying degrees of detail, as appropriate, based on the potential impacts to a given resource. See Section 3.2 and Section 3.3 of the EA. The BLM has complied with both the settlement agreement and NEPA.
1-500349683	Air Quality	To understand what the maximum and average year emission estimates represent, suggest the following revisions: • Present a table that depicts the emissions per well by phase (construction/development and production) and per well emission factors for oil and gas wells as well as helium wells. • Present a table that depicts the total emissions for the RFD by alternative. • Include in the table of maximum and average year emissions the assumed number of wells drilled as well as the number of producing wells associated with the RFD for each alternative.	3.3.1	The BLM revised the Air Quality section of the EA and added Appendix G to include more information about emissions per well by phase, total emissions for the RFD, and the assumed number of wells associated with the RFDS for each alternative, based on available information.

Letter Number	Resource/ Topic	Comment	Addressed in the EA, Section	Comment Response
1-500349683	Air Quality	EPA also supports the Lease Notices for air resources noted on page 3-35, which include potential mitigation measures and may require additional analyses. Clarify if UT-LN-96 is applicable since this notice is not identified for individual parcels, and none of the three notices (UT-LN-96, UT-LN-102, UT-LN-99) are found in Appendix C (which only includes stipulation UT-S-01). Apply UT-LN-96 to all parcels and expand it to identify that Tier IV engines may be necessary for drilling and hydraulic fracturing pump engines to avoid unnecessary impacts to air quality. Additionally, near-field dispersion modeling should be conducted prior to approval of APDs to demonstrate that Tier IV equipment is not needed to avoid exceedances of the NAAQS.	3.3.2; Appendix C	The EA was revised to clarify whether UT-LN-96 is applicable and, if so, to which parcels. The BLM also reviewed Appendix C to include UT-LN-96, UT-LN-99, and UT-LN-102. Regarding EPA's comment to potentially require Tier IV engines, EPA regulations allow for the use of less than Tier IV engines that were manufactured before 2014. If the air quality analysis at the APD stage indicates that less than Tier IV engines may cause a significant air quality impact, then the BLM may require emissions control measures, potentially including Tier IV engines, as a condition of approval. UT-LN-102 already provides notice to an operator that additional air quality analysis and control measures may be required before project-specific approval is given. Because UT-LN-102 provides notice of possible air quality control measures, there is no need to expand UT-LN-96.
EMAIL-1	Air Quality	The NPS raised concerns about the potential for dust emissions to influence streamflow and other hydrologic processes and requested a Fugitive Dust Control Plan be required for any mineral activities that would disturb a surface area larger than 0.25 acre or that would involve truck traffic on unpaved or untreated surfaces.	3.3.1	The BLM will consider further consultation with the NPS at the APD stage if air quality analysis indicates potential impacts to Class I areas managed by the NPS. Dust emissions are regulated by State of Utah Administrative Code R307-309 and R307-205. These rules only require a Fugitive Dust Control Plan for new sources of fugitive dust one-quarter acre or greater that are located in a PM_{10} or $PM_{2.5}$ nonattainment or maintenance areas. The project location is in attainment. The BLM relies on state air quality regulations to ensure there are no significant impacts due to fugitive dust emissions. This information was added to Section 3.3.1.
1-500349683; 1-500349731	APD	The commenter recommends completing as much site-specific analysis of reasonably foreseeable development as is feasible at this stage, and committing at this stage (via, e.g., attaching notices to any offered leases) to requirements for	Section 3.2; AIB-1–AIB-18	Impacts from reasonably foreseeable future development as outlined in Section 3.1.1 are analyzed in Sections 3.2 and 3.3 based on best available information. When a lease holder submits an APD and prior to drilling, additional site-specific NEPA review of individual well

Letter Number	Resource/ Topic	Comment	Addressed in the EA, Section	Comment Response
		reasonable mitigation measures that can be predicted at this stage as potentially warranted. They also recommend providing a public comment period at the APD phase. Do not defer analysis of reasonably foreseeable impacts to the APD stage because at that point the 'No Action Alternative' is no longer on the table with respect to the non-NSO leases. This is particularly true where the BLM has deferred analysis based on its contention that certain lease stipulations, notices, and BMPs will be adopted if/when development is proposed on the leases.		sites, roads, and associated infrastructure would occur. During this time, the BLM has authority, according to the standard terms and conditions of the leases, to attach COAs to the APD that reduce or avoid impacts to public land, resources, and/or resource values. When and if an APD is submitted for a lease, the BLM would adhere to numerous IMs (as revised through the life of an active lease), including specific instructions for bonding and other laws (such as the NHPA, ESA, etc.). Management provisions would adhere to Gold Book BMPs (BLM and USFS 2007).
1-500349731	ESA Sec. 7 Consultation	BLM must consult with the USFWS and prepare a biological assessment to determine whether species or designated critical habitat may be affected by the proposed action and that the re-evaluation of the September and December 2018 lease sales is an agency action under the ESA. BLM should not defer Section 7 consultation to the APD stage because incomplete information about post-leasing activities does not excuse the failure to comply with the statutory requirement of a comprehensive biological opinion using the best information available. The ESA does not contemplate allowing BLM to rely on an already existing programmatic biological opinion in order to satisfy its Section 7 consultation obligations. The PFO Biological Opinion, which was specifically issued to support the Price RMP, did not "conduct independent analysis of site-specific data." Rather the PFO Biological Opinion considers, at a field office-wide level, the general impacts of oil and gas leasing on listed species within the planning area. Therefore,	Section 4.1	The Department of the Interior has long held that the Mineral Leasing Act allows the use of a segmented decision-making process for Section 7 consultation. Additionally, USFWS regulations do not prevent evaluating on-shore mineral leasing activities through incremental-step consultation (USFWS and National Marine Fisheries Service 1998). As noted in Chapter 4 of the EA, the BLM coordinated with USFWS on species by species findings and reinitiated consultation for species not previously covered under the BO for the RMP. Additionally, the BLM will analyze future proposals associated with leases under additional site-specific NEPA consultation and may apply any additional requirements as necessary to protect designated species and their habitat within the vicinity of the leases at the APD stage. The BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. The BLM will not approve any ground-disturbing activity until it completes its

Letter Number	Resource/ Topic	Comment	Addressed in the EA, Section	Comment Response
		the PFO Biological Opinion alone cannot satisfy BLM's consultation duties.		obligations under applicable requirements of the ESA, including completion of any required procedure for conference or consultation.
EMAIL-1	Geology	The NPS raised concerns about the potential for earthquakes that could result from operations performed during hydraulic fracturing or injection of produced water. The NPS recommended the BLM evaluate the effects of fluid injection on the geologic formations and the susceptibility of those formations to earthquakes caused by fluid injections.	AIB-7 and AIB-13	The BLM reviewed the geology and the effects of hydraulic fracturing on seismicity and determined that injection zones in Utah are located stratigraphically thousands of feet above basement rock. Due to this, and other factors relating to Utah geology, induced seismicity is not considered a problem in Utah oil fields.
1-500349731	MLP	The commenter does not agree with BLM's conclusion that pre-leasing NEPA analysis is beyond the scope of the proposed action. The BLM's reversal of the MLP policy meets the "relatively low" threshold standard for a NEPA triggering event and the agency failed to prepare any NEPA analysis prior to making that decision. The BLM offered these leases without first finalizing the "required" pre-leasing NEPA analysis and issued the leases subject to the outdated leasing stipulations and categories the BLM had previously explained during the MLP process failed to protect resource values in the San Rafael Desert. BLM must provide a reasoned explanation for how/why the agency's prior years-long position regarding the need for pre-leasing NEPA analysis for the San Rafael Desert was/is no longer accurate or relevant.	1.1	The BLM notes the comment concerning the San Rafael Desert MLP and also notes that the MLP was not finalized (BLM 2018). As stated in the EA, the purpose of this EA is to decide whether to affirm the BLM's 2018 leasing decisions for the 59 leases, cancel these leasing decisions (or a portion therein), or amend and affirm the leases with revised terms. The directives established under BLM Instruction Memoranda Nos. 2023-07 and 2023-010 apply to evaluation of parcels prior to a lease sale. This EA analyzes the action of affirming or canceling leases that were previously sold. The BLM does not always need to conduct "pre-leasing NEPA" analysis to determine if an area requires new stipulations prior to leasing. By conducting site-specific analysis in the context of an EA, the BLM can determine if the existing stipulations are adequate to protect the resources at issue. If the BLM determines that the existing stipulations are not adequate, it can complete an RMP amendment to create new stipulations or close an area to new leasing. The BLM is not precluded from determining whether an RMP amendment may be necessary to adjust resource allocations.

Letter Number	Resource/ Topic	Comment	Addressed in the EA, Section	Comment Response
				The BLM's decision not to prepare an MLP for the San Rafael Desert is not a major federal action requiring NEPA. The commenter appears to suggest that abandoning the MLP (which never went beyond an internal draft) "reopened" acreage to oil and gas development and, therefore, changed the status quo. However, that is not the case as these 59 lease parcels, since at least 2008, have remained open for oil and gas development in accordance with the relevant RMP. Therefore, the BLM has not changed position on the status of these lands. In addition, IM 2018-34 explains why the BLM determined MLPs would no longer to be developed, finding that the process created duplicative layers of NEPA review. See IM 2018-34 (superseding IM 2010-117). Consistent with case law, the BLM acknowledged its change in position regarding the preparation of an MLP, and the BLM explained why it was departing from this previous practice (duplicative NEPA review). Id. Given that the BLM never released a draft MLP to the public and that nothing in FLPMA or any other statute or regulation requires the BLM to prepare MLPs, the BLM's explanation is sufficient.
1-500349730	Other Relevant Plans	Commenters requested that the BLM review several state and county plans for consistency. These plans included the Utah State RMP (SRMP), Utah county resource management plans (CRMPs), Emery CRMP, *Utah Wildlife Action Plan*, *Utah Pronghorn Statewide Management Plan*, and the Utah Division of Wildlife Resources' (DWR) *2023 Strategic Plan*.	1.5.1; AIB-11	The BLM reviewed and considered the proposed action for consistency with the State RMP and the Emery CRMP. As noted in comments, specific portions of the Emery CRMP the BLM considered include Section 6.2 (Public Lands/Federal and State Agencies); Section 8.7 (Mineral and Energy Resource Extraction); Section 8.8 (Multiple-Use); Section 8.9 (Action/Implementation Steps (Policies & Guidance); Section 9.8 (Mining and Mineral Resources); Section 9.11 (Special Designation Lands); Section 9.11.4.1 (Adjacent Private Lands and Land Management); and Section 9.11.4.6 (Mineral Rights and Claims). As applicable, the findings and policies

