



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

**Carlsbad Field Office Oil and Gas Lease Sale
Environmental Assessment
Eddy and Lea Counties, New Mexico
Quarter 1 2025
DOI-BLM-NM-P020-2024-0740-EA**

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The BLM'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 ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
µg/m ³	micrograms per cubic meter
ACEC	Area of Critical Environmental Concern
AF	acre-feet
AFMSS	Automated Fluid Minerals Support System
AIB	analyzed in brief
AirToxScreen	Air Toxics Screening Assessment
amsl	above mean sea level
AO	Authorized Officer
APD	Application for Permit to Drill
APE	area of potential effects
AQRV	Air Quality Related Value
ARTSD	Air Resources Technical Support Document
b/d	barrels per day
bbl	barrel(s)
Bcf/d	billion cubic feet per day
BCR	Bird Conservation Region
BLM	Bureau of Land Management
BLM Specialist Report	<i>2022 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends</i>
BMP	best management practice
CAA	Clean Air Act
CAMx	Comprehensive Air Quality Model with extensions
CAP	criteria air pollutant
CCNP	Carlsbad Caverns National Park
CDP	census-designated place
CEQ	Council on Environmental Quality
CFO	Carlsbad Field Office
C.F.R.	Code of Federal Regulations
CH ₄	methane
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
COA	condition of approval

CSU	controlled surface use
EA	environmental assessment
EC	exposure concentration
EIA	U.S. Energy Information Administration
EMPSi	Environmental Management and Planning Solutions, Inc.
EOI	Expression of Interest
EOR	enhanced oil recovery
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
EUR	estimated ultimate recovery
FEMA	Federal Emergency Management Agency
FLPMA	Federal Land Policy and Management Act of 1976
FONSI	Finding of No Significant Impact
GHG	greenhouse gas
GIS	geographic information system
GMU	Game Management Unit
GtCO ₂	gigatonnes of CO ₂
GUMO	Guadalupe Mountains National Park
GWP	Global Warming Protection
GWPC	Groundwater Protection Council
H ₂ S	hydrogen sulfide
HAP	hazardous air pollutant
HA	Habitat Area
HI	hazard index
HQ	hazard quotient(s)
HUC	hydrologic unit code
IDT	interdisciplinary team
IM	Instruction Memorandum
IMPROVE	Interagency Monitoring of Protected Visual Environments
IPA	Isolated Population Area
IPaC	Information for Planning and Consultation
IPCC	Intergovernmental Panel on Climate Change
IRA	Inflation Reduction Act of 2022
IWG	Interagency Working Group on Social Cost of Greenhouse Gases, United States Government
kg N/ha	kilograms of nitrogen per hectare
kg/ha/yr	kilogram per hectare per year

kg S/ha	kilograms of sulfur per hectare
km	kilometer(s)
LANDFIRE	Landscape Fire and Resource Management Planning Tools
LEPC	lesser prairie-chicken
LOC	level of concern
LWC	lands with wilderness characteristics
m	meter(s)
M	magnitude
MAGICC	Model for the Assessment of Greenhouse Gas Induced Climate Change
Mcf	thousand cubic feet
MCM	Menu of Control Measures
MID	most impaired days
MLA	Mineral Leasing Act of 1920
MMst	million short tons
Mt	megatonne(s)
N/A	not applicable
NATA	National Air Toxics Assessment
N ₂ O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act of 1969, as amended
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NETL	National Energy Technology Laboratory
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act of 1966
NMAAQs	New Mexico Ambient Air Quality Standards
NMAC	New Mexico Administrative Code
NMACD	New Mexico Association of Conservation Districts
NMCRIS	New Mexico Cultural Resource Information System
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
NMOCD	New Mexico Oil Conservation Division
NMOSE	New Mexico Office of the State Engineer
NMPM	New Mexico Principal Meridian
NMSO	New Mexico State Office
NO ₂	nitrogen dioxide
NO _x	nitrogen oxide(s)

NORM	naturally occurring radioactive material
NPS	National Park Service
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NWI	National Wetlands Inventory
O ₃	ozone
O&G	oil and gas
OAI	Ozone Attainment Initiative
OCC	Oklahoma Corporation Commission
Pb	lead
PBPA	Permian Basin Programmatic Agreement
PDO	Pecos District Office
PFAS	per- and polyfluoroalkyl substances
PFYC	Potential Fossil Yield Classification
PM	particulate matter
PM _{2.5}	particulate matter equal to or less than 2.5 microns in diameter
PM ₁₀	particulate matter equal to or less than 10 microns in diameter
ppb	parts per billion
ppm	parts per million
PRPA	Paleontological Resources Preservation Act
PSD	prevention of significant degradation
RfC	reference concentration
RFD	reasonably foreseeable development
RFFA	reasonably foreseeable future action
RFO	Roswell Field Office
RMP	resource management plan
RMPA	Resource Management Plan Amendment
ROD	Record of Decision
RRC	Railroad Commission of Texas
RRF	relative response factor
SC-GHG	social cost of greenhouse gases
SCC	social cost of carbon
SCR	selective catalytic reduction
SHPO	State Historic Preservation Office
SIP	New Mexico State Implementation Plan
SLO	State Land Office
SMA	special management area

SO ₂	sulfur dioxide
SPA	Secretarial Order Potash Area
SRA	Seismic Response Area
SRMA	special recreation management area
STCs	standard terms and conditions
STEO	short-term energy outlook
SQI	Sky Quality Index
SWD	saltwater disposal
T&E	threatened and endangered
TCP	traditional cultural property
UIC	Underground Injection Control
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
VRM	Visual Resource Management
WAQS	Western Air Quality Study
WIPP	Waste Isolation Pilot Plant
WO	Washington D.C. Office
WRAP	Western Regional Air Partnership

CHAPTER 1. INTRODUCTION

1.1 BACKGROUND

This environmental assessment (EA) documents the Bureau of Land Management (BLM) Carlsbad Field Office (CFO) review of seven parcels (1,317.29 acres) nominated for auction in the BLM CFO Quarter 1 2025 Competitive Oil and Gas Lease Sale (the Proposed Action). The nominated parcels are in Eddy and Lea Counties, New Mexico (see parcel maps in Appendix A). The nominated lease parcels contain federal minerals managed by the BLM and consist of BLM-administered surface land and private surface land. For detailed information on the leasing process, see the following website: <https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/leasing/parcel-nominations>.

1.2 PURPOSE AND NEED

The BLM's purpose in preparing the EA is to respond to Expressions of Interest (EOIs) to lease federal oil and gas resources through a competitive leasing process. The need for the action is established by the BLM's responsibility under the Mineral Leasing Act of 1920 (MLA), as amended, to make mineral resources, such as oil and gas, available for development and as part of the BLM's multiple-use and sustained-yield mandate under the Federal Land Policy and Management Act of 1976 (FLPMA).

1.3 DECISION TO BE MADE

The BLM Authorized Officer (AO) will decide whether to make available for lease the nominated lease parcels with or without constraints, in the form of lease stipulations, as provided for in the approved land use plans. If the decision is to make the lands available for lease and subsequently issue a lease, standard terms and conditions (STCs) under Section 6 of the BLM lease form (Form 3100-11, Offer to Lease and Lease for Oil and Gas), herein referred to as STCs, would apply. The BLM AO also has the authority to defer the parcels, based on the analysis of potential effects presented in this EA. The Decision Record will identify whether the BLM decided to lease the nominated lease parcels and the rationale for the decision.

1.4 CONFORMANCE WITH BLM LAND USE PLANS, OTHER STATUTES, REGULATIONS, AND PLANS

1.4.1 BLM Land Use Plan Conformance

The BLM, under the MLA and FLPMA, as amended, must make mineral resources, such as oil and gas, available for development. 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.

Under FLPMA, the BLM must manage public lands, resources, and resource values according to its multiple-use, sustained-yield mandate in a manner that will best meet the present and future needs of the public, and in accordance with an approved land use plan or resource management plan (RMP). For split-estate lands where the mineral estate is an interest owned by the United States, the BLM has no authority over use of the surface estate; however, the BLM is required to declare how the federal mineral estate will be managed, including identification of all appropriate lease stipulations (BLM Handbook H-1601-1 and H-1624-1 [BLM 2005, 2018a]). 43 Code of Federal Regulations [C.F.R.] § 3101.13 and 43 C.F.R. § 1601.0-7(b). This Proposed Action aligns with the Carlsbad RMP (BLM 1988), as amended (BLM 1997a, 2008a).

The nominated lease parcels fall within areas that are open to leasing under the RMP indicated above, as amended, and are subject to certain stipulations. The nominated lease parcels, lease parcel surface ownership, lease parcel legal description and total acreage, and lease stipulations and notices that apply are detailed in Chapter 2. Appendix A contains parcel maps. Stipulation and lease notice descriptions are detailed in Appendix B.

The BLM is currently revising the RMP for the CFO planning area. Should the BLM finalize this RMP between the lease sale and lease issuance, lease parcels in the CFO planning area would be subject to the lease stipulations adopted in the revised RMP following the provisions in 43 C.F.R. § 3120. If new stipulations are mandated by the RMP revision between the lease sale and lease issuance, the successful bidder would be given the opportunity to accept the modified lease or reject it and receive a refund. If the bidder declines the lease terms because of additional or revised stipulation(s), the BLM will refund all monies, including the administrative fee, and include the parcel(s) with all the appropriate stipulations in a subsequent sale notice for future auction. In either case, the BLM would update the analysis to reflect the additional or revised stipulation(s). For more information, see *BLM Oil and Gas Adjudication for Competitive Leases*, Handbook 3120-1 (BLM 2013).

1.4.2 Relationship to Statutes, Regulations, Policies, and Other Plans

Purchasers of oil and gas lease parcels 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. The BLM is also required to comply with all applicable federal, state, and local laws and regulations, as well as U.S. Department of the Interior policies, when leasing mineral estate and responding to EOIs. Table 1.1 provides a listing of statutes, regulations, policies, and other plans applicable to the leasing decision.

Table 1.1. Relationship to Statutes, Regulations, Policies, and Other Plans

Relevant Statute, Regulation, or Plan	Relationship to the Proposed Action
Federal Land Policy and Management Act	FLPMA, 43 United States Code [U.S.C.] § 1701 <i>et seq.</i> , established guidelines to provide for the management, protection, development, and enhancement of public lands. Section 103 of FLPMA defines public lands as any lands and interest in lands owned by the United States. For split-estate lands where the mineral estate is an interest owned by the United States, the BLM has limited authority over use of the surface by the surface owner; however, the BLM is required to identify and analyze potential effects connected to the authorization to lease and develop federal mineral estate and to declare how federal mineral estate is managed in the RMP, including identification of all appropriate lease stipulations (BLM Handbook H-1601-1 and H-1624-1 [BLM 2005, 2018a]). 43 C.F.R. § 3101.13 and 43 C.F.R. § 1601.0-7(b). Within the context of the National Environmental Policy Act of 1969, as amended (NEPA), the BLM considers FLPMA compliance when conducting NEPA analyses for mineral leasing actions, and the BLM issues a Finding of No Significant Impact (FONSI) when it determines that the Proposed Action would not violate any federal, state, tribal, or local law protecting the environment, including but not limited to FLPMA's mandate to ensure that undue and/or unnecessary degradation would not occur.
Mineral Leasing Act of 1920	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, 42 U.S.C. § 4321 <i>et seq.</i> ; and other applicable laws, regulations, and policies.
43 C.F.R. § 3100 <i>et seq.</i>	These regulations govern onshore oil and gas leasing, development, and production of federal minerals.
Federal Onshore Oil and Gas Leasing Reform Act	FOOGLRA, at 30 U.S.C. § 181 <i>et seq.</i> , directs the BLM to conduct quarterly oil and gas lease sales whenever eligible lands are available for leasing.

Relevant Statute, Regulation, or Plan	Relationship to the Proposed Action
New Mexico Surface Owner Protection Act	Requires operators to provide the surface owner at least five business days' notice prior to initial entry upon the land for activities that do not disturb the surface, and at least 30 days' notice prior to conducting actual oil and gas operations. Included in this policy is the implementation of a Notice to Lessees, a requirement of lessees and operators of onshore federal oil and gas leases within the state of New Mexico to provide the BLM with the names and addresses of the surface owners of those lands where the federal government is not the surface owner, not including lands where another federal agency manages the surface.
Endangered Species Act (ESA)	The ESA, 16 U.S.C. § 1531 <i>et seq.</i> , requires all federal departments and agencies to conserve threatened, endangered, and critical and sensitive species and the habitats on which they depend, as well as consult with the U.S. Fish and Wildlife Service (USFWS) 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 B for details.
National Historic Preservation Act of 1966 (NHPA)	Leasing is considered an undertaking pursuant to 54 U.S.C. § 300101 <i>et seq.</i> , commonly known as the NHPA, and 54 U.S.C. § 306108, commonly known as Section 106 of the NHPA (Section 106). Agencies may follow a phased approach to Section 106 compliance. At the leasing level, existing records reviews, and consultation drive identification of historic properties. Class III field inventories are an important part of identification at the lease-development level. See the text of stipulation HQ-CR-1 in Appendix B for details.
Federal Cave Resource Protection Act	This Act, at 16 U.S.C. § 4301 <i>et seq.</i> , secures and protects significant caves on federal land for the benefit and enjoyment of all people and directs the Secretary of the Interior to inventory and list significant caves on federal lands. Details regarding general cave management; the significant cave nomination, evaluation, and designation process; and cave and karst resource confidentiality noted within the Federal Cave Resource Protection Act are located in 43 C.F.R. § 37 (Cave Management).
Inflation Reduction Act of 2022 (IRA)	The IRA made the following major changes to BLM's oil and gas leasing program: • Rescinded the BLM's authority to issue noncompetitive leases under the MLA by striking 30 U.S.C. § 226I. • Removed BLM's authority to issue reversionary noncompetitive leases. • Updated the royalty rate and rental rate lease terms for competitive leases. • Changed the grounds and conditions for certain reinstatements. In addition, Section 50265 of the IRA states that the BLM may not issue a right-of-way for wind or solar energy development on federal land unless it has: 1) held an onshore oil and gas lease sale during the past 120 days and 2) offered the lesser of a "sum total" of either 2,000,000 acres or 50 percent of the acreage for which EOIs have been submitted for lease sales during the previous 1-year period. The BLM has issued regulations to implement the oil and gas leasing provisions in the IRA.

* See Appendix C for BLM's evaluation of the nominated lease sale parcels in accordance with 43 C.F.R. § 3120.32, *Expression of interest leasing preference*.

1.5 PUBLIC INVOLVEMENT AND ISSUES

1.5.1 Internal Scoping

The BLM CFO interdisciplinary team (IDT) conducted internal scoping to identify issues, potential alternatives, and data needs by reviewing the leasing actions within the context of the applicable RMP under the National Environmental Policy Act of 1969 (NEPA) framework. IDT meetings were held at the BLM CFO on April 26, 2024. Weekly meetings were held with additional BLM CFO IDT members during the parcel review process. Additionally, other resource-specific meetings with resource specialists were held to aid in refining issues related to the proposed lease sale.

1.5.2 External Scoping

A project summary page for the CFO Quarter 1 2025 Competitive Oil and Gas Lease Sale was posted May 6, 2024, on the BLM's National NEPA Register website (<https://eplanning.blm.gov>) (ePlanning).

The nominated lease parcel information (draft parcel list) was posted on that website for a public scoping period from May 6 to June 5, 2024.

The BLM CFO received 11 comment letters via ePlanning during the scoping period for the Quarter 1 2025 Competitive Oil and Gas Lease Sale. Members of the public and non-governmental organizations commented on the following topics:

- Effects of lease sales on greenhouse gas (GHG) emissions and climate change
- Air quality and associated health impacts
- Compliance with the Inflation Reduction Act of 2022 (IRA)
- Tribal consultation and public participation
- Cumulative impacts of BLM's leasing program and other similar actions nationwide
- Public health and environmental justice
- Big-game habitat and migration corridors
- Lesser prairie-chicken (*Tympanuchus pallidicinctus*)
- Impacts to groundwater quality and quantity from hydraulic fracturing and injection wells

In addition, commenters made the following requests:

- Defer parcels with no or low potential for oil and gas development and/or with resource concerns.
- Analyze potential effects on big game, cultural resources, special status species, and special designations; requested that BLM perform this analysis.
- Complete a programmatic environmental impact statement for the BLM's federal oil and gas program.
- Consider and recommend a reasonable range of alternatives.
- Incorporate climate costs.
- Impose climate change impact requirements and GHG emissions mitigation on leasing.
- Consult with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service pursuant to Section 7 of the Endangered Species Act (ESA).

1.5.3 Draft EA Public Comment and Response

The draft Quarter 1 2025 Competitive Oil and Gas Lease Sale EA was made available for a public comment period from July 30 to August 29, 2024. The BLM received seven unique comment letters via ePlanning during the public comment period for the Quarter 1 2025 Competitive Oil and Gas Lease Sale. The BLM responded to substantive comments (Appendix F). The BLM issued a press release in both English and Spanish to facilitate public involvement within the analysis area.

1.5.4 Public Protest Period

The Oil and Gas Lease Sale Notice was made available for a protest period from November 7 to December 9, 2024. Two protests were received from non-governmental organizations, and one was received from an individual. After review, the BLM has determined that protests of the CFO parcels in

the Quarter 1 2025 Competitive Oil and Gas Lease Sale, as amended, have been dismissed or denied. The protests and the resolution letters are available on www.eplanning.gov.

1.5.5 Issues

This analysis adheres to requirements of the National Environmental Policy Act, 42 U.S.C. §§ 4321–4370m-11 (NEPA) and the Department of the Interior’s NEPA regulations at 43 C.F.R. §§ 46.10-46.450.

Through scoping, three issues were identified for detailed analysis in this EA:

- How would future potential development of the nominated lease parcels affect air quality (particularly with respect to National Ambient Air Quality Standards [NAAQS] and volatile organic compounds [VOCs]) in the New Mexico portion of the Permian Basin?
- How would future potential development of the nominated lease parcels contribute to greenhouse gas (GHG) emissions?
- How would future potential development of the nominated lease parcels affect surface and groundwater quantity?

An additional 25 issues were identified, considered, and analyzed in brief (AIB) during review of the Proposed Action. These issues are presented in Section 3.5.

Table 1.2 lists resources or concerns that were considered but determined to not warrant analysis in this EA and provides rationale for the determination.

Table 1.2. Issues Considered but not Analyzed in this EA

Resource or Concern	Rationale for Not Analyzing in EA
Lands with wilderness characteristics (LWCs)	There are no LWCs within or near the nominated lease parcels. The closest LWC is over 10 miles from the nominated lease sale parcels. Therefore, analysis of potential effects on LWCs is not warranted.
ACECs/Special Management Areas/Special Designations/Recreation	There are no ACECs, proposed ACECs, Special Management Areas (SMAs), Special Designations or dispersed/designated recreation areas within the nominated lease parcels. The nearest SMA, ACEC, proposed ACEC, national byway and recreation area is Seven Rivers Hills, which is 1.25 miles north of parcel 468. Therefore, analysis of potential effects ACECs, proposed ACECs, SMAs, Special Designations or dispersed/designated recreation areas is not warranted.
Farmlands	There are no farmlands or Natural Resources Conservation Service-designated prime farmland soils within the nominated lease sale parcels. Therefore, analysis of potential effects on farmlands is not warranted.
Forestry and woodlands	No woodland areas or woodland vegetation types were found within the nominated lease parcels (see AIB-6); therefore, no management is implemented within the nominated lease parcels specifically for this vegetation type and analysis of potential effects on forestry and woodlands is not warranted.
Fuels and fire management	The potential for ignition of wildland fire from activities associated with future potential development of the nominated lease parcels would be minimized to the extent practicable through adherence to all applicable federal, state, and local fire safety requirements. No specific concerns or conflicts were identified through internal scoping relating to the effects of future potential development on fuels and fire management.
Lands and realty	Future potential development of the nominated lease parcels would be subject to existing land rights and interests (e.g., easements and water rights). Any potential land use conflicts would be resolved through other processes, such as administrative or legal proceedings, independent from this NEPA review.

CHAPTER 2. PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

Under the Proposed Action, the BLM would offer for lease federal minerals associated with the seven nominated lease parcels. Table 2.1 includes surface management, the legal land description of the nominated lease parcels totaling 1,317.29 acres, and lease stipulations and notices attached to the parcels. Appendix A contains parcel maps. Appendix B provides a summary of stipulations and lease notices. Under the Proposed Action, the BLM AO has the authority to lease the parcels, or to defer some or all of the parcels, based on the analysis of potential effects presented in this EA.

Drilling wells on lease parcels is not permitted until the leaseholder submits, and the BLM approves (subsequent to additional site-specific environmental review documentation), a complete Application for Permit to Drill (APD) package (Form 3160-3) following the requirements specified in 43 C.F.R. § 3162.3-1 and 43 C.F.R. § 3171. The BLM has authority, according to the STCs of the leases, to attach conditions of approval (COAs) to the APD that reduce or avoid impacts to public land, resources, and/or resource values. Under 43 C.F.R. § 3101.12, 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 they do not require relocation of proposed operations by more than 800 meters (m) (2,625 feet); require that operations be sited off the leasehold; or prohibit new surface-disturbing operations for a period in excess of 90 days in any lease year.

2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the BLM would not offer the nominated parcels for competitive leasing in the Quarter 1 2025 Competitive Oil and Gas Lease Sale; therefore, no parcels would be developed at this time. The parcels would have the potential to be nominated again for a future oil and gas lease sale.

Table 2.1. CFO Quarter 1 2025 Lease Sale Nominated Lease Parcels

Lease Parcel Number	Surface Ownership	Legal Description	Acres*	Lease Notices and Stipulations
NM-2025-02-465	BLM	T. 20 S., R. 27 E., NMPM; Sec. 12 NW1/4. Eddy County BLM CFO 16.67% Acquired Royalty Interest EOI# NM00019129	160	HQ-CR-1 BLM Lease Notice for Cultural Resource Protection HQ-MLA-1 BLM Lease Notice for Notice to Lessee Concerning Mineral Leasing Act Section 2(a)(2)(A) HQ-TES-1 BLM Lease Notice for Threatened and Endangered Species Act NM-1-LN BLM Lease Notice Stipulations for NMSO – LN – Potential, Suitable and Occupied Habitat for Special Status Plant Species NM-11-LN BLM Lease Notice for Special Cultural Resource NM-13-CSU BLM Stipulations for Paleontological Resources NM-14-LN BLM Lease Notice for Paleontological Resources SENM-LN-1 BLM Lease Notice for Potential Cave or Karst Occurrence Area SENM-S-18-CSU BLM Stipulations for Streams, Rivers, and Floodplains SENM-S-21-CSU BLM Stipulations for Caves and Karst
NM-2025-02-466	BLM	T. 20 S., R. 27 E., NMPM; Sec. 13 N1/2NE1/4. Eddy County BLM CFO 16.67% Acquired Royalty Interest EOI# NM00019129	80	HQ-CR-1 BLM Lease Notice for Cultural Resource Protection HQ-MLA-1 BLM Lease Notice for Notice to Lessee Concerning Mineral Leasing Act Section 2(a)(2)(A) HQ-TES-1 BLM Lease Notice for Threatened and Endangered Species Act NM-1-LN BLM Lease Notice Stipulations for NMSO – LN – Potential, Suitable and Occupied Habitat for Special Status Plant Species NM-11-LN BLM Lease Notice for Special Cultural Resource SENM-LN-1 BLM Lease Notice for Potential Cave or Karst Occurrence Area SENM-S-19-CSU BLM Stipulations for Playas and Alkali Lakes SENM-S-20-CSU BLM Stipulations for Springs, Seeps, and Tanks SENM-S-21-CSU BLM Stipulations for Caves and Karst

Lease Parcel Number	Surface Ownership	Legal Description	Acres*	Lease Notices and Stipulations
NM-2025-02-468	Private	T. 20 S., R. 26 E., NMPM; Sec. 31 LOTS 1 thru 4; Sec. 31 E1/2,E1/2W1/2. Eddy County BLM CFO 16.67% Acquired Royalty Interest EOI# NM00019187	639.84	HQ-CR-1 BLM Lease Notice for Cultural Resource Protection HQ-MLA-1 BLM Lease Notice for Notice to Lessee Concerning Mineral Leasing Act Section 2(a)(2)(A) HQ-TES-1 BLM Lease Notice for Threatened and Endangered Species Act NM-1-LN BLM Lease Notice Stipulations for NMSO – LN – Potential, Suitable and Occupied Habitat for Special Status Plant Species NM-11-LN BLM Lease Notice for Special Cultural Resource NM-13-CSU BLM Stipulations for Paleontological Resources NM-14-LN BLM Lease Notice for Paleontological Resources SENM-LN-1 BLM Lease Notice for Potential Cave or Karst Occurrence Area SENM-S-18-CSU BLM Stipulations for Streams, Rivers, and Floodplains SENM-S-20-CSU BLM Stipulations for Springs, Seeps, and Tanks SENM-S-21-CSU BLM Stipulations for Caves and Karst SENM-S-25-CSU BLM Stipulations for Visual Resource Management
NM-2025-02-470	BLM	T. 18 S., R. 27 E., NMPM; Sec. 34 NE1/4. Eddy County BLM CFO 16.67% Acquired Royalty Interest EOI# NM00019220	160	HQ-CR-1 BLM Lease Notice for Cultural Resource Protection HQ-MLA-1 BLM Lease Notice for Notice to Lessee Concerning Mineral Leasing Act Section 2(a)(2)(A) HQ-TES-1 BLM Lease Notice for Threatened and Endangered Species Act NM-1-LN BLM Lease Notice Stipulations for NMSO – LN – Potential, Suitable and Occupied Habitat for Special Status Plant Species NM-11-LN BLM Lease Notice for Special Cultural Resource SENM-LN-1 BLM Lease Notice for Potential Cave or Karst Occurrence Area SENM-S-18-CSU BLM Stipulations for Streams, Rivers, and Floodplains SENM-S-19-CSU BLM Stipulations for Playas and Alkali Lakes SENM-S-20-CSU BLM Stipulations for Springs, Seeps, and Tanks SENM-S-21-CSU BLM Stipulations for Caves and Karst
NM-2025-02-6845	BLM	T. 24 S., R. 27 E., NMPM; Sec. 6 LOTS 1 thru 4. Eddy County BLM CFO 16.67% Acquired Royalty Interest EOI# NM00019186	158.25	HQ-CR-1 BLM Lease Notice for Cultural Resource Protection HQ-MLA-1 BLM Lease Notice for Mineral Leasing Act Section 2(A)(2)(A) HQ-TES-1 BLM Lease Notice for Endangered Species Act Section 7 Consultation NM-1-LN BLM Lease Notice Stipulations for NMSO – LN – Potential, Suitable and Occupied Habitat for Special Status Plant Species NM-11-LN BLM Lease Notice for Special Cultural Resource SENM-LN-1 BLM Lease Notice for Potential Cave or Karst Occurrence Area SENM-S-19-CSU BLM Stipulations for Playas and Alkali Lakes SENM-S-21-CSU BLM Stipulations for Caves and Karst

Lease Parcel Number	Surface Ownership	Legal Description	Acres*	Lease Notices and Stipulations
NM-2025-02-6846	BLM	T. 20 S., R. 27 E., NMPM; Sec. 13 NW1/4NW1/4. Eddy County BLM CFO 16.67% Acquired Royalty Interest EOI# NM00019129	40	HQ-CR-1 BLM Lease Notice for Cultural Resource Protection HQ-MLA-1 BLM Lease Notice for Notice to Lessee Concerning Mineral Leasing Act Section 2(a)(2)(A) HQ-TES-1 BLM Lease Notice for Threatened and Endangered Species Act NM-11-LN BLM Lease Notice Stipulations for NMSO – LN – Potential, Suitable and Occupied Habitat for Special Status Plant Species NM-11-LN BLM Lease Notice for Special Cultural Resource NM-13-CSU BLM Stipulations for Paleontological Resources NM-14-LN BLM Lease Notice for Paleontological Resources SENM-LN-1 BLM Lease Notice for Potential Cave or Karst Occurrence Area SENM-S-21-CSU BLM Stipulations for Caves and Karst
NM-2025-02-6848	Private	T. 24 S., R. 36 E., NMPM; Sec. 6 LOT 5; Sec. 6 SE1/4NW1/4. Eddy County BLM CFO 16.67% Acquired Royalty Interest EOI# NM00019220	79.2	HQ-CR-1 BLM Lease Notice for Cultural Resource Protection HQ-MLA-1 BLM Lease Notice for Notice to Lessee Concerning Mineral Leasing Act Section 2(a)(2)(A) HQ-TES-1 BLM Lease Notice for Threatened and Endangered Species Act NM-11-LN BLM Lease Notice for Special Cultural Resource SENM-S-17-CSU BLM Stipulations for Slopes & Fragile Soils SENM-S-22-CSU BLM Stipulations for Lesser Prairie-Chickens SENM-S-27-CSU BLM Stipulations for Plan of Development

CSU = controlled surface use; LN = lease notice; NSO= no surface occupancy; NMPM = New Mexico Principal Meridian

*All acreages contained in the EA analysis were calculated using geographic information system (GIS) data sets for resources and parcels which may differ slightly from the acreages contained in legal descriptions above. Difference in total acres between parcels can vary because of geoprocessing operations where slivers of area are created when two or more data sets intersect. Any inaccuracies are negligible and do not change the overall impact analysis conclusions presented in this EA.

CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

3.1 INTRODUCTION

This chapter contains the effects analysis related to the issues listed in Section 1.5.5. Section 3.2 describes the analysis assumptions related to future potential development of the nominated lease parcels.

Section 3.3 presents an overview of reasonably foreseeable cumulative actions considered in the effects analysis. Section 3.4 describes the effects of the No Action Alternative for all issues. Section 3.5 presents the issues that are analyzed in brief. Section 3.6 presents the issues that are analyzed in detail.

3.2 ANALYSIS ASSUMPTIONS

While leasing would not directly authorize any oil and gas development or production, future oil and gas development and production is a reasonable outcome of a granted lease right. Because there are currently no development proposals for the nominated lease parcels, the BLM is unable to complete an analysis that uses information related to a specific proposed project or projects. However, for the purpose of this analysis, Sections 3.2.1 and 3.2.2 outline the methodology for estimating number of wells, potential production volumes, and surface disturbance associated with the future potential development of the nominated lease parcels.

3.2.1 Methodology for Estimating Number of Oil and Gas Wells and Production Volumes

Reasonably foreseeable quantitative well development estimates were derived from the well densities identified in the BLM Pecos District Office (PDO) (which is composed of the CFO and Roswell Field Office [RFO]) reasonably foreseeable development (RFD) scenario (Engler et al. 2012; Engler and Cather 2014; herein incorporated by reference). The projected number of wells for each nominated lease parcel is based on the horizontal and vertical well densities (in wells per acre) for each field office, which are calculated by dividing the number of wells projected for each field office in their RFD by the number of potentially available acres. To calculate the volumes of oil, natural gas, and water expected to be produced from the parcels, the projected number of wells (calculated as described above) was multiplied by the estimated ultimate recoveries (EURs) of oil, natural gas, and produced water per well. These EURs are generated by performing decline curve analyses of existing production within the PDO.

The projected number of wells and associated oil, gas, and produced water production for the nominated lease parcels are summarized in Table 3.1.

Table 3.1. Estimated Well Count and Production for the Nominated Lease Parcels

Parcel Number (number of acres)*	Field Office	Surface Management	Total Horizontal Wells†	Surface Disturbance (acres)	Oil Production (bbl)	Gas Production (mcf)	Produced Water Production (bbl)
NM-2025-02-465 (160)	BLM CFO	BLM	1	1.6	347,292	1,189,482	1,383,460
NM-2025-02-466 (80)	BLM CFO	BLM	1	1.6	347,292	1,189,482	1,383,460
NM-2025-02-468 (639.84)	BLM CFO	Private	1	1.6	347,292	1,189,482	1,383,460

Parcel Number (number of acres)*	Field Office	Surface Management	Total Horizontal Wells [†]	Surface Disturbance (acres)	Oil Production (bbl)	Gas Production (mcf)	Produced Water Production (bbl)
NM-2025-02-470 (160)	BLM CFO	BLM	1	1.6	347,292	1,189,482	1,383,460
NM-2025-02-6845 (158.25)	BLM CFO	BLM	1	1.6	347,292	1,189,482	1,383,460
NM-2025-02-6846 (40)	BLM CFO	BLM	1	1.6	347,292	1,189,482	1,383,460
NM-2025-02-6848 (79.21)	BLM CFO	Private	1	1.6	347,292	1,189,482	1,383,460
Total (1,317.29)	–	–	7	11.2	2,431,044	8,326,374	9,684,220

Note: bbl = barrels; mcf = thousand cubic feet

* All acreages contained in the EA analysis were calculated using geographic information system (GIS) data sets for resources and the parcels, which may differ slightly from the acreages contained in legal description here and in Table 2.1. Difference in total acres between the parcels and acres analyzed in the EA can vary slightly because of geoprocessing operations where slivers of area are created when two or more data sets intersect. Any inaccuracies are negligible and do not change the overall impact analysis conclusions presented in this EA.

[†] In cases where the methodology used for estimating the number of wells per nominated lease parcel resulted in a fractional value of less than one well per nominated lease parcel (because of low anticipated drilling rate), the fractional value was adjusted upward to the next whole number to represent a rational outcome of the number of potential wells that could be drilled and developed on the nominated lease parcel, as well as to provide meaningful inputs to the oil, gas, and produced water production projections.

3.2.2 Methodology for Estimating Surface Disturbance

It is unknown when, where, or to what extent subsequent well sites, roads, and associated infrastructure would be proposed in the event the BLM decides to lease the nominated lease parcels. Future potential development of the nominated lease parcels could include the following phases (Appendix D provides a summary of the phases of oil and gas development):

- Constructing new access roads or expansion of existing roads
- Constructing a well pad
- Drilling a well
- Hydraulically fracturing a well
- Installing pipeline
- Producing a well, which entails vehicle traffic; hauling of produced fluids such as oil or produced water; compression to move gas through pipeline systems; potential venting from storage tanks; regular well monitoring; and workover tasks for the life of the well
- Well plugging and abandonment
- Reclaiming and remediating the well

Based on surface disturbance values identified in the CFO RFD, the BLM estimates 1.6 acres of surface disturbance per horizontal well within the CFO. These estimates include surface disturbance associated with the well pads, access roads, and flowlines, and assume three horizontal wells per pad (Engler 2023).

The CFO RFD projects approximately 19,600 wells, of which approximately 12,500 would be federal wells, spread across approximately 2.7 million acres of federal subsurface mineral estate in the CFO planning area. The BLM calculated a well density (wells per acre) using these RFD projections. Using the calculated well density, acres of land and number of parcels available for leasing and rounding to ensure that the number of wells per parcel is a non-zero, whole number, one well per parcel was estimated for this lease sale. Future potential development of the nominated lease parcels is anticipated to comprise

seven horizontal wells and approximately 11.2 total acres of new surface disturbance. Estimated surface disturbance from future potential development of the nominated lease parcels is provided in Table 3.1. Disturbance would remain on the landscape until final abandonment and reclamation of facilities (generally assumed to occur after 20 years). Interim/ongoing reclamation procedures must be completed within six months of well completion and would be used to limit impacts by restoring disturbed areas as soon as they are no longer required for operations.

3.3 CUMULATIVE IMPACTS SCENARIO

The BLM PDO, which is composed of the CFO and RFO, encompasses over 20 million acres within the RMP planning area boundaries. This includes 3.5 million acres of BLM surface and 7.3 million acres of federally managed minerals. The following sections outline the reasonably foreseeable cumulative actions within the PDO planning area that are closely related to the Proposed Action and the RFD of the nominated lease parcels. The BLM can identify and analyze reasonably foreseeable cumulative actions expected to occur over the next 20 years, as this time period is aligned with RMP and RFD scenario information (Engler 2023, Engler et al. 2012; Engler and Cather 2014). Additional information related to environmental impacts of BLM management decisions can be found in the Carlsbad RMP (BLM 1988), as amended (BLM 1997a, 2008a), and Roswell Approved RMP and Record of Decision (BLM 1997b), as amended (BLM 2008a). More information related to air resources environmental trends is available in the *Air Resources Technical Report for Oil and Gas Development in New Mexico, Oklahoma, Texas, and Kansas* (herein referred to as Air Resources Technical Report) (BLM 2023b); this document is incorporated by reference into the EA.

3.3.1 Energy Development and Other Land Uses

3.3.1.1 Mineral and Energy Development

The PDO planning area consists of surface topography, climate conditions, and mineral deposits that are conducive to energy development. These natural conditions have led to the use of suitable lands for various forms of energy development on federal and state managed surface as well as privately owned surface. It is expected that land and mineral estates within the PDO will continue to be used for energy development, resulting in a trend of increased total land use and resource impacts attributed to these activities.

The PDO, which encompasses the New Mexico portion of the Permian Basin, contains a mineral estate that is rich in accessible oil and gas reserves that has led to heavy development of these resources, starting in the early 1900s and resulting in the area becoming one of the most productive land-based fields in the country. Most of the Permian Basin open to oil and gas leasing is already leased for fluid mineral development. The BLM estimates there are currently approximately 45,579 active wells (primarily vertical wells) within the PDO, of which approximately 24,990 are federal wells. These numbers are based on information contained in the BLM 2022 Air Resources Technical Report, which considered New Mexico Oil Conservation Division (NMOCD) data (BLM 2023b) (Table 3.2). In the CFO planning area alone, approximately 109,000 acres of existing surface disturbance is associated with oil and gas development (Engler 2023). Additional oil and gas-related surface disturbance exists within the RFO planning area, which has not been estimated but is assumed to be less than CFO disturbance due to fewer wells. When wells reach the end of their useful life they get plugged and reclaimed; since 2021, a total of 1,098 wells in the PDO have been plugged and abandoned.

Table 3.2. Estimated Landscape Disturbance Associated with Cumulative Actions within the PDO

Cumulative Actions within PDO Planning Area (Analysis Area) (Total Acres: 20,000,000)	Number of Wells	Acreage of Surface Disturbance	Percent of PDO Analysis Area (acreage)
Existing development in the PDO (construction of gas plants, potash mines, oil and gas well pads, access roads, transmission lines, and other linear features)*	45,579	317,000*	1.585%
CFO oil and gas RFD†	19,600	33,367	0.166%
PDO oil and gas RFD (RFO portion of PDO planning area only)‡	640	1,088	0.005%
Mining¶	N/A	2,400	–
Other linear infrastructure¶	N/A	4,200	–
Seismic explorations¶	N/A	32,000	–
Agriculture (non-grazing)¶	N/A	140	–
Total	65,179	390,195	1.95%
Future potential development under the Proposed Action	7	11.2	0.00006%

Note: Livestock grazing, which occurs on approximately 17,600,000 acres within PDO, is not included in the surface disturbance column as it does not necessarily imply an overt conversion of land use like infrastructure developments do; however, the cumulative effects of grazing are still considered throughout this EA analysis wherever applicable to resources.

N/A = not applicable

* Source: BLM (2018b). Value includes estimates of existing disturbance from past construction of gas plants, potash mines, oil and gas well pads, access roads, transmission lines, and other linear features. Of this total, at least 109,000 acres of existing surface disturbance is attributed to oil and gas development in the planning area (Engler 2023). Additional disturbance likely exists as a result of past wells that are no longer in use and were either plugged, reclaimed, and abandoned or, in some cases, abandoned without full reclamation. There is no reliable acreage estimate for this additional disturbance. However, the BLM and the State of New Mexico are actively working to plug abandoned wells, which should serve to address some of this disturbance.

† Source: Engler (2023). Based on the 20-year scenario (2023–2043), new surface disturbance from potential wells in the RFD scenarios is estimated at 1.6 acres per horizontal well and 2.8 acres per vertical well.

‡ Sources: Engler et al. (2012); Engler and Cather (2014). Assuming the proportion of development in Chaves and Roosevelt Counties relative to the larger PDO planning area would remain relatively stable (approximately 4%) into the future, the number of projected wells from the PDO RFD that is likely to occur within Chaves and Roosevelt Counties only is estimated at 640 wells. The average per-well surface disturbance is estimated at 1.6 acres, as provided in the CFO RFD, which represents the best available data for the New Mexico portion of the Permian Basin.

¶ Sources: BLM (2014, 2018b). This estimate includes approximately 2,400 acres of surface disturbance predicted from the proposed Ochoa Mine (BLM 2014), 4,200 acres of surface disturbance from development of transmission lines and pipelines/associated infrastructure (BLM 2018b), 140 acres of surface disturbance from agriculture (BLM 2018b), and 32,000 acres of short-term disturbance from seismic exploration, with reclamation occurring within 3 years (BLM 2018b).

The PDO planning area consists of the CFO and RFO, each of which has its own acting RFD scenario and associated projections of reasonably foreseeable well development. Well projections for the CFO planning area, which encompasses Lea and Eddy Counties and portions of Chaves County, are provided in the CFO RFD (Engler 2023). Well projections for the RFO planning area, which encompasses portions of Chaves and Roosevelt Counties, were extracted from the PDO RFD (Engler et al. 2012; Engler and Cather 2014). Well projections from these respective CFO and RFO RFDs are summarized below:

- CFO: The RFD scenario for oil and gas in the CFO (Engler 2023) projects that on average, 980 oil and gas wells would be completed within the CFO planning area each year over the 20-year scenario (2023–2043), for approximately 19,600 new wells (federal and non-federal), most of which are expected to be horizontally drilled.
- RFO: The PDO RFD projects that 800 oil and gas wells would be completed within the PDO each year for the 20-year scenario (2015–2035), for a total of approximately 16,000 new wells (federal and non-federal), most of which are expected to be horizontally drilled. Based on the review of cumulative production volumes through 2010 (see Summary Table 1 [page 49] in Engler and Cather [2012]) most of this production has occurred in CFO (Eddy and Lea Counties), and development in RFO (Chaves and Roosevelt Counties) represents approximately 4% of the cumulative production volumes for the PDO planning area. Assuming this proportion of development in RFO (Chaves and

Roosevelt Counties) relative to the larger PDO planning area would remain relatively stable into the future, the number of projected wells from the PDO RFD that is likely to occur within RFO (Chaves and Roosevelt Counties) would be approximately 640 wells.

When combined, the total number of projected wells for the PDO planning area is 20,240 (including 19,600 wells in CFO and 640 wells in RFO).

The desert climate and low-slope profile topography existing across a majority of the PDO also lends itself to being highly suitable for renewable energy development. Over the past 20 years, the PDO has shown an increase in both solar and wind development projects along with supporting infrastructure such as transmission lines, facilities, and access roads. Also, the PDO has naturally occurring saleable and locatable mineral reserves that have past and present development, with the understanding that development activities will continue at a similar rate. This includes, but is not limited to, land use and associated surface disturbance associated with seismic exploration for oil and gas and potash mining, such as tailings piles and mine development.

Past and planned actions of energy and mineral development within the PDO are estimated to entail 390,195 acres of surface disturbance, which comprises 1.95% of the PDO analysis area (see Section 3.3.1.3; see Table 3.2). Energy and mineral development on federal lands or mineral estate is expected to continue under the management and conditions outlined in the CFO and RFO RMPs (BLM 1988, 1997a, 1997b, 2008a). This represents a continued trend of human use of land and mineral resources. Such effects would correspond to the resources present at the location of development with contribution to landscape-level conditions and could result in landscape modifications over time, including habitat loss or degradation; changes in plant communities; fluctuating but generally increasing levels of emissions of pollutants; changes in land use patterns and the amount of landscape unaltered by human activities; changes to the visual landscape; and changes in the quantity or quality of water resources. Sections 3.5 and 3.6 consider the effects of these cumulative actions related to oil and gas development on resource issues analyzed in brief and in detail, respectively.

3.3.1.2 *Municipal and Other Land Uses*

Existing municipal and other land uses within the PDO planning area, such as urban development, grazing, recreation, off-road travel, and transmission or pipeline rights-of-way, are expected to continue at current or slightly increased levels. This includes municipal and urban development, including expanded footprints of cities such as Carlsbad, Roswell, and Artesia. Presently, livestock grazing is estimated to occur on 88% (17,600,000 acres) of the PDO planning area, and it is assumed this use will continue at existing levels. Other land uses, such as recreation on federal lands, are expected to continue under the management and conditions of the Carlsbad RMP (BLM 1988), as amended (BLM 1997a, 2008a), and Roswell Approved RMP and Record of Decision (BLM 1997b), as amended (BLM 2008a). Associated effects would correspond to the resources present at the specific development location with contribution to landscape-level conditions and could result in landscape modifications over time. The analyses presented in Sections 3.5 and 3.6 consider the effects of these cumulative actions related to oil and gas development on resource issues analyzed in brief and in detail, respectively.

3.3.1.3 *Quantification of Landscape Disturbance*

Table 3.2 summarizes the estimated acreage of landscape disturbance associated with energy and mineral development and other land uses within the PDO. Additional information related to environmental impacts of current BLM management decisions can be found in the applicable RMP and environmental impact statement (BLM 1988, 1997a, 1997b, 2008a). More information related to air and water resource environmental trends is also available in the Air Resources Technical Report (BLM 2023b) and *2023 BLM Water Support Document for Oil and Gas Development in New Mexico* (hereafter referred to

as the Water Support Document) (BLM 2023c); the BLM incorporates these documents by reference into the EA.

Based on the information provided in Table 3.2, future potential development of the nominated lease parcels (seven horizontal wells) would comprise 0.03% of the projected wells in the oil and gas RFD scenario (including 19,600 wells for CFO and 640 for RFO), and 0.02% of the total number of existing well development in the PDO analysis area (45,579 wells). Table 3.2 also shows that the estimated acreage of surface disturbance (11.2 acres) associated with future potential development under the Proposed Action would represent 0.03% of the projected surface disturbance in the oil and gas RFD scenarios (including 33,367 acres for CFO and 1,088 acres for RFO), and 0.004% of the total existing landscape disturbance (317,000 acres) in the PDO analysis area (20 million acres).

3.3.2 Land Restoration and Conservation Activities

A multifaceted network of federal and state agencies as well as non-governmental organizations reclaim, restore, and conserve land and resources in the PDO. The BLM New Mexico State Office (NMSO) has partnered with the State of New Mexico, ranchers, industry, and other local partners on a restoration initiative called Restore New Mexico. Since 2005, the initiative has restored over 3 million acres of grasslands, woodlands, and riparian areas across the state that had been degraded by invasive species and woodland encroachment in New Mexico (U.S. Geological Survey [USGS] 2019). This program has also resulted in the reclamation of some oil and gas legacy well pads, roads, and caliche pits within the PDO analysis area (USGS 2019). Restore New Mexico's rehabilitation efforts and continued work are considered an ongoing countervailing effect on present and future landscape-level surface disturbance as legacy oil and gas development and ecosystems are gradually restored.

The New Mexico Association of Conservation Districts (NMACD) participates in reclamation work for caliche pits and old roads and well pads, including seeding or reseeding reclaimed areas, as well as creosote and mesquite treatments (3,767 acres of mesquite and creosote were treated in the PDO in 2023) (NMACD 2023). The Carlsbad and Chaves Soil and Water Conservation Districts promote the conservation of natural resources in their districts by providing financial and technical assistance for soil- and water-related conservation projects; examples of recent and ongoing projects include invasive and noxious weed treatments, vegetation plantings and restoration, community education on conservation practices, brush control on grazing lands, irrigation improvements to conserve water, and installation of wildlife-friendly fencing (Chaves Soil and Water Conservation District 2024, Carlsbad Soil and Water Conservation District 2023). The New Mexico Department of Agriculture's Healthy Soil Program offers grants to individuals or entities to implement on-the-ground projects that benefit soil health (e.g., minimizing soil disturbance or maximizing biodiversity); three healthy soil projects are currently being implemented in the PDO planning area, including one in Lea County and two in Chaves County (New Mexico Department of Agriculture 2024). All three projects are affiliated with (i.e., sponsored or implemented by) the local SWCD. The National Fish and Wildlife Foundation's (NFWFs) Pecos River Conservation Initiative (PRCI) was formed in 2017 and is a strategic partnership between energy companies and land management agencies (such as BLM, USFWS, NRCS) that provides funding for conservation projects in the Pecos River Watershed. The initiative identifies strategic conservation opportunities and works to enhance and restore the natural resources and wildlife habitat in the region. In 2022, PRCI supported nine conservation projects that involved restoration of riparian (1,109 acres) and grassland habitats (11,477 acres) and installation of pronghorn-friendly fencing (49 miles) (NFWF 2023).

Additionally, BLM management decisions have a continued focus on conserving lands (habitat) for special status species, including lesser prairie chicken (LEPC) and dunes sagebrush lizard (*Sceloporus arenicolus*), as identified and analyzed in the 2008 BLM PDO *Special Status Species Record of Decision and Approved Resource Management Plan Amendment* (RMPA) (referred to herein as 2008 BLM ROD Special Status Species RMPA) (BLM 2008a) and those managed by candidate conservation agreements

(BLM 2007, 2008a; USFWS, BLM, et al. 2008; USFWS and Texas Comptroller of Public Accounts [CPA] 2019; USFWS, Western Association of Fish and Wildlife Agencies, et al. 2014). It is anticipated that the BLM and other agencies would also continue to treat lands within the PDO with prescribed fire, mechanical treatments, and herbicide according to the Carlsbad RMP (BLM 1988), as amended (BLM 1997a, 2008a) and the Roswell Approved RMP and ROD (BLM 1997b), as amended (BLM 2008a).

3.3.3 Changes to Regional Environmental Conditions Related to Climate

Currently, global climate models are unable to forecast local or regional effects on resources. However, general projections regarding potential impacts to natural resources and plant and animal species may be attributed to GHG emissions. Effects are likely to be varied, including those in the southwestern United States (Karl et al. 2009). Climate models project robust differences in regional changes related to precipitation patterns, average temperatures, and frequency or severity of drought (Intergovernmental Panel on Climate Change [IPCC] 2023). Impacts of GHG emissions to regionally variable ecosystem processes have also been observed and have been used to make general projections regarding potential future effects of climate change on natural resources and plant and animal species for different regions (Karl et al. 2009).

The PDO planning area is included in the Upper Rio Grande Basin (south Colorado to south-central New Mexico) and Texas-Gulf Basin (east New Mexico to southeast Texas), which are expected to be affected in both the short and long term by variations in global and regional environmental conditions. There have been observable trends in warming temperatures for both New Mexico and Texas, in which average annual temperatures have increased by almost 2 degrees Fahrenheit (°F) and 1.5°F, respectively, since the beginning of the twentieth century, and the number of extremely hot days, warm nights, and extreme heat events have also increased. Droughts are a serious threat in water scarce New Mexico and wildfire frequency and severity are projected to increase. The summer monsoon rainfall, which provides much needed water for agricultural and ecological systems, varies greatly from year to year and future trends in such precipitation are highly uncertain. In Texas, increases in extreme precipitation events are projected. Higher temperatures will increase soil moisture loss during dry spells, increasing the intensity of naturally occurring droughts. Also, increases in hurricane rainfall rates, storm surge height because of sea level rise, and the intensity of the strongest hurricanes are projected, which may affect the number of landfalling hurricanes in Texas (BLM 2023b). Additional information related to global, regional, and state climate projections can be found in the Air Resources Technical Report (BLM 2023b) and the *2022 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends* (referred to herein as BLM Specialist Report [BLM 2023a]). Lastly, information on climate impacts to ecoregions within the nominated lease parcels (see AIB-6) can be found in the *USGS Southern Great Plains Rapid Ecoregional Assessment* (Reese et al. 2017; incorporated by reference).

3.4 NO ACTION ALTERNATIVE FOR ALL ISSUES

Under the No Action Alternative, the BLM would not lease the nominated lease parcels and the existing conditions and trends related to each issue would continue. Potential impacts associated with future potential development of the nominated lease parcels would not occur under this alternative, current land and resource uses would continue, and the federal mineral acreage would remain open to future oil and gas lease development. In the 20-million-acre PDO, approximately 7.6 million acres are federal mineral estate. Oil and gas development would continue on leased land surrounding the nominated lease parcels. No natural gas or crude oil from the nominated lease parcels would be produced, and no royalties would accrue to federal or state treasuries. A choice on the part of the BLM not to lease the nominated lease parcels would eliminate seven oil and gas development opportunities in the BLM PDO. Reduction or elimination of total oil and gas development opportunities in the area is likely to incrementally reduce

local and regional employment and revenue opportunities related to the oil and gas and service support industries over time. This is because the oil and gas sector of the economy relies on both ongoing operational activities (development of existing leases) and new development opportunities (acquisition and development of new leases) to continue to provide local and regional jobs and revenue on a sustained basis.

3.5 ISSUES ANALYZED IN BRIEF

Following internal and external scoping, the IDT identified, considered, and analyzed in brief 25 issues related to the Proposed Action. Each of these issues is outlined below with a concise discussion regarding the impacts related to each issue. Stipulations HQ-TES-1 and HQ-CR-1 and Lease Notice NM-11-LN, as well as STCs described in the lease form, would apply to all nominated lease parcels. For all AIB issues that follow, it is assumed that the effects of reasonably foreseeable cumulative actions to relevant elements of the environment would be consistent with the landscape disturbance acreages presented in Table 3.2.

For the purposes of this analysis, short-term effects are considered those that cease after well construction and completion (30–60 days) or cease after interim reclamation (2–5 years). Long-term effects are 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 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 (see AIB-6 for more information).

AIB-1 Groundwater Quality

How would future potential development of the nominated lease parcels affect groundwater quality?

Leasing and future potential development of the nominated lease parcels would result in oil and gas activities, including well pad construction, drilling, and completion of an estimated seven horizontal wells. The wells would be horizontal wells that would employ standard industry practices related to well completion (i.e., perforation and hydraulic fracturing). 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.

Section 2.2.2 of the Water Support Document also contains information on per- and polyfluoroalkyl substances (PFAS), which is a broad term classification for a large group of human-made chemicals that are found in a wide variety of industrial processes and common household items. PFAS are a main component of aqueous film-forming foam, which is used regularly in fire suppression and prevention activities performed at airports and military bases. Aqueous film-forming foam is a major source of PFAS groundwater contamination and has been recognized as a nationally significant challenge in the United States (Sunderland et al. 2018). PFAS are very persistent in both the environment and the human body due to their inability to readily break down (U.S. Environmental Protection Agency [EPA] 2024e). PFAS persistence has been linked to bioaccumulation in both the environment and human body, which may lead to adverse effects on human health (EPA 2024e). In the years 2020 and 2021, the USGS partnered with the New Mexico Environment Department (NMED) to conduct a statewide assessment of PFAS to better understand PFAS contamination throughout the state (USGS 2024a). The study analyzed PFAS presence in groundwater across New Mexico. Of the 117 groundwater sample locations across New Mexico,

27 sample locations (23% of sampling locations) were found to have one or more PFAS above the laboratory detection limit (USGS 2024a). There were no PFAS sample locations that had concentrations exceeding the EPA's 70 nanogram/liter recommendation (USGS 2024a).

PFAS may be used during the hydraulic fracturing process due to their stability at high temperatures and pressures and may be used in well drilling (in the form of drilling fluids), well completion, and workover operations (Gaines 2022). In addition to drilling efficiency purposes, PFAS are used as an effective method to mitigate oil spills in water. Use of PFAS chemicals makes up a minimal amount (less than 1%) of chemical constituents disclosed to FracFocus for hydraulic fracturing in New Mexico (FracFocus 2024). In total, 63 of the approximately 31,000 ingredient disclosures (0.01%) in 2023 were related to PFAS used in hydraulic fracturing processes in New Mexico. PFAS use in hydraulic fracturing is likely to occur in areas not associated with New Mexico's drinking water.

Reasonably foreseeable well development associated with the RFD scenario (see Section 3.3) would most likely pass through a usable groundwater aquifer currently or potentially supplying stock, residential, and/or irrigation water. If proper cementing and casing programs are not followed, there may be a loss of well integrity, surface spills, or loss of fluids in the drilling and completion process that may result in large volumes of high concentrations of chemicals reaching groundwater resources. If contamination of usable water aquifers (resulting in total dissolved solids greater than 10,000 parts per million [ppm]) from any source occurs, springs and water wells that are sourced from the affected aquifers could be subject to long-term decreases in water quality depending on the severity of the contamination event, and individuals and communities that utilize those wells could be affected. According to New Mexico Administrative Code (NMAC) 19.15.16, operators are required to seal and isolate strata containing fresh water from oil and gas-bearing strata (including sealing the annulus). BLM regulations, including 43 C.F.R. § 3160, 43 C.F.R. § 3162.3-3, 43 C.F.R. § 3162.3-5, 43 C.F.R. § 3171, 43 C.F.R. § 3172, and 43 C.F.R. § 3177; NMOC regulations, NMAC 19.15.26; and the state's primacy agreement under the federal Safe Drinking Water Act include requirements for hydraulic fracturing such as casing specifications, monitoring and recording, and management of recovered fluids (wastewater or produced water). The BLM and state of NM enforce these safeguards, which have been put in place to prevent these situations from occurring.

The 2023 *BLM Water Support Document for Oil and Gas Development in New Mexico* (BLM 2023c) (hereafter referred to as the Water Support Document and incorporated by reference) contains a detailed summary of the regulatory program associated with hydraulic fracturing and measures to protect groundwater quality. A list of the potential environmental effects of hydraulic fracturing can be found in the EPA report, *Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States* (EPA 2016). In summary, this report examines six different scenarios in which drinking water resources may be affected by hydraulic fracturing: 1) water withdrawals during periods of low water availability, 2) spills of hydraulic fracturing fluids/chemicals and/or produced water, 3) release of hydraulic fracturing fluids from wells with inadequate casing, 4) direct injection of hydraulic fracturing fluids into groundwater, 5) discharge of insufficiently treated wastewater to surface water, and 6) contamination of groundwater from unlined storage/disposal pits.

Of the 20,240 wells identified in the PDO and CFO RFD scenarios, seven horizontal wells (0.03%) would be attributable to future potential development of the nominated lease parcels (see Section 3.3). The future potential development of nominated lease parcels (11.2 acres) would comprise 0.003% of the total landscape-level surface disturbance trends (390,195) (see Table 3.2) identified in Section 3.3.

The seven nominated lease parcels are within four groundwater basins (Table 3.3). The parcel acreage within these groundwater basins is between 0.002% and 0.35% of the total acreage of each groundwater basin.

Table 3.3. Groundwater Basin Impact Summary

Groundwater Basin (total basin size in acres)	Parcel (total parcel acres within each basin; percent total basin acreage)
Capitan 1965 (1,008,885.18)	466, 6848 (159.2; 0.016%)
Carlsbad 1947 (318,310.76)	468, 6845 (798.09; 0.25%)
Roswell 1946 (139,985.25)	465, 466, 470, 6846 (440; 0.31%)
Roswell 1950 (615,139.93)	468 (639.84; 0.10%)

The Captain Basin aquifer is approximately 700 feet thick on average, with a maximum depth of 2,000 feet below land surface (USGS 2024b). The Carlsbad Basin aquifer has an approximate maximum thickness of 1,600 to 2,000 feet and begins approximately 0 to 200 feet below ground level (New Mexico Office of the State Engineer [NMOSE] 2004). The Roswell Basin aquifer ranges in approximate thickness from 2,000 to 3,800 feet and occurs roughly 0 to 4,000 feet below ground level (Robson and Banta 1995).

The average oil and/or gas well depth within Eddy and Lea Counties is 5,376 feet and 9,100 feet, respectively (Mineral Answers 2022a–2022c, respectively). Based on estimated aquifer thicknesses and depths within the analysis area, future potential development of the nominated lease parcels would likely result in wells drilled beyond (deeper than) the regional aquifers. Although wells drilled would likely pass through these aquifers, the evidence indicates that the regulatory programs described previously would protect these water resources. Nominated lease parcel 468 contains two groundwater wells within the parcel and two groundwater wells within 200 m (656 feet) of the parcel. While groundwater resources are regional in nature and water withdrawals are not anticipated to affect domestic water sources, any impacts to local water wells (for example, a spill that affects groundwater) could force residents to find other means of supplying water for domestic use. Best management practices (BMPs) and COAs would help to minimize this risk. STCs would also apply to all leases, which allows for siting of wells to minimize potential impacts to existing groundwater wells and groundwater resources. For more information regarding livestock wells and range improvements, see AIB-16.

Protection of groundwater is enforced in concert with the State of New Mexico and any other applicable entities with jurisdiction, and mitigation of any water-contaminating event would occur in addition to the enforcement of applicable regulations. If effects were to occur, lessees and operators would be obligated by the standard terms of the lease, as well as the approved APD and applicable BLM and NMOCD regulations to report, respond to, and mitigate the spill or release. Additionally, all injection wells permitted by the NMOCD (including injection wells and producing wells and all related surface facilities) are subject to a surface injection pressure limitation. Wells are required to be equipped with a pressure-limiting device, which ensures that the maximum surface injection pressure is not exceeded (NMOCD 2004). The BLM inspection and enforcement personnel periodically inspect wells and surface facilities to ensure that all wells and related surface facilities are in good repair and leak free (NMOCD 2004). The NMOCD is also responsible for oversight of hydraulic fracturing wastewater pits. NMAC 19.15.17 regulates the use of liners as well as depth restrictions to protect groundwater resources.

Spill occurrences could affect groundwater on-site or during material transport. The Water Support Document (BLM 2023c) notes a total of 38,741 spills in the Permian Basin (Eddy, Lea, and Chaves Counties) in 2022. The rate of recovery varies by spill type, but the average loss rate for all liquid spill types was approximately 63%. Spills that are not recovered are remediated, which may include removal of contaminated soil. In 2022, three natural gas liquid spills were reported as having affected groundwater in Eddy, Lea, and Chaves Counties (BLM 2023c). Should a spill occur, the BLM would work with the NMOCD to immediately remediate spills on BLM lands in accordance with federal and state standards, including NMAC 19.15.29.11. According to NMAC 19.15.29.11, the operator shall complete division-approved corrective action for releases that endanger public health or the environment in accordance with a remediation plan submitted to and approved by the NMOCD or with an abatement plan submitted in

accordance with NMAC 19.15.30. The remaining contaminants from unrecovered spills are remediated in accordance with federal and state standards. Such remediation could consist of removal of contaminated soil, replacement with uncontaminated soil, and subsequent chemical testing. See the Water Support Document (BLM 2023c) for further information on spills.

In summary, the BLM, NMED, and NMOCD have put in place numerous requirements for oil and gas producers so that drilling fluids, hydraulic fracturing fluids, and produced water and hydrocarbons remain within the well bore and do not enter groundwater or any other formations. These include BLM regulations covered under 43 C.F.R. § 3160; 43 C.F.R. § 3162.3-3; 43 C.F.R. § 3162.3-5; 43 C.F.R. § 3171; 43 C.F.R. § 3172; 43 C.F.R. § 3177; Notice to Lessees 3A; NMOCD regulations under NMAC 19.15.26; and the state's primacy agreement under the Safe Drinking Water Act. With these requirements in place, including the use of casing and cementing measures, contamination of groundwater resources from the nominated lease parcels is highly unlikely. There have been no documented instances of groundwater contamination attributed to well drilling and completion in the PDO (BLM 2023c), which further supports this conclusion. In addition, the BLM has authority under STCs to require additional measures to protect water quality if site-specific circumstances require them. Site-specific mitigation tools would be developed as appropriate for the individual circumstances, including groundwater-quality monitoring studies. The regulations at 43 C.F.R. § 3162.5-2(d) give the BLM the authority to require an operator to monitor water resources to ensure that the isolation procedures used to protect water and other resources are effective.

AIB-2 Surface Water Quality

How would future potential development of the nominated lease parcels affect watershed hydrology and surface water quality?

Watersheds are delineated by USGS using a nationwide system based on surface hydrologic features. Hydrologic unit codes (HUCs) are used to identify a hydrologic area, ranging from the largest 'regions' to smaller 'cataloging' units. HUC-10, the fifth level of classification, divides subbasins into watersheds, which typically range from 40,000 to 200,000 acres (Jones et al. 2022). The PDO encompasses 12 HUC-10 watersheds. Current surface disturbance of all types within the 20-million-acre analysis area is estimated at 317,000 acres (BLM 2018b), and there are approximately 45,579 active well bores of all well types (BLM 2023b). The total existing surface disturbance comprises about 1.6% of the analysis area.

Reasonably foreseeable cumulative actions within the PDO (which include the RFD scenarios for PDO) would result in approximately 390,195 acres of surface disturbance over the next 20 years. This equates to 1.95% of the approximately 20-million-acre PDO. These actions would disturb vegetation, soils, and mineral substrate, which would create dust and increase runoff rates during precipitation events. By increasing runoff and removing vegetation, disturbed areas could become more susceptible to erosion. Soil that is carried downgradient by runoff because of upslope erosion may create sedimentation issues in streams. Sedimentation would be most likely to occur during construction of stream crossings for access roads and flowlines, and at disturbances nearest streams; however, effects would remain until disturbed areas are restored to preconstruction conditions. Development of the RFD scenario also carries a risk of spills that could result in the delivery of contaminants to surface water depending on the proximity of development activities to surface water and the measures applied to address the possibility of spills reaching surface water bodies. However, as noted in the Water Support Document (BLM 2023c), only one of the 38,741 spills in 2022 (0.003%) in the Permian Basin was reported to have impacted surface waters. The nominated lease parcels (1,317.29 acres collectively) fall within six HUC-10 watersheds (Table 3.4). The nominated lease parcels do not contain any Clean Water Act 303(d) Impaired Waters. Future potential development of the nominated lease parcels would result in approximately 11.2 acres of surface disturbance (approximately 0.85% of the total nominated lease parcel acreage (1,317.29 acres)). This surface disturbance would result in long-term disturbance to vegetation, soils, and mineral substrate,

which in turn would increase the potential for dust, runoff, salination, and sedimentation of nearby water bodies. Future potential development of the lease parcels would also result in a small, albeit present, risk of spills. For detailed discussion of risk of spills associated oil and gas development, see Section 3.2 of the Water Support Document (BLM 2023c).

Based on review of the USGS's National Hydrography Dataset (NHD), Federal Emergency Management Agency (FEMA) floodplain data, and the USFWS's National Wetlands Inventory (NWI) dataset,¹ surface water features are present on two of the seven nominated lease parcels (parcels 468 and 470). Surface water features are not present on the remaining nominated lease parcels, and none of the nominated lease parcels contain perennial streams or swamps/marshes. However, parcels 465 and 466 are within a 200-m hydraulic buffer for a mapped drainage and playa, respectively. Table 3.4 lists the previously mapped surface water features and HUC-10 watersheds for the seven nominated lease parcels. Playas (including alkali lakes and vegetative depressions) are present within some of the nominated lease sale parcels and are addressed in AIB-3.

Table 3.4. Surface Water Feature Impact Summary

Parcel (total parcel acreage)	Water Features Present in Parcel (acres or miles) [*]	HUC-10 Watershed (total parcel acres within each watershed; percent total watershed acreage)	Applicable Stipulations**
465 (160)	No mapped surface water features, but is within a 200-m hydraulic buffer of a mapped drainage	Pamilla Draw (160; 0.07%)	SENM-S-18-CSU
466 (80)	No mapped surface water features, but is within a 200-m hydraulic drainage of a mapped playa	Pamilla Draw (80; 0.04%)	SENM-S-20-CSU
468 (639.84)	Ephemeral streams/rivers (2.42 miles); riverine wetland (1.42 acres), Zone A Floodplain (47.45 acres)	Dark Canyon-Pecos River (639.84; 0.35%)	SENM-S-18-CSU; SENM-S-20-CSU
470 (160)	Ephemeral streams/rivers (0.62 miles); riverine wetland (1.48 acres)	Dark Canyon-Pecos River (160; 0.09%)	SENM-S-18-CSU, SENM-S-20-CSU
6845 (158.25)	No mapped surface water features	Black River (157.21; 0.06%), Black River-Pecos River (2.41; 0.002%)	—
6846 (40)	No mapped surface water features	Pamilla Draw (40; 0.02%)	—
6848 (79.2)	No mapped surface water features	Antelope Draw (79.2, 0.03%)	—

Note: See Appendix B for summaries of stipulations and lease notices.

Previously mapped surface water features have been identified based on analysis of the 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 STCs, as well as COAs as determined by the BLM.

CSU = controlled surface use; FEMA = Federal Emergency Management Agency

* 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.

† Artificial paths 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.

‡ FEMA defines zone A floodplains as 100-year floodplains that have a 1% change of being inundated in a given year.

Stipulation SENM-S-18-CSU (controlled surface use [CSU]) states that surface disturbance will not be allowed within up to 200 meters of the outer edge of 100-year floodplains. The stipulation is designed to protect the integrity of those floodplains applied to parcels 465, 468, and 470 (see Appendix B). Stipulation SENM-S-20-CSU, applied to parcels 466, 468, and 470, states that surface disturbance will

¹ Delineation size of surface water features varies between the NHD and NWI data sets. Site-specific analysis of the nominated lease parcels would identify aquatic features and wetlands at the time of future potential development of the nominated lease parcels.

not be allowed within up to 200 meters of the source of a spring or seep, or within downstream riparian areas created by flows from the source or resulting from riparian area management, and that surface disturbance will not be allowed within up to 200 meters of earthen tanks or the adjacent riparian areas created as a result of the presence of the tanks. Exceptions to this requirement will be considered for the installation of habitat or rangeland projects designed to enhance the spring or seep, or downstream flows. See Appendix B for more information regarding applied stipulations. For further information on measures that may be required, such as casing, cementing, or remediation that could consist of removing contaminated soil, replacing it with uncontaminated soil, and performing corresponding chemical testing, see the Water Support Document (BLM 2023c). The NMOCD expressly prohibits pollution of any surface or subsurface fresh water from well completion activities, or treatment, transportation, and disposal of produced water. Finally, NMAC 19.15.16 contains minimum casing and cementing standards. Site-specific mitigation tools would be developed as appropriate for the individual circumstances and could include surface water monitoring studies. For instance, if hydraulic fracturing were to take place in an area with potential connections to water resources, NMOCD regulations would require the operator to test the water before, during, and after the operations to ensure it is not contaminated during the process.

The BLM's authority to require additional protective measures, and the low level of surface disturbance relative to the total watersheds (11.2 acres of the total six applicable watersheds [1,037,129 acres collectively, or less than 0.001% of the applicable watershed acreage]) would all serve to minimize the risk of effects on watershed hydrology and surface water quality. Should a spill occur, the BLM would work with the NMOCD to immediately remediate it in accordance with federal and state standards, including NMAC 19.15.29.11. The responsible person shall complete corrective action for releases that endanger public health or the environment in accordance with a remediation plan submitted to and approved by NMOCD. The remaining contaminants from unrecovered spills are remediated in accordance with federal and state standards. Some remediation consists of removal of contaminated soil, replacement with uncontaminated soil, and subsequent chemical testing. See the Water Support Document (BLM 2023c) for further information on spills. Additionally, as groundwater is mostly used for oil and gas operations, surface water quantity is not expected to be impacted (see Issue 3 in Section 3.6.3).

AIB-3 Playas

How would future potential development of the parcels affect function of playa features in these locations?

Playas are relatively small, round, shallow depressions. Their basins are lined with clay soil, which collects and holds water from rainfall and runoff, creating temporary lakes. Properly functioning playas have intact clay basins, are encompassed by grassy buffer strips or prairie, and collect water runoff from the surrounding area after large rain events. Despite their small size and relatively simple structure, playas are relevant to the landscape because they provide important ecological and hydrological functions. In the 20-million-acre PDO, playas are the main source of water and are the center of biodiversity on the plains—supporting 185 bird species, 450 plant species, 13 amphibian species, and 37 mammal species at some point in their life cycle (Smith 2003). Playas are also a water source for migratory and wintering shorebirds, waterfowl, and other game and non-game wildlife, and contribute to groundwater recharge. Past development in southeastern New Mexico has resulted in disturbance to one-third of wetlands, including, but not limited to, playa wetlands (Fretwell et al. 1996).

Culturally accelerated dust and sediment accumulation, which is the result of increased transport of dust and sediments from the upland through airborne particles and water erosion, could degrade the function of the playa features. Land disturbances near a playa exacerbate the sedimentation problem through: 1) movement of sediments into the playa basin, and 2) mixing of sediments with the underlying clay layer. The additional sediments may interfere with the shrinking and swelling of the clay layer, which is vital to aquifer recharge, and reduce playa volume, which in turn decreases the hydroperiod (i.e., the

length of time and portion of the year the playa holds ponded water). Hydroperiod reduction greatly alters the plant and wildlife community supported by the playa (LaGrange et al. 2011). Oil and gas operations could result in land disturbance within the drainage basin that would introduce sediments through erosion from heavy rains or wind. Additional sediments can fill the playa, preventing water from pooling and reducing the capacity of the playa to recharge an aquifer (Gurdak and Roe 2009). Spills can occur as a result of development (see Water Support Document [BLM 2023c] for discussion of spills) resulting in degraded playa function. Remediation methods for playas (e.g., excavation of accumulated sediment) are disruptive to the hydrologic connectivity, natural hydrology, and benefits that playas provide to wildlife within the planning area. Surface disturbance associated with reasonably foreseeable cumulative actions within the PDO (390,195 acres of surface disturbance over the next 20 years) may occur in leases that include or are near playas.

Based on the review of aerial photography, the USGS NHD, FEMA floodplain data, USFWS NWI data, and internal communications with the BLM PDO IDT, approximately 22.2 acres (13.9% of total parcel acreage) of playas have been identified on nominated lease parcel 6845. Additionally, vegetative depressions, which is considered a playa wetland, have been identified on nominated lease parcels 466 (3.48 acres; 4.35% of total parcel acreage) and 470 (10.65 acres; 6.65% of total parcel acreage). Playas (including alkali lakes and vegetative depressions) have not been identified on any of the remaining nominated lease parcels.

Stipulation SENM-S-19-CSU, which provides protections to playas and does not allow surface disturbance within 200 m (656 feet) of these areas, has been applied to nominated lease parcels 466, 470, and 6845 for potential playas or vegetative depressions (see Table 2.1 and Appendix C). The BLM also has the authority under STCs to attach COAs, including relocating wells up to 800 m (2,625 feet), to minimize significant adverse effects on resource values at the time operations are proposed. STCs would allow for measures to avoid and mitigate accelerated soil erosion and sedimentation to water bodies. With consideration of STCs, stipulation SENM-S-19-CSU, and COAs as determined by the BLM AO, potential effects from surface occupancy to any playa features identified at the site-specific level would be avoided.

AIB-4 Induced Seismicity

How would future potential development of the nominated lease parcels affect the potential for induced seismicity in the Permian Basin?

Induced seismicity refers to seismic events that are triggered by human activities rather than natural tectonic forces. A broad range of human activities have been attributed to induced seismicity, including but not limited to, underground fluid injection (e.g., for wastewater and hydraulic fracturing) and oil and gas extraction (Groundwater Protection Council [GWPC] 2021). Between 2008 and 2015, seismic events increased in the mid-continental United States and studies pointed to a connection between increasing seismic events and the widespread disposal of wastewater into deep Class II² injection wells (GWPC 2021). Although most disposal wells in the United States do not pose a hazard for induced seismicity, seismic events can occur when specific geologic conditions are present (e.g., sufficient pore pressure buildup near a pre-existing fault of concern) (GWPC 2021; Oklahoma Corporation Commission [OCC] 2021). People can typically feel earthquakes when shaking occurs at a magnitude (M) of 3.0 or more (USGS 2024b). A combination of many factors is necessary to induce felt earthquakes: the injection rate and total volume injected, the presence of faults that are large enough to produce felt earthquakes, stresses that are large enough to produce earthquakes, and the presence of pathways for the fluid pressure to travel from the injection point to faults (Machette et al. 2000; USGS 2021a). High injection rates of greater than

² Class II wells dispose of fluid produced in conjunction with oil and gas drilling, completion, and production operations (GWPC 2021).

300,000 barrels (bbl) per month are much more likely to be associated with earthquakes, and any earthquake within approximately 10 to 30 kilometers (km) (6.2–18.6 miles) of an active injection well could be associated with that well (OCC 2021; Weingarten et al. 2015). The risk of induced seismicity is also influenced by proximity of injection wells to existing faults; horizontal distances of 0.55 miles (895 m) or less have been suggested to increase the risk of inducing earthquakes (Wilson et al. 2018). Although hydraulic fracturing can also contribute to induced seismicity, seismic events triggered by hydraulic fracturing are relatively uncommon and generally have smaller magnitudes than injection-induced seismicity; they are therefore considered to pose less risk (GWPC 2021; OCC 2018). Within the U.S., the largest published earthquake that has been associated with hydraulic fracturing was a M 3.5 / M 4.0 on May 1, 2018 event in Eagle Ford play of Texas (Fasola et al. 2019). Even relatively extreme seismic events associated with hydraulic fracturing have been well below the damage threshold for modern building codes (Petersen et al. 2018; USGS 2021a).

Approximately 9,684,220 bbl of produced water are projected from future potential development of the estimated seven horizontal wells within the nominated lease parcels. Assuming a 20-year production time frame, this equates to an average of approximately 40,350 bbl of produced water per month across the nominated lease parcels.

The BLM's regulations state that "for an injection well proposed on Federal or Indian leases, the operator shall obtain an Underground Injection Control (UIC) permit pursuant to 40 C.F.R. §§ 144 and 146 from the EPA or the State/Tribe where the State/Tribe has achieved 'primacy.'" See 43 C.F.R. § 3177.7. The EPA classifies these wells as Class II injection wells, which are wells used for disposal of fluids associated with the production of oil and natural gas (hydrocarbons), to inject fluids for enhanced oil recovery (EOR), or for the storage of liquid hydrocarbons. New Mexico's UIC Program monitors and regulates the injection of fluids into the subsurface. The maximum allowable surface injection pressure (MASIP) is based on a 0.2 pounds per square inch (psi)/ft. gradient multiplied by the depth of the top perforation or top of the open-hole completion (GWPC 2020). New Mexico regulations set limits on maximum allowable injection pressures and require mechanical integrity testing of the boreholes, pressure monitoring, and reporting. All injection wells permitted by NMOCD are subject to limitations on surface injection pressure. Wells are required to be equipped with a pressure-limiting device that ensures that the maximum surface injection pressure is not exceeded (NMOCD 2004). Compliance officers from the NMOCD periodically inspect wells and surface facilities to ensure wells and related surface equipment are in good repair and meet regulations. See NMAC 19.15.26.1 through 19.15.26.15.

Several areas of heightened induced seismicity have been identified in the state of New Mexico; most areas of concern occur in southeastern New Mexico, and one area occurs in northern New Mexico near the Colorado border (NMOCD 2021, 2023a). The nominated lease sale parcels are in the Permian Basin. The following four areas of concern for induced seismicity are within the Permian Basin (NMOCD 2023):

- The first area, known as the County Line Seismic Response Area, is approximately 35 miles southeast of Carlsbad, New Mexico, on the border of Eddy and Lea Counties, New Mexico, and extends slightly into Texas.
- The second area is approximately 6 miles northeast of Jal, New Mexico, in Lea County, and extend slightly into Texas.
- The third area is approximately 12 miles southwest of Lovington, New Mexico, in Lea County.
- The fourth area is approximately 9 miles south of Artesia and 10 miles northwest of Carlsbad, New Mexico, in Eddy County (also associated with an area known as the Dagger Draw Field).

Nominated lease sale parcel 468 is located in the fourth area of concern for induced seismicity between Artesia and Carlsbad. Nominated lease sale parcels 465, 466, 470, 6846, and 6848 are located within

15 miles of the areas of concern. Nominated lease sale parcel 6845 is located within 20 miles of the areas of concern. In November 2021, NMOCD issued a new seismic response protocol to address seismic activity related to injection wells in the state of New Mexico (NMOCD 2021). The protocol includes requirements that are implemented either through voluntary actions by operators or by orders issued by the NMOCD. The protocol directs operators to report seismic events and implement reduced injection rates if the seismic event has a magnitude (M) of 2.5 or greater. The magnitude of reductions varies based on the earthquake magnitude and proximity of wells to these events (with 10 miles being the maximum distance for injection reductions to apply) (NMOCD 2021).

Given that earthquakes caused by active injection wells can be felt within approximately 10 to 30 km (6.2–18.6 miles) of the well, it is possible for felt earthquakes in New Mexico to originate from injection wells located in Texas. Since January 2020, several felt earthquakes of M 3.5 or greater have occurred in west Texas with extending magnitudes that may be felt within the New Mexico portion of the Permian Basin (USGS 2023). These earthquakes occurred in an area of the Midland Basin from northeast Ector County to southwest Martin County known as the Gardendale Seismic Response Area (SRA) (Railroad Commission of Texas [RRC] 2022). Additionally, between February 2020 and April 2023, 1,444 earthquakes of M 2.5 or greater were detected in western Texas within approximately 65 km (40 miles) of the New Mexico border (USGS 2023). Most of these earthquakes occurred west of Orla, in an area known as the Northern-Culberson Reeves SRA, approximately 24 to 56 km (15–35 miles) south of the New Mexico border. In response to increasing seismic activity in the Northern-Culberson Reeves SRA, the RRC issued an operator-led response plan in March 2022. This plan, which was subsequently updated in December 2022, called for participating operating deep SWD well(s) to achieve a target of at least 210,000 bbl/day by March 31, 2023 (which is a decrease from 504,000 BWPd in August 2020) followed by further reduction of 50% of the initial target volumes by June 30, 2023 (RRC 2022).