Letter Number	Resource/ Topic	Comment	Addressed in the EA, Section	Comment Response
				described in the above sections of the Emery CRMP have been included in either Section 1.5.1 (Other Plans) of the EA and/or in the applicable resource sections in Chapter 3. Similarly, the BLM considered and evaluated the State RMP policies regarding support for traditional energy development and updated Section 1.5.1 (Other Plans) of the EA accordingly. Additionally, BLM reviewed the *Utah Wildlife Action Plan*, *Utah Pronghorn Statewide Management Plan*, and UDWR's Strategic Plan for appropriate incorporation into AIB-11.
1-500349660	Other Relevant Plans	NTEC's comments suggested reviewing and incorporating the Helium Act of 1950, the Helium Stewardship Act of 2013, and the helium-related amendment to the Mineral Leasing Act of 1920 made by the Dingell Act, Section 1109.	1.5.1	The BLM reviewed the suggested acts and added the Helium Act of 1925, the Helium Stewardship Act of 2013, and Section 1109 of the Dingell Act, amending Mineral Leasing Act to the Section 1.5 in the EA, as applicable.
1-500349731	Previous Policies	Previous leasing decisions under reconsideration were made by the prior administration's policy, and because that policy is no longer in effect, the BLM should make a decision to reaffirm leases under the BLM's current policies and directives under the Biden administration. BLM must apply the leasing preference criteria from IM 2023-007, Evaluating Competitive Oil and Gas Lease Sale Parcels for Future Lease Sales, to the leases being re-evaluated in this EA.	1.5	The directives established under BLM Instruction Memoranda Nos. 2023-07 and 2023-010 apply to evaluation of parcels prior to a lease sale. Since the BLM is not initiating a new lease sale based on expressions of interest but is reevaluating lease parcels that have already been issued, these policies are not applicable.
1-500344198	Recreation	The commenter noted that the leases in dispute in this case are located very proximate to popular recreation areas like Labyrinth Canyon and the San Rafael Reef. They stated that development in this area would negatively impact recreationalists as well as local businesses built off tourism in the area. The commenter requested that the BLM	Section 1.5; 3.3.9	The BLM appreciates the suggestion to consider the Emery County Public Land Management Act, noting that aspects of this act were incorporated into Part II of the John D. Dingell Jr. Conservation, Management, and Recreation Act. The BLM reviewed the act for applicability to the EA, adding information about the San

Letter Number	Resource/ Topic	Comment	Addressed in the EA, Section	Comment Response
		should reevaluate the leases in accordance to their multiple-use mandate (TRUE multi-use, not skewing in favor of extractive industries). Since the time these leases were issues, Congress passed the Emery County Public Land Management Act, which evaluates the importance of recreation and conservation use of this region, while this bill did not explicitly address the area within the leased boundaries, it does provide a land management direction for the overall region that should be considered in the re-evaluation of these leases.		Rafael Swell Recreation Area and proximity to the leasing area.
1-500349683	RFDS	The commenter expressed concerns about Alternative A's development potential for 59 lease parcels. They believe that without more information, this alternative lacks a reasonable estimation of development. It proposes that if only 10 out of 59 parcels are needed to meet the RFDS, there may be no need to lease parcels with wilderness characteristics or those in the Wilderness area. They recommend that the RFDS be crafted such that if a parcel is leased the assumed number of wells be sufficient to extract mineral resources from that lease. They also recommend the RFDS reflect a difference in the number of wells based on available acreage, which would result in a reduction in the number of wells projected for Alternative B relative to Alternative A. Without a reasonable upper estimate of wells for the Alternative A RFDS, the resulting impacts of both alternatives appear to be the same, which is misleading. The EPA recommend the RFDS be used to analyze the potential cumulative impacts to the environment resulting from that development.	3.2; AIB-10	The BLM has reviewed and clarified the RFDS in the EA, as applicable, including showing a difference in the number of wells based on available acreages projected for Alternative B relative to Alternative A. Additionally, the BLM notes that analysis of each alternative considers the RFDS and potential changes in impacts based on the alternative selected. The BLM revised the cumulative analysis performed for all analyzed in detail resources to add additional clarification regarding the RFDS as applicable.

Letter Number	Resource/ Topic	Comment	Addressed in the EA, Section	Comment Response
1-500349731	RFDS	The commenter requested that the EA consider water use in the RFDS and update the water resources analysis to include this information, including how much water would be used to drill the 30 reasonably foreseeable wells predicted in the San Rafael Desert MLP; how much water would be used to develop the eight wells anticipated on the 59 lease parcels; and the cumulative impacts of water use.	3.2; AIB-10	The BLM has added additional analysis regarding water resources and moved the water resources issue from analyzed in brief to analyzed in detail. The BLM reviewed available data to quantify water use for the RFDS prepared for this EA, which contemplates eight potential wells developed in the leasing area.
1-500349731	RFDS	The commenter states that the September 2018 EA predicted 11 wells would be drilled, not eight as stated in the current RFDS. The BLM provides no explanation for why the RFDS is now different.	3.2	Both the 2018 RFDS and the RFDS for this EA are based on the 30 wells predicted in the RFDS for the MLP. The 11 well RFDS calculated for the September 2018 EA was for 96 parcels and leases being analyzed in that EA (approximately 38% of the MLP area.) The 8 well RFDS calculated for this EA is for 59 leases (approximately 28% of the MLP area.)
1-500349660	RFDS	The RFDS fail to consider the development plans of NTEC Helium.	3.2	The RFDS is a tool to estimate the reasonably foreseeable development of oil and gas wells and was calculated from previous analyses and estimates of oil and gas development. Section 3.1.1.1, RFDS Assumption for Analysis in this EA, notes that the BLM has received APD packages on three leases for helium production and that of the eight wells identified in the RFDS, three are assumed to be helium. Even if all eight wells are developed for helium, that does not change the RFDS.
1-500349731	Settlement Agreement	The EA does not satisfy the requirement to "consider whether a resource management plan (RMP) amendment is necessary or appropriate to adjust leasing categories or to add or modify lease stipulations." The EA does not remedy the concerns raised in *SUWA v. Haaland*. The commentor incorporated their previous comments from the September EA	1.1	As stated in the EA, based on the analysis in this EA, the BLM will decide whether to affirm the BLM's 2018 decisions to lease the remaining 59 leases, cancel these leasing decisions (or a portion therein), or amend and affirm the leases with revised terms. While the purpose of this EA is not to complete an RMP amendment, the decision maker will consider, based on the impacts analyzed in this EA, whether it is necessary for the BLM to undertake an RMP amendment to adjust leasing

Letter Number	Resource/ Topic	Comment	Addressed in the EA, Section	Comment Response
		and December DNA in their entirety as part of their response to the Reevaluation EA.		categories or to add or modify stipulations in order to protect resources. This comment is premature because the BLM will consider an RMP amendment after completion of this EA.
1-500349683;	Water Resources	The EPA is concerned that the RMP only protects perennial and intermittent streams, and not ephemeral streams, which are important for movement of water and nutrients, connectivity, and protection of downstream water quality. They recommend evaluating the potential effects to those water resources (as well as downstream surface waters) that could result from oil and gas development or committing in the Final EA to requiring conditions of approval (COAs) protecting these resources at the APD phase of development.	3.3.11	The BLM appreciates the EPA's comments about ephemeral streams and has included additional information, as available, regarding ephemeral streams and sole-source aquifers in the EA. Additionally, COAs are included at the time an APD is approved by the BLM. The BLM appreciates and will consider the EPA's suggestions of additional COAs to protect water resources. As noted in the EA, stipulations and lease notices are attached to appropriate leases based on preliminary analysis performed by the BLM. COAs and other protections may be added as needed pending APD approval.
1-500349683	Water Resources	EPA also suggested reviewing whether any sole-source aquifers are located within the field office and avoiding leasing over the footprint of the aquifer.	3.3.11	The BLM reviewed the leases for proximity to a sole-source aquifer and updated the EA accordingly.
1-500349731	Water Resources	SUWA raised concerns that the EA did not discuss or consider the effect of water use on the environment; water quantity impacts (including those anticipated from the RFDS); or groundwater availability and quality. SUWA also suggested that a sufficiently hard look at impacts would consider how water use from lease development impacts lands, forests, wildlife, livestock, or human communities, or how these impacts would be compounded by areas experiencing drought.	3.3.11	The BLM has added analysis regarding water resources (including groundwater) and the associated impacts. The water resources issue is now analyzed in detail in the EA.

Letter Number	Resource/ Topic	Comment	Addressed in the EA, Section	Comment Response
EMAIL-1	Water Resources	NPS raised concerns that hydraulic fracturing associated with oil and gas production has the potential to introduce contaminants into groundwater systems and requested the BLM to consult with the USGS or Utah Geological Survey regarding the effects of hydraulic fracturing in the area.	3.3.11	The BLM discusses the phases of oil and gas development in Appendix D of the EA. BLM will ensure the protection of groundwater resources through casing and cementing to protect groundwater resources prior to hydraulic fracturing (Appendix D). BLM understands that consumption and depletion of groundwater and surface water resources occur throughout the phases of oil and gas development. RFDs have analyzed possible ranges of depletion and use that may occur, which is highly variable and site specific. The BLM requires that water resources for production originate from a source with a valid existing water right and all surface water and connected groundwater depletions within Colorado River Basin watersheds are subject to the Colorado River Endangered Fish Recovery Program. This has been added to the EA Section 3.3.11. As the lead agency on this EA, the BLM recognizes the expertise of other agencies such as the USGS but does not feel consultation at this stage is required. However, two USGS reports, *Bedrock Aquifers in the Northern San Rafael Swell Area, Utah, with Special Emphasis on Navajo Sandstone* (USGS 1984), and *Geohydrology of Mesozoic Rocks in the Upper Colorado River Basin in Arizona, Colorado, New Mexico, Utah, and Wyoming, Excluding the San Juan Basin* (USGS 1991), were carefully reviewed and incorporated into this EA as appropriate.
1-500349731	Wilderness	Regardless of which alternative the BLM eventually selects in the forthcoming DR, at a bare minimum, the BLM must cancel lease UTU-93713 because this lease is fully encompassed by the Labyrinth Canyon Wilderness.	3.3.5	This lease was issued on February 8, 2019, prior to the wilderness designation, and as such, qualifies as a valid existing right under the provisions of the Wilderness Act.

Letter Number	Resource/ Topic	Comment	Addressed in the EA, Section	Comment Response
1-500349731	Wildlife	The commenter noted that the BLM failed to take a hard look at impacts to wildlife and raised specific concerns with the BLM's consideration of pronghorn antelope (*Antilocapra americana*), and that the BLM's calculation of disturbed pronghorn habitat is inaccurate.	AIB-11	The BLM reevaluated potential habitat for wildlife in the leasing area, including for pronghorn. This updated information has been included in the Final EA.

Appendix F. Best Management Practices

Introduction

BMPs are measures applied on a site-specific basis to reduce or eliminate adverse impacts. For each proposed action, a number of BMPs may be applied to mitigate anticipated impacts. BMPs can be voluntarily incorporated by project proponents into individual proposals as design features or added by the BLM to authorizations as conditions of approval.

BMPs should be selected based on the site-specific requirements of the project and local environment. No one management practice is best suited to every site or situation. BMPs must be adaptive and monitored regularly to evaluate effectiveness. BMPs, by their very nature, are dynamic innovations and must be flexible enough to respond to new data, field research, technological advances, and market conditions.

The BLM continues to improve the way it manages oil and gas development on public lands. Part of that improvement includes the use of BMPs to lessen the effects of oil and gas development on the environment. The oil and gas industry and the BLM are constantly developing and improving BMPs.

The BMPs listed below may be applied to proposed oil and gas activities under Alternatives B, C, and D. The list is not comprehensive and may be modified over time as conditions change and new practices are identified. Periodically, the BMPs may be updated to stay current with the latest technology and with the latest direction from the Department of the Interior and the BLM.

Construction and Operation

- Well site locations should be planned in order to minimize long-term disruption of the surface resources and existing uses, and to promote successful reclamation.
- Existing roads will be used to the extent possible. All new roads and upgrades of existing roads will be designed to a safe and appropriate standard "no higher than necessary" to accommodate intended vehicular use and to reduce impacts to natural resources.
- No construction or routine maintenance activities shall be performed during periods when the soil is too wet to adequately support construction equipment. If such equipment creates ruts in excess of 4 inches deep, the soil shall be deemed too wet to adequately support construction equipment.
- Drainage from disturbed areas will be confined or directed so as to not cause erosion in undisturbed areas.
- Construction of access roads on steep hillsides and near water courses will be avoided where alternate routes provide adequate access.
- Access roads requiring construction with cut and fill will be designed to minimize surface disturbance and will take into account the character of the landform, natural contours, cut material, depth of cut, where the fill material will be deposited, resource concerns, and visual contrast. Roads will follow the contour of the land where practical.
- Fill material will not be cast over hilltops or into drainages. Cut slope ratios should normally be no steeper than 3:1, and fill slopes no steeper than 2:1.
- Low water-crossings will be used whenever possible.

- Placement of facilities on hilltops and ridgelines will be avoided. Well site layout should take into account the topography and landform. Deep, vertical cuts and steep, long fill slopes should be avoided. All cut and fill slopes should be constructed to the least percent slope practical.
- Trash will be retained in portable trash containers and hauled to an authorized disposal site. Burning of trash will not be allowed on the site.
- Cattle guards will be installed and maintained whenever access roads go through pasture gates or fences. Maintenance includes cleaning out under cattle guard bases when needed.
- All pits and open cellars shall be fenced in accordance with BLM specifications.
- In coordination with the BLM and Emery or Wayne Counties, operators shall maintain existing roads in a safe, usable condition. Maintenance shall include, but is not limited to, grading, ditching, installing low water crossings, and, if needed, surfacing the road with aggregate.
- Stockpile all brush, limbs, crushed stumps, and other woody material separately from topsoil. Use the stripped vegetation for interim reclamation.
- Repair/replace fences as necessary in order to prevent cattle access to project facilities. Fences will be constructed around reserve pits to prevent wildlife entry.
- Construct a berm of sufficient capacity to contain the storage capacity of the largest tank plus sufficient freeboard to contain 150% of the volume of the largest tank to surround the tank battery.
- Apply mat drilling techniques to accelerate and enhance reclamation by decreasing soil and vegetation disturbance, especially in areas where erosive soils are present.
- Locate well pads, associated facilities, and utilities in the least environmentally sensitive areas. Locate wells outside of drainages, below ridgelines, and away from important sources of forage, cover, reproductive habitats, winter habitats, parturition areas, and brood-rearing habitats.
- Centralize and combine pipeline systems and other facilities and infrastructure to minimize disturbance during development and production.

Air Quality and Greenhouse Gas/Fugitive Dust

- Water or alternative dust suppressants (i.e., surfactants or other erosion control materials) will be utilized to minimize fugitive dust during construction and applied on material (sand, gravel, soil, minerals, or other matter that may create fugitive dust) piles.
- All vehicles and construction equipment will be properly maintained to minimize exhaust emissions.
- Restrict vehicle speeds to approximately 10 miles per hour (mph) on well pads and production facility locations.
- Vehicles are not to exceed a speed of approximately 20 mph on any unpaved road that does not include a posted speed limit to discourage the generation of fugitive dust.
- Periodic watering or chemical stabilization of unpaved roads.
- Cover, enclose, or stabilize excavated or inactive material piles after activity ceases.
- Use telemetry and well automation to remotely monitor and control production.
- Use centrally stored water that is piped to the well pads through a temporary surface line.

- Centralize (or consolidate) gas processing facilities (separation, dehydration, sweetening, etc.).
- Construction and drilling crews will carpool to and from the site to minimize vehicle-related emissions.
- To the extent possible, utilize solar power to power well site equipment.
- Install vapor recovery units on all oil and condensate tanks.
- Minimize the period of time between initially disturbing the soil and revegetating or other surface stabilization. Utilize interim reclamation.
- Minimize the area of disturbed land.
- Prompt revegetation of disturbed lands.
- Enclose, cover, water, or otherwise treat loaded haul trucks to minimize loss of material to wind and spillage.
- Revegetate, mulch, or otherwise stabilize the surface of all disturbed areas adjoining roads.
- Reduce elemental carbon, particularly from diesel fueled engines by utilizing controls such as diesel particulate filters on diesel engines or using lower emitting engines.
- Opportunities to reduce nitrogen oxides (NO_x), particularly from internal combustion engines, should be pursued to control impacts to deposition and visibility in nearby Class I areas. This may include the use of lower emitting engines, and/or add on controls (e.g., selective catalytic reduction) where appropriate.
- Reduce nitrogen oxides (NO_x), particularly from internal combustion engines, by controlling impacts to deposition and visibility in nearby Class I areas. This may include the use of lower emitting engines, and/or add on controls (e.g., selective catalytic reduction) where appropriate.

Cultural Resources

- All persons who are associated with mineral operations will be informed that they will be subject to prosecution for knowingly disturbing archaeological sites or collecting artifacts.
- If any previously unidentified cultural resources or human remains are discovered as a result of mineral operations, activity in the vicinity of the discovery will cease and will be immediately reported to the BLM field office. Work may not resume at that location until approved by the BLM authorized officer.
- Use visual resource BMPs to avoid, minimize, or mitigate potential adverse effects to historic properties.

Visual Resources/Noise/Night Skies

- Use natural or artificial features, such as topography, vegetation, or an artificial berm to help screen facilities. Design roads and other linear facilities to follow the contour of the land or mimic lines in the vegetation. Avoid a straight road that will draw the viewer's eye and attention toward production facilities.
- Paint aboveground production facilities (pumping units, pipes, compressors, tanks, treaters, etc.) a color that allows the facility to blend into the background. Also, paint all new equipment brought onto the site the same color as approved by the BLM authorized officer.

- Semi-gloss paints should be used rather than flat paints; the selected paint color should be one or two shades darker than the background.
- During reclamation, replace soil, brush, rocks, shrub/tree debris, etc., over disturbed earth surfaces, which allows for natural regeneration rather than introducing an unnatural looking grass cover.
- Design well pads so that the edges are irregular and more natural looking. Straight-line edges should be avoided.
- Utilize "liquid gathering systems" to eliminate surface storage tanks and reduce truck trips for removal of liquids.
- Place infrastructure within or near previously disturbed locations. Pipelines and electric lines should be buried in or immediately adjacent to access roads. Surface-laid pipelines, if necessary, should also be located in or immediately adjacent to access roads.
- Minimize noise by using best available technology, such as installation of multi-cylinder pumps, hospital-grade sound-reducing mufflers, and placement of exhaust systems to direct noise away from sensitive receptors.
- Locate drill pads, roads, and facilities below ridgelines or behind topographic features to minimize auditory effects.
- Limit the use of artificial lighting during nighttime operations to only those that are determined necessary for the safety of operations and personnel.
- Utilize shielding and aiming techniques, as well as limiting the height of light poles to reduce glare and avoid light shining above horizon(s).
- Direct lights downward onto the task area. The bottom surface of the light fixture should be level, or if unable to be fully level, point it as close to straight down as possible, or shield it to avoid light being projected horizontally.
- Use lights only where needed, using light only when needed, and directing all lighting on-site.
- Use motion sensors, timers, or manual switching for areas that require illumination but are seldom occupied.
- Reduce lamp brightness and select lights that are not broad spectrum or bluish in color.

Soil/Water/Riparian

- Minimize disturbance to natural drainage patterns. Design locations for storm conditions, ensure off-site natural runoff does not wash over the site, and use perimeter drainage ditches.
- Divert stormwater away from well locations with ditches, berms, or water bars above the cut slopes to trap well location runoff and sediments on or near the location through the use of sediment fences or water retention ponds.
- Inspect equipment routinely for leaks (diesel fuel, hydraulic fluid, lubricating oil, and coolant) and make any necessary repairs. In the event of soil contamination due to equipment fluid spills, isolate and clean up the spill immediately. Implement soil remediation and bioremediation procedures or excavate to an appropriate container and transport to an approved off-site disposal location.