Disposal of produced water is the primary cause of induced felt earthquakes in New Mexico and across the central part of the United States. However, well drilling and completion activities associated with future potential development of the nominated lease parcels are not anticipated to noticeably contribute to induced seismicity in the Permian Basin because these activities would be minor in the context of existing oil and gas development in the region and produced water disposal will occur in adherence to BLM and NMOCD regulations limiting injection pressure and reducing the risk of induced seismic events.

Produced water may be addressed by

- injecting the produced water into EOR injection wells (typically shallower wells drilled into the hydrocarbon producing zone) to enhance oil recovery in producing oil and gas wells,
- disposing of produced water in saltwater disposal (SWD) wells (typically deeper wells drilled to depths below the hydrocarbon producing zone),
- disposing of produced water in evaporation ponds, or
- reusing the produced water elsewhere in the hydraulic fracturing process.

Currently, evaporation ponds are used sparingly for disposal of produced water because of wildlife and habitat disturbance concerns. Reuse of produced water for hydraulic fracturing is also not widespread because the chemical makeup of produced water is often not compatible with hydraulic fracturing procedures; therefore, most produced water ends up in EOR or SWD wells.

Based on the New Mexico regulatory program for injection wells, the amount of produced water anticipated from future potential development of the nominated lease parcels, the availability of produced water disposal methods, and the current risk of large-magnitude earthquakes in the Permian Basin, the leasing and future potential development of the nominated lease parcels are not expected to result in induced seismicity.

AIB-5 Sensitive Soils

How would future potential development of the nominated lease parcels affect fragile soils and soil stability?

Soil movement disrupts the existing structure of the soil horizons to the depth of disturbance. 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. Fragile soils are soil types that are easily damaged by use or disturbance and/or are those that are difficult to restore to pre-disturbance condition. Additionally, sensitive soils may 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 (see AIB-2 for more information).

Within the BLM PDO, examples of managed fragile soils include gypsum soils (a limited and fragile soil type that is difficult to reclaim to pre-disturbance condition), biological soil crusts, active sand dunes, and those on slopes greater than 30 percent. Gypsum soils are scattered throughout the analysis area and comprise approximately 156,479 acres, or 0.78% of the 20-million-acre PDO. The potential for significant adverse effects on fragile and/or sensitive soils would depend on site-specific locations. Soil effects are generally considered long term because of the amount of time (e.g., beyond the 20-year life of a well) it takes for soil to be rebuilt through deposition.

Within the PDO, reasonably foreseeable cumulative actions would add to past and present disturbance, resulting in a total of 390,195 acres of surface disturbance over the next 20 years. Future potential development of the nominated lease parcels would affect the physical and biological integrity of soils and prime and unique farmlands within the area of surface disturbance. Surface disturbance associated with future potential development of the nominated lease parcels (11.2 acres) would comprise 0.003% of total landscape-level surface disturbance (390,195 acres) (see Table 3.2) associated with reasonably foreseeable cumulative actions and 0.85% of the total nominated lease parcel acreage (1,317.29 acres). These actions would result in long-term disturbance to soils and prime and unique farmlands, with related reductions of soil-forming processes and compaction of underlying horizons, and potential loss or degradation of soil microbe communities.

The BLM utilized its own site-specific knowledge of the parcels and reviewed Natural Resources Conservation Service soils data to determine the presence of sensitive soils within the nominated parcels. One of the nominated lease parcels (parcel 6848) contains 79.2 acres (100% total parcel acreage) acres of fragile soils. None of the remaining lease parcels contain any sensitive soils and none of the nominated lease sale parcels contain any steep slopes (>30 percent), active dunes, or gypsum soils.

Stipulation SENM-S-17-CSU is applied to nominated lease parcel 6848 providing protections to fragile soils (see Appendix B). The BLM would apply COAs requiring operators to avoid disturbing sensitive soils on nominated lease parcels at the APD stage. Site-specific analysis would occur at the lease development level, and the lessee would be required to follow applicable COAs and reclamation measures as determined by the BLM to reduce impacts to or avoid sensitive soils. These may include measures such as topsoil stockpiling and pad placement in respect to topography and other factors to further mitigate effects on the physical and biological integrity of soils during the development of a lease.

AIB-6 Vegetation

How would future potential development of the nominated lease parcels affect vegetation?

Surface disturbance associated with reasonably foreseeable cumulative actions within the 20-million-acre PDO would remove surface vegetation, altering the plant community composition, increasing the potential for erosion and soil compaction, and increasing the likelihood for the introduction of noxious weeds (see AIB-7). In these arid plant communities, low rainfall (13 inches per year) combined with limited soil organic matter contributes to communities with low disturbance level thresholds and lack of resilience. Removal of vegetation may leave fragmented plant communities that would not recover to pre-disturbance levels without reclamation measures, which may take years to achieve and extend beyond the 20-year life of a well (BLM 2018b); consequently, this would be a long-term effect (see definition of long-term effects in the introduction to Section 3.5). Vegetation resources may also be subject to increased fragmentation of vegetative types, introduction of invasive species, and potential for monocultures to develop. Many of the significant adverse effects on landscape vegetation density and type resulting from surface disturbances would also be long term without successful reclamation. At the landscape level, state and federal efforts to plug and reclaim inactive wells would continue to help offset the impacts of surface disturbance to vegetation.

Within the PDO, reasonably foreseeable cumulative actions would add to past and present disturbance, resulting in a total of 390,195 acres of surface disturbance over the next 20 years; see Table 3.2. Future potential development of the nominated lease parcels would comprise approximately 11.2 acres (0.003% of total landscape-level surface disturbance associated with reasonably foreseeable cumulative actions, and approximately 0.0001% of the 20-million-acre PDO) (see Table 3.2). This surface disturbance may contribute to landscape-level variations in plant communities dependent on success of reclamation activities and concurrent effects of climate change.

The nominated lease parcels are within the Chihuahuan Deserts: Chihuahuan Basins and Playas (parcels 465, 466, 468, 470, 6845, and 6846), Chihuahuan Deserts: Chihuahuan Desert Grasslands (parcel 468), and High Plains: Shinnery Sands (parcel 6848) Level 4 Ecoregions (Griffith et al. 2006). Level 4 Ecoregions, intended for smaller ecological areas, were used to characterize the nominated lease sale parcels as they are used to distinguish spatial patterns and composition of biotic and abiotic phenomena that affect or reflect differences in ecosystem quality and integrity (EPA 2013). Based on review of Landscape Fire and Resource Management Planning Tools (LANDFIRE) geographic information system (GIS) data the nominated lease parcels contain the vegetation types listed in Table 3.5.

Table 3.5. Vegetation Types within the Nominated Lease Parcels

Land Cover Vegetation Types*	Total Area of Vegetation Type Intersected by Parcels (acres [†])	Parcel within Vegetation Types* (percent of parcel containing vegetation type)
Apacherian-Chihuahuan Semi-Desert Grassland	55.68	465 (5.22%); 466 (6.08%); 468 (1.16%); 470 (6.25%); 6845 (15.84%)
Apacherian-Chihuahuan Semi-Desert Shrub-Steppe	53.21	465 (0.28%); 468 (1.03%); 470 (1.79%); 6845 (0.42%); 6846 (1.1%); 6848 (53.28%)
Chihuahuan Creosotebush Desert Scrub	296.74	465 (0.83%); 468 (28.63%); 470 (63.84%); 6845 (6.13%); 6846 (1%)
Chihuahuan Gypsophilous Grassland and Steppe [‡]	18.32	6845 (11.57%)
Chihuahuan Loamy Plains Desert Grassland [‡]	15.87	465 (70.14%); 466 (4.33%); 468 (0.52%); 470 (1.39%); 6845 (4.06%); 6846 (0.56%)

Land Cover Vegetation Types*	Total Area of Vegetation Type Intersected by Parcels (acres [†])	Parcel within Vegetation Types* (percent of parcel containing vegetation type)
Chihuahuan Mixed Desert and Thornscrub	630.74	465 (78.01%); 466 (82.16%); 468 (57.36%); 470 (16.57%); 6845 (8.26%); 6846 (84.09%)
Chihuahuan Mixed Salt Desert Scrub	36.39	468 (4.24%); 470 (1.67%); 6845 (4.18%)
Chihuahuan Sandy Plains Semi-Desert Grassland [‡]	2.88	465 (0.69%), 466 (2.22%)
Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub	1.56	465 (0.97%)
Chihuahuan-Sonoran Desert Bottomland and Swale Grassland [‡]	0.22	468 (0.03%)
Chihuahuan Succulent Desert Scrub [‡]	0.44	6845 (0.28%)
Interior West Ruderal Riparian Scrub [‡]	6.89	468 (1.08%)
North American Warm Desert Bedrock and Cliff and Outcrop [‡]	6.67	468 (1.04%)
North American Warm Desert Cienega [‡]	1.11	468 (0.17%)
North American Warm Desert Playa [‡]	9.77	468 (1.32%), 6845 (0.83%)
North American Warm Desert Riparian Herbaceous [‡]	2.22	468 (0.35%)
North American Warm Desert Riparian Mesquite Bosque Shrubland [‡]	1.00	468 (0.16%)
North American Warm Desert Riparian Shrubland [‡]	4.00	468 (0.63%)
North American Warm Desert Riparian Woodland [‡]	0.89	468 (0.14%)
North American Warm Desert Ruderal & Planted Scrub	115.81	465 (11.37%); 466 (0.28%); 468 (1.6%); 470 (7.01%); 6845 (45.98%); 6846 (7.95%)
North American Warm Desert Ruderal & Planted Grassland [‡]	0.22	465 (0.14%)
North American Warm Desert Wash Shrubland [‡]	0.89	468 (0.14%)
Western Great Plains Mesquite Shrubland	34.71	6848 (43.82%)
Western Great Plains Sandhill Steppe	0.44	465 (0.28%)
Western Warm Temperate Developed Herbaceous [‡]	0.22	6845 (0.14%)

Note: The analysis contained in this EA generally provides percentage contribution rounded to two decimal points. As such, percentages may not always sum to 100 because of rounding.

* Source: LANDFIRE GIS data

[†] All acreages contained in the EA analysis were calculated using GIS data sets for resources and the parcels, which may differ slightly from the acreages contained in legal description here and in Table 2.1. Difference in total acres between the parcels and acres analyzed in the EA can vary slightly because of geoprocessing operations where slivers of area are created when two or more data sets intersect. Any inaccuracies are negligible and do not change the overall effect analysis conclusions presented in this EA.

[‡] Indicates rare and unique vegetation types. Rare and unique vegetation types are based on existing vegetation types that encompass 1% or less of the 20-million-acre analysis area (Sandborn 2020). This does not include vegetation types which are human-made, such as row crops or urban landscapes.

Six nominated lease parcels (465, 466, 468, 470, 6845, and 6846) contain rare and unique vegetation types (see Table 3.5). These vegetation types are categorized as rare and unique because they comprise less than 1% of present vegetation in the PDO planning area. Rare and unique vegetation types cover between 0.03% and 11.57% of these parcels. There are no stipulations that would prohibit future potential development within the rare or unique land cover types, but this acreage could reasonably be avoided through the application of STCs. Additionally, stipulations applied to these parcels for other ecological

concerns (e.g., surface water [AIB-2], sensitive soils [AIB-5], sensitive species [AIB-9], and playas [AIB-3]) may provide protections to rare and unique vegetation types found on the nominated lease parcels if they intersect these same ecological features. For example, lease notice NM-1-LN has been applied to nominated lease parcels 465, 466, 468, 470, 6845, and 6846, which would provide protections to sensitive plant species that may occur within these parcels. Any overlap between unique vegetation types and protections for other ecological resources would be determined at the APD stage after site-specific surveys have been completed to confirm the presence and precise location of ecological features within each of the nominated lease parcels.

In the event that all surface disturbance associated with development of the seven nominated lease parcels were to occur in a single common vegetation type, the level of estimated disturbance (11.2 acres collectively) would only affect a small fraction of said habitat type throughout the PDO (non-rare and unique habitat types each cover between 15,000 and 5.1 million acres of the PDO planning area) and would not result in a substantial change to the overall characteristics or availability of the vegetation type across the analysis area. This surface disturbance may contribute to landscape-level variations in plant communities dependent on success of reclamation activities and concurrent climate trends, such as warmer temperatures, changes in rainfall and runoff, and the resulting shifts in vegetation communities. 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.

STCs provide the BLM with the authority to determine site-specific vegetation management strategies, including relocating wells up to 800 m (2,625 feet), at the lease development stage for any future actions within the lease parcels to determine whether effects on rare and unique or otherwise sensitive vegetation would occur. Under STCs, which would apply to the nominated lease parcels, pre-disturbance surveys would be required at the time of the proposed lease development. The surveys would identify occurrence of rare or unique vegetation types, special status plant species, and/or vegetation providing habitat for special status wildlife species for avoidance during project siting and construction (see AIB-9 for more information). Avoidance, minimization, and/or mitigation measures would also be determined at that time. Thus, the estimated level of disturbance to vegetative communities would not pose a threat to the viability of species composing these communities or ecoregions, nor to any species using common vegetation for habitat.

AIB-7 Invasive Species (Noxious Weeds)

How would future potential development of the nominated lease parcels affect the introduction and/or spread of noxious weeds and invasive plants?

The 20-million-acre PDO has experienced an increase in noxious weed/invasive plant populations in recent years, and there appears to be a direct correlation between development and associated disturbed areas and the establishment and spread of noxious and/or invasive plants. African rue (*Peganum harmala*), a perennial deep-rooted noxious weed, has proven especially difficult to control because it colonizes every soil type and easily outcompetes native plants for soil nutrients and available water (BLM 2018b).

Invasive and noxious weeds invade disturbed sites, spread into adjacent areas, compete with and potentially displace native vegetation, and can contribute to the degradation of soil health by overusing soil nutrients. Surface disturbance, construction equipment, and source materials brought on-site (e.g., caliche, gravel) associated with reasonably foreseeable cumulative actions within the PDO (390,195 acres of surface disturbance) would likely increase the spread and density of invasive plants and noxious weeds over the long term. Additionally, livestock grazing may potentially spread noxious, invasive, or nonnative species through equipment, feed products, and on livestock themselves (BLM 2018b). On a landscape level, the Carlsbad and Chaves Soil and Water Conservation Districts have

operated a joint county venture (Chaves, Eddy, and Lea Counties) to target certain species for eradication, and in general, noxious weed treatment activities are performed on an ongoing basis by these entities (Chaves Soil and Water Conservation District 2019, 2024; USGS 2019); see Section 3.3.2 for additional information on ongoing treatment activities.

Within the PDO, reasonably foreseeable cumulative actions would add to past and present disturbance, resulting in a total of 390,195 acres of surface disturbance over the next 20 years. Future potential development of the nominated lease parcels would comprise approximately 11.2 acres (0.003% of total landscape-level surface disturbance; see Table 3.2). This would also result in a concomitant increase in risk of establishment of noxious weeds. All disturbed acreage would be vulnerable to the long-term establishment and spread of noxious weeds/invasive plants until successful reclamation. A review of the BLM PDO spatial data of known noxious weed treatment acres concluded that there are known noxious weed occurrences of African rue within nominated lease parcels 466 and 6845, and bigpod ceanothus (*Ceanothus megacarpus*) within nominated lease parcel 6845. The most recent treatment of African rue occurred in 2015 within nominated lease parcel 466 and in 2012 for nominated lease parcel 6845. The most recent treatment of bigpod ceanothus occurred in 2016 within nominated lease parcel 6845.

Within the BLM PDO, the BLM, State of New Mexico, and other entities are engaged in ongoing efforts to reduce the presence and spread of these unwanted species by way of prevention and treatment. The most common treatment method is the application of herbicides. In general, the effectiveness of treatments is variable depending on location, species, treatment type, timing of treatment, and size of population. If noxious weeds are discovered at any time during future potential development, STCs hold the operator responsible for weed treatment and prevention activities, such as herbicide application and washing vehicles coming from areas with known weed populations.

Reclamation is intended to restore previously disturbed sites to a properly functioning, natural ecological state. The effectiveness of reclamation efforts varies based upon a number of factors such as soil type, precipitation, herbicide treatments, and additional disturbance. Once physical reclamation of the site has taken place, seeding of native species is intended to reestablish the native plant community and protect the disturbed area from potential establishment of noxious weeds. While reclamation has been shown to increase and restore the health of disturbed sites, the complete eradication of noxious weed species is challenging (BLM 2018b).

Together with the STCs, site-specific approval requirements that require permit holders to treat weeds help to offset the effects of development by limiting the spread of noxious weeds across Eddy and Lea Counties and contribute to controlling the spread on a landscape level. The remaining adverse effects from development include the potential introduction of new invasive species. These remaining effects would be long term if full eradication of certain introduced species is not achieved.

AIB-8 Threatened and Endangered Species (including Lesser Prairie-Chicken)

How would future potential development of the nominated lease parcels affect threatened and endangered (T&E) species, including lesser prairie-chicken (LEPC)?

The BLM compared mapped habitat types in the nominated lease parcels with known habitat requirements of T&E species. To do so, the BLM utilized the USFWS Information for Planning and Consultation (IPaC) system (USFWS 2024a, 2024b), LANDFIRE vegetation data, NHD data (see AIB-2 for further information), USFWS NWI data, USFWS descriptions of species habitat requirements and current mapped critical habitat (USFWS 2024c), and BLM-mapped potential habitat for special status plant species.

Surface disturbance associated with reasonably foreseeable cumulative actions within the PDO (390,195 acres of surface disturbance) may reduce suitable habitat and increase fragmentation, which could affect ESA-listed species occurring within the planning area, including those listed in Table 3.6. In addition, any existing or ongoing grazing that occurs within suitable habitat for ESA-listed species could adversely affect the quality and availability of those habitats (e.g., grassland habitat for LEPC) and contribute to population declines.

Table 3.6. USFWS IPaC System ESA-listed Threatened and Endangered Species with Suitable Habitat on or in the Vicinity of the Nominated Lease Parcels

Species (scientific name) (status)*	Suitable Habitat within Nominated Lease Parcels	Discussion ^{†, ‡}
Birds		
Lesser prairie-chicken (<i>Tympanuchus pallidicinctus</i>) (E)	6848	The LEPC southern distinct population segment is currently listed as endangered under the ESA (Federal Register 87:72674–72755). LEPC are found throughout dry grasslands that contain shinnery oak or sand sagebrush (<i>Artemisia filifolia</i>). Because of their breeding system and obligate vegetation requirements, LEPC are particularly sensitive to anthropomorphic development (including oil and gas development) and habitat fragmentation. Effects of overgrazing within suitable grassland habitat has also been determined to contribute to the decrease in New Mexico populations (Hunt and Best 2004). The BLM CFO management of the LEPC is determined by the 2008 BLM ROD Special Status Species RMPA (BLM 2008a), which designates five LEPC management areas totaling 1,499,746 acres. Given the recent relisting of the LEPC, the BLM NMSO coordinated with USFWS to determine if ESA consultation is warranted to address effects on LEPC associated with BLM oil and gas leasing actions. USFWS confirmed that ESA consultation is not warranted for oil and gas leasing actions that are more than 10 miles from the species' estimated occupied range (EOR) (USFWS Regional Director 2023). For future leasing actions that occur within 10 miles or less of the species estimated occupied range, BLM would initiate Section 7 consultation for potential effects on LEPC on a case-by-case basis. The estimated occupied range was mapped by USFWS in 2013 and updated in 2022. None of the nominated lease sale parcels occur within 10 miles of the 2022 EOR. Nominated lease parcel 6848 intersects the 2013 estimated occupied range but not 2022 EOR. No nominated lease parcels are within 10 miles of the 2022 EOR. Therefore, ESA consultation is not warranted for the LEPC. The nominated lease parcels are outside the known occupied habitat for this species, and no leks are within or within 200 meters of any of the nominated lease parcels. Parcel 6848 is within the LEPC Timing Restriction Zone (100%) and LEPC Isolated Population Area (100%). LEPC habitat area is 1.24 miles north of parcel 6848. Depending on the selected location of surface disturbance, development of nominated lease parcel 6848 could result in up to 1.6 acres of surface disturbance within the LEPC IPA, and a potential decrease in LEPC habitat quality from human presence and loss of vegetation. Both effects would be considered long term because they would result in a loss of habitat and increased fragmentation until operations cease and habitat is successfully reclaimed. Within the IPA, occupied LEPC habitat (defined as areas within 1.5 miles of a lek site) is generally closed to new leasing. Stipulation SENM-S-22-CSU is applied to parcel 6848 which prohibits drilling for oil and gas and 3-D geophysical exploration operations during the period of March 1 through July 15 of each year and may provide protections to LEPC (see Appendix B). This stipulation would minimize impacts to LEPC and LEPC habitat from future potential development within this parcel. Parcel 6848 would also be subject to LEPC timing restriction zone COAs to restrict the timing of construction activities to reduce potential noise impacts during LEPC breeding season. Site-specific analysis and pre-disturbance biological surveys at the lease development stage would contribute to avoidance, minimization, and reduction of impacts to suitable habitat. BLM has determined that the stipulations applied to nominated lease parcel 6848 are sufficient to prevent LEPC from being adversely affected as a result of leasing and future potential development of the lease parcel based on review of the best available data from USFWS.

Species (scientific name) (status)*	Suitable Habitat within Nominated Lease Parcels	Discussion ^{†, ‡}
Insects		
Monarch butterfly (<i>Danaus plexippus</i>) (C)	465, 466, 468, 470, 6845, 6846, and 6848	Monarch butterflies can feed on the nectar of many flowering plants in various habitat types (e.g., fields, roadside areas, wetlands, or urban gardens), but they only breed on milkweed species (USFWS 2024d). Given the lack of site-specific flowering plant species data, and the generalist habitat requirements for monarch butterflies, the BLM does not presently know if the nominated lease parcels contain suitable habitat. Site-specific analysis at the lease development stage will provide an additional opportunity to evaluate suitable habitat for this species.
Mammals		
Tricolored bat (<i>Perimyotis subflavus</i>) (PE)	465, 466, 468, 470, and 6846	Tricolored bats primarily roost among live and dead leaf clusters of live or recently dead deciduous hardwood trees. In addition, tricolored bats have been observed roosting during summer among pine (<i>Pinus</i> spp.) needles, eastern red cedar (<i>Juniperus virginiana</i>), within artificial roosts like barns, beneath porch roofs, bridges, concrete bunkers, and rarely within caves. During the winter, tricolored bats hibernate in caves and mines; although, in the southern United States where caves are sparse, tricolored bats often hibernate in road-associated culverts, as well as sometimes in tree cavities and abandoned water wells. No critical habitat has been designated for this species. The nominated lease parcels are within the predicted range of the species. The tricolored bat has the potential to occur in nominated lease parcels 465, 466, 468, 470, and 6846 based on the generalist nature of the species and the presence of trees and some human-made structures, although the amount of potentially suitable habitat within the parcels is very limited.

*C = Candidate species undergoing USFWS review; E = Endangered; PE = Proposed Endangered

[†] The nominated lease parcels are not within species-specific critical habitat.

[‡] See Appendix B for summaries of stipulations and lease notices.

Based on review of USFWS IPaC data (USFWS 2024a, 2024b), 13 species were evaluated for the potential to occur within the nominated lease parcels, including four bird species: Mexican spotted owl (*Strix occidentalis lucida*), LEPC (*Tympanuchus pallidicinctus*), northern aplomado falcon (*Falco femoralis septentrionalis*), and piping plover (*Charadrius melodus*); two fish species: Pecos bluntnose shiner (*Notropis simus pecosensis*) and Pecos gambusia (*Gambusia nobilis*); one mussel species: Texas hornshell (*Popenaias popeii*); one insect species: monarch butterfly (*Danaus plexippus*); one mammal species: tricolored bat (*Perimyotis subflavus*); and four plant species: gypsum-wild buckwheat (*Eriogonum gypsophilum*), Lee pincushion cactus (*Coryphantha sneedii* var. *leei*), Sneed pincushion cactus (*Coryphantha sneedii* var. *sneedii*), and Wright's marsh thistle (*Cirsium wrightii*).

Three of the 13 ESA-listed species were determined to have the potential to occur within one or more of the nominated lease parcels based on the presence of suitable habitat and species distribution information (see Table 3.6). The nominated lease parcels are outside of critical habitat for all ESA-listed species. See Section 4.1 for additional information. At the landscape level, implementation of land restoration and conservation activities listed in Section 3.3.2 would continue to help offset the impacts of surface disturbance on habitats and may result in beneficial impacts to habitat dependent on the site-specific success of restoration activities and concurrent climate trends.

According to stipulation HQ-TES-1, which is applied to the nominated lease parcels, the BLM would not approve any ground-disturbing activity that may affect species or critical habitat until it completes its obligations under applicable requirements of the ESA. In addition, the BLM may require modifications to or disapprove 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 Table 2.1 and Appendix B). Section 4.1 further discusses

how the Proposed Action would comply with threatened and endangered species management guidelines outlined in the Carlsbad RMP (BLM 1988), as amended in 1997 (BLM 1997a), and the 2008 BLM ROD Special Status Species RMPA (BLM 2008a), as well as ESA Section 7 consultation requirements.

Stipulation SENM-S-18-CSU has been applied to nominated lease parcels 465, 468, and 470; stipulation SENM-S-19-CSU has been applied to nominated lease parcels 466, 470, and 6845; and stipulation SENM-S-20-CSU has been applied to nominated lease parcels 466, 468, and 470 (see Appendix B). Application of these stipulations may provide secondary protections to associated potential habitat for the species listed in Table 3.6. The applicability of these stipulations to parcel-specific species concerns would be determined at the APD stage after site-specific surveys have been completed to confirm the presence and precise location of ecological features within each of the nominated lease parcels.

STCs would apply to all nominated lease parcels, including a requirement of pre-disturbance surveys at the time of proposed lease development. The surveys would identify occurrences of ESA plant and wildlife species and habitat for avoidance during project siting and construction. The BLM would conduct site-specific evaluations at the lease development stage for any reasonably foreseeable cumulative actions within the lease parcels to determine whether effects on ESA species would occur. Avoidance, minimization, and/or mitigation measures would also be determined at that time. The BLM is working with other land management agencies to restrict and manage development through establishment of management protocols to identify and map potential and occupied habitat requiring species-specific inventories and studies, as well other requirements, ahead of locating well pads and infrastructure (BLM 2022i).

Future potential development is not anticipated to create short- or long-term significant adverse effects for the following reasons: 1) stipulations and lease notices facilitate the reduction or avoidance of effects, 2) site-specific analysis at the lease development stage provides an additional opportunity to evaluate effects and develop measures to reduce or avoid effects, and 3) the STCs that apply to the nominated lease parcels provide the BLM with the authority to require reasonable measures that reduce or avoid effects. However, as discussed in Section 3.6.2, the GHG emissions resulting from future potential development of the lease sale parcels may incrementally contribute to national and global climate change projections.

The BLM continues to review the available climate science in connection with its statutory responsibilities, including under NEPA, and has found that despite advances in climate science, global climate models are unable to forecast local or regional effects on resources as a result of specific emissions. Any contribution to global climate processes affecting listed species from the issuance of leases is simply too remote, speculative, and undetectable to trigger ESA Section 7 consultation, given accumulated and persisting GHGs already in the atmosphere, the annual volume of GHG emissions that will occur globally regardless of additional lease issuance, and projected continued climate change. See, for example, the BLM Specialist Report (finding that, “[u]nlike other common air pollutants, the ecological impacts that are attributable to the GHGs are not the result of localized or even regional emissions but are entirely dependent on the collective behavior and emissions of the world’s societies” and noting “the lack of climate analysis tools and techniques that lend themselves to describing the physical climate or earth system responses, such as changes to sea level, average surface temperatures, or regional precipitation rates, that could be attributable to emissions associated with any single [land management] action or decision” [BLM 2023a:18, 65]); see also USFWS, Threatened Species Status for Emperor Penguin With Section 4(d) Rule, Federal Register 87:64,700, 64,704 (October 26, 2022) (“based on the best scientific data available we are unable to draw a causal link between the effects of specific GHG emissions and take of the emperor penguin in order to promulgate more specific regulations under [ESA Section] 4(d)”).

AIB-9 Sensitive Species

How would future potential development of the nominated lease parcels affect sensitive species?

The BLM compared known habitat requirements of sensitive species with habitat types in the nominated lease parcels, based on mapped vegetation communities (see AIB-6), NHD (see AIB-2), published descriptions of species habitat requirements (BLM 2008b), and BLM sensitive plant and animal species lists for New Mexico (BLM 2018c).

Within the PDO, reasonably foreseeable cumulative actions would add to past and present disturbance, resulting in a total of 390,195 acres of surface disturbance over the next 20 years. Surface disturbance associated with reasonably foreseeable cumulative actions within the PDO is not anticipated to create significant adverse effects. Depending on the proximity of ground disturbance and development activity to sensitive species habitat and/or populations, there may be short-term effects (i.e., temporary displacement from habitat because of noise and construction) or long-term effects on sensitive species and the ecological processes that sustain them related to changes in the following habitat conditions: ground cover, soil nutrient flows and processes, hydrological flows and processes, solar exposure, thermal cover, fugitive dust loads, nonnative species dispersal, habitat connectivity, noise levels and human activity, light pollution, forage availability, and pollinator and dispersal agents' visitation behaviors; these include both direct and indirect impacts. If detected and avoided, actual impacts to special status plant species would be less than the potential effects estimated in this analysis. It is not certain that detected occupied habitat could be avoided, given valid existing lease rights and other resource conflicts in the vicinity of proposed development locations. However, methods to minimize impacts to sensitive species and habitats would be applied for foreseeable cumulative actions whenever applicable and consistent with valid existing lease rights. Effects may also be lower than the estimated potential when single pads host multiple wells. The remaining surface disturbance across the landscape would contribute to additional potential for habitat loss and fragmentation that could affect sensitive species. At the landscape level, implementation of land restoration and conservation activities listed in Section 3.3.2 would continue to offset the effects of surface disturbance on habitats and may result in beneficial impacts to habitat dependent on the success of restoration activities and concurrent climate trends.

As described in AIB-8, the BLM continues to review the available climate science in connection with its statutory responsibilities, including under NEPA, and has found that despite advances in climate science, global climate models are unable to forecast local or regional effects on resources as a result of specific emissions (such as emissions resulting from the future potential development of the nominated lease sale parcels) given the accumulated and persisting GHGs already in the atmosphere, the annual volume of GHG emissions that will occur globally regardless of additional lease issuance, and projected climate trends.

The BLM has identified potential habitat within the seven nominated lease parcels for 13 sensitive species (Table 3.7); therefore, sensitive species have the potential to occur within the seven nominated lease parcels. Site selection of the 11.2 acres of potential surface disturbance associated with the development of the nominated lease parcels would occur after pre-disturbance biological surveys and additional review and disclosure of potential effects on sensitive species at the time of lease development. For more information regarding wildlife, including game species and the New Mexico State Action Plan focused on mapping game corridors, see AIB-11.

Table 3.7. Potential Sensitive Species Habitat within Nominated Lease Parcels

Species (scientific name; status)	Potential Habitat (Y/N)	Parcel Number	Discussion
Birds			
Baird's sparrow (<i>Ammodramus bairdii</i> ; sensitive*)	Y	465, 466, 468, 470, 6845, and 6846	This species is a winter resident in New Mexico. It generally prefers dense, extensive grasslands with few shrubs, and avoids heavily grazed areas. The nominated lease parcels contain semi-desert grassland habitat, which may indicate potential habitat for this species (see AIB-6).
Bald eagle (<i>Haliaeetus leucocephalus</i> ; unknown)	Y	465, 466, 468, 470, 6845, and 6846	This species occurs in New Mexico year-round. Breeding is restricted to a few areas, mainly in the northern part of the state along or near lakes. In migration and during winter months, the species is found chiefly along or near rivers and streams and in grasslands associated with large prairie dog (<i>Cynomys</i> sp.) colonies. Typically perches in trees. The nominated lease parcels contain potential prairie dog habitat, which indicates potential foraging habitat for bald eagles (see AIB-6).
Bell's vireo (<i>Vireo bellii arizonae</i> , sensitive*)	Y	465, 466, 468, 470, 6845, and 6846	In New Mexico, Bell's vireo occurs in the southern one-third of the state during the breeding season. The medius race is found in the Pecos Valley north to drainages west of Roswell and in the Black River and Rattlesnake Springs areas south of Carlsbad. In New Mexico, this species characteristically occurs in dense shrubland or woodland along lowland stream courses, with willows (<i>Salix</i> sp.), mesquite, and seepwillows (<i>Baccharis salicifolia</i>). Its distribution during breeding is typically limited to riparian habitats. The nominated lease parcels contain shrub habitat, and parcels 468 and 470 contain ephemeral streams which may indicate potential habitat for this species (see AIB-2 and AIB-6).
Chestnut-collared longspur (<i>Calcarius ornatus</i> ; sensitive*)	Y	465, 466, 468, 470, 6845, and 6846	This species migrates and winters in the eastern part of New Mexico and migrates westward locally to the vicinity of the Rio Grande Valley, and occasionally farther in the Southwest. This species may be abundant in winter months in the southeastern grasslands of New Mexico (Howe 2021). Chestnut-collared longspurs are often seen within, or in association with, open grassland habitats. The nominated lease parcels contain semi-desert grassland habitat, which may indicate potential habitat for this species (see AIB-6).
McCown's longspur (<i>Calcarius mccownii</i> ; sensitive*)	Y	465, 466, 468, 470, 6845, and 6846	This species is found in Sonoran desert scrub, Chihuahuan desert scrub, annual grassland, farms, and mountain and alpine meadows. It is associated with open to dense vegetation of shrubs, low trees, and succulents, dominated by paloverde (<i>Cercidium microphyllum</i>), pricklypear (<i>Opuntia</i> sp.), and giant saguaro (<i>Cereus giganteus</i>) (DeGraaf et al. 1991). The nominated lease parcels contain Chihuahuan desert scrub and semi-desert grassland habitat, which may indicate potential habitat for this species (see AIB-6).
Sprague's pipit (<i>Anthus spragueii</i> ; sensitive*)	Y	465, 466, 468, 470, 6845, and 6846	This species occurs in New Mexico only as a sporadic winter resident. It is associated with the southern desert grasslands of the state. The species as a whole prefers dry, open grasslands. The nominated lease parcels contain semi-desert grassland habitat, which may indicate potential habitat for this species (see AIB-6).
Western burrowing owl (<i>Athene cunicularia hypugaea</i> ; sensitive*)	Y	465, 466, 468, 470, 6845, 6846, and 6848	This species is found in grasslands, especially in association with prairie dog colonies, in desert scrub, and in agricultural and semi-urban environments. The nominated lease parcels contain several suitable vegetation communities as well as potential habitat for black-tailed prairie dog (<i>Cynomys ludovicianus</i>), which may indicate potential habitat for this species (see AIB-6).

Species (scientific name; status)	Potential Habitat (Y/N)	Parcel Number	Discussion
Mammals			
Black-tailed prairie dog (<i>Cynomys ludovicianus arizonensis</i> ; sensitive*)	Y	465, 466, 468, 470, 6845, 6846, and 6848	This species prefers grasslands, including short and mixed-grass prairie, sagebrush steppe, and desert grasslands. It is also known to occur in mesquite-creosote bush, grama-needlegrass, tarbush-creosote bush, and burrograss-cholla type habitats. The nominated lease parcels contain several suitable vegetation communities, which may indicate potential habitat for this species (see AIB-6).
Reptiles and Amphibians			
Desert massasauga (<i>Sistrurus tergeminus</i> ; sensitive*)	Y	465, 466, 468, 470, 6845, and 6846	This rattlesnake species primarily inhabits desert grasslands or shortgrass prairies with sandy soil in valleys, low sloping alluvial fans, and rolling grass-covered hills within semi-desert grassland habitats. The nominated lease parcels contain semi-desert grassland and shortgrass prairie habitat, which may indicate potential habitat for this species (see AIB-6).
Plants			
Gypsum milkvetch (<i>Astragalus gypsodes</i> ; sensitive)	Y	468	This species is typically associated with gypsum flats and low-gullied gypseous hills of the Permian-aged Castile formation from 3,500 to 4,000 feet above mean sea level (amsl). The nominated lease parcel 0468 is within the BLM-mapped potential habitat for this species. Lease notice NM-1-LN, which provides protections to special status plant species, has been applied to this nominated lease parcel.
Scheer's beehive cactus (<i>Coryphantha robustispina</i> ssp. <i>scheeri</i> ; sensitive)	Y	0465, 0466, 0468, 0470, 6845, and 6846	This species is typically associated with gravelly or silty soil in desert grassland and Chihuahuan desert scrub communities. The species may also be found on rocky benches or bajadas on limestone or gypsum soils; the elevation range of this cactus is 3,300 to 3,600 feet amsl. The nominated lease parcels contain semi-desert grassland habitat and Chihuahuan desert scrub communities, which may indicate potential habitat for this species (see AIB-6). Additionally, the nominated lease parcels are within the BLM-mapped potential habitat for this species. Lease notice NM-1-LN, which provides protections to special status plant species, has been applied to these nominated lease parcels.
Tharp's blue-star (<i>Amsonia tharpii</i> ; sensitive)	Y	0470	This species is typically associated with well-drained gypsum, caliche, and dolomite sedimentary outcrops and alluvium deposits between 3,000 and 3,800 feet amsl. The nominated lease parcel is within the BLM-mapped potential habitat for this species. Lease notice NM-1-LN, which provides protections to special status plant species, has been applied to this nominated lease parcel.
Wright's waterwillow (<i>Justicia wrightii</i> ; sensitive)	Y	465, 466, 468, 470, 6845, and 6846	This species is found on limestone benches in Chihuahuan desert scrub at 3,900 feet amsl. The nominated lease parcels contain Chihuahuan desert scrub communities, which may indicate potential habitat for this species (see AIB-6). Additionally, the nominated lease parcels are within the BLM-mapped potential habitat for this species. Lease notice NM-1-LN, which provides protections to special status plant species, has been applied to these nominated lease parcels.

* Source: BLM (2018c)

Lease notice NM-1-LN, which would provide protections for any sensitive plant species, has been applied to nominated lease parcels 465, 466, 468, 470, 6845, and 6846. Stipulation SENM-S-18-CSU has been applied to nominated lease parcels 465, 468, and 470; stipulation SENM-S-19-CSU has been applied to nominated lease parcels 466, 470, and 6845; and stipulation SENM-S-20-CSU has been applied to nominated lease parcels 466, 468, and 470 (see Appendix B). Application of these stipulations may provide secondary protections to associated potential habitat for the species listed in Table 3.7. The applicability of these stipulations to parcel-specific species concerns would be determined at the APD stage after site-specific surveys have been completed to confirm the presence and precise location of ecological features within each of the nominated lease parcels.

STCs would apply to all nominated lease parcels, including a requirement of pre-disturbance surveys at the time of proposed lease development. The surveys would identify occurrences of special status plant species and special status wildlife habitat for avoidance during project siting and construction. The BLM would conduct site-specific evaluations at the lease development stage for any reasonably foreseeable cumulative actions within the lease parcels to determine whether effects on sensitive species would occur. Avoidance, minimization, and/or mitigation measures would also be determined at that time. The BLM is working with other land management agencies to restrict and manage development through establishment of management protocols to identify and map potential and occupied habitat requiring species-specific inventories and studies, as well other requirements, ahead of locating well pads and infrastructure (BLM 2022i).

AIB-10 Migratory Birds

How would future potential development of the nominated lease parcels affect migratory birds?

Loss, alteration, or fragmentation of habitat are among the main reasons why biodiversity is decreasing in many places worldwide (Taylor and Stutchbury 2016). Within the 20-million-acre PDO, habitat fragmentation, alteration, and/or loss have changed how birds move through landscapes and use the remaining habitat. The primary drivers of habitat loss and fragmentation within this area are oil and gas development, livestock grazing, and mining (see Table 3.2).

Within the PDO, reasonably foreseeable cumulative actions would add to past and present disturbance, resulting in a total of 390,195 acres of surface disturbance over the next 20 years (see Table 3.2). This landscape-level disturbance would further contribute to migratory bird habitat loss and fragmentation. Additionally, land restoration and conservation projects (e.g., riparian restoration and noxious weed treatments; see Section 3.3.2) have improved habitat, in which migratory birds have benefitted from the improved herbaceous cover associated with these activities. Future restoration projects would likely produce similar effects where they are implemented.

Habitat loss, alteration, or fragmentation that occurs outside of the PDO can also contribute to population declines in respective migratory bird populations within PDO. Taylor and Stutchbury (2016) state “that habitat loss in one region can effect sub-populations in regions that are not directly connected.” Habitat loss on wintering grounds south of the United States-Mexico border, as well as local drought conditions, can contribute to population declines in migratory birds that occur within the PDO.

Most of the effects associated with reasonably foreseeable cumulative actions within the PDO would occur at the initial stages of lease development. These disturbances include construction and drilling, human presence, traffic, heavy equipment, and noise associated with lease development activities. Bird species not tolerant of noise and human disturbance may exhibit vigilance or flight behaviors or abandon the area altogether for the duration of construction; this is especially true in areas with high densities of development (New Mexico Department of Game and Fish [NMDGF] 2007). Habitat loss effects would be long term, and in some cases, reclamation would not fully rehabilitate migratory bird habitat to pre-

development conditions. For more information regarding wildlife, including game species, and the New Mexico State Action Plan focused on mapping game corridors, see AIB-11.

Nominated lease parcels 0465, 466, 468, 470, 6845, and 6846 fall within the North American Bird Conservation Initiative Bird Conservation Region (BCR) 35 (Chihuahuan Desert) and nominated lease parcel 6848 falls within BCR 18 (Shortgrass Prairie) (North American Bird Conservation Initiative 2021; USFWS 2024a, 2024b). The New Mexico Avian Conservation Partners developed two lists reflecting the species of highest conservation concern in New Mexico (Level 1 and Level 2) based on distribution, threats, global population size, New Mexico population trends, and importance of New Mexico to breeding or wintering (New Mexico Avian Conservation Partners 2016). Some of the continent's highest-priority birds of conservation concern breed in BCR 18 and include the mountain plover (*Charadrius montanus*), long-billed curlew (*Numenius americanus*), ferruginous hawk (*Buteo regalis*), and LEPC (New Mexico Avian Conservation Partners 2016). Playa lake habitat consists of numerous shallow wetlands that support many wintering ducks, migrant shorebirds, and some breeding species, such as snowy plover (*Charadrius nivosus*) (New Mexico Avian Conservation Partners 2016). Species of highest conservation concern found in BCR 35, which require desert scrub and grassland habitats are aplomado falcon, prairie falcon (*Falco mexicanus*), scaled quail (*Callipepla squamata*), Bendire's thrasher (*Toxostoma bendirei*), wintering Sprague's pipit (*Anthus spragueii*), and wintering McCown's longspur (*Calcarius mccownii*) (New Mexico Avian Conservation Partners 2016). In riparian areas, species of highest concern include southwestern willow flycatcher, Bell's vireo (*Vireo bellii*), and Lucy's warbler (*Oreothlypis luciae*) (New Mexico Avian Conservation Partners 2016).

Future potential development of the nominated lease parcels would result in approximately 11.2 acres of total surface disturbance (0.003% of total landscape-level surface disturbance; 390,195 acres). Future potential development of nominated lease parcels 465, 466, 468, 470, 6845, and 6846 would result in 9.6 acres (0.000007%) of surface disturbance for BCR 35 (141,738,865.81 acres), and future potential development of nominated lease parcel 6848 would result in 1.6 acres (0.000002%) of surface disturbance for BCR 18 (95,063,465.03 acres). This surface disturbance could result in long-term habitat loss and fragmentation, depending on the proximity of disturbance to migratory bird habitat. The nominated lease parcels are also in proximity to recreational areas that may contain habitat for migratory birds; parcel 468 is approximately 1.25 miles from Seven River Hills Recreation Area and Special Management Area.

Stipulation SENM-S-18-CSU has been applied to nominated lease parcels 465, 468, and 470; stipulation SENM-S-19-CSU has been applied to nominated lease parcels 466, 470, and 6845; and stipulation SENM-S-20-CSU has been applied to nominated lease parcels 466, 468, and 470 (see Appendix B). Application of these stipulations would provide secondary protections to associated potential habitat (e.g., surface water features) for migratory birds. Stipulation SENM-S-22-CSU has been applied to lease parcel 6848 to provide protections for lesser prairie-chickens. STCs would apply to all nominated lease parcels, including a requirement of pre-disturbance surveys at the time of proposed lease development.

Compliance with the Migratory Bird Treaty Act would be required for any future potential developments and would follow the BLM PDO Migratory Bird Policy, which could include timing limitation constraints on developments within the nominated lease parcels during migration and nesting seasons, or requirements for netting over open water containing fluids that are harmful to migratory birds. The BLM applies measures to mitigate effects on migratory birds at the leasing stage where conflicts exist. Developmental constraints during spring and fall migrations and nesting seasons, as well as nest surveys, may be required prior to implementation of lease development activities. Some of these include the application of netting over open tanks, raptor-safe power line construction standards, and sound mufflers. In addition, the BLM may require avoidance of active avian nests and burrows or delays of development activities to accommodate migratory birds.

AIB-11 General Wildlife and Game Species

How would future potential development of the nominated lease parcels affect wildlife, including game and non-game species?

The 20-million-acre BLM PDO contains populations of big-game species, including mule deer (*Odocoileus hemionus*) and pronghorn (*Antilocapra americana*), as well as a multitude of other non-game species. Carnivores include bobcat (*Lynx rufus*), coyote (*Canis latrans*), badger (*Meles meles*), swift fox (*Vulpes velox*), and striped skunk (*Mephitis mephitis*). Two upland game bird species, mourning dove (*Zenaida macroura*) and scaled quail (*Callipepla squamata*), are prevalent throughout the area as well. The BLM PDO also contains year-round habitat for big-game species including mule deer and pronghorn. Disturbance from future potential development of the nominated lease parcels can result in the long-term loss of vegetation, burrows, and nests, and could also cause habitat disturbance, loss, and fragmentation, behavioral responses (e.g., wildlife avoidance), and mortalities (Northrup and Wittemyer 2013; Sawyer et al. 2017; Sawyer et al. 2019). Future potential development may also have effects on pronghorn, mule deer, bobcat, coyote, badger, swift fox, striped skunk, mourning dove, and scaled quail, such as avoidance of areas within and near the nominated lease parcels.

There are currently no mapped big game migration corridors within the BLM PDO (NMDGF 2019). The only mapped migration corridor in New Mexico is within the Farmington Field Office (reflected in the NMDGF New Mexico State Action Plan [NMDGF 2019]), which is outside of the analysis area (NMDGF 2019). The NMDGF has identified priority areas for further research within their New Mexico State Action Plan (NMDGF 2019), and these priority areas were based on big-game units. The PDO falls within NMDGF Priority Area 2—New Mexico Southeastern Plains landscape (deer, pronghorn) (NMDGF 2019). Within this priority area, the NMDGF is currently conducting research on movement routes and/or defined wintering areas for mule deer and pronghorn. In coordination with NMDGF, the BLM PDO is completing fence modification and grassland restoration efforts for pronghorn and elk.

Reasonably foreseeable cumulative actions within the PDO over the next 20 years would add to past and present disturbance, resulting in 390,195 acres of total landscape-level surface disturbance, which would impact wildlife habitat. Past, present, and future vegetation restoration projects (outlined in Section 3.3.2), which include habitat restoration, noxious weed treatments, wildlife-friendly fencing, and surface reclamation of well pads, roads, and caliche pits, have contributed to improved habitat conditions for wildlife and big-game species in the PDO. The aforementioned reclamation activities improve nesting cover for ground nesting birds, improve fawning habitat for pronghorn and mule deer, and restore proper hydrological functionality by increasing ground cover, slowing water movement across the surface, and increasing percolation where applicable. Migratory birds have also benefitted from the improved herbaceous cover associated with these vegetative treatments. It is assumed that future vegetative restoration will produce similar effects where they are implemented. Additionally, since 1990 the BLM has installed many wildlife habitat improvements within the analysis area including numerous watering developments and playa enclosures. These habitat improvements have been implemented through the Habitat Stamp Program funding, which is generated through the sale of a \$5.00 stamp or authorization associated with hunting and fishing licenses. The BLM has also funded many of these projects through its annual budget. Finally, the BLM requires grazing permittees to leave cattle drinkers on for the benefit of wildlife.

Overall, the landscape habitat fragmentation and human presence could be considered long-term effects for wildlife, and potential exists for the decline in species numbers and/or use of the analysis area. Where implemented, restoration projects (outlined in Section 3.3.2) would help offset disturbance to wildlife habitat at the landscape level. Additionally, new wildlife watering developments and playa enclosures would have beneficial impacts related to water availability for wildlife species.

GMUs are subdivisions used to manage big-game species in the state. These GMUs are designated and mapped by the NMDGF and are readily available through its annual hunting proclamation (NMDGF 2024) and website (<http://www.wildlife.state.nm.us/hunting/maps/big-game-unit-maps-pdfs/>). The NMDGF has provided a set of guidelines that are useful to guide oil and gas development statewide. Specifically, these guidelines can be applied in areas where potential conflicts occur between development and the various wildlife species present (NMDGF 2007).

Nominated lease parcels 465, 466, 470, 6845, 6846, and 6848 would comprise approximately 676.88 acres of GMU 31 (which totals 5,340,536.21 acres) and nominated lease parcel 468 would comprise approximately 643.58 acres of GMU 30 (which totals 1,881,995.61 acres). Future potential development of the nominated lease parcels is anticipated to impact approximately 9.6 acres (0.0002%) of GMU 31 and 1.6 acres (0.00009%) of GMU 30.

The nominated lease parcels are also in proximity to recreational areas that may contain habitat for general wildlife; specifically parcel 468 is approximately 1.25 miles from Seven River Hills Recreation Area and Special Management Area. This area is designated for sensitive soils and sensitive plant species, however, it may provide viewing opportunities for general wildlife such as waterfowl and other bird species, deer, and turkey, as well as hunting opportunities for small game hunting, and limited draw deer, draw turkey, and draw pheasants. For more information regarding potential impacts to habitat for threatened and endangered species, sensitive species, and migratory birds, see AIBs 8, 9, and 10, respectively.

Surface disturbance associated with future potential development of the nominated lease parcels would result in approximately 11.2 acres of surface disturbance (0.00006% of the acreage in the approximately 20-million-acre PDO). Pre-disturbance surveys would be required at the time of proposed lease development in accordance with STCs of the lease. The surveys would analyze potential effects on game and non-game species habitat. Avoidance, minimization, and/or mitigation measures would also be determined at that time. The BLM has the authority under STCs 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 implementing design modifications to avoid or minimize effects on sensitive habitats; limiting the number of well pads under simultaneous construction; incorporating seasonal restrictions; limiting the number of proposed roads; reclaiming old and/or unnecessary roads; minimizing truck traffic; implementing noise-buffering measures; conducting pre-development surveys; or using special construction techniques to minimize surface disturbance to sensitive areas.

Impacts to wildlife are reduced by implementing the appropriate timing, and/or surface use stipulations (see Appendix B). Stipulations have been applied to one or more of nominated lease parcels for the protection of sensitive plant species (NM-1-LN), water features (SENM-S-18-CSU and SENM-S-20-CSU), playas (SENM-S-19-CSU), or lesser prairie-chicken (SENM-S-22-CSU) may provide secondary protections to wildlife found within this parcel (see Table 2.1 and Appendix B). Any overlap between wildlife or big game habitat and protections for other ecological resources would be determined at the APD stage after site-specific surveys have been completed to confirm the presence and precise location of ecological features within each of the nominated lease parcels.

The stipulations within this appendix are derived from the RMP, as amended. The NMDGF was a cooperating agency during the development of the Carlsbad Draft RMP and stipulations were developed with their input and data. NMDGF did not recommend any additional stipulations or deferrals for big-game habitat as the existing stipulations remain adequate under the current RMPs. Refer to the RMPs for more information about wildlife impacts including but not limited to barriers, wildlife waters, and brush treatments to improve habitat. Subsequently, site-specific analysis of impacts to wildlife will also be addressed with COAs at the development stage.

AIB-12 Paleontological Resources

How would future potential development of the nominated lease parcels affect paleontological resources?

The Potential Fossil Yield Classification (PFYC) is a tool that allows the BLM PDO to predict the likelihood that a geologic unit contains paleontological resources (BLM 2022h). The PFYC uses a numeric system of 1 to 5 to rank that likelihood, as well as “U” for areas with unknown likelihood. An area identified as PFYC 1 has very low likelihood of containing paleontological resources, whereas an area identified as PFYC 5 is a geologic unit that has a very high likelihood to contain scientifically significant paleontological resources. Paleontological resource management concerns and mitigation efforts are related to that likelihood and PFYC classification. For example, in 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, as the probability of affecting scientifically significant paleontological resources is generally moderate to high.

Within the PDO, reasonably foreseeable cumulative actions would add to past and present disturbance, resulting in a total of 390,195 acres of surface disturbance over the next 20 years (see Table 3-2). Surface disturbance and the risk of effects on paleontological resources associated with reasonably foreseeable cumulative actions within the PDO would depend on the locations of proposed disturbance relative to PFYC class. As currently mapped, nearly the entire PDO analysis area is PFYC 2 and 3, with only a small amount of PFYC 4 and no PFYC 5 areas identified in the area. As such, the potential for paleontological resources to be affected by reasonably foreseeable actions would mostly be low to moderate. Disturbance associated with development could cause immediate physical loss of fossils and their contextual data. Ground disturbance could also subject fossils to long-term damage or destruction from erosion and create improved access to the public and increased visibility, 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.

The nominated lease parcels are geologically mapped as containing Holocene to late Pleistocene (less than 129,000 years ago) Alluvium, Holocene to middle Pleistocene (less than 774,000 years ago) Eolian Deposits, and Holocene to Pleistocene (less than 2.58 million years ago [Ma] Piedmont Gravels, middle to early Pleistocene 129,000 years ago –2.58 Ma) Older Alluvial Deposits, late Permian (251.902 - 259.51 Ma) Salado Formation, and the middle Permian (259.51 - 273.01 Ma) Tansill and Yates Formations (Table 3.8) (Anderson et al. 1997; BLM 2023d; Cohen et al. 2023; New Mexico Bureau of Geology and Mineral Resources 2003). The BLM (2023d) has designated most of these geologic units as having low paleontological potential (PFYC 2), with the exception of Alluvium and Older Alluvial Deposits, which are assigned unknown paleontological potential (PFYC U). As such, four of the seven nominated lease parcels (466, 470, 6845, and 6848) are entirely in areas of mapped geologic units with PFYC 2 designation. Parcels 465, 468, and 6846 are partially or entirely within areas mapped as unknown potential (PFYC U) Alluvium or Older Alluvial Deposits (see Table 3.8).

Table 3.8. Geologic Units and PFYC Classifications in the Nominated Lease Parcels

Mapped Geologic Unit(s) (Age)	Parcel(s) (PFYC Classification; total acreage of geologic unit; percent of parcel)
Alluvium (Holocene to late Pleistocene)	468 (Unknown [U]), 332.38 acres, 51.98%)
Eolian Deposits (Holocene to middle Pleistocene)	465 (Low [2], 105.11 acres, 65.7%); 466 (Low [2], 78.43 acres, 98.04%)
Piedmont Alluvial Gravels (Holocene to Pleistocene)	6845 (Low [2], 158.25 acres, 100%); 6848 (Low [2], 79.2 acres, 100%)

Mapped Geologic Unit(s) (Age)	Parcel(s) (PFYC Classification; total acreage of geologic unit; percent of parcel)
Older Alluvial Deposits (middle to early Pleistocene)	465 (Unknown [U], 54.77 acres, 34.23%); 6846 (Unknown [U], 39.33 acres, 98.32%)
Salado Formation (late Permian)	470 (Low [2], 15.21 acres, 9.51%)
Tansill and Yates Formations (middle Permian)	468 (Low [2], 311.2 acres, 48.64%); 470 (Low [2], 145.19 acres, 90.74%)

Late to middle Pleistocene fossils have been recovered from localities across New Mexico, including in Eddy County and Lea County (Morgan and Lucas 2005, 2006). The New Mexico Museum of Natural History and Science has records of 66 invertebrate and vertebrate specimens from Pleistocene deposits at five localities in Eddy County and six localities in Lea County, although the exact locations of these fossil localities are not known at this time. These localities produced specimens of snails, turtle, rodents, rabbit, ground sloth, bison, horse, camel, mammoth, mastodon, badger, bear, and saber-toothed cat (Morgan and Lucas 2005). The Tansill and Yates Formations preserve generally dolomitized, fragmented, and locally rare to abundant fossils of fusulinids, bivalves, gastropods, scaphopods, brachiopods, and algae in the deeper, carbonate facies of the ancient reef complex that formed in this area during the Permian (Hayes 1964; Kelley 1972). The evaporitic sequence of the Salado Formation is composed mainly of halite and muddy halite, with lesser amounts of anhydrite, dolostone, and mudstone, that formed in a restricted back-reef basin adjacent to the Permian ocean and is not known to produce fossils (Lowenstein 1988).

Future potential development of all nominated lease parcels would result in up to 11.2 acres of total surface disturbance, up to approximately 1 acre of which may occur in the geologic unit with unknown paleontological potential (PFYC U) and the remainder in geologic units with low potential (PFYC 2), depending on the specific locations of that disturbance.

Future potential development of the nominated lease parcels would be analyzed further through separate NEPA processes, as directed by regulations and current policy. Effects on paleontological resources can be mitigated by STCs, which require a lessee to conduct inventories and/or monitoring or special studies at the discretion of the BLM. Further research or consultation with local experts may be needed to assess whether projects may encounter subsurface geological units with high to very high paleontological potential. Site-specific projects that would cause surface disturbance in areas with unknown potential (PFYC U) may require a paleontological survey and/or monitoring conducted at the time of the proposed lease development in accordance with NEPA, Paleontological Resources Preservation Act (PRPA), and FLPMA. Specifically, the BLM has applied stipulation NM-13-CSU to nominated lease parcels 465, 468, and 6846 in which lease development would be subject to compliance with the PRPA, NEPA, and FLPMA, and surface occupancy or use is subject to special operating constraints (see Appendix B). Additionally, Lease Notice NM-14-LN is applied to nominated lease parcels 465, 468, and 6846. This stipulation requires lease development to comply with the PRPA, NEPA, and FLPMA, and requires the lessee to immediately notify the BLM AO of any paleontological resources discovered as a result of approved surface-disturbing operations, to suspend all activities in the vicinity of such discovery until notified to proceed by the AO, and to protect the discovery from damage or looting (see Appendix B). Additional mitigation measures may be applied as COAs based on the results of the survey. If during operations within the nominated lease parcels paleontological resources are discovered and a permitted paleontological monitor is not on-site, the lessee must cease any operations that would result in the destruction of such specimens and contact the BLM AO. Scientifically significant paleontological resources discovered through surveys or monitoring would be collected by a permitted paleontologist and curated at an appropriate repository. These same measures for minimizing effects at the site-specific level would be followed for resources associated with reasonably foreseeable cumulative actions. Additionally, stipulation SENM-S-18-CSU has been applied to nominated lease parcels 465, 468, and 470; stipulation SENM-S-19-CSU has been applied to nominated lease parcels 466, 470, and 6845; and stipulation

SENM-S-20-CSU has been applied to nominated lease parcels 466, 468, and 470, all of which provide protections for surface water features (see Appendix B). Application of these stipulations may provide secondary protections for geologic exposures along these features that may have paleontological potential. With consideration of these protections, potential effects on paleontological resources of scientific interest would be avoided or mitigated.

AIB-13 Cave and Karst

How would the future potential development of the nominated lease parcels affect cave and karst resources?

Karst is a landscape produced by the dissolution of soluble rock types such as limestone, dolomite, marble, gypsum, or salt. Features associated with karst terrains include sinkholes or closed depressions, caves, dry valleys, sinking streams, and resurgences or springs. Sinkholes leading to underground voids and drainages are common. These features, as well as fissures and discontinuities in the bedrock, may serve as direct conduits leading to groundwater. Thus, surface and subsurface contaminants have the potential to be quickly transported into subterranean water systems and freshwater aquifers without filtration as a result of the development of oil and gas lease parcels. In addition, contaminants spilled or leaked into or onto karst zones (including surface and subsurface) may disrupt and displace cave species and critical biological processes. Changes in geologic formation integrity, runoff quantity/quality, drainage course, rainfall percolation factors, vegetation, surface contour, and other surface factors can negatively impact cave ecosystems and aquifer recharge processes. Heavy vibrations and focusing of surface drainages can lead to slow subsidence, collapse of subsurface voids, and/or cave ecosystem damage. The BLM categorizes all areas within the PDO as having either low, medium, or high karst potential occurrence based on geology, occurrence of known caves, and density of known karst features (BLM 1997a, 2018b). Effects on cave and karst resources would depend on the locations of proposed disturbance relative to existing subsurface cave and/or karst features as described above.

Effects from reasonably foreseeable cumulative actions are anticipated to be the same as the effects documented above. Reasonably foreseeable cumulative actions would result in a total of 390,195 acres of total landscape-level surface disturbance, of which future potential development of the nominated lease parcels would comprise approximately 11.2 acres (0.003% of total landscape-level surface disturbance; see Table 3.2).

Of the PDO's mapped cave potential zones, one nominated lease parcel (6848) intersects approximately 79.20 acres of low cave potential areas, one nominated lease parcel (6845) intersects approximately 158.25 acres of medium cave potential areas, and five nominated lease parcels intersect approximately 1,079.84 acres of high cave potential areas. Additionally, one nominated lease parcel (6848) intersect approximately 79.20 acres of low karst potential, four nominated lease parcels (465, 466, 6845, and 6846) intersect approximately 438.25 acres of medium karst potential, and two nominated lease parcels (468 and 470) intersect approximately (799.84) acres of high karst potential. Table 3.9 lists the nominated lease parcels, associated cave and karst intersects, and applicable stipulations and lease notices. Lease notice SENM-LN-1 and stipulation SENM-S-21-CSU (each of which provide protections for caves and karst resources [see Appendix B]) have been applied to nominated lease parcels with medium, high, or critical cave or karst occurrence areas (see Table 3.9).

Table 3.9. Cave and Karst Impact Summary

Nominated Lease Parcel (total parcel acres)	Cave Designation (percent of parcel within cave designation)	Karst Designation (percent of parcel within karst designation)	Applicable Stipulations and Lease Notices
465 (159.88)	High (100%)	Medium (100%)	SENM-LN-1, SENM-S-21
466 (78.43)	High (100%)	Medium (100%)	SENM-LN-1, SENM-S-21
468 (643.58)	High (100%)	High (100%)	SENM-LN-1, SENM-S-21
470 (160.40)	High (100%)	High (100%)	SENM-LN-1, SENM-S-21
6845 (159.63)	Medium (100%)	Medium (100%)	SENM-LN-1, SENM-S-21
6846 (39.33)	High (100%)	Medium (100%)	SENM-LN-1, SENM-S-21
6848 (79.21)	Low (100%)	Low (100%)	-

While there is a low likelihood of encountering karst features within the low karst occurrence zone, past oil and gas development in critical, high, and medium karst occurrence zones has resulted in the intersection of subterranean voids during construction, resulting in damage to equipment, loss of infrastructure, bit drops, and losses of drilling medium and cement during drilling and casing, respectively. Losses of circulation during drilling and cementing introduce foreign materials into the subterranean environment, while the opening of subterranean voids could change airflow patterns within a cave system to negatively impact the cave ecosystem and compromise the structural integrity of the cave passage. In the past year, the BLM PDO has received five reports of subsurface voids opening during construction (power line, pipeline, and facility pad) and exploration activities (two seismic surveys) in areas where there were no previously known sinkholes or caves. None of these events resulted in reported contamination events of groundwater, and the features impacted did not meet the criteria of a “significant cave;” thus, development remained in conformance with the Cave Resource Protection Act of 1988 and attendant regulations.

All future potential development within medium and high karst occurrence zones on the nominated lease parcels would be further reviewed and mitigated at the time of proposed lease development, or during other proposed ground-disturbing activities, per STCs of the lease. While several measures can be implemented to mitigate impacts, it is still possible for impacts to occur from containment failures, well blowouts, accidents, spills, and structural collapses. It is therefore necessary to implement long-term monitoring studies to determine if current mitigation measures are sufficient to prevent long-term or short-term impacts to cave/karst resources. Mitigation measures could include changes in drilling operations, special casing and cementing programs, installation of leak detection and automatic shut-off systems, and modifications in surface activities. A complete list of mitigation measures can be found in Appendix 3, Practices for Oil and Gas Drilling and Production in Cave and Karst Areas, within the Carlsbad and Roswell RMPs (BLM 1997a, 1997b). Therefore, although cave/karst resources may experience impacts, the likelihood of impacts occurring is very low, and the Proposed Action is expected to remain in conformance with the Cave Resource Protection Act of 1988 and attendant regulations.

AIB-14 Fluid Minerals

How would future potential development of the nominated lease parcels affect fluid minerals and energy production?

There are currently 2,412,770 acres leased within the BLM PDO. Current annual production within the analysis area is estimated to be 653,838,835 bbl of oil and 2,603,499,746 thousand cubic feet (mcf) of gas (NMOCD 2024). Reasonably foreseeable cumulative actions (which includes the RFD scenarios for

PDO) would result in potential for development of 20,240 wells in addition to other mineral development. Using the most recent production estimates from the CFO RFD scenario (see Table 3.1), development of all reasonably foreseeable wells would produce approximately 8,880,000,000 bbl of oil and 34,000,000,000 mcf of gas over 20 years. As with the future potential development of the nominated lease parcels, development of the RFD scenario is consistent with laws mandating development of mineral resources on public lands. Oil and gas development associated with reasonably foreseeable cumulative actions, including development of the nominated lease parcels, is consistent with various laws, including FLPMA, that mandate that the BLM administer the exploration and development of these mineral resources on public lands for the benefit of the citizens of the United States.

Future potential development of the nominated lease parcels would include 11.2 acres of surface disturbance and would add 1,317.29 acres (a 0.05% increase) to the total amount of the 20-million-acre PDO analysis area that is leased. The total future estimated production from the nominated lease parcels is 2,431,044 bbl of oil and 8,326,374 mcf of gas (see Table 3.1) and would contribute an additional 0.4% oil and 0.3% gas production within the analysis area. Future potential development of the nominated lease parcels (seven horizontal wells) would comprise 0.01% of all past and reasonably foreseeable future oil and gas development (65,179 wells) and depending on the success of oil and gas well drilling, non-renewable natural gas and/or oil would be extracted and delivered to market. Of the seven nominated lease parcels, only parcel 470 contains an oil and gas well (1 well), which is currently inactive.

AIB-15 Potash, Solid, and Leasable Minerals

How would future potential development of the nominated lease parcels impact solid and other leasable minerals, such as potash?

Potash resources in southeastern New Mexico are in an area governed by the rules of the (Interior) Secretary's Order 3324, "Oil, Gas, and Potash Leasing and Development Within the Designated Potash Area of Eddy and Lea Counties, NM" dated December 4, 2012. This area is commonly called the Secretarial Order Potash Area (SPA). The Secretary's Order was written to establish rules for concurrent operations in prospecting for, development of, and production of oil and gas and potash deposits owned by the United States within the SPA. The SPA completely encompasses the Known Potash Leasing Area, which was established for the administration of potassium leasing. The SPA is composed of four classifications respective to the density of core holes or geophysical inference: measured ore (potash enclave), indicated ore, inferred ore, and barren of potash ore. Oil and gas development within measured ore (potash enclave) reserves would affect economical potash resources. Development in areas that are indicated, or inferred ore may affect economical potash reserves or resources. Oil and gas development in areas that are barren of potash reserves would not affect economical potash reserves or resources.

Reasonably foreseeable cumulative actions (which includes the RFD scenarios for PDO) would result in potential development of 20,240 wells over 20 years (see Section 3.3) in addition to other mineral development. Of the number of wells identified in the RFD scenario, seven horizontal wells would be attributable to future potential development of the nominated lease parcels. This is 0.03% of the RFD scenario (see Section 3.3). While it is assumed that some portion of development associated with the RFD would occur in the SPA, all seven wells associated with the nominated lease parcels would occur outside the SPA and not result in reductions of available potash resources. Impacts of the RFD scenario would vary depending on the area of the SPA in which the reasonably foreseeable future wells would be developed. Additionally, nominated lease parcel 6848 contains one potash lease (Lease NMNM 122279), in which potential impacts would be examined at the site-specific development stage. One aggregate open pit surface mine is located approximately 2.1 miles south of parcel 468. The BLM has the authority under STCs to attach COAs at the site-specific level to minimize significant adverse effects on resource values at the time operations are proposed. Additionally, stipulations applied to parcel 6848 for other ecological

concerns (i.e. slopes and fragile soils [AIB-5]) may provide protections to resources found within the potash lease if they intersect these same ecological features.

AIB-16 Livestock Grazing

How would future potential development of the nominated lease parcels impact livestock grazing?

There are currently 8,727,888 acres of livestock grazing allotments (644 allotments) within the 20-million-acre PDO. As outlined in the 1988 CFO RMP, the extent, location, and timing of range improvements is based on allotment-specific management objectives adopted through a cooperative management plan process, interdisciplinary development and review of proposed actions, contributions from operators and others, and BLM funding capability. Such improvements enhance or improve livestock grazing management, improve watershed conditions, enhance wildlife habitat, or serve similar purposes. Surface disturbance associated with reasonably foreseeable cumulative actions within the 20-million-acre PDO would involve vegetation removal and changes in forage conditions, altering the grazing availability for livestock. Additionally, alterations to the existing range improvements are also possible; consequently, this would be a long-term effect.

Within the PDO, reasonably foreseeable cumulative actions would add to past and present disturbance, resulting in a total of 390,195 acres of surface disturbance over the next 20 years (see Table 3.2). Proposed vegetation treatments and reclamation projects (Section 3.3.2) may offset surface disturbance as new forage for livestock grazing is made available through revegetation.

Six of the seven nominated lease parcels are located within grazing allotments (Table 3.10). Future potential development of these seven nominated lease parcels would comprise approximately 11.2 acres of surface disturbance (0.003% of total landscape-level surface disturbance within the PDO). This surface disturbance would contribute to reduced forage availability, which would affect grazing success. Surface disturbance for future potential development of each nominated lease parcel would affect between 0.008% and 0.03% of the allotments they intersect. One retention dam and two troughs are located within 200 m (656 feet) of the boundary of parcel 465; one storage tank is located within 200 m (656 feet) of the boundary of parcel 468.

Table 3.10. Grazing Allotments by Parcel

Grazing Allotment(s)	Parcel Number(s) (parcel acreage within grazing allotment, percent of total parcel acreage)*	Estimated Area of Surface Disturbance (acres)	Percent of Grazing Allotment that Would be Disturbed
Angell Draw No. 77015 14,275.4 acres	465 (160 acres, 100%); 466 (78.43 acres, 98%); 6846 (39.33 acres, 98%)	4.8	0.03%
Seven River Hills No. 78055 13,730.1 acres	468 (639.84 acres, 100%)	1.6	0.012%
South Turkey Track No. 77075 140,207.9 acres	470 (160 acres, 100%)	1.6	0.001%
Big Hackberry No. 78087 20,652.2 acres	6845 (158.25 acres, 100%)	1.6	0.008%

Note: The analysis contained in this EA generally provides percentage contribution rounded to two decimal points. As such, percentages may not always sum to 100 because of rounding.

* Acreages contained in the table above were calculated using GIS data sets for resources and parcels, which may differ slightly from the acreages contained in the parcel acreage within grazing allotments. Difference in total acres between parcels can vary because of geoprocessing operations where slivers of area are created when two or more data sets intersect. Any inaccuracies are negligible and do not change the overall impact analysis conclusions presented in this EA.

The BLM's authority under STCs would allow for the application of measures, including relocating wells up to 800 m (2,625 feet), to mitigate livestock grazing-related impacts and avoid impacting existing grazing infrastructure (e.g., retention dams and troughs). The reasonably foreseeable cumulative actions described in Section 3.3 provide a quantitative overview of these actions within the PDO. These actions would result in a cumulative loss of forage across the allotments within the analysis area. Proposed vegetation treatments and reclamation projects would ultimately contribute to cumulatively long-term countervailing impacts as new forage for livestock grazing is made available through revegetation.

AIB-17 Visual Resources

How would future potential development of the nominated lease parcels affect the visual landscape, including areas adjacent to Carlsbad Caverns and Guadalupe Mountains National Parks?

Reasonably foreseeable cumulative actions within the 20-million-acre PDO would create surface disturbances and visual contrasts with the surrounding landscape and may adversely effect the scenic quality of the analysis area's landscapes. The degree of effect would depend on the location of proposed infrastructure relative to sensitive viewsheds and areas already highly modified in character. At the landscape level, state and federal efforts to plug and reclaim inactive wells would continue to help offset negative effects on visual resources. 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).

None of the nominated lease parcel are located with VRM Class I or Class II designated areas. Nominated lease parcel 468 (639.84 acres; 100% total parcel acreage) is located entirely within the VRM Class III designated area. The objective of this VRM class is to partially retain the existing character of the landscape (BLM 1986). The remaining six nominated lease parcels are located entirely within VRM Class IV designated area (677.45 acres collectively). The objective of this VRM class is to provide for management activities which require major modification of the existing character of the landscape. Within this VRM class, the level of change to the characteristic landscape can be high, and management activities may dominate the view and be the major focus of viewer attention (BLM 1986). However, the BLM will make every attempt to minimize the effect of these activities through careful location, minimal disturbance, and repetition of basic visual elements (BLM 1986).

Future potential development of the nominated lease parcels would result in approximately 11.2 acres (0.85% of total parcel acreage) of surface disturbance, and seven horizontal wells. This disturbance comprises 0.03% of the projected surface disturbance in the oil and gas RFD scenarios (including 33,367 acres for CFO and 1,088 acres for RFO), 0.004% of the total existing landscape disturbance (317,000 acres), and 0.003% of the total landscape-level surface disturbance (390,195 acres) associated with reasonably foreseeable cumulative actions within the PDO (see Table 3.2). The BLM PDO reviewed aerial photography and records of existing oil and gas development to evaluate the nature and extent of visual effects as a result of future potential development of the nominated lease parcels and found that the nominated lease parcels are adjacent to lands with a high degree of oil and gas development. Future potential development of an estimated seven horizontal wells on the nominated lease parcels (one well each) would lead to a new visual element and modification of the landscape, resulting in long-term visual impacts associated with the nominated parcels, however, this would be visually consistent with the surrounding landscape, which is already highly modified in character.

The nearest nominated lease parcels to the boundary of Carlsbad Caverns National Park (CCNP) are parcels 6845 (8.86 miles southeast), 468 (22.55 miles north), and 6846 (27.86 miles northeast). The nearest nominated lease parcel to the boundary of Guadalupe Mountains National Park (GUMO) are

parcels 6845 (34.13 miles northeast), 468 (40.28 miles northeast), and 6846 (49.23 miles northeast). As such, future potential development of the nominated lease parcels is not expected to be visible from portions of CCNP or GUMO.

Although none of the nominated lease parcels contain residences within the parcel boundaries, it is assumed that development of the nominated lease parcels could be visible from some or all of the residences located near the nominated lease parcels and surrounding areas (nearest residences range from approximately 1.25 to 2.6 miles from parcel boundaries, see AIB-23). However, there is also potential for views of oil and gas development-related equipment and structures from individual residences to be obscured by intervening topography and vegetation. The presence of oil and gas development-related equipment and structures on the nominated parcels is unlikely to change the visual landscape of adjacent surface because of the limited scale of the proposed development (see Table 3.2), and the presence of existing oil and gas development in adjacent and surrounding areas.

Stipulation SENM-S-25 is attached to the nominated lease parcel located within VRM Class III (parcel 468), which requires measures to reduce visual impacts (see Appendix B). STCs allow the BLM to consider further mitigation for visual resources at the time of proposed lease development. Measures could include siting of well sites, roads, and associated infrastructure to follow the contour of the landform and mimicking the lines in vegetation to screen and hide locations. In addition, per 43 C.F.R. § 3171.25(b)(2), interim reclamation (reclamation of surface disturbance not necessary for production) and final reclamation (reclamation following well plugging and abandonment) is required within 6 months of well completion and well plugging, respectively.

AIB-18 Night Skies at Carlsbad Caverns National Park

How would future potential development of the lease parcels affect the quality of night skies at the Carlsbad Caverns National Park?

The darkness of the night sky is a valuable aspect of CCNP. Those who visit the park often seek an experience of solitude and the wilderness experience that dark night skies provide. Sky glow is the result of scattered artificial light in the atmosphere; it raises night sky luminance and creates the most visible negative effect of light pollution. The Sky Quality Index (SQI) is an index of light pollution from sky glow with a range of 0 to 100, where 100 is a sky free from artificial sky glow. The National Park Service's (NPS's) Night Sky Monitoring Reports from 2008, which are the best available data, indicate the SQI for the CCNP monitoring station within CCNP is between 89 and 91 (NPS 2016a). These values show that skies in the analysis area 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-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.

The main sources of sky glow in the analysis area are the following: the communities of Artesia, Carlsbad, Roswell, Dexter, Hagerman, and Hobbs; artificial lighting associated with areas of consolidated oil and gas development (particularly at Loco Hills); and infrastructure lighting, flaring, and traffic. At present, approximately 45,579 active well bores of all well types are in the PDO (see Table 3.2). Surface disturbance associated with reasonably foreseeable cumulative actions within the PDO based on the 20-year scenario (390,195 acres of total landscape-level surface disturbance) would likely contribute to sky glow over the long term with an incremental increase as wells are developed. Past and reasonably foreseeable cumulative actions would result in a total of 65,179 wells. While NPS monitoring data indicate that dark sky conditions in the area currently retain their natural characteristics, SQI ratings could

be affected by sky glow associated with community and urban growth, as well as oil and gas well development associated with reasonably foreseeable cumulative actions.

Future potential development of the nominated lease parcels would result in 11.2 acres of surface disturbance and seven horizontal wells, which would represent 0.01% of the 65,179 wells associated with past and reasonably foreseeable cumulative actions (see Table 3.2). Future potential development of the nominated lease parcels could introduce additional artificial lighting that would contribute to sky glow over the short and long term. The degree to which artificial lighting contributes to sky glow would be generally temporary and transient in nature and would vary based on conditions such as cloud cover, weather, and wind speed or direction. For example, most artificial lighting would be short term and would occur during the drilling, completion, and potential flaring of a well, which could last for approximately 30 to 60 days. Long-term lighting sources from oil and gas development and production include those associated with vehicle traffic as well as safety lighting required at night. There is wide variability in both types of lighting and potential impacts of that lighting on night skies that are dependent on environmental factors best understood at the site-specific development stage. Because site-specific information such as the average number of lumens per well or proposed lighting plans for each proposed development is not known at the leasing stage, the number of proposed wells and anticipated new surface disturbance is used as the proxy for determining the change in oil and gas-related lighting from existing conditions (currently estimated at 45,579 active wells and 317,000 acres of related surface disturbance; see Section 3.3.1). Given that the NPS reports that the primary sources that contribute to an increase in night sky effects (sky glow) are cities (NPS 2016b), contributions to sky glow from future potential development of the nominated lease parcels (seven horizontal wells; 11.2 acres of surface disturbance) would be a small contribution to the existing sources (a 0.01% increase over current number of wells and a 0.004% increase in oil and gas-related surface disturbance). Nominated lease parcel 6845 is 13.42 miles northeast of, and most proximal to, the CCNP dark sky monitoring site, and is 8.86 miles northeast of, and most proximal to, the CCNP boundary (NPS 2016a).

Under STCs, the BLM has the authority to require mitigation measures to reasonably reduce resource effects at the lease development level. The BLM may require mitigation measures that specify flare shields, the type of lighting (limited to downcast lighting with covers for safety purposes only), and project alignment.

AIB-19 Cultural Resources

How would future potential development of the nominated lease parcels affect cultural resources?

Within the PDO, reasonably foreseeable cumulative actions would add to past and present disturbance, resulting in a total of 390,195 acres of surface disturbance over the next 20 years. Surface disturbance associated with reasonably foreseeable cumulative actions within the PDO would have the potential to impact cultural resources. Such impacts may include, but are not limited to, loss of or damage to cultural resources or contextual information (such as redistribution of cultural resources) because of the development of oil and gas facilities and related industrial development, increased vehicular traffic, unauthorized ground disturbances, inadvertent oil and produced water spills, erosion, unauthorized collection, and new audible and visual impacts. The magnitude of impacts associated with reasonably foreseeable cumulative actions would generally depend upon the location of RFD relative to the location of cultural resources and the degree to which the setting has already been affected. Effects from RFD on federal lands or with a federal nexus would require separate National Historic Preservation Act (NHPA) processes to avoid, minimize, and/or mitigate effects on cultural resources.

The BLM CFO conducted a records review of the New Mexico Cultural Resource Information System (NMCRIIS), internal BLM data sources, and New Mexico General Land Office records for the lease

parcels to identify known historic properties, traditional cultural properties (TCPs), sacred sites, and traditional use areas within the area of potential effects (APE) for the lease sale. The records review was completed for seven parcels, totaling 1,317.29 acres. The APE for physical effects is the physical footprint of the parcel boundaries (1,317.29 acres collectively). The APE for audible and visual effects is the physical footprint of the parcels plus a 1-mile buffer; this is to account for any potential development that may occur within the parcels or within 1 mile of the parcels at the APD stage.