- During reclamation, apply certified weed-free mulch or other suitable materials and crimp or tackify to remain in place to reclaim areas for seed retention.
- In areas of identified biological soil crusts, the top 2 to 5 inches of topsoil, inclusive of the biological soil crusts, shall be carefully stripped and stockpiled separately from all other soil materials.
- Organic matter and debris shall be retained in the piles to help sustain biological activity and increase the effectiveness of respreading the crust material. Storage piles shall be shallow to preserve microorganisms and seeds. Respread the soil crust during interim and final reclamation. During reclamation, reestablish mounds on the surface prior to reapplying the biological soil crusts.
- Stabilize topsoil stockpiles by 1) spraying with water to establish crust, and 2) covering with biodegradable product.
- Utilize erosion control structures, such as certified weed-free straw bales, silt fences, sediment traps, water bars, drainage ditches, and sediment ponds to prevent down cutting on slopes, to reduce loss of sediment, and to avoid contamination of runoff into perennial and intermittent streams. These structures will remain in place and will be maintained until stabilization and revegetation are complete.
- Regular monitoring of revegetated and reclaimed areas will be conducted with regular maintenance or reseeding as needed until the BLM determines that the revegetation is successful.
- Topsoil will be segregated and stored separately from subsurface materials to avoid mixing during construction, storage, and interim and final reclamation. Subsurface materials will never be placed on top of topsoil material at any point in the operation. Stockpiles will be located and protected so that wind and water erosion are minimized, and reclamation potential is maximized. Ensure that the topsoil is spread evenly over the reclaimed area.
- Use closed-loop drilling systems in sensitive areas or where there is shallow groundwater.
- Substitute less toxic, yet equally effective products, for conventional drilling products.
- Disposal or emergency pits will be located in cut material rather than fill material.
- If water is encountered during construction of a pit, cease construction and immediately contact the BLM.
- Avoid constructing reserve pits in areas of shallow groundwater. To prevent contamination of groundwater and soils, use semi-closed-loop or closed-loop drilling systems or lined pits with impermeable liners.
- Where operations are conducted in the vicinity of public water sources, the operator will work with the public water supplier to identify possible methods to protect water supplies.
- At a minimum, the operator and the BLM will adhere to BLM Instruction Memorandum 2010-055 regarding the Protection of Groundwater in Association with Oil and Gas Leasing, Exploration, and Development or the latest BLM policy or guidance. Areas identified with shallow unconfined aquifers and potential unconsolidated aquifers will require additional mitigation that may include closed-loop drilling, no surface pits, or off-site location of production storage facilities; a spill prevention, control and countermeasure plan (as specified by the EPA); and a stormwater management plan. A water monitoring plan may be required to ensure the effectiveness of mitigation to protect water resources.

- Construct all road and pipeline crossings at right angles to streams to minimize the area of disturbance.
- Locate and construct all structures crossing intermittent and perennial streams and ephemeral drainages such that they do not decrease channel stability or increase water velocity.
- Minimize crossings of streams (intermittent and perennial) with vehicles and heavy machinery.
- As specified by the authorized officer, reserve pits and other surface impoundments will be lined with synthetic liners with a minimum thickness of 12 millimeters or other materials, such as bentonite or clay. Decommission by removing all contaminants and liners and dispose of the liners in an approved waste management facility or recycle them. For additional siting and closure guidance, refer to IB No. UT 2013-038.
- Use wind fences, other forms of wind breaks, or other techniques where needed to control wind erosion and prevent downwind (off-site) emissions of fugitive dust.
- Use BLM-approved dust suppressants or other techniques when and where needed to prevent emissions of fugitive dust from development sites and associated unpaved roadways.

Reclamation

- Provide a reclamation plan as part of mineral proposals that includes plans for both interim and final reclamation. Reclamation is required of any disturbed surface that is not necessary for continued production operations. Additional reclamation measures may be required based on existing conditions at the time of final abandonment.
- Operators would be required to follow the Green River Reclamation Guidelines for all development in the Price Field Office.
- Planning for reclamation should occur prior to construction in order to achieve successful reclamation in the future. Successful final reclamation is achieved more efficiently by locating six operations in areas that minimize reclamation needs, by sufficiently salvaging topsoil, and by completing interim reclamation.
- Reclaimed areas above pipelines that receive incidental disturbance during maintenance activities will be reseeded as soon as practical.
- Final reclamation of all mineral-related disturbances will involve recontouring of all disturbed areas, including access roads to the original contour or a contour that blends with the surrounding topography and revegetating all disturbed areas to native species. It also involves salvaging and reusing all available topsoil (whatever soil is on top) in a timely manner, revegetating disturbed areas, controlling erosion, controlling invasive non-native plant and noxious weeds, and monitoring results. Reclamation measures should begin as soon as possible after the disturbance and continue until successful reclamation is achieved.
- The long-term objective of final reclamation is to set the course for eventual ecosystem restoration, including the restoration of the natural vegetation community, hydrology, and wildlife habitats. In most cases, this means returning the land to a condition approximate to or equal to that which existed prior to the disturbance.
- During the life of the mineral operation, all disturbed areas not needed for active support of the operation should undergo interim reclamation in order to minimize the environmental impacts of development on other resources and uses. Reclamation is required of any disturbed surface that is not necessary for continued mineral operations.

- Disturbed areas should be revegetated after the site has been satisfactorily prepared. Site preparation will include respreading topsoil to an adequate depth, and may also include ripping, tilling, disking on contour, and dozer track imprinting.
- Any topsoil pile set aside should be revegetated to prevent it from eroding and to help maintain its biological viability.
- All pits must be reclaimed to a safe and stable condition that blends with the rest of the reclaimed area. If necessary, the pit area should usually be mounded slightly to allow for settling and to allow for positive surface drainage.
- Interim reclamation of the well pad and access road will begin as soon as practical.
- Facilities will be grouped on the pads to allow for maximum interim reclamation. Interim reclamation will include road cuts and fills and will extend within proximity of the well head and production facilities.
- Respread topsoil over the entire location and revegetate to within a few feet of the production facilities unless an all-weather, surfaced access route or turn-around is needed.
- The well site must be recontoured to original contour or a contour that blends with the surrounding landform, stockpiled topsoil evenly distributed, and the site revegetated. Salvaged topsoil must be respread evenly over the surfaces to be revegetated. The topsoiled site should be prepared to provide a seedbed for reestablishment of desirable vegetation.
- Final reclamation includes recontouring the road back to the original contour, seeding, controlling noxious weeds, and may also include other techniques to improve reclamation success, such as ripping, scarifying, replacing topsoil, constructing water bars, pitting, mulching, redistributing woody debris, and barricading.
- Use stockpiled brush, limbs, crushed stumps, other woody material, and stripped vegetation for interim and final reclamation.
- Fencing will be installed to prevent livestock from grazing the reclaimed area until vegetation is reestablished.

Vegetation/Noxious Weeds and Invasive Species

- Seeding performed as part of reclamation operations will take place in the fall from mid-October until mid-December when the ground surface is not frozen.
- Prior to commencing operations, all equipment and vehicles will be cleaned to remove seeds and soil that may contain seeds in order to avoid the spread of noxious weeds and invasive species.
- To minimize the potential of spreading weed seeds between drilling locations, compressed air will be used to remove weed seeds and soil from equipment before it is mobilized to the next drilling location.
- Develop a weed management plan on how to monitor growth of invasive species resulting from surface disturbance caused by project activities and how to control noxious weeds and invasive species through the application of commercial herbicides after obtaining a pesticide use permit from the BLM.
- Treatment to prevent the introduction or spread of invasive/noxious plants would conform to the guidelines and principles of the Western States Environmental Impact Statement for vegetation

treatments, which specifies herbicides approved for use, treatment protocols, mitigation, and monitoring.

- Construction equipment and vehicles will not be allowed to drive through weed-infested areas.
- In coordination with the BLM and Emery and Wayne Counties, control noxious and invasive plants that become established along roads, on well pads, or adjacent to other facilities.
- Clean and sanitize all equipment brought in from other regions. Use portable washing stations to periodically wash down equipment entering and leaving well field areas, especially during muddy conditions.

Wildlife

- Identify important, sensitive, and unique habitats and wildlife in the area. Incorporate mitigation practices that minimize impacts to these habitats.
- Plan the pattern and rate of development to avoid the most important habitats and generally reduce the extent and severity of impacts.
- Cluster drill pads, roads, and facilities in specific areas that would have a lower impact on wildlife habitat.
- Consider liquid-gathering systems to eliminate surface storage tanks and to reduce truck trips for removal of liquids.
- Place infrastructure within or near previously disturbed locations in order to avoid new impacts to wildlife habitat.
- Roads will be reclaimed as soon as possible after they are no longer required.
- Personnel will be advised to minimize stopping and exiting their vehicles in big game winter range when there is snow on the ground.
- If it is found that project activities could potentially affect raptor nesting, as determined from decreased raptor productivity or nesting, or documented nest abandonment or failure, alternate nesting sites may be constructed at a rate of up to two alternate nesting sites for one impacted nest. Existing degraded raptor nests may be upgraded or reinforced to minimize potential impacts.
- In order to minimize potential for raptor mortalities on production facility structures, raptor protection measures shall be applied (e.g., modify for raptor-safe construction, install perches, perching deterrents, nesting platforms, nest deterrent devices, etc.).
- In order to limit impacts to pronghorn antelope, avoid aggressive non-native grasses and shrubs in pronghorn habitat restoration.
- If produced water is allowed to evaporate after completion of drilling, reserve pits will be fenced on four sides to prevent entry by wildlife and/or livestock.
- Promptly report observations of potential wildlife problems to the regional office of the UDWR and, as applicable, to the USFWS.
- The operator will notify the BLM authorized officer and nearest USFWS law enforcement office within 24 hours if the operator discovers a dead or injured federally protected species (i.e., migratory bird species, bald or golden eagle, or species listed by the USFWS as threatened or endangered) in or adjacent to a pit, trench, tank, exhaust stack, or fence. (If the operator is unable

to contact the USFWS law enforcement office, the operator must contact the nearest USFWS ecological services office.)