Approximately 348.61 acres (26.5%) of 1,317.29 total acres of the parcels have been previously surveyed for cultural resources. The records search found a total of 35 archaeological sites. Three sites were located within the physical APE of the lease parcels (parcels 0465, 0468, and 0470), and 32 sites were located within a 1-mile buffer of all seven parcels. Of the 35 archaeological sites located within the lease parcels and the 1-mile buffer of the lease parcels, 13 sites have been determined eligible for listing to the National Register of Historic Places (NRHP), 10 have been determined not eligible, five are undetermined, and seven have no formal determination on file. The probability of discovering previously unrecorded historic properties in this area is moderate.

Of the seven nominated lease sale parcels, three are located within the Permian Basin Programmatic Agreement (PBPA) (parcels 0465, 0466, and 6846) and the remaining four parcels are located outside of the PBPA. Parcels within the PBPA are identified to have sufficient inventory and analysis of cultural resources using predictive models or other methods. With sufficient inventory and analysis, there is a low probability of identifying new historic properties within these seven parcels. Because of low archaeological survey coverage of the four parcels outside the PBPA and minimal overall ground disturbance from development within those lease parcels, there is potential for identifying previously unrecorded sites. However, the nominated lease parcels would be subject to additional cultural resource analysis through NEPA and Section 106 of the NHPA.

The nominated lease parcels have been assigned the National HQ-CR-1 Lease Stipulation, which requires additional cultural resource analyses pursuant to Section 106 of the NHPA, to include identification, effects assessment, consultation, and if necessary, resolution of significant adverse effects, prior to the authorization of any ground-disturbing activities associated with the oil and gas lease. Additionally, the nominated lease parcels assessed within this EA have also been assigned Lease Notice NM-11-LN, which requires compliance with Section 106 of the NHPA and Executive Order 13007 (see Appendix B). In effect, this lease notice notifies lessees that the BLM, if it ultimately offers these leases, could require intensive cultural resource inventories, Native American consultation, and mitigation measures to avoid adverse effects—the costs for which would be borne by the lessee—and that the BLM may require modifications to activities that are likely to adversely affect TCPs or sacred sites for which no mitigation measures are possible. Such measures could include the development of COAs to protect cultural resources. The BLM would work with consulting parties, including any tribes or pueblos that might attach religious and cultural significance to properties within the APE, to identify additional historic properties when an APD is received and may develop COAs to mitigate physical, audible, or visual impacts to sensitive cultural resources. This identification constitutes a separate undertaking that would be analyzed through the NHPA Section 106 process at that time.

Because the proposed oil and gas lease sale does not directly authorize ground disturbance and future oil and gas development would constitute a new undertaking that would require a separate analysis under Section 106 of the NHPA, the CFO cultural heritage resources specialists determined there would be no adverse effect on historic properties as defined in 36 C.F.R. § 800.5(b) as a result of the proposed lease sale.

The CFO sent letters notifying the New Mexico State Historic Preservation Office (SHPO) of their intent to use the State Protocol Appendix C.I.a. on May 8, 2024, as part of the BLM CFO Quarter 1 2025

Competitive Oil and Gas Lease Sale planning process. The CFO received SHPO concurrence for their effect determination on July 3, 2024; see Section 4.3 for additional details.

AIB-20 Native American Concerns

How would future potential development on the nominated lease parcels impact Native American concerns?

Within the PDO, reasonably foreseeable cumulative actions would add to past and present disturbance, resulting in a total of 390,195 acres of surface disturbance over the next 20 years. Surface disturbance associated with reasonably foreseeable environmental trends and planned oil and gas operations within the PDO have the potential to adversely impact TCPs and religious properties within the vicinity. Such impacts may include, but are not limited to, temporary or long-term loss of or damage to Native American religious use or gathering areas, or loss of access to these areas because of the development of oil and gas facilities and related industrial development, increased vehicular traffic, unauthorized ground disturbances, inadvertent oil and produced water spills, or erosion. The magnitude of impacts associated with reasonably foreseeable cumulative actions would generally depend upon the location of RFD relative to areas of concern to Native American tribes. RFD on federal lands or with a federal nexus would undergo the same type of consultation process discussed above (see AIB-19). In addition, the BLM could apply COAs to protect such properties, which may affect or limit oil and gas development. Through tribal consultation, such measures may include COAs to mitigate audible and visual impacts to sensitive TCPs. The processing of lease development applications is a separate undertaking that would be analyzed through the Section 106 process at that time, as directed in law, regulation, and policy, including the use of the Permian Basin Programmatic Agreement (PBPA) (as applicable). The BLM PDO entered the PBPA as an option for compliance with Section 106 of the NHPA for energy-related projects in the PBPA project area. See the Programmatic Agreement fact sheet for further information (BLM 2019).

The BLM CFO initiated government-to-government consultation under NEPA and NHPA for the seven nominated lease parcels for auction in the BLM CFO Quarter 1 2025 Competitive Oil and Gas Lease Sale. This government-to-government consultation took place on May 8, 2024, with letters mailed to the Apache Tribe of Oklahoma, Comanche Nation, Hopi Tribe, Kiowa Tribe of Oklahoma, Mescalero Apache Tribe, Pueblo of Isleta, and Ysleta del Sur Pueblo. No specific Native American concerns have been identified on the subject lease parcels; however, this consultation is considered ongoing. If the nominated parcels are leased, future potential development would go through separate NEPA and NHPA processes as directed by regulation and current policy.

AIB-21 Human Health and Safety

How would future potential development of the nominated lease parcels contribute risks to human health and safety concerns?

Within the 20-million-acre PDO (Eddy, Lea, Chaves, and Roosevelt Counties), there are 45,579 existing active well bores of all well types across all land jurisdictions (BLM 2023b). 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 south and east of Carlsbad along New Mexico State Road 128 and U.S. Route 285; infrequent industrial accidents; presence of hydrogen sulfide (H₂S); increased levels of fugitive dust particulate matter equal to or less than 10 microns in diameter [PM₁₀] and particulate matter equal to or less than 2.5 microns in diameter [PM_{2.5}]; other criteria pollutants; VOCs; and hazardous air pollutants (HAPs). See the air quality analysis in Section 3.6.1 for projected levels of

criteria pollutants, HAPs, GHG emissions, and VOC and nitrogen oxide (NO_x) emissions that contribute to ozone (O₃) formation, as well as NAAQS.

As discussed in AIB-1, Section 2.2.2 of the Water Support Document contains information on PFAS, which are very persistent in both the environment and the human body due to their inability to readily break down (EPA 2024e). PFAS persistence has been linked to bioaccumulation in both the environment and the human body, which may lead to adverse effects on human health (EPA 2024e). PFAS groundwater contamination has been recognized as a nationally significant challenge in the United States (Sunderland et al. 2018). PFAS may be used during the hydraulic fracturing process due to their stability at high temperatures and pressures and may be used in well drilling (in the form of drilling fluids), well completion, and workover operations (Gaines 2022). In addition to drilling efficiency purposes, PFAS are used as an effective method to mitigate oil spills in water. The use of PFAS chemicals makes up a minimal amount (less than 1%) of chemical constituents disclosed to FracFocus for hydraulic fracturing in New Mexico (FracFocus 2024). In total, 63 of the approximately 31,000 ingredient disclosures (0.01%) in 2023 were related to PFAS used in hydraulic fracturing processes in New Mexico. PFAS use in hydraulic fracturing is likely to occur in areas not associated with New Mexico's drinking water.

As further described in Section 3.6.1 and the Air Resources Technical Report (BLM 2023b), future potential development of the nominated lease parcels would result in emissions of air pollutants that can lead to human health effects depending on the level and duration of exposure. The distance that air pollutants can travel depends on a multitude of environmental factors that vary geographically (e.g., climate, topography, land use) and temporally (e.g., time of day, meteorological conditions), making it inexact to predict the spatial extent of potential human health effects associated with future potential development of the lease parcels. In addition, there is no single distance from oil and gas wells that has been accepted across the scientific community as conveying health effects on human populations. However, several studies have found that residents living at varying distances, within less than 1.25 miles of active oil and gas wells, are at greater risk for experiencing health effects from air pollution than those living beyond 2,000 m (roughly 1.25 miles) (Adgate et al. 2014; Czolowski et al. 2017; Haley et al. 2016; Kroepsch et al. 2019).

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 O₃ 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. Breathing air with a high concentration of carbon monoxide (CO) reduces the amount of oxygen that can be transported in the blood stream to critical organs like the heart and brain. At very high levels, which are possible indoors or in other enclosed environments, CO can cause dizziness, confusion, unconsciousness, and death. Very high levels of CO are not likely to occur outdoors. However, when CO levels are elevated outdoors, they can be of particular concern for people with some types of heart disease. Particulate matter, also known as particle pollution or PM, is a complex mixture of extremely small particles and liquid droplets. PM is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. PM is measured and regulated according to particle size. Smaller particles 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 (BLM 2023b).

The following links provide additional information on air pollution health effects and criteria pollutants:

- 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#Effects>) (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)

While no formal human health risk assessments have been conducted specific to past and present development in the PDO, the results of EPA's 2019 Air Toxics Screening Assessment (AirToxScreen) indicate that cancer, neurological risks, and respiratory risks in the analysis area are all lower than national levels and are generally the same as the state of New Mexico levels (EPA 2022b) (see Section 3.6.1.1).

While the 2019 AirToxScreen estimates the risk of cancer and/or other health impacts solely based on exposure to HAPs, other 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 because of demographic or socioeconomic factors) within the analysis area show that most of the indicators for populations at risk are higher for the state of New Mexico compared with the nation as a whole (Headwaters Economics 2024a). Compared with the state of New Mexico, most of the indicators for populations at risk in Eddy and Lea Counties are similar to or lower than state levels. However, certain indicators are noticeably higher than those for the state of New Mexico. The percentages of these populations in Eddy and Lea Counties exceed those within the state of New Mexico by 5% to 43% (Headwaters Economics 2023b, 2023c).

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 cumulative 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. When wells reach the end of their useful life and are properly plugged and reclaimed, they would no longer contribute to air quality 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 nominated lease parcels is estimated to be seven new wells for this lease sale. This is a 0.02% increase in addition to the 45,579 existing active wells. Residences that occur within 1.25 miles or less from oil and gas development are generally at a higher risk for experiencing air pollution effects (Adgate et al. 2014; Czolowski et al. 2017; Haley et al. 2016; Kroepsch et al. 2019) and residences within 0.5 mile or less from oil and gas development is where noise and odor effects may reach nuisance levels, depending on the phase of development (Adgate et al. 2014; Blair et al. 2018; Hays et al. 2017; Kroepsch et al. 2019). None of the nominated lease parcels contain residences within the parcel boundaries. Of the seven nominated lease parcels, one parcel (parcel 6845) has a residence within 1.25 miles or less of the parcel boundary. For the remaining six nominated lease parcels, the closest

residences are all within 1.7 to 2.6 miles from the parcel boundaries and would be at lower risk for experiencing adverse quality of life effects from future potential development.

Regarding Air Quality, fugitive dust and diesel exhaust emissions from construction would result in criteria pollutant, VOC, and HAP emissions. These emissions would be short term (30–60 days) and would have the greatest impact at locations near the construction activities (1.25 miles or less). Therefore, residents near the construction activities would experience greater levels of impacts because of project construction. Air pollution and associated health effects (as described in Section 3.6.1) can affect individuals within communities in the analysis area who are already socially vulnerable and have greater difficulty accessing healthcare facilities and paying for medical treatment or have a higher likelihood of having pre-existing health conditions (EPA 2021).

Regarding greenhouse gas emissions, any climate change-related impact would be regional in nature but may affect individuals within the analysis area who are already socially vulnerable and have a lower capacity to prepare for, cope with, and recover from climate impacts, including higher temperatures, decreased overall water availability, or increased flooding (EPA 2021).

Additional review would be conducted at the time of the proposed lease development if development occurs; standard design features and project-specific COAs would help to minimize potential effects.

When authorizing development, federal and state laws, regulations, and policies are applied to reduce effects or respond to incidents. These include the following:

- Federal, state, county, and municipal fire managers shall coordinate on 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 NMOCD requires spill response measures after releasing hydrocarbons, produced water, or hydraulic fracturing fluids (see the Water Support Document [BLM 2023c] for further information on spills).
- All well pads, vehicles, and other workplaces must comply with worker safety laws as stipulated by the Occupational Safety and Health Administration.
- Vehicular traffic and pipelines are regulated according to safety laws as stipulated by the New Mexico Department of Transportation.
- Measures to lower risks related to H₂S exposure include flaring or venting gas and the use of stock tank vapor recovery systems.

Fugitive dust is concentrated in the short term during construction but may occur to a lesser degree in the long term because of increased vehicle use and ground disturbance. See the air quality analysis in Section 3.6.1 for additional information on fugitive dust as well as the potential health effects of other air pollutants, including criteria pollutants, VOCs, and HAPs. See AIB-1 and AIB-2 for further information regarding potential groundwater and surface water effects and relevant regulations, stipulations, and lease notices offering protections to groundwater and surface water quality.

The U.S. Department of Energy's Waste Isolation Pilot Plant (WIPP) fenced property boundary, the nation's only deep, geologic, long-lived radioactive waste repository that permanently isolates defense-generated transuranic waste 2,150 feet underground in an ancient salt formation (U.S. Department of Energy 2022), is approximately 26 miles west of the nearest nominated lease parcel (parcel 6845).

No impacts to the WIPP are expected from future potential development of the nominated lease parcels. The WIPP is insulated by a 16-section minerals withdrawal. The waste storage area is in the center of the withdrawal, and waste is encapsulated before transport and storage. In most areas around the WIPP, oil and gas wells would not directionally drill beneath the WIPP, as minerals are withdrawn in this area. On the southwest corner of the WIPP, existing oil and gas leases are in areas where minerals have not

been withdrawn and hydraulic fracturing has taken place within the WIPP boundary. The WIPP has multiple seismicity, waterflow, and air monitors on-site to detect adverse impacts related to oil and gas development near the WIPP, and no impacts have been detected. Additionally, the salt beds containing the WIPP are tied to existing potash mining, and lease parcels are buffered to ensure future potential development of the nominated lease parcels does not interfere with existing potash mining, which indirectly protects the WIPP. Finally, the BLM is required to notify the WIPP if an oil and gas well is to be located within 1 mile of the WIPP boundary and coordinate application of COAs. As a result of these protective measures, no impacts to the WIPP are expected from the Proposed Action.

AIB-22 Economic Activity

What are the potential effects from oil and gas leasing and future potential development on economic activity?

The oil and gas industry has been a substantial contributor to the social setting and economic basis of the BLM PDO for decades. The oil and gas sector of the economy relies on both ongoing operational activities (maintenance of existing leases) and new development opportunities (acquisition and development of new leases) to continue to provide local and regional jobs and revenue on a sustained basis. In the 20-million-acre PDO, there are approximately 7.6 million acres of federal mineral estate. Overall development of federal fluid minerals comprises approximately 38% of total oil and gas development activities in the PDO.

Eddy County has a population of 61,264, with 7.2% of the population under the age of 5 and 12.1% of the population over the age of 65 (Headwaters Economics 2024d). Median household income is \$77,458, with 62.1% of the population between the ages of 16 and 64 participating in the labor force and an unemployment rate of 2.6% (Headwaters Economics 2024d, 2024e). Lea County has a population of 73,103, with 8.0% of the population under the age of 5 and 9.6% of the population over the age of 65 (Headwaters Economics 2024f). Median household income is \$65,855, with 62.2% of the population between the ages of 16 and 64 participating in the labor force and an unemployment rate of 3.5% (Headwaters Economics 2024f, 2024g). While the act of leasing federal minerals itself would not result in social effects, subsequent development of a lease may generate impacts on communities and individuals in the vicinity of the lease. At the lease sale stage, it is unknown where, or if, development would occur in any given nominated lease parcels; however, in general, acquisition and development of new leases provide short-term local and regional jobs and long-term revenue on a sustained basis. These may include employment opportunities related to the oil and gas and service support industries in the region, as well as federal, state, and county government revenue related to taxes, royalty payments, and other revenue streams. For example, the revenue collected from the lease sale auction is split between the U.S. Treasury and the state in which the auction is held and can be used for improvements to transportation networks and education systems. As specific types and locations of development are proposed, their effects would be analyzed and addressed at the time of the proposed lease development.

Oil and gas lease sales may contribute to employment for area residents, continued demand for oil and gas industry-related goods and services, and continued demand for support goods and services. This continued demand may contribute to stability in employment in sectors outside of the oil and gas industry. To the extent that additional oil and gas development affect recreational and tourism opportunities in the area of the nominated lease parcels, there may be related effects in these economic sectors. Continued expansion of the oil and gas industry may be perceived as having a negative effect on quality of life considerations for people who value undeveloped landscapes, opportunities for isolation, and activities such as wildlife viewing and cattle ranching. The BLM uses a number of stipulations and lease notices applied to the nominated lease parcels in the current sale that may mitigate potential effects on wildlife (see AIBs 8, 9, 10, and 11) and other resources that in turn may mitigate effects on related recreation (see Section 1.5.5, and AIB-11 and 17) and quality of life (see AIB-23) concerns (see Table 2.1 and Appendix

B for specific stipulations and lease notices applied to the nominated lease parcels, and individual stipulation and lease notice summaries).

The BLM updated its regulations in March 2024 to reduce the waste of natural gas from oil and gas operations on federal and tribal lands. The BLM's Waste Prevention, Production Subject to Royalties, and Resource Conservation Rule—also known as the Waste Prevention Rule—went into effect on June 10, 2024. This rule updates Onshore Oil and Gas Operations and Production Rules 43 C.F.R. § 3160 and 43 C.F.R. § 3170 to help curb waste of natural gas from flaring, venting, and leaks, and provide a fair return for federal taxpayers, tribes, and states. The rule is expected to conserve billions of cubic feet of gas that might have otherwise been vented, flared, or leaked from operators. This rule will replace the BLM's current requirements governing venting and flaring, which are more than four decades old. Following the publication of BLM's Waste Prevention Rule in March of 2024, Notice to Lessees 4a (NTL-4A) no longer applies to oil and gas operations in New Mexico. The BLM is phasing in the new requirements to allow operators ample time to appropriately adjust. For example, some flaring limits will go into effect roughly 60 days after the effective date of the rule. Some flare measurements will be required either 6, 12, or 18 months after the effective date of the rule. Operators will have 18 months to submit leak detection and repair plans to BLM state offices.

The Waste Prevention Rule leverages technological advances made during the last 40 years, as well as industry best practices, to help achieve natural gas waste reductions and prioritize royalties for federal taxpayers, tribes, and states. In fact, many oil and gas operators are already voluntarily taking steps to reduce natural gas waste and improve operational efficiency in ways that often comply with requirements in the rule.

AIB-23 Quality of Life

How would future potential development of the nominated lease parcels affect quality of life and residences within and adjacent to the nominated lease parcels?

Within the PDO, reasonably foreseeable cumulative actions would add to past and present disturbance, resulting in a total of 390,195 acres of surface disturbance over the next 20 years (see Table 3.2). Cumulative actions include activities that generate increased human activity, traffic, noise, dust, odor, light pollution, and visual effects (see the oil and gas development summary in Appendix D). Collective effects from noise, dust, odor, and light disturbance associated with reasonably foreseeable cumulative actions could affect the quality of life for residents, depending on the intensity of development activities and proximity to residences.

For oil and gas development specifically, the distance at which residents may experience quality of life effects from increased human activity, traffic, noise, dust, odor, light pollution, and visual effects depends on a multitude of environmental factors, which vary geographically (e.g., topography, landscape, and land use) and temporally (e.g., phase of development, time of day, meteorological conditions), making it inexact to predict the spatial extent of potential quality of life effects associated with future potential development of the lease parcels. While some environmental factors can be analyzed at the lease sale stage (e.g., vegetation and landscape [AIB-6 and AIB-17] and topography and soils [AIB-5], and surrounding land uses [AIB-15 and AIB-16]), other influential factors cannot be analyzed until detailed site-specific studies are performed at the APD stage and the specific location of wells relative to nearby residences is known. In addition, there is no single distance from oil and gas wells that has been accepted across the scientific community as conveying quality of life effects on human populations. However, monitoring studies have found that residents living within approximately 0.5 mile or less of oil and gas wells (at varying stages of development) experienced nuisance levels of noise (≥ 50 A-weighted decibels) with residents less than 1,000 feet away experiencing the greatest effects (Blair et al. 2018; Hays et al. 2017; Kroepsch et al. 2019); residents living within 0.5 mile of oil and gas wells experienced nuisance

levels of odors (Adgate et al. 2014); and residents living within 1.25 miles or less experienced greater risk of air pollution effects (including, but not limited to, dust) than those living beyond 1.25 miles (Adgate et al. 2014; Czolowski et al. 2017; Haley et al. 2016; Kroepsch et al. 2019). As described in AIB-17, the visual effects of oil and gas development are negligible (i.e., unlikely to change the visual landscape) when development occurs in areas that are already highly modified in character due to a high degree of oil and gas development.

Future potential development of the nominated lease parcels would comprise approximately 11.2 acres of surface disturbance (0.03% of the projected surface disturbance in the oil and gas RFD scenarios and 0.004% of the total existing landscape disturbance in the PDO analysis area) and seven horizontal wells. All nominated lease parcels are in rural, sparsely populated areas containing sporadically to heavily concentrated oil and gas development. Residences that are within 1.25 miles or less from oil and gas development are generally at a higher risk for experiencing air pollution effects (Adgate et al. 2014; Czolowski et al. 2017; Haley et al. 2016; Kroepsch et al. 2019) and residences within 0.5 mile or less from oil and gas development is where noise and odor effects may reach nuisance levels, depending on the phase of development (Adgate et al. 2014; Blair et al. 2018; Hays et al. 2017; Kroepsch et al. 2019). None of the nominated lease parcels contain residences within the parcel boundaries or within 0.5 mile or less of the parcel boundaries. Of the seven nominated lease parcels, one parcel (parcel 6845) has a residence within 1.25 miles or less of the parcel boundary (1.04 miles northwest of parcel). For the remaining six nominated lease parcels, the closest residences are all within 1.7 to 2.6 miles from the parcel boundaries and would be at lower risk for experiencing adverse quality of life effects from future potential development. While most effects on the nearest residences would be short term and would cease during operations (e.g., increased human activity, traffic, noise, dust, and odor during construction, drilling, completion, and interim reclamation phases), the residences would continue to experience long-term visual or other effects that have potential to affect quality of life (see AIB-17 and AIB-23).

The BLM cannot predict where oil and gas reserves may exist on each lease parcel. Consequently, there may be instances where oil and gas exploration activities affect communities because of proximity, and for variable amounts of time. For example, a typical horizontal well averages from 30 to 60 days from start of drilling to completion (see Appendix D) and may have a greater effect (increased dust, traffic, etc.) on nearby resident populations while the drilling operations are ongoing. These types of exploration activities may result in impacts to communities located near the drilling operations; however, the BLM does not know exactly where drilling operations may take place until lease development is proposed, if a nominated lease parcel is developed at all. Thus, the BLM CFO uses stipulations and COAs to minimize impacts to nearby populations during construction and operations, to the extent practicable.

With consideration of total lease acreage, topographic variations within each parcel, and avoidance of other sensitive resources (e.g., surface waters, sensitive soils, or suitable habitat for special-status species) within the nominated lease parcels, there remain opportunities for future potential development to reasonably be placed in portions of the nominated lease parcels that are less proximal to the residences to minimize quality of life issues. Under the authority granted in STCs attached to each lease, measures to reduce effects on or avoid resource values, land uses, or users would be attached as COAs to the APD. Site-specific avoidance, minimization, and/or mitigation measures would be determined at the time of proposed lease development. This could include measures to reduce noise, dust, odor, and light effects during construction and operations. As with reasonably foreseeable cumulative actions, effects on quality of life from these trends and actions would be examined at the APD level with consideration of site-specific locational information and development of COAs to reduce effect as needed.

3.6 ISSUES ANALYZED IN DETAIL

The issues identified for detailed analysis in this EA were developed in accordance with regulations and the guidelines set forth in the BLM NEPA Handbook H-1790-1 (BLM 2008c) using input from internal and external scoping. Issues are retained for detailed analysis if that analysis is necessary to make a reasoned choice between alternatives, 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.

3.6.1 Issue 1: Air Quality

How would future potential development of the nominated lease parcels affect air quality (particularly National Ambient Air Quality Standards and volatile organic compounds) in the analysis area?

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. Air pollutants result from a number of different and widespread sources of emissions. The analysis area for this issue is the CFO tri-county area (Lea, Chaves, and Eddy Counties), which is part of the New Mexico portion of the Permian Basin which includes Lea, Eddy, Roosevelt, and Chaves Counties. This spatial scope of analysis was identified based on the regional nature of air pollution and to facilitate analysis using the best available air quality data, which are generally provided at the county level. For the purposes of this analysis, short-term effects on air quality are considered those that cease after well construction and completion (30–60 days); long-term effects are considered those associated with operations and production and would cease after operations/production are concluded.

Much of the information in this section is incorporated from the *BLM 2022 Air Resources Technical Report for Oil and Gas Development in New Mexico, Oklahoma, Texas, and Kansas* (herein referred to as Air Resources Technical Report and incorporated into this EA by reference) (BLM 2023a).

3.6.1.1 Affected Environment

The CAA, 42 U.S.C. §§ 7401-7671(q), requires the EPA to set NAAQS for pollutants considered harmful to public health and the environment. Primary standards provide public health protection, and secondary standards provide for public welfare, including protection against degraded visibility and damage to animals, crops, vegetation, and buildings (EPA 2024a). The primary NAAQS are required to be set at a level to protect public health, including the health of at-risk populations, with an adequate margin of safety in order to prevent known or anticipated health-related effects from polluted air.

The EPA has set NAAQS for six principal pollutants (“criteria” air pollutants): carbon monoxide (CO); nitrogen dioxide (NO₂); ozone (O₃); particulates (i.e., particulate matter equal to or less than 10 microns in diameter [PM₁₀] and particulate matter equal to or less than 2.5 microns in diameter [PM_{2.5}]); sulfur dioxide (SO₂); and lead (Pb) (EPA 2024a). The EPA has delegated the responsibility of regulation and enforcement of the NAAQS to the state level for states with approved State Implementation Plans, and has approved the New Mexico State Implementation Plan, which allows the State to enforce both the New

Mexico Ambient Air Quality Standards (NMAAQs) and the NAAQS on all public and private lands with the exception of tribal lands and lands within Bernalillo County (BLM 2023a).³ The NMED Air Quality Bureau is responsible for implementation of the State Implementation Plan and enforcement of air quality standards (BLM 2023a). NMAAQs have only been specified for annual NO₂, as shown in Table 3.12. A detailed description of these pollutants, along with their health effects and their sources, can be found in Chapter 3 of the Air Resources Technical Report (BLM 2023a).

CRITERIA POLLUTANT CONCENTRATIONS

Concentrations of air pollutants are measured at air monitoring sites and expressed in parts per million (ppm), parts per billion (ppb), or micrograms per cubic meter (µg/m³), depending on the unit of measure for a specific standard. The EPA and State of New Mexico periodically analyze and review air monitor locations and will discontinue monitoring where pollutant concentrations have been well below standards or may add monitors in areas where concentrations are suspected of approaching the NAAQS or the NMAAQs (BLM 2023a).

Design values are the concentrations of air pollution at specific monitoring sites that can be compared with the NAAQS. Compliance with the NAAQS is typically demonstrated through monitoring of ground-level concentrations of atmospheric air pollutants. Areas where pollutant concentrations are below the NAAQS are designated as attainment/unclassifiable. Locations where monitored pollutant concentrations are higher than the NAAQS are designated nonattainment, and air quality is considered unhealthy (BLM 2023a). The most recent design values for criteria pollutants within the Permian Basin and other representative monitor locations are listed in Table 3.12 of the Air Resources Technical Report (BLM 2023a). Some of these counties do not have monitoring data, for example there is no available criteria pollutant monitoring data for Chaves County, but because the county is relatively rural, it is likely that pollutants are not elevated. The Proposed Action is located in an area that is classified as attainment/unclassified for each of the NAAQS; however, air monitoring data show that 8-hour O₃ design values in the Proposed Action area are within 95% of the 8-hour O₃ NAAQS and in some cases are above the NAAQS.

Table 3.12. 2023 Design Values for Representative Counties

Pollutant	2023 Design Values	Averaging Time	NAAQS	NMAAQs
CO	2.0 ppm (El Paso County, TX – El Paso Chamizal) 0.7 ppm (El Paso County, TX – Ojo De Agua)	8-hour	9 ppm	–
CO	4.1 ppm (El Paso County, TX – El Paso Chamizal) 1.0 ppm (El Paso County, TX – Ojo De Agua)	1-hour	35 ppm	–
O ₃	0.078 ppm (Eddy County - Holland Street 350151005) 0.078 ppm (Eddy County - Carlsbad Caverns Highway 350150010) 0.071 ppm (Lea County)	8-hour	0.070 ppm [†]	–
NO ₂	5 ppb (Eddy County), 5 ppb (Lea County)	Annual	53 ppb [†]	50 ppb
NO ₂	31 ppb (Eddy County), 31 ppb (Lea County)	1-hour	100 ppb [§]	–
SO ₂	5 ppb (El Paso County, TX – El Paso Chamizal)	1-hour ^{§§}	75 ppb	–
PM _{2.5} ^{††}	6.3 µg/m ³ (Lea County)	Annual	9.0 µg/m ³ * [‡]	–

³ Under the CAA and the Tribal Authority Rule, tribes have express authority to manage air quality on tribal lands. Air quality in Bernalillo County is regulated by the City of Albuquerque/Bernalillo Air Quality Division.

Pollutant	2023 Design Values	Averaging Time	NAAQS	NMAAQs
PM _{2.5} ^{††}	19.0 µg/m ³ (Lea County)	24-hour	35.0 µg/m ³ §. *	–
PM ₁₀	2.7 average estimated exceedances (Doña Ana County – Holman Rd) 1.7 average estimated exceedances (Doña Ana County – West Mesa) 4.7 average estimated exceedances (Luna County – Deming Airport)	24-hour [‡] . *	150 µg/m ³ , not to be exceeded more than once per year on average over 3 years	–

Source: Air Resources Technical Report (BLM 2023a), EPA 2024b.

Notes: The NMAAQs standard for total suspended particulates, which was used as a comparison for PM₁₀ and PM_{2.5}, was repealed as of November 30, 2018. Where no standards are presented, the NAAQS still apply.

* Annual mean, averaged over 3 years.

[†] Annual fourth-highest daily maximum 8-hour concentration averaged over 3 years.

[‡] Not to be exceeded during the year.

§§ 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years.

^{††} 2023 PM_{2.5} design values have not been released by EPA. As a result, 2022 design values for PM_{2.5} are populated in this table.

§ 98th percentile, averaged over 3 years.

O₃ is the criteria pollutant that is of most concern for the analysis area. As stated above, 8-hour O₃ design values in the Proposed Action area are within 95% of the 8-hour O₃ NAAQS and in some cases are above the NAAQS. If the NMED determines that emissions from sources within its jurisdiction cause or contribute to O₃ concentrations in excess of 95% of the NAAQS for O₃, it must adopt a plan, including regulations, to control emissions of NO_x and volatile organic compounds (VOCs) to provide for attainment and maintenance of the standard. See N.M.S.A. 1978, § 74-2-5. The NMED initiated an Ozone Attainment Initiative (OAI) to address O₃ levels in the area, including recent new rulemaking. See Waste Prevention Rule, NMAC 19.15.27.9, and O₃ Precursor Rule, NMAC 20.2.50.1-20.2.50.128 (NMED 2023a, 2023b). O₃ is not emitted directly into the air, but results from chemical reactions between a group of highly reactive gases called NO_x and VOCs when they are exposed to sunlight (EPA 2024c). O₃ and NO₂ are criteria air pollutants (CAPs) and are regulated under the NAAQS and NMAAQs. VOCs are not criteria pollutants; however, emissions of both VOCs and NO_x (particularly NO₂, which is used as an indicator for the larger group of gases) are used as proxies for determining potential levels of secondary formation of O₃.

O₃ is most likely to reach unhealthy levels on hot, sunny days in urban environments and can be transported long distances by wind into rural areas (EPA 2024c). People most at risk from breathing air containing O₃ include people with asthma, children, older adults, and people who are active outdoors, especially outdoor workers. In addition, people with certain genetic characteristics, and people with reduced intake of certain nutrients, such as vitamins C and E, are at greater risk from O₃ exposure (EPA 2024c). Additional discussion of ozone effects can be found in the cumulative effects analysis (section 3.6.1.3) and Air Resources Technical Report (BLM 2023a). The largest sources of both NO_x and VOC emissions in Eddy and Lea Counties include oil and gas sources, point sources, and on-road and non-road mobile sources (see Section 4 of the Air Resources Technical Report [BLM 2023a]). Biogenic sources, such as vegetation and soil, can also represent a substantial portion of NO_x and VOC emissions, including Eddy and Lea Counties (BLM 2023a). Additional information on O₃, along with its health effects and sources, can be found in Section 3 of the Air Resources Technical Report (BLM 2023a).

Specifically, the 2811 Holland Street, 727 Carlsbad Caverns Highway, and CCNP - Maintenance Area monitoring stations in Eddy County are analyzed in depth below (EPA 2023a). Table 3.13 and Table 3.14 provide the available 8-hour O₃ values from the three Eddy County monitoring stations, including the number of days per year any exceedances of the NAAQS occurred. Compliance with the NAAQS is typically demonstrated through monitoring of ground-level concentrations of atmospheric air pollutants. Current design values in Eddy County are above the 70 ppb O₃ 8-hour NAAQS; however, the EPA has

not designated the area as nonattainment for O₃. Design value data and trends for the Proposed Action are found in the Air Resources Technical Report (BLM 2023a). Aside from requiring NMED to plan for O₃ mitigation in areas where monitors indicate O₃ levels are within 95% of the federal O₃ standard, N.M.S.A. 1978, Section 74-2-5(C) also authorizes the state's OAI and encompasses three main goals (NMED 2023a):

- To ensure the health and welfare of current residents and future generations in New Mexico.
- To protect the attainment/unclassifiable status of all areas in the state.
- To develop plans that detail how nonattainment areas will attain and maintain the standards by reducing O₃.

Table 3.13. O₃ Exceedances at the Eddy County Holland Site

Year	O ₃ 8-hour ppm*				
	Days with Exceedances	Highest	2nd Highest	3rd Highest	4th Highest
2016	0	0.065	0.064	0.064	0.063
2017	10	0.082	0.078	0.077	0.076
2018	18	0.096	0.095	0.091	0.083
2019	19	0.095	0.092	0.084	0.080
2020	5	0.075	0.075	0.075	0.073
2021	23	0.092	0.082	0.080	0.080
2022	23	0.084	0.083	0.080	0.079
2023	18	0.081	0.079	0.079	0.076

Source: EPA (2023a, 2024c).

Note: Values are from the Eddy County Holland Site: 2811 Holland Street, Carlsbad, New Mexico (ID 350151005).

* Annual fourth-highest daily maximum 8-hour concentration averaged over 3 years.

Table 3.14. O₃ Exceedances at the Eddy County Carlsbad Sites

Year	O ₃ 8-hour ppm*				
	Days with Exceedances	Highest	2nd Highest	3rd Highest	4th Highest
2016	0 [†]	0.070	0.069	0.069	0.069
2017	0 [†]	0.069	0.065	0.065	0.065
2018	10 [†]	0.099	0.081	0.080	0.080
2019	6 [‡]	0.082	0.080	0.078	0.074
2020	9 [‡]	0.074	0.074	0.073	0.072
2021	15 [‡]	0.085	0.080	0.079	0.077
2022	21 [‡]	0.086	0.085	0.084	0.083
2023	11	0.083	0.077	0.076	0.076

Source: EPA (2023a, 2024c).

Note: Values are from the Eddy County Carlsbad Sites: 727 Carlsbad Caverns Highway, Carlsbad, New Mexico (ID 35010010) and Carlsbad Caverns Np - Maintenance Area (350153001).

* Annual fourth-highest daily maximum 8-hour concentration averaged over 3 years.

[†] Carlsbad Caverns Np - Maintenance Area (350153001) data.

[‡] Carlsbad Caverns Highway (ID 35010010) data.

Additional discussion of the BLM contribution is in Section 3.6.1.3, which discusses cumulative impacts and modeling studies with future model projections of O₃ and other pollutants.

To address NO_x and VOC emissions, the NMED developed the “Oil and Natural Gas Regulation for Ozone Precursors,” NMAC 20.2.50.1–20.2.50.128, which went into effect August 5, 2022.

Approximately 50,000 wells and associated equipment will be subject to this regulation. It is anticipated that the regulation will annually reduce VOC emissions by 106,420 tons, NO_x emissions by 23,148 tons, and methane (CH₄) emissions by 200,000 to 425,000 tons statewide. The regulation includes emissions reduction requirements for compressors, engines and turbines, liquids unloading, dehydrators, heaters, pneumatics, storage tanks, and pipeline inspection gauge launching and receiving. The regulation also encourages operators to stop venting and flaring and use fuel cell technology to convert CH₄ to electricity at the well site and incentivizes new technology for leak detection and repair.

The NMED also participates in the voluntary Ozone Advance Program, which is a collaborative effort to encourage O₃ emission reductions in attainment areas. Through this program, states, tribes, and local governments work with EPA to take near-term steps to improve local air quality and ensure continued health protection over the long term. The goal is to avoid NAAQS violations and maintain an attainment designation. In total, the Ozone Advance Program and outreach efforts include the following nine counties: Chaves, Doña Ana, Eddy, Lea, Rio Arriba, San Juan, Santa Fe, Sandoval, and Valencia.

Another pollutant of concern in the southwestern United States is particulate matter. The EPA regulates particulate matter 10 micrometers in diameter or smaller (PM₁₀ and PM_{2.5}) because these smaller particles are associated with negative health effects, including respiratory and cardiovascular problems, and because they can become more deeply imbedded into the lungs and may even get into the bloodstream (EPA 2023b) but does not regulate particles larger than 10 micrometers in diameter (such as sand and larger dust particles). As shown in Table 3.12, particulate matter PM_{2.5} in the analysis area is not currently exceeding the NAAQS, including the new PM_{2.5} annual NAAQS, as indicated by monitoring in Lea County. PM₁₀ is not currently monitored in the analysis area because, per previous monitoring and/or state regulatory expertise, it is expected to meet the EPA’s standard. *See generally*, 42 U.S.C. § 7407. Like O₃, particulate matter is formed by reactions between other chemicals, specifically between SO₂ and NO_x, which are emitted from vehicles, power plants, and other industrial processes (EPA 2023b). Additionally, particulate matter emissions often result directly from activities like construction, traffic on unpaved roads, fields, and fires (EPA 2023b). Additional information on particulate matter, along with its health effects and sources, can be found in Section 3 of the Air Resources Technical Report (BLM 2023a).

CRITERIA POLLUTANT EMISSIONS

Along with criteria pollutant concentrations as measured by air monitors, the EPA provides data on criteria pollutant emissions, expressed in tons per year or total volume of pollutant released into the atmosphere. Emissions data point to which industries and/or practices are contributing the most to the general level of pollution (BLM 2023a). State, basin, and county total emissions for all sources are reported in Table 3.15, based on the 2020 National Emissions Inventory (NEI) in tons per year. NEI data are described in Section 4 of the Air Resources Technical Report (BLM 2023a).

The primary sources of air pollution in the analysis area are oil and gas sources, natural sources (biogenics), point sources, and on-road/non-road sources. In New Mexico, the largest sources of CAPs emitted by human activities are area sources for PM₁₀ and PM_{2.5}, on-road sources for CO, and oil and gas sources for VOCs, SO₂, and NO_x. In the Permian Basin, the largest sources of CAPs emitted by human activities are area sources for PM₁₀ and PM_{2.5}, point sources for SO₂, and oil and gas sources for CO, VOCs, and NO_x (BLM 2023a). Additional 2020 NEI data can be found in Section 4 of the Air Resources Technical Report (BLM 2023a).

Table 3.15. 2020 Air Pollutant Emissions, in Tons per Year

Source	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOCs	HAPs
State of New Mexico Total Emissions	129,132	42,623	199,462	87,828	615,513	712,639	105,524
Eddy, Lea, and Chaves Counties, New Mexico Total Emissions	17,608	5,575	64,518	83,283	104,321	244,704	28,505
Eddy County, New Mexico Total Emissions	7,325	2,305	26,808	35,502	45,159	101,008	11,764
Lea County, New Mexico Total Emissions	6,245	2,295	32,702	46,579	46,128	126,317	13,507
Chaves County, New Mexico Total Emissions	4,038	975	5,008	1202	13,034	17,379	3,234

Source: BLM (2023a)

Note: BLM reports both biogenic and human-caused emissions in the table above.

HAPs = hazardous air pollutants

HAZARDOUS AIR POLLUTANTS

The CAA requires control measures for HAPs. A pollutant is classified as a HAP if it has been identified by the EPA as a compound that is known or suspected to cause cancer or other serious health effects, such as compromises to immune and reproductive systems, birth defects, developmental disorders, and/or adverse environmental effects (BLM 2023a). There are currently 187 compounds listed as HAPs by the EPA. National Emission Standards for HAPs (NESHAPs), established by the EPA, limit the release of specified HAPs from specific industries. 40 C.F.R. §§ 61, 63. NESHAPs for oil and gas development include control of benzene, toluene, ethyl benzene, mixed xylenes, and n-hexane from major sources, and benzene emissions from triethylene glycol dehydration units as area sources (BLM 2023a).

The Air Resources Technical Report discusses the relevance of HAPs to oil and gas development and the particular HAPs that are regulated in relation to these activities (BLM 2023a). Potential health risks associated with HAPs released into the air from oil and gas operations have been evaluated by review of existing emissions data, air quality monitoring, and modeling studies. The Air Resources Technical Report discusses in detail a 2019 health assessment study for which scientists from Colorado State University conducted on-site air monitoring for 47 VOCs (including HAPs) during various stages of well development and production at oil and gas extraction facilities in Colorado. In summary, simulated cancer risks to average individuals were below one in 1 million at distances of 1,400 feet from the well pads, four in 1 million at 500 feet from the well pads, and 10 in 1 million at 300 feet from the well pads. Fewer than one in 1 million people at distances of 2,000 feet from the well pads experienced the worst potential long-term combination of individual risk factors, oil and gas emissions, and local meteorological conditions (maximum exposed individual). This figure rises to seven in 1 million at 500 feet from the well pads, and 10 in 1 million at 400 feet from the well pads (BLM 2023a).

The Air Toxics Screening Assessment (AirToxScreen), published by the EPA, provides a screening tool for state, local, and tribal air agencies (EPA 2022a). The EPA's AirToxScreen is used to evaluate impacts from existing HAP emissions in New Mexico. AirToxScreen is the successor to the previous National Air Toxics Assessment (NATA). In December 2022, EPA released the results of its 2019 AirToxScreen (EPA 2022a). Currently, the 2020 AirToxScreen results are being rolled out from EPA but are incomplete; therefore, 2019 AirToxScreen results are discussed and presented. AirToxScreen calculates concentration and risk estimates from a single year's emissions data using meteorological data for that same year. The risk estimates assume a person breathes these emissions each year over a lifetime (or approximately 70 years). AirToxScreen provides quantitative estimates of potential cancer risk and five classes of non-

cancer hazards (grouped by organ/system: immunological, kidney, liver, neurological, and respiratory) associated with chronic inhalation exposure to real-world toxics for each county and census tract (BLM 2023a). AirToxScreen is a cumulative HAP assessment based on total HAP emissions from all sources contained in the NEI. Per the AirToxScreen Technical Support Document (EPA 2022b), this national-scale assessment (AirToxScreen) is consistent with EPA's definition of a cumulative risk assessment, as stated in EPA's *Framework for Cumulative Risk Assessment*, as "an analysis, characterization, and possible quantification of the combined risks to health or the environment from multiple agents or stressors" (EPA 2003:6). A review of the results of the 2019 AirToxScreen shows that cancer risks, neurological risks, and respiratory risks in the analysis area are all lower than national levels and are generally the same as the state of New Mexico.

The 2019 AirToxScreen analysis reveals that the total cancer risk (defined as the probability of contracting cancer over the course of a 70-year lifetime, assuming continuous exposure) in Lea, Chaves and Eddy Counties is 20.2, 19.2 and 22.3 in 1 million people, respectively, which is lower than the nationwide level (25.5 in 1 million) and in the same range as the state of New Mexico (19.1 in 1 million). The contribution of the oil and gas industry to the cancer risk in Lea, Chaves, and Eddy Counties is 3.0, 0.15, and 3.9 cases in 1 million, respectively (EPA 2022a).⁴ Bright lines⁵ could not be used in the analysis of the HAP results to determine if a particular risk level is acceptable or not, as no such construct for risk exists within the CAA framework akin to the NAAQS (that is, there are no NAAQS against which to compare modeled HAP concentrations). Rather, values or ranges of values published by EPA (e.g., AirToxScreen [NATA] or 40 C.F.R. § 300.430 [Remedial Investigation/Feasibility Study]) were used to provide useful context to risk estimates. While no explicit risk thresholds are available, EPA uses one in 1 million and 100 in 1 million risk for context (EPA 2022b). The values for Lea, Chaves, and Eddy Counties are within the contextual range published by the EPA.

AirToxScreen non-cancer hazards (i.e., respiratory) are expressed as a ratio of an exposure concentration to a reference concentration (RfC). RfCs are indicators defined by the EPA as the daily inhalation concentrations at which no long-term adverse health impacts are expected. For a given air toxin, exposures at or below the RfC (i.e., hazard quotients [HQs] 1 or less) are not likely to be associated with adverse health effects. As exposures increase above the RfC (i.e., HQ greater than 1), the potential for significant adverse effects also increases (BLM 2023b). Chronic non-cancer hazards are estimated for multiple air toxics by summing the HQs, creating a hazard index (HI). The respiratory HI in the analysis area (Lea, Chaves, and Eddy Counties) are 0.21, 0.24, and 0.23, respectively, which is lower than the national HI (0.31) and within a similar range as the New Mexico HI (0.22) (BLM 2023a). Additional AirToxScreen data can be found in Section 5 of the Air Resources Technical Report (BLM 2023a).

This HAPs analysis was prepared in response to an adverse decision of the U.S. Court of Appeals for the Tenth Circuit. While the Tenth Circuit directed the BLM to analyze cumulative HAPs emissions for the San Juan Basin in its oil and gas leasing under NEPA (*Diné Citizens Against Ruining Our Env't v. Haaland*, 59 F.4th 1016, 1047 (10th Cir. 2023) ("*Diné CARE II*"),⁶ the BLM has also created the same analysis for the CFO. The BLM Cumulative Hazardous Air Pollutants Modeling – Final Report (Ramboll and BLM 2023) and the BLM Summary of Cumulative Oil and Gas Hazardous Air Pollutant Analysis for the PDO (Appendix E), incorporated by reference and summarized below, detail the modeling methods

⁴ A one in 1 million lifetime cancer risk is defined as for every 1 million people who are continuously exposed over 70 years to a certain level of a pollutant, one person may develop cancer (EPA 2022a).

⁵ "A "bright line" in risk characterization refers to a threshold value that separates acceptable and unacceptable levels of risk. It is regarded as a clear and unambiguous limit used to determine whether a particular level of exposure to a hazardous substance is safe or not." (BLM 2024a:6).

⁶ The federal Clean Air Act defines a hazardous air pollutant (HAP) as "any air pollutant" of which "emissions, ambient concentrations, bioaccumulation or deposition of the substance are known to cause or may reasonably be anticipated to cause adverse effects to human health or adverse environmental effect." 42 U.S.C. § 7412.

used and the results of the modeling. Note, while Appendix E shows the analysis for all of the PDO, only the three counties in the CFO are discussed in this EA.

The BLM's Western United States HAP photochemical modeling assessment was prepared to support BLM's analysis of cumulative oil and gas impacts from HAPs originating from oil and gas production in Colorado, Montana, New Mexico, North Dakota, South Dakota, Utah, and Wyoming (states where the BLM commonly authorizes federal activities for fossil energy development) on public health. In regard to which HAPs to consider in the analysis, the *Diné CARE II* Court specifically mentioned five HAPs—benzene, toluene, ethylbenzene, mixed xylenes, and n-hexane—as applying to oil and gas development activities based on the National Emission Standards for HAPs (NESHAPs). See 43 C.F.R. § 63.

The modeling assessment evaluated emissions from existing federal, new federal, and non-federal oil and gas sources and includes six key HAPs—benzene, toluene, ethylbenzene, xylene, n-hexane, and formaldehyde—because these compounds are common in the oil and gas sector and consistent with regulatory requirements described in the EPA's New Source Performance Standards (NSPS), see 43 C.F.R. § 60, and NESHAPs. HAP emissions in this study include emission sources associated with wellsite exploration, wellsite production, and midstream sources (Ramboll and BLM 2023).

The modeling analysis evaluated air quality out to a future year of 2032⁷ utilizing data from the 2028 Western Regional Air Partnership (WRAP)/Western Air Quality Study (WAQS) modeling platform, the EPA SPECIATE 5.14 speciation profiles, the EPA's 2016v2 emissions modeling platform (EPA 2022c), and the BLM oil and gas development projections to quantify and apportion federal and non-federal oil and gas emissions (Ramboll and BLM 2023). The model output allows the BLM to compare concentrations of HAPs to calculated risk-based thresholds in order to provide the hard look at the effects on public health required by NEPA.

Carcinogenic and non-carcinogenic chronic risks from modeled oil and gas concentrations were calculated for future year 2032. The emissions inventory for the CFO was based on Annual Energy Outlook oil and gas projections for the Permian Basin. These projections describe the reasonably foreseeable oil and gas development anticipated to occur within the Permian Basin projected out to 2032, providing the temporal component of the cumulative oil and gas analysis. These projections reflect the best currently available information for projected oil and gas development in the Permian Basin. Health-based inhalation thresholds and cancer unit risk estimate threshold values were obtained from the weight of evidence for carcinogenicity under the 2005 EPA cancer guidelines (without revisions) (EPA 2021; 2022d). A residency exposure adjustment factor was applied to the cancer inhalation risk by multiplying the annual modeled concentration by the cancer unit risk factor and multiplying this product by an applicable exposure adjustment factor. The residency exposure adjustment factor⁸ is computed by taking the average residency of the county where development is proposed (Table 3.16) and dividing that by the length of exposure over an assumed 70-year life span. For example, for Eddy County, the residency exposure adjustment factor would be 15.0/70. All other values in Table 3.16 through Table 3.18 are raw model outputs with no adjustment applied.

Table 3.16. County-Specific Residency Information

Area	Chaves County, New Mexico	Eddy County, New Mexico	Lea County, New Mexico	New Mexico	United States
Years	14.9	15.0	14.0	13.1	12.4

Source: U.S. Census Bureau (2023).

⁷ EPA's 2016v2 modeling platform (EPA 2022c), the most advanced dataset at the time of model development, includes emissions for the years 2016, 2023, 2026, and 2032. Future year 2032 was used in this modeling assessment.

⁸ EPA's Exposure Assessment Tools by Routes – Inhalation; <https://www.epa.gov/expobox/exposure-assessment-tools-routes-inhalation>.

Table 3.17 shows the oil and gas cancer risk from federal sources (existing and new) and from all mineral designations together from the combination of benzene, ethylbenzene, and formaldehyde. The risk analysis was only performed for three HAPs (benzene, ethylbenzene, and formaldehyde) because these pollutants had EPA-provided non-zero unit risk estimate values based on the weight of evidence approach (EPA 2021). The non-adjusted (70-year) cancer risk from all oil and gas sources for Chaves, Eddy, and Lea Counties is less than 20 in a million (maximum of 15.10 in Eddy County). The maximum total oil and gas residency exposure-adjusted cancer risk for Chaves, Eddy, and Lea Counties, as described above, is 1.59, 3.24, and 2.62, respectively.

Table 3.17. Estimated Cancer Risk from 2032 Oil and Gas Production in the Carlsbad Field Office by Mineral Designation

County	Cancer Risk* from Existing Federal Wells (per million)	Cancer Risk* from New Federal Wells (per million)	Cancer Risk* from Total Federal Wells (per million)	Cancer Risk* from Non- Federal Wells (per million)	Cancer Risk* from Cumulative Oil and Gas Production (per million)	Adjusted Cancer Risk† From Cumulative Oil and Gas Production (per million)
Chaves	0.20 to 2.51	0.07 to 1.54	0.26 to 3.95	0.20 to 3.53	0.46 to 7.48	0.10 to 1.59
Eddy	0.20 to 6.91	0.08 to 2.95	0.28 to 7.57	0.22 to 8.95	0.51 to 15.10	0.11 to 3.24
Lea	0.45 to 4.65	0.25 to 4.86	0.72 to 7.10	0.79 to 6.46	1.61 to 13.11	0.32 to 2.62

*Cancer risk from emissions of benzene, ethylbenzene, and formaldehyde.

†Adjusted residency risk based on residency factors by county (14.9 years for Chaves, 15.0 years for Eddy, and 14.0 years for Lea Counties).

Risk characterization is a description of the nature and, often, magnitude of human risk, including resulting uncertainties. Risk characterization is accomplished by integrating information from the components of the risk assessment and synthesizing an overall conclusion about risk that is complete, informative, and useful for decision makers (EPA 2000). A “bright line” in risk characterization refers to a threshold value that separates acceptable and unacceptable levels of risk. It is regarded as a clear and unambiguous limit used to determine whether a particular level of exposure to a hazardous substance is safe. Bright lines were not used in the analysis of the cumulative oil and gas HAPs results to determine if a particular risk level is acceptable or not, as no such construct for risk exists within the CAA framework akin to the NAAQS (that is, there are no NAAQS against which to compare modeled HAP concentrations). Rather, values or ranges of values published by EPA (e.g., AirToxScreen [NATA] or 40 C.F.R. § 300.430 [Remedial Investigation/Feasibility Study]) were used to provide useful context to risk estimates associated with the cumulative oil and gas HAPs study. As described in the BLM Cumulative Hazardous Air Pollutants Modeling - Final Report (Ramboll and BLM 2023), while no explicit risk thresholds are available, EPA uses a one in 1 million and 100 in 1 million risk for context (EPA 2022d). Both the 70-year cancer risk and the adjusted cancer risk in Table 3.17 are within the contextual range published by the EPA. It is important to note that the cancer risks estimated by this assessment only consider cumulative oil and gas sources and six common oil and gas HAP pollutants. While the cumulative oil and gas contribution is within the contextual range published by EPA (one in 1 million and 100 in 1 million), additional HAPs from non-oil and gas sources could increase the overall risk in the project area. This modeling assessment looked at cumulative oil and gas sources to address the Court’s holding in regard to analysis of cumulative HAP emissions. It was beyond the scope of this modeling assessment to determine cumulative HAP values from non-oil and gas sources.

AirToxScreen is a cumulative risk assessment, consistent with EPA’s definition (EPA 2003). The contribution, based on EPA’s most recent AirToxScreen results (2019), of the oil and gas industry to the cancer risk in Chaves, Eddy, and Lea Counties ranged from 0.15 to 3.91 in a million (BLM 2023a). BLM’s cumulative oil and gas model analyzes a future year (2032) while the EPA’s AirToxScreen model analyzes a historical year (2019). While not paired in time, the BLM’s cumulative oil and gas study

showed the contribution of the oil and gas industry to cancer risk (circa 2032) in Chaves, Eddy, and Lea Counties ranged from 1.59 to 3.24 in a million (Appendix E). While different methods were used by EPA and the BLM to determine cumulative oil and gas contributions and this could result in inconsistencies when comparing the data, the overall trend projects cumulative oil and gas contribution will be steady to slightly decreasing between 2019 and circa 2032. The overall HAPs trend could be further affected by projected declines in other sectors based on increased electrification, equipment efficiency, and renewable technologies for electricity generation (U.S. Energy Information Administration [EIA] 2023a). To have an entirely consistent analysis between BLM and EPA would have required BLM to project the entire NEI forward to a common future year (2032 in the BLM study) and use the Community Multiscale Air Quality Modeling System (CMAQ) model with the unique chemical mechanism within CMAQ used in AirToxScreen. To BLM's knowledge, in the near 30-year history of EPA's NATA, of which AirToxScreen is a part, a future-year projection for NATA has never been attempted and such an exercise would be outside the scope of this EA as a current model does not exist. Therefore, using the AirToxScreen results described above, if one were to simply add the risk values for the respective counties between EPA's and BLM's modeling (would not be scientifically valid given the varying methodologies), the addition of the other source categories places the total risk from other sources, in addition to future projections of HAPs impacts from oil and gas development, still well within the one in 1 million and 100 in 1 million risk range.

Table 3.18 shows the HQs for each compound and the HI. EPA estimates chronic non-cancer HQs by dividing a chemical's estimated long-term exposure concentration by the RfC for that chemical. Chronic non-cancer hazards from multiple air toxics were assessed by calculating an HI through the summation of individual HAP HQs that share similar adverse health effects, resulting in a target organ-specific HI representing the risk to a specific organ or organ system. An HQ or HI value less than 1 indicates that the exposure is not likely to result in adverse non-cancer effects (Ramboll and BLM 2023, EPA 2022c). Chaves, Eddy, and Lea Counties show HQ and HI values below 1 for all mineral designations, indicating that cumulative oil and gas source exposure is not likely to result in adverse non-cancer effects. The maximum HI from total oil and gas production is below 1, at 0.0564, 0.1145, and 0.1007, for Chaves, Eddy, and Lea Counties, respectively. It is important to note that the non-cancer risks estimated by this assessment only consider cumulative oil and gas sources and the six common oil and gas pollutants. While the cumulative oil and gas contribution are below 1, additional HAPs from non-oil and gas sources could increase the overall risks in the project area. This modeling assessment looked at cumulative oil and gas sources to address the Court's holding in regard to analysis of cumulative HAP emissions. It was beyond the scope of this modeling assessment to determine cumulative HAP values from non-oil and gas sources.

Table 3.18. Estimated Hazard Quotients and Hazard Index from Circa 2032 Oil and Gas Production in the Carlsbad Field Office by Mineral Designation

	Hazard Quotient						Hazard Index
Source	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	
Chaves County							
Existing federal	<0.0001 to 0.0008	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0001	Range is <0.0001	0.0015 to 0.0181	0.0015 to 0.0191
New federal	<0.0001 to 0.0019	Range is <0.0001	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0004	0.0005 to 0.0085	0.0005 to 0.0109
Total federal	<0.0001 to 0.0026	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0002	<0.0001 to 0.0004	0.0019 to 0.0263	0.002 to 0.0294
Non-federal	<0.0001 to 0.0017	Range is <0.0001	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0004	0.0015 to 0.0259	0.0015 to 0.027

	Hazard Quotient						Hazard Index
Source	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	
<i>Total</i>	<i>0.0001 to 0.0034</i>	<i>Range is <0.0001</i>	<i>Range is <0.0001</i>	<i><0.0001 to 0.0003</i>	<i><0.0001 to 0.0005</i>	<i>0.0034 to 0.0522</i>	<i>0.0035 to 0.0564</i>
Eddy County							
Existing federal	<0.0001 to 0.0039	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0004	<0.0001 to 0.0006	0.0015 to 0.047	0.0016 to 0.0516
New federal	<0.0001 to 0.0037	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0001	<0.0001 to 0.0008	0.0005 to 0.0162	0.0006 to 0.0208
Total federal	<0.0001 to 0.0052	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0005	<0.0001 to 0.0008	0.0021 to 0.0528	0.0021 to 0.0563
Non-federal	<0.0001 to 0.0043	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0004	<0.0001 to 0.0008	0.0017 to 0.0632	0.0017 to 0.0679
<i>Total</i>	<i>0.0001 to 0.0069</i>	<i>Range is <0.0001</i>	<i>Range is <0.0001</i>	<i><0.0001 to 0.0007</i>	<i><0.0001 to 0.0009</i>	<i>0.0037 to 0.1066</i>	<i>0.0039 to 0.1145</i>
Lea County							
Existing federal	0.0001 to 0.0014	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0002	<0.0001 to 0.0002	0.0033 to 0.0353	0.0034 to 0.0361
New federal	0.0002 to 0.012	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0002	<0.0001 to 0.0029	0.0015 to 0.0156	0.0018 to 0.0309
Total federal	0.0004 to 0.0127	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0003	<0.0001 to 0.003	0.0049 to 0.0491	0.0054 to 0.0511
Non-federal	0.0003 to 0.0016	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0002	<0.0001 to 0.0003	0.0057 to 0.0477	0.006 to 0.0496
<i>Total</i>	<i>0.0008 to 0.0133</i>	<i>Range is <0.0001</i>	<i>Range is <0.0001</i>	<i><0.0001 to 0.0003</i>	<i><0.0001 to 0.003</i>	<i>0.0111 to 0.0968</i>	<i>0.0121 to 0.1007</i>

AIR QUALITY RELATED VALUES

Prevention of Significant Deterioration (PSD) is a CAA permitting program for new or modified major sources of air pollution located in attainment areas. It is designed to prevent NAAQS violations, preserve and protect air quality in sensitive areas, and protect public health and welfare (EPA 2023c). Under PSD regulations, the EPA classifies airsheds as Class I, Class II, or Class III. The CAA PSD requirements give more stringent air quality and visibility protection to national parks and wilderness areas that are designated as Class I areas, but a PSD designation does not prevent emission increases. Federal land managers are responsible for defining specific AQRVs, including visual air quality (haze) and acid (nitrogen and sulfur) deposition, for an area and for establishing the criteria to determine an adverse impact on the AQRVs. AQRVs are resources sensitive to air quality and can include a wide variety of atmospheric chemistry-related indicators. Monitoring and modeling of AQRVs help to provide a level of protection to sensitive areas such as Class I park and wilderness areas. This project is not subject to PSD analysis or permitting.

Congress established certain national parks and wilderness areas as mandatory Class I areas where only a small amount of air quality degradation is allowed. Defined by the CAA, Class I areas include national parks greater than 6,000 acres, wilderness areas and national memorial parks greater than 5,000 acres, and international parks. These areas must have been in existence at the time the CAA was passed by Congress in August 1977. There are three Class I areas in or near the analysis area: CCNP, Guadalupe Mountains National Park (GUMO), and Salt Creek Wilderness. The most closely watched Class I areas near the analysis area are CCNP and GUMO. GUMO has monitoring data representative of the CCNP. The NPS is responsible for managing the CCNP and the GUMO. The nearest nominated lease parcels to the boundary of CCNP are parcels 6845 (8.86 miles southeast), 468 (22.55 miles north), and 6846

(27.86 miles northeast). The nearest nominated lease parcels to the boundary of GUMO are parcels 6845 (34.13 miles northeast), 468 (40.28 miles northeast), and 6846 (49.23 miles northeast). The analysis area is in attainment for the NAAQS and the NMAAQs and is categorized as a Class II area except for the Class I CCNP area located in Eddy County (BLM 2023a).

Visibility⁹ is generally projected to be steady or improving at the Interagency Monitoring of Protected Visual Environments (IMPROVE) monitors near the project area (BLM 2023b). 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 at NPS monitors near the project area show generally poor to fair conditions with no trends available, while sulfur deposition conditions are generally poor to good with no trend or a relatively unchanging trend (where trend data are available) (BLM 2023a).

As required by the Regional Haze Rule, state reasonable progress goals must provide for an improvement in visibility for the 20 percent most anthropogenically impaired days relative to baseline visibility conditions and ensure no degradation in visibility for the 20 percent clearest days relative to baseline visibility conditions (EPA 2019). Model simulations projected visibility out to the model year 2028 using the average visibility (in deciviews) for the years 2014 through 2017 for each Class I area. The visibility conditions in these years are the benchmark for the “provide for an improvement” and “no degradation” requirements.

A line drawn between the end of the 2014–2017 baseline period and 2064 (deciviews/year) shows a uniform rate of progress or “glidepath” between these two points. The glidepath represents a linear or uniform rate of progress and is the amount of visibility improvement needed in each implementation period to stay on the glidepath; there is no rule requirement to be on or below the glidepath. Results for the nearest Class I areas to the analysis area show a decreasing glidepath of visibility trends for both the base (2014–2017) and future year (2028) deciview values on the 20% clearest and most impaired days (MID). More information can be found in the Technical Support Document for EPA’s Updated 2028 Regional Haze Modeling (EPA 2019), incorporated by reference.

Visibility trends based on air monitoring data from IMPROVE monitors in the BLM New Mexico area of responsibility show that visibility trends have been flat or improving (Figures 9 through 20 of the Air Resources Technical Report [BLM 2023a]). Specifically, visibility trends shown for CCNP/GUMO, Salt Creek Wilderness, and White Mountain Wilderness indicate that visibility on the best days has been flat to improving and that visibility on worst days has shown a flat to a slight improvement over the period of record, although the annual variability makes determining a trend difficult over the period of record. Implementation of Best Available Retrofit Technology strategies as required under the federal Regional Haze Rule over the next few years should result in further improvements (BLM 2023a).

AIR QUALITY DESIGN CONSIDERATIONS

Various federal and state-level permitting programs ensure the protectiveness of the NAAQS and reduce effects on AQRVs in Class I areas. New major emitting facilities or significant modifications to major emitting facilities are required to undergo PSD preconstruction review. PSD review requires an air quality analysis to assess the project’s potential contribution to the NAAQS and PSD increments (maximum allowable increases in air quality over baseline concentrations), a Best Available Control Technology Analysis, and an additional effects analysis (to assess potential effects on soils, vegetation, and visibility) (EPA 2023d). Complete PSD applications are generally forwarded to the NPS Air Quality Division for review to ensure protectiveness of AQRVs at Class I areas.

⁹ Visibility impairment is a result of regional haze that is caused by the accumulation of pollutants from multiple sources in a region. Emissions from industrial and natural sources may undergo chemical changes in the atmosphere to form particles of a size that scatter or absorb light and result in reductions in visibility.

Additional state-level permitting requirements have been adopted by NMED, such as New Source Review permitting requirements or de minimis emission thresholds (10 pounds per hour or 25 tons per year of any criteria pollutant) that must be met in lieu of completing the construction permitting process; these are also enforced within the analysis area to ensure protectiveness of the NAAQS (NMED 2023c).

Construction permitting requirements are listed in NMAC 20.2.72. The Air Resources Technical Report (BLM 2023a) contains additional discussion on federal and state air quality rules and regulations. At the APD stage, the BLM looks to minimize air pollutants via COAs. Examples of additional air quality control measures imposed at the APD stage may include submission of an emissions inventory for the plan of development, air quality modeling, or implementation of mitigation measures and best management practices (BMPs). The BLM would do this in coordination with the EPA, NMED, and other agencies that have jurisdiction over air quality. The BLM tries to reduce project impacts regardless of the NAAQS level (for example, COAs in an attainment area to reduce road dust or construction dust).

3.6.1.2 Environmental Effects

IMPACTS OF THE PROPOSED ACTION

Substantial air resource impacts are not anticipated from leasing as it is an administrative action. Any potential effects on air quality from the sale of lease parcels would occur at such time that any issued lease is developed and not at the leasing stage itself. The Proposed Action does not authorize or guarantee the number of wells analyzed herein. If leased, 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 better inform the decision maker and the public of potential impacts to air quality if the leases are developed.

Four general phases of post-lease development would generate air pollutant emissions: 1) well development (well site construction, well drilling, and well completion), 2) well production operations (extraction, separation, gathering), 3) midstream (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 authority over these activities on federal surface and federal minerals, midstream and end-use emissions (phases 3 and 4) typically occur off-lease where the BLM has no authority.

During well development, there could be emissions from earth-moving equipment, vehicle traffic, drilling, and completion activities. NO₂, SO₂, 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 NO₂ and CO emissions, with lesser amounts of SO₂. These temporary emissions would be short-term during the drilling and completion phases, which are expected to last between 30 and 60 days. During well production and operations there could be continuous emissions from separators, condensate storage tanks, flares or combustors, and daily tailpipe and fugitive dust emissions from operations traffic. During the operational phase of a well, NO₂, CO, VOC, and HAP emissions would result from the long-term use of storage tanks, pumps, separators, and other equipment. Additionally, dust (PM₁₀ and PM_{2.5}) would be produced due to wind erosion on well pads and roads, and by vehicles servicing the wellsite infrastructure.

The BLM CFO emission estimates were developed from the BLM Single Oil and Gas Well Emission Inventory Tool (BLM Emission Inventory Tool) (BLM 2021). The BLM Emission Inventory Tool uses the EPA Compilation of Air Pollutant Emissions Factors (AP-42), EPA Motor Vehicle Emission Simulator, EPA Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression Ignition, and other sources (BLM 2023a). The tool has also been modified to account for Permian Basin gas profiles, typical project details, and recent New Mexico Energy, Minerals and Natural Resources

Department (EMNRD) and NMED rules and regulations (Waste Prevention Rule and Ozone Precursor Rule). Production data from the S&P Global Marketplace database (commercial source) (BLM 2023a), including an estimate of the total potential mineral yield, or EUR, and the associated decline rates were included in the BLM Emission Inventory Tool. Single well estimates and associated production data were based on horizontal drilling. The horizontally drilled single well emissions could be used in cases when well types are unknown, such as during leasing, providing a conservative estimate for vertically drilled wells (if vertical wells were to be drilled). Whereas this information provides an estimate of emissions based on typical development occurring in New Mexico, actual emissions from the development of any given well may differ. The CFO is calculating project-specific emissions on a project-specific basis. Emissions estimates per well are included in Table 3.19.

Table 3.19. Future Potential Development of the Lease Parcel Emissions

Future Potential Development	Lease Sale Emissions (tons per year)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs
2020 NEI emissions (Eddy and Lea Counties)	13,570	4,600	59,510	82,081	91,287	227,325	25,271
Single well construction/development phase	2.73	0.75	13.21	0.0111	3.16	0.69	0.02
Single well operation phase	1.40	0.51	0.97	0.00450	1.21	10.53	0.93
Single well total	4.13	1.26	14.18	0.0156	4.37	11.21	0.95
Total emissions from lease sale (7 horizontal wells)	28.91	8.82	99.26	0.11	30.59	78.47	6.65
Proposed Action percent of Eddy and Lea Counties Emissions	0.21%	0.19%	0.17%	<0.001%	0.03%	0.03%	0.03%

Source: BLM (2024a)

Note: The analysis contained in this table provides the percentage contribution rounded to two decimal points. The representative well used to calculate emissions is a horizontal well.

The most substantial criteria pollutants and O₃ precursors emitted by oil and gas development and production are VOCs, HAPs, particulate matter, and NO_x. VOCs and NO_x contribute to the formation of O₃, which is the pollutant of most concern in the Permian Basin, and because O₃ is not a direct emission, emissions of NO_x and VOCs are used as proxies for estimating O₃ levels. Under the Proposed Action, the additional NO_x and VOC emissions (quantified in Table 3.19) from the well would incrementally add to O₃ levels within the analysis area, which currently has design values in Eddy County above the 70 ppb 2015 O₃ NAAQS. As discussed in Section 3.6.1.4, the New Mexico OAI showed 2028 projected future O₃ design values in southern New Mexico to be below the 70 ppb O₃ 8-hour NAAQS when following EPA guidance, using the 2012–2016 current design value and the Oil and Gas Control Strategy (Oil and Gas Control Strategy) scenario. A sensitivity study using a current design value from 2015–2019 resulted in 2028 projected future O₃ design values below the 70 ppb 2015 O₃ NAAQS when using the Oil and Gas Control Strategy scenario. An additional sensitivity study using a current design value from 2017–2019 resulted in 2028 projected future O₃ design values above the 70 ppb 2015 O₃ NAAQS when using the Oil and Gas Control Strategy scenario. However, it should be noted that these sensitivity studies likely result in uncertainties and likely overstate the 2028 O₃ future design values in the Permian Basin emissions, as the scaling factor (relative response factor [RRF] = $\Sigma \text{Model}_{2028} / \Sigma \text{Model}_{2014}$) does not account for emission increases in oil and gas sources between 2014 and 2020. It should also be noted that the sensitivity studies did not use the average of three current year design values centered on the base modeling year (NMED 2021). Additionally, the modeling results for the future year (2032) simulations

for New Mexico from the BLM Regional CAP Model, which used BLM oil and gas development projections to quantify and apportion federal and non-federal oil and gas emissions, showed that O₃ cumulative concentrations ranged between 50 and 65 ppb in New Mexico. The highest modeled O₃ concentrations were seen in the San Juan Basin and isolated regions on the western side of New Mexico. The modeled values did not lead to any O₃ NAAQS exceedances in the state circa 2032, including in the PDO area (BLM and Environmental Management and Planning Solutions, Inc. [EMPSi] 2023).

Levels of HAPs would also temporarily increase during construction and completion activities under the Proposed Action, particularly in the form of diesel particulate matter from the on- and off-road construction equipment. However, concentrations of mobile source emissions of diesel particulate matter are typically reduced by 60% at approximately 300 feet (Zhu et al. 2002). According to Zhu et al. (2002), the ultrafine particle (diameter less than 100 nanometers) concentration measured at 300 meters downwind from the source of emissions was indistinguishable from the upwind background concentration. The relatively steep drop-off with distance of diesel particulate matter concentrations and the short duration of the activity make the effects from exposure to HAP emissions minimal during construction. Additionally, a 2019 health assessment study completed by Colorado State University (ICF and Colorado State University 2019) during various stages of well development and production at oil and gas extraction facilities in Colorado found that chemical air concentrations for VOCs (including HAPs) and associated exposure levels decreased rapidly with distance. Simulated chronic cancer risks over a lifetime of exposure for average individuals were below one in 1 million at distances of 1,400 feet from the well pads, four in 1 million at 500 feet from the well pads, and 10 in 1 million at 300 feet from the well pads. Simulated chronic cancer risks over a lifetime of exposure for maximum exposed individuals were below one in 1 million at distances of 2,000 feet from the well pads, seven in 1 million at 500 feet from the well pads, and 10 in 1 million at 400 feet from the well pads (ICF and Colorado State University 2019). Additional information related to HAPs and the Colorado State University study can be found in Section 5 of the Air Resources Technical Report (BLM 2023a).

Construction activities would be one of the primary sources of particulate matter emissions as a result of dust and fine particles generated from on-site equipment use and related groundwork, as well as on- and off-site vehicles (Araújo et al. 2014; Reid et al. 2010). How particulate matter interacts with the environment is dependent on a variety of factors, with the size and chemical composition of the airborne particles being the most important in terms of dispersion (distance from the source) and deposition from the atmosphere. Effects of all particulate matter emissions would not be confined to the construction site because PM_{2.5} (fine particles) can travel farther in terms of distance than PM₁₀ (dust) and other total suspended particulates (particles of sizes up to 50 micrometers) (Araújo et al. 2014). According to Araújo et al. (2014), construction site activities may influence the environment in the immediate area or neighborhood through emissions of total suspended particulates. Total suspended particulates are particles that have lower permanence in the atmosphere, thereby depositing near the emission sources (Araújo et al. 2014). The dispersion and concentration of particulate matter emissions depend on the technology and management control methods used by each project and the weather condition variables (i.e., wind speed, wind direction, and humidity/moisture) (Araújo et al. 2014). Some particles can remain in the atmosphere for days to weeks. Consequently, particle pollution generated in one area can travel hundreds or thousands of miles and influence the air quality of regions far from the original source (EPA 2024d). Compliance with state permitting requirements and following BMPs can reduce off-site effects from fugitive dust.

Emissions of CAPs would also occur outside the planning area from transport, processing, distribution, and end use. New Mexico's crude oil production has increased significantly since 2010. Most of it comes from the Permian Basin, which is located in eastern New Mexico and western Texas. The Permian Basin is one of the most prolific crude oil-producing areas in the nation and the world. Advanced drilling and oil recovery technologies have increased production from the Basin's low-permeability shale formations. Crude oils from the well fields in the Permian Basin are transported to the crude oil refinery in Artesia,

located in southeastern New Mexico, as well as refineries located outside of the state (mostly in Texas). The Artesia refinery processes crude oils and serves markets in the southwestern United States and northern Mexico and primarily produces gasoline, diesel, and asphalt (EIA 2023a). The increase in oil production and natural gas output in New Mexico has meant that operators have faced challenges in delivering this increased output to market. Most of the vastly expanded crude oils production has had to be exported to refineries outside the state (Center for Strategic and International Studies 2018). In southeastern New Mexico, horizontal wells in Lea and Eddy Counties drove much of the recent growth in Permian Basin crude oil output and account for 29% of Permian Basin crude oil production (EIA 2023c).

Natural gas is produced from conventional oil and gas wells and shale gas in the Permian Basin in southeastern New Mexico. Interstate pipelines bring natural gas into New Mexico from Texas and Colorado and carry most of the natural gas that leaves the state to Arizona or back to Texas. Some of New Mexico's natural gas is placed in the state's two underground storage fields (EIA 2023a). As natural gas production increases in the Permian Basin, midstream pipeline companies continue to increase the region's takeaway capacity. Companies have announced an additional 4.2 Bcf/d of new pipeline capacity will come online by the end of 2024, allowing more production to reach consumption markets and liquefied natural gas terminals on the U.S. Gulf Coast (EIA 2023d).

Since combustion of all petroleum products emits criteria and HAP emissions, local ambient concentrations of these pollutants could increase in areas where products from the Permian Basin (oil and gas) are combusted. This could contribute to an area exceeding either national or local air quality standards. Air quality involves complex physical and chemical transformations at a local/regional level, so impacts would vary considerably depending on background concentrations, meteorology, and other local pollutant sources. If any pollutant concentration is near or above its standard in a particular area, the combustion of oil and gas products could contribute to or exacerbate nonattainment. Potential pollutant concentration change resulting from combustion is therefore often a key driver of public policy to mitigate air quality and public health impacts in such areas. Downstream combustion and end uses are regulated by the EPA or delegated to state agencies.

NO ACTION ALTERNATIVE

Under the No Action Alternative, the BLM would not affirm the issuance of the leases. However, in the absence of a Land Use Plan Amendment closing the lands to leasing, the parcels could be considered for inclusion in future lease sales. Although no new emissions resulting from new federal oil and gas development would occur under the No Action Alternative, the national and global demand for energy is not expected to differ, regardless of BLM decision making.

MITIGATION MEASURES AND RESIDUAL EFFECTS

Based on the BLM's authority under the STCs, the BLM requires industry to incorporate and implement BMPs, which are designed to reduce effects on air quality by reducing emissions, surface disturbances, and dust from field production and operations. Typical measures include requirements for watering dirt roads or applying magnesium chloride dust suppressants on dirt roads during periods of high use to reduce fugitive dust emissions of PM₁₀; colocation of wells and production facilities to reduce new surface disturbance; implementation of directional and horizontal drilling and completion technologies whereby one well provides access to petroleum resources that would normally require the drilling of several vertical wellbores; maintenance of vapor recovery systems at functional levels where petroleum liquids are stored; green completions where technically feasible; and interim reclamation to revegetate areas not required for production facilities and reduce the amount of fugitive dust. Examples of additional air quality control measures imposed at the APD stage may include submission of an emissions inventory for the plan of development, air quality modeling, or implementation of mitigation measures and BMPs. The BLM would do this in coordination with the EPA, NMED, and other agencies that have jurisdiction

over air quality. At the APD stage, COAs could be applied based on site-specific environmental analysis for the APD. Emission control techniques would be further evaluated when specific lease development projects are proposed.

The BLM also encourages industry to participate in the Natural Gas STAR program, administered by the EPA. The Natural Gas STAR program is a flexible, voluntary partnership that encourages oil and natural gas companies to adopt proven, cost-effective technologies and practices that improve operational efficiency and reduce natural gas emissions (BLM 2023a). Additionally, EPA and State of New Mexico rules/regulations help to reduce emissions. CAA regulations at 40 C.F.R. Section 60, Subparts OOOO thru OOOOc, serve to control CH₄ emissions from oil and natural gas industry sources by requiring reduced emissions completions (“green” completions) on new hydraulically fractured gas wells as well as emissions controls on pneumatic controllers, pumps, storage vessels, and compressors.

At the state level, the EMNRD enforces the NMOCD Statewide Natural Gas Capture Requirements (Waste Prevention Rule), NMAC 19.15.27, as part of the New Mexico statewide enforceable regulatory framework to secure reductions in oil and gas sector emissions and to prevent natural gas waste from new and existing sources. Key provisions include prohibition of unnecessary venting and flaring of waste natural gas where it is technically feasible to recover the gas by routing it to a pipeline or using it for some other beneficial purpose (such as on-site fuel consumption). In limited circumstances, and if recovery is infeasible, operators must flare gas rather than venting it, which results in uncombusted VOC emissions. Venting is only permissible “in an emergency or malfunction ... to avoid a risk of an immediate and substantial adverse impact on safety, public health, or the environment.” NMAC 19.15.27.8. These provisions will likely reduce VOC emissions as well as emissions of NO_x, CO, SO₂, GHGs, and particulate matter. The NMED developed the “Oil and Natural Gas Regulation for Ozone Precursors,” NMAC 20.2.50, which went into effect August 5, 2022. Approximately 50,000 wells and associated equipment are subject to this regulation. It is anticipated that the regulation will annually reduce VOC emissions by 106,420 tons, nitrogen oxide emissions by 23,148 tons, and CH₄ emissions by 200,000 to 425,000 tons. The regulation includes emissions reduction requirements for compressors, engines and turbines, liquids unloading, dehydrators, heaters, pneumatics, storage tanks, and pipeline inspection gauge launching and receiving. A description of federal and state rules and regulations can be found in Section 2 of the Air Resources Technical Report (BLM 2023a).