- Design, construct, and maintain exclosure fencing for all open cellars and pits containing freestanding fluids to prevent access to livestock and large forms of wildlife, such as deer, elk, and pronghorn. At a minimum, the operator will adequately fence all fluids pits and open cellars during and after drilling operations until the pit is free of fluids and the operator initiates backfilling. The operator will maintain the fence in order to protect public health and safety, wildlife, and livestock. (For examples of exclosure fencing design, refer to the Oil and Gas Gold Book – Exclosure Fence Illustrations, Figure 1, Page 18.) Adequate fencing (in lieu of more stringent requirements by the surface owner) includes all of the following:

    1. Construction materials will consist of steel and/or wood posts. Use a fence with five separate wires (smooth or barbed) or hog panel (16 feet long × 50 inches in height) with connectors, such as fence staples, quick-connect clips, hog rings, hose clamps, twisted wire, etc. Do not use electric fences.
    2. Set posts firmly in the ground. Stretch the wire tightly, if used, and space it evenly from the ground level to the top wire, effectively keeping out animals. Tie hog panels securely into posts and to one another using fence staples, clamps, etc. Construct the fence at least 2 feet from the edge of the pit.
    3. For reserve pits, fence all four sides as soon as the pit is constructed. Reconstruct any damage to the rig side of the fence immediately following release of the drilling rig.
    4. Maintain the erect fences in adequate condition until the pit is closed.

- The operator will prevent wildlife and livestock access (including avian wildlife) to fluids pits that contain or have the potential of containing salinity sufficient to cause harm to wildlife or livestock, hydrocarbons, surfactants, or Resource Conservation and Recovery Act of 1976–exempt hazardous substances. At a minimum, the operator will install approved netting in these circumstances, in accordance with the requirements below, immediately following release of the drilling rig. Note: The BLM generally does not approve of the use of flagging, strobe lights, metal reflectors, or noisemakers as techniques for deterring wildlife.

    Minimum Netting Requirements

    The operator will:

    1. Construct a rigid structure made of steel tubing or wooden posts with cable strung across the pit at no more than 7-foot intervals along the X- and Y-axes to form a grid of seven footsquares.
    2. Suspend netting a minimum of 4 to 5 feet above the pit surface.
    3. Use a maximum netting mesh size of 1½ inches to allow for snow loading while excluding most birds in accordance with U.S. Fish and Wildlife Service recommendations.
    4. Cover the top and sides of the netting support frame with netting and secure the netting at the ground surface around the entire pit to prevent wildlife entry at the netting edges. Note: Hog wire panels or other wire mesh panels or fencing used on the sides of the netting support frame is ineffective in excluding small wildlife and songbirds unless covered by smaller meshed netting.

5. Monitor and maintain the netting sufficiently to ensure the netting is functioning as intended, has not entrapped wildlife, and is free of holes and gaps greater than 1½ inches.

- The operator will construct and maintain pits, cellars, open-top tanks, and trenches, that are not otherwise fenced, screened, or netted, to exclude livestock, wildlife, and humans (for example, lined, clean water pits; well cellars; or utility trenches) to prevent livestock, wildlife, and humans from becoming entrapped. At a minimum, the operator will construct and maintain escape ramps, ladders, or other methods of avian and terrestrial wildlife escape in pits, cellars, open-top tanks, or at frequent intervals along trenches where entrapment hazards may exist.
- Immediately following active drilling or completion operations, the operator will take actions necessary to prevent wildlife and livestock access, including avian wildlife, to all open-topped tanks that contain or have the potential to contain salinity sufficient to cause harm to wildlife or livestock, hydrocarbons, or Resource Conservation and Recovery Act of 1976–exempt hazardous substances. At a minimum, the operator will net, screen, or cover open-topped tanks to exclude wildlife and livestock and prevent mortality. If the operator uses netting, the operator will cover and secure the open portion of the tank to prevent wildlife entry. The operator will net, screen, or cover the tanks until the operator removes the tanks from the location or the tanks no longer contain substances that could be harmful to wildlife or livestock.
- The operator will prevent all hazardous, poisonous, flammable, and toxic substances from coming into contact with soil and water. At a minimum, the operator will install and maintain an impervious secondary containment system for any tank or barrel containing hazardous, poisonous, flammable, or toxic substances sufficient to contain the contents of the tank or barrel and any drips, leaks, and anticipated precipitation. The operator will dispose of fluids within the containment system that do not meet applicable state or EPA livestock water standards in accordance with state law. The operator must not drain the fluids to the soil or ground.
- The operator will design, construct, and maintain all secondary containment systems to prevent wildlife and livestock exposure to harmful substances. At a minimum, the operator will install effective wildlife and livestock exclosure systems, such as fencing, netting, expanded metal mesh, lids, and grate covers.
- The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. Production equipment includes, but may not be limited to, tanks, heater treaters, separators, dehydrators, flare stacks, in-line units, and compressor mufflers.

Appendix G. Emissions Tables

This appendix provides the per-well emissions factors (GHGs and non-GHGs) by phase (well development and production operations) and by the total emissions calculated for each alternative on an annual basis. An emissions factor is a value that relates the quantity of a pollutant released into the atmosphere with an activity that generates the pollutant. They are typically expressed in units of eight or mass (e.g., pounds, kilograms, tons) per activity (e.g. duration of equipment operation, construction of an oil or gas well). Emissions factors are the basis for developing emissions inventories that are used for air quality management decisions. The BLM uses emissions inventories to evaluate the change to county-level emissions, to compare NEPA alternatives, and as inputs for air quality models if modeling is warranted. Over time, emissions factors may change due to new emissions regulations, development of control technologies, or data and information improvements for emissions.

Air pollutant emissions from oil and gas activities occur during construction and operation of a well. Construction-related emissions occur from the use of heavy machinery during pad construction, drilling, testing and completion, venting and flaring, interim reclamation, and vehicles. Construction emissions are typically a one-time occurrence. Operation/production related emissions occur from well workovers, pump engines, heaters, tanks, truck loading, fugitive leaks, pneumatics, dehydrators, compressor engines, reclamation, and vehicle traffic. Emissions from operation activities occur throughout the life of a well. Several factors, such as location, geological formation, well depth, equipment used, supporting infrastructure, and other factors, may influence actual emissions. The single well emissions for all alternatives, for both the oil and gas and helium wells, are presented in Table G-1. Annual emissions for the alternatives are based on the single-well emissions factors and the estimated number of wells developed and operating in each year. No Action Alternative emissions are presented in Table G-2 through Table G-11. Wilderness and Lands with Wilderness Characteristics Alternative emissions are presented in Table G-12 through Table G-18.

Table G-1. Single Well Emissions Factors in Tons Per Year, and Metric Tonnes

Activity	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	VOC (tpy)	NO_x (tpy)	CO (tpy)	SO_2 (tpy)	HAPs (tpy)	CO_2 (t)	CH_4 (t)	N_2O (t)
Construction	1.45	0.44	1.09	9.16	3.18	0.02	0.09	1179.22	0.26	0.01
Production	0.61	0.21	7.63	1.88	3.05	0.00	0.70	998.41	2.31	0.00

Source: BLM Lease Sale Emissions Tool (BLM 2022b). Using the weighted average emissions from emissions inventories developed for different types of oil and gas development (horizontal, vertical/directional drilling for oil and gas wells) that occurred in 2022.

Table G-2. Estimated Annual Emissions from the Development of Five Oil and Gas Leases – No Action Alternative

Activity	Field Office	County	PM_{10}	$PM_{2.5}$	VOC	NO_x	CO	SO_2	HAPs
Maximum year*	PFO	Emery	4.5	1.5	39.3	18.6	18.4	0.020	3.581
Average year*	PFO	Emery	2.7	0.9	31.1	8.9	12.8	0.004	2.840

Source: BLM Lease Sale Emissions Tool (BLM 2022b).

* Values in tons per year.

Table G-3. Estimated Annual Emissions from the Development of Three Helium Leases – No Action Alternative

Activity	Field Office	County	PM_{10}	$PM_{2.5}$	VOC	NO_x	CO	SO_2	HAPs
Maximum year*	PFO	Emery	3.3	1.1	24.0	14.8	12.3	0.019	2.186
Average year*	PFO	Emery	1.7	0.6	20.3	5.8	8.4	0.003	1.855

Source: BLM Lease Sale Emissions Tool (BLM 2022b).

* Values in tons per year.

Table G-4. Estimated Life of Lease Emissions from Well Development, Well Production Operations, Mid-Stream, and End-Use – No Action Alternative – Five Oil and Gas Wells

Activity	CO_2	CH_4	N_2O	CO_2e (100 years)	CO_2e (20 years)
Well development	5,896	1.30	0.043	5,947	6,015
Well production operations	99,841	231.02	0.200	106,780	118,954
Mid-stream	74,000	199.28	1.228	80,274	90,776
End-use	559,341	21.52	4.215	561,133	562,266
Total	739,078	453.11	5.687	754,133	778,012

Source: BLM Lease Sale Emissions Tool (BLM 2022b).

Note: all values in metric tons.

Table G-5. Estimated Life of Lease Emissions from Well Development, Well Production Operations, Mid-Stream, and End-Use – No Action Alternative – Three Helium Wells

Activity	CO_2	CH_4	N_2O	CO_2e (100 years)	CO_2e (20 years)
Well development	3,538	0.78	0.026	3,568	3,609
Well production operations	59,905	138.61	0.120	64,068	71,373
Mid-stream	0	0.00	0.000	0	0
End-use	0	0.00	0.000	0	0
Total	63,442	139.39	0.146	67,636	74,982

Source: BLM Lease Sale Emissions Tool (BLM 2022b).

Note: all values in metric tons.

Table G-6. Comparison of Lease Sale Annual Emissions to Other Sources – No Action Alternative – Five Oil and Gas Wells

Reference	Mt CO2e* (Per Year)	Average Year Percentage of Reference
Emissions from leases (average year)	0.028	–
Utah onshore federal (oil and gas)†	12.68	0.220%
U.S. onshore federal (oil and gas)†	465.63	0.006%
U.S. federal – all (oil and gas)†	844.27	0.003%
U.S. federal (oil, gas, and coal)†	1,292.57	0.002%
Utah total (all sectors)‡	71.41	0.039%
U.S. total (all sectors)‡	5,981.40	<0.001%

* Estimates are based on 100 Global Warming Potential values.