3.6.1.3 Cumulative Effects

Cumulative impacts for air quality are the result of the incremental impacts from the Proposed Action when added to other past, present, and reasonably foreseeable future actions. The sections below describe trends in air quality and how they relate to past and present oil and gas activities and projected emissions through modeling for the CFO RFD scenarios. The cumulative effects analysis area is the Permian Basin and the surrounding airshed. More information regarding cumulative effects can be found in Chapters 3, 6, 8, and 9 of the Air Resources Technical Report (BLM 2023a).

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 ongoing oil and gas development and associated infrastructure, geophysical exploration, ranching and livestock grazing, range improvements, recreation (including off-highway vehicle use), authorization of rights-of-way 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 and gas; 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 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 Mountain Region (Montana, Idaho, Wyoming, Nevada, Utah, Colorado, Arizona, and New Mexico) are based on the EIA 2023 Annual Energy Outlook (EIA 2023b), which provides an estimate of the change in emissions from oil and gas sources in New Mexico. 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 expected to increase by 15% from 2022 to 2050, while crude oil is expected to increase by 11% during the same period. Similarly, oil and gas-related CAP and HAP emissions from existing and foreseeable wells, plus development of lease parcels, are anticipated to rise due to increasing production.

Design value trends for pollutants in the Permian Basin can be found in Section 3 of the Air Resources Technical Report (BLM 2023a), incorporated by reference, and the EPA design value webpage (EPA 2024b). O₃ (8-hour) design value trends from the 2011–2013 design value to the 2020–2023 design value indicate a steady to slightly increasing trend, depending on the county in the Permian Basin. NO_x (annual and 1-hour) shows a flat to increasing trend, and PM_{2.5} (annual and 24-hour) shows a slightly decreasing trend.

REASONABLY FORESEEABLE DEVELOPMENT

While there are other sources of emissions in the CFO, the oil and gas industry is one of the most prominent sources of emissions. Approximately 45,579 active oil and gas wells are in the New Mexico portion of the Permian Basin. Of this total, roughly 24,990 wells are federal, with the remainder occurring in other jurisdictions. Table 3.20 provides past well spud data (BLM 2024d).

Table 3.20. Past and Present Well Spud Data

Number of Well Spuds*	2016	2017	2018	2019	2020	2021	2022	2023
Carlsbad Field Office	196	522	650	785	823	1,150	1,195	1,431
Pecos District Office	198	525	659	791	824	1,153	1,202	1,444

Source: BLM (2024d)

*Total of CFO and RFO.

The RFD scenario for oil and gas in the CFO (Engler 2023) projects that on average, 980 oil and gas wells would be completed within the CFO planning area each year over the 20-year scenario (2023–2043), for approximately 19,600 new wells (federal and non-federal), most of which are expected to be horizontally drilled. Of this, at least 12,500 wells in CFO planning area alone would be federal (Engler 2023). CFO well spud projections by year vary from 1,208 new federal and non-federal well spuds (770 federal) in 2023 to 769 new federal and non-federal well spuds (490 federal) in 2043. The CFO planning area encompasses Lea and Eddy Counties and portions of Chaves County. The CFO RFD does not account for future well development in the RFO portion of the PDO planning area (which encompasses portions of Chaves and Roosevelt Counties); therefore, well projections for the RFO planning area were extracted from the PDO RFD (Engler et al. 2012; Engler and Cather 2014). The PDO RFD projects that 800 oil and gas wells would be completed within the PDO each year for the 20-year scenario (2015–2035), for a total of approximately 16,000 new wells (federal and non-federal), most of which are expected to be horizontally drilled. Based on the review of cumulative production volumes through 2010 (see Summary Table 1 [page 49] in Engler and Cather 2012), most of the production has occurred in Eddy and Lea Counties, and development in Chaves and Roosevelt Counties represents

approximately 4% of the cumulative production volumes for the PDO planning area. Assuming that this proportion of development in Chaves and Roosevelt Counties relative to the larger PDO planning area would remain relatively stable into the future, the number of projected wells from the PDO RFD that are likely to occur within Chaves and Roosevelt Counties would be approximately 640. When combined, the total number of projected wells for the PDO planning area is 20,240 (including 19,600 wells in CFO and 640 wells in RFO). PDO RFD projections over a 20-year time period show well development with an average of 1,012 wells per year (of which at least 625 would be federal). The BLM Air Resources Technical Report (BLM 2023a) provides information related to the RFD for the PDO planning area. Annual well averages are multiplied by the one oil-well pollutant emission factor (Table 3.21) to calculate reasonably foreseeable future action annual emissions for both federal well development and federal and non-federal well development associated with the RFD scenarios (see Table 3.21). PDO RFD emissions are also compared with the 2020 NEI data for the Permian Basin (Eddy, Lea, Chaves, and Roosevelt Counties) in Table 3.21.

Table 3.21. Total and Federal PDO Emissions per Year Based on the RFD

PDO RFD	RFD Emissions (tons per year)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs
Single well construction/development phase	2.73	0.75	13.21	0.0111	3.16	0.69	0.02
Single well operation phase	1.40	0.51	0.97	0.00450	1.21	10.53	0.93
Single well total	4.13	1.26	14.18	0.0156	4.37	11.21	0.95
Total emissions from PDO RFD (1,012 wells)	4,179.56	1,275.12	14,350.16	15.79	4,422.44	11,344.52	961.40
Federal emissions from PDO RFD (625 wells)	2,581.25	787.50	8,862.50	9.75	2,731.25	7,006.25	593.75
2020 NEI Permian Basin (Eddy, Lea, Chaves, and Roosevelt Counties) emissions	20,585	6,270	66,098	83,521	109,477	252,387	30,508
Total RFD percent of PDO emissions (1,012 wells)	20.30%	20.34%	21.71%	0.02%	4.04%	4.49%	3.15%
Federal RFD percent of PDO emissions (625 wells)	12.54%	12.56%	13.41%	0.01%	2.49%	2.78%	1.95%

Note: The analysis contained in this table provides the percentage contribution rounded to two decimal points. The representative well used to calculate emissions is a horizontal well.

3.6.1.4 Air Quality and Air Quality-Related Values Modeling

NEW MEXICO OZONE ATTAINMENT INITIATIVE STUDY

The State of New Mexico initiated the New Mexico OAI Photochemical Modeling Study in spring 2018 to address the high O₃ concentrations, protect the O₃ attainment status, and ensure the health and welfare of the residents of the state for future generations (NMED 2021). Based on the WRAP/WAQS Comprehensive Air Quality Model with extensions (CAM_x) 2014 36-/12-kilometer modeling platform, a CAM_x 2014 36-/12-/4-kilometer O₃ modeling platform was developed with the 4-kilometer domain focused on New Mexico and adjacent states. The study also looked at a 2028 Base Case future year modeling and an Oil and Gas Control Strategy scenario that implemented proposed controls on 2028 New Mexico oil and gas sources. The 2028 Oil and Gas Control Strategy reduced oil and gas combustion-related NO_x emissions by approximately 21,000 tons per year (or by 64%, compared with the 2028 Base Case) and VOC emissions from oil and gas by approximately 53,000 tons per year (or by 46%, compared with the 2028 Base Case [NMED 2021]). The Air Resources Technical Report (BLM 2023a) provides

methodologies for the New Mexico OAI Photochemical Modeling Study, and the results are summarized below.

The 2028 Base Case and 2028 Oil and Gas Control Strategy modeling results followed EPA guidance (EPA 2018), which recommended using a current year design value based on an average of three O₃ design values centered on the base modeling year (in this study, 2014) and allows for the development of a projected 2028 O₃ future year design value for the respective scenarios (Base Case or Oil and Gas Control Strategy). The current 2012–2016 O₃ design values at southern New Mexico sites range from 62.0 ppb to 72.0 ppb. The 2028 Base Case saw future O₃ design value reductions of -2.0 to -6.3 ppb in this area, including reductions of -2.3 ppb at Carlsbad and -2.0 ppb at Hobbs in Eddy and Lea Counties. The 2028 Base Case future O₃ design values in southern New Mexico ranged from 59.0 to 67.0 ppb. The 2028 Oil and Gas Control Strategy saw future O₃ design value reductions of -0.1 to -0.7 ppb, including reductions of -0.3 ppb at Carlsbad and -0.7 ppb at Hobbs in Eddy and Lea Counties, from the 2028 Base Case. The 2028 projected Oil and Gas Control Strategy O₃ design values in southern New Mexico ranged from 58.9 to 66.8 ppb. Using this method and following EPA guidance, all 2028 projected O₃ future design values at monitoring sites in New Mexico were below the 70 ppb 2015 O₃ NAAQS using the 2012–2016 design value (NMED 2021).

With the recent upward trend in O₃ values in southeast New Mexico, the New Mexico OAI study also looked at more recent design values (2015–2019 and 2017–2019) (NMED 2021). The current 2015–2019 O₃ design values at all New Mexico sites selected for this sensitivity test ranged from 65.0 to 74.3 ppb and included both Carlsbad (73.7 ppb) and Hobbs (69.3 ppb) in Eddy and Lea Counties. The 2028 Base Case saw future O₃ design value reductions of -1.7 to -6.6 ppb, including reductions of -2.5 ppb at Carlsbad and -2.1 ppb at Hobbs in Eddy and Lea Counties. The 2028 projected Base Case O₃ design values at all New Mexico sites selected for this sensitivity test ranged from 61.0 to 71.2 ppb. Note that the 2015–2019 future O₃ design value had one monitoring site (Carlsbad) that exceeded the 2015 O₃ NAAQS at 71.2 ppb. The 2028 Oil and Gas Control Strategy saw future O₃ design value reductions of 0.0 to -1.5 ppb, including reductions of -0.3 ppb at Carlsbad and -0.7 ppb at Hobbs in Eddy and Lea Counties, from the 2028 Base Case. The 2028 projected Oil and Gas Control Strategy O₃ design values at all New Mexico sites selected for this sensitivity test ranged from 60.5 to 70.9 ppb. Emission controls in the 2028 Oil and Gas Control Strategy were sufficient to reduce the 2028 future O₃ value at Carlsbad (70.9 ppb) to below the O₃ NAAQS (NMED 2021). The current 2017–2019 O₃ design values at all New Mexico sites selected for this sensitivity test ranged from 66.0 to 79.0 ppb and included both Carlsbad (79.0 ppb) and Hobbs (71.0 ppb) in Eddy and Lea Counties (both above the 2015 O₃ NAAQS). The 2028 Base Case saw future O₃ design value reductions of -2.1 to -6.7 ppb, including reductions of -2.6 ppb at Carlsbad and -2.1 ppb at Hobbs in Eddy and Lea Counties. The 2028 projected Base Case O₃ design values at all New Mexico sites selected for this sensitivity test ranged from 61.9 to 76.4 ppb. Note that the 2015–2019 future O₃ design value had two monitoring sites (Carlsbad, with 76.4 ppb, and Desert View, Doña Ana County, with 71.6 ppb) that exceeded the 2015 O₃ NAAQS. The 2028 Oil and Gas Control Strategy saw future O₃ design value reductions of 0.0 to -1.5 ppb, including reductions of -0.3 ppb at Carlsbad and -0.7 ppb at Hobbs in Eddy and Lea Counties, from the 2028 Base Case. The 2028 projected Oil and Gas Control Strategy O₃ design values at all New Mexico sites selected for this sensitivity test ranged from 61.4 to 76.0 ppb.

The 2028 future design value at Carlsbad of 76.0 ppb, with the Oil and Gas Control Strategy, exceeds the 2008 and 2015 O₃ NAAQS. However, the design of this sensitivity study will result in uncertainties and will likely overstate the 2028 O₃ future design values in the Permian Basin, as emissions from oil and gas sources were higher at the end of the 2010 decade than in 2014 (NMED 2021). The final part of the New Mexico OAI study investigated source apportionment and was conducted to determine the contributions of source sectors to 2028 future year O₃ design values under the Oil and Gas Control Strategy scenario. One investigation involved international emissions. The Speciated Modeled Attainment Test O₃ projection tool was run without the contributions of international anthropogenic emissions for current

design values (2012–2016, 2015–2019, and 2017–2019). In New Mexico, international anthropogenic emissions contributed 11 to 26 ppb to the projected 2028 future design values. The Carlsbad site had reductions of 20.3 ppb, 21.7 ppb, and 23.2 ppb under all three design value scenarios (2012–2016, 2015–2019, and 2017–2019), respectively. Carlsbad, which had produced a projected 2028 O₃ exceedance for both the 2008 and 2015 O₃ NAAQS under the current design value for the 2017–2019 scenario, was below 55 ppb for a future design value under all three design value scenarios (2012–2016, 2015–2019, and 2017–2019) (NMED 2021).

2032 BLM REGIONAL CRITERIA AIR POLLUTANT PHOTOCHEMICAL MODELING STUDY

The BLM developed a photochemical model using the CAM_x photochemical modeling platform and 12-km grid spacing to assess the impacts of oil and gas development and coal production and other cumulative sources on air quality in the western United States (Utah, Colorado, New Mexico, Wyoming, Montana, North Dakota and South Dakota). The modeling analysis evaluated air quality and AQRVs out to a future year of ca. 2032 using data from the WRAP/WAQS modeling platform, the EPA's 2016v2 emissions modeling platform (EPA 2022e), and the BLM oil and gas development projections to quantify and apportion federal and non-federal oil and gas emissions (BLM and EMPSi 2023). The photochemical modeling was conducted using a scenario that included coal, oil and gas development, natural and other anthropogenic emissions, representative of the cumulative sources around the year 2032. Additional methodology can be found in the BLM Regional Criteria Air Pollutant Photochemical Modeling Study (BLM and EMPSi 2023), incorporated by reference.

The BLM Regional Criteria Air Pollutant Modeling Study (BLM and EMPSi 2023) results show that the cumulative concentrations of O₃ over New Mexico range between 50 and 65 ppb in New Mexico, with the higher concentrations in the San Juan Basin and isolated regions on the west side of the state.

The modeled values did not lead to any O₃ NAAQS exceedances in the state, including for the PDO.

O₃ cumulative concentrations range from 50 to 60 ppb in the Carlsbad area. The largest contributions to O₃ are due to the modeled boundary conditions (contributions from sources outside New Mexico), followed by other anthropogenic sources (i.e., those not including oil, gas, or coal source groups) and natural sources.

The 1-hour NO₂ modeled cumulative concentrations showed the highest concentrations over the San Juan Basin (highest value of 60.0 ppb); the El Paso and Dallas, Texas area; and the Permian Basin.

The modeled values did not lead to any 1-hour NO₂ NAAQS exceedances in New Mexico, including for the PDO (values range from 0.50 to 50 ppb). The largest contributions to 1-hour NO₂ are due to federal, non-federal, and tribal oil and gas development.

The annual NO₂ modeled cumulative concentrations showed the highest concentrations over the San Juan Basin (highest value of 23.9 ppb); the Dallas, Texas area; and the Permian Basin. The modeled values did not lead to any annual NO₂ NAAQS exceedances in New Mexico, including for the PDO (values range from 0.1 to 15 ppb). The largest contributions to annual NO₂ are due to federal, non-federal, and tribal oil and gas development.

The 24-hour PM_{2.5} modeling showed a northwest to southeast gradient, with larger PM_{2.5} concentrations in the southeastern portion of New Mexico. The largest 24-hour PM_{2.5} concentration in the state is 47.2 µg/m³ in Socorro County (primarily due to wildfires). As a result, the modeled values did exceed the 24-hour PM_{2.5} NAAQS in Socorro County, New Mexico, but nowhere else in New Mexico was the NAAQS exceeded. The largest contributors to 24-hour PM_{2.5} are wildfires and non-coal, oil, or gas anthropogenic sources. Annual PM_{2.5} modeled values showed cumulative concentrations over New Mexico did lead to an annual PM_{2.5} NAAQS exceedance over the Albuquerque area based on the new PM_{2.5} NAAQS standard of 9.0 µg/m³, but nowhere else in the state, including the PDO, was the NAAQS

exceeded. Cumulative annual PM_{2.5} concentrations were highest near Albuquerque (9.2 µg/m³), which were due to other anthropogenic sources (i.e., those not including oil, gas, or coal source groups), and generally less than 4 µg/m³ within the rest of New Mexico. Annual PM_{2.5} cumulative concentrations range from 0.7 to 4 µg/m³ for the Carlsbad area. The largest contributors to annual PM_{2.5} are the anthropogenic and wildfire sources.

The 24-hour PM₁₀ cumulative concentrations showed PM₁₀ NAAQS exceedances in a few grid cells in southwestern New Mexico (primarily due to wildfires), but nowhere else in the state, including the PDO, was the NAAQS exceeded. PM₁₀ cumulative concentrations over most of New Mexico range between 2 and 30 milligrams per cubic meter (mg/m³), with smaller areas of concentrations between 30 and 150 mg/m³. Carlsbad area 24-hour PM₁₀ cumulative concentrations range from 5 to 50 µg/m³. The largest contributors to annual PM₁₀ are wildfires and other anthropogenic sources (i.e., those not including oil, gas, or coal source groups).

The 1-hour SO₂ modeled cumulative concentrations over New Mexico did not lead to any 1-hour SO₂ NAAQS exceedances. Most of the state had concentrations that did not exceed 10 ppb, except for a few southeastern counties (e.g., Eddy, Lea, and Roosevelt Counties), where concentrations ranged from 5 to 69 ppb. The largest contributors to 1-hour SO₂ concentrations in New Mexico are oil and gas activities and wildfires. The 3-hour SO₂ modeled cumulative concentrations showed no exceedances of the 3-hour SO₂ NAAQS, including for the PDO. The largest contributors to the 3-hour SO₂ concentrations in New Mexico were oil and gas activities, other anthropogenic sources (i.e., those not including oil, gas, or coal source groups), and wildfires.

The 1-hour CO modeled cumulative concentrations over New Mexico did not lead to any 1-hour CO NAAQS exceedances. Most of the state had concentrations less than 5 ppm, although Socorro County had concentrations up to 10 ppm. Carlsbad area 1-hour CO cumulative concentrations range from 0.1 to 3 ppm. The 8-hour CO modeled cumulative concentrations over New Mexico did not lead to any 8-hour CO NAAQS exceedances. Most of the state had concentrations less than 5 ppm, although Socorro County had concentrations up to 6.9 ppm. Carlsbad area 8-hour CO cumulative concentrations range from 0.1 to 1.0 ppm. The location of the higher 1-hour and 8-hour CO concentrations is the same location as the PM₁₀ peak, indicating that natural sources (likely fires) are responsible for the higher 1-hour and 8-hour CO concentrations in this area (BLM and EMPSi 2023).

Cumulative annual nitrogen deposition over most of New Mexico varies between around 1 and 6 kilograms of nitrogen per hectare per year (kg N/ha-year) with an east-to-west gradient. The eastern part of New Mexico shows nitrogen deposition generally between 2 and 6 kg N/ha-year, whereas the west side of the state is generally lower, with nitrogen deposition range from 1 to 4 kg N/ha-year (although higher deposition is present in a few grid cells in San Juan County). Nitrogen critical loads for the Class I areas in the New Mexico analysis area range from 3.0 to 7.54 kg N/ha. The cumulative average nitrogen deposition ranges from 1.2 at Petrified Forest National Park to 2.7 kg N/ha-year at Carlsbad Caverns National Park (CCNP). None of the areas exceed the critical load thresholds for cumulative average nitrogen deposition. The largest contributors to the cumulative average nitrogen deposition are other anthropogenic sources (i.e., those not including oil, gas, or coal source groups), ranging from 40% to 60% depending on the area of interest. The cumulative maximum nitrogen deposition values in all Class I areas of interest are below their critical loads for atmospheric nitrogen deposition, except for CCNP. Cumulative annual sulfur deposition over most of New Mexico ranges between 0.1 and 2.0 kilograms of sulfur per hectare per year (kg S/ha-year), with higher concentrations in the southeastern part of New Mexico. In the southeastern part of the state, concentrations generally range between 1 and 4 kg S/ha-year (although a few grid cells show concentrations between 4 and 9 kg S/ha-year in Roosevelt, Eddy, and Lea Counties). For total sulfur deposition, the 5 kg/ha-year threshold published by Fox et al. (1989) is used as the critical load for each area of interest. The cumulative average sulfur deposition ranges from 0.1 at Petrified Forest National Park/Great Sand Dunes National Park to 1.8 kg S/ha-year at CCNP. None of the

areas exceed the critical load thresholds for cumulative average and maximum sulfur deposition. The largest contributors to sulfur deposition in New Mexico are oil and gas non-federal and existing federal sources (BLM and EMPSi 2023). Additional modeling results can be found in the BLM Regional Criteria Air Pollutant Photochemical Modeling Study (BLM and EMPSi 2023), incorporated by reference.

SUMMARY

In summary, atmospheric concentrations for CAPs in the project area are projected to be below the NAAQS based on future year modeling. O₃, which is currently above the NAAQS in Eddy County, is projected to be below the NAAQS in the CFO area in future year (2032) modeling. NMED modeling following EPA guidance showed 2028 future year design values below the NAAQS (using the 2012–2016 design value). Sensitivity analyses by NMED showed 2028 future design values at Carlsbad (using the 2017–2019 design value), with the Oil and Gas Control Strategy, exceeding the 2008 and 2015 O₃ NAAQS. However, the design of this sensitivity study would result in uncertainties and would likely overstate the 2028 O₃ future design values in the Permian Basin, as emissions from oil and gas sources are higher at the end of the 2010 decade than in 2014. PM_{2.5}, another pollutant of concern, showed both annual and 24-hour ca. 2032 values below the NAAQS in the project area. Visibility is generally projected to be steady or improving at IMPROVE monitors near the project area (BLM 2023b). Nitrogen deposition at NPS monitors near the project area show generally poor to fair conditions with no trends available, while sulfur deposition conditions are generally poor to good with no trend or a relatively unchanging trend (where trend data is available). The cumulative visibility design values from the BLM Regional Criteria Air Pollutant Modeling Study show that Salt Creek Wilderness is the only area that has visibility design values for the MID that are projected to be above (by 1.6 deciview) the uniform rate of progress toward the 2064 visibility goals area. The BLM Regional Criteria Air Pollutant Modeling Study also shows contributions from oil and gas sectors to visibility impacts are usually less than 4%, except for the existing federal oil and gas from the rest of New Mexico that can contribute up to 17% of the total light extinction at CCNP.

Using the best science and data available (EPA's AirToxScreen), the current Lea and Eddy Counties cancer risk—20.16 and 22.25 in 1 million people, respectively—is within the contextual range published by the EPA. New production from the foreseeable development of the Proposed Action and from approved and pending APDs should outweigh the production decline from currently producing wells (EIA 2023a) and result in slightly higher future HAPs emissions. However, an increase in oil and gas-related HAPs emissions should not make a substantial change to cumulative HAPs impacts since the total county cancer risk is well within the contextual range published by the EPA, and the oil and gas industry contributes a small percentage (county maximum of 18%) to the overall cancer risk.

In addition, the EPA has promulgated various regulations to protect Class I AQRVs from degradation as discussed in Section 3.6.1.1.

3.6.2 Issue 2: Greenhouse Gases

How would future potential development of the nominated lease parcels contribute to greenhouse gas (GHG) emissions?

Future development of lease parcels under consideration could lead to emissions of methane (CH₄), carbon dioxide (CO₂), and nitrous oxide (N₂O), the three most common GHGs associated with oil and gas development. These GHG emissions would be emitted from activities occurring on the leased parcels, and from the consumption of any fluid minerals produced. However, the BLM cannot reasonably determine at the leasing stage whether, when, and in what manner a lease would be explored or developed. The uncertainty that exists at the time the BLM offers a lease for sale includes 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, and production; abandonment operations; product transportation; and potential regulatory changes over the 10-year primary lease term. Actual development on a lease is likely to vary from what is analyzed in this EA and will be evaluated through a site-specific NEPA analysis when an operator submits an APD or plan of development to the BLM.

For the purposes of this analysis, the BLM has evaluated the potential impacts of the proposed leasing action by estimating and analyzing the projected potential GHG emissions from oil and gas development on the parcels. Projected emissions estimates are based on past actual oil and gas development analyses, and any available information from existing development within the state.

Further discussion of climate science and predicted impacts as well as the reasonably foreseeable and cumulative GHG emissions associated with BLM's oil and gas leasing actions and methodologies are included in the *2022 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends* (BLM 2023b) (Annual GHG Report) and the Air Technical Resources Report (BLM 2023b). 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 and Air Technical Resources Report (BLM 2023b) are incorporated by reference as an integral part of this analysis.

3.6.2.1 Affected Environment

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. GHGs may influence the global climate by increasing the amount of solar energy retained by land, water bodies, 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. The buildup of these gases has contributed to the current changing state of the climate equilibrium towards warming. Past, current, and projected future GHG impacts are described in Chapters 4, 8, and 9 of the Annual GHG Report (BLM 2023b). These chapters describe currently observed climate trends globally, nationally, and in each state, and present a range of projected impact scenarios depending on future GHG emission levels.

The incremental impacts of global GHGs from a single proposed land management action cannot be accurately translated into its potential global or localized climate effects in the area specific to the action. Currently, global climate models are unable to forecast local or regional effects on resources resulting from a specific subset of emissions. However, there are general projections regarding potential impacts on natural resources and plant and animal species that may be attributed to the accumulation of GHG emissions over time. In this EA, the BLM uses GHG emissions as a proxy for impacts and provides context with other proxies such as GHG equivalents.

For the purposes of this EA, the projected emissions from the Proposed Action can be compared to modeled emissions that have been shown to have definitive or quantifiable impacts on the climate. Table 3.22 shows the total estimated GHG emissions from fossil fuels at the global, national, and state scales from 2016 to 2021 (6 years). Emissions are shown in megatonnes (Mt) per year of carbon dioxide (CO₂). Chapter 3 of the Annual GHG Report contains additional information on GHGs and an explanation of CO₂e. State and national energy-related CO₂ 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 development and cumulative GHG emissions is included in Chapters 5, 6, and 7 of the Annual GHG Report.

Table 3.22. Global, United States, and New Mexico Fossil Fuel GHG Emissions, 2016–2021 (Mt CO₂/year)

Scale	2016	2017	2018	2019	2020	2021
Global	36,465.6	36,935.6	37,716.2	37,911.4	35,962.9	37,500.0
United States	4,909.9	4,852.5	4,989.8	4,855.9	4,344.9	4,639.1
New Mexico	48.8	49.4	45.2	48.4	45.0	46.0

Sources: Annual GHG Report (BLM 2023b:Chapter 5, Table 5-1 [U.S.] and Table 5-2 [State]). Global emissions (CO₂ only): GHG Emissions of all World Countries 2023 Report (Emissions Database for Global Atmospheric Research 2023). State 2021 data: Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021 (EPA 2023e).

Mt (megatonne) = 1 million metric tonnes

3.6.2.2 *Environmental Consequences*

PROPOSED ACTION

While the leasing action does not directly result in development that would generate GHG emissions, emissions from future potential development of the leased parcels can be estimated for the purposes of this analysis. Four general phases of post-lease development processes would generate GHG emissions: 1) well development (well site construction, well drilling, and well completion), 2) well production operations (extraction, separation, gathering), 3) midstream (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 authority over these activities, midstream and end-use emissions (phases 3 and 4) typically occur off-lease where the BLM has little to no 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 or that the BLM may require. Due to these uncertainties, the BLM applies several assumptions to estimate emissions at the leasing stage. The number of estimated wells per parcel is based on state data for past lease development combined with per-well drilling, development, and operating emissions data from representative wells in the area. The amount of oil or gas that may be produced if the offered parcels 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 this analysis, the BLM assumes 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 midstream operations) associated with production from the lease parcels. These sources may include emissions of CH₄ (a more potent GHG than CO₂ 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 midstream emissions associated with lease parcels for this analysis would be similar to the national level emissions identified by the Department of Energy's National Energy Technology Laboratory (NETL 2009, 2019). Section 6 of the

Annual GHG Report includes a more detailed discussion of the methodology for estimating midstream emissions.

The emission estimates calculated for this analysis were generated using the assumptions previously described above in the BLM Lease Sale Emissions Tool (BLM 2024a) and lease development analysis. Emissions are presented for each of the four phases of post-lease development processes 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, midstream, 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 operation 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.
- Midstream emissions occur from the transport, refining, processing, storage, transmission, and distribution of produced oil and gas. Midstream emissions are estimated by multiplying the EUR of produced oil and gas with emissions factors from NETL life-cycle analysis of U.S. oil and natural gas. Additional information on emission factors can be found in the Annual GHG Report (BLM 2023b:Chapter 6, Tables 6-8 and 6-10).
- 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 C.F.R. § 98). Additional information on emission factors and EUR factors can be found in the Annual GHG Report (BLM 2023b:Chapter 6).

Table 3.23 shows the estimated maximum year and average year GHG emissions over the life of the lease for both 100-year and 20-year global warming potentials (GWPs). Section 3.4 of the Annual GHG Report provides a detailed explanation of GWP.

Table 3.23. Estimated Direct and Indirect Emissions from Lease Parcels on an Annual and Life-of-Lease Basis (metric tonnes)

Time Frame	CO ₂	CH ₄	N ₂ O	CO ₂ e (100-year)	CO ₂ e (20-year)
Maximum year	213,990	183.45	1.582	219,889	229,557
Average year	63,594	58.88	0.467	65,476	68,579
Life of lease	1,780,621	1,648.54	13.089	1,833,321	1,920,199

Source: BLM Lease Sale Emissions Tool (BLM 2024a)

Table 3.24 lists the estimated direct (well development and production operations) and indirect (midstream and end-use) GHG emissions in metric tonnes for the subject leases over the average 20-year production life of the lease. In summary, potential GHG emissions from the Proposed Action could result in GHG emissions of 1,833,321 metric tonnes of CO₂e over the life of the lease.

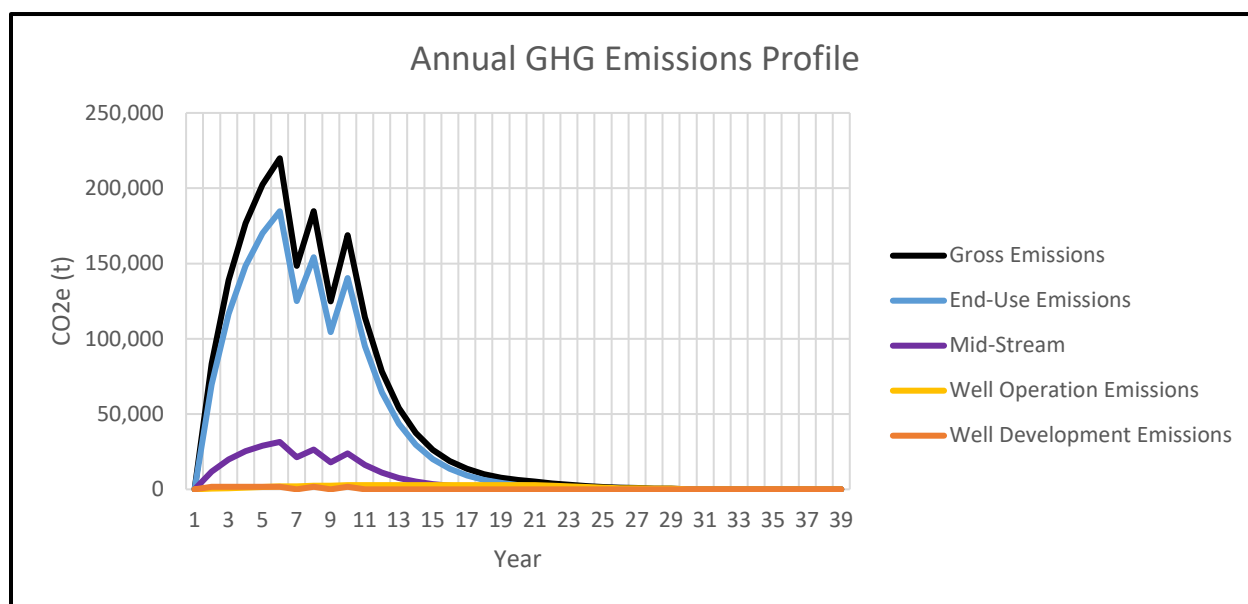
Table 3.24. Estimated Life-of-Lease Emissions from Well Development, Well Production Operations, Midstream, and End Use (metric tonnes)

Activity	CO ₂	CH ₄	N ₂ O	CO ₂ e (100-year)	CO ₂ e (20-year)
Well development	11,807	3.15	0.094	11,927	12,093
Well production operations	50,191	197.40	0.305	56,157	66,560
Midstream	215,045	1,397.18	3.382	257,604	331,236
End use	1,503,577	50.81	9.308	1,507,633	1,510,311
Total (life of lease)	1,780,621	1,648.54	13.089	1,833,321	1,920,199

Source: BLM Lease Sale Emissions Tool (BLM 2024a)

Note: IPCC Sixth Assessment Report GWP: 100-year GWP (CO₂ = 1, CH₄ = 29.8, N₂O = 273); 20-year GWP (CO₂ = 1, CH₄ = 82.5, N₂O = 273) (IPCC 2021).

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 gross (total) emissions as well as emissions during the four phases of lease development processes—well development, well production operations, midstream, and end-use.



Source: BLM Lease Sale Emissions Tool (BLM 2024a)

Figure 3.1. Estimated annual GHG emissions profile over the life of a lease.

The EPA GHG equivalency calculator can be used to place potential average-year emissions from this lease sale in contexts relatable to everyday life (EPA 2023f). For instance, the projected average annual GHG emissions from potential development of the subject lease are equivalent to 15,583 gasoline-fueled passenger vehicles driven for 1 year, or the emissions that could be avoided by operating 17.2 wind turbines as an alternative energy source or offset by the carbon sequestration of 76,445 acres of forest land for 1 year.

Table 3.25 compares emission estimates over the 20-year life of the lease compared to the 30-year projected federal fossil fuel emissions in the state and nation from existing wells, the development of approved APDs, and emissions related to reasonably foreseeable lease actions. The production life of a lease can vary by location, the type of well, and other factors, but a well can usually remain productive for

a few decades. For this analysis the BLM assumes that leases will remain productive for 20 years. Well development is assumed to take place over the 10-year lease term, with a potential for a well to be developed in the 10th year and produce for 20 years. Therefore, well operation emissions and indirect emissions (midstream and end use) are assumed to occur from the first year until year 29, with well development emissions potential occurring from the first year until the 10th year. This value differs slightly from EIA long-term (30-year) energy demand and emissions projections. For comparison, a well in New Mexico that produces for 20 years instead of 30 will result in total life-cycle emissions that are approximately 4% less of CO₂e (100-year GWP) and 5% less of CO₂e (20-year GWP).

Table 3.25. Comparison of the Life-of-Lease Emissions to Other Federal Oil and Gas Emissions

Reference	Mt CO ₂ e (100-year)	Life of Lease Percentage of Reference
Lease sale emissions (life of lease)	1.83	100.00%
New Mexico reasonably foreseeable short-term federal (oil and gas)*	3,183.17	0.058%
New Mexico EIA-projected long-term federal (oil and gas)†	9,961.81	0.018%
United States reasonably foreseeable short-term federal (oil and gas)	6,033.00	0.030%
United States EIA-projected long-term federal (oil and gas)	16,523.00	0.011%

Source: U.S. and federal emissions from BLM Lease Sale Emissions Tool (BLM 2024a) data and Tables 7-18, 7-19 and Section 7 of the 2022 Annual GHG Report (BLM 2023b).

* 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 federal oil and gas development, the life-of-lease emissions for the Proposed Action are between 0.02% and 0.06% of federal fossil fuel authorization emissions in the state and between 0.01% and 0.03% of federal fossil fuel authorization emissions in the nation. In summary, potential GHG emissions from the Proposed Action could result in GHG emissions of 1.83 Mt CO₂e over the life of the lease.

Table 3.26 compares the estimated annual lease sale emissions to existing federal fossil fuel (oil, gas, and coal) emissions, state, and U.S. total GHG emissions.

Table 3.26. Comparison of Lease Sale Emissions to Other Sources (megatonnes)

Reference	Mt CO ₂ e* (per year)	Maximum Year Percentage of Reference
Lease sale emissions (maximum year)	0.220	—
New Mexico onshore federal (oil and gas) †	326.00	0.067%
U.S. onshore federal (oil and gas) †	542.06	0.041%
U.S. federal-all (oil and gas) ††	933.87	0.024%
U.S. federal onshore (oil, gas, and coal) †	1,033.21	0.021%
New Mexico total (all sectors) †	331.85	0.066%
U.S. total	6,899.49	0.0032%

Source: BLM Lease Sale Emissions Tool (BLM 2024a)

* Mt (megatonne) = 1 million metric tonnes. Estimates are based on 100-GWP values.

† Federal values come from Tables ES-1 and ES-2 of the Annual GHG Report.

‡ Includes offshore and onshore oil and gas production.

SOCIAL COST OF GREENHOUSE GASES

The National Environmental Policy Act (NEPA) does not require an agency to quantify project impacts through a specific methodology, such as estimating the “social cost of carbon,” “social cost of methane,” or “social cost of greenhouse gases.” A protocol to estimate what is referenced as the “social cost of carbon” (SCC) associated with greenhouse gas (GHG) emissions was developed by a federal Interagency Working Group on the Social Cost of Greenhouse Gases (IWG).

Executive Order 14154, *Unleashing American Energy* (Jan. 20, 2025), disbanded the IWG and withdrew any guidance, instruction, recommendation, or document issued by the IWG. Section 6(c) of Executive Order 14154 states:

The calculation of the “social cost of carbon” is marked by logical deficiencies, a poor basis in empirical science, politicization, and the absence of a foundation in legislation. Its abuse arbitrarily slows regulatory decisions and, by rendering the United States economy internationally uncompetitive, encourages a greater human impact on the environment by affording less efficient foreign energy producers a greater share of the global energy and natural resource market. Consequently, within 60 days of the date of this order, the Administrator of the EPA shall issue guidance to address these harmful and detrimental inadequacies, including consideration of eliminating the “social cost of carbon” calculation from any Federal permitting or regulatory decision.

Executive Order 14154 further directs agencies to ensure consistency with the guidance in OMB Circular A-4 of September 17, 2003, when estimating the value of changes in greenhouse gas emissions from agency actions.

The BLM has not included any estimates for the SCC for this lease sale for multiple reasons. First, this action is not a rulemaking. Rulemakings are the administrative actions for which the IWG originally developed the SCC protocol. Second, Executive Order 14154 clarifies that the IWG has been disbanded and its guidance has been withdrawn.

Further, NEPA does not require agencies to conduct a cost-benefit analysis. Including an SCC analysis without a complete cost-benefit analysis, which would include the social benefits of the proposed action to society as a whole and other potential positive benefits, would be unbalanced, potentially inaccurate, and not useful to foster informed decision-making. Any increased economic activity—in terms of revenue, employment, labor income, total value added, and output—that is expected to occur as a result of the proposed action is simply an economic impact, not an economic benefit, inasmuch as any such impacts might be viewed by another person as a negative or undesirable impact due to a potential increase in the local population, competition for jobs, and concerns that changes in population will change the quality of the local community. “Economic impact” is distinct from “economic benefit,” as understood in economic theory and methodology, and the socioeconomic impact analysis required under NEPA is distinct from a cost-benefit analysis, which NEPA does not require. In addition, many benefits and costs from agency actions cannot be monetized and, even if monetizable, cannot meaningfully be compared directly to SCC calculations for a number of reasons, including because of differences in scale (local impacts vs global impacts).

Finally, purported estimates of SCC would not measure the actual environmental impacts of a proposed action and may not accurately reflect the effects of GHG emissions. Estimates of SCC attempt to identify economic damages associated with an increase in carbon dioxide emissions—typically expressed as a one metric ton increase in a single year—and typically includes, but is not limited to, potential changes in net

agricultural productivity, human health, and property damages from increased flood risk over hundreds of years. The estimate is developed by aggregating results across models, over time, across regions and impact categories, and across multiple scenarios. The dollar cost figure arrived at based on consideration of SCC represents the value of damages avoided if, ultimately, there is no increase in carbon emissions. But SCC estimates are often expressed in an extremely wide range of dollar figures, depending on the particular discount rates used for each estimate, and would provide little benefit in informing BLM's decision. For these reasons, the Department of the Interior has also rescinded its memorandum of October 16, 2024, entitled, "Updated Estimates of the Social Cost of Greenhouse Gases," which had directed Interior bureaus to calculate SCC using the methodology contained in the Environmental Protection Agency's Final Rule of March 8, 2024, 89 Fed. Reg. 16,820.

To summarize, BLM is not evaluating SCC for this lease sale because: (1) BLM is not engaged in a rulemaking for which the now-rescinded SCC protocol was originally developed; (2) the IWG has been disbanded and all technical supporting documents and associated guidance have been withdrawn; (3) NEPA does not require agencies to prepare SCC estimates or cost-benefit analyses; (4) costs attributed to GHGs are often so variable and uncertain that they are unhelpful for the BLM's analysis; and (5) the full social benefits of carbon-based energy production have not been monetized, and quantifying only the costs of GHG emissions, but not the benefits, would yield information that is both potentially inaccurate and not useful.

NO ACTION ALTERNATIVE

Under the No Action Alternative, the BLM would not affirm the issuance of the leases. 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. Although no new GHG emissions would result under the No Action Alternative, the national and global demand for energy is not expected to differ regardless of BLM decision making.

The BLM does not have a model to estimate energy market substitutions at a spatial resolution needed for this onshore 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 case the indirect GHG emissions would be similar), or overseas, in which case the GHG emissions could be higher, to the extent environmental protection requirements for production are less vigorous, 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 because 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 2023b). 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 energy source (see Table 10-3 of the Annual GHG Report [BLM 2023b]). 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 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 No Action Alternative, but the relative contribution of each is unknown. Regardless, GHG emissions under the No Action Alternative are not expected to be zero.

3.6.2.3 Cumulative Effects

The analysis of GHGs contained in this EA includes estimated emissions from the lease as described above. An assessment of GHG emissions from other BLM fossil fuel authorizations, including coal leasing and oil and gas leasing and development, is included in the Annual GHG Report (BLM 2023b:Chapter 7). The Annual GHG Report includes estimates of reasonably foreseeable GHG emissions related to BLM lease sales anticipated during the fiscal year, as well as the best estimate of emissions from ongoing production, and development of parcels sold in previous lease sales. It is, therefore, an estimate of cumulative GHG emissions from the BLM federal mineral estate based on actual production and statistical trends as they are presently known.

The methodologies used in the Annual GHG Report provide estimates of foreseeable short-term and projected long-term GHG emissions from activities across the BLM's federal mineral estate. The foreseeable short-term methodology includes a trends analysis of 1) leased federal lands that are held by production,¹⁰ 2) approved APDs, and 3) leased lands from competitive lease sales projected to occur over the next annual reporting cycle (12 months). The data are used to provide a 30-year life-of-lease projection of potential emissions from all federal oil and gas activities and potential lease actions over the next 12 months. The projected 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 fluid minerals. For both methodologies, the emissions are calculated using life-cycle-assessment data and emission factors. These analyses are the basis for projecting GHG emissions from lease parcels 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 oil and gas leasing and the best available estimate of reasonably foreseeable cumulative emissions related to any one lease sale or set of quarterly lease sales that could occur annually across the entire federal onshore mineral estate.

Table 3.28 presents the summation of the 30-year life-of-project emissions estimates for both the short and long term as previously described for each state where federal mineral actions have been authorized. The differences between the short- and long-term emissions estimates can be thought of as an approximation of additional leasing that could occur on federal lands and does not take into consideration additional policies, technological advancements in production or end-use efficiency standards, or an accelerated economy-wide transition away from fossil fuel derived energy production. A detailed explanation of the short-term and long-term emissions estimate methodologies are provided in Sections 6.6 and 6.7 of the Annual GHG Report.

Table 3.28. GHG Emissions from Past, Present, and Reasonably Foreseeable Federal Onshore Lease Development (Mt CO₂e)

State	Existing Wells (report year)	Existing Wells (projected)	Approved APDs	New Leasing	Short-Term Foreseeable Totals	Long-Term Projected Totals
Alabama	0.51	7.56	0.00	0.18	7.74	15.28
Alaska	1.31	19.47	23.13	34.70	77.31	39.67
Arizona	0.00	0.00	0.00	0.00	0.00	0.00
Arkansas	0.55	8.72	0.24	0.24	9.19	16.63
California	4.92	67.90	5.93	2.13	75.96	151.15
Colorado	46.16	399.35	30.80	23.95	454.10	1,395.90

¹⁰ Held by production - A provision in an oil or natural gas property lease that allows the lessee to continue drilling activities on the property as long as it is economically producing a minimum amount of oil or gas. The held-by-production provision thereby extends the lessee's right to operate the property beyond the initial lease term.

State	Existing Wells (report year)	Existing Wells (projected)	Approved APDs	New Leasing	Short-Term Foreseeable Totals	Long-Term Projected Totals
Idaho	0.00	0.00	0.00	0.29	0.30	0.01
Illinois	0.01	0.11	0.00	0.02	0.13	0.26
Indiana	0.00	0.00	0.00	0.02	0.02	0.00
Kansas	0.26	3.81	0.00	0.11	3.92	7.80
Kentucky	0.01	0.07	0.00	0.03	0.10	0.25
Louisiana	3.84	48.54	44.95	13.11	106.60	115.95
Maryland	0.00	0.00	0.00	0.00	0.00	0.00
Michigan	0.07	1.36	0.00	0.58	1.94	2.11
Mississippi	0.12	1.59	0.38	0.38	2.35	3.62
Montana	2.52	25.68	0.42	12.63	38.73	77.12
Nebraska	0.02	0.22	0.00	0.03	0.25	0.47
Nevada	0.13	1.01	0.01	0.19	1.22	4.07
New Mexico	326.00	2,318.83	745.21	119.12	3,183.17	9,961.81
New York	0.00	0.01	0.00	0.00	0.01	0.01
North Dakota	33.32	279.03	57.62	3.57	340.22	1,020.91
Ohio	0.40	3.83	0.00	4.64	8.47	12.20
Oklahoma	1.25	12.23	0.95	1.66	14.83	37.81
Oregon	0.00	0.00	0.00	0.12	0.12	0.00
Pennsylvania	0.00	0.06	0.00	0.67	0.72	0.12
South Dakota	0.11	1.77	0.11	0.11	1.98	3.23
Tennessee	0.00	0.00	0.00	0.00	0.00	0.00
Texas	3.31	36.52	19.00	1.97	57.49	99.95
Utah	13.90	175.34	16.33	36.75	228.41	421.63
Virginia	0.01	0.14	0.00	0.03	0.16	0.27
West Virginia	0.00	0.06	0.00	0.59	0.65	0.14
Wyoming	103.34	920.76	178.16	317.98	1,416.91	3,134.55
Total onshore federal*	542	4,334	1,123	576	6,033	16,523

Source: BLM Annual GHG Report, Section 7 (BLM 2023b).

* Totals have been rounded.

As detailed in the 2022 Annual GHG Report, the BLM also looked at other tools to inform its analysis, including the Model for the Assessment of Greenhouse Gas Induced Climate Change (MAGICC)¹¹ (see Section 9.0 of the Annual GHG Report). BLM conducted MAGICC runs evaluating potential BLM contributions to global climate and related values for two different IPCC global climate scenarios. These two scenarios were used because they reflect lower total global projected GHG emissions and will therefore reflect the greatest emissions contribution by the BLM relative to global emissions levels, resulting in a conservative contribution analysis. Of the two IPCC scenarios chosen, the most optimistic evaluates global CO₂ emissions cut to net zero around 2050. This scenario keeps global warming to around 1.5 degrees Celsius (°C) above pre-industrial temperatures. The second, “middle of the road”

¹¹ <https://magicc.org>.

scenario leaves global CO₂ emissions around current levels before starting to fall by 2050 but does not reach net zero by 2100. In this scenario, temperatures rise 2.7°C by the end of the century. The MAGICC model results show that regardless of the global climate projection scenario and the pathway that federal fossil fuels emissions follow, federal BLM minerals emissions are predicted to have minimal impacts to future global climate through the end of the century. The maximum BLM fossil fuel (oil, gas, and coal) contribution to global temperature increases under these two scenarios is 0.015°C and 0.013°C, respectively. Because the projected federal mineral CO₂ emissions constitute a larger portion of the global levels in the most optimistic scenario, the modeled impacts are generally higher than those of the “middle of the road” scenario.

Recent short-term energy outlook (STEO) reports published by the EIA (EIA 2024) predict that the world’s oil and gas supply and consumption will increase over the next 18 to 24 months. The STEO projections are useful for providing context for the cumulative 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. Recent STEOs include the following projections for the next 2 years:

- U.S. liquid fuels consumption is projected to increase to 20.40 million barrels per day (b/d) in 2024, up from 20.25 million b/d in 2023.
- U.S. crude oil production is expected to average 13.19 million b/d in 2024 and rise to 13.65 million b/d in 2025.
- U.S. natural gas consumption is expected to average 89.68 billion cubic feet/day (Bcf/d) in 2024, decreasing slightly to 89.21 Bcf/d in 2025.
- U.S. liquid natural gas exports are expected to increase from 11.9 Bcf/d in 2023 to 12.34 Bcf/d in 2024 and 14.43 Bcf/d in 2025.
- U.S. coal production is expected to total 496.6 million short tons (MMst) in 2024 and 465.8 MMst in 2025 and decrease to 15% of total U.S. electricity generation in 2024 compared to 17% in 2023, driven by the ongoing retirement of coal-fired generating plants.

Generation from renewable sources will make up an increasing share of total U.S. electricity generation, rising from 21% in 2023 to 24% in 2024. Recent events, both domestically and internationally, have resulted in abrupt changes to the global oil and gas supply. EIA studies and recent U.S. analyses (associated with weather impacts) 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 2024). Recent global supply disruptions have also led to multiple releases from the U.S. Strategic Petroleum Reserve in order to meet consumer demand and curb price surges.

The EIA 2023 Annual Energy Outlook (EIA 2023b) projects energy consumption increases through 2050 as population and economic growth outweigh efficiency gains. As a result, U.S. production of natural gas and petroleum and liquids will rise amid growing demand for exports and industrial uses. U.S. natural gas production will increase by 15% from 2022 to 2050. However, renewable energy will be the fastest-growing U.S. energy source through 2050. As electricity generation shifts to using more renewable sources, domestic natural gas consumption for electricity generation is expected to decrease by 2050 relative to 2022. As a result, energy-related CO₂ emissions are expected to fall 25% to 38% below the 2005 level, depending on economic growth factors. Further discussion of past, present, and projected global and state GHG emissions can be found in Chapter 5 of the Annual GHG Report (BLM 2023b).

Carbon budgets estimate 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 pre-industrial levels (see Section 9.1 of the Annual GHG Report [BLM 2023b]). The IPCC Special Report on Global Warming of 1.5°C is the most widely accepted authority on the development of a carbon budget (IPCC 2020). At present, no national or federal agency carbon budgets have been established, primarily due to the lack of consensus on how to allocate the global budget to each nation, and as such the global budgets that limit warming to 1.5°C or 2.0°C are not useful for BLM decision making, particularly at the leasing stage, as it is unclear what portion of the budget applies to emissions occurring in the United States.

Stakeholders and members of the public have requested that the BLM consider comparing the estimated federal oil and gas emissions in the context of global carbon budgets. Table 9-1 in the Annual GHG Report (BLM 2023b) provides an estimate of the potential emissions associated with federal fossil fuel authorizations in relation to IPCC carbon budgets. Projected annual emissions are added over the remaining timeframe until the global emissions budget is estimated to be exhausted to show the portion of the budget that is consumed by federal emissions. Results of the carbon budget analysis are presented as the percent of the budget consumed by federal fossil fuel emissions and the additional time (days) it takes to consume the budget without federal fossil fuel emissions. Total BLM federal fossil fuel authorizations, including coal, natural gas, and oil, represent approximately 2.1% of the remaining global carbon budget of 380 gigatonnes of CO₂ needed to limit global warming to 1.5°C. The additional time frame to exhaust the remaining budget (380 gigatonnes of CO₂) without federal BLM coal, natural gas, and oil is 38 days. Additional information on this analysis is provided in Section 9.1 of the Annual GHG Report.

3.6.2.4 Emission Control Measures Considered in the Analysis

The relationship between GHG emissions and climate impacts is complex, but a project's potential to contribute to impact climate is reduced as its net emissions are reduced. When net emissions approach zero, the project has little or no effect on climate. 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) 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) can remove GHGs from the atmosphere or reduce emissions in other areas. Chapter 10 of the Annual GHG Report (BLM 2023b) provides a more detailed discussion of GHG mitigation strategies.

Several federal agencies work in concert to meet U.S. emissions reduction goals all 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 NSPS for Crude Oil and Natural Gas Facilities, 40 C.F.R. § 60, Subpart OOOOa, and Waste Emissions Charge for Petroleum and Natural Gas Systems, 40 C.F.R. § 99. In December of 2023, the EPA released a separate rule under the Clean Air Act (CAA) to reduce methane and other harmful air pollutants from new and existing oil and gas operations nationwide, which includes the Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced after November 15, 2021, 40 C.F.R. § 60, Subpart OOOOb; and Emissions Guidelines for Greenhouse Gas Emissions from Existing Crude Oil and Natural Gas Facilities, Subpart OOOOc. These regulations impose emission limits, equipment design standards, and monitoring requirements on oil and gas facilities and a waste emissions charge on CH₄ emissions that exceed 25,000 metric tonnes of CO₂e

for applicable petroleum and natural gas facilities currently required to report under the GHG Reporting Rule. A detailed discussion of existing regulations 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 2023b). Section 2.5 of the Annual GHG Report, Executive Orders (EOs), has not been incorporated by reference as the EOs discussed therein have been rescinded as of January 20, 2025.

This rule (EPA Methane Rule – OOOOb and OOOOc) is distinct from the BLM’s Waste Prevention Rule. The BLM’s rule updates the BLM’s outdated natural gas waste regulations to better address the Secretary of the Interior’s obligation, under the MLA, to prevent avoidable waste of natural gas from oil and gas operations. However, the BLM and EPA worked closely to ensure the two rules avoid duplicative or contradictory requirements for industry, even though the rules serve different purposes.

The EPA’s Methane Rule will sharply reduce emissions of methane and other harmful air pollution from oil and natural gas operations — including, for the first time, from existing sources nationwide. The final action includes New Source Performance Standards (NSPS) to reduce methane and smog-forming volatile organic compounds from new, modified and reconstructed sources. It also includes Emissions Guidelines, which set procedures for states to follow as they develop plans to limit methane from existing sources. First, the EPA Rule finalizes 40 C.F.R. § 60 Subpart OOOOb regulating GHGs (in the form of a limitation on emissions of methane) and VOCs emissions for the Crude Oil and Natural Gas source category pursuant to CAA Section 111(b)(1)(B). Second, the EPA finalizes the presumptive standards in 40 C.F.R. § 60 Subpart OOOOc to limit GHGs emissions (in the form of methane limitations) from designated facilities in the Crude Oil and Natural Gas source category, as well as requirements under the CAA section 111(d) for states to follow in developing, submitting, and implementing state plans to establish performance standards. Third, the EPA finalizes several related actions stemming from the joint resolution of Congress, adopted on June 30, 2021, under the CRA, disapproving the previous 2020 Policy Rule. Fourth, the EPA finalizes a protocol under the general provisions of 40 C.F.R. Part 60 for Optical Gas Imaging to detect gas leaks from industrial sources.

At the state level, the EMNRD enforces the NMOCD Statewide Natural Gas Capture Requirements (Waste Prevention Rule), NMAC 19.15.27, as part of the New Mexico statewide enforceable regulatory framework to secure reductions in oil and gas sector emissions and to prevent natural gas waste from new and existing sources. Key provisions include prohibition of unnecessary venting and flaring of waste natural gas where it is technically feasible to recover the gas by routing it to a pipeline or using it for some other beneficial purpose (such as on-site fuel consumption). In limited circumstances, and if recovery is infeasible, operators must flare gas rather than venting it, which results in uncombusted VOC emissions. According to NMAC 19.15.27.8, venting is only permissible "in an emergency or malfunction ... to avoid a risk of an immediate and substantial adverse impact on safety, public health, or the environment." These provisions will likely reduce VOC emissions as well as emissions of NO_x, CO, SO₂, GHGs, and particulate matter. The NMED developed the “Oil and Natural Gas Regulation for Ozone Precursors,” NMAC 20.2.50, which went into effect August 5, 2022. Approximately 50,000 wells and associated equipment will be subject to this regulation. It is anticipated that the regulation will annually reduce VOC emissions by 106,420 tons, NO_x emissions by 23,148 tons, and CH₄ emissions by 200,000 to 425,000 tons. The regulation includes emissions reduction requirements for compressors, engines and turbines, liquids unloading, dehydrators, heaters, pneumatics, storage tanks, and pipeline inspection gauge launching and receiving. A description of federal and state rules and regulations can be found in Section 2 of the Air Resources Technical Report (BLM 2023a).

The majority of GHG emissions resulting from federal fossil fuel authorizations occur outside of the BLM’s authority and control. 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 (i.e., the well development and well production phases). 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 lease parcel. 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. 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, is provided in Chapter 10 of the Annual GHG Report (BLM 2023b).

3.6.3 Issue 3: Water Use and Quantity

How would future potential development of the nominated lease parcels affect surface and groundwater quantity?

The analysis area for this issue is the total area of Chaves, Eddy, and Lea Counties, which collectively make up the New Mexico portion of the Permian Basin and which the BLM refers to as the tri-county analysis area. This analysis area is used because water sources used to support future potential development of the nominated lease parcels would likely be sourced from these three counties.

Water uses associated with development of the nominated lease parcels would occur during the 30- to 60-day well construction and completion period (such as hydraulic fracturing), the 20-year operation period (e.g., water use associated with dust control), and interim and final reclamation. While most of the water use associated with oil and gas development is expected to occur within a 30- to 60-day well construction and completion period, the effect of this use on groundwater aquifers is expected to last until recharge occurs. Because of uncertainty about water sources and recharge rates, it is assumed that all water use associated with oil and gas development is likely to have a long-term effect. Additionally, the ability for aquifer recharge may be affected by drought conditions associated with climate trends.

The following analysis summarizes information contained in the Water Support Document (BLM 2023c). Water use for development of the nominated lease parcels is assumed to primarily come from groundwater sources based on previous oil and gas development in the area.

3.6.3.1 Affected Environment

CURRENT TOTAL WATER USE IN THE ANALYSIS AREA

The USGS report, *Estimated Use of Water in the United States in 2015* (Dieter et al. 2018), lists total water withdrawals across eight water use categories: aquaculture, domestic, industrial, irrigation, livestock, mining, public water supply, and thermoelectric power. Water use for 2015 is summarized in Table 3.29 for the eight water use categories in each of the three counties within the analysis area. Irrigation is the largest category of water use in all counties, accounting for an average of 75% (466,784 acre-feet [AF]) of the total water withdrawal for the analysis area (619,375 AF). Approximately 88% (545,154 AF) of the total water use is from groundwater. Mining (which includes oil and gas development) comprises approximately 15% of water withdrawals. All mining-related water use (94,758 AF) is from groundwater. Of that total, 99% of withdrawals are from non-potable saline sources (i.e., water containing dissolved solids of 1,000 milligrams per liter or more).

Table 3.29. Tri-County Analysis Area 2015 Water Use by Category

Category	Surface Water			Groundwater			Total Withdrawals			
	Fresh (AF)	Saline (AF)	Total (AF)	Fresh (AF)	Saline (AF)	Total (AF)	Fresh (AF)	Saline (AF)	Total (AF)	Percent Total Use
Aquaculture	0	0	0	1,782	0	1,782	1,782	0	1,782	<1%
Domestic	0	–	0	2,780	–	2,780	2,780	–	2,780	<1%
Industrial	0	0	0	1,121	0	1,121	1,121	0	1,121	<1%
Irrigation	73,908	–	73,908	392,877	–	392,877	466,785	–	466,785	75%
Livestock	314	–	314	10,537	–	10,537	10,851	–	10,851	2%
Mining	0	0	0	1,379	93,379	94,758	1,379	93,379	94,758	15%
Public Water Supply	0	0	0	39,470	0	39,470	39,470	0	39,470	6%
Thermoelectric Power	0	0	0	1,827	0	1,827	1,827	0	1,827	<1%
Total	74,222	0	74,222	451,773	93,379	545,152	525,995	93,379	619,374	100%

Source: BLM (2023c)

Note: The Mining category (highlighted in dark gray) represents the category into which the Proposed Action falls.

See the Water Support Document (BLM 2023c) for graphical representation of these data, as well as comparisons with water use across the state of New Mexico.

CURRENT WATER USE ASSOCIATED WITH OIL AND GAS DEVELOPMENT

As part of oil and gas development, water is used for drilling fluid preparation and makeup water for completion fluids, in well stimulation (of which the most common method is hydraulic fracturing), as rig wash water, as coolant for internal combustion engines, for dust suppression on roads or well pads, and for equipment testing. Water uses for oil and gas development in the tri-county analysis area are typically sourced from groundwater. Of these uses, hydraulic fracturing activities use the most water. The amount of water used for hydraulic fracturing is dependent on many factors, including the geologic formation. In the CFO, all wells use water for completion, and some include nitrogen gel or slickwater additives to the completion technologies (Herrell 2020).

Oil and gas operators are required by the State of New Mexico to disclose water use to FracFocus (per NMAC 19.15.16), a national hydraulic fracturing chemical registry managed by the GWPC and Interstate Oil and Gas Compact Commission to provide objective information on hydraulic fracturing. The BLM examined FracFocus data reported for the calendar years of 2014 to 2022 to ascertain actual water use in the analysis area (Table 3.30).

Table 3.30. Actual Water Use in the Tri-County Analysis Area for Calendar Years 2014 to 2022

Year	Federal Water Use (AF)	Non-Federal Water Use (AF)	Total Water Use (AF)	Federal Water Use (%)	Average Water Use per Well (AF)	Total Number of Wells Reported to Frac Focus
2014	872	635	1,507	58%	7.6	199
2015	4,041	4,357	8,398	48%	14.5	578
2016	874	5,978	6,852	13%	20.3	337
2017	3,368	11,047	14,415	23%	24.7	584
2018	9,171	22,623	31,794	29%	28.9	1,099

Year	Federal Water Use (AF)	Non-Federal Water Use (AF)	Total Water Use (AF)	Federal Water Use (%)	Average Water Use per Well (AF)	Total Number of Wells Reported to Frac Focus
2019	10,385	31,979	42,364	25%	38.4	1,103
2020	15,539	24,822	40,361	38%	50.9	793
2021	34,426	31,342	65,768	52%	51.7	1,272
2022	36,044	50,703	86,747	42%	52.9	1,639
Total	114,720	183,486	298,206	38%	51.8	7,604

Source: BLM (2023b). The analysis contained in this table provides percentage contribution rounded to one decimal point.

Note: Tri-county analysis area is Lea, Chaves, and Eddy Counties.

Total water use (federal and non-federal) has increased from 1,507 AF in 2014 to 86,747 AF in 2022, with a corresponding basin-wide average water use per well increase from 7.6 AF per well to 52.9 AF per well (BLM 2023c). Although the average water use per well for hydraulic fracturing increased to 52.9 AF in 2022, the 3-year average is 51.8 AF per well. This increase in water use per well is associated with changes in production stimulation techniques (BLM 2023c).

While much of the water use associated with oil and gas development is expected to occur within a 30- to 60-day well construction and completion period (such as hydraulic fracturing), the effect of this use on groundwater aquifers is expected to last until recharge occurs. Long-term water requirements during operation would depend on the project but include the use of water as coolant for internal combustion engines and dust suppression on roads or well pads. The Water Support Document (BLM 2023c) indicates there are four potential sources of groundwater in the tri-county analysis area: the Pecos Valley alluvium aquifer; the Dockum Formation aquifer; the Rustler Formation aquifer; and the Captain Reef aquifer (BLM 2023c). A recent study within the analysis area to identify source waters indicated that most water wells contained a mix of source waters; however, in general, the main water source for water wells was the Dockum Formation and Rustler Formation aquifers. Some wells near the community of Carlsbad access the Captain Reef aquifer (BLM 2023c). Recharge for the Dockum Formation aquifer and the Rustler Formation aquifer is driven by precipitation (BLM 2023c). No additional information is available about recharge rates. In addition, estimating overall aquifer volumes and water availability is difficult because of the size and complexity of water sources within the analysis area. Although some water budgets exist for individual watersheds and recent studies have measured and modeled water resource use within parts of the Permian Basin (Lowry et al. 2018; Reardon et al. 2021; USGS 2021b), data regarding overall aquifer volumes for the tri-county analysis area are not available. In light of this uncertainty about water sources and recharge rates, the BLM therefore assumes that water use associated with oil and gas development is likely to have a long-term effect on aquifer water levels, and the ability for aquifer recharge may be affected by drought conditions associated with climate trends.

As stated in the Water Support Document (BLM 2023c), a model has been developed as part of the Sandia National Laboratories study (Lowry et al. 2018; Reardon et al. 2021) to simulate water availability over a range of different future scenarios, including drilling activity and water demand relative to areas that are most vulnerable, and to estimate the risk to water sustainability. While the model has been recently completed, it is still undergoing review by the BLM for accuracy, reliability, and useability in evaluating water supply and demand related to oil and gas development in the PDO. This model is not yet being used in the Water Support Document for water use simulations.

REASONABLY FORESEEABLE ENVIRONMENTAL TRENDS AND PLANNED ACTIONS

The CFO is currently undertaking an RMP revision, and as part of that, has revised its RFD and water modeling. This RFD scenario includes federal and non-federal wells; well development projected as a result of ongoing BLM and state lease sales; and well development associated with recent or reasonably foreseeable APDs or master development plans. Development of the RFD scenarios assumes approximately 60 AF of water use per well, for a total 1,214,400 AF water over the 20-year development period (assuming 19,600 wells for CFO and 640 for RFO), or 60,720 AF of water in any given year if all wells were drilled horizontally (BLM 2023c). If more water-intensive stimulation methods (e.g., slickwater fracturing) are implemented or if laterals become longer, or if the number of wells continue to increase, aggregate water use could increase from estimates provided in the Water Support Document (BLM 2023c). Alternatively, water use estimates could be lower if produced water is reused or recycled for use in hydraulic fracturing or if methods such as nitrogen completions (less common than slickwater completions in PDO) are implemented.

Based on 2015 water use (619,375 AF), annual water use associated with the RFD scenario is projected to comprise about 9.5% of the total tri-county analysis area's annual water use (BLM 2023c). Irrigation would remain by far the largest water use within the analysis area (currently 75% of all water use within the tri-county analysis area and 82% of all water use within the state).

Aside from the RFD scenario for oil and gas development, no other reasonably foreseeable mining projects are expected to contribute to water withdrawals within the tri-county analysis area. Some water use would be required during construction and operation of reasonably foreseeable transmission lines and pipelines; these uses are addressed in the Water Support Document (BLM 2023c).

Predicted climate effects for the analysis area include intensified droughts (Mankin et al. 2021). A Bureau of Reclamation report (Bureau of Reclamation 2013) predicts decreases in overall water availability by one-quarter to one-third through the end of the twenty-first century for the Upper Rio Grande Basin (southern Colorado to south-central New Mexico).

3.6.3.2 *Environmental Effects*

Drilling and completion of seven horizontal wells on the nominated lease parcels are estimated to use approximately 420 AF of groundwater. This calculation is based on a factor of 60 AF per horizontal well, which the BLM considers a reasonable current estimate of water use associated with drilling and completion of a single horizontal well within the analysis area based on review of recent FracFocus data the CFO RFD water use estimates (BLM 2023c). If more water-intensive stimulation methods (e.g., slick water fracturing) are implemented or if laterals become longer, water use could increase from estimates provided in the Water Support Document (BLM 2023c). Alternatively, water use could be lower if produced water is reused or recycled, or if less water-intensive stimulation methods are used (e.g., nitrogen) in hydraulic fracturing. Water sourced from outside of the geological formation that is used in hydraulic fracturing, which remains in the geological formation after hydraulic fracturing is complete, is unlikely to be recovered for other uses (Kondash et al. 2018).

Assuming that all wells are developed in the same year, groundwater water use associated with future potential development of the leases would result in a 0.07% increase of the tri-county analysis area 2015 total water use (619,375 AF), 0.08% of the tri-county area 2015 total groundwater use (545,154 AF) and would result in an 0.44% increase over 2015 water use in the mining category for the tri-county analysis area (94,758 AF).

Assuming a 20-year development scenario for the Proposed Action (consistent with the RFD time frame), the water use associated with development of the lease parcels would be approximately 21 AF for any given year. Annual water use associated with future potential development of the lease parcels would result in a 0.003% increase of the tri-county analysis area total water use (619,375 AF), 0.004% of the tri-county analysis area total groundwater use (545,154 AF), and a 0.02% increase over 2015 water use in the mining category for the tri-county analysis area (94,758 AF). The total estimated water use for drilling and completion of the seven horizontal wells in the nominated lease parcels in a single year (21 AF) represents approximately 0.02% of the 2022 oil and gas water use reported to FracFocus (86,747 AF) for the tri-county analysis area (see Table 3.30).

Water use associated with future potential development of the proposed lease parcels (420 AF) would comprise 0.69% of annual RFD water use (60,720 AF) and 0.03% of total water use associated with the RFD (1,214,400 AF).

The demand from future potential development of the nominated lease parcels (420 AF) is minor when contrasted with the estimated water demand of the RFD (1,214,400 AF over 20 years, or 60,720 AF in any given year), the tri-county analysis area 2015 water use (619,374 AF) and the demands of other sectors in the tri-county analysis area such as irrigation (466,785 AF in 2015) and mining (94,758 AF in 2015).

While groundwater resources are regional in nature and water withdrawals are not anticipated to affect domestic water sources, any impacts to local water wells could force residents to find other means of supplying water for domestic use.

Water used for the purpose of oil and gas drilling, completion, and operations would be purchased legally from those who hold water rights in or around the Permian Basin. The transaction would be handled by the NMOCD, as well as the NMOSE. The BLM would evaluate all water uses at the time of proposed lease development in site-specific environmental review documentation and subject to STCs and site-specific mitigation. Table 3-8 of the Water Support Document (BLM 2023c) identifies the potential sources of groundwater in the analysis area.

Produced water associated with development of the lease parcels is estimated at approximately 9,684,220 bbl of water (1,383,460 bbl per well). Produced water would be either recycled, reused, or disposed of in accordance with all applicable federal and state laws and regulations. Disposal of produced water would occur at regulated and permitted commercial facilities (such as SWD wells).

3.6.3.3 Mitigation Measures and Residual Effects

Public concern about water use from hydraulic fracturing is especially high in semiarid regions such as the tri-county analysis area, where water withdrawals associated with hydraulic fracturing make up most oil and gas-related water use. Overall, there has been a concerted effort to increase the use of alternative water sources such as brackish water or recycling produced water, minimizing the extent to which oil and gas-related consumptive water uses contribute to the strain on local freshwater resources (Kondash et al. 2018). The BLM encourages the use of recycled water in hydraulic fracturing techniques, and in 2019, the State of New Mexico passed the Produced Water Act, which encourages oil and gas producers to reuse produced water, when possible, rather than relying on freshwater sources for oil and gas extraction. Additionally, New Mexico has promulgated new rules on produced water stemming from passage of the 2019 Produced Water Act (NMED 2021).¹² The rules were developed to encourage the recycling, reuse, or disposition of produced water while also affording reasonable protection against contamination of fresh

¹² The State of New Mexico House Bill 546, which included the Produced Water Act, went into effect July 1, 2019. Amendments to NMED 19.15.34, Produced Water, Drilling Fluids and Liquid Oil Field Waste, became effective on October 13, 2020.

water and establish procedures by which persons may transport and dispose of produced water, drilling fluids, and other liquid oil field waste. Such rules do not change the requirement that development of a federal lease must comply with all applicable federal and state laws and regulations.

Recent studies indicate that the water used for hydraulic fracturing may be retained within the shale formation, with only a small fraction of the fresh water injected into the ground returning as flowback water; water returning to the surface is highly saline, difficult to treat, and often disposed of through deep-injection wells (Kondash et al. 2018). Since the 2014 RFD, the Pecos District Office has seen an increase in the use of slickwater wells for oil and gas development. It is reasonable to assume with the increase in slickwater well construction that highly saline return water from the hydraulic fracturing process can be reused via water recycling methods. In 2019, NMED entered into a memorandum of understanding with New Mexico State University to develop new technologies for treating produced water to inform future policies for produced water reuse; an updated memorandum of understanding was signed on November 10, 2022 (NMED 2022).

CHAPTER 4. CONSULTATION AND COORDINATION

The following consultation and coordination efforts with tribes, individuals, organizations, and agencies were conducted for the proposed leasing actions.

4.1 ENDANGERED SPECIES ACT CONSULTATION

BLM CFO biologists have reviewed the proposed leasing and determined the Proposed Action would comply with threatened and endangered species management guidelines outlined in the 1988 CFO RMP as amended in 1997 (Consultation #2-22-96-F-128), in the biological assessment, and in accordance with the requirements of FLPMA and NEPA. In April 2008, the BLM PDO ROD Special Status Species RMPA and associated September 2006 Biological Assessment (Consultation #22420-2007-TA-0033) amended both of these land use plans in portions of Chaves, Roosevelt, Eddy, and Lea Counties to ensure continued habitat protection of two BLM special status species: LEPC and dunes sagebrush lizard.

Given the listing of the LEPC under the ESA effective March 27, 2023 (Federal Register 87:72674 and 88:73971), the BLM NMSO coordinated with USFWS to determine if ESA consultation is warranted to address effects on LEPC associated with BLM oil and gas leasing actions. USFWS confirmed that ESA consultation is not warranted for oil and gas leasing actions what are 10 miles or greater from the species estimated occupied range (USFWS Regional Director 2023). For future leasing atctions that occur within 10 miles or less of the species estimated occupied range, BLM would initiate Section 7 consultation for potential effects on LEPC on a case-by-case basis. As described in AIB-8, one of the nominated lease sale parcels (6848) is within the 2013 estimated occupied range for LEPC, but is not within 10 miles of the 2022 estimated occupied range. The remaining six nominated lease sale parcels analyzed in this EA are outside of the LEPC's estimated occupied range and 10-mile buffer and would have no effect on the species.

Additionally, in April 2024, the BLM also completed a review of the current species listings within the vicinity of the nominated lease parcels using the USFWS IPaC system (Consultation Code: 2024-0078785) for Eddy County (USFWS 2024a) and Consultation Code: 2024-0079109 for Lea County (USFWS 2024b). No federally listed fish species were found to have potential to be present on the nominated lease parcels (see AIB-8). Based on the understanding that water use for drilling and operations would be properly permitted from existing legal sources (i.e., no new water depletions), no federally listed fish species would be impacted by future potential development of the lease parcels. Therefore, outside of the programmatic consultation, no further consultation with the USFWS is required at this stage for these species. BLM would initiate Section 7 consultation with the USFWS in compliance

with the ESA for species not previously analyzed in the 1997 RMP Biological Assessment (BLM 1997a, 1997b) if during site selection federally listed species are found to have a potential to be present or effected during lease development. If during site selection federally listed species are found to have a potential to be affected during lease development, the BLM would initiate Section 7 consultation with the USFWS in compliance with the ESA.

While federal regulation and policies require the BLM to make its public land and resources available on the basis of the principle of multiple uses, it is BLM policy to conserve special status species and their habitats, and to ensure that actions authorized by the BLM do not contribute to the need for the species to become listed as threatened or endangered by the USFWS. Official species lists, whether obtained via IPaC or local USFWS offices, are valid for 90 days. After 90 days, project proponents should confirm their results on IPaC by requesting an updated official species list for their project.

The BLM continues to review the available climate science in connection with its statutory responsibilities, including under NEPA, and has found that despite advances in climate science, global climate models are unable to forecast local or regional effects on resources as a result of specific emissions (IPCC 2013). Any contribution to global climate processes from the issuance of leases is simply too remote, speculative, and undetectable to trigger ESA Section 7 consultation, given accumulated and persisting GHGs already in the atmosphere, the annual volume of GHG emissions that will occur globally regardless of additional lease issuance, and projected climate trends. See, for example, the BLM Specialist Report (finding that, “[u]nlike other common air pollutants, the ecological impacts that are attributable to the GHGs are not the result of localized or even regional emissions but are entirely dependent on the collective behavior and emissions of the world’s societies”; and noting “the lack of climate analysis tools and techniques that lend themselves to describing the physical climate or earth system responses, such as changes to sea level, average surface temperatures, or regional precipitation rates, that could be attributable to emissions associated with any single [land management] action or decision” [BLM 2023a:16, 85]); see also USFWS, Threatened Species Status for Emperor Penguin With Section 4(d) Rule, Federal Register 87:64,700, 64,704 (October 26, 2022) (“based on the best scientific data available we are unable to draw a causal link between the effects of specific GHG emissions and take of the emperor penguin in order to promulgate more specific regulations under [ESA Section] 4(d)”).

4.2 TRIBAL CONSULTATION

Tribal consultation for the leasing actions is done on a government-to-government basis. The CFO initiated government-to-government consultation for the Quarter 1 2025 Competitive Oil and Gas Lease Sale under NEPA and NHPA on May 8, 2024, with letters mailed to the Apache Tribe of Oklahoma, Comanche Nation, Hopi Tribe, Kiowa Tribe of Oklahoma, Mescalero Apache Tribe, Pueblo of Isleta, and Ysleta del Sur Pueblo.

Tribal consultation is ongoing, and the BLM CFO will remain available to engage with tribes and pueblos and respond to any consultation requests. If the nominated parcels are leased, future potential development would go through separate NEPA and NHPA processes as directed by regulation and current policy.

4.3 STATE HISTORIC PRESERVATION OFFICE AND TRIBAL HISTORIC PRESERVATION OFFICE CONSULTATION

Section 106 of the NHPA and its implementing regulations in 36 C.F.R. § 800 require federal agencies to consider what effect their licensing, permitting, funding, or otherwise authorizing an undertaking, such as an APD or right-of-way, may have on properties listed in or eligible for listing in the NRHP.

The regulation at 36 C.F.R. § 800.16 gives specific definitions for key cultural resource management concepts such as undertakings, effects, and areas of potential effects.

The New Mexico BLM has a two-party agreement with the SHPO that implements an authorized alternative to 36 C.F.R. § 800 for most undertakings (BLM and SHPO 2014). This agreement, called the State Protocol, offers a streamlined process for reporting and review that expedites consultation with the SHPO. However, certain circumstances, including intense public controversy over an undertaking, may result in the SHPO or BLM requiring use of the standard Section 106 consultation procedures outlined in 36 C.F.R. § 800 rather than the State Protocol.

The State Protocol details how the New Mexico BLM and SHPO consult and regulate their relationship. The State Protocol also addresses the necessity of case-by-case SHPO consultation for specific undertakings, the procedures for evaluating the effects of common types of undertakings, and resolution of significant adverse effects on cultural and historic properties. These common types of undertakings regularly include actions undertaken by the BLM.

The BLM CFO cultural heritage resources specialists determined that there would be *no adverse effect* on historic properties as a result of the undertaking. The use of State Protocol Appendix C.I.a¹³ for this undertaking is appropriate because the lease sale itself does not directly authorize surface disturbance. Rather, leaseholders are granted future right of development to the leased mineral estate that is subject to site-specific analysis under NEPA and Section 106 of the NHPA at the stage of lease development. Such lease development activities are considered undertakings separate from the lease sale. These undertakings would be subject to additional detailed analysis under NEPA and Section 106. Any significant adverse effects identified for development of the lease parcels would be subject to mitigation or avoidance, as appropriate.

The BLM PDO also entered the PBPA as an option for compliance with Section 106 of the NHPA for energy-related projects in the PBPA project area. Of the seven parcels, three are located within the PBPA (parcels 0465, 0466, and 6846) and development on these parcels could comply with the provisions of the PBPA. The remaining four parcels are located outside of the PBPA. See the Programmatic Agreement fact sheet for further information (BLM 2019). The CFO sent a letter notifying the SHPO of their intent to use the State Protocol Appendix C.I.a. and/or the PBPA on May 8, 2024. Consultation is considered ongoing. Please refer to Section 4.2 for information regarding tribal consultation.

CHAPTER 5. LIST OF PREPARERS

Table 5.1 contains a list of individuals that contributed to preparation of this EA.

Table 5.1. List of EA Preparers

Name	Area of Expertise	Organization
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Hebin Lin	Economist	BLM NMSO
Phil Gensler	Paleontologist	BLM NMSO

¹³ Appendix C.I.a of the State Protocol applies to actions involving the issuance of leases, easements, rights-of-way, permits (excluding grazing permit), or other authorizations or approvals that do not authorize surface disturbance.

Name	Area of Expertise	Organization
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Brandon Gonia	Archaeologist	BLM CFO
Cassandra Brooks	Wildlife Biologist	BLM CFO
Ellen Trautner	Cave Specialist	BLM CFO
James Rutley	Solid Minerals Geologist (Potash)	BLM CFO
Matias Telles	Supervisory Natural Resource Specialist	BLM CFO
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CHAPTER 6. LITERATURE CITED

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APPENDIX A. MAPS

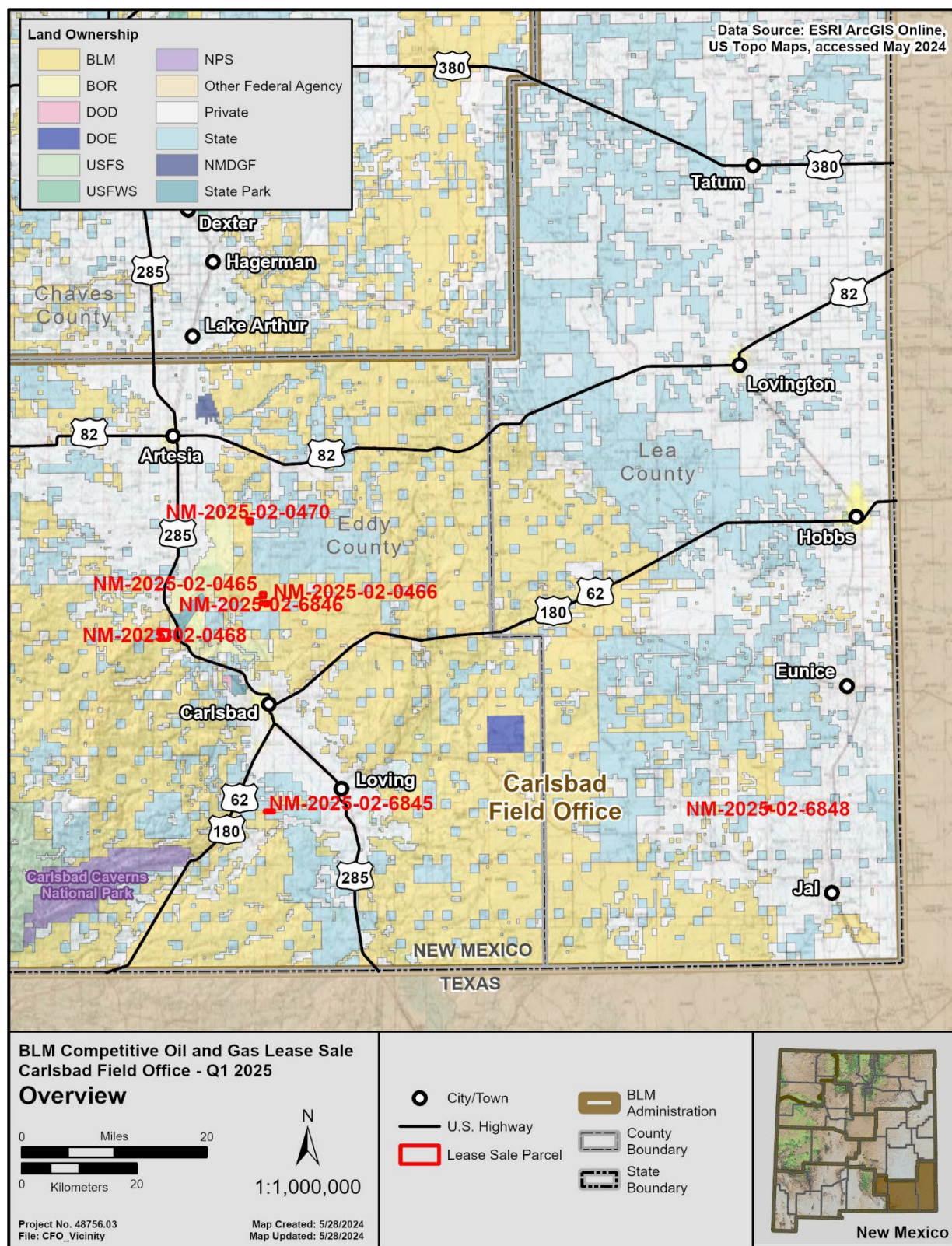


Figure A.1. Location of the nominated lease parcels analyzed within this EA, within the BLM CFO

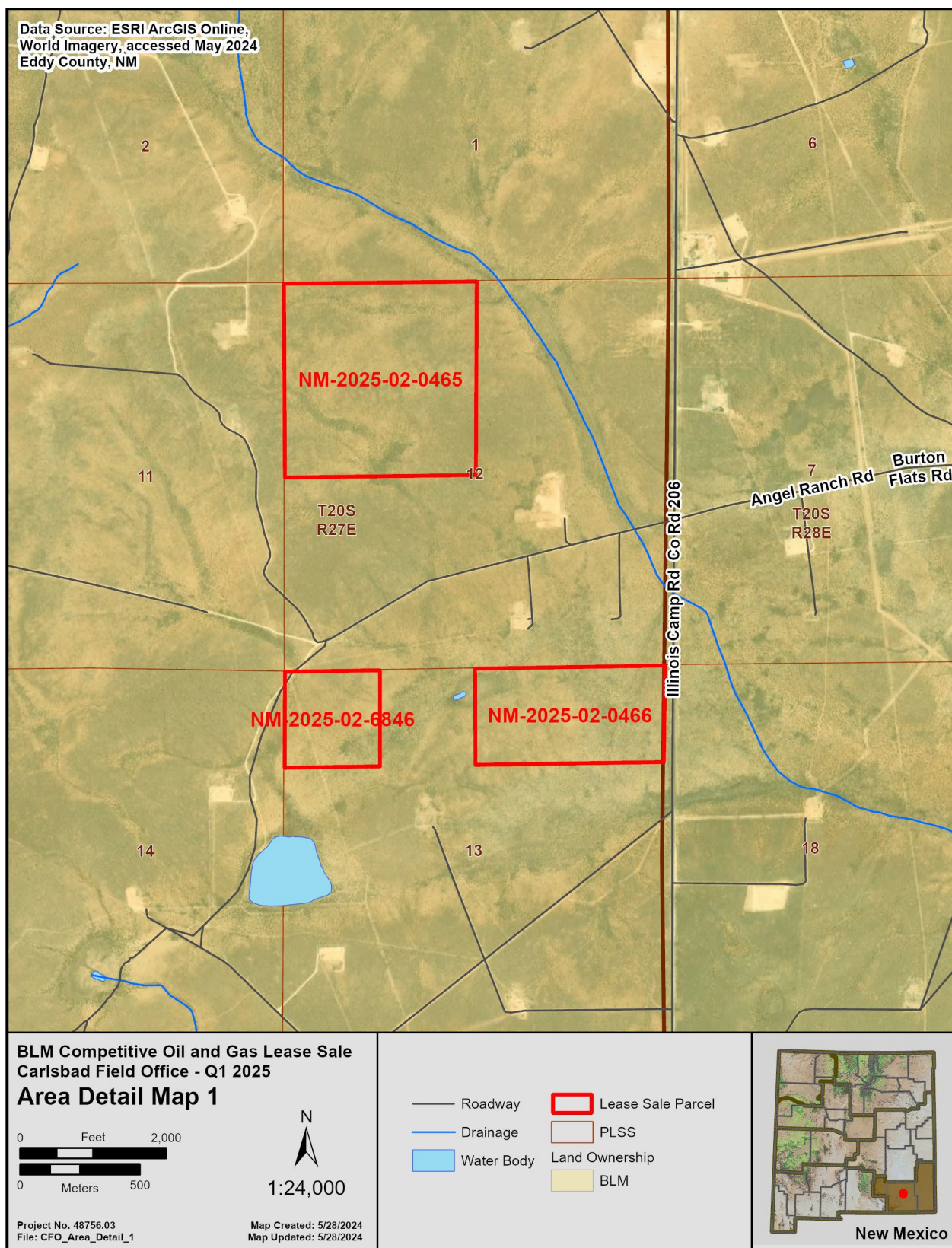


Figure A.2. Detailed map of nominated lease parcels 465, 466, and 6846 analyzed in this EA, within Eddy County and the BLM CFO.

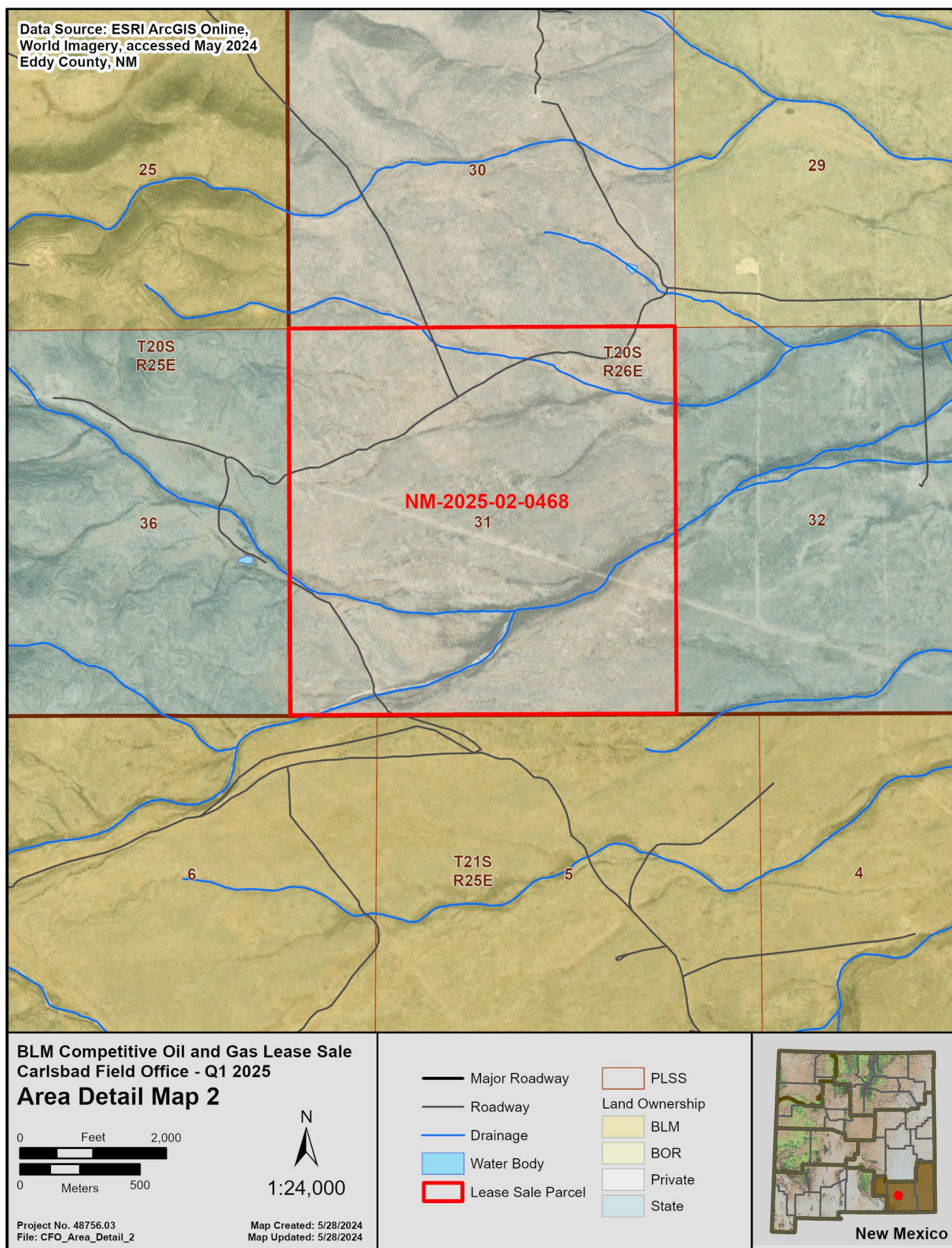


Figure A.3. Detailed map of nominated lease parcel 468 analyzed in this EA, within Eddy County and the BLM CFO.

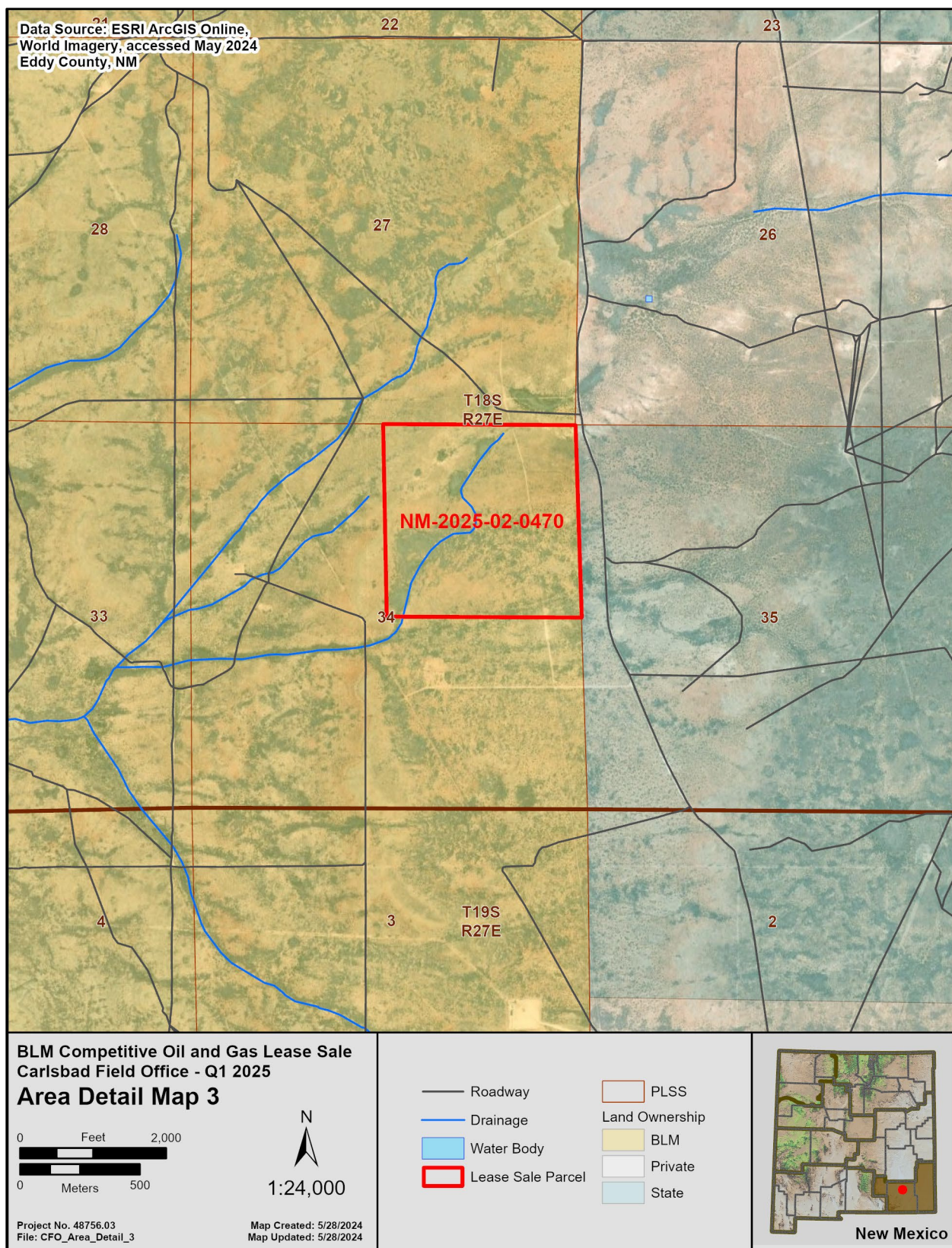


Figure A.4. Detailed map of nominated lease parcel 470 analyzed in this EA, within Eddy County and the BLM CFO.

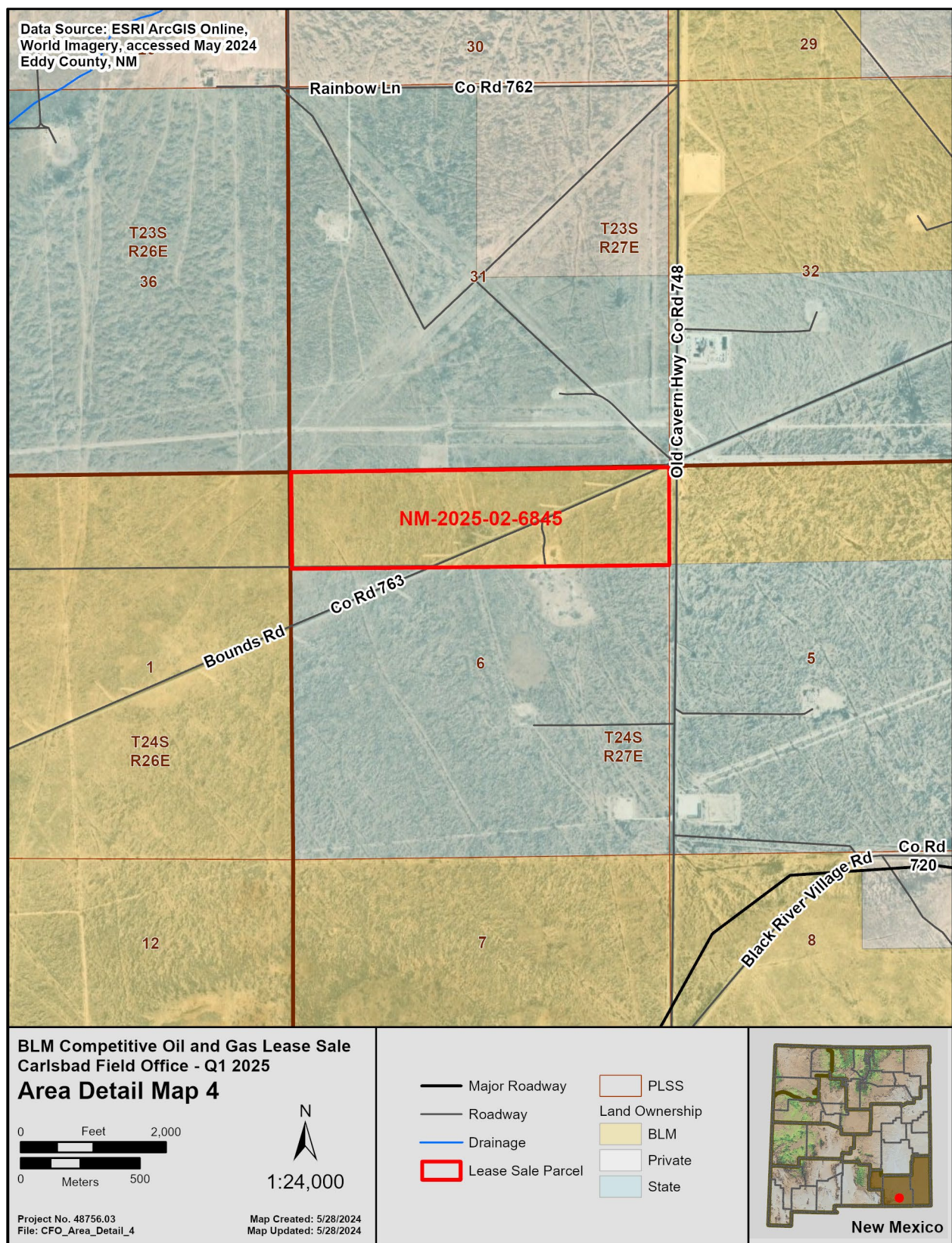


Figure A.5. Detailed map of nominated lease parcel 6845 analyzed in this EA, within Eddy County and the BLM CFO.

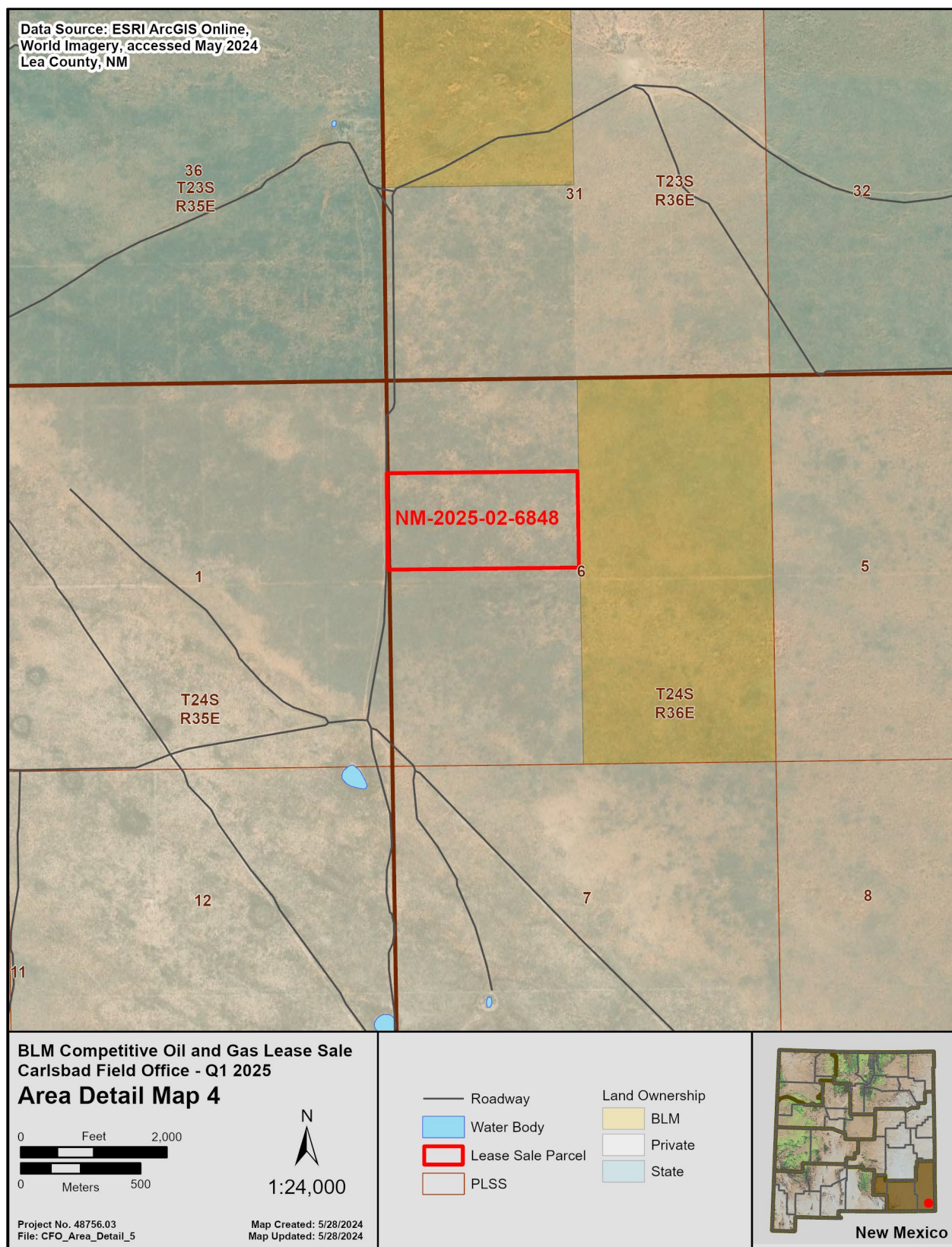


Figure A.6. Detailed map of nominated lease parcel 6848 analyzed in this EA, within Lea County and the BLM CFO.

APPENDIX B. CARLSBAD FIELD OFFICE LEASE STIPULATION AND LEASE NOTICE SUMMARY

Table B.1. Lease Stipulations and Lease Notices

Stipulation	Description/Purpose*
HQ-CR-1	CULTURAL RESOURCES AND TRIBAL CONSULTATION 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, Executive Order 13007, or other statutes and executive orders. The Bureau of Land Management (BLM) will not approve any ground-disturbing activities that may affect any such properties or resources until it completes its obligations (e.g., State Historic Preservation Officer [SHPO] and tribal consultation) 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-MLA-1	LEASE NOTICE- 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 United States Code (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 that is not producing coal in commercial quantities from each such lease cannot qualify for the issuance of any other lease granted under the MLA. 43 Code of Federal Regulations (C.F.R.) § 3472 explains coal lessee compliance with Section 2(a)(2)(A). 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; 2) the initial lessee as assignor or as transferor is no longer in compliance with Section 2(a)(2)(A); or 3) 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 because of noncompliance with Section 2(a)(2)(A). The lease case file, as well as in other BLM records available through the state office issuing this lease, contains information regarding assignor or transferor compliance with Section 2(a)(2)(A).
HQ-TES-1	ENDANGERED SPECIES ACT SECTION 7 CONSULTATION 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 will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove 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. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended (16 U.S.C. § 1531 <i>et seq.</i>), including completion of any required procedure for conference or consultation.
NM-1-LN	LEASE NOTICE – SPECIAL STATUS PLANT SPECIES The lease contains potential, suitable, and/or occupied habitat for special status plant species; therefore, special status plant species clearance surveys may be required prior to approving any surface-disturbing activities within or adjacent to BLM Special Status Plant Species' potential, suitable, and occupied habitats. Based on the results of the survey, COAs may be applied to land use authorizations and permits that fall within the area of direct/indirect impacts or affected habitat, as appropriate. Possible mitigation strategies may include, but are not limited to, avoidance/restriction of development, minimizing the area of disturbance, dust abatement measures, deterrents to reduce human disturbance, construction outside of the blooming season, specialized reclamation procedures, long-term monitoring of impacts, general oversight by qualified and independent third-party contractors, nonnative or invasive species monitoring and control in occupied and suitable habitat, or any other on-site habitat protection or improvements.

Stipulation	Description/Purpose*
NM-11-LN	LEASE NOTICE – SPECIAL CULTURAL RESOURCE All development activities proposed under the authority of this lease are subject to compliance with Section 106 of the NHPA and Executive Order 13007. The lease area may contain historic properties, traditional cultural properties (TCPs), and/or sacred sites currently unknown to the BLM that were not identified in the Resource Management Plan or during the lease parcel review process. Depending on the nature of the lease developments being proposed and the cultural resources potentially affected, compliance with Section 106 of the NHPA and Executive Order 13007 could require intensive cultural resource inventories, Native American consultation, and mitigation measures to avoid adverse effects—the costs for which will be borne by the lessee. The BLM may require modifications to or disapprove proposed activities that are likely to adversely affect TCPs or sacred sites for which no mitigation measures are possible. This could result in extended time frames for processing authorizations for development activities, as well as changes in the ways in which developments are implemented.
NM-13-CSU	CONTROLLED SURFACE USE STIPULATION – PROTECTION OF PALEONTOLOGICAL RESOURCES All development in this lease will be subject to compliance with the Paleontological Resources Preservation Act (PRPA), the National Environmental Policy Act (NEPA), and the Federal Land Policy and Management Act of 1976 (FLPMA). Surface occupancy or use is subject to the following special operating constraint: motorized vehicle use associated with lease operations are restricted to approved roads. Prior to approved operations, any vehicle use necessary for well staking and surveys should be constrained to existing roads and trails when possible; a pedestrian survey must be conducted for paleontological material, using a qualified permitted paleontologist determined by the BLM as part of the permit application for the proposed lease activity in geologic units that are classified on the BLM's Potential Fossil Yield Classification (PFYC) scale as a PFYC U- Unknown, 4, or 5. A survey is also required in areas that are known to contain fossil localities. The survey and report will be used to determine the presence of paleontological material exposed on the surface, and if necessary, the appropriate mitigation of ground-disturbing activities such as monitoring, avoidance, project redesign, data recovery, stabilization, protective barriers and/or signs; and/or the lessee shall immediately notify the BLM AO of any paleontological resources discovered as a result of approved surface-disturbing operations. The lessee shall suspend all activities in the vicinity of such discovery until notified to proceed by the AO and shall protect the discovery from damage or looting. The AO will evaluate, or will have evaluated, such discoveries after being notified and determine, after consulting with the operator and the BLM Regional Paleontologist, the appropriate measures to mitigate adverse effects on significant paleontological resources. Upon approval of the AO, the operator will be allowed to continue construction through the site or will be given the choice of either following the AO's instructions for stabilizing the fossil resource in place and avoiding further disturbance to the fossil resource, or following the AO's instructions for mitigating impacts to the fossil resource prior to continuing construction through the project area. The lessee is responsible for any cost associated for mitigating paleontological resources discovered as a result of their activities.
NM-14-LN	LEASE NOTICE – PALEONTOLOGICAL RESOURCES All development in this lease will be subject to compliance with the PRPA, NEPA, and FLPMA. The lessee shall immediately notify the BLM AO of any paleontological resources discovered as a result of approved surface disturbing operations. The lessee shall suspend all activities in the vicinity of such discovery until notified to proceed by the AO and shall protect the discovery from damage or looting. The AO will evaluate, or will have evaluated, such discoveries after being notified and determine after consulting with the operator and the BLM Regional Paleontologist, the appropriate measures to mitigate adverse effects on significant paleontological resources. Upon approval of the AO, the operator will be allowed to continue construction through the site, or will be given the choice of either following the AO's instructions for stabilizing the fossil resource in place and avoiding further disturbance to the fossil resource, or following the AO's instructions for mitigating impacts on the fossil resource prior to continuing construction through the project area. The lessee is responsible for any cost associated for mitigating paleontology resources discovered as a result of their activities. In addition, surface occupancy or use may be subject to, but not limited to, the special operating constraints:
SENM-LN-1	LEASE NOTICE – POTENTIAL CAVE OR KARST OCCURRENCE AREA All or a portion of the lease is in a potential cave or karst occurrence area. Because of the sensitive nature of the cave or karst systems of this area, special protective measures may be developed during environmental analyses and be required as part of approvals for drilling or other operations on this lease. These measures could include changes in drilling operations; special casing and cementing programs; modifications in surface activities; or other reasonable measures to mitigate impacts on cave or karst values.
SENM-S-17-CSU	CONTROLLED SURFACE USE – PROTECTION OF SLOPES OR FRAGILE SOILS Surface disturbance will not be allowed on slopes over 30 percent. Occupancy or use of fragile soils will be considered on a case-by-case basis.
SENM-S-18-CSU	CONTROLLED SURFACE USE – PROTECTION OF STREAMS, RIVERS, FLOODPLAINS Surface disturbance will not be allowed within up to 200 meters of the outer edge of 100-year floodplains, to protect the integrity of those floodplains.
SENM-S-19-CSU	CONTROLLED SURFACE USE – PROTECTION OF PLAYAS AND ALKALI LAKES Surface disturbance will not be allowed within up to 200 meters from the edge of playas or alkali lakes.

Stipulation	Description/Purpose*
SENM-S-20-CSU	CONTROLLED SURFACE USE STIPULATION – PROTECTION OF SPRINGS, SEEPS, AND TANKS Surface disturbance will not be allowed within up to 200 meters of the source of a spring or seep, or within downstream riparian areas created by flows from the source or resulting from riparian area management. Surface disturbance will not be allowed within up to 200 meters of earthen tanks or the adjacent riparian areas created as a result of the presence of the tanks. Exceptions to this requirement will be considered for the installation of habitat or rangeland projects designed to enhance the spring or seep, or downstream flows.
SENM-S-21-CSU	CONTROLLED SURFACE USE – PROTECTION OF CAVES AND KARSTS Surface disturbance will not be allowed within up to 200 meters of known cave entrances, passages, or aspects of significant caves, or significant karst features.
SENM-S-22-CSU	CONTROLLED SURFACE USE – PROTECTION OF LESSER PRAIRIE-CHICKEN (LEPC) Drilling for oil and gas, and 3-D geophysical exploration operations will not be allowed in lesser prairie-chicken habitat during the period of March 1 through July 15, each year. During that period, other activities that produce noise or involve human activity, such as the maintenance of oil and gas facilities, geophysical exploration other than 3-D operations, and pipeline, road, and well pad construction, will be allowed except between 3:00 a.m. and 9:00 a.m. Additionally, no new drilling will be allowed within up to 200 meters of leks known at the time of permitting. Normal vehicle use on existing roads will not be restricted. Exhaust noise from pump jack engines must be muffled or otherwise controlled so as not to exceed 75 decibels measured at 30 feet from the source of the noise. Open-top tanks, disposal pits, or other open pits will be required to be covered with a fine mesh netting to make them inaccessible to avian species and other wildlife. A low-profile marker will be required for a plugged or abandoned well. The well marker must be approximately 2 inches above ground level.
SENM-S-25-CSU	CONTROLLED SURFACE USE – VISUAL RESOURCE MANAGEMENT Surface occupancy or use is subject to the following special operating constraints: Painting of oil field equipment and structures to minimize visual impacts is to be conducted according to the requirements of Notice to Lessees 87-1, New Mexico. Low profile facilities also may be required, when needed to reduce the contrast of a project with the dominant color, line, texture, and form of the surrounding landscape. Other surface facilities or equipment approved by the BLM, such as large-scale range improvements or pipelines, will be painted, when needed, to conform to the requirements of visual resource management to minimize visual impacts. Paint colors will be selected from the environmental color chart approved by the Rocky Mountain Coordinating Committee. The selected paint color will match as closely as possible the predominant soil or vegetation color of the area. Upon completion of the well and installation of the production facilities (if the well is a producer) the pad will be reclaimed back to a size necessary for production operations only. The edges will be re-contoured and the extra caliche and pad material (excluding topsoil) will be hauled off-site. The BLM may require additional reclamation depending upon vegetation recovery. The reclaimed area will be re-contoured and reseeded according to vegetation and soil type.
SENM-S-27-CSU	PLAN OF DEVELOPMENT (POD) STIPULATION A “plan of development” (POD) for the entire lease must be submitted for review and approval, including NEPA analysis, by the BLM, with concurrence from Bureau of Reclamation, New Mexico Department of Game and Fish, U.S. Fish & Wildlife Service (USFWS), and New Mexico State Parks, as appropriate, prior to approval of development (Sundry Notices) actions. The POD must indicate planned access to well facilities (roads, pipelines, power lines), and the approximate location of well sites. Should it become necessary to amend the POD, the amendment must be approved prior to approval of subsequent development actions. Deviations from a current POD are not authorized until an amended POD has been approved by the BLM.

* Stipulation descriptions are summarized for brevity. The full text of all stipulations, including all modifications, waiver, and exceptions, can be found in the Carlsbad Approved RMP (BLM 1988), as amended (BLM 1997a, 2008a).

APPENDIX C. LEASING PREFERENCE RATINGS FOR NOMINATED LEASE PARCELS

In accordance with 43 C.F.R. § 3120.31, *Expression of interest process*, the BLM has evaluated the nominated lease parcels against five criteria to determine each parcel's leasing preference (Table C.1). The parcels nominated are rated as low preference based on one or more criteria. The IM states that if no high-preference parcels are available for the sale, the office will select one or more low-preference parcels that present the least number of conflicts based on the criteria listed. Given the low resource concerns with these parcels and protections offered through stipulations and COAs, the BLM is moving them forward for leasing, furthering the intent of Section 50265 of the IRA, which states that the BLM may not issue a right-of-way for wind or solar energy development on federal land unless it has: 1) held an onshore oil and gas lease sale during the past 120 days, and 2) offered the lesser of a "sum total" of either 2,000,000 acres or 50% of the acreage for which EOIs have been submitted for lease sales during the previous 1-year period.

Table C.1. Leasing Preference Ratings for Nominated Lease Parcels

Leasing Preference Rating Based on the Following Criteria								
Parcel Information		Preference Criteria					Preference for Leasing [#]	
Office	Parcel	1 Proximity to Existing Development*	2 Habitat [†]	3 Cultural Resources [‡]	4 Recreation/ Other Resources [§]	5 High Potential	High	Low
CFO	NM-2025-02-0465	High	Low	Low	Low	High		X
CFO	NM-2025-02-0466	High	Low	High	Low	High		X
CFO	NM-2025-02-0468	Low	Low	Low	Low	Low		X
CFO	NM-2025-02-0470	Low	Low	Low	Low	High		X
CFO	NM-2025-02-6845	High	Low	High	Low	High		X
CFO	NM-2025-02-6846	High	Low	High	Low	High		X
CFO	NM-2025-02-6848	High	Low	High	High	High		X

*Determinations in this column are made by reviewing aerial imagery for signs of existing oil and gas development within 5 miles of the parcel boundaries.

[†]Low determinations in this column were made if the parcels are within known or potentially suitable habitat for BLM sensitive species and/or ESA species, or if the parcels contain dunes, wetland, water, playa, or alkali lake features which provide unique wildlife habitat.

[‡]Low determinations in this column would indicate the presence of known cultural resources within the parcel, such as historic properties, sacred sites, and other high value cultural resources. Three of the nominated lease sale parcels contain known archaeological sites (see AIB-19). The nominated lease parcels assessed within this EA have been assigned the National HQ-CR-1 Lease Stipulation, which requires additional cultural resources analyses pursuant to Section 106 of the NHPA, to include identification, effects assessment, consultation, and if necessary, resolution of adverse effects, prior to the authorization of any ground-disturbing activities associated with the oil and gas lease. Additionally, the nominated lease parcels assessed within this EA have also been assigned Lease Notice NM-11-LN, which requires compliance with Section 106 of the NHPA and Executive Order 13007 (see Appendix B). Because of the protections offered through stipulations and COAs, the BLM proposes moving parcels forward for leasing.

[§] Low determinations in this column indicate the presence of recreation or other important uses or resources which are incompatible with oil and gas development. Of the seven nominated lease sale parcels, six received low determinations due to the presence of surface water features and/or cave and karst features. The BLM proposes moving these parcels forward for leasing because of the protections offered through stipulations and COAs. See Appendix B for full descriptions of stipulations.

^{||} Determinations in this column are made using the RFD scenario and consider site-specific changes that may have occurred since the RMP was signed. Parcels located within areas mapped as "Moderate" potential for oil and gas development in the RFD were assigned high potential for the purpose of this rating exercise.

[#]If a parcel receives a low preference value for any single criterion, it will receive an overall low preference value regardless of the other criteria. If none of the criterion result in a low preference value, then the parcel would receive a high preference value for leasing. Other considerations that would warrant a different preference value can also be used but should be justified in the evaluation sheet.

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,¹⁴ and perforating the casing in target zones. If a well is going to be drilled directionally,¹⁵ horizontally,¹⁶ or vertically¹⁷ 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

¹⁴ According to BLM regulations from 43 C.F.R. § 3172, 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 that 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.

¹⁵ 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).

¹⁶ 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).

¹⁷ 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 from 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 pit¹⁸ 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.

¹⁸ 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 (U.S. Fish and Wildlife Service 2009).

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. 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. The 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 (estimates of water usage for hydraulic fracturing are provided in the BLM New Mexico Water Support Document [BLM 2023]). 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 most 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 the 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. Testing is required prior to disposal of pipes, tanks, and pipe deposits according to Section 19.15.35.8 of the New Mexico Administrative Code (NMAC). Radiation levels used to define “regulated NORM” in oil field soils, equipment, sludges, or other materials related to oil field operations or processes are defined at 20.3.14.1403 NMAC. Disposal of NORM (including in produced water) is regulated per 19.15.35.9 through 19.15.35.14 NMAC and the New Mexico environmental improvement board rule, 20.3.14 NMAC. Per 20.3.14.1403 NMAC, produced water is exempt from the requirements of these regulations if it is reinjected into a Class I or Class II Underground Injection Control (UIC) well permitted by the New Mexico Oil Conservation Division (NMOCD) and/or stored or disposed of in a double, synthetically lined surface impoundment permitted by the NMOCD.

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 roads, and other facilities require 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 roads 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 according to 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, 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 nonhazardous 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	

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APPENDIX E. BUREAU OF LAND MANAGEMENT SUMMARY OF CUMULATIVE OIL AND GAS HAZARDOUS AIR POLLUTANT ANALYSIS FOR THE PECOS DISTRICT OFFICE

1.0 INTRODUCTION

The National Environmental Policy Act (NEPA), 42 United States Code (U.S.C.) Chapter 55, requires federal agencies to consider the environmental impacts of its actions as a way to help “attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences.” 42 U.S.C. § 4331. *See also* 42 U.S.C. § 4321 (statement of Congressional purpose); 42 U.S.C. § 4336e (defining “major federal actions” to which the law applies). The U.S. Court of Appeals for the Tenth Circuit has recognized that NEPA “requires agencies to consider the environmental impact of their actions as part of the decision-making process and to inform the public about these impacts.” *Diné Citizens Against Ruining Our Env't v. Haaland*, 59 F.4th 1016, 1025 (10th Cir. 2023) (“*Diné CARE II*”), citing *Citizens' Comm. to Save Our Canyons v. U.S. Forest Serv.*, 297 F.3d 1012, 1021 (10th Cir. 2002). Pursuant to NEPA, the BLM conducts environmental reviews at all stages of its processes leading to the extraction of oil and gas from BLM lands. In *Diné CARE II*, the U.S. Court of Appeals for the Tenth Circuit held that BLM’s NEPA analysis was insufficient in relevant part because the analysis “did not account for the cumulative impact to [Hazardous Air Pollutant (HAP)] emissions from the wells. While BLM considered the cumulative impacts of the criteria pollutants from the approximately 3,000 wells, it did not include any analysis of the anticipated HAP emissions from the construction of those wells over a period of years.” *Diné CARE II*, 59 F.4th at 1047.¹⁹

This paper summarizes the actions the BLM has undertaken to address the court’s holding in regard to analysis of cumulative HAP emissions and the associated effects on public health from oil and gas leasing and development. Section 2 describes the broad-scale implications of the ruling for BLM oil and gas leasing and development decisions, and the cumulative oil and gas HAPs analysis approach implemented to address the ruling and BLM’s obligations under NEPA. Section 3 focuses on the results of the analysis as it pertains to Applications for Permit Drill (APDs) in the BLM New Mexico’s Pecos District Office.

2.0 CUMULATIVE HAPS ANALYSIS

The Tenth Circuit Court holding highlighted the need for BLM to take immediate action to develop a cumulative oil and gas HAPs analysis. In formulating a methodology to address the Tenth Circuit concerns, the BLM had an existing blueprint for assessing air quality-related impacts at a regional scale, the recently completed 2032 BLM Regional Air Modeling Study (Ramboll 2023a). This study, which modeled CAP concentrations across western states with significant oil and gas development (Figure A-1), is being used to provide the hard look at impacts on air quality and air quality related values from BLM-authorized oil and gas decisions in the western United States. Employing a similar approach, the BLM contracted for a regional modeling study over the same area to assess HAP emissions from BLM-authorized oil and gas development activities (Ramboll 2023b). The model output allows the BLM to compare concentrations of HAPs to calculated risk-based thresholds in order to provide the hard look at the effects on public health required by NEPA.

¹⁹ The federal Clean Air Act defines a Hazardous Air Pollutant as “any air pollutant” of which “emissions, ambient concentrations, bioaccumulation or deposition of the substance are known to cause or may reasonably be anticipated to cause adverse effects to human health or adverse environmental effect.” 42 U.S.C. § 7412.

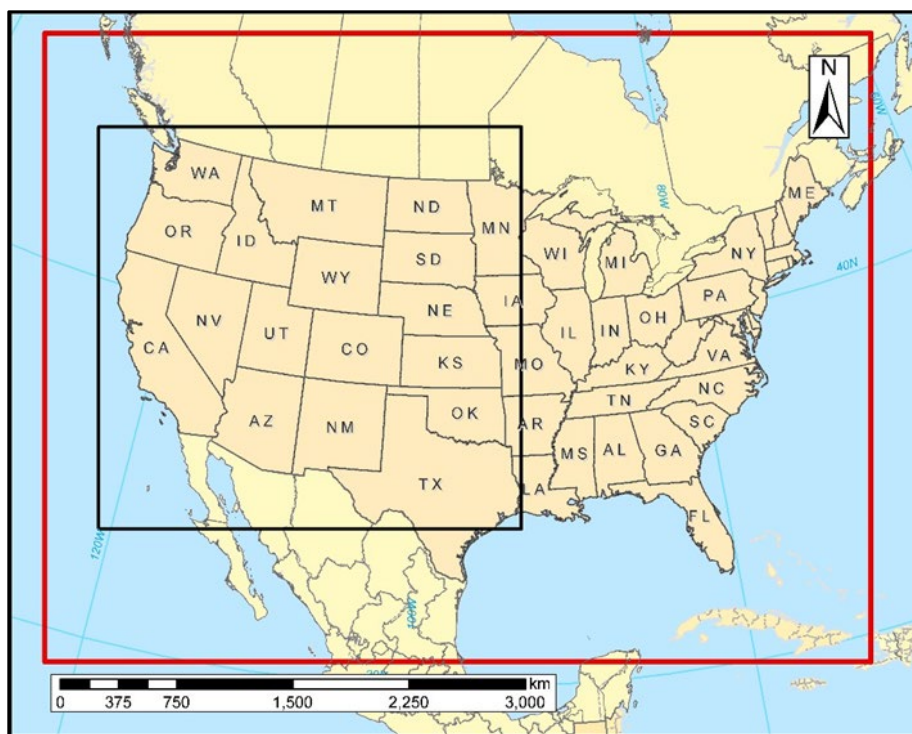


Figure F-1. 36-km resolution continental U.S. and 12-km resolution western U.S. modeling

2.1 CUMULATIVE OIL AND GAS HAPS ANALYSIS

2.1.1 Cumulative Oil and Gas HAPs Modeling Study

In designing the cumulative oil and gas HAPs modeling study (Ramboll 2023b), the BLM was able to rely on its experience related to air quality modeling of oil and gas development activities. As part of the design, the BLM took into consideration the thresholds to compare health impacts against, as directed by the *Diné CARE II* ruling.

In regard to which HAPs to consider in the analysis, the *Diné CARE II* Court specifically mentioned five HAPs—benzene, toluene, ethylbenzene, mixed xylenes, and n-hexane—as applying to oil and gas development activities based on the National Emission Standards for HAPs (NESHAPs; *see* 43 Code of Federal Regulations [C.F.R.] Part 63). For this study, the BLM chose to include six key HAPs—benzene, toluene, ethylbenzene, xylene, n-hexane, and formaldehyde—because these compounds are common in the oil and gas sector and consistent with regulatory requirements described in the Environmental Protection Agency’s (EPA’s) New Source Performance Standards, *see* 43 C.F.R. § 60, and NESHAPs.

Oil and gas emissions for the HAPs described above were compiled using the emission inventories developed for the 2032 BLM Regional Air Modeling Study (Ramboll 2023a); these emission inventories were derived using Annual Energy Outlook oil and gas production forecasts for 2032²⁰. Using these emission inventories reflected the best available information for projected oil and gas development on BLM-administered lands in the western United States. It also allowed for consistency of modeled sources with the BLM Regional Air Modeling Study (Ramboll 2023a) and enabled the BLM to rapidly deploy a

²⁰ This approach was used for all BLM field offices except Newcastle and North Dakota, for which new reasonably foreseeable development scenarios had been developed in support of ongoing RMP revision efforts.

solution for providing the cumulative oil and gas HAPs analysis required by the Tenth Circuit and to incorporate this analysis into current BLM resource management planning efforts, namely the North Dakota Resource Management Plan (RMP), which is nearing finalization and for which incorporation of this analysis was deemed critical.

The Bureau of Land Management defines cumulative impacts as the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Thus, the cumulative effects analysis includes both a geographic (spatial) and a temporal component.

Use of a photochemical grid model provided the spatial component of the analysis. Spatially, the study modeled projected HAP concentrations from existing and reasonably foreseeable new federal and non-federal oil and gas-related emission sources throughout the Western United States using a 12-kilometer modeling domain, the same domain as used in the BLM Regional Air Modeling Study. Use of a regional photochemical model also allows for simulation of potential transport of HAP emissions both within and between airsheds of basins where development of oil and gas is ongoing or forecasted. Within the modeling platform, emissions from point sources were mapped to their geographic coordinates, while emissions from nonpoint sources were allocated by federal and non-federal mineral designation based on spatial surrogates developed for the 2032 BLM Regional Air Modeling Study (Ramboll 2023a). This modeling domain allows the BLM to analyze the effects of projected HAP concentrations on public health across the western states, supporting future oil and gas-related decisions within the Pecos District Office and in field offices throughout the Western United States.

Temporally, the study estimated HAP emissions and modeled HAP concentrations from all existing and reasonably foreseeable federal and non-federal oil and gas-related development anticipated to occur through 2032²¹. Within the modeling platform, existing and reasonably foreseeable HAP emissions were distributed into months, days, and hours using temporal profiles and source/profile cross-references for the oil and gas sector from the EPA's emission modeling platform, an approach that aligns with the methodology EPA uses in its Air Toxics Screening Assessment (EPA 2022a). As described by that document, this approach is also consistent with EPA's Guidelines for Carcinogen Risk Assessment (EPA 2005a) and EPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (EPA 2005b).

2.1.2 Public Health Analysis

The cumulative HAPs modeling study provided modeled oil and gas concentrations of HAPs to compare against health-based risk thresholds. While the *Diné CARE II* ruling referenced only cancer risk, modeled annual concentrations of HAPs were compared to health risk thresholds²² to assess both cancer risk and non-cancer effects from inhalation of the modeled HAPs. Cancer risk was assessed by multiplying the annual modeled concentration of each carcinogenic pollutant by its cancer unit risk estimate found in EPA 2021 and summing the values to determine the long-term cumulative oil and gas individual cancer risk from inhalation of multiple substances.

Non-cancer health effects were assessed by calculating the hazard quotient for each HAP (annual modeled concentration divided by the reference concentration for chronic inhalation; EPA 2021) and

²¹ EPA's 2016v2 modeling platform (EPA 2022c), the most advanced dataset at the time of model development, includes emissions for the years 2016, 2023, 2026, and 2032. Future year 2032 was used in this modeling assessment.

²² Since the cumulative HAPs modeling for oil and gas development was performed, the Non-Carcinogenic Chronic Health-Based Threshold concentration for ethylbenzene was updated (see Table 2).

summing the hazard quotient of all six HAPs to determine the overall hazard index. HAP emissions and concentrations as well as associated cancer risk, hazard index, and hazard quotient values by modeling grid cell were used by the BLM to develop an interactive web-based tool²³ that the BLM can utilize in formulating analyses that provide a hard look at the effects on public health from oil and gas leasing and permitting decisions.

3.0 PECOS DISTRICT OFFICE CUMULATIVE OIL AND GAS HAPS ANALYSIS

This report provides a summary of modeling results and risk calculations for the grid cells comprising the geographic area corresponding to the Pecos District Office (Chaves, Curry, DeBaca, Eddy, Guadalupe, Lincoln, Lea, Quay, and Roosevelt Counties, which includes the New Mexico portion of the Permian Basin). This spatial scope of analysis was identified based on the regional nature of air pollution and to facilitate analysis using the best available air quality data, which are generally provided at the county level.

3.1 EMISSIONS INVENTORY DEVELOPMENT

To develop an estimate of HAP emissions in the Pecos District Office needed for the cumulative oil and gas HAPs analysis, oil and gas emissions for the six relevant HAPs were compiled using the emission inventories developed for the circa 2032 BLM Regional Air Modeling Study (Ramboll 2023a).

The emissions inventory for the Pecos District Office was based on Annual Energy Outlook oil and gas projections for the Permian Basin. These projections describe the reasonably foreseeable oil and gas development anticipated to occur within the Permian Basin projected out to 2032, providing the temporal component of the cumulative oil and gas analysis as described by the regulations. These projections reflect the best currently available information for projected oil and gas development in the Permian Basin (and thus the Pecos District Office).

Emissions of HAPs were distinguished as coming from federal or non-federal sources to allow the BLM to analyze the contribution of impacts from BLM-authorized activities as well as the impacts from cumulative (federal and non-federal) oil and gas activity. In addition, federal emissions were estimated separately for existing oil and gas activity (pre-2020) and new oil and gas activity (2020 to 2032). A description of the oil and gas-related sources included in the emissions inventory and the methodology for the emissions inventory can be found in Section 2.1 of the BLM Cumulative Hazardous Air Pollutants Modeling Final Report (Ramboll 2023b). As described in Section 2.1.1, above, point and nonpoint sources were spatially allocated within the modeling domain to model the concentration of HAPs that could be experienced by individuals within each 12-kilometer modeling grid.

3.2 CARCINOGENIC AND NON-CARCINOGENIC RISK CALCULATIONS

As described in Section 2.1.2, above, the cumulative oil and gas HAPs modeling study generated modeled concentrations of HAPs based on projected HAP emissions from federal and non-federal oil and gas activity. These concentrations were used to assess cancer risk and non-cancer health effects by comparing the HAP concentrations against health-based thresholds (EPA 2021). As described in Section 3.2 of the BLM Cumulative Hazardous Air Pollutants Modeling Final Report (Ramboll 2023b), inhalation exposure concentration (EC) was assumed to be the same as the modeled ambient air concentrations of HAPs,

²³ BLM Integrated Air Resource Tool, HAP Viewer, <https://www.blm.gov/content/iart/>.

providing a conservative estimate of risk because no adjustment was made for factors such as time spent indoors (which would result in lower exposure levels).

Risk characterization is a description of the nature and, often, magnitude of human risk, including resulting uncertainties. Risk characterization is accomplished by integrating information from the components of the risk assessment and synthesizing an overall conclusion about risk that is complete, informative, and useful for decision makers (EPA 2000). A “bright line” in risk characterization refers to a threshold value that separates acceptable and unacceptable levels of risk. It is regarded as a clear and unambiguous limit used to determine whether a particular level of exposure to a hazardous substance is safe or not.

Bright lines were not used in the analysis of the cumulative oil and gas HAPs results to determine if a particular risk level is acceptable or not, as no such construct for risk exists within the Clean Air Act framework akin to the national ambient air quality standards (that is, there are no national ambient air quality standards against which to compare modeled HAP concentrations). Rather, values or ranges of values published by EPA (e.g., AirToxScreen [National Air Toxics Assessment] or 40 C.F.R. § 300.430 [Remedial Investigation/Feasibility Study]) were used to provide useful context to risk estimates associated with the cumulative oil and gas HAPs study.

3.2.1 Carcinogenic Risk Calculations

Cancer inhalation risk was calculated for three of the six HAPs—benzene, ethylbenzene, and formaldehyde—by multiplying the annual modeled concentration by the cancer unit risk estimate shown in Table A-1. The other modeled HAPs—toluene, xylenes, and n-hexane—had a cancer risk estimate of zero, indicating that they do not have an associated cancer risk. Total cancer risk was estimated by summing the individual cancer risks for benzene, ethylbenzene, and formaldehyde. As described in the BLM Cumulative Hazardous Air Pollutants Modeling Final Report (Ramboll 2023b), while no explicit risk thresholds are available, EPA uses 1 in 1 million and 100 in 1 million risk for context (EPA 2022).

Table F-1. Cancer Unit Risk Estimates (EPA 2021)

HAP	Cancer Unit Risk Estimate (1/[mg/m ³])
Benzene	0.0000078
Toluene	0
Ethylbenzene	0.0000025
Xylenes	0
n-Hexane	0
Formaldehyde	0.000013

Note: mg/m³ = milligrams per cubic meter

The most conservative procedure for estimating carcinogenic risk is to assume constant exposure based on a 70-year lifetime exposure. However, it is a common and accepted risk assessment procedure to refine the assumed duration of exposure based upon geographic unit-specific sociological information. EPA exposure assessment guidance states that risk assessments may require adjusted air concentrations be used to represent continuous exposure (EPA 2024).

The adjusted air concentration may be estimated by the following equation:

$$Conc_{ADJ} = Conc_{AIR} \times ET \times \frac{1 \text{ day}}{24 \text{ hours}} \times EF \times \frac{ED}{AT}$$

Where:

$Conc_{ADJ}$ = adjusted concentration of contaminant in air (mg/m³ or micrograms per cubic meter [µg/m³])

$Conc_{AIR}$ = Concentration of contaminant in air (mg/m³ or µg/m³)

ET = Exposure time (hours/day)

EF = Exposure frequency (days/year)

ED = Exposure duration

(years) AT = Averaging
time (days)

Because cancer risk is based on a 70-year lifetime exposure, the BLM refined the cancer risk assessments in its interactive web-based tool to present both the upper range of risk based on a 70-year exposure and an adjusted risk based on the average household residency rates for each county in the modeling domain (Lin 2023). Time factors for exposure calculations (from the equation above) used in this study include: 1) exposure time (ET) is assumed to be 24 hours/day, and 2) exposure frequency (EF) (in days/year) is assumed to be 365 days/year. Mathematically, when using the time factors cited above, exposure duration reduces to county residency in years divided by 70 years to yield a simple ratio representing exposure duration (sometimes called the exposure adjustment factor) (AECOM 2017). Adjusted risk can be computed by multiplying the upper range of risk (represented by the assumption of constant exposure of an air concentration of a carcinogenic compound over the 70-year lifetime exposure) by the exposure adjustment factor.

Figure A-2 shows the average householder residency periods for New Mexico by county (see Lin 2023 for data sources). The residency factors for counties within the Pecos District Office are 14.9 years for Chaves, 12.6 years for Curry, 15.0 years for DeBaca, 15.0 years for Eddy, 18.9 years for Guadalupe, 14.0 years for Lea, 14.3 years for Lincoln, 15.6 years for Quay, and 14.1 years for Roosevelt Counties.

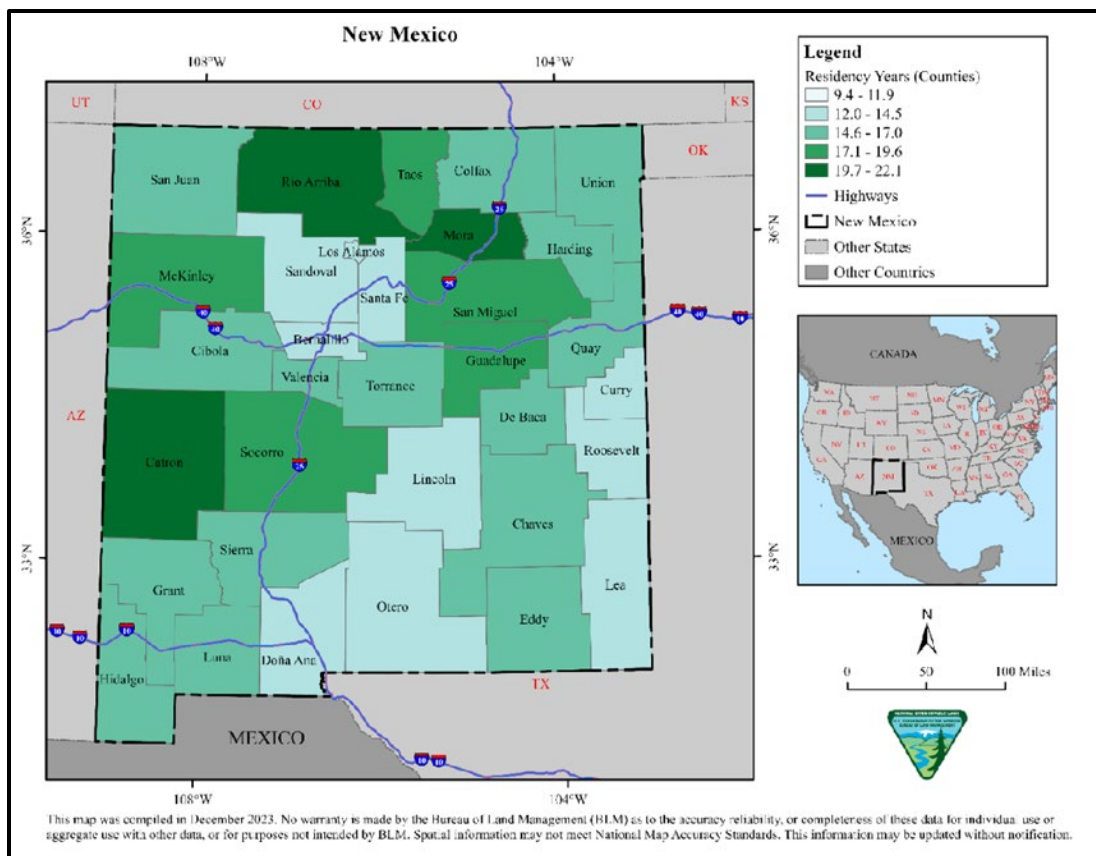


Figure F-2. Residency Periods in Years for Counties in New Mexico

3.2.2 Non-carcinogenic Risk Calculations

A reference concentration for chronic inhalation (RfC) is defined by EPA as the threshold to assess non-cancer health effects. RfC values for the HAPs included in this study are shown in Table A-2. Hazard quotients (HQ) were calculated for each HAP by dividing the modeled HAP concentration by its RfC. An HQ value of 1 or less signifies a low likelihood of noncancerous health issues resulting from exposure, while an HQ value exceeding 1 indicates that there is a potential for adverse effects but does not predict the statistical likelihood of them occurring.

Table F-2. Non-Carcinogenic Chronic Health-Based Threshold Concentrations (EPA 2021)

HAP	Non-Carcinogenic Health-Based Chronic Threshold Concentration (mg/m ³)
Benzene	0.03
Toluene	5.0
Ethylbenzene	0.3*
Xylenes	0.1
n-Hexane	0.7
Formaldehyde	0.0098

* The updated threshold for ethylbenzene is shown in EPA 2021 to be 0.26.

Chronic non-cancer hazards from multiple HAPs were assessed by summing individual HAP HQs to derive a hazard index (HI). An HI equal to or less than 1 suggests no expected non-cancer-related health issues from exposure. To demonstrate that a pollutant has a significant chronic hazard, it is necessary to establish that the chronic HI exceeds 1 and that at least 10,000 people are exposed to this pollutant.

3.3 SOURCES OF UNCERTAINTY IN HEALTH RISK ESTIMATION

3.3.1 Emissions Quantification and Spatial Allocation

The estimates of HAP emissions from projected oil and gas development were based on the best available information at the time of study development. Sources of uncertainty, which may either overestimate or underestimate HAP emissions that contribute to potential health risk, include: 1) uncertainty in the estimation of emissions, 2) uncertainty in the spatial allocation of emissions from sources that have not yet been developed, and 3) uncertainty in the timing of emission sources.

The emissions presented herein represent a snapshot of estimated emissions for circa 2032 based on the methodology described in Section 3.1. Actual rates of development over time may differ based on market conditions, changes in technology, or a variety of other factors that could result in a greater or lesser amount of oil and gas development than is represented here. Conversely, the emissions in this study may be inherently conservative for the estimated rate of development because emissions from wells are assumed to occur at a steady rate, while actual emissions would likely decline as production decreases over time.

It is important to note that in estimating and simulating the transport and fate of oil and gas emissions from sources not yet realized (i.e., future upstream and midstream sources of emissions associated with the projected increase in development represented by basin-specific reasonably foreseeable development numbers), exact locations of sources cannot be known. As noted in Ramboll 2023b, for future nonpoint oil and gas emissions that are allocated at the county level, spatial surrogates by mineral designation were utilized to spatially allocate emissions to 12-kilometer grid cells. The spatial surrogates were developed using the information provided by BLM as part of the 2032 BLM Regional Air Modeling Study (Ramboll 2023a). These surrogates were assigned to emissions sources based on source classification code²⁴. Thus, future year emissions are allocated spatially within a basin according to assumed relationships between upstream and midstream emission sources, which may or may not correspond to a specific location of any wellsite development at the APD stage. Lastly, the timing of well development within an area may differ from what has been modeled, resulting in differing emissions and resultant HAP concentrations.

3.3.2 Health Risk Estimation

The estimates of health risks are based on the current state of knowledge, and the cumulative oil and gas HAPs study followed well established practices for estimating emissions, simulating the transport and fate of these emissions, and estimating public health impacts. However, there is uncertainty associated with the processes of risk assessment.

Sources of uncertainty, which may either overestimate or underestimate risk, include: 1) extrapolation of toxicity data in animals to humans (e.g., in the estimation of the cancer unit risk factors), 2) uncertainty in the estimation of emissions (discussed above), 3) uncertainty in the air dispersion models, and 4) uncertainty in the exposure estimates.

²⁴ The EPA uses source classification codes (SCCs) to classify different types of activities that generate emissions. Each SCC represents a unique source category-specific process or function that emits air pollutants.

This uncertainty stems from the lack of data in many areas, which necessitates the use of assumptions. Such assumptions are consistent with current scientific knowledge and state-of-the-practice for both air modeling and risk assessment procedures but are often designed to be conservative on the side of health protection in order to avoid underestimation of public health risks. Examples include: 1) use of a simplifying assumption that a person will be exposed to the exact same air concentration of specific hazardous compounds each year for the assumed period of exposure (70 years or less), 2) estimated duration of exposure is either based upon the simplifying assumption of a person residing at the same location for 70 years or use of sociological information to derive average length of residency for geographic units (i.e., county, state, country), 3) simplified exposure duration calculations associated with this study do not take into account more refined exposure adjustments such as number of hours per day a person would be in their home as opposed to being away (e.g., being at a person's place of employment for specified period of hours per day) or the average number of days per year a person would be at their residence, and 4) the simulated air concentrations from this study represent outdoor concentrations air concentrations and do not account for outdoor/indoor air exchange rates, which would attenuate the concentration of a person indoors by a certain amount depending upon air exchange rates, thus this study assumes exposure to the full annual air concentration (dose).

In reality, annual concentrations of compounds will vary from year to year. When using more simple air quality models such as the American Meteorological Society (AMS)/EPA Regulatory Model (AERMOD) model, it is customary to use 5 years of airport meteorological data. Annual average air concentrations are calculated for each year of the 5-year meteorological record. Since risk assessment procedures are often designed to be conservative for protection of public health, choice of the maximum annual average over that 5-year period is deemed acceptable, and risk values are estimated from the maximum annual concentration. However, with this study or when considering EPA's AirToxScreen to help characterize inhalation risk, regional photochemical transport models are used. The complexity and resource-intensive nature of regional photochemical modeling, as compared to AERMOD, effectively prohibits exercise of such models for more than one or several calendar years. Thus, annual concentration from Comprehensive Air Quality Model with extensions (CAMx)/RTRAC used in this study may not be conservative due to the interannual variability of meteorological factors over a wide geographic region, which could result in differences in annual air concentrations from year to year.

3.3.3 Limits on Use of this Information

Due to the uncertainties described above, the risk estimates in this study should not be interpreted as actual rates of disease in the exposed population, but rather as estimates of potential risk, based on current knowledge and a number of assumptions. However, a consistent approach to risk assessment is useful to compare different sources and different substances to characterize potential public health issues that may result from emissions and transport of hazardous air pollutants resulting from oil and gas operations. Additionally, since locations and geographic distributions of emissions from emission sources yet to be developed within specific basins are not known in actuality, risk estimates should largely be used to characterize the range of conditions that could be realized (if full estimated oil and gas development were to occur) across an entire basin airshed as opposed to any specific location within that airshed.

3.4 PECOS DISTRICT OFFICE MODEL RESULTS

The cumulative oil and gas HAPs modeling study provides an assessment of the health effects of HAPs originating from cumulative oil and gas production. A photochemical model is used to estimate the cumulative ambient air concentrations of six HAPs (benzene, toluene, ethylbenzene, xylenes, n-hexane, and formaldehyde) resulting from emissions from federal and non-federal oil and gas sources. These six HAPs were selected by BLM for study because these compounds are common in the oil and gas sector

and consistent with regulatory requirements described in the EPA's New Source Performance Standards and NESHAPs.

The BLM's interactive web-based tool was used to extract anticipated emissions for the nine counties that represent the Pecos District Office. The web-based tool, or integrated air resources tool (iART), is a platform that hosts a collection of tools designed to facilitate screening-level assessments of land management projects with the potential to impact air resources. The results of the Western Regional HAPs modeling were incorporated into iART to help streamline the geospatial analysis of cumulative oil and gas HAPs that the BLM may be required to complete for future NEPA projects. As indicated by the data in Table A-3, total federal HAP emissions from oil and gas sources comprise approximately 50 percent of oil and gas HAP emissions in the nine-county planning area.

Table F-3. Circa 2032 Oil and Gas HAP Emissions in the Pecos District Office by County and Mineral Designation

	Hazardous Air Pollutants (tons/year)						
County	Benzene	Toluene	Ethylbenzene	Xylenes	n-Hexane	Formaldehyde	Total
Existing Federal							
Chaves	5.36	2.49	0.58	2.27	8.00	24.70	43.40
Curry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DeBaca	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eddy	103.00	50.60	10.80	40.90	163.00	595.00	963.30
Guadalupe	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lea	64.40	31.80	7.62	27.30	101.00	389.00	621.12
Lincoln	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Quay	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roosevelt	0.97	0.50	0.10	0.35	2.27	4.72	8.91
Total	173.73	85.39	19.10	70.82	274.27	1013.42	1636.73
New Federal							
Chaves	3.80	2.24	0.24	0.40	13.90	7.31	27.89
Curry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DeBaca	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eddy	40.50	16.30	3.92	15.20	46.20	206.00	328.12
Guadalupe	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lea	104.00	68.70	8.24	14.00	485.00	162.00	841.94
Lincoln	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Quay	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roosevelt	0.42	0.24	0.03	0.09	1.31	1.38	3.48
Total	148.72	87.48	12.43	29.69	546.41	376.69	1201.43
Total Federal (Existing plus New)							
Chaves	9.16	4.73	0.82	2.67	21.90	32.00	71.28
Curry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DeBaca	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Hazardous Air Pollutants (tons/year)						
County	Benzene	Toluene	Ethylbenzene	Xylenes	n-Hexane	Formaldehyde	Total
Eddy	143.00	67.00	14.80	56.10	209.00	801.00	1290.90
Guadalupe	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lea	169.00	100.00	15.90	41.30	586.00	552.00	1464.20
Lincoln	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Quay	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roosevelt	1.39	0.74	0.14	0.44	3.58	6.10	12.39
Total	322.55	172.47	31.66	100.51	820.48	1391.1	2838.77
Non-Federal							
Chaves	9.15	4.71	0.82	2.66	21.40	32.10	70.84
Curry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DeBaca	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eddy	159.00	81.80	14.90	49.70	346.00	747.00	1398.40
Guadalupe	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lea	76.10	32.90	8.11	28.80	80.10	456.00	682.01
Lincoln	0.16	0.06	0.02	0.06	0.04	2.45	2.79
Quay	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roosevelt	71.20	49.40	7.17	17.80	352.00	129.00	626.57
Total	315.61	168.87	31.02	99.02	799.54	1366.55	2780.61
Oil and Gas Total							
Chaves	18.30	9.44	1.64	5.33	43.30	64.20	142.21
Curry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DeBaca	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eddy	302.00	149.00	29.60	106.00	555.00	1550.00	2691.60
Guadalupe	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lea	245.00	133.00	24.00	70.10	667.00	1010.00	2149.10
Lincoln	0.16	0.06	0.02	0.06	0.04	2.45	2.79
Quay	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roosevelt	72.60	50.10	7.30	18.20	356.00	136.00	640.20
Total	638.06	341.60	62.56	199.69	1621.34	2762.65	5625.90

The BLM's interactive web-based tool was used to extract modeled HAP concentrations for the nine counties that represent the Pecos District Office (Table A-4). Concentrations are presented as a range to account for the range of concentrations modeled to occur across each county.

Table F-4. Circa 2032 Oil and Gas HAP Concentrations in the Pecos District Office by County and Mineral Designation

	Hazardous Air Pollutant Concentrations (µg/m ³)						
Source	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	Total HAPs
Chaves County							
Existing Federal	0.0004 to 0.0076	0.0001 to 0.0029	<0.0001 to 0.0007	<0.0001 to 0.0028	0.0006 to 0.0129	0.0116 to 0.145	0.0127 to 0.1719
New Federal	0.0003 to 0.0179	<0.0001 to 0.01	<0.0001 to 0.001	<0.0001 to 0.0014	0.0006 to 0.0781	0.0036 to 0.0678	0.0046 to 0.1761
Total Federal	0.0007 to 0.0248	0.0002 to 0.0125	<0.0001 to 0.0016	<0.0001 to 0.0042	0.0012 to 0.0856	0.0154 to 0.2107	0.0175 to 0.3393
Non-Federal	0.0005 to 0.0158	0.0002 to 0.0093	<0.0001 to 0.0009	<0.0001 to 0.0022	0.0011 to 0.0735	0.0117 to 0.206	0.0134 to 0.3077
Total Oil and Gas	0.0011 to 0.032	0.0004 to 0.0153	<0.0001 to 0.0022	0.0001 to 0.0059	0.0023 to 0.0988	0.0271 to 0.4167	0.031 to 0.5707
Curry County							
Existing Federal	0.0004 to 0.0006	0.0001 to 0.0002	Range is <0.0001	<0.0001 to 0.0001	0.0005 to 0.0008	0.0111 to 0.0177	0.0121 to 0.0194
New Federal	0.0006 to 0.001	0.0002 to 0.0004	Range is <0.0001	Range is <0.0001	0.0016 to 0.0029	0.0071 to 0.0094	0.0095 to 0.0137
Total Federal	0.001 to 0.0016	0.0003 to 0.0006	Range is <0.0001	<0.0001 to 0.0002	0.0021 to 0.0037	0.0182 to 0.0271	0.0216 to 0.0332
Non-Federal	0.0011 to 0.002	0.0004 to 0.0009	<0.0001 to 0.0001	0.0001 to 0.0003	0.0027 to 0.0064	0.0187 to 0.0293	0.023 to 0.0389
Total Oil and Gas	0.0021 to 0.0034	0.0007 to 0.0014	0.0001 to 0.0002	0.0002 to 0.0004	0.0048 to 0.0099	0.0369 to 0.0564	0.0448 to 0.0718
DeBaca County							
Existing Federal	0.0004 to 0.0011	0.0001 to 0.0004	Range is <0.0001	<0.0001 to 0.0003	0.0006 to 0.0014	0.0112 to 0.0279	0.0123 to 0.0311
New Federal	0.0004 to 0.0015	0.0001 to 0.0006	Range is <0.0001	<0.0001 to 0.0001	0.001 to 0.0045	0.0055 to 0.0128	0.007 to 0.0195
Total Federal	0.0008 to 0.0024	0.0002 to 0.0009	<0.0001 to 0.0002	<0.0001 to 0.0004	0.0016 to 0.0057	0.0167 to 0.0403	0.0193 to 0.0499
Non-Federal	0.0007 to 0.002	0.0002 to 0.0008	<0.0001 to 0.0001	<0.0001 to 0.0003	0.0014 to 0.0052	0.0138 to 0.0405	0.016 to 0.0488
Total Oil and Gas	0.0015 to 0.0043	0.0004 to 0.0017	<0.0001 to 0.0003	0.0001 to 0.0007	0.0029 to 0.0109	0.0305 to 0.0808	0.0355 to 0.0987
Eddy County							
Existing Federal	0.0004 to 0.0363	0.0001 to 0.0186	<0.0001 to 0.002	<0.0001 to 0.0084	0.0007 to 0.117	0.0121 to 0.375	0.0134 to 0.5573
New Federal	0.0004 to 0.0349	0.0001 to 0.0195	<0.0001 to 0.0019	<0.0001 to 0.0029	0.0007 to 0.152	0.0043 to 0.129	0.0054 to 0.3402
Total Federal	0.0008 to 0.0488	0.0003 to 0.0247	<0.0001 to 0.0033	<0.0001 to 0.0112	0.0014 to 0.1657	0.0164 to 0.421	0.0188 to 0.6746
Non-Federal	0.0006 to 0.0404	0.0002 to 0.0212	<0.0001 to 0.0028	<0.0001 to 0.0088	0.0012 to 0.158	0.0132 to 0.504	0.0152 to 0.7352
Total Oil and Gas	0.0013 to 0.065	0.0004 to 0.0293	<0.0001 to 0.0049	0.0002 to 0.0168	0.0026 to 0.1847	0.0296 to 0.851	0.0341 to 1.1517

	Hazardous Air Pollutant Concentrations (µg/m³)						
Source	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	Total HAPs
Guadalupe County							
Existing Federal	0.0003 to 0.0005	<0.0001 to 0.0001	Range is <0.0001	Range is <0.0001	0.0005 to 0.0007	0.0095 to 0.015	0.0103 to 0.0163
New Federal	0.0004 to 0.0006	0.0001 to 0.0002	Range is <0.0001	Range is <0.0001	0.0008 to 0.0015	0.0048 to 0.0077	0.0061 to 0.0101
Total Federal	0.0007 to 0.0011	0.0002 to 0.0004	Range is <0.0001	<0.0001 to 0.0001	0.0014 to 0.0022	0.0144 to 0.0227	0.0167 to 0.0266
Non-Federal	0.0006 to 0.001	0.0002 to 0.0003	Range is <0.0001	<0.0001 to 0.0001	0.0011 to 0.0022	0.0111 to 0.0213	0.0129 to 0.025
Total Oil and Gas	0.0013 to 0.0021	0.0003 to 0.0007	<0.0001 to 0.0001	0.0001 to 0.0002	0.0024 to 0.0044	0.0255 to 0.044	0.0297 to 0.0517
Lea County							
Existing Federal	0.001 to 0.0133	0.0004 to 0.0064	<0.0001 to 0.0012	0.0002 to 0.0044	0.0018 to 0.0365	0.0263 to 0.282	0.0297 to 0.3438
New Federal	0.0018 to 0.113	0.0006 to 0.0698	0.0001 to 0.0057	0.0002 to 0.0043	0.0021 to 0.58	0.0122 to 0.125	0.017 to 0.8978
Total Federal	0.0034 to 0.1194	0.0016 to 0.0726	0.0002 to 0.0063	0.0004 to 0.0064	0.0079 to 0.5941	0.0393 to 0.392	0.0528 to 1.1908
Non-Federal	0.0024 to 0.0148	0.0009 to 0.008	0.0002 to 0.0012	0.0005 to 0.004	0.0037 to 0.0637	0.0452 to 0.381	0.0529 to 0.4726
Total Oil and Gas	0.0073 to 0.1248	0.003 to 0.0747	0.0005 to 0.0067	0.0011 to 0.0078	0.0141 to 0.6034	0.0889 to 0.773	0.1149 to 1.5904
Lincoln County							
Existing Federal	0.0002 to 0.0009	<0.0001 to 0.0004	Range is <0.0001	<0.0001 to 0.0001	0.0002 to 0.002	0.0063 to 0.0263	0.0068 to 0.0297
New Federal	0.0002 to 0.0005	<0.0001 to 0.0001	Range is <0.0001	Range is <0.0001	0.0005 to 0.0011	0.0028 to 0.0063	0.0035 to 0.008
Total Federal	0.0004 to 0.0014	0.0001 to 0.0005	Range is <0.0001	<0.0001 to 0.0002	0.0007 to 0.0029	0.0092 to 0.0326	0.0104 to 0.0376
Non-Federal	0.0003 to 0.0009	<0.0001 to 0.0003	Range is <0.0001	<0.0001 to 0.0001	0.0006 to 0.0022	0.0079 to 0.0288	0.0088 to 0.0323
Total Oil and Gas	0.0007 to 0.0023	0.0002 to 0.0008	<0.0001 to 0.0001	<0.0001 to 0.0003	0.0013 to 0.0051	0.0171 to 0.0544	0.0193 to 0.0631
Quay County							
Existing Federal	0.0003 to 0.0006	<0.0001 to 0.0002	Range is <0.0001	<0.0001 to 0.0001	0.0004 to 0.0008	0.0091 to 0.0171	0.0097 to 0.0188
New Federal	0.0005 to 0.0008	0.0001 to 0.0003	Range is <0.0001	Range is <0.0001	0.001 to 0.0021	0.0068 to 0.0087	0.0084 to 0.0118
Total Federal	0.0008 to 0.0014	0.0002 to 0.0005	Range is <0.0001	<0.0001 to 0.0002	0.0014 to 0.0028	0.0162 to 0.0258	0.0186 to 0.0306
Non-Federal	0.0008 to 0.0013	0.0002 to 0.0005	Range is <0.0001	<0.0001 to 0.0002	0.0016 to 0.0034	0.0151 to 0.0249	0.0178 to 0.0302
Total Oil and Gas	0.0016 to 0.0026	0.0004 to 0.0009	<0.0001 to 0.0002	0.0001 to 0.0003	0.003 to 0.0062	0.0313 to 0.0507	0.0365 to 0.0609
Roosevelt County							
Existing Federal	0.0005 to 0.0017	0.0002 to 0.0007	<0.0001 to 0.0001	<0.0001 to 0.0004	0.0007 to 0.0041	0.0128 to 0.0372	0.0141 to 0.0443

Source	Hazardous Air Pollutant Concentrations (µg/m ³)						
	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	Total HAPs
New Federal	0.0009 to 0.0022	0.0003 to 0.0011	<0.0001 to 0.0001	<0.0001 to 0.0002	0.0023 to 0.0084	0.0077 to 0.0171	0.0112 to 0.0292
Total Federal	0.0013 to 0.0039	0.0005 to 0.0018	<0.0001 to 0.0002	0.0001 to 0.0006	0.0031 to 0.0122	0.0205 to 0.0543	0.0256 to 0.073
Non-Federal	0.0014 to 0.0915	0.0005 to 0.0572	<0.0001 to 0.0081	0.0002 to 0.0256	0.0035 to 0.476	0.0258 to 0.668	0.0314 to 1.3264
Total Oil and Gas	0.0029 to 0.0948	0.001 to 0.0587	0.0002 to 0.0083	0.0003 to 0.026	0.0067 to 0.4865	0.049 to 0.7037	0.0601 to 1.378

3.5 PECOS DISTRICT OFFICE CUMULATIVE OIL AND GAS CHRONIC CARCINOGENIC AND NON- CARCINOGENIC RESULTS

The modeled oil and gas HAPs long-term (annual) concentrations were assessed for cancer risk and non-cancer effects from inhalation for the Pecos District Office for the three modeled oil and gas production source groups (existing federal, new federal, and total non-federal). Lifetime cancer risks for each pollutant have been calculated based on the modeled HAP concentrations. Total lifetime cancer risk from the exposure to three HAPs (benzene, ethylbenzene, and formaldehyde) were calculated by summing the individual cancer risks for each pollutant. Total cancer risk is below 100 in 1 million for context (Table A-5).