† Federal values come from the Annual GHG Report, Tables ES-1 and ES-2. U.S Federal – All includes offshore oil and gas production (BLM 2022e).

‡ Values comes from the EPA Inventory of U.S. GHG Emissions and Sinks: 1990–2020 (EPA 2022a) and use the Intergovernmental Panel on Climate Change (2007) Fourth Assessment Report Global Warming Potential values.

Table G-7. Comparison of Lease Sale Annual Emissions to Other Sources – No Action Alternative – Three Helium Wells

Reference	Mt CO2e* (Per Year)	Average Year Percentage of Reference
Emissions from leases (average year)	0.003	–
Utah onshore federal (oil and gas)†	12.68	0.022%
U.S. onshore federal (oil and gas)†	465.63	0.001%
U.S. federal – all (oil and gas)†	844.27	0.000%
U.S. federal (oil, gas, and coal)†	1,292.57	0.000%
Utah total (all sectors)‡	71.41	0.004%
U.S. total (all sectors)‡	5,981.40	<0.001%

* Estimates are based on 100 Global Warming Potential values.

† Federal values come from the Annual GHG Report, Tables ES-1 and ES-2. U.S Federal – All includes offshore oil and gas production (BLM 2022e).

‡ Values comes from the EPA Inventory of U.S. GHG Emissions and Sinks: 1990–2020 (EPA 2022a) and use the Intergovernmental Panel on Climate Change (2007) Fourth Assessment Report Global Warming Potential values.

Table G-8. Annual GHG Emissions for the No Action Alternative in Metric Tonnes – Five Oil and Gas Wells

	# Wells		Well Development Emissions				Well Operation Emissions				Indirect (Mid-Stream, End-Use) Emissions				Sum of Direct and Indirect Emissions				
Year	Developed	Operating	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2e (20-yr)
1	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
2	1	1	1,179.2	0.26	0.009	1,189.3	998.4	2.31	0.002	1,067.8	41,403.3	12.06	0.362	41,861.5	43,581	14.63	0.372	44,119	44,890
3	0	1	0.0	0.00	0.000	0.0	998.4	2.31	0.002	1,067.8	27,209.3	7.35	0.239	27,493.6	28,208	9.66	0.241	28,561	29,071
4	0	1	0.0	0.00	0.000	0.0	998.4	2.31	0.002	1,067.8	18,125.2	5.02	0.159	18,318.3	19,124	7.33	0.161	19,386	19,773
5	1	2	1,179.2	0.26	0.009	1,189.3	1,996.8	4.62	0.004	2,135.6	53,553.8	15.67	0.468	54,148.5	56,730	20.55	0.480	57,473	58,557
6	1	3	1,179.2	0.26	0.009	1,189.3	2,995.2	6.93	0.006	3,203.4	76,805.1	22.11	0.671	77,647.3	80,980	29.30	0.686	82,040	83,584
7	0	3	0.0	0.00	0.000	0.0	2,995.2	6.93	0.006	3,203.4	50,896.2	14.45	0.445	51,448.6	53,891	21.39	0.451	54,652	55,779
8	1	4	1,179.2	0.26	0.009	1,189.3	3,993.6	9.24	0.008	4,271.2	75,487.8	22.35	0.658	76,333.7	80,661	31.85	0.675	81,794	83,473
9	1	5	1,179.2	0.26	0.009	1,189.3	4,992.0	11.55	0.010	5,339.0	91,593.8	27.08	0.799	92,618.8	97,765	38.89	0.818	99,147	101,196
10	0	5	0.0	0.00	0.000	0.0	4,992.0	11.55	0.010	5,339.0	60,943.1	18.29	0.531	61,633.2	65,935	29.84	0.541	66,972	68,545
11	0	5	0.0	0.00	0.000	0.0	4,992.0	11.55	0.010	5,339.0	40,974.2	13.35	0.354	41,468.9	45,966	24.91	0.364	46,808	48,120
12	0	5	0.0	0.00	0.000	0.0	4,992.0	11.55	0.010	5,339.0	27,762.9	10.19	0.237	28,131.3	32,755	21.74	0.247	33,470	34,616
13	0	5	0.0	0.00	0.000	0.0	4,992.0	11.55	0.010	5,339.0	18,979.1	8.05	0.160	19,262.6	23,971	19.60	0.170	24,602	25,635
14	0	5	0.0	0.00	0.000	0.0	4,992.0	11.55	0.010	5,339.0	13,120.9	6.57	0.108	13,346.2	18,113	18.12	0.118	18,685	19,640
15	0	5	0.0	0.00	0.000	0.0	4,992.0	11.55	0.010	5,339.0	9,202.7	5.52	0.073	9,387.3	14,195	17.07	0.083	14,726	15,626
16	0	5	0.0	0.00	0.000	0.0	4,992.0	11.55	0.010	5,339.0	6,573.7	4.76	0.051	6,729.3	11,566	16.31	0.061	12,068	12,928
17	0	5	0.0	0.00	0.000	0.0	4,992.0	11.55	0.010	5,339.0	4,802.7	4.19	0.035	4,937.3	9,795	15.74	0.045	10,276	11,106
18	0	5	0.0	0.00	0.000	0.0	4,992.0	11.55	0.010	5,339.0	3,603.8	3.76	0.025	3,722.7	8,596	15.31	0.035	9,062	9,869
19	0	5	0.0	0.00	0.000	0.0	4,992.0	11.55	0.010	5,339.0	2,786.7	3.43	0.018	2,893.7	7,779	14.98	0.028	8,233	9,022
20	0	5	0.0	0.00	0.000	0.0	4,992.0	11.55	0.010	5,339.0	2,225.2	3.16	0.013	2,323.0	7,217	14.71	0.023	7,662	8,437
21	0	5	0.0	0.00	0.000	0.0	4,992.0	11.55	0.010	5,339.0	1,835.2	2.94	0.010	1,925.6	6,827	14.49	0.020	7,265	8,028
22	0	4	0.0	0.00	0.000	0.0	3,993.6	9.24	0.008	4,271.2	1,361.9	2.31	0.007	1,432.9	5,356	11.55	0.015	5,704	6,313
23	0	4	0.0	0.00	0.000	0.0	3,993.6	9.24	0.008	4,271.2	1,176.2	2.18	0.006	1,242.6	5,170	11.42	0.014	5,514	6,116
24	0	4	0.0	0.00	0.000	0.0	3,993.6	9.24	0.008	4,271.2	1,041.6	2.06	0.005	1,104.3	5,035	11.30	0.013	5,375	5,971
25	0	3	0.0	0.00	0.000	0.0	2,995.2	6.93	0.006	3,203.4	743.3	1.51	0.003	789.3	3,739	8.44	0.009	3,993	4,438
26	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	480.0	1.00	0.002	510.2	2,477	5.62	0.006	2,646	2,942
27	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	441.0	0.95	0.002	469.8	2,438	5.57	0.006	2,605	2,899
28	0	1	0.0	0.00	0.000	0.0	998.4	2.31	0.002	1,067.8	212.0	0.46	0.001	226.1	1,210	2.77	0.003	1,294	1,440
29	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
30	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
31	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0

Year	# Wells		Well Development Emissions				Well Operation Emissions				Indirect (Mid-Stream, End-Use) Emissions				Sum of Direct and Indirect Emissions				
	Developed	Operating	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2e (20-yr)
32	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
33	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
34	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
35	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
36	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
37	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
38	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
39	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
Total (MT)	5		5,896	1.30	0.043	5,947	99,841	231.02	0.200	106,780	633,341	220.80	5.444	641,407	739,078	453.11	5.687	754,133	778,012
Max Year			1,179.2	0.26	0.009	1,189	4,992.0	11.55	0.010	5,339	91,594	27.08	0.799	92,618.8	97,765.0	38.89	0.818	99,147	101,196
Average Year							3,697.8	8.6	0.0	3,954.8	23,457	8.18	0.202	16,446.3	27,373	16.78	0.211	27,931	28,815

Table G-9. Annual GHG Emissions for the No Action Alternative in Metric Tonnes – Three Helium Wells

Year	# Wells		Well Development Emissions				Well Operation Emissions				Indirect (Mid-Stream, End-Use) Emissions				Sum of Direct and Indirect Emissions				
	Developed	Operating	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2e (20-yr)
1	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
2	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
3	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
4	1	1	1,179.2	0.26	0.009	1,189.3	998.4	2.31	0.002	1,067.8	0.0	0.00	0.000	0.0	2,178	2.57	0.011	2,257	2,393
5	0	1	0.0	0.00	0.000	0.0	998.4	2.31	0.002	1,067.8	0.0	0.00	0.000	0.0	998	2.31	0.002	1,068	1,190
6	1	2	1,179.2	0.26	0.009	1,189.3	1,996.8	4.62	0.004	2,135.6	0.0	0.00	0.000	0.0	3,176	4.88	0.013	3,325	3,582
7	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	0.0	0.00	0.000	0.0	1,997	4.62	0.004	2,136	2,379
8	1	3	1,179.2	0.26	0.009	1,189.3	2,995.2	6.93	0.006	3,203.4	0.0	0.00	0.000	0.0	4,174	7.19	0.015	4,393	4,772
9	0	3	0.0	0.00	0.000	0.0	2,995.2	6.93	0.006	3,203.4	0.0	0.00	0.000	0.0	2,995	6.93	0.006	3,203	3,569
10	0	3	0.0	0.00	0.000	0.0	2,995.2	6.93	0.006	3,203.4	0.0	0.00	0.000	0.0	2,995	6.93	0.006	3,203	3,569
11	0	3	0.0	0.00	0.000	0.0	2,995.2	6.93	0.006	3,203.4	0.0	0.00	0.000	0.0	2,995	6.93	0.006	3,203	3,569
12	0	3	0.0	0.00	0.000	0.0	2,995.2	6.93	0.006	3,203.4	0.0	0.00	0.000	0.0	2,995	6.93	0.006	3,203	3,569
13	0	3	0.0	0.00	0.000	0.0	2,995.2	6.93	0.006	3,203.4	0.0	0.00	0.000	0.0	2,995	6.93	0.006	3,203	3,569
14	0	3	0.0	0.00	0.000	0.0	2,995.2	6.93	0.006	3,203.4	0.0	0.00	0.000	0.0	2,995	6.93	0.006	3,203	3,569
15	0	3	0.0	0.00	0.000	0.0	2,995.2	6.93	0.006	3,203.4	0.0	0.00	0.000	0.0	2,995	6.93	0.006	3,203	3,569
16	0	3	0.0	0.00	0.000	0.0	2,995.2	6.93	0.006	3,203.4	0.0	0.00	0.000	0.0	2,995	6.93	0.006	3,203	3,569