Table F-5. Estimated Cancer Risk from Circa 2032 Oil and Gas Production in the Pecos District Office by Mineral Designation

County	Cancer Risk* from Existing Federal Wells (per million)	Cancer Risk* from New Federal Wells (per million)	Cancer Risk* from Total Federal Wells (per million)	Cancer Risk* from Non-federal Wells (per million)	Cancer Risk* from Cumulative Oil and Gas Production (per million)	Adjusted Cancer Risk† From Cumulative Oil and Gas Production (per million)
Chaves	0.20 to 2.51	0.07 to 1.54	0.26 to 3.95	0.20 to 3.53	0.46 to 7.48	0.10 to 1.59
Curry	0.19 to 0.30	0.13 to 0.18	0.32 to 0.47	0.33 to 0.52	0.64 to 0.99	0.12 to 0.18
DeBaca	0.19 to 0.48	0.10 to 0.24	0.29 to 0.70	0.24 to 0.70	0.52 to 1.40	0.11 to 0.30
Eddy	0.20 to 6.91	0.08 to 2.95	0.28 to 7.57	0.22 to 8.95	0.51 to 15.1	0.11 to 3.24
Guadalupe	0.16 to 0.25	0.09 to 0.14	0.25 to 0.39	0.19 to 0.37	0.44 to 0.76	0.12 to 0.2
Lea	0.45 to 4.65	0.25 to 4.86	0.72 to 7.1	0.79 to 6.46	1.61 to 13.11	0.32 to 2.62
Lincoln	0.11 to 0.44	0.05 to 0.11	0.16 to 0.56	0.14 to 0.48	0.29 to 0.93	0.06 to 0.19
Quay	0.15 to 0.29	0.12 to 0.16	0.28 to 0.45	0.26 to 0.43	0.54 to 0.88	0.12 to 0.20
Roosevelt	0.22 to 0.62	0.15 to 0.32	0.36 to 0.93	0.45 to 12.8	0.87 to 13.45	0.18 to 2.71

*Cancer risk from emissions of benzene, ethylbenzene, and formaldehyde

†Adjusted residency risk based on residency factors by county (14.9 years for Chaves, 12.6 years for Curry, 15.0 years for DeBaca, 15.0 years for Eddy, 18.9 years for Guadalupe, 14.0 years for Lea, 14.3 years for Lincoln, 15.6 years for Quay, and 14.1 years for Roosevelt Counties)

Chronic non-cancer hazards from multiple air toxics are assessed by calculating the individual HQ of each pollutant and the overall HI. Table A-6 provides the chronic non-cancer HQs and HI for each county in the Pecos District Office. The HI for oil and gas production in each county is below one, indicating no substantial chronic non-cancer health effects from oil and gas production.

Table F-6. Estimated Hazard Quotients and Hazard Index from Circa 2032 Oil and Gas Production in the Pecos District Office by Mineral Designation

	Hazard Quotient (HQ)						Hazard Index (HI)
Source	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	
Chaves County							
Existing Federal	<0.0001 to 0.0008	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0001	Range is <0.0001	0.0015 to 0.0181	0.0015 to 0.0191
New Federal	<0.0001 to 0.0019	Range is <0.0001	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0004	0.0005 to 0.0085	0.0005 to 0.0109
Total Federal	<0.0001 to 0.0026	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0002	<0.0001 to 0.0004	0.0019 to 0.0263	0.002 to 0.0294
Non-Federal	<0.0001 to 0.0017	Range is <0.0001	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0004	0.0015 to 0.0259	0.0015 to 0.027
Total Oil and Gas	0.0001 to 0.0034	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0003	<0.0001 to 0.0005	0.0034 to 0.0522	0.0035 to 0.0564
Curry County							
Existing Federal	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0014 to 0.0022	0.0014 to 0.0023
New Federal	<0.0001 to 0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0009 to 0.0012	0.001 to 0.0013
Total Federal	0.0001 to 0.0002	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0023 to 0.0034	0.0024 to 0.0036
Non-Federal	0.0001 to 0.0002	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0024 to 0.0037	0.0025 to 0.0039
Total Oil and Gas	0.0002 to 0.0004	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0046 to 0.0071	0.0049 to 0.0075
DeBaca County							
Existing Federal	<0.0001 to 0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0014 to 0.0035	0.0015 to 0.0036
New Federal	<0.0001 to 0.0002	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0007 to 0.0016	0.0007 to 0.0018
Total Federal	<0.0001 to 0.0003	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0021 to 0.0051	0.0022 to 0.0054
Non-Federal	<0.0001 to 0.0002	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0017 to 0.0051	0.0018 to 0.0053
Total Oil and Gas	0.0002 to 0.0005	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0038 to 0.0101	0.004 to 0.0107
Eddy County							
Existing Federal	<0.0001 to 0.0039	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0004	<0.0001 to 0.0006	0.0015 to 0.047	0.0016 to 0.0516
New Federal	<0.0001 to 0.0037	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0001	<0.0001 to 0.0008	0.0005 to 0.0162	0.0006 to 0.0208

	Hazard Quotient (HQ)						Hazard Index (HI)
Source	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	
Total Federal	<0.0001 to 0.0052	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0005	<0.0001 to 0.0008	0.0021 to 0.0528	0.0021 to 0.0563
Non-Federal	<0.0001 to 0.0043	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0004	<0.0001 to 0.0008	0.0017 to 0.0632	0.0017 to 0.0679
Total Oil and Gas	0.0001 to 0.0069	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0007	<0.0001 to 0.0009	0.0037 to 0.1066	0.0039 to 0.1145
Guadalupe County							
Existing Federal	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0012 to 0.0019	0.0012 to 0.0019
New Federal	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0006 to 0.001	0.0006 to 0.0011
Total Federal	<0.0001 to 0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0018 to 0.0029	0.0019 to 0.003
Non-Federal	<0.0001 to 0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0014 to 0.0027	0.0015 to 0.0028
Total Oil and Gas	0.0001 to 0.0002	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0032 to 0.0055	0.0033 to 0.0058
Lea County							
Existing Federal	0.0001 to 0.0014	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0002	<0.0001 to 0.0002	0.0033 to 0.0353	0.0034 to 0.0361
New Federal	0.0002 to 0.012	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0002	<0.0001 to 0.0029	0.0015 to 0.0156	0.0018 to 0.0309
Total Federal	0.0004 to 0.0127	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0003	<0.0001 to 0.003	0.0049 to 0.0491	0.0054 to 0.0511
Non-Federal	0.0003 to 0.0016	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0002	<0.0001 to 0.0003	0.0057 to 0.0477	0.006 to 0.0496
Total Oil and Gas	0.0008 to 0.0133	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0003	<0.0001 to 0.003	0.0111 to 0.0968	0.0121 to 0.1007
Lincoln County							
Existing Federal	<0.0001 to 0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0008 to 0.0033	0.0008 to 0.0034
New Federal	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0004 to 0.0008	0.0004 to 0.0009
Total Federal	<0.0001 to 0.0002	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0012 to 0.0041	0.0012 to 0.0043
Non-Federal	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.001 to 0.0036	0.001 to 0.0037
Total Oil and Gas	<0.0001 to 0.0002	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0021 to 0.0068	0.0022 to 0.0071
Quay County							
Existing Federal	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0011 to 0.0022	0.0012 to 0.0022
New Federal	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0009 to 0.0011	0.0009 to 0.0012
Total Federal	<0.0001 to 0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.002 to 0.0032	0.0021 to 0.0034

	Hazard Quotient (HQ)						Hazard Index (HI)
Source	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	
Non-Federal	<0.0001 to 0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0019 to 0.0031	0.002 to 0.0033
Total Oil and Gas	0.0002 to 0.0003	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0039 to 0.0064	0.0041 to 0.0067
Roosevelt County							
Existing Federal	<0.0001 to 0.0002	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0016 to 0.0047	0.0017 to 0.0048
New Federal	<0.0001 to 0.0002	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.001 to 0.0022	0.0011 to 0.0024
Total Federal	0.0001 to 0.0004	Range is <0.0001	Range is <0.0001	Range is <0.0001	Range is <0.0001	0.0026 to 0.0068	0.0027 to 0.0071
Non-Federal	0.0001 to 0.0097	Range is <0.0001	<0.0001 to 0.0001	<0.0001 to 0.0011	<0.0001 to 0.0024	0.0032 to 0.0837	0.0034 to 0.0955
Total Oil and Gas	0.0003 to 0.0101	Range is <0.0001	<0.0001 to 0.0001	<0.0001 to 0.0011	<0.0001 to 0.0025	0.0061 to 0.0882	0.0066 to 0.1004

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APPENDIX F. COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND BLM'S RESPONSE TO SUBSTANTIVE COMMENTS

The BLM evaluated all comments received and parsed them into substantive or non-substantive comments according to the guidance in the BLM's NEPA Handbook (BLM 2008:66). The substantive comments in Table F.1 are representative of the topics raised, and single responses are provided for similarly stated topics.

Table G-1. Substantive Comment Topics and Responses

Letter Number	Comment Number	Topic	Comment Text	Response
1	1	Climate Change, Green House Gases, and Social Cost of Carbon	Please do not approve any further fossil fuel development on BLM lands or subsurface rights. There is an overwhelming international scientific consensus that the climate crisis is already deadly serious, rapidly getting worse, and poses an existential threat to humanity. The attached IPCC report summarizes this consensus. The Biden administration has been bipolar in addressing this crisis. On the one hand, the administration acknowledges the severity of the crisis and the need for an urgent transition away from harmful fossil fuels. On the other hand, the administration has allowed a huge amount of fossil fuel development to continue on federal lands. The administration is clearly not walking its talk on the climate crisis. I feel sorry for the BLM employees who may feel like caged hamsters endlessly running on an exercise wheel. They keep turning out fossil fuel related NEPA and decision documents that are substantially similar, reference much of the same science, and where there is virtually no chance that the proposed action would be denied. This tends to become robotic NEPA where the public learns that its input is largely pointless. I wish that BLM NEPA staff would organize and stand up to their corrupt and cowardly managers who pander to oil companies, bend to short-term political expediency, and ignore the mounting climate crisis threats to all Americans. Profiles in courage for change are much needed. The status quo is not sustainable and does not serve the public interest. Please act as if our collective future is at stake - because it is. Thanks for your kind consideration of my comments and the attached report.	The BLM has reviewed the Intergovernmental Panel on Climate Change (IPCC) report provided by the commenter. The 2023 IPCC report referenced by the commenter is one of many reports published by the IPCC in recent years, and as explained in the introduction to the report, it is largely based on the integrated findings of other IPCC Special Reports and Working Group reports previously published between 2018 and 2022. Of these, two of the IPCC reports published between 2018 and 2022 (IPCC 2020, 2021) are already referenced in the EA. A reference to the 2023 IPCC report has been added to the EA in Section 3.3.3 (Changes to Regional Environmental Conditions Related to Climate Change). However, the 2023 IPCC report does not contradict the BLM's previous analysis or conclusions and does not present any additional risk factors or provide additional impact indicators that were not already previously considered. Therefore, the BLM has concluded that the risks are adequately evaluated in the analysis as described below and further in the Air Resources Technical Report for Oil and Gas Development in New Mexico, Oklahoma, Texas, and Kansas (ARTR) and the 2022 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends (Annual GHG Report). The BLM will continue to monitor publicly available sources and will incorporate scientific sources as they are published. The BLM analyzes potential impacts, including cumulative impacts, from greenhouse gases (GHGs) in detail in the EA (see Sections 3.6.1 and 3.6.2). These sections incorporate new and updated sources of information related to air emissions using the best science and data available. The BLM quantifies direct, indirect, and cumulative emissions from the combustion of oil and gas and discusses the significance of these emissions. The BLM takes a hard look at the environmental impacts of leasing, including quantifying and forecasting aggregate GHG emissions from oil and gas development and addressing the environmental effects of downstream oil and gas use. The EA also incorporates by reference the ARTR as well as the Annual GHG Report, which provides a more comprehensive assessment of

Letter Number	Comment Number	Topic	Comment Text	Response
				cumulative emissions, climate impacts, and reputable climate science sources. Chapter 2 of the Annual GHG Report discusses the relationship between the BLM's coal, oil, and gas leasing programs with other laws and policies at the federal and state level. The emissions used in this analysis are estimated using the 2024 BLM Lease Sale Emissions Tool and evaluated with the U.S. Environmental Protection Agency (EPA) GHG equivalency calculator. The BLM makes federal mineral resources, such as oil and gas, available for development in accordance with laws including the Mineral Leasing Act of 1920, as amended (MLA), and the Federal Land Policy and Management Act of 1976, as amended (FLPMA). See EA Sections 1.2 and 1.4 for information regarding the BLM's requirements under the MLA, FLPMA, and other statutes and regulations.
2	1	Climate Change, Green House Gases, and Social Cost of Carbon	Please do not approve any further fossil fuel development on BLM lands or subsurface rights. There is an overwhelming international scientific consensus that the climate crisis is already deadly serious, rapidly getting worse, and poses an existential threat to humanity. The attached IPCC report summarizes this consensus. The Biden administration has been bipolar in addressing this crisis. On the one hand, the administration acknowledges the severity of the crisis and the need for an urgent transition away from harmful fossil fuels. On the other hand, the administration has allowed a huge amount of fossil fuel development to continue on federal lands. The administration is clearly not walking its talk on the climate crisis. I feel sorry for the BLM employees who may feel like caged hamsters endlessly running on an exercise wheel. They keep turning out fossil fuel related NEPA and decision documents that are substantially similar, reference much of the same science, and where there is virtually no chance that the proposed action would be denied. This tends to become robotic NEPA where the public learns that its input is largely pointless. I wish that BLM NEPA staff would organize and stand up to their corrupt and cowardly managers who pander to oil companies, bend to short-term political expediency, and ignore the mounting climate crisis threats to all Americans. Profiles in courage for change are much needed. The status quo is not sustainable and does not serve the public interest. Please act as if our collective future is at stake - because it is.	See response to letter 1 comment 1.

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			Thanks for your kind consideration of my comments and the attached report.	
3	1	Climate Change, Green House Gases, and Social Cost of Carbon	It would be immoral to approve more fossil fuel development and use. The attached IPCC report explains why. Don't make the climate crisis worse!	See response to letter 1 comment 1.
4	2	Expressions of Interest	BLM must offer parcels that have been deemed available and eligible in their respective resource management plans (RMPs) and upon which this industry has indicated an interest in leasing.	Executive Order 14154, Unleashing American Energy (Jan. 20, 2025), and a Presidential Memorandum, Ending Illegal Discrimination and Restoring Merit-Based Opportunity (Jan. 21, 2025), require the Department to strictly adhere to the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321 et seq. Further, such Order and Memorandum repeal Executive Orders 12898 (Feb. 11, 1994) and 14096 (Apr. 21, 2023). Because Executive Orders 12898 and 14096 have been repealed, complying with such Orders is a legal impossibility. The BLM verifies that it has complied with the requirements of NEPA, including the Department's regulations and procedures implementing NEPA at 43 C.F.R. Part 46 and Part 516 of the Departmental Manual, consistent with the President's January 2025 Order and Memorandum. See EA Sections 1.2 and 1.4 for information regarding the BLM's requirements under MLA, FLPMA, and other statutes and regulations. Generally, the BLM responds to Expressions of Interest (EOIs) to lease federal oil and gas resources through a competitive leasing process. The BLM holds oil and gas lease sales consistent with the MLA and FLPMA, when eligible lands are available for leasing. Ultimately, the BLM has the discretion to offer or defer any parcel during any sale. The MLA allows discretion in that "[a]ll lands subject to disposition . . . which are known or believed to contain oil or gas deposits may be leased by the Secretary." 30 U.S.C. 226(a) (emphasis added). As explained in Appendix C., the BLM evaluates nominated parcels for leasing in accordance with 43 C.F.R. § 3120.32 <i>Expression of interest leasing preference</i>, which outlines five criteria to determine each parcel's leasing preference. Table C.1, "Leasing Preference Ratings for Nominated Lease Parcels," identifies and explains the five criteria and indicates how they apply to each of the parcels. The BLM has evaluated the parcels against the lease parcel preference criteria. After screening, guidance states that "The BLM will generally conduct environmental analysis for lease parcels with a high preference value first for potential inclusion in a lease sale; however, if there are no high preference parcels available, the office may select one or more low preference parcels that present the least conflicts based on the criteria listed in the IM, including parcels deferred from previous sales, to analyze for potential inclusion in the sale." As stated in Appendix C of the EA, all of the parcels nominated are rated as low preference based on one or

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				more criteria; however, given the low resource concerns with these parcels and protections offered through stipulations and COAs, the BLM is moving them forward for leasing, furthering the intent of Section 50265 of the IRA, which states that the BLM may not issue a right-of-way for wind or solar energy development on federal land unless it has: 1) held an onshore oil and gas lease sale during the past 120 days, and 2) offered the lesser of a "sum total" of either 2,000,000 acres or 50% of the acreage for which EOLs have been submitted for lease sales during the previous 1-year period.
4	4	Purpose and Need	The draft EA's purpose and need statement should clarify that the purpose of the draft EA is to analyze impacts from leasing while the need is to offer lands for leasing, based on EOLs. As it currently stands, the need is stated as a policy to lease lands for the continued production of oil and natural gas from public lands but fails to explain the purpose of the document to analyze leasing impacts.	As stated in Section 2.1 of the EA, the Proposed Action is to offer for lease federal minerals associated with the seven nominated lease parcels, and as described in Section 1.2 of the EA, the underlying purpose and need for the proposed action is to respond to Expressions of Interest (EOIs) to lease federal oil and gas resources through a competitive leasing process, and to fulfill BLM's responsibility under the MLA and FLPMA. Therefore, the purpose and need statement as written in the EA aligns properly with applicable legal authorities and does not need to be revised. Section 2.1 explains how under the Proposed Action, the BLM AO has the authority to lease the parcels, or to defer the parcels, based on the analysis of potential effects presented in this EA; this statement provides clarification on the role of the EA in the NEPA process, which the commenter is requesting.
4	5	Development Potential / Leasing Preference	The draft EA offers no explanation of its lease preference analyses as required by BLM's 2024 Fluid Minerals Lease and Leasing Process Rules. The draft EA needs to be revised to explain and disclose BLM's lease preference process, analysis, and decision making, especially if those deferrals were based on endangered species habitat or the existence of playas, caves, or karsts. See draft EA at Section 2. Without such analysis, BLM fails to identify any deferred parcels and fails to explain its determination to defer EOIs with a low preference for leasing.	Appendix C of the EA provides BLM's leasing preference ratings for the nominated lease parcels. The preference ratings were determined in conjunction with the EA analysis presented in Sections 3.5 and 3.6, and were informed by the effects conclusions for resources that correspond to each preference criteria. The text of Appendix C explains the BLM's process for determining overall preference ratings for each parcel, and the footnotes to Table C.1 summarize the BLM's rationale for each of the preference criteria ratings.
4	7	Economic Activity	BLM failed to analyze and disclose the full suite of benefits of American oil and natural gas leasing and development in its socio-economic impacts analysis, including economic benefits such as the promotion of local jobs and increased revenue for school funding, in violation of NEPA. The socioeconomic analysis in the draft EA is legally deficient under NEPA.	The Proposed Action, to offer for lease parcels for oil and gas development, and its effects have been evaluated in a manner consistent with NEPA. See 42 U.S.C. § 4336 ("An agency shall prepare an environmental assessment with respect to a proposed agency action that does not have a reasonably foreseeable significant effect on the quality of the human environment, ... Such environmental assessment shall be a concise public document prepared by a Federal agency to set forth the basis of such agency's finding of no significant impact or determination that an environmental impact statement is necessary."); see also 43 C.F.R. § 46.300.

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				Even so, EA Section 3.5 discloses the potential for beneficial impacts, including employment opportunities and revenue streams for federal, state, and local governments (see AIB-22, Economic Activity) and fluid mineral availability (see AIB-14, Fluid Minerals). Generally, the BLM analyzes the impacts associated with the alternatives using the best available information, which is not necessarily monetized estimates of benefits or costs.
4	8	Climate Change, Green House Gases, and Social Cost of Carbon	The draft EA fails to reference the extensive GHG inventory released in 2021, called the "BLM Specialist Report on Annual Greenhouse Gas Emissions from Coal, Oil, and Gas Exploration and Development on Public Lands and the Federal Mineral Estate," which includes reasonably foreseeable development quantitative analysis for New Mexico, and the air quality modeling and monitoring technical report, titled "BLM Air Resources Technical Report for Oil and Gas Development in New Mexico, Oklahoma, Texas, and Kansas (2020)," which detailed cumulative GHG emissions by regions, including New Mexico. The draft EA further ignores that given the small number of parcels nominated in New Mexico's first quarter 2025 lease sale, the potential emissions from APDs for development of these leases would be minimal.	Chapter 2 of the Annual GHG Report discusses the relationship between BLM's coal, oil, and gas leasing programs with other laws and policies at the federal and state level. Additional discussion of climate science and predicted impacts, as well as the reasonably foreseeable and cumulative GHG emissions associated with BLM's oil and gas leasing actions, are included in the Annual GHG Report. This report presents the estimated emissions of GHGs attributable to fossil fuels produced on lands and mineral estate managed by the BLM. Both the Annual GHG Report and the Specialist Report are referenced and relied upon as integral parts of the analysis for this proposed lease sale. Also see response to letter 1 comment 1.
4	9	Policy and Legal Compliance	The draft EA fails to analyze the cumulative effects of deferred EOs, and minimal lease acreage offerings violates NEPA and APA. This lack of disclosure and analysis is contrary to BLM's mandatory requirements under the Inflation Reduction Act (IRA).	To the extent that this comment relies on an interpretation of the IRA, the BLM considers it non-substantive, because legal authorities are the best evidence of their contents. To the extent that this comment relates to agency-wide compliance with the IRA, it is outside the scope of this NEPA analysis. The decision under review is "whether to make available for lease the nominated lease parcels with or without constraints, in the form of lease stipulations, as provided for in the approved land use plan." See EA Section 1.3.
4	10	Expressions of Interest	The draft EA fails to disclose the EOI backlog or how many pending EOIs it terminated. This is particularly important given the significant EOI backlog that dates back in many instances to 2017.	BLM NM does not currently have a backlog of deferred EOIs. In general, the BLM has discretion to offer or defer any parcel during any sale. 30 U.S.C. 226(a) ("All lands subject to disposition . . . which are known or believed to contain oil or gas deposits <i>may</i> be leased by the Secretary.") (emphasis added). For parcels deferred for inadequate or incomplete information (i.e., necessary tribal consultation), the BLM will offer the parcels at the next available sale if and when information is complete and supports a decision to lease. However, lands may not be offered for sale if the information reveals impacts that warrant a subsequent deferral (lease preference factors, significant cultural concerns identified in on-going consultation, etc.).
4	11	Policy and Legal Compliance	The draft EA also fails to disclose and analyze whether the lease parcels being offered, when added cumulatively to other lease parcels being offered in other states, is sufficient for BLM to meet its statutory leasing obligations under IRA.	See response to letter 4 comment 9.

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4	12	Expressions of Interest	...the draft EA fails to disclose the number of EOIs BLM terminated or failed to carry forward for purposes of this lease sale.	See response to letter 4 comments 2 and 10.
4	13	Resource Management Plan(s)	The draft EA states that the parcels are subject to standard terms and conditions and special stipulations in the Carlsbad RMP (BLM 1988), as amended (BLM 1997a, 2008a). Therefore, any stipulations placed on the leased parcels must be in conformance with the existing RMP. Should BLM's proposed leasing action not conform with the governing RMP, which allows for BLM to lease additional lands for oil and natural gas development as part of reasonably foreseeable development, and instead propose new stipulations, BLM will then have acted contrary to its obligations under the Federal Land Policy and Management Act (FLPMA).	The BLM has analyzed the decision in conformance with the CFO RMP. Comment fails to allege with specificity which stipulations conflict with the RMP, is therefore non-substantive, and the BLM is unable to respond.
4	14	Policy and Legal Compliance	The draft EA offers no Modified Proposed Action and provides no explanation of its lease preference analyses, as required by BLM's 2024 Lease and Leasing Rules. This omission violates BLM's obligations under NEPA, FLPMA, the Mineral Leasing Act (MLA) and its implementing regulations, and APA. The draft EA needs to be revised to explain and disclose BLM's lease preference process, analysis, and decision making. Without such analysis, BLM fails to identify any deferred parcels.	Regarding the BLM's lease preference analysis, see response to letter 4 comment 5. Regarding a "Modified Proposed Action," in BLM NEPA Handbook H-1790-1, the BLM is directed to evaluate the proposed action, the no action alternative as a baseline, and other "Reasonable Alternatives" that meet the BLM's Purpose and Need and are within the BLM's authority. The BLM is not required to evaluate alternatives that do not meet the BLM's Purpose and Need, are not within the BLM's discretion, or which are precluded by law. Because the commenter has not alleged with specificity what such a "Modified Proposed Action" would have contributed to the analysis, the BLM is unable to respond in any additional detail.
4	16	NEPA Compliance	The Draft FONSI Incorrectly Enlarges the BLM's Discretionary Legal Authority and Obligations for Offering Parcels for Oil and Natural Gas Leasing Based on NEPA Analysis and Misapplies Recent Legal Precedent on Informed Leasing Decisions. The draft FONSI states an entirely incorrect interpretation of the legal holding in <i>Wilderness Soc'y v. Dept. of the Interior</i>, No. 22-cv-1871 (CRC), U.S. Dist. LEXIS 51011, at *91-92 (D.D.C. Mar. 22, 2024). Western Energy Alliance participated in the companion case, and also in the remedy phase of this case. In this decision, cited in the draft FONSI, the court stated only that BLM must explain how its GHG analysis performed under NEPA informed its leasing decisions. See, draft FONSI Section 2 Table 2. The court decision provides no legal support for BLM's statement in the draft FONSI that the MLA provides the Secretary or BLM with discretion to alter its obligations to offer parcels available for oil and gas leasing based on NEPA analysis.	A comment is considered non-substantive if it does not allege an error or material omission in the analysis of the Proposed Action, and so, to the extent that this comment relies on interpretation of a legal authority that is the best evidence of its contents rather than an alleged flaw in the analysis, the BLM considers it non-substantive. In the FONSI, in referring to the <i>Wilderness Society</i> case, the BLM stated that it "must consider the effects of its onshore oil and gas lease sales on GHG emissions and climate change, and the Mineral Leasing Act provides the Secretary of the Interior with discretion to tailor those sales—including which parcels are offered for sale and the terms of leases—in light of climate effects." Following this requisite consideration of climate effects, "the BLM [did] not exercise[] its discretion to tailor this lease sale to account for global climate change." The BLM maintains its interpretation of <i>Wilderness Society</i>. See, e.g., <i>Wilderness Society</i>, 2024 WL 1241906, at *1 ("the Secretary has discretion to decide where, when, and under what terms and conditions oil and gas development should occur"); <i>id.</i> at *24 ("If, in fact, the [BLM] did not consider GHG emissions when rendering its decision on the challenged lease sale, it would appear to have overlooked what is widely regarded as the most pressing environmental threat facing the world today.").

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				Regardless, the comment fails to indicate how the BLM's interpretation of the <i>Wilderness Society</i> case, even if it were incorrect, causes any error in the leasing decision.
4	17	Policy and Legal Compliance	Congress did not grant BLM the regulatory authority to regulate GHGs or climate or otherwise promulgate and impose a national climate policy. Congress prioritized development of U.S. oil and natural gas resources in MLA and FLPMA. In FLPMA, Congress identifies "mineral exploration and production" as one of the "principal or major uses" of public lands. 43 U.S.C. § 1702(l). FLPMA contains an express declaration of Congressional policy that BLM manage public lands "in a manner which recognizes the Nation's need for domestic sources of minerals, [and other commodities] from the public lands." 43 U.S.C. § 1701(a)(12).	The BLM does not claim to regulate GHGs or national climate policy in the EA. However, in the context of NEPA, the BLM must take a hard look at the environmental impacts of leasing, including quantifying and forecasting aggregate GHG emissions from oil and gas development and addressing the environmental effects of downstream oil and gas use. The BLM's Specialist Reports on Annual Greenhouse Gas Emissions and Climate Trends also account for current and projected future agency wide GHG emissions related to fossil fuel actions on Public Land, national and global GHG emission trends, and potential climate impacts related to these emissions, which provides the information necessary to properly assess agency-wide, nationwide, and global reasonably foreseeable cumulative impacts of each State Office lease sale. See EA Sections 1.2 and 1.4 for information regarding the BLM's requirements under MLA, FLPMA, and other statutes and regulations.
4	22	Economic Activity	The draft EA does not sufficiently analyze and disclose to the public the full suite of benefits of American oil and natural gas leasing and development in its socio-economic impacts analysis. The draft EA needs to be revised and updated to include these benefits to provide an accurate picture of the socio-economic and other benefits of leasing and developing New Mexico's abundant oil and gas resources.	For an explanation of why the BLM is not required to conduct a cost-benefit analysis in an EA, see response to letter 4 comment 7. Additionally, "the full suite of benefits of American oil and natural gas leasing and development" exceeds the scope of the decision, "whether to make available for lease the nominated parcels with or without constraints, in the form of lease stipulations, as provided for in the approved land use plan." See EA Section 1.3.
4	23	Climate Change, Green House Gases, and Social Cost of Carbon	Indeed, the draft EA misinforms the public through a one-sided analysis that focuses on the benefits of renewable energy for GHG emissions reductions, while largely skirting the benefits of natural gas for GHG emissions reductions. See, e.g., draft EA Section 3.6.2.3. BLM needs to more definitively explain the benefits of natural gas for GHG emissions reductions, and BLM's failure to analyze the direct and indirect benefits of leasing and development of American oil and natural gas violates NEPA. <i>Interstate Nat. Gas Ass'n of Am. v. PHMSA</i> , 2024 U.S. App. LEXIS 20710 (D.C. Cir. Aug. 19, 2024).	The BLM considers this comment non-substantive to the extent it seeks to interpret case law that is the best evidence of its contents rather than focusing on an error or material omission in the BLM's analysis or offering new information for the BLM's consideration. However, the BLM does note that <i>Interstate Natural Gas Association</i> considered a challenge to a pipeline rulemaking under statutory requirements of 49 U.S.C. § 60102(b)(5), which are specific to the transportation sector and not applicable to the BLM's oil and gas development. The BLM has analyzed the GHG emissions from the Proposed Action and provided context for those emissions compared to existing federal onshore GHG emissions in the state and nationally in Section 3.6.1 and 3.6.2 of the EA. The BLM has included an evaluation of the climate impacts that could result from the proposed action and incorporated by the reference the 2022 BLM Specialists Report on Annual Greenhouse Gas Emissions and Climate Trends, which provides a more detailed assessment of cumulative emissions, climate impacts, and reputable climate science sources. Estimating the GHG reductions associated with oil and gas leasing is not required for NEPA. For an explanation of

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				why the BLM is not required to conduct a cost-benefit analysis in an EA, see response to letter 4 comment 7.
4	24	Environmental Justice	The draft EA does not disclose and analyze the benefits that flow to Environmental Justice communities in the form of local jobs and revenue from local oil and gas development. See draft EA at 65-69.	EA Section 3.5 discloses the potential for beneficial impacts, including employment opportunities and revenue streams for federal, state, and local governments (see AIB-22, Economic Activity) and fluid mineral availability (see AIB-14, Fluid Minerals). For an explanation of why the BLM is not required to conduct a cost-benefit analysis in an EA, see response to letter 4 comment 7.
4	25	Climate Change, Green House Gases, and Social Cost of Carbon	The draft EA also fails to analyze emissions reductions that will result from implementation of BLM's new waste prevention rules and the Environmental Protection Agency's (EPA) new methane rules and fails to explain to the public the benefits of these reductions. The draft EA needs to be revised to disclose and analyze the fact that continued leasing and development of federal natural gas resources provides significant beneficial impacts in the context of GHG emission reductions.	The decision under review is "whether to make available for lease the nominated lease parcels with or without constraints, in the form of lease stipulations, as provided for in the approved land use plan." See EA Section 1.3. Unrelated federal actions such as the promulgation of BLM's new waste prevention rules and the EPA's new methane rules are outside the scope of the leasing decision, such that the BLM considers arguments related to those actions non-substantive except where they will directly influence the analyses. Generally, the 2022 ARTR, which is incorporated by reference into the EA, provides additional information on the regulatory environment for emissions, including but not limited to the NMOCD statewide waste prevention rule and EPA NSPS rules, and explains how these regulations were considered in the development of BLM's per-well emissions estimates.
4	26	Climate Change, Green House Gases, and Social Cost of Carbon	The draft EA needs to quantify and disclose the indirect beneficial effects of the decision to lease federal natural gas reserves. As EPA explained in its 2021 GHG Inventory Report: "[t]he decrease in coal-powered electricity generation and increase in natural gas and renewable energy electricity generation have contributed to the 33 percent decrease in overall CO2 emissions from electric power generation from 2005 to 2019...	See responses to letter 4 comments 7, 22, and 23.

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			Between 2018 and 2019, emissions from the electric power sector decreased 8.4 percent due to a decrease in electric power generation of 1.4 percent and a decrease in the carbon intensity of the electric power energy mix." The draft EA needs to cite to this 2021 EPA Report for the first quarter lease sale for 2025 and present this information to the public or include it in its analyses. Further, the Energy Information Administration (EIA) shows that fuel switching to natural gas has provided 58% of the GHG reductions in the electricity sector, whereas wind and solar energy have provided only 42%. BLM needs to update the draft EA to disclose this information to the public. The draft EA needs to be revised and updated to disclose and analyze the direct and indirect benefits of leasing and development of American oil and natural gas. See, e.g., draft EA at Section 3.6.1	
4	27	Expressions of Interest	From an economic standpoint, the draft EA fails to analyze or even disclose the acreage of long-pending EOs that have been continually deferred and how these continued deferrals impact federal oil and natural gas revenues and other benefits such as local jobs and secondary revenue at the county and local levels.	This comment appears to relate to agency-wide EOI deferrals, which is separate from the Proposed Action and is therefore outside the scope of the NEPA analysis for this action. See EA Section 1.3, describing the decision as "whether to make available for lease the nominated parcels with or without constraints, in the form of lease stipulations, as provided for in the approved land use plan." To any extent commenter is suggesting that BLM New Mexico has a large backlog of deferred EOIs, the BLM New Mexico responds that it does not. Generally, the BLM has discretion to offer or defer any parcel during any sale. 30 U.S.C. 226(a) ("All lands subject to disposition . . . which are known or believed to contain oil or gas deposits may be leased by the Secretary.") (emphasis added). For parcels deferred for inadequate or incomplete information (i.e., necessary tribal consultation), the BLM will offer the parcels at the next available sale if and when information is complete and supports a decision to lease. However, lands may not be offered for sale if the information reveals impacts that warrant a subsequent deferral (lease preference factors, significant cultural concerns, etc.).
4	28	Policy and Legal Compliance	BLM failed to disclose the aggregate number of EOIs and their aggregate acreage that BLM terminated or did not carry forward for this lease sale. This failure violates NEPA and underscores BLM's violation of FLPMA and MLA in failing to prevent waste by stranding federal fluid mineral resources. Under MLA, Congress requires the U.S. Department of the Interior to hold competitive oil and gas lease sales "at least quarterly" to promote responsible development of this nation's energy	See responses to letter 4 comments 2, 10, and 27.

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			resources, 30 U.S.C. § 181, and requires BLM to conduct quarterly competitive oil and gas lease sales for lands that are eligible and available for leasing. 30 U.S.C. § 181 et seq.; 43 C.F.R. § 3120.12(a). Under FLPMA, Congress identified “mineral exploration and production” as one of the “principal or major uses” of public lands. 43 U.S.C. § 1702(l). FLPMA contains an express declaration of Congressional policy that BLM manage public lands “in a manner which recognizes the Nation’s need for domestic sources of minerals, [and other commodities] from the public lands.” 43 U.S.C. § 1701(a)(12). Congress prioritized the leasing and development of America’s abundant oil and gas resources in MLA and identified oil and natural gas resource development as one of the principle uses of public lands under FLPMA, and BLM’s decision to not offer additional parcels for lease contradicts the purpose of MLA and FLPMA. As a result of these failures, in addition to violating NEPA and contravening the MLA and FLPMA, BLM’s proposed leasing decision and draft EA is arbitrary, capricious, and an abuse of discretion in violation of APA. BLM needs to update the draft EA to disclose this information and data to the public.	
4	29	Expressions of Interest	The Draft EA Fails to Analyze the Cumulative Effects of Deferred EOs and Its Infinitesimally Small Lease Acreage Offerings.	See responses to letter 4 comments 2, 10, and 27.
4	30	Policy and Legal Compliance	As explained in the draft EA, in Section 1.4.2 at page 13, IRA includes a provision that ties the amount of oil and natural gas onshore lease acreage BLM offers for sale on an annual basis to whether BLM can issue rights-of-way for wind or solar energy projects. [...] To comply with Section 50265 of IRA, on an annual basis BLM must offer either a sum total of 2,000,000 acres or 50% of the acreage nominated through EOs, whichever is lesser, for sale through the competitive lease sale process. BLM’s failure to analyze the cumulative effects of deferred EOs and its infinitesimally small lease acreage offerings violates NEPA and APA and is contrary to BLM’s mandatory requirements under IRA.	See response to letter 4 comment 9.

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4	31	Expressions of Interest	The draft EA needs to be revised and updated to disclose deferred EOs for the past 10 years and analyze whether BLM is in compliance with IRA. IRA fails to identify how many EOs have been terminated or deferred on a cumulative basis prior to 2025. BLM cannot piecemeal and segregate its analysis by only analyzing EOs received for the first quarter 2025 Lease Sale. BLM's statutory obligations under both NEPA and IRA are broader, and must be disclosed and analyzed in the draft EA.	Regarding EOI deferrals, see responses to letter 4 comments 2, 10, and 27. Regarding the IRA, see response to letter 4 comment 9.
4	32	Expressions of Interest	BLM failed to analyze and inform the public on the percentage of lease acreage offered for sale compared to the aggregate of all EOs that have been long pending and deferred by BLM. BLM must inform the public of deferrals dating back at least six years (statute of limitations), or at a minimum since January 21, 2021, when BLM started issuing and implementing new policies to severely restrict oil and natural gas leasing. These policies have resulted in significant EOI deferrals, lease parcel deferrals, inaction on EOs, and a significant reduction in lease parcels that BLM has offered for sale. The draft EA fails to analyze and disclose this aggregate deferred acreage for purposes of informing the public of the adverse impacts of BLM's decision to not offer nominated lease parcels for sale in terms of lost federal oil and natural gas revenues to the U.S. Treasury and to the state of New Mexico.	See responses to letter 4 comments 2, 10, and 27.
4	33	Policy and Legal Compliance	BLM failed to analyze, forecast, even address whether the minimum amount of oil and natural gas leases BLM offered at the first quarter lease sale will adversely impact BLM's ability to meet its statutory requirements under IRA and in turn whether this nominal lease acreage offering will impact renewable energy project rights-of-way on federal lands.	See response to letter 4 comment 9.
4	34	Policy and Legal Compliance	Nor does the draft EA analyze, disclose, and present, from a cumulative impacts standpoint, what percentage of the parcels offered for sale would go towards BLM's annual oil and natural gas leasing requirements under IRA, and an analysis and forecast as to whether a sufficient amount of acreage is being offered in New Mexico, when combined with lease acreage offered in other states, to meet BLM's annual IRA requirements.	See response to letter 4 comment 9.
4	35	Policy and Legal Compliance	Given the severely small amount of acreage being offered in these states, one of which is one of the most prolific federal oil and natural gas states, it is difficult to believe that BLM will be able to meet its IRA statutory requirements in 2025. BLM has an obligation to analyze and disclose this to the public and also to inform its own decision-making.	See responses to letter 4 comments 2 and 9.

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4	36	Policy and Legal Compliance	The draft EA also fails to disclose the adverse impacts that would result to renewable energy development if BLM does not meet its statutory leasing requirements under IRA. BLM must provide this cumulative impacts analysis under NEPA to inform the public, and to inform its own decision making.	See response to letter 4 comment 9.
4	37	Policy and Legal Compliance	To comply with NEPA, FLPMA, and IRA, BLM must conduct an analysis to inform the public and its own decision-making as to what extent the lease acreage being offered goes towards meeting its mandatory statutory requirements under IRA Section 50265.	See response to letter 4 comment 9.
4	38	Renewable Energy	The draft EA's failure to analyze the impacts of offering minimal parcels for oil and natural gas leasing is compounded by the fact that the draft EA does include an analysis regarding impacts on renewable energy under its IRA statutory obligations. As discussed above, BLM arbitrarily analyzes the benefits of future renewable energy deployment but does not analyze or present the benefits of offering more American oil and natural gas to market. This significant omission renders the draft EA legally untenable.	The decision under review is "whether to make available for lease the nominated lease parcels with or without constraints, in the form of lease stipulations, as provided for in the approved land use plan." See EA Section 1.3. Renewable energy development is not part of the Proposed Action (see EA Section 2.1) and is therefore outside the scope of the NEPA analysis for this action.
4	39	Renewable Energy	In the draft EA's narrative on the No Action Alternative, BLM does attempt to present the benefits of renewable energy in the context of reducing GHG emissions: "renewable energy sources are stronger substitutes for natural gas in electricity generation." Draft EA at 99. However, this statement is incomplete at best, as EIA finds that natural gas has reduced more electricity sector emissions than wind and solar combined. Id. BLM fails to provide the appropriate corresponding analysis regarding oil and natural gas development. This analysis gap is in violation of NEPA and is arbitrary and capricious in violation of APA.	See response to letter 4 comment 38. The relative merits of various energy sources are outside the scope of the decision.
4	40	Renewable Energy	The draft EA needs to be updated to disclose that EIA found and reported that natural gas has reduced more electricity sector emissions than wind and solar combined. Id. BLM fails to do so for oil and natural gas development. The draft EA must also disclose the significant constraints confronting renewable energy expansion (e.g., lack of electric transmission infrastructure). Draft EA, at 102-104. Without correction, and full disclosure, this analysis gap is in violation of NEPA and is arbitrary and capricious in violation of the APA.	See responses to letter 4 comments 38 and 39.

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4	41	Renewable Energy	In addition, BLM's decision to analyze IRA in the context of increased renewable energy usage while failing to analyze impacts to oil and natural gas leasing or BLM's ability to comply with its IRA statutory obligations related to leasing is entirely arbitrary, capricious, and an abuse of discretion in violation of APA.	See responses to letter 4 comments 9 and 38.
4	42	Renewable Energy	BLM must update the draft EA to analyze potential beneficial impacts of both oil and natural gas and renewable energy development. BLM cannot capriciously choose to analyze the benefits of one form of energy and not another under its multiple use mandate pursuant to FLPMA. This capricious decision violates NEPA and FLPMA and is contrary to the Congressional intent of Section 50265 of the IRA. Each failure is a violation of APA.	See response to letter 4 comment 38.
5	1	Defer Parcel(s) from Lease Sale	The BLM should exercise its authority to defer parcels in this lease sale that do not comport with the guidance provided in IM 2023-007.	In accordance with 43 C.F.R. § 3120.32 <i>Expression of interest leasing preference</i> , the BLM has evaluated the parcels against the lease parcel preference criteria. After screening, IM guidance states that "The BLM will generally conduct environmental analysis for lease parcels with a high preference value first for potential inclusion in a lease sale; however, if there are no high preference parcels available, the officer may select one or more low preference parcels that present the least conflicts based on the criteria listed in the IM, including parcels deferred from previous sales, to analyze for potential inclusion in the sale." (BLM 2022b). As stated in Appendix C of the EA, all of the parcels nominated are rated as low preference based on one or more criteria; however, given the low resource concerns with these parcels and protections offered through stipulations and COAs, the BLM is moving them forward for leasing, furthering the intent of Section 50265 of the IRA, which states that the BLM may not issue a right-of-way for wind or solar energy development on federal land unless it has: 1) held an onshore oil and gas lease sale during the past 120 days, and 2) offered the lesser of a "sum total" of either 2,000,000 acres or 50% of the acreage for which EOs have been submitted for lease sales during the previous 1-year period.
5	2	Defer Parcel(s) from Lease Sale	For the reasons discussed below, we recommend deferring all seven lease parcels. In the alternative, we urge considering deferral of a subset of the lowest preference parcels. The final Leasing Rule states that the agency will continue to apply the preference criteria consistent with IM 2023-007. The IM states that the BLM "will defer lease parcels with a low preference value." An exception to such deferral occurs "[i]f there are no high preference parcels available for the sale," in which case "the office will select one or more low preference parcels that present the	See responses to letter 4 comment 2 and letter 5 comment 1. Although commenter has stated "[t]here is no need or justification for allowing this parcel to be leased," commenter has not presented an error or material omission in the BLM's analysis, or provided additional information for the BLM's consideration, and for that reason the BLM considers the comment non-substantive.

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			least conflicts based on the criteria." So long as there is one high leasing preference parcel available for the sale, the BLM should defer all parcels with any low leasing preference designation. If, based on its assessment, the BLM believes it needs to offer some parcels for lease to comply with the Inflation Reduction Act's requirements for offering acreage to in order to issue wind or solar right-of-way permits, we urge the agency, pursuant to the IM, to at least defer lease parcel 0468 that received a "low" preference designation across all criteria, including low development potential. There is no need or justification for allowing this parcel to be leased.	
5	3	Cave and Karst	The BLM should defer all parcels in areas with high or medium karst potential. The following parcels in areas with karst potential should be deferred under 43 C.F.R. § 3120.32(d), "presence of . . . important . . . resources," and 43 C.F.R. § 3120.32(b), "presence of important fish and wildlife habitats or connectivity areas," and deferred from leasing: 0468, 0470, 6845, 0465, 0466, and 6846. The Draft EA properly designates these parcels as having a "low" preference for leasing under "Recreation/Other Resources." Nonetheless, it proposes to move these parcels forward for leasing because "protections" offered through lease stipulations and conditions of approval. But SENM-LN-1 is equivocal, noting only that "special protective measures may be developed" and that this would occur during "environmental analyses." Other than SENM-S-21-CSU, which prohibits surface disturbance within 200 meters of known cave entrances, the Draft EA does not appear to develop any further protections. These parcels are located within an area in known soluble rock types with high or medium densities of significant cave systems or bedrock fractures that lead to the rapid recharge of karst groundwater aquifers from surface runoff. These areas provide critical drinking water supplies for major communities, ranching operations, and springs that support rivers and vital riparian habitat. Further, those cave and karst areas are close to the protected cave systems at Carlsbad Caverns National Park and could very well be connected through underground passages or fractures that have not yet been mapped.	Potential impacts to cave and karst resources are analyzed in AIB-13. Appendix B in the EA lists lease notices and stipulations for protection of these resources. These include, as the commenter notes, SENM-LN-1 and SENM-S-21-CSU for the CFO. As discussed in AIB-13 of the EA, all future potential development within medium, high, and critical karst occurrence zones on the nominated lease parcels would be further reviewed and mitigated at the time of proposed lease development, or during other proposed ground-disturbing activities, per STCs of the lease.

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5	4	Cave and Karst	The entire area which makes up the Carlsbad Field Office should be studied thoroughly to assess the vulnerabilities to aquifer resources and fragile karst resources, which can also be home to unique wildlife and habitat, as the cave and karst system throughout the region is deeply interconnected. Carlsbad Caverns is a designated World Heritage Area and indeed attracts visitors from around the world. A single leak from hydraulic fracturing or reinjection of "produced water," or seismic activity that has been linked to hydraulic fracturing and produced water, could have a devastating and irreversible impact on the National Park and on public health and safety. In recent years exploratory wells have run into empty space at about the same depth as Carlsbad's caverns. According to a 2007 NPS Geologic Resource Evaluation Report: Hundreds of producing oil and gas wells have been drilled north, east, and south of Carlsbad Caverns National Park. Exploratory wells have been drilled within a few thousand feet of the north and east boundaries of Carlsbad Caverns, and some of these have encountered voids at the same depth as major passages in Lechuguilla Cave (NPS 1996). At least 61 wells drilled near the park have encountered lost circulation zones in the Capitan and Goat Seep Formations, suggesting that unexplored cave passages were intersected during drilling (NPS 1993, 1996). Substantial hydrocarbon reserves and known cave resources exist immediately north of the park boundary. It is probable that exploratory drilling will intersect openings that connect with caves in the park. Resources inside the park could be at risk of contamination from toxic and flammable gases and other substances associated with the exploration and production of oil and gas.	See response to letter 5 comment 3. Regarding the suggested 1993, 1996 and 2007 National Park Service studies, the BLM responds that the closest parcel (parcel 6845) is 8.86 mile southeast of the CCNP park boundary. The CFO's Dark Canyon EIS established a Cave Protection Zone north of the park boundary, preventing exploratory drilling near the park. In addition, none of the leases intersect the Capitan and Goat Seep Formations.
5	5	Cave and Karst	A Stanford University study released in April 2018 documents seismic threats in the Permian Basin resulting from injection wells. In addition, a Durham University Study released in February 2018 noted, "The risk of human-made earthquakes due to fracking is greatly reduced if high-pressure fluid injection used to crack underground rocks is 895m away from faults in the Earth's crust." Hydraulic fracking in the Permian basin was not remotely close to current levels 15 years ago. Not only does this underscore the issue of the BLM not adequately responding to comments, it also indicates the BLM is not using the best available science. The National Environmental Policy Act (NEPA) requires the BLM to "ensure[] that the agency, in reaching its decision, will have available and will carefully consider detailed information concerning significant environmental impacts."	The BLM analyzed the risk of seismic events in Analyzed in Brief (AIB)-4, Induced Seismicity. Commenter has not pointed to any error in the BLM's analysis. The BLM has reviewed the two studies and has incorporated one study (the Durham University Study) into AIB-4 to provide additional information. The Stanford University study discusses the increasing trend of induced seismicity in the Permian Basin and highlights the Dagger Draw field as an area of concerns in the state of NM, specifically, with the remaining areas of concern in the neighboring state of Texas; this is consistent with what the BLM has already described in AIB-4 and does not alter the BLM's existing analysis or conclusions. The BLM's analysis in AIB-4 relies upon data and studies sourced from state and federal agencies as well as peer-reviewed literature, which represents the best available information on seismicity in the Permian Basin.

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5	6	Economic Activity	In addition to the potential impacts to cave systems, poorly planned leasing and oil and gas development can have a negative impact on a sustainable local tourism economy. Carlsbad Caverns and Guadalupe Mountains National Parks combined generated over \$53 million in local economic output and supported 655 jobs in 2017. According to a National Parks Conservation Association report, however: The breadth and density of oil and gas development around Carlsbad Caverns is one of the factors that has already taken a toll on the park's popularity. In the 1980s, Carlsbad received more than 700,000 visitors every year, but from 1993 to 2016 visitation decreased from 690,000 to 470,000, more than 30%. The development that might be driving visitors away includes blighting of the viewshed with drill rigs, pump jacks, and other industrialization, and the loss of dark night skies from excessive lighting and flaring in the area—all of which argues for the importance of taking care in managing leasing and land use activities near Carlsbad Caverns, Guadalupe Mountains, and other publicly accessible caves, recreational areas, groundwater resources, and agricultural activities in the area.	The factors mentioned by the commenter that may influence and effect the tourism economy for Carlsbad Caverns and Guadalupe Mountains National Parks are analyzed in the EA under AIB-17 (Visual Resources), AIB-18 (Night Skies at Carlsbad Caverns National Park), and AIB-22 (Economic Activity). Additionally, although the commenter states that tourism in the Carlsbad area declined between 1993 and 2016, the commenter does not offer data, beyond speculation, that link this reported decline to the BLM's oil and gas development. To the extent the BLM receives information bearing on its above-referenced analyses of natural resource values or its other analyses of socio-economic impacts, the BLM will consider that information.
5	7	Development Potential / Leasing Preference	The BLM should designate as low preference for leasing and defer parcels in areas with low oil and gas development potential. The BLM will preference lands with "high potential" for oil and gas development. The MLA directs the BLM to hold periodic oil and gas lease sales for "lands . . . which are known or believed to contain oil or gas deposits." Offering parcels on low potential lands precludes management for other uses. The BLM itself recently reiterated this point, explaining that the preference criteria are meant to "ensure that oil and gas leasing on public lands focuses development where there is the most potential for recovery and allows the agency to manage public lands for other uses."	See responses to letter 4 comment 2 and letter 5 comment 1.
5	8	Development Potential / Leasing Preference	The BLM designated parcel 0468 as having lower preference for leasing not only in terms of development potential, but also for its proximity to existing development, habitat conflicts, cultural resource conflicts, and recreation/other resource conflicts. Accordingly, we urge the BLM to defer leasing this parcel.	See responses to letter 4 comment 2 and letter 5 comment 1.

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5	9	Climate Change, Green House Gases, and Social Cost of Carbon	The BLM must factor greenhouse gas emissions and related climate impacts stemming from this lease sale into its leasing decision-making and should defer parcels based on the projected impacts. We appreciate the BLM's analysis and discussion of greenhouse gas (GHG) emissions likely to result from this lease sale. However, the BLM fails to factor GHG emissions into leasing decision-making. The BLM claims that it "lacks the data and tools to estimate specific, climate-related effects from the sale" and that there are no established thresholds, qualitative or quantitative, for NEPA analysis to assess the GHG emissions or social cost of an action in terms of the action's effect on the climate, incrementally or otherwise. There is also no scientific data in the record, including scientific data submitted during the comment period for this lease sale, that would allow the BLM, in the absence of an agency carbon budget or similar standard, to evaluate the significance of the GHG emissions from this proposed lease sale. These methodological shortcomings prevent the BLM from qualitatively comparing alternatives, and the BLM has therefore not exercised its discretion to tailor this lease sale to account for global climate change. Yet, the BLM does have tools to ascertain the potential climate impacts of its leasing decisions for this sale, which it deploys in the Draft EA: the social cost of greenhouse gas emissions. Earlier this year, a court held that "the complexity of the task does not give the [BLM] a free pass to avoid making these tough decisions by asserting that GHG emissions did not factor into its decision-making."¹⁹ While we appreciate the analysis of GHG emissions in the Draft EA, the BLM must take the further step of "explain[ing] how its GHG analysis inform[s] the decision to select" lease parcels.	The BLM analyzes potential impacts from GHGs in detail in the EAs (see Sections 3.6.1 and 3.6.2). The BLM quantifies direct, indirect, and cumulative emissions from the combustion of oil and gas and discusses the significance of these emissions. The BLM takes a hard look at the environmental impacts of leasing, including quantifying and forecasting aggregate GHG emissions from oil and gas development and addressing the environmental effects of downstream oil and gas use including the effects on climate. The EA also incorporates by reference the 2022 ARTR as well as the 2022 BLM Specialists Report on Annual Greenhouse Gas Emissions and Climate Trends which provides a more detailed assessment of cumulative emissions, climate impacts, and reputable climate science sources. Based on these analyses, the BLM has concluded that GHG emissions from the decision do not rise to significance. Although the commenter may not agree with the BLM's conclusion, the comment does not allege a specific error that the BLM could address and to that extent, it is non-substantive. Regarding <i>Wilderness Soc'y v. United States DOI</i>, No. 22-cv-1871 (CRC), 2024 U.S. Dist. LEXIS 124730, at *10 (D.D.C. July 16, 2024), a comment is non-substantive to the extent it relies on an interpretation of legal authorities that are the best evidence of their contents. In this case, although the comment is non-substantive in this aspect, commenter and the BLM appear to agree on the interpretation. See response to letter 4 comment 16.
5	10	Climate Change, Green House Gases, and Social Cost of Carbon	The Draft EA explains that this sale could incur costs exceeding \$265 million. But the BLM fails to explain how leasing justifies these enormous costs. The NEPA analysis must offer this explanation. Moreover, in light of these costs, we urge the BLM to defer the seven parcels for this lease sale.	Executive Order 14154, Unleashing American Energy (Jan. 20, 2025), and a Presidential Memorandum, Ending Illegal Discrimination and Restoring Merit-Based Opportunity (Jan. 21, 2025), require the Department to strictly adhere to the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321 et seq. Further, such Order and Memorandum repeal Executive Orders 12898 (Feb. 11, 1994) and 14096 (Apr. 21, 2023). Because Executive Orders 12898 and 14096 have been repealed, complying with such Orders is a legal impossibility. The BLM verifies that it has complied with the requirements of NEPA, including the Department's regulations and procedures implementing

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				NEPA at 43 C.F.R. Part 46 and Part 516 of the Departmental Manual, consistent with the President's January 2025 Order and Memorandum. Estimating the economic benefits associated with oil and gas leasing is not required for NEPA. The BLM analyzes the impacts associated with the alternatives using the best available information, which is typically not monetized estimates of benefits or costs. See also response to letter 4 comment 7.
6	1	Wildlife - Big Game	As noted in our scoping comments, the State of New Mexico has identified the southeastern plains landscape—where the BLM proposes to lease parcels—as the first priority area in its New Mexico State Action Plan for Implementation of Department of Interior Secretarial Order 3362. In the event any of these parcels are sold, we urge the BLM to ensure that operators conduct thorough site surveys prior to development.	The EA addresses impacts to general wildlife and game species in AIB-11, including stipulations and COAs. Additionally, none of the nominated lease sale parcels are within known mapped migration corridors. Therefore, attaching stipulations related to big-game corridors to the parcels is not warranted at this time. As stated in AIB-11 of the EA, pre-disturbance surveys would be required at the time of proposed lease development in accordance with STCs of the lease. The surveys would analyze potential effects on game and non-game species habitat. Avoidance, minimization, and/or mitigation measures would also be determined at that time. The BLM has the authority under STCs to attach COAs at the site-specific level to minimize significant adverse effects on resource values at the time operations are proposed.
6	2	Wildlife - Big Game	Further, the agency should attach timing, density, surface use, and other stipulations to the parcels in advance of leasing as appropriate and conditions of approval that will minimize impacts to big game habitat and migration corridors.	See response to letter 6 comment 1.
6	3	Wildlife - Big Game	While we appreciate the Carlsbad District Office's proposed use of the New Mexico Department of Game and Fish's Oil and Gas Development Guidelines, aspects of this document may be outdated. We urge the agency to consider the best available science as it develops conditions of approval, including the following: • Mark Hebblewhite & Evelyn H. Merrill, Trade-offs between predation risk and forage differ between migrant strategies in a migratory ungulate, ECOLOGY (Dec. 1, 2009). • Kevin L. Monteith et al., Timing of seasonal migration in mule deer: effects of climate, plant phenology, and life-history characteristics, ECOSPHERE (Apr. 27, 2011). • Joseph M. Northrup & George Wittemyer, Characterising the impacts of emerging energy development on wildlife, with an eye towards mitigation, ECOLOGY LETTERS (Aug. 28, 2012). • Hall Sawyer, et al., Mule deer and energy development—Long-term trends of habituation and abundance, GLOBAL CHANGE BIOLOGY (Apr. 4, 2017) (see also studies cited within this article). • Hall Sawyer et al., Long-term effects of energy development on winter distribution and residency of pronghorn in the Greater Yellowstone Ecosystem, CONSERVATION SCIENCE AND	See response to letter 6 comment 1. Regarding the suggested references, the BLM has reviewed the studies and AIB-11 (General Wildlife and Game Species) has been revised to reference three of the studies which were relevant to the analysis (including articles by Northrup and Wittemyer 2013, Sawyer et al. 2017, and Sawyer et al. 2019). The remaining studies were found to not be relevant to the analysis since they do not examine the effects of energy development, particularly oil and gas development, on wildlife or big game species, and do not alter any of the analysis or conclusions presented in AIB-11. The BLM's analysis in AIB-11 relies upon NMDFG sources and other peer-reviewed studies which represents the best available information on game in the leasing area.

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			PRACTICE (July 2, 2019). • Thomas A. Morrison et al., Drivers of site fidelity in ungulates, JOURNAL OF ANIMAL ECOLOGY (Jan. 22, 2021).	
6	4	Development Potential / Leasing Preference	The BLM should not offer parcels on lands with low or no potential for recovering oil and gas reserves, as it proposes to do here. The BLM has identified Parcel NM-2025-02-0468 as having low potential for development, as well as low preference for all other screening criteria. As such, we urge the BLM to defer this parcel.	See responses to letter 4 comments 2, 10, and 27.
6	5	Development Potential / Leasing Preference	As described in our scoping comments, the BLM treats the presence of a lease—whether or not it is likely to be developed—as an impediment to actions or management policies that could benefit other uses. Leasing low potential lands is unfair to taxpayers, and in addition, by locking up these lands for oil and gas interests, the BLM fails to manage them for other uses in violation of the Federal Lands Policy Management Act's multiple-use mandate.	See responses to letter 4 comments 2, 10, and 27. Additionally, the EA addresses all of the other known resource values for the lease area and did not identify significant impacts. To the extent the comment does not allege a specific error in the BLM's analysis, the BLM considers it non-substantive.
6	6	Development Potential / Leasing Preference	The Final Leasing Rule and IM 2023-007 provide that lands with low or no potential will be given a low preference for leasing, and IM 2023-007 further states that "if there are no high preference parcels available for the sale, the office will select one or more low preference parcels" The Final Leasing Rule specifically provides that this prioritization criteria is to be considered in the scoping process, and may be applied after scoping and before publication of the applicable NEPA document. We applaud the BLM's commitment to prioritize lands with high potential for oil and gas development over those with moderate, low and no potential. Consistent with this policy, we urge the BLM to focus leasing in areas with medium to high potential and manage lands with low potential for other uses.	See responses to letter 4 comments 2, 10, and 27 and letter 6 comment 5.
6	7	Environmental Justice	The BLM must consider, avoid, and mitigate potential impacts of developments to nearby communities, minority populations, and low-income populations. As we note in our scoping comments, it is critical that the BLM consider the potential impacts oil and gas development may have on the health, safety, and wellbeing of front-line communities, especially Indigenous peoples, people of color, and low-income populations. We appreciate the agency's recognition of these potential impacts on those who live, work, and recreate nearby and its commitment to continued outreach and engagement with these front-line communities as the agency moves forward.	To the extent the comment does not allege a specific error in the BLM's analysis, the BLM considers it non-substantive. See also response to letter 4 comment 24.

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7	1	Policy and Legal Compliance	Recent and upcoming legislation, rulemaking, and regulatory changes do not absolve BLM of its duties under NEPA, FLPMA, the ESA, the APA, and all other applicable laws and regulations. The agency cannot rely on emissions reductions goals or other measures in statutes like the Inflation Reduction Act to avoid analyzing, disclosing, and attempting to mitigate or avoid the impacts of oil and gas leasing.	To the extent the comment does not allege a specific error in the BLM's analysis, the BLM considers it non-substantive. Generally, the BLM makes mineral resources, such as oil and gas, available for development in accordance with laws including the MLA and FLPMA. See EA Sections 1.2 and 1.4 for information regarding the BLM's requirements under MLA, FLPMA, and other statutes and regulations. Chapter 2 of the 2022 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends, incorporated in the EA by reference, discusses the relationship between BLM's coal, oil, and gas leasing programs with other laws and policies at the federal and state level.
7	2	Policy and Legal Compliance	BLM Is Not Required to Hold a Lease Sale or Issue Any Leases—Even Following the Passage of the Inflation Reduction Act.	To the extent the comment does not allege a specific error in the BLM's analysis, the BLM considers it non-substantive. Generally, the need for the action is established by the BLM's responsibility under the MLA, as amended, is to make mineral resources, such as oil and gas, available for development. See EA Sections 1.2 and 1.4 for information regarding the BLM's requirements under MLA, FLPMA, and other statutes and regulations. BLM issued updated oil and gas leasing guidance on November 21, 2022, which includes seven IMs, that will enable consistent implementation of the IRA's changes to agency's oil and gas programs. See Section 1.4.2 and Appendix C of the EA for more details.
7	3	Policy and Legal Compliance	As an initial matter, we note that nothing in the recently enacted Inflation Reduction Act of 2022, H.R. 5376 ("IRA" or "Act") requires BLM to offer any onshore oil and gas leases or alters BLM's inherent authority under FLPMA and the MLA to hold or postpone lease sales or to issue leases sold.	See response to letter 7 comment 2.
7	4	Renewable Energy	While the IRA conditions the Interior Department's ability to issue rights-of-way for renewable energy development on new oil and gas leasing, BLM cannot take as a given that new renewable rights-of-way must be issued in the coming months. The entire purpose of prioritizing renewable energy development on public lands is to benefit the climate and facilitate a just transition. If oil and gas leasing pursuant to the IRA offsets or eliminates those climate benefits, the rationale for renewable projects disappears. BLM should not approve renewable projects in that circumstance, because doing so consumes significant staff resources and the projects will cause their own adverse impacts to public lands and wildlife.	See response to letter 4 comment 38.
7	5	Renewable Energy	Before moving forward with any new oil and gas lease sales, BLM must provide a reasoned explanation for that choice, supported by record evidence relevant to the IRA. Among other relevant factors, BLM must consider: (a) whether and how many renewable rights-of-way are ready for issuance; (b) when those renewable projects	To the extent this comment relies on an interpretation of the IRA, the BLM considers it non-substantive because legal authorities are the best evidence of their contents. See also response to letter 4 comment 38.

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			would come on-line and how the energy they produce would compare with the energy and carbon pollution generated by production on the proposed oil and gas leases; and (c) alternatives that would minimize or mitigate the carbon pollution from the proposed oil and gas leases.	
7	6	Climate Change, Green House Gases, and Social Cost of Carbon	The BLM May Not Assume GHG Reductions based on Passage of the IRA. The IRA was signed into law by President Biden on August 16, 2022. The administration has asserted that passage of the Act will result in a 40%—or one gigaton—reduction of greenhouse gas emissions by 2030, and has lauded the Act as a means to “significantly cut the social costs of climate change.” There is little question that the Act’s \$369 billion investment in energy security and climate change programs represents an essential infusion of resources toward tackling the climate crisis. Nonetheless, BLM may not rely on the Act as a basis for assuming a quantifiable decrease in emissions or as an offset to emissions under the lease sale for three reasons: (1) the Act itself contains provisions that undercut its goals of effecting a clean energy transition by perpetuating the federal oil and gas program, contrary to all scientific mandates; (2) even provisions that directly address supply-side sources of greenhouse gas emissions have the potential to increase emissions in the near-term; and, finally; (3) the majority of the IRA’s climate provisions will vary in efficacy (i.e. emissions reductions) depending on how they are implemented by the federal government, as well as state and local governments, and it is therefore impossible to reliably assume that a given level of reductions will be achieved.	To the extent this comment relies on an interpretation of the IRA, the BLM considers it non-substantive because legal authorities are the best evidence of their contents. The BLM analyzes potential impacts from GHGs in detail in the EAs (see Sections 3.6.1 and 3.6.2). The BLM quantifies direct, indirect, and cumulative emissions from the combustion of oil and gas and discusses the significance of these emissions. The BLM takes a hard look at the environmental impacts of leasing, including quantifying and forecasting aggregate GHG emissions from oil and gas development and addressing the environmental effects of downstream oil and gas use. The EA also incorporates by reference the 2022 ARTR as well as the 2022 BLM Specialists Report on Annual Greenhouse Gas Emissions and Climate Trends which provides a more comprehensive assessment of cumulative emissions, climate impacts, and reputable climate science sources. The EA analysis does not assume GHG reductions based on passage of the IRA.
7	7	Climate Change, Green House Gases, and Social Cost of Carbon	Any New Leasing Authorized by the IRA Runs Counter to Climate Science Section 50265 of the Act requires that for any renewable energy right-of-way issued during the first ten years following ratification of the Act, at least one onshore lease sale must have been held in the 120 days prior to its issuance and a minimum number of acres must have been offered for lease during the twelve-month period preceding the right-of-way’s issuance. As discussed in depth in section II.C, below, there is little ambiguity about the science of climate change. In order to maintain a coin flip chance of maintaining warming below 1.5°C, global fossil fuel production must decrease by approximately 6% per year between 2020 and 2030, and approximately 60% of global fluid mineral resources must be left in the ground.	The BLM considers this comment non-substantive because it fails to allege an error or material omission in the BLM’s analysis, and does not submit any new information for the BLM’s consideration. The BLM also considers the comment non-substantive to the extent the comment relies on an interpretation of the IRA, which is the best evidence of its contents. For sections of the EA that analyze GHG emissions and climate impacts, see response to letter 7 comment 6.

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			For developed nations, including the U.S., in order to maintain a 50% or better chance of avoiding 1.5°C of warming, “coal production needs to fall by 50% within five years and be effectively eliminated by 2030,” while oil and gas production must be cut by 74% by 2030 and end by 2035. To maintain a 67% chance of avoiding 1.5°C of warming, the U.S. must end oil and gas production by 2031. It is clear that extreme weather events, and their human, ecological, and economic costs, are already harming, killing, and displacing millions of people around the world. Instead of falling, greenhouse gas concentrations continue to rise, and modest reductions have done little to check their trajectory. Without drastic action, “the physical and socioeconomic impacts of climate change will be devastating. Irreversible physical changes in the climate system, known as tipping points, cannot be ruled out and could have significant global and regional consequences.” International pledges—including by the United States—are insufficient to avert catastrophic temperature increases and are woefully insufficient to constrain global temperature rise below 1.5°C. Moreover, most nations that pledged reductions are nowhere near meeting those pledges. By dictating that additional onshore leasing must occur to allow development of urgently needed renewable energy infrastructure on public lands, the Act holds hostage potential emissions reductions to the continuance of federal fossil fuel leasing, in direct contravention of the scientific reality that fossil fuel production must end within the decade. Moreover, the requirement that a quota for both sales held and acres offered be met before any new right-of-way for renewable energy development can be issued virtually ensures that the minimum amounts set forth in Section 50265 will be exceeded, because BLM must ensure that these criteria are met proactively, rather than in response to a particular renewable development project. The IRA's mandate for additional onshore fluid mineral development over the next decade jeopardizes humanity's ability to constrain warming to 1.5°C, and flies in the face of an overwhelming scientific consensus.	
7	8	Climate Change, Green House Gases, and Social Cost of Carbon	Provisions of the IRA Designed to Reduce GHGs may have the Opposite Effect Section 60113 of the IRA amends the Clean Air Act to implement the Methane Emissions Reduction Program (MERP), which provides both incentives for methane reduction and taxes on excessive releases of the greenhouse gas from oil and gas infrastructure. Because the MERP program allows EPA to use	See responses to letter 7 comments 6 and 7.

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			and enforce state methane regulations when they meet or exceed federal regulations, it is entirely possible – due to tax subsidies and other factors that may incentivize leasing in currently undeveloped areas – that implementation of MERP may have the effect of actually increasing oil and gas production and consequent methane emissions in states that already have strong methane regulations at a time when production should be decreasing. The effects of this increase will be compounded by the fact that neither these states nor the EPA have implemented or shown a willingness to implement strong enforcement mechanisms, meaning that the effects of such “strong regulations” are diluted. GHG concentrations in the atmosphere have risen dramatically in the past two years despite efforts at reduction. These increases have been particularly troubling with respect to methane. Because methane is a far more potent greenhouse gas than CO2 over the short-term, additional methane emissions made possible by the IRA’s fossil-fuel leasing mandates will undercut—at least in part—the longer-term consumption-based reductions the IRA is designed to encourage. This is particularly true with respect to methane because of its high near-term radiative forcing characteristics, which have the potential to trigger climate feedback loops that may be irreversible by the time reductions achieved through energy infrastructure changes take effect. BLM must acknowledge these realities, and must incorporate them into its analysis of cumulative effects for the lease sales, particularly in the context of disclosing the public health and climate impacts of burning fossil fuels from the lease parcels.	
7	9	Climate Change, Green House Gases, and Social Cost of Carbon	The IRA’s Emissions Reduction Potential Depends on Implementation Most of the IRA’s provisions seek to facilitate the transition away from fossil-fuel energy sources by expanding tax credits for and investing in renewable energy, energy efficiency, and as-yet unproven carbon capture and storage technology. Because nothing in the legislation requires emissions cuts, its efficacy at reducing emissions will depend on how quickly lower and zero-emission energy sources can displace fossil-fuel based energy sources. This transition in turn depends on the willingness and ability of state and local government entities to overcome transmission shortages, political agendas, and setbacks in the global supply chain. As a result, the IRA’s provisions may be viewed as creating the potential for significant emissions cuts, rather than guaranteeing	See responses to letter 7 comments 6 and 7.

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			them. As current climate science tells us, immediate cuts are not only desirable, they are an absolute necessity if the direst outcomes of climate change are still to be averted. Because of this reality, NEPA dictates that BLM may not count on the IRA as an offset to emissions projected under these lease sales but must instead analyze the IRA in the context of its imprimatur of continuing fossil-fuel development on public lands. And particularly in the absence of a significance threshold (see <i>infra</i> at II.B) for these emissions and impacts, BLM cannot assume that any speculative offsets from the IRA would render GHG emissions and climate impacts from this lease sale “insignificant.” Moreover, even if the IRA did result in substantial emissions cuts in the future, NEPA requires BLM to take a hard look at GHG emissions and impacts—and other potentially significant impacts—of oil and gas leasing and development before moving forward with a lease sale.	
7	10	Renewable Energy	BLM must disclose which wind or solar rights-of-way are supported by the New Mexico oil and gas lease sale and should establish publicly accessible tracking for renewable rights-of-way. The IRA, and now BLM, tie issuance of rights-of-way for wind and solar development on public lands to recent issuance of oil and gas leases within the last 120 days (and offers for lease within the last year). Accordingly, BLM must identify which renewable development rights-of-way the proposed New Mexico oil and gas lease sale will facilitate. While BLM’s April 2023 Instruction Memorandum 2023-036, “Inflation Reduction Act Conditions for Issuing Rights-of-Way for Solar or Wind Energy Development,” provides the agency instructions for issuing rights-of-way in compliance with the IRA, it does not identify the specific rights-of-way under consideration. BLM must provide information on upcoming wind or solar rights-of-way to the public through this NEPA process and make available any publicly-accessible tracking system for renewable rights-of-way that are under consideration. BLM must explain in its NEPA reviews which specific renewable rights-of-way are facilitated by these decisions. For the sake of efficiency and transparency, given the leasing provisions of the IRA, Commenters further request that in addition to providing this information in specific NEPA reviews, BLM establish a publicly-accessible system for tracking potential and recently-issued rights-of-way for wind and solar development on public lands.	The decision under review is “whether to make available for lease the nominated lease parcels with or without constraints, in the form of lease stipulations, as provided for in the approved land use plan.” See EA Section 1.3. To the extent this comment seeks to interpret the IRA and IM 2023-036, the BLM considers it non-substantive because those authorities are the best evidence of their contents. While the acres proposed for lease in this sale would count toward “the sum total of acres offered for lease in onshore lease sales” in the IRA, this EA does not concern the issuance of a right-of-way for wind or solar energy development. The BLM will calculate the acreage offered for lease for purposes of the IRA. Any calculation of the required acreage to issue rights of way pursuant to the IRA is outside the scope of this EA. It is also outside its scope because the calculation necessarily happens at the national level, and not in a state-level decision such as the one at issue here.

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7	11	Climate Change, Green House Gases, and Social Cost of Carbon	BLM's NEPA Analysis must Address whether any Proposed Leasing is Consistent with U.S. Climate Commitments, and Address Its Full Costs and Benefits. BLM must consider and address whether the proposed leasing is consistent with U.S. climate commitments and national policy. The United States committed in 2021 to reduce the nation's greenhouse gas emissions 50–52% by 2030. President Biden also has recognized the need for action, stating that the "United States and the world face a profound climate crisis. We have a narrow moment to pursue action . . . in order to avoid the most catastrophic impacts of that crisis." Exec. Order No. 14008, Tackling the Climate Crisis at Home and Abroad, 86 Fed. Reg. 7,619, 7,619 (Jan. 27, 2021). Similarly, the Interior Department has acknowledged the need to address climate change when making management decisions on federal lands. Interior Secretarial Order 3289, Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources (Sept. 14, 2009), stated that "the realities of climate change require us to change how we manage the land, water, fish and wildlife, and cultural heritage and tribal lands and resources we oversee"; and acknowledged that the Department of the Interior is "responsible for helping protect the nation from the impacts of climate change." And in 2021, the Secretary recognized that the "Nation faces a profound climate crisis," ordering the Interior Department to "prioritize[] action on climate change." Interior Secretarial Order 3399, Department-Wide Approach to the Climate Crisis and Restoring Transparency and Integrity to the Decision-Making Process (April 16, 2021). A fundamental disconnect exists, however, between the federal government's commitment to address climate change, and how public lands are managed for energy production. A recent paper calculates that lifecycle emissions from federal fossil fuel development resulted in an average of 1,408 million metric tons (MMT) of Carbon Dioxide equivalent (CO₂e) per year since 2005—the equivalent of 377 coal-fired power plants, or the emissions from 303 million cars—and are projected to be around 1,130 MMT CO₂e by 2030. These emissions will amount to around 20% of total U.S. greenhouse gas emissions each year. BLM has failed to adequately address national climate policy in the draft EA for the proposed lease sale.	The decision under review is "whether to make available for lease the nominated lease parcels with or without constraints, in the form of lease stipulations, as provided for in the approved land use plan." See EA Section 1.3. To the extent the comment raises issues outside the scope of this decision—including U.S. climate commitments, COP 28 and the Paris Accord—the BLM considers it non-substantive. It is also non-substantive to the extent it purports to interpret legal authorities including Executive Order 14008 and Secretarial Order 3399, because those authorities are the best evidence of their contents. Executive Order 14154, Unleashing American Energy (Jan. 20, 2025), and a Presidential Memorandum, Ending Illegal Discrimination and Restoring Merit-Based Opportunity (Jan. 21, 2025), require the Department to strictly adhere to the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321 et seq. Further, such Order and Memorandum repeal Executive Orders 12898 (Feb. 11, 1994) and 14096 (Apr. 21, 2023). Because Executive Orders 12898 and 14096 have been repealed, complying with such Orders is a legal impossibility. The BLM verifies that it has complied with the requirements of NEPA, including the Department's regulations and procedures implementing NEPA at 43 C.F.R. Part 46 and Part 516 of the Departmental Manual, consistent with the President's January 2025 Order and Memorandum. The Proposed Action, to offer for lease parcels for oil and gas development, and its effects have been evaluated in a manner consistent with NEPA. See 42 U.S.C. § 4336 ("An agency shall prepare an environmental assessment with respect to a proposed agency action that does not have a reasonably foreseeable significant effect on the quality of the human environment, . . . Such environmental assessment shall be a concise public document prepared by a Federal agency to set forth the basis of such agency's finding of no significant impact or determination that an environmental impact statement is necessary."); see also 43 C.F.R. § 46.300. The BLM analyzes potential impacts, including cumulative impacts, from greenhouse gases (GHGs) in detail in the environmental assessment (EA), Sections 3.6.1 and 3.6.2. The EA incorporates by reference information from the ARTR. The emissions used in this analysis are estimated using the 2023 BLM Lease Sale Emissions Tool and evaluated with the U.S. Environmental Protection Agency (EPA) GHG equivalency calculator. Regarding the "recent paper" cited and the claim that "emissions will amount to around 20% of total U.S. greenhouse gas emissions each year", the BLM responses that the Annual GHG report includes EIA yearly total long-term projection data (federal and US total) through 2050 in the report spreadsheet. The Annual GHG report has been incorporated by reference in this EA document.

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			Relatedly, BLM's NEPA analysis must address the social and economic costs resulting from development of any leases it offers, and explain what benefits warrant incurring those costs. We appreciate that the draft EA includes the social cost of greenhouse gases (SC-GHG) metric. Draft EA at 89. However, while BLM uses this metric to project that foreseeable development would cause millions of dollars in social and environmental harms, BLM provides no analysis on why it would choose to incur such enormous societal costs by proceeding with leasing, nor any discussion of how its cost analysis informs the agency's decision making. Id. Most recently, at COP28, the parties to the Paris Agreement acknowledged the need for a just transition away from fossil fuel energy sources and a phase-out of fossil fuel subsidies. BLM's continued authorization of fossil fuel leasing and development is contrary to these international goals, and seriously undermines U.S. progress toward meeting them.	
7	12	Human Health and Safety	WORC v. BLM requires BLM to analyze the climate and non-climate public health effects of downstream use of fossil fuels from oil and gas leases. In a recent decision, the federal District Court in Montana held that BLM violated NEPA in amending the Buffalo Field Office Resource Management Plan ("RMP"). Specifically, the court held that BLM failed to take a hard look at the climate and non-climate public health impacts of downstream use of fossil fuels produced under the plans: "BLM ... must disclose the public health impacts, both climate and non-climate, of burning fossil fuels from the planning areas." WORC v. BLM, No. 4:20-CV-00076-GF-BMM, 2022 WL 3082475, at *8 (D. Mont. Aug. 3, 2022) ("WORC v. BLM"). The court instructed BLM to correct the NEPA deficiencies the court identified in both the remand for the RMPs and in any future analyses supporting fossil fuel leases within the planning areas. Under the court's clear instruction to BLM, "[a]ny new or pending leases of coal, oil, or gas resources in the planning areas subject to the Buffalo RMP and the Miles City RMP must undergo comprehensive environmental analyses in compliance with this order and all existing procedural requirements under NEPA and the APA." Id. at *8. At a minimum BLM must analyze and disclose the climate and non-climate public health impacts of downstream use of fossil fuels from these leases, which it has not adequately done in the Draft EA. While the Montana District Court order specifically directs BLM's analysis with respect to those leases within the	To the extent this comment purports to interpret legal authorities that are the best evidence of their contents, the BLM considers it non-substantive. The EA analyzes potential human health impacts in AIB-21, including non-climate related health effects associated with occasional fire starts; spills of hazardous materials, hydrocarbons, produced water, or hydraulic fracturing fluid and corresponding potential contamination of air, soil, or water; exposure to naturally occurring radioactive material (NORM) in drill cuttings or produced water; traffic congestion and collisions from commercial vehicles and heavy use; infrequent industrial accidents; presence of hydrogen sulfide (H₂S); or increased levels of fugitive dust (PM₁₀ and PM_{2.5}), other criteria pollutants, VOCs, and hazardous air pollutants (HAPs). The BLM also discloses potential downstream and indirect effects of the leasing decision in Section 3.6.1 on air quality, specifically Section 3.6.1.2, Environmental Effects. Additional information regarding the human health and safety effects of GHG emissions can be found in the 2023 BLM Specialist Report on Annual GHG Emissions and Climate Trends, which is incorporated by reference into the EA. The comment does not allege any specific inadequacies or inaccuracies within these analyses or submit new substantive information that the BLM could consider.