Year	# Wells		Well Development Emissions				Well Operation Emissions				Indirect (Mid-Stream, End-Use) Emissions				Sum of Direct and Indirect Emissions				
	Developed	Operating	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2e (20-yr)
17	0	3	0.0	0.00	0.000	0.0	2,995.2	6.93	0.006	3,203.4	0.0	0.00	0.000	0.0	2,995	6.93	0.006	3,203	3,569
18	0	3	0.0	0.00	0.000	0.0	2,995.2	6.93	0.006	3,203.4	0.0	0.00	0.000	0.0	2,995	6.93	0.006	3,203	3,569
19	0	3	0.0	0.00	0.000	0.0	2,995.2	6.93	0.006	3,203.4	0.0	0.00	0.000	0.0	2,995	6.93	0.006	3,203	3,569
20	0	3	0.0	0.00	0.000	0.0	2,995.2	6.93	0.006	3,203.4	0.0	0.00	0.000	0.0	2,995	6.93	0.006	3,203	3,569
21	0	3	0.0	0.00	0.000	0.0	2,995.2	6.93	0.006	3,203.4	0.0	0.00	0.000	0.0	2,995	6.93	0.006	3,203	3,569
22	0	3	0.0	0.00	0.000	0.0	2,995.2	6.93	0.006	3,203.4	0.0	0.00	0.000	0.0	2,995	6.93	0.006	3,203	3,569
23	0	3	0.0	0.00	0.000	0.0	2,995.2	6.93	0.006	3,203.4	0.0	0.00	0.000	0.0	2,995	6.93	0.006	3,203	3,569
24	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	0.0	0.00	0.000	0.0	1,997	4.62	0.004	2,136	2,379
25	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	0.0	0.00	0.000	0.0	1,997	4.62	0.004	2,136	2,379
26	0	1	0.0	0.00	0.000	0.0	998.4	2.31	0.002	1,067.8	0.0	0.00	0.000	0.0	998	2.31	0.002	1,068	1,190
27	0	1	0.0	0.00	0.000	0.0	998.4	2.31	0.002	1,067.8	0.0	0.00	0.000	0.0	998	2.31	0.002	1,068	1,190
28	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
29	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
30	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
31	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
32	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
33	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
34	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
35	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
36	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
37	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
38	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
39	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
Total (MT)	3		3,538	0.78	0.026	3,568	59,905	138.61	0.120	64,068	0	0.00	0.000	0	63,442	139.39	0.146	67,636	74,982
Max Year			1,179.2	0.26	0.009	1,189	2,995.2	6.93	0.006	3,203	0	0.00	0.000	0.0	4,174.5	7.19	0.015	4,393	4,772
Average Year							2,496.0	5.8	0.0	2,669.5				0.0	2,643	5.81	0.006	2,818	3,124

Table G-10. Annual CAP and HAP Emissions for the No Action Alternative in Short Tons – Five Oil and Gas Wells

	# Wells		Well Development Emissions							Well Operation Emissions							Sum of Well Development and Operation Emissions						
Year	Developed	Operating	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs
1	0	0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00
2	1	1	1.5	0.4	1.1	9.2	3.2	0.02	0.09	0.6	0.2	7.6	1.9	3.1	0.00	0.70	2.1	0.6	8.7	11.0	6.2	0.02	0.79
3	0	1	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.6	0.2	7.6	1.9	3.1	0.00	0.70	0.6	0.2	7.6	1.9	3.1	0.00	0.70
4	0	1	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.6	0.2	7.6	1.9	3.1	0.00	0.70	0.6	0.2	7.6	1.9	3.1	0.00	0.70
5	1	2	1.5	0.4	1.1	9.2	3.2	0.02	0.09	1.2	0.4	15.3	3.8	6.1	0.00	1.40	2.7	0.9	16.4	12.9	9.3	0.02	1.49
6	1	3	1.5	0.4	1.1	9.2	3.2	0.02	0.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09	3.3	1.1	24.0	14.8	12.3	0.02	2.19
7	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
8	1	4	1.5	0.4	1.1	9.2	3.2	0.02	0.09	2.4	0.8	30.5	7.5	12.2	0.00	2.79	3.9	1.3	31.6	16.7	15.4	0.02	2.88
9	1	5	1.5	0.4	1.1	9.2	3.2	0.02	0.09	3.1	1.1	38.2	9.4	15.3	0.00	3.49	4.5	1.5	39.3	18.6	18.4	0.02	3.58
10	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
11	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
12	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
13	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
14	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
15	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
16	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
17	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
18	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
19	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
20	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
21	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
22	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
23	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
24	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
25	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
26	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
27	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
28	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
29	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
30	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49
31	0	5	0.0	0.0	0.0	0.0	0.0	0.00	0.00	3.1	1.1	38.2	9.4	15.3	0.00	3.49	3.1	1.1	38.2	9.4	15.3	0.00	3.49

	# Wells		Well Development Emissions							Well Operation Emissions							Sum of Well Development and Operation Emissions						
Year	Developed	Operating	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs
32	0	4	0.0	0.0	0.0	0.0	0.0	0.00	0.00	2.4	0.8	30.5	7.5	12.2	0.00	2.79	2.4	0.8	30.5	7.5	12.2	0.00	2.79
33	0	4	0.0	0.0	0.0	0.0	0.0	0.00	0.00	2.4	0.8	30.5	7.5	12.2	0.00	2.79	2.4	0.8	30.5	7.5	12.2	0.00	2.79
34	0	4	0.0	0.0	0.0	0.0	0.0	0.00	0.00	2.4	0.8	30.5	7.5	12.2	0.00	2.79	2.4	0.8	30.5	7.5	12.2	0.00	2.79
35	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
36	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
37	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
38	0	1	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.6	0.2	7.6	1.9	3.1	0.00	0.70	0.6	0.2	7.6	1.9	3.1	0.00	0.70
39	0	0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00
Total (MT)			7.3	2.2	5.5	45.8	15.9	0.09	0.47	91.6	31.9	1,144.7	281.7	458.0	0.06	104.63	99	34	1,150	328	474	0	105
Max Year			1.5	0.4	1.1	9.2	3.2	0.02	0.09	3.1	1.1	38.2	9.4	15.3	0.00	3.49	4.5	1.5	39.3	18.6	18.4	0.0	3.6
Average Year			1.5	0.4	1.1	9.2	3.2	0.0	0.1	2.5	0.9	30.9	7.6	12.4	0.0	2.8	2.7	0.9	31.1	8.9	12.8	0.0	2.8

Table G-11. Annual CAP and HAP Emissions for the No Action Alternative in Short Tons – Three Helium Wells

	# Wells		Well Development Emissions							Well Operation Emissions							Sum of Well Development and Operation Emissions						
Year	Developed	Operating	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs
1	0	0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00
2	0	0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00
3	0	0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00
4	1	1	1.5	0.4	1.1	9.2	3.2	0.02	0.09	0.6	0.2	7.6	1.9	3.1	0.00	0.70	2.1	0.6	8.7	11.0	6.2	0.02	0.79
5	0	1	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.6	0.2	7.6	1.9	3.1	0.00	0.70	0.6	0.2	7.6	1.9	3.1	0.00	0.70
6	1	2	1.5	0.4	1.1	9.2	3.2	0.02	0.09	1.2	0.4	15.3	3.8	6.1	0.00	1.40	2.7	0.9	16.4	12.9	9.3	0.02	1.49
7	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
8	1	3	1.5	0.4	1.1	9.2	3.2	0.02	0.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09	3.3	1.1	24.0	14.8	12.3	0.02	2.19
9	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
10	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
11	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
12	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
13	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
14	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
15	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
16	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
17	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09

	# Wells		Well Development Emissions							Well Operation Emissions							Sum of Well Development and Operation Emissions						
Year	Developed	Operating	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs
18	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
19	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
20	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
21	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
22	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
23	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
24	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
25	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
26	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
27	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
28	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
29	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
30	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
31	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
32	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
33	0	3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.8	0.6	22.9	5.6	9.2	0.00	2.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09
34	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
35	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
36	0	1	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.6	0.2	7.6	1.9	3.1	0.00	0.70	0.6	0.2	7.6	1.9	3.1	0.00	0.70
37	0	1	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.6	0.2	7.6	1.9	3.1	0.00	0.70	0.6	0.2	7.6	1.9	3.1	0.00	0.70
38	0	0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00
39	0	0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00
Total (MT)			4.4	1.3	3.3	27.5	9.5	0.05	0.28	54.9	19.1	686.8	169.0	274.8	0.04	62.78	59	20	690	197	284	0	63
Max Year			1.5	0.4	1.1	9.2	3.2	0.02	0.09	1.8	0.6	22.9	5.6	9.2	0.00	2.09	3.3	1.1	24.0	14.8	12.3	0.0	2.2
Average Year			1.5	0.4	1.1	9.2	3.2	0.0	0.1	1.6	0.6	20.2	5.0	8.1	0.0	1.8	1.7	0.6	20.3	5.8	8.4	0.0	1.9

Table G-12. Estimated Annual Emissions from the Development of Oil and Gas Leases – Wilderness and Lands with Wilderness Characteristics Alternative – Two Oil and Gas Wells

Activity	Field Office	County	PM_{10}	$PM_{2.5}$	VOC	NO_x	CO	SO_2	HAPs
Maximum year*	PFO	Emery	6.3	2.1	62.1	24.2	27.6	0.021	5.674
Average year*	PFO	Emery	4.2	1.4	48.4	13.8	20.0	0.006	4.425

Source: BLM Lease Sale Emissions Tool (BLM 2022b).

* Values in tons per year.