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			Buffalo Field Office, once BLM analyzes foreseeable downstream impacts for those Montana leases, there is no reason to expect it could not undertake the same analysis for the lease sale at issue here, or for any other lease sales. NEPA requires BLM to analyze foreseeable indirect effects, 40 C.F.R. § 1508.1(g)(2), and this provides BLM with the independent obligation to analyze non-climate, public health effects of its leasing decisions for New Mexico, including non-climate public health effects of foreseeable downstream end-use of fossil fuels. Several of the Conservation Groups joining this letter recently identified for BLM the myriad non-climate public health effects of fossil fuel combustion, which BLM should use as part of its analysis here. Additionally, the recent decision in <i>Held v. Montana</i> illustrates the need to take into account many climate and public health impacts of downstream use of fossil fuels, particularly with regards to children's health, now and for future generations.	
7	13	Policy and Legal Compliance	...nothing in the IRA or other recent and upcoming legislation or regulatory changes obviates the need for BLM to take a hard look at potentially significant impacts of oil and gas leasing and development, and otherwise meet its NEPA obligations for this lease sale and the federal oil and gas program as a whole.	This comment is non-substantive in that it does not allege any specific error or material omission from the BLM's analysis. But see also response to letter 7 comment 2.
7	14	NEPA Compliance	Adequate NEPA Review Under Secretarial Order 3399 Is Required Prior to Offering These Leases for Sale. On July 16, 2020, the Council of Environmental Quality (CEQ) published in the Federal Register its final rule to revise the NEPA regulations (2020 Rule), which went into effect on September 14, 2020. The 2020 Rule immediately drew five lawsuits challenging the Rule on a variety of grounds, including under the Administrative Procedure Act, NEPA, and the Endangered Species Act, contending that the 2020 Rule exceeded CEQ's authority and that the related rulemaking process was procedurally and substantively defective. <i>Wild Va. v. Council on Env't Quality</i>, No. 3:20cv45 (W.D. Va. 2020); <i>Env'tl. Justice Health All. v. Council on Env't Quality</i>, No. 1:20cv06143 (S.D.N.Y. 2020); <i>Alaska Cmty. Action on Toxics v. Council on Env't Quality</i>, No. 3:20cv5199 (N.D. Cal. 2020); <i>California v. Council on Env't Quality</i>, No. 3:20cv06057 (N.D. Cal. 2020); <i>Iowa Citizens for Cmty. Improvement v. Council on Env't Quality</i>, No. 1:20cv02715 (D.D.C. 2020). Following the inauguration of President Biden in January 2021, CEQ moved the courts to stay the litigation mentioned above, pending the new administration's review of the 2020 Rule.	The BLM considers this comment non-substantive, as it relies exclusively on interpretations of legal authorities that are the best evidence of their own content and does not allege with any specificity an error or material omission in the BLM's analysis. BLM continues to ensure that NEPA analysis is consistent with BLM's current regulations and ongoing guidance to comply with the requirements of the statute. Discussion of climate science and predicted impacts, including the reasonably foreseeable and cumulative GHG emissions associated with BLM's oil and gas leasing actions, is included in the BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends (2022). This report presents the estimated emissions of greenhouse gases attributable to 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 the analysis for this proposed lease sale.

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			In response to CEQ and joint motions, the districts courts have issued temporary stays in each of the cases, except for Wild Virginia v. Council on Environmental Quality, which the district court dismissed without prejudice on June 21, 2021, and is currently on appeal to the U.S. Court of Appeals for the Fourth Circuit. Prior to the effective date of the Phase 2 Rule, under the plain terms of NEPA and Secretarial Order 3399, the BLM's NEPA processes for the proposed Q1 '25 Lease Sale must take place under the CEQ's pre-2020 regulations implementing NEPA as modified by its Phase 1 Final Rule. As set forth below, BLM's NEPA analysis must also include the cumulative impact analysis of GHG emissions in the 2021 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends from Coal, Oil, and Gas Exploration and Development on the Federal Mineral Estate, (hereinafter "Specialist Report"). Moreover, in January 2023, the CEQ issued interim NEPA Guidance on Consideration of Greenhouse Gas Emissions and Climate Change (CEQ Interim Guidance). In the Guidance, CEQ recognizes both the urgency of the climate crisis and its fundamental relevance to NEPA, stating: "The United States faces a profound climate crisis and there is little time left to avoid a dangerous—potentially catastrophic—climate trajectory. Climate change is a fundamental environmental issue, and its effects on the human environment fall squarely within NEPA's purview." 2023 Interim CEQ Guidance at 1197. The CEQ Interim Guidance also recognizes that climate change implicates environmental justice, and directs agencies to analyze and address environmental justice impacts, including cumulative impacts. Id. at 1197, 1198, 1203, 1209. Importantly, the Guidance directs agencies to analyze both the impacts of a proposed action on climate change, and the impacts of climate change on a proposed action and its environmental impacts. Id. at 1197. "Environmental" impacts under NEPA are broadly defined, and include ecological, cultural, economic, social, health and environmental justice impacts. See 40 C.F.R § 1508.1(g)(4). BLM should ensure that its analysis and disclosure of GHG emissions and climate change impacts, including climate justice considerations and impacts, adhere to this Guidance. On April 16, 2021, the Secretary of the Interior issued Secretarial	

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			Order 3399, which directs Interior's bureaus and offices to "not apply the 2020 Rule in a manner that would change the application or level of NEPA that would have been applied to a proposed action before the 2020 Rule went into effect." To the extent BLM may rely on or apply the 2020 Rule for purposes of administering this lease sale proposed for Q1 '25, we find that reliance on and application of the 2020 Rule unlawful for the reasons explained in the stayed litigation of the 2020 Rule referenced above. Further, on April 20, 2022, CEQ finalized the first of two proposed rulemakings (the "Phase 1 Final Rule") to revise its NEPA regulations pursuant to direction set forth in Executive Order No. 14008, Tackling the Climate Crisis at Home and Abroad (EO 14008) and Executive Order 13990, Protecting Public Health and the Environment and Restoring Science to Tackle Climate Change (EO 13990). Both executive orders directed federal agencies to engage in a comprehensive review of regulations issued during the previous administration. The Phase 1 Final Rule involved a narrow set of revisions essentially restoring long-standing regulations that were in effect prior to the promulgation of the 2020 Rule. The proposed Phase 2 Rule, published in the Federal Register on July 31, 2023, would bolster agency decision-making by including important provisions for the consideration of climate change and environmental justice effects of a proposed action.	
7	15	NEPA Compliance	BLM Must Prepare an EIS to Address the Cumulative Impacts of All Lease Sales Proposed for 2024. As set forth above in section I.A., the parcels proposed for sale in New Mexico, including those explicitly commented on here, are driven by the Interior Department's incorrect rationale that the IRA mandates new oil and gas leasing. In addition, BLM has proposed lease sales in other states throughout the country, including the Montana-Dakotas, Colorado, and Wyoming in 2024. Each of the proposed lease sales in 2024 are plainly part of a larger national initiative to implement the IRA and must be analyzed as such under NEPA. That means preparing an environmental impact statement (EIS) to address the cumulative impacts of the tens of millions of acres that may be leased both onshore and offshore. Cumulative impacts include not only those related to climate and greenhouse gases, but also wildlife habitat, water pollution, impacts to wildlife and recreation and other uses of these lands and waters, health	Under NEPA, an agency need not prepare an EIS if it determines the action will not have significant effect on the human environment or where such effects may be mitigated by adoption of appropriate measures. The level of environmental analysis conducted by the BLM the EA is consistent with the purpose and requirements of NEPA. Additionally, the concurrent offering of leases across multiple states does not constitute a connected action for purposes of NEPA analysis for several reasons: 1) the individual lease sales are not part of or dependent on a larger proposed action to proceed, and 2) the concurrent timing of the lease sales does not represent a connected action that authorizes concurrent development, or indeed any development, to occur. The timing, scale, and locations of development that may occur as a result of the separate leasing actions are not interdependent, and therefore do not represent connected actions for the purposes of NEPA analysis. Also see response to letter 7 comment 56. Finally, the BLM does not conduct oil and gas leasing because it is mandated by the IRA, but because it is required by the MLA and FLPMA.

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			and environmental justice, cultural resources, and other relevant issues. NEPA's cumulative impacts requirement mandates that BLM must evaluate impacts "result[ing] from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions." 40 C.F.R. § 1508.1(g)(3) (2022). BLM's cumulative effects analysis "must give a realistic evaluation of the total impacts and cannot isolate a proposed project, viewing it in a vacuum." Grand Canyon Trust v. Fed. Aviation Admin., 290 F.3d 339, 342 (D.C. Cir. 2002); see also Great Basin Mine Watch v. Hankins, 456 F.3d 955, 973-74 (9th Cir. 2006) (holding agency's cumulative impacts analysis insufficient based on failure to discuss other mining projects in the region); Blue Mountains Biodiversity Project v. Blackwood, 161 F.3d 1208, 1214-16 (9th Cir. 1998) (overturning Forest Service EA that analyzed impacts of only one of five concurrent logging projects in the same region); see also Kern v. BLM, 284 F.3d 1062, 1078 (9th Cir. 2002) (holding that BLM arbitrarily failed to include cumulative impacts analysis of reasonably foreseeable future timber sales in the same district as the current sale).	
7	16	NEPA Compliance	Taking NEPA's requisite hard look at those impacts will require an EIS. NEPA requires an agency to prepare an EIS for any major federal action that may significantly affect the quality of the human environment. 42 U.S.C. § 4332(2)(C). An agency can rely on an EA only if it makes an affirmative finding that environmental impacts will not be significant (a FONSI). If there are "substantial questions" whether leasing may have a significant effect on the environment, an EIS is required. Anderson v. Evans, 371 F.3d 475, 488 (9th Cir. 2004); Ctr. For Biological Diversity v. BLM, 937 F. Supp. 2d 1140, 1154 (N.D. Cal. 2013). Here, it is arbitrary and capricious to conclude that leasing on such a scale is not significant. As a result, all 7 parcels for the New Mexico Q1 '25 lease sale, listed in Appendix A, in addition to the parcels proposed to-date for lease in other states, require the preparation of such an EIS.	See response to letter 7 comment 15.
7	17	Climate Change, Green House Gases, and Social Cost of Carbon	BLM fails to analyze the cumulative greenhouse gas emissions and climate impacts from this lease sale, cumulatively with other 2024 lease sales or program-wide, in the EA. The Draft EA quantifies the reasonably foreseeable GHG emissions from this sale under the proposed alternative, Draft EA at 85-86, making it entirely feasible to aggregate and assess all the 2024 lease sales' cumulative emissions and impacts. Even if such an analysis would be an estimate, that does not excuse BLM from providing any forecast of cumulative emissions from the 2024 lease sales.	Under NEPA, an agency need not prepare an EIS if it determines the action will not have significant effect on the human environment or where such effects may be mitigated by adoption of appropriate measures. The level of environmental analysis conducted by the BLM in the EA is consistent with the purpose and requirements of NEPA. Additionally, the concurrent offering of leases across multiple states does not constitute a connected action for purposes of NEPA analysis for several reasons: 1) the individual lease sales are not part of or dependent on a larger proposed action to proceed, and 2) the

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				concurrent timing of the lease sales does not represent a connected action that authorizes concurrent development, or any development, to occur. The timing, scale, and locations of development that may occur as a result of the leasing actions are not interdependent, and therefore do not represent similar connected actions for the purposes of NEPA analysis. See also response to letter 7 comment 56.
7	18	NEPA Compliance	Moreover, while BLM does also quantify GHG emissions globally, nationally, and in New Mexico from 2016-2021, Draft EA at 84, the agency fails to take a hard look at the reasonably foreseeable climate impacts of those emissions, fails to define or indicate a significance threshold for those emissions and impacts, and otherwise provides no meaningful context for those emissions and impacts, either relative to other contemporaneous lease sales or with respect to BLM's oil and gas program as a whole. This is contrary to NEPA and the APA. The Tenth Circuit's February 2023 decision in <i>Dine Citizens Against Ruining Our Env't v. Haaland</i>, 59 F.4th 1016 (10th Cir. 2023) is instructive here. In that case, the court rightly recognized that "all agency actions causing an increase in GHG emissions will appear de minimis when compared to the regional, national, and global numbers." Id. at 1043-1044. And, "[W]here BLM neither applied the carbon budget method nor explained why it did not, BLM acted arbitrarily and capriciously by failing to consider the impacts of the projected GHGs." Id. at 1044. BLM must use an accepted methodology, such as the global carbon budget, to analyze the significance of new emissions and put them into context.	The BLM considers this comment non-substantive to the extent that it seeks to interpret legal authorities that are the best evidence of their contents. See also response to letter 7 comment 56.
7	19	NEPA Compliance	In accordance with the Tenth Circuit ruling and the requirements of NEPA, BLM should set a cumulative significance threshold for reasonably foreseeable greenhouse gas emissions from projects authorized by the agency nationally, pursuant to the scientific recommendations of the IPCC's AR6 and accepted methodologies such as the carbon budget, and incorporate that threshold into its GHG emissions and climate impacts analyses for a programmatic EIS and for all of its planning, leasing and permitting decisions.	NEPA allows agencies to prepare an EA "on any action at any time in order to assist agency planning and decision-making." 43 CFR § 1501.3; see also 43 CFR § 1508.9 (defining "environmental assessment"). An agency need not prepare an EIS if it determines the action will not have significant effect on the human environment or where such effects may be mitigated by adoption of appropriate measures. The level of environmental analysis conducted by the BLM for the Lease Sale is consistent with the purpose and requirements of NEPA. See also response to letter 7 comment 56. The BLM has prepared multiple EISs that allocate land uses overlying the mineral estate. The BLM has disclosed the GHG emissions from the Proposed Action and provided context for those emissions compared to existing federal onshore GHG emissions in the state and nationally. The BLM has included an evaluation of climate impacts that could result from the proposed action and incorporated by reference the 2022 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends (Annual GHG Report). which provides a more robust assessment of cumulative emissions, climate impacts, and reputable

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				climate science sources. If/when a proposed action for development is submitted, the BLM can determine appropriate mitigation measures to mitigate GHG emissions that are not already required by law or proposed by the operator. Climate impacts are one of many factors that are considered in the NEPA analysis to evaluate the significance of a proposed action and the BLM's exercise of its discretion in deciding leasing actions. Other factors include wildlife habitat, water pollution, impacts to wildlife, recreation, health, cultural resources, and other relevant issues. The reasonably foreseeable development scenario developed for this EA has enabled the BLM to evaluate impacts to these resources based on the development potential of each proposed lease. These proposed leases account for total impacts of the lease sale, not piecemealed for each potential isolated project. Currently, there is not a formal Federal policy establishing a national carbon budget or a final international consensus on which carbon budget the world should use for limiting global warming (1.5°C or 2.0°C) that the BLM can use to evaluate the significance of a proposed action. However, this may change in the future. The BLM works in concert with other U.S. federal agencies (including EPA and DOE) to implement U.S. strategies and meet committed goals, including applicable executive and secretary's orders, to reduce GHG. Furthermore, at this time, BLM has not developed a standard or emissions budget that it can apply uniformly to make a determination of significance based on GHG emissions. Until such time as the Department develops further tools to analyze the relative emissions impact of its activities nationwide, the BLM can disclose GHG emissions and climate impacts, and provide context and analysis for those emissions and impacts; the agency cannot render a determination of significance for a proposed action based on GHG emissions or climate impacts alone. The 2022 Specialists Report, which was incorporated by reference in the lease sale EA, provides a hard look and cumulative assessment of the Federal oil and gas program's contribution to state and national GHG emissions, and includes forecasts of leasing activity across the various BLM states. Under this analysis and disclosure an EIS is not required. See <i>Dakota Res. Council v. United States DOI</i>, 2024 U.S. Dist. LEXIS 51013.
7	20	NEPA Compliance	BLM Must Prepare a Programmatic EIS to take a Hard Look at the Impacts of the Resumption of Federal Oil and Gas Leasing and to Avoid Any New Greenhouse Gas Pollution.	See response to letter 7 comment 19.
7	21	NEPA Compliance	The proposed lease sale in New Mexico is plainly part of a larger national initiative and must be analyzed as such under NEPA. There is no remaining room in the carbon budget for any new commitments of future greenhouse gas (GHG) pollution.	BLM NEPA Handbook H-1790-1, direct the BLM to evaluate the proposed action, the no action alternative as a baseline, and other "Reasonable Alternatives" that meet the BLM's Purpose and Need and are within the BLM's authority. The BLM is not required to

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			Greenhouse gas pollution resulting only from existing federal fossil fuel development and potential development from leases and drilling permits already issued but not yet under production, would contribute to catastrophic climate change and unnecessary and undue degradation to the atmosphere and other public lands values that BLM is legally obligated to protect. The additional burden of new leasing would only exacerbate these extreme climate impacts. BLM has yet to acknowledge this data-driven reality at a programmatic level. BLM and Interior must therefore take a hard and comprehensive look at the cumulative climate change impacts of authorizing any new leasing when combined with committed emissions already under lease or permit, and immediately defer ANY sale of new leases and APD approvals pending demonstration of compatibility with U.S. and global climate goals. This is the type of analysis that BLM and Interior had the opportunity to conduct under the auspices of the comprehensive review and reconsideration of Federal oil and gas permitting and leasing practices called for by Executive Order 14008, but failed to complete. The Department and BLM must do so now, along with other relevant agencies that manage fossil fuel development on federal lands and waters, including BOEM. BLM must also consider, as proposed in the Conservation Groups' scoping comments, a reasonable alternative of managed decline of GHG emissions from the approximately 13.5 million acres of fossil fuel estate already under lease but not producing.	evaluate alternatives that do not meet the BLM's Purpose and Need, are not within the BLM's discretion, or which are precluded by law. Because the commenter has not alleged with specificity what such a "Modified Proposed Action" would have contributed to the analysis, the BLM is unable to respond in any additional detail. See also response to letter 7 comment 19.
7	22	NEPA Compliance	The climate crisis is fundamentally an incremental problem and the contribution of individual oil and gas development actions on the part of the BLM to climate change are difficult to assess, precisely because it is rare that such actions—taken in isolation—will be truly significant at a national or global scale. This is particularly true at the level of an individual lease sale, where the projected development of mineral resources on a given lease or set of leases will reduce the remaining global and national carbon budgets by vanishingly small fractions. Yet it is this creeping normalcy that results in fossil fuel development on BLM administered lands being responsible for 15.3% of total U.S. GHG emissions, 1.8% of global emissions, and nearly 21% of all emissions in the U.S. from fossil fuel production. With respect to carbon dioxide, emissions from fossil fuels produced on federal lands represent a quarter of all CO2 emissions in the U.S. It is precisely because of this incrementally small but collectively	The BLM considers this comment non-substantive to the extent that it seeks to interpret Executive Order 14008, which is the best evidence of its contents. See also response to letter 7 comment 19.

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			mammoth impact on the climate crisis that BLM must prepare a programmatic EIS for the federal oil and gas program. The "comprehensive review and reconsideration of the Federal oil and gas permitting and leasing practices" called for in Executive Order 14008 demanded no less. Yet neither Interior nor BLM fulfilled the explicit mandate of Executive Order 14008. They must do before committing a single additional acre to fossil-fuel development. Such a programmatic examination would dovetail with an EIS that collectively analyzes the proposed 2024 lease sales, discussed above, which collectively constitute the government's response to the fossil fuel leasing provisions of the IRA. At the outset, however, Conservation Groups stress that BLM should prepare a programmatic EIS for the entire federal oil and gas leasing program before holding another lease sale. The purpose of a programmatic EIS or other programmatic NEPA review is to: [A]ddress the general environmental issues relating to broad decisions, such as those establishing policies, plans, programs, or suite of projects, and can effectively frame the scope of subsequent site-and project-specific federal actions . . . [o]ne advantage of preparing a programmatic NEPA review for repetitive agency activities is that the programmatic NEPA review can provide a starting point for analyzing direct, indirect, and cumulative impacts.	
7	23	NEPA Compliance	A programmatic approach is compelled for the following reasons: 1) the fundamentally incremental nature of the climate crisis; 2) Executive Order 14008 recognizes the small and shrinking window that remains to avoid the most catastrophic effects of climate change, a recognition that was not reflected in the Department's Report on the Federal Oil and Gas Leasing Program; 3) BLM should complete the analysis it started with its issuance of the BLM Specialist Report and the Interior Report, by conducting a PEIS; and 4) the need for consistency with the pending federal coal review.	The BLM considers this comment non-substantive to the extent that it seeks to interpret Executive Order 14008 and the Report on the Federal Oil and Gas Leasing Program, which are the best evidence of their contents. See also response to letter 7 comment 19.
7	24	NEPA Compliance	The Incremental Nature of Climate Change Requires a Programmatic EIS. The Council on Environmental Quality (CEQ) has provided guidance on how federal agencies should address climate change in their NEPA analyses through 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" (hereafter "Final Climate Guidance"). The Final Climate Guidance applies to all proposed	The BLM considers this comment non-substantive to the extent that it seeks to interpret CEQ guidance, case law, and regulations, which are the best evidence of their contents. See also response to letter 7 comment 19.

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			federal agency actions, "including land and resource management actions." BLM has struggled in the past to comply with this guidance and frame the requisite "hard look" required by NEPA with regard to the climate impacts of individual oil and gas lease sales. The agency has run afoul of NEPA in the past precisely because it has been unable or unwilling to articulate the ways in which individual lease sales and subsequent site-specific decisions contribute to climate change. Importantly, courts have held BLM accountable by recognizing that "the impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct." <i>Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.</i>, 538 F.3d 1172, 1217 (9th Cir. 2008). These past failings argue for a comprehensive, programmatic approach to provide context for subsequent leasing and drilling stage actions. NEPA, by its plain language, demands a comprehensive analysis of the impacts of the federal oil and gas leasing program—including, but not limited to the climate impacts. Indeed, the 1978 regulations promulgated by the Council on Environmental Quality appear prescient in this respect; the cumulative impact and effects analyses might have been drafted as tools to help describe climate change. "Cumulative Impact" is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions." 40 C.F.R. § 1508.7. "Indirect Effects" encompass such indicia as "effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems." 40 C.F.R. § 1508.8.50 If these sections, combined with the fundamentally cumulative nature of climate change, do not themselves compel a programmatic EIS, they certainly provide necessary guidance for one. As previously noted, BLM has been faulted in the past for not taking into consideration the cumulative and downstream impacts of its lease sales on climate change. E.g. <i>San Juan Citizens All. v. United States Bureau of Land Mgmt.</i>, 326 F. Supp. 3d 1227, 1248 (D.N.M. 2018); <i>Wildearth Guardians v. U.S. Bureau of Land Mgmt.</i>, 457 F. Supp. 3d 880, 894 (D. Mont. 2020). Yet the necessarily broad scale of an adequate analysis is indubitably best done once, and at the programmatic level, allowing the agency to tier to and place its subsequent, site-specific analyses within the context of the larger framework. While the BLM	

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			Specialist Report initiated this process, it has yet to be completed because BLM omitted a number of important considerations, including a meaningful analysis of fossil fuels currently committed to development under existing leases, a program-wide economic analysis of the climate costs of the oil and gas program, and a meaningful discussion about how BLM land management fits within the broader framework of global climate commitments and warming thresholds. In short, preparing a programmatic NEPA analysis will help the Agency to reduce or eliminate redundant and duplicative analyses and effectively address cumulative impacts, substantially reducing the administrative burden and economic costs to the Agency and assisting the Agency in formulating comprehensive mitigation measures that apply at the national level.	
7	25	NEPA Compliance	[...] BLM has yet to complete either a project or program-level NEPA document that analyzes the federal oil and gas program in light of these scientific conclusions and with an eye to developing alternatives that respond to them. A programmatic NEPA review is the ideal vehicle for such an analysis. NEPA requires analysis before making decisions with potentially irreversible effects: “the appropriate time for preparing an EIS is prior to a decision, when the decisionmaker retains a maximum range of options.” <i>Sierra Club v. Peterson</i>, 717 F.2d 1409, 1414 (D.C. Cir. 1983). While this is of course true at the project level, it is no less true at the programmatic level when each project comprises an incremental part of the overall impact.	The BLM considers this comment non-substantive to the extent that it seeks to interpret case law, which is the best evidence of its contents. See also response to letter 7 comment 19.
7	26	Policy and Legal Compliance	The issuance of EO 14008 and its implementing secretarial orders represents both an opportunity and a demand for comprehensive action by the Department of Interior and BLM. Neither entity has yet responded to this directive to the extent explicitly contemplated by the Executive Order, but both retain the opportunity to do so before committing public lands to additional fossil-fuel production. The “comprehensive review and reconsideration” of the federal leasing program called for in Section 208 of EO 14008 required a hard and holistic look not only at emissions from federal fossil fuels but at how the program contributes to the climate crisis and what must be done to help the United States achieve and contribute to global climate security—not only by compliance with binding international agreements but in a way that meaningfully reduces programmatic emissions.	The BLM considers this comment non-substantive to the extent that it seeks to interpret Executive Order 14008, which is the best evidence of its contents. See also responses to letter 7 comments 11 and 19.
7	27	Climate Change,	BLM Must Complete the Analysis Begun in the 2020 and 2021 BLM	See responses to letter 7 comments 11, 17, 19, and 56.

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		Green House Gases, and Social Cost of Carbon	Specialist Reports. A programmatic review is particularly critical following release of the 2020 and 2021 BLM Specialist Reports and Interior Report. The former constitutes—in large part—the quantification and context of federal mineral estate-associated GHG emissions courts have faulted BLM for not providing in the past. BLM must now take the logical next step, by completing the programmatic NEPA analysis it has effectively begun with the BLM Specialist Report. It must also do what it failed to do in the Interior Report – qualitatively and quantitatively discuss the climate change impacts of these emissions in the context of the federal program, leased but as yet undeveloped federal lands, as well as national and global emissions. Failure to do so will represent not only a derogation of the action called for by EO 14008, but also a lost opportunity to meaningfully evaluate the outsized role the federal oil and gas leasing program plays in the climate crisis, and to explore alternatives to reduce its impacts through the federal oil and gas program. BLM has, with the BLM Specialist Report, fulfilled the lowest common denominator of quantifying federal emissions against the backdrop of federal laws and climate science. It must now meaningfully analyze those emissions in light of remaining national and global carbon budgets, and must apply tools such as the Social Cost of Greenhouse Gases to describe the actual economic, ecologic, and human costs of the program at national and global scales. Section 7.2 of the BLM Specialist Report briefly describes federal fossil fuel emissions in the context of various carbon budgeting mechanisms and global emissions commitments (such as under the Paris Agreement). However, more is required by NEPA, and it must be done at a programmatic level, as the quantification of GHGs in the BLM Specialist Report was done. Just as uncertainty about the effects of an individual sale or permitted development does not absolve BLM from its duty to attempt to analyze those effects, uncertainty about the United States' equitable share of the remaining carbon budget, or variability in carbon budgeting methods and social cost metrics does not justify a failure to analyze meaningful ways to address climate change and the oil and gas program's contributions to it.	
7	28	NEPA Compliance	A Programmatic EIS for the Federal Oil and Gas Program Is Consistent with The Department's Review of the Federal Coal Leasing Program. A final factor weighing in favor of the completion of a	See responses to letter 7 comments 17, 19, and 56.

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			programmatic EIS is the Federal Coal Program Review. Originally initiated in response to Secretarial Order 3338 (January 15, 2016), the intent was to prepare a programmatic EIS and review of the federal coal program designed to address a range of concerns, including but not limited to questions as to the fair return to American taxpayers from federal coal royalties, market fluctuations and resultant impacts to coal-dependent communities, and the more fundamental question of whether the leasing and production of federal coal is consistent with the Nation's domestic and international goals to preserve a livable climate and meet international commitments to maintain global warming below certain critical thresholds, namely 1.5°C. Secretarial Order 3338 was rescinded by former Interior Secretary Ryan Zinke through Secretarial Order 3348, which also lifted the federal coal leasing pause that had been implemented by SO 3338. On August 20, 2021, the BLM issued a Federal Register notice in response to Secretarial Order 3398 (issued by Interior Secretary Deb Haaland), indicating its intent to reinstitute a federal coal program review and soliciting public comment. BLM received 214,866 comments in response to its request. The current status of the review itself is unknown. While SO 3398 did not reinstate SO 3338 or explicitly revive the PEIS, it did reinstate review of the federal coal leasing program. The appropriate course for both that review and the "comprehensive review and reconsideration" called for by EO 14008 is one or more programmatic NEPA processes analyzing the climate, fiscal, and taxpayer impacts of all federal fossil fuel development. Until those analyses occur, no additional fossil fuel leasing should occur. As explained above, BLM and Interior must comply with EO 14008's mandates and retain the ability to do so before committing federal lands to additional GHG emissions. They are compelled to do so by both EO 14008 and existing statutory mandates under FLPMA. For the above-described reasons, all 7 parcels for the New Mexico Q1 '25 lease sale, listed in Appendix A, should be withdrawn pending preparation of such an EIS.	
7	29	Reasonable Range of Alternatives	BLM Has Failed to Consider an Adequate Range of Alternatives. The NEPA alternatives analysis required by 42 U.S.C. § 4332(C)(iii) is "heart" of the NEPA process. 40 C.F.R. § 1502.14. For the reasons articulated below, BLM must comply with NEPA in its analysis of alternatives for the New Mexico Q1 '25 lease sale.	NEPA directs the BLM to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. § 4332(E). BLM NEPA Handbook H-1790-1 and guidance direct the BLM to evaluate the proposed action, the no action alternative as a baseline, and other "Reasonable Alternatives" that meet the BLM's Purpose and Need and are within the BLM's authority. The BLM is not required to evaluate alternatives that do not meet the BLM's Purpose and Need, are not within the BLM's discretion,

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				or which are precluded by law. The alternatives considered adequately weigh the courses of actions that BLM could take based on potential resource conflicts and whether making certain lands available would meet the purpose and need of the EA. A description of the BLM's decision space based on the alternatives analyzed in detail is provided in EA Sections 1.3 and 2.1. As informed by the issue-based analysis in the EA, the BLM Authorized Officer retains the discretion to lease none, some, or all of the nominated lease parcels.
7	30	No Action Alternative	BLM's analysis of the no-leasing or no action alternative is incomplete and insufficient to adequately inform the public and the decision maker. The impacts to GHG emissions and climate for the no action alternative (under which the parcels could not be leased) considered in the EA are brief and fail to indicate the difference in estimated GHG emissions between the proposed alternatives and the no action alternative. See, e.g., Draft EA at 89. The 2016 CEQ GHG Guidance indicates that in the alternatives analysis, agencies should compare anticipated levels actions to provide information to the public and enable the decision maker to make an informed decision. The 2023 Interim CEQ Guidance further underscores the importance of considering alternatives that would avoid or mitigate GHG emissions. The analysis of the no-action alternative also asserts that Federal production levels would remain static or even increase if the leases are not developed, a "perfect substitution" argument that courts have repeatedly rejected. See, e.g. Friends of the Earth v. Haaland, No. CV 21-2317 (RC), 2022 WL 254526, at *12 (D.D.C. Jan. 27, 2022) (finding argument that no action alternative would result in higher emissions arbitrary); WildEarth Guardians v. United States Bureau of Land Mgmt., 870 F.3d 1222, 1238 (10th Cir. 2017) (irrational and unsupported substitution argument arbitrary). As discussed above, BLM should develop a single NEPA document analyzing all of the proposed 2024 lease sales to better evaluate the cumulative GHG emissions estimated from the proposed lease sales and their impact on climate change. Likewise, the no-action alternative should evaluate and discuss the cumulative effect of not leasing any of the 2024 parcels proposed for oil and gas development. This analysis should not only quantify the total GHG emissions that would be avoided as a result of not leasing but should also quantify and evaluate the co-benefits of not leasing, including the benefits of avoided air pollution, avoided water use, avoided produced water disposal, and the ability to put lands not leased to other beneficial uses. The cobenefits analysis should also reflect the cumulative value of the	The BLM considers this comment non-substantive to the extent it seeks to interpret legal authorities, which are the best evidence of their content. The BLM has disclosed the GHG emissions from the Proposed Action and provided context for those emissions compared to existing federal onshore GHG emissions in the state and nationally. The BLM has also included an evaluation of the climate change impacts that could result from the proposed action and incorporated by reference the 2023 BLM Specialists Report on Annual Greenhouse Gas Emissions and Climate Trends, which provides a more comprehensive assessment of cumulative emissions and reputable climate science sources. If or when a proposed action for development is submitted, the BLM can determine appropriate mitigation measures to reduce or offset GHG emissions that are not already required by law or proposed by the operator. Climate impacts are among many factors that the BLM considers in the NEPA analysis to evaluate the significance of a proposed leasing action. See also responses to letter 7 comments 17, 19, and 56.

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			renewable energy-generating capacity of the federal lands and mineral estate that would be preserved under the no-action alternative.	
7	31	Reasonable Range of Alternatives	In our scoping comments, we requested BLM include an alternative that considers adopting a policy of managed decline of fossil fuel production from the entire federal mineral estate. BLM does not discuss this alternative, let alone analyze it in detail. We urge the agency to offer more than a cursory explanation for its dismissal of this and other alternatives. In other recent BLM lease sale EAs in other states, BLM has often failed to discuss—and thus, seemingly failed to consider—this and other proposed alternatives at all. Inconsistencies among BLM offices in determining the alternatives to consider exemplify the need to consider the proposed lease sales in a single impact statement rather than through individual EAs. They also underscore the need for a programmatic review of the BLM fossil fuel program. We request BLM explain the basis for how and why it determines whether to consider proposed alternatives, and we request that BLM seriously consider an alternative involving a policy of managed decline of fossil fuel production from the entire federal mineral estate. See <i>Dubois vs. USDA</i>, 102 F.3d 1273 (1st Cir. 1996) (agencies must legitimately assess the relative merits of reasonable alternatives before making decision); <i>Antipollution League vs. Nuclear Regulatory Commission</i>, 598 F.2d 1221, 1330 (1st Cir. 1979) (agencies must not only identify and study reasonable alternatives that they identify on their own, but also analyze and consider significant alternatives that are called to its attention by other agencies, organizations, communities, members of the public). The MLA provides BLM with authority to require zero GHG emissions. See, e.g., <i>W. Energy All. v. Salazar</i>, 709 F.3d 1040, 1044 (10th Cir. 2013); <i>W. Energy All. v. Jewell</i>, No. CV 16-0912 WJ/KBM, 2017 WL 3600741, at *3 (D.N.M. Jan. 13, 2017), rev'd sub nom. <i>W. Energy All. v. Zinke</i>, 877 F.3d 1157 (10th Cir. 2017). The MLA also allows the Secretary of the Interior to “alter or modify from time to time the rate of prospecting and development and the quantity and rate of production under such plan.” Likewise, nearly all BLM leases for onshore oil and gas contain a clause which states: “Lessor reserves the right to specify rates of development and production in the public interest.” To address climate impacts, BLM may require full mitigation of GHG emissions and associated climate impacts via lease stipulations and conditions of approval (COAs) designed “to minimize adverse impacts to other resource values.” We request that BLM consider	The BLM considers this comment non-substantive to the extent it seeks to interpret legal authorities that are the best evidence of their contents. The decision under review is “whether to make available for lease the nominated lease parcels with or without constraints, in the form of lease stipulations, as provided for in the approved land use plan.” See EA Section 1.3. Therefore, the suggested focus for an alternative of “a policy of managed decline of fossil fuel production from the entire federal mineral estate” is outside the scope of the decision under review. NEPA directs the BLM to “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources.” 42 U.S.C. 4332(E). Additionally, BLM NEPA Handbook H-1790-1, direct the BLM to evaluate the proposed action, the no action alternative as a baseline, and other “Reasonable Alternatives” that meet the BLM’s Purpose and Need and are within the BLM’s authority. The BLM is not required to evaluate alternatives that do not meet the BLM’s Purpose and Need, are not within the BLM’s discretion, or which are precluded by law. The suggested alternative constitutes an oil and gas program regulatory or policy preference rather than an alternative appropriate for consideration for the Lease Sale. Additionally, the commenter does not identify what, if any, unresolved resource conflict associated with the Lease Sale would be resolved by consideration of this alternative. See also responses to letter 7 comments 17, 19, and 56.

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			an alternative involving a policy of managed decline of fossil fuel production from the entire federal mineral estate.	
7	32	Reasonable Range of Alternatives	BLM must consider alternatives that would protect usable groundwater. See <i>WildEarth Guardians v. U.S. Bureau of Land Mgmt.</i> , 457 F.Supp.3d 880, 890 (D. Mont. 2020). Specifically, BLM should consider not leasing parcels within areas where there is less than 2,000 feet of vertical separation between the oil and gas formations likely to be targeted and any groundwater aquifer with 10,000 ppm TDS or less. BLM should also analyze an alternative whereby parcels would not be leased in areas overlying usable groundwater and surface water, and an alternative that includes other measures to ensure that all usable groundwater zones are protected. This might involve pre-leasing groundwater testing and adding a lease stipulation or lease notice requiring specified casing and cementing depths. Alternatively, or additionally, BLM should consider requiring a lease stipulation or lease notice requiring the lessee to perform groundwater testing prior to drilling to identify all usable water, and consultation with the U.S. Geological Survey and other agencies to identify those waters with up to 10,000 ppm TDS. BLM did not consider such an alternative.	NEPA directs the BLM to “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources.” 42 U.S.C. 4332(E). Additionally, BLM NEPA Handbook H-1790-1, direct the BLM to evaluate the proposed action, the no action alternative as a baseline, and other “Reasonable Alternatives” that meet the BLM’s Purpose and Need and are within the BLM’s authority. The BLM is not required to evaluate alternatives that do not meet the BLM’s Purpose and Need, are not within the BLM’s discretion, or which are precluded by law. The commenter does not identify what, if any, unresolved resource conflict associated with the Lease Sale would be resolved by consideration of this alternative, nor how such a proposal would be reasonably implemented. The BLM analyzed groundwater quality impacts at AIB-1, incorporating by reference the 2023 BLM Water Support Document for Oil and Gas Development in New Mexico. In this analysis, the BLM described numerous requirements for oil and gas producers so that drilling fluids, hydraulic fracturing fluids, and produced water and hydrocarbons remain within the well bore and do not enter groundwater or any other formations. With these requirements in place, including the use of casing and cementing measures, contamination of groundwater resources from the nominated lease parcels is highly unlikely. Specifically with regard to casing requirements, under 43 C.F.R. § 3172, 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 that 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. See Appendix D, n. 15. There have been no documented instances of groundwater contamination attributed to well drilling and completion in the PDO, which underscores the effectiveness of the BLM’s approach to protecting groundwater. In addition, the BLM has authority under STCs to require additional measures to protect water quality if site-specific circumstances require them. Site-specific mitigation tools would be developed as appropriate for the individual circumstances, including

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				groundwater-quality monitoring studies. The regulations at 43 C.F.R. § 3162.5-2(d) give the BLM the authority to require an operator to monitor water resources to ensure that the isolation procedures used to protect water and other resources are effective. Aside from suggesting groundwater as the basis for an added alternative, the commenter has not alleged any deficiency in the BLM's groundwater quality analysis, or provided any new information for the BLM to consider.
7	33	Reasonable Range of Alternatives	BLM must include in their analysis an alternative that applies a stipulation that mandates the use of best available methane reduction technologies to parcels. Recent research has demonstrated that the use of ten technically proven and commercially available methane emissions reduction technologies can together capture more than 80 percent of the methane currently going to waste in the oil and gas sector's operations. See Harvey Report referenced above. These technologies include: • Green Completions to capture oil and gas well emissions; • Plunger Lift Systems or other well deliquification methods to mitigate gas well emissions; • Tri-Ethylene Glycol (TEG) Dehydrator Emission Controls to capture emissions from dehydrators; • Desiccant Dehydrators to capture emissions from dehydrators; • Dry Seal Systems to reduce emissions from centrifugal compressor seals; • Improved Compressor Maintenance to reduce emissions from reciprocating compressors; • Low-Bleed or No-Bleed Pneumatic Controllers used to reduce emissions from control devices; • Pipeline Maintenance and Repair to reduce emissions from pipelines; • Vapor Recovery Units used to reduce emissions from storage tanks; and • Leak Monitoring and Repair to control fugitive emissions from valves, flanges, seals, connections and other equipment.	NEPA directs the BLM to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. 4332(E). Additionally, BLM NEPA Handbook H-1790-1, and guidance, direct the BLM to evaluate the proposed action, the no action alternative as a baseline, and other "Reasonable Alternatives" that meet the BLM's Purpose and Need and are within the BLM's authority. The BLM is not required to evaluate alternatives that do not meet the BLM's Purpose and Need, are not within the BLM's discretion, or which are precluded by law. The Bureau of Land Management updated its regulations in March of 2024 to reduce the waste of natural gas from oil and gas operations on federal and Tribal lands. The BLM's Waste Prevention, Production Subject to Royalties, and Resource Conservation Rule, known as the Waste Prevention Rule²⁵, revises 43 C.F.R. §§ 3160 and 3170 to help curb waste of natural gas from flaring, venting, and leaks, and provide a fair return for federal taxpayers, Tribes, and states. The Waste Prevention Rule leverages technological advances made during the last 40 years, as well as industry best practices, to help achieve natural gas waste reductions. In fact, many oil and gas operators are already voluntarily taking steps to reduce natural gas waste and improve operational efficiency in ways that often comply with requirements in the rule. The rule's requirements regarding safety, storage tanks, and leak detection and repair apply to operations on Federal or Tribal surface lands in New Mexico. BLM's rule updates the BLM's outdated natural gas waste regulations to better address the Secretary of the Interior's obligation, under the MLA, to prevent avoidable waste of natural gas from oil and gas operations. Additionally, oil and gas operations in New Mexico are subject to New Mexico's Natural Gas Capture Requirements (Waste Prevention Rule), NMAC 19.15.27, and the "Oil and Natural Gas Regulation for Ozone

²⁵ The DOI's Waste Prevention Rule factsheet is available at: https://www.blm.gov/sites/default/files/docs/2024-03/FACT%20SHEET%20_%20Waste%20Prevention%20Rule%20ka%20CEQ.pdf#:~:text=The%20Waste%20Prevention%20Rule%20requires%20oil%20and%20gas,or%20to%20develop%20waste%20minimization%20plans%20before%20drilling.

FACT%20SHEET%20_%20Waste%20Prevention%20Rule%20ka%20CEQ.pdf#:~:text=The%20Waste%20Prevention%20Rule%20requires%20oil%20and%20gas,or%20to%20develop%20waste%20minimization%20plans%20before%20drilling.

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				Precursors" rule, NMAC 20.2.50.1, including emissions reduction requirements for compressors, engines and turbines, liquids unloading, dehydrators, heaters, pneumatics, storage tanks, and pipeline inspection gauge launching and receiving. The regulation also encourages operators to stop venting and flaring and use fuel cells technology to convert CH₄ to electricity at the well site and incentivizes new technology for leak detection and repair. Approximately 50,000 wells and associated equipment will be subject to this regulation. It is anticipated that the regulation will annually reduce VOC emissions by 106,420 tons, NOX emissions by 23,148 tons, and methane (CH₄) emissions by 200,000 to 425,000 tons statewide. Analysis and approval of future development may include application of BMPs within BLM's authority, as COAs or lease stipulations, to reduce or mitigate GHG emissions. Additional measures proposed at the project development stage also 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.
7	34	Reasonable Range of Alternatives	In addition to these best available methane reduction technologies, BLM must also consider an alternative that implements its legal obligation to use all reasonable precautions to prevent waste, including a stipulation on leases that provides for no routine venting or flaring, similar to regulations that are already being implemented in the states of Colorado and New Mexico. Although BLM has completed a rulemaking effort pursuant to its authority to prevent waste under 30 U.S.C. §§ 187, 225, BLM's proposed rule does not go nearly far enough to prevent waste from routine flaring on BLM managed leases on Tribal and federal public lands. Until methane waste is adequately addressed, BLM should not be holding lease sales or issuing leases, much less granting applications for permits to drill. Failing this, however, BLM must, at a minimum, use its existing authority under Notice to Lessees 4a (Jan. 1, 1980) ("NTL-4A) and the Inflation Reduction Act to condition such leases as it does issue to limit the environmental and human health harms caused by routine venting and flaring and to safeguard Tribal and publicly held resources from unreasonable and undue waste. Interior's standard lease form, Form 3100-11 (October 2008) provides, in section 4, that a "[l]essee ... must prevent unnecessary damage to, loss of, or waste of leased resources," and that Interior "reserves right to specify rates of development and production in the public interest ...". Such an alternative must also articulate the implementation of existing methane waste policies as described in NTL-4A and provide guidance requiring strict compliance with, at a minimum, NTL-4a's existing measures as well as BLM's legal	The BLM considers this comment non-substantive to the extent it seeks to interpret legal authorities that are the best evidence of their contents. The decision under review is "whether to make available for lease the nominated lease parcels with or without constraints, in the form of lease stipulations, as provided for in the approved land use plan." See EA Section 1.3. Complaints about separate federal actions, including BLM rulemakings, are outside the scope of this decision. Following the publication of BLM's Waste Prevention Rule in March of 2024 (see responses to letter 7 comments 33 and 73), NTL-4A no longer applies to oil and gas operations in New Mexico. See also response to letter 7 comment 33.

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			authority and responsibility pursuant to the Federal Land Policy and Management Act to prevent or reduce methane emissions, independent of the agency's MLA duty to prevent waste. In addition, such an alternative could involve the following mechanisms to prevent methane waste: • Removal of a lease parcel from proposed sale or denial of an application for permit to drill if Interior determines that methane, nitrogen oxides, or other harmful emissions are impermissible, whether because such emissions would constitute waste or impair or cause undue or unnecessary harm to non-mineral public lands resources and values, in particular but not exclusively "air and atmospheric" values. • Controlling the timing, location, and pace of new drilling as well as the rate of production of new or existing wells to eliminate methane or other harmful emissions to align new drilling and production with midstream system capacity. • A requirement, whether via stipulation or condition of approval, that a lessee or operator, once flowback establishes the level of gas production, connect an oil well producing associated gas to a natural gas line with sufficient capacity prior to the commencement of full production. • A menu of drilling-stage of conditions of approval specifying known and readily available practices or technologies typically employed to reduce methane waste in accord with the MLA or methane and other harmful emissions in accord with FLPMA. Again, BLM attempts to defer a hard-look analysis of methane waste impacts, or consideration of alternatives that eliminate or mitigate those impacts, to the APD stage. EA at 106.	
7	35	NEPA Compliance	As described in a number of contexts below, BLM has failed to take the requisite "hard look" at the reasonably foreseeable environmental consequences of the proposed New Mexico lease sale. As a result, for the reasons set forth in this section, all 7 parcels should be withdrawn pending a NEPA analysis that adequately addresses these issues.	See response to letter 7 comment 14.
7	36	NEPA Compliance	The EA and the 2021 BLM Specialist Report Fail NEPA's "Hard Look" Test with Regard to Analyzing Climate Impacts of Resuming Federal Oil and Gas Leasing: BLM Improperly Segmented Its NEPA Analysis of The Proposed Lease Sales. BLM improperly segmented its decision to offer portions of the federal mineral estate for fossil fuel development. Rather than evaluate all the proposed 2024 lease sales and their associated environmental impacts in a single NEPA analysis, BLM separated the environmental analysis despite the connected nature of the leasing actions and the reasonably foreseeable cumulative	Under NEPA, an agency need not prepare an EIS if it determines the action will not have significant effect on the human environment or where such effects may be mitigated by adoption of appropriate measures. The level of environmental analysis conducted by the BLM for the Lease Sale is consistent with the purpose and requirements of NEPA. The BLM analyzes potential impacts from GHGs in detail in the EA (see Sections 3.6.1 and 3.6.2). The documents also incorporate by reference the ARTR as well as the Annual GHG Report, which provides a more detailed assessment of cumulative emissions and reputable climate science sources.

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			climate impacts associated with the potential GHG emissions from authorized leases.	The concurrent offering of leases across multiple states does not constitute a connected action for purposes of NEPA analysis for several reasons: 1) the individual lease sales are not part of or dependent on a larger proposed action to proceed, and 2) the concurrent timing of the lease sales does not represent a connected action that authorizes concurrent development, or any development, to occur. The timing, scale, and locations of development that may occur as a result of the leasing actions are not interdependent, and therefore do not represent similar connected actions for the purposes of NEPA analysis. See also responses to letter 7 comments 17, 19, and 56.
7	37	NEPA Compliance	To assess the effects of a proposed action, BLM should account for the proposed action –including “connected” actions – subject to reasonable limits based on feasibility and practicality.	See response to letter 7 comment 36.
7	38	NEPA Compliance	Other types of actions that should be considered in a single impact statement also include “cumulative actions,” actions which when viewed with other proposed actions have cumulatively significant impacts, and “similar actions,” actions which when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography. Agencies should analyze similar actions in the same impact statement when the best way to assess adequately the combined impacts of similar actions or reasonable alternatives to such actions is to treat them in a single impact statement.	See response to letter 7 comment 36.
7	39	NEPA Compliance	Rather than segment the NEPA analysis according to individual oil and gas lease sales, the CEQ NEPA regulations regarding connected actions, cumulative actions, and similar actions suggest BLM should analyze the environmental impacts of the proposed lease sales in a single NEPA analysis. The proposed 2024 lease sales meet the definition of “connected action” because according to BLM, the agency offered the 2024 lease sales pursuant to the same overarching statutory obligation – the Inflation Reduction Act. The proposed 2024 lease sales also qualify as “cumulative actions” based on their cumulatively significant emissions of GHGs and their impacts on climate change. In addition, the proposed 2024 lease sales are properly understood as “similar actions” because the NEPA analysis and proposed sale dates are common in time and the best way to adequately assess their cumulative GHG emissions is through a single impact statement.	See response to letter 7 comment 36.
7	40	Climate Change, Green House Gases, and	BLM does not address the possibility of analyzing potential GHG emissions that could occur from other lease sales during 2024. This is nonsensical, as BLM has previously estimated the emissions from all the parcels offered in a year in the EA	See response to letter 7 comment 36.

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		Social Cost of Carbon	associated with each sale. BLM plainly can analyze the potential GHG emissions of all the actions and should do so in a single impact statement.	
7	41	Climate Change, Green House Gases, and Social Cost of Carbon	BLM evaluated GHG emissions estimated from the proposed lease sale and from the cumulative GHG emissions from BLM's onshore federal fossil fuel program using several analytical tools, all of which indicate federal fossil fuel emissions of GHGs are significant under NEPA. BLM used EPA's greenhouse gas equivalency calculator to express the estimated annual GHG emissions from the lease sale in terms of the GHG emissions produced from gas-fueled vehicles driven for one year, or the emissions that could be avoided by operating wind turbines as an alternative energy source or offset by the carbon sequestration of forest land. As explained above, BLM improperly segmented its NEPA analysis and only analyzed GHG emissions using EPA's GHG equivalency calculator for this individual lease sale. We request BLM contextualize the GHG emissions of the 2024 lease sales by using the EPA GHG equivalency calculator to consider the GHG emissions over the average 30-year production life of the leases. We also request BLM contextualize the cumulative GHG emissions from the federal fossil fuel program using EPA's GHG equivalency calculator. While BLM does compare the life of lease emissions from the proposed action as a percentage of other federal oil and gas emissions, this is precisely the type of decontextualized, fractional comparison of emissions that courts have held is unlawful. <i>Diné CARE v. Haaland</i> , 59 F.4th at 1043-1044; see also <i>350 Montana v. Haaland</i> , 50 F.4th 1254, 1266-1267 (9th Cir. 2022). BLM cannot fulfill its NEPA obligations with this type of comparison, which artificially minimizes significance and tells the public nothing about the actual impacts of emissions.	The BLM makes mineral resources, such as oil and gas, available for development in accordance with laws including the MLA and FLPMA. See EA Sections 1.2 and 1.4 for information regarding the BLM's requirements under MLA, FLPMA, and other statutes and regulations. Chapter 2 of the 2022 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends, incorporated in the EA by reference, discusses the relationship between BLM's coal, oil, and gas leasing programs with other laws and policies at the federal and state level. The BLM analyzes potential impacts, including cumulative impacts, from greenhouse gases (GHGs) in detail in the environmental assessment (EA). See Sections 3.6.1 and 3.6.2. The EA incorporates by reference information from the ARTR. The emissions used in this analysis are estimated using the 2023 BLM Lease Sale Emissions Tool and evaluated with the U.S. Environmental Protection Agency (EPA) GHG equivalency calculator. The BLM employs the methodologies best suited to its analysis. See <i>WildEarth Guardians v. Bernhardt</i>, 501 F. Supp. 3d 1192, 1209 (D.N.M. 2020) ("nothing in [NEPA's] text and nothing in its associated regulations specifically mandates that agencies perform a particular analysis or subscribe to a particular methodology. ... NEPA requires that the agency assess the direct and indirect impact on the environment, and agencies have wide discretion in how to perform those tasks."). Therefore, the BLM's determination to not use the GHG equivalency calculator at this time is within the agency's discretion.
7	42	Climate Change, Green House Gases, and Social Cost of Carbon	BLM also used the social cost of greenhouse gases (SC-GHG) as another tool to assess GHG emissions and climate change effects from the proposed lease sale. The social cost of greenhouse gases provides an estimate of the monetized global damages associated with the incremental increases of GHGs. Again, because BLM improperly segmented its NEPA analysis of the proposed 2024 lease sales, the Draft EA only provides the social cost of GHGs for each individual lease sale rather than a cumulative total. Additionally, although BLM provided SC-GHG, it failed to provide any analysis of the decision making pursuant to those numbers. See, e.g., Draft EA at 88-89.	See responses to letter 7 comments 11 and 41.
7	43	Climate Change, Green House Gases, and	BLM did not use the social cost of GHGs tool to assess the impacts of the cumulative cost of global damages from BLM's fossil fuel program in the 2022 BLM Specialist Report, and BLM failed to explain the basis for its decision to omit this analysis. We	See responses to letter 7 comments 11 and 41.

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		Social Cost of Carbon	request BLM contextualize the cumulative GHG emissions from the federal fossil fuel program using the social cost of GHGs. The cumulative cost of the federal fossil fuel program is an important consideration for BLM to weigh, as it is many orders of magnitude greater than the already significant costs of just the proposed 2024 lease sales.	
7	44	Climate Change, Green House Gases, and Social Cost of Carbon	Moreover, we are concerned by the way BLM frames its understanding and weight of the social cost of GHG analysis. BLM states: "These numbers were monetized; however, they do not constitute a complete cost-benefit analysis... The SC-GHGs measure is provided only to inform agency decision-making." Draft EA at 88. However, BLM must be clear that the SC-GHG is a measure of impacts to the human environment (reflected in 2020 U.S. dollars) that BLM is obligated to evaluate pursuant to NEPA regardless of whether or not BLM conducts a complete or partial cost cost-benefit analysis of the proposed lease sales.	See responses to letter 7 comments 11 and 41.
7	45	Climate Change, Green House Gases, and Social Cost of Carbon	As discussed elsewhere in these comments, there are scientifically established standards and findings that can inform BLM's analysis. And pursuant to the Tenth Circuit's ruling in <i>Dine Citizens Against Ruining Our Env't v. Haaland</i> , 59 F.4th 1016 (10th Cir. 2023), BLM must analyze the significance of new emissions and put them into context. The agency should use existing, accepted methodologies, tools, and information such as the social cost of greenhouse gases and carbon budgeting, and the findings of the IPCC in the recently-released AR6, and develop a cumulative significance threshold for reasonably foreseeable greenhouse gas emissions from projects authorized by BLM.	The BLM considers this comment non-substantive to the extent it seeks to interpret legal authorities that are the best evidence of their contents. See also responses to letter 7 comments 11 and 41.
7	46	Climate Change, Green House Gases, and Social Cost of Carbon	In addition to SC-GHG, BLM references the 2022 Specialist Report, where it used the "MAGICC model" and other tools to evaluate the impact of GHG emissions associated with BLM's onshore fossil fuel authorizations on the remaining atmospheric capacity to take on further GHG emissions without exceeding different degrees of additional warming. Draft EA at 91. As discussed below, BLM improperly omitted carbon budget analysis of the United States' share of the global carbon budget. Nonetheless, GHG emissions from the onshore federal fossil fuel program consume a tremendous amount of the global budget – 1.37% of the remaining global carbon budget of 380 GtCO ₂ needed to limit global warming to 1.5 C. Draft EA at 93.	See responses to letter 7 comments 41 and 56.
7	47	Climate Change, Green House Gases, and	In addition to the tools BLM used to contextualize and evaluate federal fossil fuel GHG emissions, we request BLM evaluate and consider the impacts of climate change that have already occurred as a result of the cumulative emissions of GHGs. BLM's	See responses to letter 7 comments 41 and 56.

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		Social Cost of Carbon	NEPA analysis of GHGs and climate change tends to frame the impacts of climate change as long-term impacts, estimated to be realized at some future point in time. However, the climate has already changed as a result of anthropogenic GHG emissions and the consequences of global climate change are already being realized.	
7	48	Climate Change, Green House Gases, and Social Cost of Carbon	BLM's analysis frequently cites the 2022 BLM Specialist Report, which refers to the IPCC climate assessment report, which states: "Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentration of greenhouse gases have increased." The IPCC AR6 report indicates that the globally averaged combined land and ocean surface temperature data, as calculated by a linear trend, shows human caused warming of $1.07 \pm 0.23^{\circ}\text{C}$ over the period 1850 to 2019. Warming of 1.07 C is over half the warming the 1.5 C of warming the U.S. has committed to avoid and yet scientists are increasingly able to show the significant impacts of just 1.07 C of warming in terms of the intensification of wildfires, hurricanes, drought, and other weather-related phenomena. We request BLM consider, discuss, and evaluate the climate science regarding past and present impacts from climate change to further contextualize the climate impacts from the cumulative emissions of GHGs associated with the proposed lease sales and the federal fossil fuel program.	See responses to letter 7 comments 41 and 56.
7	49	Climate Change, Green House Gases, and Social Cost of Carbon	BLM Has the Ability to Provide For Meaningful And Measurable Mitigation Actions In The Context of Cumulative Climate Change Resulting From Global Emissions. Throughout the BLM Specialist Report and the EA for the proposed lease sale, BLM mischaracterizes its duty and authority to address climate change programmatically and in the context of project level actions. BLM's mischaracterizations misinform the public and decision makers and prejudice its NEPA analysis and conclusions. Examples of BLM's mischaracterizations include: • BLM "has limited ability to provide for meaningful or measurable mitigations actions in the context of cumulative climate change resulting from global emissions." • The BLM's decision space for mitigating climate impacts from fossil fuels development is currently limited by authorization in statutes such as FLPMA and the MLA. • No single authorized project level action can produce emissions with such significance that the action could be perceived as influencing the climate. However, all GHG emissions (big and	The BLM considers the comment non-substantive to the extent that, while it alleges that the BLM "mischaracterizes its duty and authority," it does not allege an error or material omission in the BLM's analysis or suggest new information for the BLM to consider. Generally, the BLM regulations at 43 C.F.R. §§ 3101.1–2, 3101.1–3, and 3162.5–1 authorize the agency to prescribe reasonable mitigation measures within its discretion and its technical judgment. The EA, Section 3.6.2.3, discusses mitigation strategies designed to reduce GHG emissions and incorporates by reference information from the ARTR as well as the Annual GHG Report. Analysis and approval of future development may include application of best management practices within BLM's authority, as COAs, to reduce or mitigate GHG emissions. Additional measures proposed at the project development stage also 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.

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			small) contribute to changes in atmospheric radiative forcing and ultimately climate change	
7	50	Policy and Legal Compliance	Under FLPMA, BLM has an array of responsibilities, implicated by the impacts of climate change, when deciding whether to approve new oil and gas lease sales, including to: • Protect public land values including air and atmospheric, water resource, ecological, environmental, and scenic values, and to preserve and protect "certain public lands in their natural condition," and "food and habitat for fish and wildlife." 43 U.S.C. §1701(a)(8); • Account for "the long-term needs of future generations." 43 U.S.C. § 1702(c); • Prevent "permanent impairment of the productivity of the land and quality of the environment." 43 U.S.C. § 1702(c); • "[T]ake any action necessary to prevent unnecessary or undue degradation of the lands." 43 U.S.C. § 1732(b), and • Manage public lands on the basis of multiple use and sustained yield. 43 U.S.C. § 1732(a). To carry out these responsibilities in the context of oil and gas leasing, BLM has a corresponding array of authorities to address the impacts of oil and gas leasing and development. These authorities include choosing not to lease the federal mineral estate for oil and gas development, withdrawing federal minerals from leasing; prohibiting leasing in resource management plans and through resource management plan amendments, requiring conditions of approval in new authorizations of oil and gas leases, as well as managing the rate of oil and gas production in federal leases.	The BLM considers this comment non-substantive to the extent it seeks to interpret legal authorities that are the best evidence of their contents and does not allege an error or material omission in the BLM's analysis or submit new information for the BLM's consideration. The BLM makes mineral resources, such as oil and gas, available for development in accordance with laws including the MLA and FLPMA. See EA Sections 1.2 and 1.4 for information regarding the BLM's requirements under MLA, FLPMA, and other statutes and regulations. Chapter 2 of the Annual GHG Report, incorporated in the EA by reference, discusses the relationship between BLM's coal, oil, and gas leasing programs with other laws and policies at the federal and state level.
7	51	Policy and Legal Compliance	To BLM's authority to choose not to lease the federal mineral estate, development of public lands is not required but must instead be weighed against other possible uses, including conservation to protect environmental values. See, e.g., <i>New Mexico ex rel. Richardson v. BLM</i>, 565 F.3d 683, 710 (10th Cir. 2009) ("BLM's obligation to manage for multiple use does not mean that development must be allowed. . . . Development is a possible use, which BLM must weigh against other possible uses—including conservation to protect environmental values, which are best assessed through the NEPA process." (emphasis in original)); <i>Wilderness Workshop v. BLM</i>, 342 F. Supp. 3d 1145, 1166 (D. Colo. 2018) ("[T]he principle of multiple use does not require BLM to prioritize development over other uses" (internal quotations and citations omitted)). As we indicated above, the court in <i>Louisiana v. Biden</i> confirmed that BLM is authorized to	See response to letter 7 comment 50.

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			postpone lease sales to address NEPA and similar concerns tied to particular lease proposals. Louisiana v. Biden, No. 2:21-cv-778-TAD-KK at *14. See also W. Energy All. v. Biden, No. 21-CV-13-SWS, 2022 WL 18587039 (D. Wyo. Sept. 2, 2022). Under the Mineral Leasing Act (MLA), "the DOI Secretary enjoys wide discretion when it comes to determining which federal lands will be offered for oil and gas development." Id. at *10 (citing 30 U.S.C. § 226(a) ("lands with known or suspected oil and gas deposits may be leased by the Secretary"))(emphasis added).	
7	52	Policy and Legal Compliance	Just as BLM can deny a project outright to protect the environmental uses of public lands, it can also condition a project's approval on the commitment to mitigation measures that lessen environmental impacts. See, e.g., Pub. Lands Council v. Babbitt, 167 F.3d 1287, 1300–01 (10 th Cir. 1999) ("FLPMA unambiguously authorizes the Secretary to specify terms and conditions in livestock grazing permits in accordance with land use plans."); Grynberg Petro, 152 IBLA 300, 307–08 (2000) (describing how appellants challenging conditions of approval bear the burden of establishing that they are "unreasonable or not supported by the data").	See response to letter 7 comment 49.
7	53	Climate Change, Green House Gases, and Social Cost of Carbon	BLM's authority to mitigate environmental impacts is importantly related to BLM's NEPA obligations to consider ways to avoid, minimize, and mitigate impacts in accordance with the mitigation hierarchy. 40 C.F.R. §§ 1508.8, 1502.14, 1502.16, 1508.20. Specifically, BLM must "include appropriate mitigation measures not already included in the proposed action or alternatives." Id. §§ 1502.14(f), 1502.16(h). Thus, based on site-specific NEPA reviews that rationally connect to FLPMA's mandates, BLM must impose constraints on new well approvals to avoid catastrophic climate change and protect and advance the public interest. This includes the robust use by BLM of conditions of approval to, in sequenced priority, avoid, mitigate, or compensate for climate, public lands, or community impacts. See 43 U.S.C. §§ 1701(a)(8), 1702(c), 1732(b); 43 C.F.R. § 3101.1-2; Yates Petroleum Inc., 176 I.B.L.A. 144, 154 (2008) (upholding conditions of approval more stringent than provisions contained in the overarching resource management plan).	See response to letter 7 comment 49.
7	54	Policy and Legal Compliance	The Mineral Leasing Act (MLA) also authorizes BLM to reduce the rate of production over a defined period of time, limiting the amount of extraction and greenhouse gas pollution that would result. The MLA authorizes the Secretary of the Interior to "alter or modify from time to time the rate of prospecting and development and the quantity and rate of production under such a plan." 30 USCA § 226(m). Likewise, nearly all BLM leases for onshore oil and gas contain a clause which states that "Lessor reserves the	The BLM considers this comment non-substantive to the extent it seeks to interpret legal authorities that are the best evidence of their contents, and advances a policy preference, rather than alleging an error or material omission in the BLM's analysis or submitting new information for the BLM's consideration. See also response to letter 7 comment 49.

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			right to specify rates of development and production in the public interest." See U.S. Department of the Interior, Offer to Lease and Lease for Oil and Gas, Form 3100-11 (Oct. 2008). According to these authorizations, the Secretary and BLM could set a declining rate of production over time that provides for an orderly phase-out of onshore fossil fuel production.	
7	55	Climate Change, Green House Gases, and Social Cost of Carbon	BLM's legal duty and authority provide a variety of mitigation actions BLM could take to meaningfully and measurably address cumulative climate change impacts resulting from global emissions. We request BLM revise its NEPA analyses to correctly reflect its legal duties and authorities.	See response to letter 7 comment 49.
7	56	Climate Change, Green House Gases, and Social Cost of Carbon	The Draft EA and the 2022 BLM Specialist Report Inadequately Analyze Compatibility of New Commitments of Federal Fossil Fuels with the U.S. Goal of Avoiding 1.5°C Warming. Neither the EA for the proposed lease sale nor the 2022 BLM Specialist Report adequately analyze whether the estimated GHG emissions associated with the proposed lease sales and the cumulative GHG emissions from the federal fossil fuel program are compatible with the U.S. goal of avoiding 1.5 C of warming. The United States is a signatory to the United Nations' Paris Agreement, which seeks to keep global temperatures within 2 C of the preindustrial climate, and preferably within 1.5 C. Among other pledges and commitments, the United States has pledged to reduce its emissions by filing an intended nationally determined contribution with the United Nations to reduce net GHG emissions by 17 percent below 2005 levels by 2020, and by 26-28 percent by 2025. However, BLM's NEPA analyses fail to analyze the compatibility of cumulative federal fossil fuel program emissions with the United States' commitments to avoid 1.5 C of warming. This is despite federal agencies, including the Bureau of Ocean Energy Management, which oversees offshore leasing, having conducted this type of analysis in the context of reviewing other federal projects pursuant to NEPA.	The requested analysis is included for informational purposes in Section 7.2 of the Annual GHG Report, which was incorporated by reference in the lease sale EA. See Section 3.6.2. This analysis includes information from the United Nations emissions gap report which shows the difference between global emissions pathways required to limit warming to 1.5 degrees Celsius (°C) or 2.0°C (i.e. carbon budgets) with the anticipated emissions based on national commitments to reduce GHG emissions. At this time, BLM has not developed a standard or emissions budget that it can apply uniformly to determine significance based solely on climate change or GHG emissions. Until the BLM develops tools to analyze the relative emissions impact of its activities nationwide, the BLM can only disclose GHG emissions and climate impacts, and provide context and analysis for those emissions and impacts.
7	57	Climate Change, Green House Gases, and Social Cost of Carbon	In the 2022 BLM Specialist Report section 9.4, "Goal Alignment", BLM states that "At present, the BLM's short-term projections of potential emissions from existing and near-term authorizations are consistent with the nation's net zero by 2050 goal and the shorter-term 2030 commitments made for the NDCs under the Paris Agreement. This is primarily due to a decline in projected production of oil, gas, and coal through mid-century (see Figure 7-1) from existing and foreseeable Federal fossil fuel leases, and increases in Federal renewable energy right of ways (see Table	The BLM makes mineral resources, such as oil and gas, available for development in accordance with laws including the MLA and FLPMA. See EA Sections 1.2 and 1.4 for information regarding the BLM's requirements under MLA, FLPMA, and other statutes and regulations. Chapter 2 of the Annual GHG Report, incorporated in the EA by reference, discusses the relationship between BLM's coal, oil, and gas leasing programs with other laws and policies at the federal and state level. See also response to letter 7 comment 56.

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			10-4). The longer-term estimates that include the modeled effects of the Inflation Reduction Act also show progress towards meeting national goals, such that the economy-wide influences of the law are likely to shape additional federal fossil fuel development in the years to come." However, as discussed elsewhere in these comments, BLM cannot use future predictions of GHG reductions based on the IRA to justify the authorization of GHG emissions now.	
7	58	Climate Change, Green House Gases, and Social Cost of Carbon	The EA briefly mentions the U.S. goal of avoiding 1.5 C of warming in the context of carbon budgets, but fails to analyze the compatibility of the proposed lease sales and the cumulative GHG emissions from the federal fossil fuel program with this goal.	See responses to letter 7 comments 41 and 56.
7	59	Climate Change, Green House Gases, and Social Cost of Carbon	The 2023 Interim CEQ Guidance also directs agencies to "place emissions in the context of relevant climate action goals and commitments." 2023 Interim CEQ Guidance at 1201. We request BLM consider, discuss, and evaluate the compatibility of this lease sale and the federal oil and gas program as a whole on avoiding 1.5 C of warming.	See responses to letter 7 comments 41 and 56.
7	60	Climate Change, Green House Gases, and Social Cost of Carbon	The Draft EA and the 2022 BLM Specialist Report Inadequately Analyzes the Global and National Over-Commitment of Fossil Fuels Relative to Global Carbon Budgets Necessary to Avoid 1.5°C Warming. BLM's EA for the proposed lease sale omits analyzing and evaluating the estimated GHG emissions from the lease sales and cumulative GHG emissions within the context of the widening production gap. The production gap is the difference between global fossil fuel production projected by governments and fossil fuel production consistent with the 1.5 C warming pathway and other pathways. In 2019, the Stockholm Environment Institute (SEI) released a report on the production gap with grave findings that the world's projected fossil fuel production was seriously out of sync with the level of fossil fuel production consistent with limiting warming to 1.5 C. [...]	The BLM has considered the SEI report in light of the comment, but it did not alter the BLM's conclusions, for reasons explained in responses to letter 7 comments 41 and 56.
7	61	Climate Change, Green House Gases, and Social Cost of Carbon	BLM failed to consider the production gap reports discussed above [Stockholm Environment Institute 2020 Production Gap Report; UN Production Gap Report, released in November 2023], which indicate an imperative to rapidly transition away from fossil fuels using supply side policies.	See responses to letter 7 comments 41, 56, and 60.

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7	62	Climate Change, Green House Gases, and Social Cost of Carbon	The BLM failed to properly complete a cumulative impacts analysis of the proposed 2024 lease sales, including an assessment of the cumulative impact of greenhouse gas emissions from the federal fossil fuel program. 40 C.F.R. §§ 1502.14, 1508.7; Center for Biological Diversity v. National Highway Traffic Admin., 538 F.3d 1172, 1215 (9th Cir. 2008). BLM must analyze greenhouse gas emissions from any and all federal, state, and private fossil fuel leasing and development projects. As discussed above, BLM may not improperly segment its NEPA analysis of the proposed lease sales and must more effectively conduct an analysis of the cumulative impacts of fossil fuel leasing and development in the context of a programmatic review of the federal fossil fuel program. Should BLM choose to carry on without a programmatic review, it must still comprehensively analyze cumulative GHG emissions pursuant to its statutory obligations under NEPA.	The BLM has prepared multiple EISs covering the lands BLM is considering making available for competitive auction. The BLM has analyzed the GHG emissions from the Proposed Action and provided context for those emissions compared to existing federal onshore GHG emissions in the state and nationally. The BLM has included an evaluation of climate impacts that could result from the Proposed Action and incorporated by the reference the Annual GHG Report, which provides a more comprehensive assessment of cumulative emissions, climate impacts, and reputable climate science sources. If a proposed action for development is submitted, the BLM can determine appropriate mitigation measures to reduce or offset GHG emissions that are not already required by law or proposed by the operator. Climate impacts are among many factors that are considered in the NEPA analysis to evaluate the significance of a proposed action and the BLM's exercise of its discretion in deciding leasing actions. See also response to letter 7 comment 15.
7	63	Climate Change, Green House Gases, and Social Cost of Carbon	BLM failed to assess the cumulative greenhouse gas emissions and impacts from recent and reasonably foreseeable federal offshore oil and gas lease sales.	See response to letter 7 comment 62. The BLM does not cover offshore oil and gas leases. However, in Table ES-2 of the Annual GHG Report (and several other Tables in the report), offshore emissions are disclosed (current and historical).
7	64	Climate Change, Green House Gases, and Social Cost of Carbon	BLM also failed to assess the cumulative greenhouse gas emissions and impacts from recent and reasonably foreseeable federal fossil fuel lease sales and similar federal actions, as required by NEPA. WildEarth Guardians v. Zinke, 368 F. Supp. 3d 41, 63 (D.D.C. 2019).	The BLM considers this comment non-substantive to the extent it seeks to interpret legal authorities that are the best evidence of their contents rather than alleging an error or material omission in the BLM's analysis or submitting new information for the BLM's consideration. See also response to letter 7 comment 62.
7	65	Climate Change, Green House Gases, and Social Cost of Carbon	BLM continues to fail to assess cumulative greenhouse gas emissions and impacts from recent and reasonably foreseeable non-federal oil and gas leasing and development projects. For example, in 2022, 10 states held 45 lease sales, and in 2023, 10 states held 40 lease sales, selling tens of thousands of acres of state lands for oil and gas development.	BLM recognizes the national and global impact potential of GHG emissions and the likewise broad scope of climate impacts related to them and prepared the Annual GHG Report. These reports account for current and projected future agency-wide GHG emissions related to fossil fuel actions on public land, national and global GHG emission trends, and potential climate impacts related to these emissions. The report is specifically referenced in and incorporated into each State Office lease sale NEPA analysis and provides the information necessary to properly assess agency-wide, nationwide, and global reasonably foreseeable cumulative impacts of each State Office lease sale. See also responses to letter 7 comments 41 and 56.

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7	66	Climate Change, Green House Gases, and Social Cost of Carbon	BLM continues to improperly frame and weigh the context and intensity factors for assessing the significance of reasonably foreseeable GHG emissions from the proposed lease sales and their cumulative climate impacts. Although BLM acknowledges that all GHGs contribute incrementally to the climate change phenomenon, BLM persists in comparing the estimated emissions associated with the proposed action to the total global, national, state, and other categories of GHG emissions to support its finding that the GHG emissions from the proposed actions are insignificant. BLM's attempt to minimize the estimated GHG emissions from the proposed actions in this way is precisely how the 2016 CEQ GHG Guidance and 2023 Interim CEQ Guidance directed federal agencies not to limit assessments of the significance of GHG emissions. Federal Courts, including, most recently, the Tenth Circuit, agree. See, e.g., <i>Diné CARE v. Haaland</i> , 59 F.4th at 1043-1044; see also <i>350 Montana v. Haaland</i> , 50 F.4th 1254, 1266-1267 (9th Cir. 2022). This method of analysis doesn't reveal anything beyond the nature of the climate change challenge itself.	The BLM considers this comment non-substantive to the extent it seeks to interpret legal authorities that are the best evidence of their contents rather than alleging an error or material omission in the BLM's analysis or submitting new information for the BLM's consideration. The BLM analyzes potential GHG impacts in detail in the EA (see Sections 3.6.1 and 3.6.2). In the ARTR, the BLM quantifies direct, indirect, and cumulative emissions from the combustion of oil and gas and discusses the significance of these emissions. The BLM analyzes, in accordance with NEPA, the environmental impacts of leasing, including quantifying and forecasting aggregate GHG emissions from oil and gas development and addressing the environmental effects of downstream oil and gas use including the effects on climate. As described in Section 3.6.2.2, to put the estimated GHG emissions for this lease sale in a relatable context, potential emissions that could result from development of the nominated lease parcels are compared with other common activities that generate GHG emissions and with emissions at the state and national level. To the extent that GHGs can influence changes in climates across various scales, the EA and the associated Specialist Report on GHGs has analyzed and disclosed those relationships. As detailed in the Annual GHG Report, the BLM also looked at other tools to inform its analysis, including the Model for the Assessment of Greenhouse Gas Induced Climate Change (MAGICC) model (see Section 9.0 of the Specialist Report). See also response to letter 7 comment 65.
7	67	Climate Change, Green House Gases, and Social Cost of Carbon	Moreover, BLM's analysis of GHG emissions from the proposed lease sale in comparison with global, national, state, and other categories of emissions is incomplete and fails to inform the public and decision maker of comparisons that would more effectively reveal the context and intensity of the reasonably foreseeable GHG emissions. BLM correctly points out that GHGs have a long atmospheric lifetime, which allows them to become well mixed and uniformly distributed over the entirety of the Earth's surface, no matter their point of origin. Draft EA at 83. However, BLM's EA for the proposed lease sale never explains why this aspect of GHGs should limit BLM's comparison of potential emissions from the proposed actions to global, state, and national emission totals for purposes of providing context of their significance and potential contribution to climate change impacts. In other words, BLM never compares or offers a rational explanation for why it would be inappropriate to compare potential GHG emissions from one proposed lease sale to the potential GHG emissions from another past or present lease sale. Similarly, why not compare the potential GHG emissions from one proposed lease sale with another past or	The BLM employs the methodologies best suited to its analysis. See <i>WildEarth Guardians v. Bernhardt</i>, 501 F. Supp. 3d 1192, 1209 (D.N.M. 2020) ("nothing in [NEPA's] text and nothing in its associated regulations specifically mandates that agencies perform a particular analysis or subscribe to a particular methodology. ... NEPA requires that the agency assess the direct and indirect impact on the environment, and agencies have wide discretion in how to perform those tasks."). See also response to letter 7 comment 66.

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			present federal (or non-federal) fossil fuel action or project? Why not compare the potential emissions to different individual sources of GHG emissions, such as a gas-fired power plant? A dairy operation? A landfill?	
7	68	Climate Change, Green House Gases, and Social Cost of Carbon	BLM does not adequately explain the basis for its decision to limit its GHG emission comparisons to the global, national, and state levels, even though the examples of other comparisons mentioned above would provide valuable context and intensity information to the public and the decision maker. We request BLM include a more comprehensive comparison of the estimated GHG emissions associated with the proposed lease sale and the cumulative GHG emissions from the federal fossil fuel program to other emissions sources, including but not limited to other individual federal and non-federal fossil fuel leases, individual coal-fired and natural gas electric generating facilities, and individual concentrated animal feeding operations (CAFOs).	See responses to letter 7 comments 66 and 67.
7	69	Climate Change, Green House Gases, and Social Cost of Carbon	Neither the EA nor the FONSI for the proposed lease sale clearly or properly assesses the significance of the cumulative impacts of the potential emissions of GHGs and their impact on climate change. The Draft EA refers the public and decision maker to a discussion of past, current, and projected future climate change impacts in the annual BLM Specialist Report. See, e.g., Draft EA at 16. However, nothing in the 2022 BLM Specialist Report ever provides BLM's basis for assessing significance of GHG emissions or its ultimate conclusion on significance. It is impossible to understand how BLM reached its conclusions regarding significance because BLM failed to discuss how it assessed the significance of GHG emissions in the Draft EA, as well as in the 2022 BLM Specialist Report.	See responses to letter 7 comments 56, 66, and 67.
7	70	Climate Change, Green House Gases, and Social Cost of Carbon	In addition, although the 2022 BLM Specialist Report provided a discussion of cumulative GHG emissions from the BLM fossil fuel leasing program and future climate change impacts, BLM appears to have chosen not to conduct an analysis of the monetized net harm to society associated with the cumulative increases in GHG emissions in the 2022 BLM Specialist Report. The 2022 BLM Specialist Report failed to analyze these cumulative impacts using the SC-GHG and failed to assess carbon budgets according to historic GHG contribution and equitable apportionment.	See responses to letter 7 comments 56, 66, and 67.