Table G-13. Estimated Life of Lease Emissions from Well Development, Well Production Operations, Mid-Stream, and End-Use - Wilderness and Lands with Wilderness Characteristics Alternative – Two Oil and Gas Wells

Activity	CO_2	CH_4	N_2O	CO_2e (100 years)	CO_2e (20 years)
Well development	2,358	0.52	0.017	2,379	2,406
Well production operations	39,936	92.41	0.080	42,712	47,582
Mid-stream	29,600	79.71	0.491	32,110	36,311
End-use	223,736	8.61	1.686	224,453	224,907
Total	295,631	181.24	2.275	301,653	311,205

Source: BLM Lease Sale Emissions Tool (BLM 2022b).

Note: All values in metric tons.

Table G-14. Comparison of Lease Sale Annual Emissions to Other Sources - Wilderness and Lands with Wilderness Characteristics Alternative – Two Oil and Gas Wells

Reference	Mt CO_2e* (Per Year)	Average Year Percentage of Reference
Emissions from leases (average year)	0.013	–
Utah onshore federal (oil and gas)†	12.68	0.103%
U.S. onshore federal (oil and gas)†	465.63	0.003%
U.S. federal – all (oil and gas)†	844.27	0.002%
U.S. federal (oil, gas, and coal)†	1,292.57	0.001%
Utah total (all sectors)‡	71.41	0.018%
U.S. total (all sectors)‡	5,981.40	<0.001%

* Estimates are based on 100 Global Warming Potential values.

† Federal values come from the Annual GHG Report, Tables ES-1 and ES-2. U.S Federal – All includes offshore oil and gas production (BLM 2022e).

‡ Values comes from the EPA Inventory of U.S. GHG Emissions and Sinks: 1990–2020 (EPA 2022a) and use the Intergovernmental Panel on Climate Change (2007) Fourth Assessment Report Global Warming Potential values.

Table G-15. Comparison of the Life of Lease Emissions to Other Federal Oil and Gas Emissions - Wilderness and Lands with Wilderness Characteristics Alternative – Two Oil and Gas Wells

Reference	Mt CO_2e (100 years)	Life of Lease Percentage of Reference
Lease sale emissions (life of lease)	0.302	100.000%
Utah reasonably foreseeable short-term federal (oil and gas)*	187.84	0.161%
Utah EIA projected long-term federal (oil and gas)†	536.32	0.056%
U.S. short-term federal (oil and gas)	4,614.81	0.007%
U.S. long-term federal (oil and gas)	13,560.24	0.002%

Source: BLM Lease Sale Emissions Tool (BLM 2022b); and Annual GHG Report (BLM 2022e), Tables 5-17 and 5-18.

* Short-term foreseeable is estimated federal emissions from existing producing wells, approved APDs, and 1 year of leasing.

† Long-term foreseeable are estimated federal emissions to meet EIA projected energy demand.

Table G-16. Annual GHG Emissions for the Wilderness and Lands with Wilderness Characteristics Alternative in Metric Tonnes – Two Oil and Gas Wells

	# Wells		Well Development Emissions				Well Operation Emissions				Indirect (Mid-Stream, End-Use) Emissions				Sum of Direct and Indirect Emissions				
Year	Developed	Operating	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2e (20-yr)
1	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
2	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
3	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
4	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
5	1	1	1,179.2	0.26	0.009	1,189.3	998.4	2.31	0.002	1,067.8	41,403.3	12.06	0.362	41,861.5	43,581	14.63	0.372	44,119	44,890
6	0	1	0.0	0.00	0.000	0.0	998.4	2.31	0.002	1,067.8	27,209.3	7.35	0.239	27,493.6	28,208	9.66	0.241	28,561	29,071
7	0	1	0.0	0.00	0.000	0.0	998.4	2.31	0.002	1,067.8	18,125.2	5.02	0.159	18,318.3	19,124	7.33	0.161	19,386	19,773
8	1	2	1,179.2	0.26	0.009	1,189.3	1,996.8	4.62	0.004	2,135.6	53,553.8	15.67	0.468	54,148.5	56,730	20.55	0.480	57,473	58,557
9	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	35,401.7	10.05	0.310	35,785.7	37,399	14.67	0.314	37,921	38,694
10	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	23,686.9	7.10	0.206	23,954.9	25,684	11.72	0.210	26,091	26,708
11	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	15,959.3	5.27	0.138	16,153.8	17,956	9.89	0.142	18,289	18,810
12	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	10,830.7	4.05	0.092	10,976.7	12,828	8.67	0.096	13,112	13,569
13	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	7,416.2	3.22	0.062	7,529.1	9,413	7.84	0.066	9,665	10,078
14	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	5,136.8	2.64	0.042	5,227.0	7,134	7.26	0.046	7,363	7,745
15	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	3,611.2	2.23	0.029	3,685.3	5,608	6.85	0.033	5,821	6,182
16	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	2,586.6	1.92	0.020	2,649.3	4,583	6.54	0.024	4,785	5,130
17	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	1,895.8	1.70	0.014	1,950.2	3,893	6.32	0.018	4,086	4,419
18	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	1,427.6	1.53	0.010	1,475.7	3,424	6.15	0.014	3,611	3,935
19	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	1,108.1	1.39	0.007	1,151.5	3,105	6.01	0.011	3,287	3,604
20	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	888.2	1.28	0.005	927.8	2,885	5.90	0.009	3,063	3,374
21	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	735.0	1.19	0.004	771.7	2,732	5.81	0.008	2,907	3,214
22	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	626.9	1.12	0.003	661.2	2,624	5.74	0.007	2,797	3,099
23	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	549.3	1.06	0.003	581.5	2,546	5.68	0.007	2,717	3,016
24	0	2	0.0	0.00	0.000	0.0	1,996.8	4.62	0.004	2,135.6	492.3	1.00	0.002	522.8	2,489	5.62	0.006	2,658	2,955
25	0	1	0.0	0.00	0.000	0.0	998.4	2.31	0.002	1,067.8	251.0	0.51	0.001	266.5	1,249	2.82	0.003	1,334	1,483
26	0	1	0.0	0.00	0.000	0.0	998.4	2.31	0.002	1,067.8	229.0	0.49	0.001	243.7	1,227	2.80	0.003	1,312	1,459
27	0	1	0.0	0.00	0.000	0.0	998.4	2.31	0.002	1,067.8	212.0	0.46	0.001	226.1	1,210	2.77	0.003	1,294	1,440

Year	# Wells		Well Development Emissions				Well Operation Emissions				Indirect (Mid-Stream, End-Use) Emissions				Sum of Direct and Indirect Emissions				
	Developed	Operating	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2e (20-yr)
28	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
29	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
30	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
31	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
32	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
33	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
34	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
35	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
36	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
37	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
38	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
39	0	0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0.0	0.00	0.000	0.0	0	0.00	0.000	0	0
Total (MT)	2		2,358	0.52	0.017	2,379	39,936	92.41	0.080	42,712	253,336	88.32	2.178	256,563	295,631	181.24	2.275	301,653	311,205
Max Year			1,179.2	0.26	0.009	1,189	1,996.8	4.62	0.004	2,136	53,554	15.67	0.468	54,148.5	56,729.8	20.55	0.480	57,473	58,557
Average Year							1,736.4	4.0	0.0	1,857.0	11,015	3.84	0.095	6,578.5	12,854	7.88	0.099	13,115	13,531

Table G-17. Annual CAP and HAP Emissions for the Wilderness and Lands with Wilderness Characteristics Alternative in Short Tons – Two Oil and Gas Wells

Year	# Wells		Well Development Emissions							Well Operation Emissions							Sum of Well Development and Operation Emissions						
	Developed	Operating	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs
1	0	0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00
2	0	0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00
3	0	0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00
4	0	0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00
5	1	1	1.5	0.4	1.1	9.2	3.2	0.02	0.09	0.6	0.2	7.6	1.9	3.1	0.00	0.70	2.1	0.6	8.7	11.0	6.2	0.02	0.79
6	0	1	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.6	0.2	7.6	1.9	3.1	0.00	0.70	0.6	0.2	7.6	1.9	3.1	0.00	0.70
7	0	1	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.6	0.2	7.6	1.9	3.1	0.00	0.70	0.6	0.2	7.6	1.9	3.1	0.00	0.70
8	1	2	1.5	0.4	1.1	9.2	3.2	0.02	0.09	1.2	0.4	15.3	3.8	6.1	0.00	1.40	2.7	0.9	16.4	12.9	9.3	0.02	1.49

	# Wells		Well Development Emissions							Well Operation Emissions							Sum of Well Development and Operation Emissions						
Year	Developed	Operating	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs
9	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
10	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
11	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
12	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
13	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
14	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
15	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
16	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
17	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
18	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
19	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
20	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
21	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
22	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
23	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
24	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
25	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
26	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
27	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
28	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
29	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
30	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
31	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
32	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
33	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
34	0	2	0.0	0.0	0.0	0.0	0.0	0.00	0.00	1.2	0.4	15.3	3.8	6.1	0.00	1.40	1.2	0.4	15.3	3.8	6.1	0.00	1.40
35	0	1	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.6	0.2	7.6	1.9	3.1	0.00	0.70	0.6	0.2	7.6	1.9	3.1	0.00	0.70
36	0	1	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.6	0.2	7.6	1.9	3.1	0.00	0.70	0.6	0.2	7.6	1.9	3.1	0.00	0.70
37	0	1	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.6	0.2	7.6	1.9	3.1	0.00	0.70	0.6	0.2	7.6	1.9	3.1	0.00	0.70
38	0	0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00

Year	# Wells		Well Development Emissions							Well Operation Emissions							Sum of Well Development and Operation Emissions						
	Developed	Operating	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	HAPs
39	0	0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00
Total (MT)			2.9	0.9	2.2	18.3	6.4	0.04	0.19	36.6	12.7	457.9	112.7	183.2	0.02	41.85	40	14	460	131	190	0	42
Max Year			1.5	0.4	1.1	9.2	3.2	0.02	0.09	1.2	0.4	15.3	3.8	6.1	0.00	1.40	2.7	0.9	16.4	12.9	9.3	0.0	1.5
Average Year			1.5	0.4	1.1	9.2	3.2	0.0	0.1	1.1	0.4	13.9	3.4	5.6	0.0	1.3	1.2	0.4	13.9	4.0	5.7	0.0	1.3