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7	71	Climate Change, Green House Gases, and Social Cost of Carbon	BLM should conduct a social cost analysis of the cumulative GHG emissions attributable to all federal fossil fuel development and production, as well as of the GHG emissions attributable to the proposed sale(s) in accordance with the 2021 United States Government, Interagency Working Group (IWG) Social Cost of Greenhouse Gas estimates. In doing so, BLM should acknowledge the fact that the IWG has consistently indicated that these numbers represent an underestimate of the actual social costs associated with a given ton of GHG pollution. This fact has been borne out by the Environmental Protection Agency's September 2022 Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances, which reflects "recent advances in the scientific literature on climate change and its economic impacts and incorporate recommendations made by the National Academies of Science, Engineering, and Medicine." The fact that the EPA's social cost estimates, which are scientifically rigorous and reflect the best and most up-to-date scientific and economic data, are significantly higher than those of the IWG further illustrates the extent to which the IWG interim numbers may be considered an underestimate. Nonetheless, the IWG numbers represent the most current official estimate of social costs, and therefore constitute an important starting point for BLM's analysis, which must include a discussion of the ways in which the IWG estimates are likely to undervalue future climate damages.	See responses to letter 7 comments 11, 56, 66, and 67.
7	72	Climate Change, Green House Gases, and Social Cost of Carbon	BLM's 2022 BLM Specialist Report must also further contextualize its carbon budget analysis by evaluating carbon budgets according to the United States' historic contributions. It is well-documented that the United States is the world's largest historic contributor of GHG emissions and, thus, bears a greater global responsibility to more quickly reduce the quantity of its GHG emissions. The 2022 BLM Specialist Report attempts to cast doubt on the utility of assessing GHG emissions according to carbon budgets, stating: "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 as such the global budgets that limit warming to 1.5°C or 2.0°C are not useful for BLM decision-making as it is unclear what portion of the budget applies to emissions occurring in the United States." However, uncertainty in other contexts of GHG and climate change analysis has not prevented BLM from using averages, estimates, and models to address uncertainty and provide the public and decision makers helpful information. As such, BLM should consult the best scientific reports and data available to determine a representative carbon budget that reasonably applies to emissions in the United States, given its	See responses to letter 7 comments 11, 56, 66, and 67.

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			historic contributions. The carbon budget analysis in the 2022 BLM Specialist Report, as currently drafted, is misleading because it inappropriately compares GHG emissions from the BLM federal fossil fuel program to the remaining global carbon budget. To the public or a decision maker, this analysis minimizes the GHG emissions from the BLM federal fossil fuel program and implies the emissions are insignificant to the global carbon budget, comparatively. The EA's analysis of the significance of GHG emissions from the BLM federal fossil fuel program fails to take the hard look required by NEPA.	
7	73	Climate Change, Green House Gases, and Social Cost of Carbon	BLM must take a hard look at the impacts of methane, preferably in both a programmatic NEPA review, and an aggregated EIS for the proposed 2024 sales as discussed above. Methane is an incredibly potent greenhouse gas. Methane has contributed to approximately 30% of the global rise in temperatures to date. Because of methane's potent short-term warming characteristics, curbing methane emissions is one of the most effective near-term ways to address the climate crisis. Methane emissions from fossil fuel operations represent nearly one-third of human-caused emissions. These emissions represent both a major climate threat and also an opportunity. Slowing and ultimately halting fossil fuel demand will not by itself achieve needed GHG cuts, particularly in the near-term. This means that curbing wasteful methane emissions from oil and gas production are an essential element of reducing climate-warming emissions.	The BLM analyzes air impacts, including methane emissions, in Section 3.6 in both a general air quality context and a climate context. In December of 2023, the EPA released a rule under the Clean Air Act (CAA) to reduce methane and other harmful air pollutants from new and existing oil and gas operations nationwide. The EPA's Rule will sharply reduce emissions of methane and other harmful air pollution from oil and natural gas operations — including, for the first time, from existing sources nationwide. The final action includes New Source Performance Standards (NSPS) to reduce methane and smog-forming volatile organic compounds from new, modified and reconstructed sources. It also includes Emissions Guidelines, which set procedures for states to follow as they develop plans to limit methane from existing sources. Specifically, the EPA Rule finalizes 40 C.F.R. § 60 Subpart OOOOb regulating GHGs (in the form of a limitation on emissions of methane) and VOCs emissions for the Crude Oil and Natural Gas source category pursuant to CAA section 111(b)(1)(B). Second, the EPA finalizes the presumptive standards in 40 C.F.R. § 60 Subpart OOOOc to limit GHGs emissions (in the form of methane limitations) from designated facilities in the Crude Oil and Natural Gas source category, as well as requirements under the CAA section 111(d) for states to follow in developing, submitting, and implementing state plans to establish performance standards. Third, the EPA finalizes several related actions stemming from the joint resolution of Congress, adopted on June 30, 2021, under the CRA, disapproving the previous 2020 Policy Rule. Fourth, the EPA finalizes a protocol under the general provisions of 40 C.F.R. § 60 for 40 CFR part 60 for Optical Gas Imaging to detect gas leaks from industrial sources.

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				Additionally, oil and gas operations in New Mexico are subject to New Mexico's Natural Gas Capture Requirements (Waste Prevention Rule), NMAC 19.15.27, and the "Oil and Natural Gas Regulation for Ozone Precursors" rule, NMAC 20.2.50.1, including emissions reduction requirements for compressors, engines and turbines, liquids unloading, dehydrators, heaters, pneumatics, storage tanks, and pipeline inspection gauge launching and receiving. The regulation also encourages operators to stop venting and flaring and use fuel cells technology to convert CH₄ to electricity at the well site and incentivizes new technology for leak detection and repair. Approximately 50,000 wells and associated equipment will be subject to this regulation. It is anticipated that the regulation will annually reduce VOC emissions by 106,420 tons, NOX emissions by 23,148 tons, and methane (CH₄) emissions by 200,000 to 425,000 tons statewide. Analysis and approval of future development may include application of BMPs within BLM's authority, as COAs or lease stipulations, to reduce or mitigate GHG emissions. Additional measures proposed at the project development stage also 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.
7	74	Climate Change, Green House Gases, and Social Cost of Carbon	BLM failed to take a hard look at the direct, indirect, and cumulative methane emissions that will result from development of these leases and their commensurate impacts in accordance with NEPA. This includes Interior's duty to quantify methane emissions and, on that basis, to assess impacts and a range of reasonable alternatives and mitigation measures to cut those emissions. BLM also failed to consider the other environmental impacts of this wasted resource, including the public health and welfare impacts of flaring.	See response to letter 7 comment 73.
7	75	Climate Change, Green House Gases, and Social Cost of Carbon	While Conservation Groups understand that BLM has undertaken a rulemaking on methane waste, as discussed in Section D.4, supra, and while this is necessary regulatory action, BLM should not be issuing additional leases until it takes affirmative steps to address waste on Tribal and federal lands. At a minimum, as discussed supra, BLM must adequately address the impacts of methane waste from these sales both individually and collectively, and identify pathways to mitigate both the emission of methane and its impacts.	The MLA allows discretion in that "[a]ll lands subject to disposition . . . which are known or believed to contain oil or gas deposits may be leased by the Secretary." 30 U.S.C. 226(a) (emphasis added). This discretion is not constrained by separate rulemaking processes. See EA Sections 1.2 and 1.4 for information regarding the BLM's requirements under MLA, FLPMA, and other statutes and regulations. Chapter 2 of Annual GHG Report, incorporated in the EA by reference, discusses the relationship between BLM's coal, oil, and gas leasing programs with other laws and policies at the federal and state level.

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				The decision under review is "whether to make available for lease the nominated lease parcels with or without constraints, in the form of lease stipulations, as provided for in the approved land use plan." See EA Section 1.3. Therefore, the BLM considers the comment non-substantive to the extent that it concerns a separate federal rulemaking rather than the decision at hand. See also response to letter 7 comment 73.
7	76	Climate Change, Green House Gases, and Social Cost of Carbon	BLM is well-aware that flaring results in waste of federal and tribal minerals, loss of revenue, and social and environmental impacts. Yet, BLM has repeatedly ignored flaring in its NEPA analyses for oil and gas lease sales in New Mexico. We urge BLM to correct this deficiency and consider flaring and its impacts in the EA for this lease sale.	See response to letter 7 comment 73.
7	77	Climate Change, Green House Gases, and Social Cost of Carbon	BLM must: • Consider the direct, indirect, and cumulative socioeconomic impacts of flaring. A recent analysis conducted by Synapse Energy Economics calculated natural gas methane emissions volumes from venting, flaring, and leaks in the production segment on federal and tribal lands and determined the value of that lost gas in the form of (1) lost royalties, (2) lost state revenue from taxes, and (3) lost revenue from wasted natural gas that could be used for other purposes. In 2019, about 62.7 Bcf of natural gas was wasted from federal and tribal lands in New Mexico, and roughly half of this waste came from flaring. This amounts to lost state revenues of \$14.2 million from state taxes and \$11.7 million from federal royalty payments. BLM must consider these socioeconomic impacts.	See response to letter 7 comment 73.
7	78	Climate Change, Green House Gases, and Social Cost of Carbon	BLM must: Consider the direct, indirect, and cumulative human health impacts of flaring. For example, a recent study found that a 1% increase in flared natural gas in North Dakota increases the respiratory-related hospitalization rate by 0.73%. BLM must examine how flaring affects people living in the region.	See response to letter 7 comment 73.
7	79	Climate Change, Green House Gases, and Social Cost of Carbon	BLM must: Consider the direct, indirect, and cumulative environmental justice impacts of flaring. On April 21, 2023, President Biden reaffirmed his administration's commitment to working towards environmental justice in Executive Order 14,096 on Revitalizing Our Nation's Commitment to Environmental Justice for All. Executive Order 14,096 requires all federal agencies to "consider adopting or requiring measures to avoid, minimize, or mitigate disproportionate and adverse human health and environmental effects (including risks) and hazards of Federal activities on communities with environmental justice concerns, to the maximum extent practicable, and to address any contribution	The BLM considers this comment non-substantive to the extent it seeks to interpret Executive Order 14,096, which is the best evidence of its contents, rather than focusing on an error or material omission in the BLM's analysis or offering new information for the BLM's consideration. See also response to letter 7 comment 73.

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			of such Federal activities to adverse effects—including cumulative impacts of environmental and other burdens—already experienced by such communities." To fulfill this mandate, BLM must not only consider the impacts of flaring on Indigenous communities but also mitigate those harms.	
7	80	Human Health and Safety	BLM must include an analysis of reasonably foreseeable direct, indirect, and cumulative human health impacts resulting from oil and gas leasing and development.	The BLM considers this comment non-substantive because it does not allege a specific error or material omission in the BLM's analysis or present new information for the BLM to consider. Generally, the BLM analyzes potential impacts, including cumulative impacts, to air quality and GHGs in detail in the EAs, Sections 3.6.1 and 3.6.2. The EA analysis also discloses the potential for adverse direct, indirect, and cumulative health impacts from the Proposed Action. See EA AIB-21, Human Health and Safety. The EA analysis describes the relevant social determinants of risk for affected communities and discusses how air pollutants associated with oil and gas activities can cause health effects for people of all ages, including but not limited to asthma, compromises to immune and reproductive systems, birth defects, and developmental disorders. Additional information regarding the human health and safety effects of air quality and GHGs can be found in the ARTR and the Annual GHG Report, respectively, which are incorporated by reference in the EA analysis.
7	81	Human Health and Safety	[...] in the Draft EA for this proposed lease sale, BLM fails to analyze several important issues related to health and safety risks and impacts—whether direct, indirect, or cumulative.	See response to letter 7 comment 80.
7	82	Human Health and Safety	And BLM summarizes some of its obligations to analyze disproportionately high and adverse human health effects on "minority" and "low-income populations" under Executive Order 12898, along with CEQ and EPA Guidance on environmental justice and BLM's own recent Instruction Memorandum IM 2022-059. Draft EA at 55. However, the agency fails to take NEPA's requisite hard look at the reasonably foreseeable future health and safety impacts that could result from this sale, including disproportionate and adverse impacts to "environmental justice" populations. As stated above, BLM cannot defer its analysis of health impacts to the leasing stage. And in proceeding to dismiss health and environmental justice impacts as insignificant, despite acknowledging the potential for increased, disproportionate, and adverse health risks and impacts, BLM fails to articulate a rational connection between the facts found and the choices made, rendering its decision to issue a FONSI and authorize this lease sale arbitrary and capricious. NEPA and its implementing regulations require BLM to not just list	The BLM considers this comment non-substantive to the extent that it seeks to interpret legal authorities that are the best evidence of their contents rather than alleging a specific error or material omission in the BLM's analysis or suggesting new information for the BLM to consider. See response to letter 7 comment 80 for a description of where in the EA the BLM has conducted an extensive analysis of human health impacts, including air quality impacts. Because the BLM cannot know until the APD stage exactly where development will occur relative to human presence, and because some impacts such as emissions are highly variable depending on distance, some site-specific analysis and mitigation must necessarily occur at that later stage of development in order to best protect human health. Additionally, Executive Order 14154, Unleashing American Energy (Jan. 20, 2025), and a Presidential Memorandum, Ending Illegal Discrimination and Restoring Merit-Based Opportunity (Jan. 21, 2025), require the Department to strictly adhere to the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321 et seq. Further, such Order and Memorandum repeal Executive Orders 12898 (Feb. 11, 1994) and

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			generalized categories of risks, but rather analyze and take a hard look at those risks and their effects. See 40 C.F.R. § 1508.1(g). "General statements about 'possible' effects and 'some risk' do not constitute a 'hard look' absent a justification regarding why more definitive information could not be provided." Kern v. Unites States BLM, 284 F.3d 1062, 1075 (9th Cir. 2002). BLM cannot defer NEPA's requisite hard look at health impacts to the APD stage. The intent of NEPA is for agencies to study the impact of their actions on the environment—here, leasing—before the action is taken. See Conner v. Burford, 848 F.2d 1441, 1452 (9th Cir. 1988) (NEPA requires that agencies prepare an EIS before there is "any irreversible and irretrievable commitment of resources"); see also Upper Pecos Ass'n v. Stans, 500 F.2d 17 (10th Cir. 1974) (concluding that "consideration of environmental factors should come in the early stages of program and project formulation").	14096 (Apr. 21, 2023). Because Executive Orders 12898 and 14096 have been repealed, complying with such Orders is a legal impossibility. The BLM verifies that it has complied with the requirements of NEPA, including the Department's regulations and procedures implementing NEPA at 43 C.F.R. Part 46 and Part 516 of the Departmental Manual, consistent with the President's January 2025 Order and Memorandum.
7	83	Human Health and Safety	An extensive and ever-growing body of peer-reviewed research has shown what people living near oil and gas operations already know firsthand—that proximity to drilling and fracking operations and other oil and gas facilities is linked to adverse health risks and impacts. These risks and impacts are discussed in further detail throughout this section, and in the numerous accompanying exhibits, but in general, they include (but are not limited to): • Reproductive harms – including birth defects, low birth weight, preterm births, and miscarriages; • Respiratory health effects – including asthma, lung disease, breathing difficulty, and, most recently, increased vulnerability to COVID-19; • Eye, skin, and throat irritation and rashes; • Cardiovascular effects – including higher blood pressure and other indicators of, or precursors to, heart disease; • Possible disruption of the endocrine system (a system of glands producing hormones that regulate a variety of functions in the body, including metabolism, growth and development, reproduction, sleep, and mood); • Cancer (lung cancer and other types of cancer); Motor vehicle injuries and fatalities, and other health and safety risks associated with increased vehicle traffic (and the air pollutants it emits) from oil and gas development; • Injuries and fatalities from explosions, fires, spills, and leaks; and • Trauma and psychological stress.	See response to letter 7 comment 80. The comment does not provide information that the BLM has not already analyzed and discussed in the EA.
7	84	Human Health and Safety	One excellent, frequently updated, and easy-to-use resource for keeping up with this growing body of peer-reviewed research is the Physicians, Scientists, and Engineers for Healthy Energy ("PSE Healthy Energy") database, the Repository for Oil and Gas	See response to letter 7 comments 12 and 80. The BLM appreciates commenter's suggestion and will continue to monitor publicly available sources and will incorporate scientific sources as they are published.

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			Energy Research, or "ROGER." ROGER is an extensive repository of peer-reviewed literature, "a near-exhaustive collection of bibliographic information, abstracts, and links to many of [sic] journal articles that pertain to shale and tight gas development." This database is organized into several categories, and for the "Health" category alone, there are over 260 studies listed, including several recent studies from 2019-2022. BLM should avail itself of this invaluable resource in order to take NEPA's requisite hard look at health impacts.	
7	85	Human Health and Safety	There are several other notable scientific papers BLM should consider in order to analyze and disclose to the public the health risks and impacts associated with its leasing decisions. Multiple peer-reviewed papers have identified adverse health effects and risks arising from exposure to unconventional oil and gas drilling operations, even within a large radius of residences—potentially up to ten miles. For example, one study found that babies whose parents lived in close proximity to multiple oil and gas wells were 30% more likely to be born with heart defects than babies born to parents who did not live close to oil and gas wells. Other adverse health impacts documented among residents living near drilling and fracking operations include increased reproductive harms, asthma attacks, higher rates of hospitalization, ambulance runs, emergency room visits, self-reported respiratory problems and rashes, motor vehicle fatalities, trauma, and drug abuse. Moreover, one recent study found that fracking and drilling near people's homes "drives stress experiences that go beyond the mere presence of industrial land uses in neighborhoods," and identified two key institutional barriers driving negative mental health impacts for people living near UOG [unconventional oil and gas] production – namely: 1) uncertainty, due to inaccessible, transparent information about environmental and public health risks and 2) powerlessness to meaningfully impact regulatory or zoning processes. In turn, "these institutional barriers make UOG production a chronic stressor – which can be more insidious, negative, and, significantly, can generate longer- term mental health impacts such as self-reported depression."	See response to letter 7 comment 80. Additionally, the BLM has reviewed and considered the studies listed by the commenter regarding the potential risks to human health. The studies do not contradict BLM's analysis or conclusions. They do not present any additional risk factors or provide additional impact indicators that are not already considered. Therefore, the BLM has concluded that the risks are adequately evaluated in the analysis as described above and further in the 2022 Air Resources Technical Report. The BLM will continue to monitor publicly available sources and will incorporate scientific sources as they are published.
7	86	Human Health and Safety	A 2022 review of literature on health impacts of fracking by Physicians for Social Responsibility ("PSR") concluded that: In sum, the vast body of scientific studies now published on hydraulic fracturing in the peer-reviewed scientific literature confirms that the climate and public health risks from fracking are real and the range of environmental harms wide. Our examination uncovered no evidence that fracking can be practiced in a manner	The BLM identified, discussed, and analyzed the potential impacts to groundwater quality and quantity in AIB-1 and Section 3.6.3, and potential impacts to human health and safety in AIB-21 of the EA. Cumulative effects on groundwater resources and human health and safety are also analyzed and discussed in these sections. Additionally, the BLM further analyzes the risk of spills, casing failures, and groundwater contamination in the 2023 BLM Water Support Document for Oil and Gas Development in New Mexico.

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			that does not threaten human health directly or without imperiling climate stability upon which human health depends. The rapidly expanding body of evidence compiled here is massive, troubling, and cries out for decisive action. Across a wide range of parameters, the data continue to reveal a plethora of recurring problems that cannot be sufficiently averted through regulatory frameworks. The risks and harms of fracking are inherent in its operation. The only method of mitigating its grave threats to public health and the climate is a complete and comprehensive ban on fracking. Indeed, a fracking phase-out is a requirement of any meaningful plan to prevent catastrophic climate change.	Human Health and Safety is analyzed in AIB-21 of the EA. As stated in the EA, 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. As stated in EA Section 1.4.2, 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. This includes, but is not limited to, BLM and state regulations regarding hydraulic fracturing, including casing specifications, monitoring and recording, and management of recovered fluids. The BLM is also required to comply with all applicable federal, state, and local laws and regulations, as well as Department of Interior policies when leasing mineral estate and responding to EOIs. The BLM does not judge the adequacy of applicable laws and regulations.
7	87	Human Health and Safety	"No Surface Occupancy" (NSO) stipulations could be implemented within a certain distance of residences, schools, or other occupied areas that might mitigate some of these effects, but they do not eliminate BLM's obligation to take a hard look at health effects at the leasing stage, as NEPA requires. Stipulations and notices are used to comply with FLPMA and the MLA, and are not a substitute for a NEPA analysis. See, e.g., 43 C.F.R. § 3101.1-3; 43 U.S.C. § 1732(a). Moreover, most existing oil and gas setbacks or NSO stipulations (typically < 1000 feet) are likely inadequate to protect people and communities against health and safety risks and adverse effects. At minimum, some health experts have called for a one-mile minimum distance between drilling facilities and schools, hospitals, and occupied dwellings, in light of the heightened health risks of residing within close proximity to unconventional oil and gas drilling sites. Many others call for setbacks of even greater distances. One study found adverse health impacts at distances of six miles. Another study found increased risk of congenital heart and neural tube defects in babies born to mothers living within 10 miles of natural gas wells. Even larger setbacks may not protect against certain health hazards, especially for people already facing disproportionate health risks due to cumulative social, structural, and environmental factors, or for children and the elderly. For example, a 2016 study and Health Impact Assessment ("HIA") in Maryland's Marcellus Shale Basin found that, even with a setback of 2000 feet from residential property as a "mitigating factor," Air Quality was a fracking-related hazard of High concern for its potential negative health impacts after taking into account additional evaluation criteria, such as presence of vulnerable populations, duration and frequency of exposure, and likelihood and severity/magnitude of	See response to letter 7 comment 85.

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			health effects. BLM must take a hard look at the adverse health risks and effects associated with proximity to oil and gas activity and facilities and disclose them to the public. We appreciate BLM's acknowledgment of adverse health risks and effects associated with living within 1.25 miles of oil and gas wells, and the agency's general acknowledgment of the potential for amplified, adverse and disproportionate effects on certain populations or individuals. See, e.g., Draft EA at 52. However, having acknowledged these risks and effects, and the presence of residences and populations who might experience them, BLM must take the next step and apply these findings to its decision-making, and articulate a rational connection between the facts found and the choice made to authorize the lease sales.	
7	88	Human Health and Safety	BLM must take a hard look not only at direct health impacts and proximity-related health impacts of oil and gas development, but also at cumulative health risks and impacts. See 40 C.F.R. § 1508.1(g)(3). Cumulative health risks and impacts can arise not only from multiple pollutant exposures, and cumulative pollution exposures over time, but also from compounding structural, social, and economic factors, many of which are rooted in systemic inequities and injustices. Researchers have begun to apply a growing body of evidence documenting how social and environmental stressors lead to health inequities and cumulative impacts specifically in the oil and gas drilling context. For example, the aforementioned 2016 Marcellus Shale study and Health Impact Assessment ("HIA") ranked "social determinants of health," (in this study, social determinants included crime, injuries, mental health, sexually transmitted infections, and substance abuse) as a fracking-related hazard of the highest concern with respect to public health impacts, along with air quality and health care infrastructure. Cumulative risks, too, were considered their own category of fracking-related public health hazard, and ranked as a "moderately high" concern (along with water quality, noise, and traffic).	See response to letter 7 comment 85.
7	89	Human Health and Safety	In general, the research indicates that the potential cumulative effects of social and environmental stressors and "social determinants of health" in the context of oil and natural gas activity are as follows: (1) they can increase the risk or magnitude of exposure and the number and/or severity of adverse health impacts of oil and gas drilling (e.g. pollution sources are often located closer to "environmental justice" communities; underlying health conditions can increase vulnerability to pollution-related health impacts; and pollution-related risks and impacts can exacerbate existing health, social, and economic stressors and vice versa); and (2) they can present obstacles to diagnosing,	See response to letter 7 comment 80.

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			managing, treating, and mitigating adverse health impacts (e.g. lack of access to health care providers makes it more difficult to manage asthma). BLM must take a hard look at the reasonably foreseeable cumulative health impacts of its actions, including cumulative impacts as they relate to social and structural factors—often referred to as social determinants of health—and environmental justice. These “social determinants” can include both positive and negative factors.	
7	90	Human Health and Safety	Most broadly, “social determinants of health” that BLM should consider are: conditions in the environments in which people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks. Conditions (e.g., social, economic, and physical) in these various environments and settings (e.g., school, church, workplace, and neighborhood) have been referred to as ‘place.’ In addition to the more material attributes of ‘place,’ the patterns of social engagement and sense of security and well-being are also affected by where people live. Resources that enhance quality of life can have a significant influence on population health outcomes. Examples of these resources include safe and affordable housing, access to education, public safety, availability of healthy foods, local emergency/health services, and environments free of life-threatening toxins.	See response to letter 7 comment 80.
7	91	Environmental Justice	Moreover, the CEQ guidance on environmental justice in the NEPA process specifically directs agencies to incorporate relevant underlying health data, and what amounts to social determinants of health, into their NEPA analyses, and to use this data to identify cumulative risks and reasonably foreseeable cumulative effects. It emphasizes the importance of using public health data to identify “the potential for multiple or cumulative exposure to human health or environmental hazards in the affected population and historical patterns of exposure to environmental hazards, to the extent such information is reasonably available...” and notes that “[a]gencies should consider these multiple, or cumulative effects, even if certain effects are not within the control or subject to the discretion of the agency proposing the action.” It also embraces a broad, socio-ecological model of health that is consistent with the language and purpose of NEPA. An additional guiding principle is that “[a]gencies should recognize the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed agency action. These factors should include the physical sensitivity of the community or population to particular impacts; the effect of any disruption of the community structure associated with the proposed action; and the nature and degree of impact on	See responses to letter 4 comment 24 and letter 7 comments 80 and 82.

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			the physical and social structure of the community." Instead of taking a hard look at cumulative health risks and impacts from its oil and gas leasing decisions, BLM notes that there are environmental justice communities of concern who could experience adverse and disproportionate risks and impacts from the lease sale, and proceeds to punt on further analysis of, or discussion of how to mitigate or avoid, those risks and impacts, stating that impacts are indirect and "may incrementally contribute to impacts associated with reasonably foreseeable cumulative actions." As with cumulative GHG emissions and climate change, BLM cannot simply dismiss these "incremental" contributions or defer analysis of their impacts to the drilling stage.	
7	92	Human Health and Safety	BLM's full analysis and disclosure of health and safety risks and impacts, including cumulative impacts, is particularly important given that typical methods of collecting and analyzing emissions data have often underestimated health risks by failing to adequately measure the intensity, frequency, and duration of community exposure to toxic chemicals from fracking and drilling; failing to examine the effects of chemical mixtures; and failing to consider vulnerable populations. Of high concern, numerous studies highlight that health assessments of drilling and fracking emissions often fail to consider impacts on vulnerable populations including environmental justice communities and children. For example, a recent analysis of oil and gas development in California found that 14 percent of the state's population totaling 5.4 million people live within a mile of at least one oil and gas well. More than a third of these residents, totaling 1.8 million people, also live in areas most burdened by environmental pollution. BLM also cannot dismiss the potential for elevated pollution concentrations —and associated, potentially significant health risks and effects—in rural areas simply because those areas are sparsely populated. See, e.g., Draft EA at 61 (assuming, without justification, that certain criteria pollutant concentrations are not elevated in Chaves, Lea, and Eddy counties "because the counties are relatively rural."). By BLM's own estimates, there are over 45,000 active oil and gas wells currently in the Pecos District Office. Draft EA at 12. The potentially significant air pollutant emissions from those wells cannot be ignored simply because they are located in rural areas. BLM also acknowledges the potential for health and safety risks and impacts from increased vehicle traffic associated with oil and gas development in the region. Draft EA at 52. That traffic, too, likely contributes to additional criteria pollutant emissions (particulate matter and others).	See response to letter 7 comment 80.

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7	93	Human Health and Safety	The existing health status and pollution burdens experienced by individuals and populations in the lease sale areas, and the disproportionate health risks they face in light of social determinants of health and environmental justice concerns, are precisely the kinds of “incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions” that NEPA requires BLM to analyze here. 40 C.F.R. § 1508.1(g)(3). BLM cannot simply dismiss the incremental addition of wells from a particular lease sale (or the incremental increase in air pollution from those wells) as insignificant merely because they constitute a small percent increase compared to state, regional/basin-wide, or national well counts or emissions, or a small percent of total air pollutant emissions. This misses the entire point of NEPA’s requisite cumulative impacts analysis—it is not to determine what fraction of regional, state, or national wells and emissions the wells and emissions from a particular lease sale make up. Quite the opposite—as with GHG emissions, rather than breaking emissions from an individual lease sale down into annual fractions or “component parts” in attempt to dismiss them as insignificant, BLM must analyze additive short and long-term emissions and their direct, indirect, and cumulative health effects from these lease sales—the impacts which result “from the incremental impact of the action when added to past, present, and reasonably foreseeable future actions” (and impacts). 40 C.F.R. § 1508.1(g)(3). And, as with GHG emissions, BLM must put these emissions into context and discuss their potentially significant impacts, including health risks and impacts.	See response to letter 7 comment 80.
7	94	Human Health and Safety	In addition, BLM must not summarily dismiss health and safety impacts as temporary simply because some exposures (e.g., to emissions and fugitive dust from construction) are temporary. It is arbitrary, and contrary to scientific understanding, to assume that just because an exposure is temporary, so too are the effects resulting from that exposure. The health effects that can arise from environmental exposures, especially in conjunction with social determinants of health and environmental justice issues, may endure long after the acute exposure source is gone. In a February 2023 ruling, the Tenth Circuit agreed. See <i>Diné CARE v. Haaland</i> , F.4th at 1046-1047. It is arbitrary and capricious for BLM to dismiss health impacts as insignificant, without further justification and without further elaboration on these effects specific to the populations in this lease sale area. See <i>Standing Rock Sioux Tribe, F. Supp. 3d at 140</i> ; <i>Friends of Buckingham v. State Air Pollution Control Board</i> , 947 F.3d 68, 92 (4th Cir. 2020); <i>California v. Bernhardt</i> , 472 F. Supp. 3d 573, 622 (N.D. Cal. 2020).	The BLM considers the comment non-substantive to the extent it seeks to interpret legal authorities rather than focusing on errors or material omissions in the BLM’s analysis. See also responses to letter 4 comment 24 and letter 7 comment 80.

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			(citing Anderson v. Evans, 371 F.3d 475, 490 (9th Cir. 2004)). We appreciate BLM's general acknowledgment, in this EA, of the potential for health effects arising from both short and long-term exposures to Hazardous Air Pollutants (HAPs), Draft EA at 50-51. And we appreciate BLM's acknowledgment that "other economic or social indicators can also influence the general health risks of a population, such as poverty status, educational attainment, or language proficiency" and inclusion of some relevant demographic data for "at risk" populations in Lea, Eddy and Chaves counties and New Mexico. Draft EA at 51. BLM should then take the next step and explain how HAP emissions from this lease sale, coupled with other reasonably foreseeable direct, indirect, and cumulative emissions and effects, could affect these populations, take this into account in its decision-making, and articulate a rational connection between the facts found and the choices made regarding leasing. We hope that BLM will truly take a hard look at direct, indirect, and cumulative HAP emissions and impacts, both short and long-term, in accordance with the 10th Circuit's ruling and the requirements of NEPA and the APA.	
7	95	Climate Change, Green House Gases, and Social Cost of Carbon	we urge BLM to consider, and disclose to the public directly in its NEPA documents, additional context for EPA's risk ranges, even as there is no singular "safe" threshold for HAPs. For example, with respect to the benzene NESHAPs, which set up a two-step risk-based decision framework, the 100-in-1-million upper limit of "acceptable" lifetime cancer risk applies to the "most exposed person." BLM should make clear to the public what, if anything, it has done to ensure that its modeling accounts for the "most exposed person." In addition, satisfying the "100-in-1-million" upper limit for "acceptable" lifetime cancer risk to the most exposed person does not end the inquiry. As EPA notes, "The EPA will generally presume that if the risk to that individual [the Maximum Individual Risk] is no higher than approximately 1 in 10 thousand, that risk level is considered acceptable and EPA then considers the other health and risk factors to complete an overall judgment on acceptability." (emphasis added). While BLM acknowledges that there are populations who could experience increased risks associated with HAPs exposure based on Headwaters Economics data generally/at the county levels, Draft EA at 51, the agency should take the next step and discuss how this informs a determination of significance and articulate a rational connection between the facts found and the leasing decisions made. Ultimately, as with cumulative GHG emissions and climate change and with criteria pollutant emissions, we also emphasize that NEPA, FLPMA, the APA, and applicable regulations require BLM to go beyond disclosing additional information about HAPs, even as we appreciate that additional	Additional context for EPA's AirToxScreen risk values is provided in the 2022 ARTR, which is incorporated by reference into the EA, and in the BLM Cumulative Hazardous Air Pollutants Modeling - Final Report referenced in the EA. Section 3.6.1.1. of the EA explains how the BLM used EPA's acceptable risk levels to determine the significance of HAP emissions. The level of environmental analysis conducted by the BLM for the Lease Sale is consistent with the purpose and requirements of NEPA.

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			information —BLM must ensure that the additional information informs its decision-making, and articulate a rational connection between the facts found and the choices made. This is particularly important given the potential for cancer risks to “the most exposed.	
7	96	Human Health and Safety	BLM also cannot dismiss cumulative health impacts as temporary, and thus avoid taking a hard look at cumulative impacts, by simply assuming that wells will be properly plugged and reclaimed at the end of their useful lives, and thus cease to cause health risks and impacts at that time. For one, a well’s time in production can span decades. BLM must analyze cumulative emissions and their impacts over the full life course of a well, in conjunction with other wells in the lease sale area and other past, present, and reasonably foreseeable future actions and emissions. Moreover, information from several states, and nationally, indicates that wells often are not properly plugged and reclaimed at the end of their “useful lives.” For example, while it is sometimes difficult to obtain an exact count of “orphaned” or improperly plugged and abandoned wells, reports indicate that there are hundreds, even thousands, of such wells across private, state, and federal lands in Western states such as Colorado, New Mexico, and Wyoming. These wells can leach toxic chemicals and contaminate water supplies, posing direct and cumulative health risks to nearby communities. State and BLM bonding requirements are usually insufficient to meet the costs associated with plugging and abandoning these wells, retiring other equipment, and cleaning up the well sites. Thus, idle or orphaned wells and abandoned well sites pose not only health risks and impacts, but also financial ones, which can further compound existing health impacts, including cumulative impacts, and related health inequities.	See response to letter 7 comment 80. The decision under review is “whether to make available for lease the nominated lease parcels with or without constraints, in the form of lease stipulations, as provided for in the approved land use plan.” See EA Section 1.3. The BLM enforces rigorous plugging and abandonment requirements for wells that have reached the end of their production, although those requirements are outside the scope of the decision. Additionally, 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) can remove GHGs from the atmosphere or reduce emissions in other areas. Chapter 10 of the Annual GHG Report provides a detailed discussion of GHG mitigation strategies.
7	97	Environmental Justice	BLM also failed to take a hard look at the inexorable relationship between health and environmental justice. Executive Order 12898 (“EO 12898”) on environmental justice requires each federal agency to make the achievement of “environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and lowincome populations.” EO 12898, Section 1-101 (emphasis added). The Draft EA failed to adequately link health and environmental justice for these lease sales, despite the clear mandate of EO 12898, and, even more recently, EO 14008. As mentioned above, BLM nominally acknowledges, but does not fully analyze, health and safety impacts in the EA. It is difficult to see how BLM can possibly	See response to letter 4 comment 24.

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			analyze, let alone take NEPA's requisite hard look at, environmental justice impacts without properly analyzing health and safety impacts, particularly cumulative and disproportionate risks and impacts.	
7	98	Environmental Justice	As noted above, the CEQ guidance on environmental justice in the NEPA process specifically directs agencies to incorporate relevant underlying health data, and social and structural factors, into their NEPA analyses, and to use this data to identify cumulative risks and reasonably foreseeable cumulative effects. BLM also identifies potential "communities of concern" including "low-income" and "minority" populations throughout the analysis area, and acknowledges that they may experience "adverse environmental impacts." See, e.g., EA at 56-58. However, the agency proceeds, without adequate justification, to dismiss environmental justice and health risks and impacts as insignificant or defer any real environmental justice analysis to the development stage. See Draft EA at 56-59. As with other impacts, BLM must thoroughly analyze these impacts, and factored them into its decision-making, at the leasing stage. See Wilderness Workshop v. Bureau of Land Mgmt., 342 F. Supp. 3d at 1163.	See response to letter 4 comment 24.

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7	99	Environmental Justice	An environmental justice analysis must contain more than a textbook citation to Executive Order 12898, agency guidance, or tables listing demographic data and identifying the general existence of “environmental justice” populations of concern or potential for disproportionate impacts in the lease sale area, with no discussion of actual risks and impacts to those populations or how those risks and impacts might be mitigated or avoided. Merely providing a textbook citation to the requirements of Executive Order 12898, or the definitions of environmental justice populations, or listing and describing environmental justice populations in the lease sale area, as BLM does here, without engaging in any further analysis or public disclosure of the impacts of its leasing decisions on these populations is arbitrary and capricious and fails to satisfy NEPA’s hard look mandate. <i>Standing Rock Sioux Tribe v. U.S. Army Corps of Engineers</i> , 255 F. Supp. 3d 101, 140 (D.D.C. 2017), is instructive here. In this case, concerning the Dakota Access Pipeline (DAPL), the court looked to the CEQ Guidance on Environmental Justice in the NEPA processes and ruled that it was not enough for the Army Corps EA merely to acknowledge that the Standing Rock community had a high percentage of “minorities” and “low-income individuals,” and could be affected by an oil spill. The court noted that the EA was silent on “the distinct cultural practices of the Tribe and the social and economic factors that might amplify its experience of the environmental effects of an oil spill” and that in order to meet its NEPA “hard look” obligations, the Army Corps “needed to offer more than a bare-bones conclusion that Standing Rock would not be disproportionately harmed.” <i>Standing Rock Sioux Tribe</i> , 255 F. Supp. 3d at 140; see also <i>Friends of Buckingham v. State Air Pollution Control Board</i> , 947 F.3d 68, 92 (4th Cir. 2020) (finding that the agency’s failure to consider disproportionate impacts on those closest to a Compressor Station resulted in a “flawed analysis.”). “In sum, NEPA requires more. BLM cannot discount the localized impacts to people for whom the public health impacts are of clear significance.” <i>California v. Bernhardt</i> , 472 F. Supp. 3d 573, 622 (N.D. Cal. 2020) (citing <i>Anderson v. Evans</i> , 371 F.3d 475, 490 (9th Cir. 2004)).	The BLM considers this comment non-substantive to the extent it seeks to interpret legal authorities rather than alleging an error or material omission in the BLM’s analysis or presenting new information for the BLM’s consideration. See also response to letter 4 comment 24.
7	100	Environmental Justice	The inequities at which BLM must take a hard look in an environmental justice analysis are not incidental, nor are they biologically determined—they are structural, systemic, and part of an unjust historical and ongoing pattern and practice of environmental racism, settler colonialism, and treatment of communities in the leasing areas as energy sacrifice zones. And, as discussed throughout these comments, there are several other health risks and impacts BLM should also analyze in the context	See response to letter 4 comment 24. Additionally, the BLM employs the methodologies best suited to its analysis. See <i>WildEarth Guardians v. Bernhardt</i> , 501 F. Supp. 3d 1192, 1209 (D.N.M. 2020) (“nothing in [NEPA’s] text and nothing in its associated regulations specifically mandates that agencies perform a particular analysis or subscribe to a particular methodology. ... NEPA requires that the agency assess the direct and indirect impact on the environment, and agencies have wide discretion in how to perform those tasks.”). There is currently no specific

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			of health and environmental justice, particularly in light of social and structural factors that affect health. BLM must engage in a thorough analysis of these and other inequities that NEPA requires, apply this analysis to its decision-making, and articulate a “rational connection between the facts found and the choices made” in coming to its ultimate conclusions in light of that analysis. <i>Motor Vehicle Mfr. Ass’n v. State Farm Mut. Auto. Ins. Co.</i> , 463 U.S. 29, 43, 52 (1983). In conducting this analysis, BLM can and should synthesize existing local health, socioeconomic, and other data in the lease sale areas—for example, county health statistics and reports, locally-conducted health impact assessments, where available, or mapping of pollution exposure risks and demographic data through tools like U.S. EPA’s “EJ Screen” or the Climate and Economic Justice Screening Tool—and the best available science, including but not limited to the peer-reviewed studies and sources mentioned in these comments.	guidance on requiring the use of these particular tools for evaluating impacts in NEPA documents. Therefore, the BLM’s determination to not use the cited screening tools at this time is within the agency’s discretion.
7	101	Environmental Justice	Moreover, BLM’s own September 2022 Instruction Memorandum 2022-059, “Environmental Justice Implementation,” mandates environmental justice analyses in BLM’s NEPA reviews. This Instruction Memorandum, the accompanying FAQ/guide to Addressing Environmental Justice in NEPA Documents, and the numerous tools and resources listed therein, should—indeed, must—help guide not just BLM’s identification of environmental justice “populations” or “communities of concern,” but actual environmental justice analysis, including an analysis of any disproportionate, adverse, or cumulative health impacts, for these lease sales. As discussed above and throughout these comments, IM 2022-059, EO 12898 and EO 14008, NEPA and the APA require more than mere identification of EJ communities. BLM must take a hard look at risks and impacts to those communities that could result from these lease sales, and factor those findings into its decision-making. And here, BLM offers no evidence or justification for its apparent conclusion that EJ impacts will not be significant.	See response to letter 4 comment 24.
7	102	Human Health and Safety	BLM should analyze these asthma-related effects in relation to existing asthma rates and related impacts in the communities adjacent to and counties encompassing the proposed lease sales. BLM’s previously-mentioned IM 2022-059 on implementing environmental justice, and the accompanying FAQ, outline ways of collecting such data. And air pollution-related asthma, in particular, can exert profound and widespread cumulative health effects throughout a person’s life course, especially when combined with social determinants of health. For example,	See response to letter 7 comment 80.

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			children with asthma are much more likely to miss school, hurting their educational prospects as well as their health (with some adverse health effects enduring into adulthood), and resulting in significant funding losses for local schools. As the New Mexico Department of Health has noted, and nationwide studies confirm, “low-income” populations and “environmental justice” populations face not only disproportionate asthma risks, but also significant difficulty managing their asthma, in part due to lack of access to health care	
7	103	Human Health and Safety	Ozone is a criteria pollutant of particular concern that contributes to asthma and missed school days (and one that can, in general, adversely affect health, especially for “sensitive groups” such as children, the elderly, and those with pre-existing health issues). Background concentrations of ozone in some of the lease sale areas are already at or exceed the National Ambient Air Quality Standards (“NAAQS”), leaving virtually no room for growth in emissions. Several studies that measured and/or modeled gas-related air emissions in various states have identified significant increases in ground level ozone as a result of natural gas development. Ozone was once a summertime urban phenomenon but is now being seen increasingly in western rural areas during the winter due to the natural gas boom, so much so that some relatively small cities are no longer in compliance with the federal regulations that set allowable ozone levels. This is insufficient to comply with NEPA’s requirements. BLM must go further and address how the proposed sale is consistent with meeting NAAQS requirements, as well as addressing the health and environmental impacts of such exceedances as are already occurring and those that are likely to occur or be exacerbated by the proposed action.	Ozone emissions are analyzed extensively in the EA including in AIB-21 (Human Health and Safety) and, most extensively, in the air quality analysis at Section 3.6.1. In addition to federal limits, oil and gas operations in New Mexico are subject to New Mexico’s Natural Gas Capture Requirements (Waste Prevention Rule), NMAC 19.15.27, and the “Oil and Natural Gas Regulation for Ozone Precursors” rule, NMAC 20.2.50.1, including emissions reduction requirements for compressors, engines and turbines, liquids unloading, dehydrators, heaters, pneumatics, storage tanks, and pipeline inspection gauge launching and receiving. The regulation also encourages operators to stop venting and flaring and use fuel cells technology to convert CH₄ to electricity at the well site and incentivizes new technology for leak detection and repair. Approximately 50,000 wells and associated equipment will be subject to this regulation. It is anticipated that the regulation will annually reduce VOC emissions by 106,420 tons, NO_x emissions by 23,148 tons, and methane (CH₄) emissions by 200,000 to 425,000 tons statewide. The CFO does not have a wintertime ozone issue. Wintertime ozone occurs in areas where strong temperature inversions trap pollutants at the surface, usually as the result of terrain and snow accumulation, among other factors. Future year modeling of ozone in the area completed by the BLM shows no exceedance of the ozone NAAQS in circa year 2032 (see section 3.6.1 and the ARTR). Analysis and approval of future development may include application of BMPs within BLM’s authority, as COAs or lease stipulations, to reduce or mitigate emissions. Additional measures proposed at the project development stage also may be incorporated as applicant-committed measures by the project proponent or added to necessary air quality permits.
7	104	Human Health and Safety	Despite these known risks and impacts, BLM fails to analyze the health risks and impacts of air pollution from this lease sale, on specific populations in this lease sale area, or from oil and gas leasing and development overall. BLM’s discussion of air quality impacts—with respect to health or otherwise—in the EA falls short of NEPA’s requisite hard look. In the Draft EA, BLM includes tables with projected air pollutant emissions quantities resulting	The BLM considers the comment non-substantive to the extent it seeks to interpret legal authorities, which are the best evidence of their contents, rather than alleging an error or material omission in the BLM’s analysis or offering new information for the BLM’s consideration. See also responses to letter 7 comments 80 and 103.

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			from well construction and operations —specifically, PM10, PM2.5, NOx, SO2, CO and VOC—for this lease sale, under the proposed alternative. Draft EA at 73. However, as with GHG emissions and climate change, BLM fails to analyze cumulative air pollutant emissions, and fails to analyze or even mention the effects of these emissions—on health or otherwise—or provide any metric by which BLM or the public can put these emissions in context or analyze their significance. BLM's discussion of hazardous air pollutant emissions and impacts fails to link lease sale emissions to specific impacts (rather than general categories of health risks and impacts) and only discusses comparative cancer rates at the county levels, which tells BLM and the public little about increased cancer risks associated with these lease sales. This is the type of analysis of Hazardous Air Pollutants the Tenth Circuit rejected in <i>Diné CARE v. Haaland</i>, 59 F.4th at 1046-1047. Moreover, as BLM acknowledges in its own 2015-2020 Air Resources Management Program Strategy, the agency is subject to the following mandates with respect to air quality under FLPMA: • FLPMA declares a policy that the BLM will manage the public lands in a manner that will protect the quality of air and atmospheric values, among other resources; • FLPMA requires the BLM's land use plans to provide for compliance with applicable air pollution standards or implementation plans, among other laws; and • FLPMA requires the BLM's leases or other instruments authorizing use or development of public lands to include provisions allowing the BLM to revoke or to suspend the lease for violation of terms that require compliance with air quality standards or implementation plans.	
7	105	Air Quality	With respect to the first obligation, it is difficult to see how continued authorization of oil and gas leasing and drilling is consistent with managing the public lands "in a manner that will protect the quality of air and atmospheric values"—particularly in the Permian where there are already several areas with criteria air pollutant concentrations nearing or exceeding the National Ambient Air Quality Standards and particularly given that the greenhouse gas emissions from rampant oil and gas drilling in the region have led to it being referred to is a "climate bomb." As to the third obligation, BLM should discuss in its NEPA analysis (and ultimately, build into its Resource Management Plans—as relevant here, the Carlsbad RMP, which is long overdue for revision) what these lease provisions are and how BLM plans to monitor for, and act on, noncompliance with air quality standards or implementation plans, particularly in light of New Mexico's upcoming regional haze SIP revisions and the fact that New	See responses to letter 7 comments 80, 103, and 104.

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			Mexico is already undergoing an Ozone Attainment Initiative due in large part to high ozone levels in the Permian.	
7	106	Water and Wetland Resources	With respect to water quality and quantity and health impacts, in addition to the considerations discussed infra, BLM should also consider how its authorization of this lease sale and reasonably foreseeable development of the leases could exacerbate water quality-related health impacts associated with PFAS contamination. For example, a new report by Physicians for Social Responsibility (PSR) reveals the staggering amount of these health-harming “forever chemicals” known to be used in oil and gas operations in New Mexico—not to mention additional PFAS chemicals that are likely present but not disclosed due to trade secret protections. BLM should take this report and the concerns it raises into account in its analysis and decision-making with respect to health impacts and potential impacts to groundwater and drinking water from PFAS “forever chemicals” used in oil and gas drilling and fracking.	See response to letter 7 comment 86. In addition, the BLM has revised its analysis to include information on PFAS, see section AIB-1 (Groundwater Quality) and AIB-21 (Human Health and Safety).
7	107	Human Health and Safety	Numerous studies also suggest that higher parental exposure to fracking and drilling during pregnancy can increase the incidence of high-risk pregnancies, premature births, lowbirthweight babies, and birth defects. A study of more than 1.1 million births in Pennsylvania found evidence of a greater incidence of low-birth-weight babies and significant declines in average birth weight for babies born to people living within 3 kilometers of fracking sites. The study estimated that about 29,000 U.S. births each year occur within 1 kilometer of an active fracking site and “that these births therefore may be at higher risk of poor birth outcomes.” A study of 9,384 pregnant people in Pennsylvania found that those who live near active drilling and fracking sites had a 40 percent increased risk for having premature birth and a 30 percent increased risk for having high-risk pregnancies. Another Pennsylvania study found that pregnant people who had greater exposure to gas wells—measured in terms of proximity and density of wells—had a much higher risk of having low-birthweight babies; the researchers identified air pollution as the likely route of exposure. In rural Colorado, parents with greater exposure to natural gas wells had a higher risk of having babies with congenital heart defects and possibly neural tube defects. A July 2020 study found that residential proximity to flaring (the open combustion of natural gas) from oil and gas development was associated with an increased risk of preterm birth, specifically for “Hispanic women,” in the Eagle Ford Shale of Texas. Here, again, these documented risks are of particular concern in certain communities near the proposed lease sales in light of environmental justice concerns, like proximity of homes to multiple	The BLM’s analysis discloses the potential for adverse direct, indirect, and cumulative health impacts from the Proposed Action. See EA AIB-21. See also Section 3.6.1 and 3.6.2 for the BLM’s air quality and climate analyses, which also consider human health. The EA describes the relevant social determinants of risk for affected communities and discusses how air pollutants associated with oil and gas activities can cause health effects, including but not limited to, compromises to immune and reproductive systems, birth defects, and developmental disorders. Additional information regarding the human health and safety effects of air quality and GHGs can be found in the ARTR and the Annual GHG Report, respectively, which are incorporated by reference in the EA.

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			wells (an exacerbating factor in the Eagle Ford Shale study), and social and structural inequities, such as limited access to prenatal care. BLM should have taken local health data like this into account as part of its "hard look" at health impacts, especially as they relate to social determinants of health and environmental justice.	
7	108	Human Health and Safety	Those living near oil and gas development aren't the only ones at risk. Oil and gas workers also suffer high risks from toxic exposure and accidents. One study of the occupational inhalation risks caused by emissions from chemical storage tanks associated with fracking wells found that chemicals used in 12.4 percent of wells posed acute non-cancer risks, chemicals used in 7.5 percent of wells posed acute cancer risks, and chemicals used in 5.8 percent of wells posed chronic cancer risks. As summarized below: Drilling and fracking jobs are among the most dangerous jobs in the nation with a fatality rate that is four to seven times the national average. Irregularities in reporting practices mean that counts of on-the-job fatalities among oil and gas workers are likely underestimates...Occupational hazards in the fracking industry include head injuries, traffic accidents, blunt trauma, burns, inhalation of hydrocarbon vapors, toxic chemical exposures, heat exhaustion, dehydration, and sleep deprivation. An investigation of occupational exposures found high levels of benzene in the urine of wellpad workers, especially those in close proximity to flowback fluid coming up from wells following fracturing activities. Exposure to silica dust, which is definitively linked to silicosis and lung cancer, was singled out by the National Institute for Occupational Safety and Health as a particular threat to workers in fracking operations where silica sand is used. At the same time, research shows that many gas field workers, despite these serious occupational hazards, are uninsured or underinsured and lack access to basic medical care. In addition, many oilfield workers may lack basic social and economic safety nets and lack support from their employer in mitigating risks and addressing harms such as those mentioned above. A recent survey of current and former oilfield workers in New Mexico's Permian Basin revealed that, there, about 57 percent of workers surveyed were not provided health insurance by their employer. Just 21 percent got retirement benefits and 78 percent did not have access to unemployment, yet 69% reported being laid off or having their hours cut during dips in the volatile market. Almost half of respondents (46%) said they had an accident on the job. BLM should take information like this into account in its NEPA analysis of health risks and impacts, socioeconomic, and environmental justice, and in particular, should factor information like this into its consideration of any purported socioeconomic benefits of oil and	Human health and safety is analyzed in AIB-21 of the EA. As stated in the EA, 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. This includes, but is not limited to, worker safety laws administered by the Occupational Safety and Health Administration.

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			gas development to individuals or communities associated with the proposed lease sale.	
7	109	Human Health and Safety	Radioactive wastes from oil and gas production can be found in produced water, flowback water from hydraulic fracturing, drilling waste including cuttings and mud, and/or sludge. This material can concentrate in pipes, storage tanks and facilities, and on other extraction equipment, and may be left on site or be emitted into the environment. Some of these materials, such as Radium, can penetrate the skin and raise the risk of cancer. The NEPA analysis conducted here must consider the potential health impacts of radioactive materials, as well as all other potential health effects discussed herein. Processes used to produce oil and gas often generate radioactive waste containing concentrations of naturally occurring radioactive materials (NORM) and Technologically Enhanced Naturally Occurring Radioactive Materials (TENORMS). The geological formations to be drilled will result in radioactive waste, containing both NORMS and TENORMs. The radioactive materials will show up in formation drilling, production wastes, and operations. Every single shale well that uses an on-site pit for disposal of drill cuttings and/or fluids likely will leave behind some amount of concentrated radioactive materials. Further, Alpha-emitting radioactive decay elements concentrate at the pipe scale, so the waste is much more radioactive than any of the constituent parts. BLM must also evaluate radiation exposure risks as part of its obligation to take a hard look at public health and safety. Further, BLM should conduct a baseline groundwater analysis in the lease sale areas before any more leasing and development occurs, to ensure that no environmental contamination occurs from disposal of radioactive sludge/scale.	Potential impacts to human health and safety from radioactive materials are discussed in AIB-21 and Appendix D of the EA. The analysis discusses the risk of exposure to radioactive materials, how NORM can be brought to the surface in drill cuttings and produced water, as well as the state's regulatory program to safely manage the disposal of drill cuttings and produced water. To the extent this comment is referring specifically to worker exposures, see also BLM's response to letter 7 comment 108.
7	110	Environmental Justice	BLM must also take a hard look at environmental justice—not just in relation to health, but also in its own right. As defined by the U.S. Environmental Protection Agency, "environmental justice" means "the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, in the development, implementation, and enforcement of environmental laws, regulations, and policies." Executive Order 12898 (EO 12898) requires each Federal agency to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Even more recently, President Biden's January 27, 2021 "Executive Order on Tackling the Climate Crisis at Home and Abroad" (EO 14008) explicitly recognizes the inexorable links	See response to letter 4 comment 24.

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			among climate, health, and environmental justice (which includes social and economic justice), and the corresponding need to address all of them in concert, with a whole-of-government approach.	
7	111	Environmental Justice	According to EPA Guidance on environmental justice in the NEPA process, an environmental justice analysis must also include "the cultural values that the community and/or Indian Tribe may place on a natural resource at risk." The Guidance also states that it is "essential" for the "NEPA analyst to consider the cumulative impacts from the perspective of these specific resources or ecosystems which are vital to the communities of interest." BLM must incorporate Tribes' and community members' knowledge of, and concerns about, such cultural values and cumulative impacts in its NEPA analyses for the lease sales.	The BLM considers this comment non-substantive because it has not alleged with any specificity that the BLM has erred in conducting its consultation obligations. The BLM conducts extensive, ongoing tribal consultation as described in Sections 4.2 and 4.3 of the EA. See also response to letter 4 comment 24.
7	112	Environmental Justice	BLM acknowledges in the EA that there are "EJ populations" in the lease sale area, and acknowledges that there is a potential for disproportionate air quality, climate change, water use, quality of life, and human health and safety impacts to EJ communities. See, e.g. Draft EA at 55-59. Yet BLM still proceeds to dismiss environmental justice impacts as insignificant, and still attempts to defer analysis of environmental justice impacts to the drilling and development stage. See, e.g., Draft EA at 59. It is arbitrary and capricious, a failure to "articulate a rational connection between the facts found and the choices made," Motor Vehicle Mfr. Ass'n, 463 U.S. at 43, for BLM to acknowledge that there are "environmental justice" communities in the lease sale area who could experience adverse and disproportionate risks or impacts, without actually analyzing the risks and impacts of its leasing decisions on these populations—let alone taking these risks, impacts, and concerns into account in its decision-making. "Where BLM has acknowledged increased risk, it cannot then conclude impacts are not significant absent a comprehensive analysis." State of California, F. Supp. 3d at 622. And BLM cannot defer that analysis to the APD stage. The intent of NEPA is for agencies to study the impact of their actions on the environment before the action is taken. See Conner v. Burford, F.2d 1441, 1452 (9th Cir. 1988) (NEPA requires that agencies prepare an EIS before there is "any irreversible and irretrievable commitment of resources"); see also Upper Pecos Ass'n v. Stans, 500 F.2d 17 (10th Cir. 1974) (concluding that "consideration of environmental factors should come in the early stages of program and project formulation").	See response to letter 4 comment 24.
7	113	Environmental Justice	BLM must also adhere to the "process" requirements of environmental justice—fair treatment and meaningful involvement. While the EA lists some attempts by BLM staff to contact the EJ	See response to letter 4 comment 24.

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			communities of concern, and we appreciate the inclusion of Spanish-language communication materials, it does not indicate that any public comment meeting, consultation, or meaningful engagement has occurred to-date. See, e.g., Draft EA 57. In order to be meaningful, engagement must occur early and often—as with its analysis of other impacts under NEPA, BLM cannot wait until the APD stage, after the irretrievable commitment of resources has already occurred. See, e.g., Conner v. Burford, 848 F.2d 1441, 1450-51 (9th Cir. 1988); Sierra Club v. Peterson, 717 F.2d 1409, 1413-15 (D.C. Cir. 1983).	
7	114	Environmental Justice	If BLM ignores or excludes the very people and communities who are most affected by its leasing decisions, BLM is not only denying them fair treatment and meaningful involvement in decision-making—and, in the case of indigenous peoples and Tribes, abrogating the right to self-determination and free prior and informed consent—but also depriving itself, and the general public, of invaluable knowledge and expertise that would enable better-informed and more transparent decision-making. “Better decisions” are indeed a fundamental goal of NEPA, and they require extensive, meaningful public involvement throughout an agency’s decisionmaking process—not just “input” on pre-determined agendas. Indeed, “environmental justice is not merely a box to be checked.” Friends of Buckingham, 947 F.3d at 92.	See response to letter 4 comment 24.
7	115	NEPA Compliance	BLM must analyze and disclose the reasonably foreseeable impacts to a variety of nonclimate resources from drilling on these particular leases. In particular, BLM must take a hard look at the impacts to groundwater, wildlife and other resources that will be harmed by oil and gas development resulting for its leasing decisions.	Impacts to groundwater are analyzed in AIB-1 and AID-3 of the EA, impacts to wildlife are analyzed in AIB-11 of the EA, and AIB-14, fluid minerals, discusses reasonably foreseeable impacts of oil and gas development from the proposed action on fluid minerals and energy production. The BLM considers this comment non-substantive because it has not alleged with any specificity how the BLM has erred in conducting these analyses.
7	116	NEPA Compliance	Courts have long made clear that “the sale of leases cannot be divorced from post-leasing exploration, development, and production.” Bob Marshall All. v. Hodel, 852 F.2d 1223, 1229 (9th Cir. 1988). BLM’s issuance of leases typically is an irretrievable commitment of resources, and before taking that step the agency must consider the reasonably foreseeable impacts—such as oil and gas drilling—to other resources. Making an irreversible commitment of resources, without analyzing effects of developing those leases, is an “approve now and ask questions later” approach—“precisely the type of environmentally blind decision-making NEPA was designed to avoid.” Conner v. Burford, 848 F.2d 1441, 1450-51 (9th Cir. 1988); Sierra Club v. Peterson, 717 F.2d 1409, 1413-15 (D.C. Cir. 1983).	The BLM considers this comment non-substantive because it seeks to interpret legal authorities, which are the best evidence of their contents, instead of alleging with any specificity how the BLM has erred in conducting its analyses.

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7	117	NEPA Compliance	BLM may not simply provide broad descriptions of categories of impacts that result from oil and gas development generally, without examining how severe those impacts are likely to be for the particular leases being offered here. Such boilerplate could be applied to virtually any oil and gas proposal anywhere on public lands, and provides the agency and the public no useful information about the specific leases proposed in these lease sales. This does not satisfy NEPA. "General statements about possible effects and some risk do not constitute a hard look absent a justification regarding why more definitive information could not be provided." Conservation Cong. v. Finely, 774 F.3d 611, 621 (9th Cir. 2014).	The BLM considers this comment non-substantive because it has not alleged with any specificity how the BLM has erred in conducting its analyses.
7	118	NEPA Compliance	Similarly, an assertion that additional analysis is not feasible at the leasing stage would be arbitrary and capricious and violates NEPA. There is ample information available to forecast reasonably foreseeable development on the specific leases being offered, and to evaluate the potential impacts of that development on groundwater, wildlife and other resources.	The BLM considers this comment non-substantive because it has not alleged with any specificity how the BLM has erred in conducting these analyses. See also response to letter 7 comment 115.
7	119	NEPA Compliance	As discussed below, it is entirely feasible for BLM to project future development on the leases to estimate impacts to other resources. BLM can use evidence of impacts from existing development on wildlife, groundwater, etc., to predict what will happen from allowing even more oil and gas development in these areas.	The BLM considers this comment non-substantive because it has not alleged with any specificity how the BLM has erred in conducting these analyses. See also response to letter 7 comments 11 and 115.
7	120	NEPA Compliance	While any projection of future development impacts necessarily involves uncertainty, that uncertainty does not excuse BLM from making any projection at all. Failure to use readily available resources to forecast reasonably foreseeable impacts to these resources would be arbitrary and capricious and violate NEPA. New Mexico ex rel. Richardson v. BLM, 565 F.3d 683, 718-19 (10th Cir. 2009) (failure to discuss impacts from developing oil and gas lease was arbitrary and capricious where "[c]onsiderable exploration has already occurred on parcels adjacent to the" proposed lease); N. Plains Res. Council, 668 F.3d at 1078-79 (rejecting agency argument that impacts from future coalbed methane development were "too speculative" to evaluate where there was "available data concerning likely future development").	The BLM considers this comment non-substantive because it has not alleged with any specificity how the BLM has erred in conducting these analyses. See also response to letter 7 comments 11 and 115.
7	121	Water and Wetland Resources	The EA violates NEPA by failing to adequately analyze the reasonably foreseeable impacts to groundwater from drilling on the proposed lease sale. The EA contains generic boilerplate about potential water impacts from oil and gas development and identifies the watersheds that will potentially be affected, Draft EA	The BLM considers this comment non-substantive because it has not alleged with any specificity how the BLM has erred or omitted material information in conducting the groundwater analysis. See response to letter 7 comment 106.

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			at 19-21, but it tells the agency and the public little about the development of these leases.	
7	122	NEPA Compliance	NEPA requires BLM to assess all the potential environmental impacts from oil and gas leases, before it offers those leases to operators. That responsibility includes taking a “hard look” at how ensuing development could impact groundwater. <i>WildEarth Guardians v. U.S. Bureau of Land Mgmt.</i> , 457 F. Supp. 3d 880, 886–89 (D. Mont. May 1, 2020).	The BLM considers this comment non-substantive because it has not alleged with any specificity how the BLM has erred or omitted material information in conducting the groundwater analysis. See also response to letter 7 comment 86.
7	123	Water and Wetland Resources	Groundwater is a critical resource that supplies many communities, particularly rural ones, with drinking water. Protecting both the quality and quantity of these resources is imperative to protect human health and the environment, especially because groundwater will become more important as increased aridity and higher temperatures alter water use. The U.S. Environmental Protection Agency (EPA) has noted that existing drinking water resources “may not be sufficient in some locations to meet future demand” and that future sources of fresh drinking “will likely be affected by changes in climate and water use.” As a result, BLM must protect both aquifers currently used for drinking water, and deeper and higher-salinity aquifers that may be needed in coming decades.	The BLM considers this comment non-substantive because it has not alleged with any specificity how the BLM has erred or omitted material information in conducting the groundwater analysis. See response to letter 7 comment 86.
7	124	Water and Wetland Resources	Oil and gas drilling involves boring wells to depths thousands of feet below the surface, often through or just above groundwater aquifers. Without proper well construction and vertical separation between aquifers and fractured formations, oil and gas development can contaminate underground sources of water. However, federal rules and regulations do not provide specific direction for BLM and operators to protect all usable water. Even rules that purport to do so, like Onshore Order No. 2’s requirement to “protect and/or isolate all usable water zones,” are inconsistently applied and often disregarded in practice. State regulations are similarly inadequate to ensure protection of groundwater. Moreover, industry has admitted that it often does not protect usable water in practice. Western Energy Alliance and the Independent Petroleum Association of America have told BLM that the “existing practice for locating and protecting usable water” does not measure the numerical quality of water underlying drilling locations, and therefore does not consider whether potentially usable water would be protected during drilling. For example, reports studying samples of existing oil and gas well records in Wyoming and Montana confirm industry admissions that well casing and cementing practices do not always protect underground sources	See response to letter 7 comment 32. Because the BLM cannot know until the APD stage exactly where development will occur relative to groundwater, some site-specific analysis and mitigation must necessarily occur at that later stage of development in order to best protect groundwater supplies.

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			of drinking water. Similarly, a study of hydraulic fracturing in Pavillion, Wyoming, confirmed that oil and gas drilling had contaminated underground sources of drinking water in that area due to lack of vertical separation between the aquifer and target formation. In light of these risks to a critical resource, BLM must evaluate potential groundwater impairment. As a threshold matter, BLM must provide a detailed account of all regional groundwater resources that could be impacted, including usable aquifers that may not currently be used as a drinking water supply. The accounting must include, at minimum, all aquifers with up to 10,000 parts per million total dissolved solids, and it cannot substitute existing drinking water wells or any other incomplete proxy for a full description of all usable or potentially usable groundwater in the region. Second, BLM must use that accounting to assess how new oil and gas wells might impact these resources. That evaluation must assess the sufficiency of protective measures that will be employed, including wellbore casing and cementing and vertical separation between aquifers and the oil and gas formations likely to be hydraulically fractured. In assessing these protections, BLM cannot presume that state and federal regulations will protect groundwater, because of the shortcomings and industry noncompliance described above. BLM may not defer this analysis of groundwater impacts to the APD stage. <i>WildEarth Guardians</i>, 457 F. Supp. 3d at 888. Failure to conduct this analysis violates NEPA. <i>Id.</i>	
7	125	Water and Wetland Resources	In order to adequately protect water resources and comply with NEPA, BLM must complete a detailed, project-specific analysis of water resources prior to approving the lease sale. See <i>Center for Biological Diversity</i> , 937 F. Supp. 2d at 1158; <i>Conner</i> , 848 F.2d at 1450. BLM must also consider cumulative effects of the proposed action pursuant to Secretarial Order 3399, recent case law, and BLM's NEPA Handbook.	See responses to letter 7 comments 32 and 124.
7	126	Wildlife - Big Game	BLM has failed to fully evaluate the reasonably foreseeable impacts to big game from development on the proposed leases. This extends beyond a description of: (a) the regulatory and management frameworks applicable to big game species, along with the scientific literature, (b) existing conditions, and which lease parcels are in different categories of habitat (such as crucial winter habitat and migration corridors), (c) the lease stipulations that would apply, and (d) how BLM selected which parcels in big game habitat to offer or defer – none of which BLM has done in this Draft EA. Such information would provide a basis for	See response to letter 6 comment 1.

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			analyzing the likely impacts to big game from development on the proposed leases—but it would not substitute for that analysis. BLM's failure to analyze the likely impacts to big game populations from the leases it proposes to offer and boilerplate statements about categories of impacts violates NEPA. BLM instead must analyze the site-specific, direct, indirect, and cumulative impacts of leasing the parcels on the biology, ecology, reproduction, migration, connectivity, and viability of individual herds and entire populations of pronghorn, mule deer, and other big game species. This must be done for the proposed parcels in connection with parcels sold in other, past federal and non-federal oil and gas lease sales and developments.	
7	127	NEPA Compliance	BLM must also take a hard look at impacts to other resources. For example, BLM must analyze foreseeable impacts to cultural and heritage resources, wilderness study areas and lands with wilderness characteristics, cave and karst resources, areas of critical environmental concern (ACECs), and special status species.	Potential impacts to special status species are analyzed in AIB-9, impacts to cave and karst resources are analyzed in AIB-13 and impacts to cultural resources are analyzed in AIB-19. These analyses include applicable stipulations, analysis of impacts to these resources, and cumulative impacts. Impacts to ACES, LWCs, and other special designations were considered but not analyzed in the EA as these features are not located within or near the nominated lease parcels (see EA Table 1.2). The BLM considers this comment non-substantive because it has not alleged with any specificity how the BLM has erred in conducting these analyses.
7	128	Wildlife - Dunes Sagebrush Lizard	BLM almost also take a hard look at impacts to other resources, including endangered species. For example, BLM must adequately analyze foreseeable impacts to the Dunes Sagebrush Lizard (DSL), which was recently listed as an Endangered Species by the U.S. Fish and Wildlife Service. The listed parcels for this sale may overlap with DSL habitat, in which case, BLM needs to take a hard look at potential impacts to the DSL before moving forward with any development. The DSL was listed because oil and gas development is a primary threat to the species. BLM must take a hard look at the likely adverse impacts of these lease sales on this endangered species.	Potential impacts to DSL are analyzed in the Section 3.6.4 of the EA, which includes recommended stipulations, analysis of impacts to DSL and its habitat, and cumulative impacts. In conjunction with management actions such as stipulations and lease notices applied at the lease sale stage, site-specific analysis and pre-disturbance biological surveys at the lease development stage would avoid, minimize, and reduce impacts to DSL habitat. Section 4.1 of the EA discusses how the Proposed Action would comply with ESA Section 7 consultation requirements. The BLM considers this comment non-substantive because it has not alleged with any specificity how the BLM has erred in analyzing impacts to the DSL.
7	129	Wildlife - Lesser Prairie Chicken	BLM administers much of the LPC's remaining habitat. BLM therefore has the power to either help protect the remaining New Mexico LPC population, or to further threaten its survival by permitting leasing of federal lands in critical LPC habitat areas for oil and gas exploration and development. Any use of BLM lands inconsistent with the preservation of current LPC habitat will have a significant and negative impact on the LPC population. Parcels in located in Lea County in both of the BLM's proposed May and Fourth Quarter 2023 oil and gas lease sales are located within or near the range of the endangered southern distinct population	The decision under review is the Quarter 1 2025 lease sale, not 2023 lease sales. Even assuming this was a typographical error, the BLM considers this comment non-substantive because it has not alleged with any specificity how the BLM has erred in analyzing impacts to the LPC. Generally, potential impacts to LPC are analyzed in the Section 3.6.4 of the EA, which includes recommended stipulations, analysis of impacts to LPC and its habitat, habitat fragmentation, and cumulative impacts. In conjunction with management actions such as stipulations and lease notices applied at the lease sale stage, site-specific analysis and pre-disturbance biological surveys at the lease development stage would avoid, minimize, and reduce impacts to LPC habitat. Section 4.1 of the

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			segment ("DPS") of the lesser prairie chicken (<i>Tympanuchus pallidicinctus</i>) ("LPC").	EA discusses how the Proposed Action would comply with Endangered Species Act (ESA) Section 7 consultation requirements, and includes a summary of BLM's efforts to consult with FWS over the recent LPC listing.
7	130	Wildlife - Lesser Prairie Chicken	Leasing this land would create new and exacerbate existing threats to LPC survival, including increases in infrastructure and ensuing habitat fragmentation, noise pollution, and environmental hazards from the oil and gas drilling and extraction itself. The LPC New Mexico population stands on a precipice, and BLM's decision with respect to these federal lands will likely determine the fate of this unique and genetically distinct population. BLM should choose not to lease any federal land for oil and gas development, and to preserve this unique and biologically significant population.	See response to letter 7 comment 129.
7	131	Wildlife - Lesser Prairie Chicken	Given the serious threats already facing the LPC, and the fact that climate change will further exacerbate them, BLM should not open federal lands to lease for oil and gas development. Such activity will inflict significant harm on the LPC population and significantly decrease its ultimate chance of survival and recovery. While the existing threats facing the LPC and those predicted from climate change will be difficult to control, BLM does control the decisions about new land leases in critical habitat areas of the New Mexico LPC. BLM must use its power to avoid further harm to this fragile and genetically unique population.	See response to letter 7 comment 129.
7	132	Wildlife - Lesser Prairie Chicken	BLM's past, current, and future decisions with respect to the leasing of LPC habitat will significantly and gravely impact the LPC. BLM's planning area includes 2.1 million acres of Federal surface land, and 3 million acres of BLM-managed mineral estate in New Mexico's Chaves, Eddy, and Lea Counties. These counties are located in south-eastern New Mexico and overlap considerably with critical LPC habitat. LPCs currently occupy seven counties within New Mexico—specifically, Eddy, Lea, Chaves, Leah, De Baca, Roosevelt, and Quay counties.	See response to letter 7 comment 129.
7	133	Wildlife - Lesser Prairie Chicken	Preserving remaining LPC habitat is critical because the LPC population already faces significant threats to its survival. This section outlines the EA's failure to take a hard look at the most significant threats to the LPC, making preservation by BLM of remaining LPC habitat and population even more crucial. BLM failed to take a hard look at the following threats to LPC that will arise from leasing parcels in and near occupied habitat for LPC, and unoccupied habitat that, critically, may in the future be necessary to ensure the newly-ESA-listed bird's survival and recovery. For these reasons, BLM should defer all parcels within or within 10 miles of the endangered Southern DPS.	See response to letter 7 comment 129.

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7	134	Wildlife - Lesser Prairie Chicken	The Draft EA fails to take a hard look at impacts to lesser prairie-chicken habitat whose conservation is necessary for the survival, recovery, and potential future reintroductions of the Southern DPS.	See response to letter 7 comment 129.
7	135	Wildlife - Lesser Prairie Chicken	The Draft EA omits any analysis of how much habitat must be conserved to ensure the bird's survival and recovery, or which habitat may be needed for reintroductions to ensure survival and recovery. The Draft EA instead relies on existing analyses and policies under whose inadequate provisions oil and gas leasing has caused population declines warranting listing under the Endangered Species Act.	See response to letter 7 comment 129.
7	136	Wildlife - Lesser Prairie Chicken	The Draft EA in part sidesteps analysis by claiming that parcels are at least 10 miles away from estimated occupied habitat; however, the Draft EA lacks monitoring or other data to demonstrate that parcels are or are not in fact occupied by lesser prairie-chicken; it lacks such data to demonstrate that parcels are not in fact sufficiently close to occupied habitat to ensure against habitat fragmentation and other indirect impacts of adjacency; it lacks analysis of what currently unoccupied habitat may need to be preserved in order ensure the survival and recovery of lesser prairie-chicken, and it in turn lacks an analysis of how the leasing and development of estimated unoccupied habitat within the Southern DPS that may compromise or foreclose future reintroductions or other conservation necessary to ensure for the lesser prairie-chicken survival and recovery. By committing parcels within the Southern DPS to oil and gas leasing without undertaking NEPA's required hard look analysis, the Draft EA and BLM violate NEPA and blindly continue a program of oil and gas expansion already causing lesser prairie-chicken's precipitous decline.	As stated in the EA at AIB-8, the BLM used USFWS data to confirm that none of the nominated lease sale parcels occur within 10 miles of the 2022 Estimated Occupied Range (EOR). The nominated lease parcels are outside of critical habitat for this species, and no leks are within or within 200 meters of any of the nominated lease parcels. The BLM reviews the parcels against this data, and data of the LPCs historical range, as part of the internal scoping process. As stated in the EA, the LEPC habitat area is 1.24 miles north of parcel 6848. Within the Isolated Population Area, occupied LEPC habitat (defined as areas within 1.5 miles of a lek site) is generally closed to new leasing. Stipulation SENM-S-22-CSU is applied to parcel 6848 which prohibits drilling for oil and gas and 3-D geophysical exploration operations during the period of March 1 through July 15 of each year and may provide protections to LEPC. See EA Appendix B. This stipulation would minimize impacts to LEPC and LEPC habitat from future potential development within this parcel. Parcel 6848 would also be subject to LEPC timing restriction zone COAs to restrict the timing of construction activities to reduce potential noise impacts from during the LEPC breeding season. Site-specific analysis and pre-disturbance biological surveys at the lease development stage would contribute to avoidance, minimization, and reduction of impacts to suitable habitat.
7	137	Wildlife - Lesser Prairie Chicken	The Draft EA's failure to take a hard look at impacts to habitat necessary for survival, recovery, and potential future introductions are made more problematic by the uniqueness and fragility of the New Mexico's LPC population, where survival and recovery of this population will almost certainly require not just stopping habitat loss, but also conservation, restoration, and reintroduction of birds into previously occupied habitat. Each population of the LPC is genetically unique, and this is particularly true of the LPC New Mexico population. The LPC population in New Mexico resides in an ecoregion known as the Shinnery Oak Prairie, and members	See response to letter 7 comment 129.

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			within this population exhibit especially unique genetic patterns. In fact, numerous genetic studies comparing LPC populations of New Mexico to the nearest neighboring population in Oklahoma have documented substantial genetic differences between these regions that suggest significant, if not complete, isolation by distance. This isolation has resulted in a number of adaptations that make the population uniquely suited to the conditions of the Shinnery Oak Prairie. For example, studies document that this population invests more in survival and less in reproduction than do LPCs in more northerly regions. The particular adaptations of the New Mexico LPC make this population highly biologically significant, and loss of this specific population of the LPC would mean substantial and irrevocable loss of intra-species biodiversity.	
7	138	Wildlife - Lesser Prairie Chicken	The Draft EA fails to take a hard look at the impacts of habitat fragmentation on LPC. This includes habitat fragmentation that may result from the development oil and gas leasing with wells, powerlines, roads, and other infrastructure within both occupied habitat and habitat that is now unoccupied that may in the future be necessary for lesser prairie-chicken survival and recovery.	See response to letter 7 comment 129.
7	140	Wildlife - Lesser Prairie Chicken	Habitat fragmentation can be caused by human activities such as construction of roads and powerlines, energy development, cropland cultivation, and urban or rural sprawl. Habitat fragmentation can result in both displacement of populations from preferred habitats, and significant stress to individuals that remain in close proximity. By failing to buttress its estimates of occupied and unoccupied habitat with actual lesser prairie-chicken location monitoring data, the EA charges forward with leasing parcels without understanding in fact where or how the bird's may be impacted.	The BLM refers the commentor to section 3.3 of the EA titled Cumulative Impacts Scenario. Existing surface disturbance such as by the human activities mentioned by the commentor are accounted for in Section 3.3.1 (and Table 3.2) of the EA. As part of the analysis assumptions, see section 3.2.1 (specifically Table 3.1), the BLM also assumes surface disturbance projected from the Proposed Action. These surface disturbance estimates include disturbance projected from the development of well pads, access roads, and flowlines. In the analysis, the BLM discloses a potential decrease in LEPC habitat quality from human presence and loss of vegetation. Both effects would be considered long term because they would result in a loss of habitat and increased fragmentation until operations cease and habitat is successfully reclaimed. See also the response to letter 7 comment 129.
7	141	Wildlife - Lesser Prairie Chicken	The Draft EA lacks fails to take a hard look at the how leasing parcels for oil and gas may impact lesser prairie-chicken cumulatively alongside livestock grazing, which also presents a critical risk to the LPC's survival. A habitat characterized by intermittent fire and heavy but infrequent bison grazing is most suitable for the LPC. Human actions such as fire suppression and replacing bison with domestic cattle degrades the habitat for the LPC. Because lesser prairie chickens are dependent on medium to tall grasses in a region of low rainfall, their habitat is very sensitive to overgrazing. The shift from heavy but infrequent grazing by bison to heavy and constant grazing by domestic livestock has contributed to the spread of shrubs and trees, and has reduced the prevalence of native perennial grasses.	See response to letter 7 comment 129 and 140. The EA mentions in Section 3.3.1 that livestock grazing is estimated to occur on 88% (17,600,000 acres) of the PDO planning area, and it is assumed this use will continue at existing levels. Table 3-2 of the EA has been revised to include a footnote explaining how livestock grazing has been considered throughout the EA. Issue AIB-8 states "The remaining surface disturbance across the landscape would contribute to additional potential for habitat loss and fragmentation that could affect sensitive species.", which includes grazing. AIB-8 also states "The BLM would conduct site-specific evaluations at the lease development stage for any reasonably foreseeable cumulative actions within the lease parcels to determine whether effects on ESA species would occur."; consideration of cumulative actions at the lease development stage would include

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			Therefore, the cultivation of livestock alters the natural composition of the grasslands, making the area increasingly unsuitable to support the LPC.	grazing, among other uses. Additional text has been added to AIB-8 to further discuss grazing-related effects on LEPC and how grazing uses could contribute to cumulative effects for ESA species in general.
7	142	Wildlife - Lesser Prairie Chicken	The Draft EA fails to take a hard and site-specific look at how roads associated with the development of the proposed, past, and potential future oil and gas lease parcels may impact lesser prairie-chicken. The Draft EA's failure to monitoring data to buttress estimates of occupied and unoccupied habitat effectively forecloses such an analysis by foreclosing an analysis of road impacts to where birds actually occur. The Draft EA also fails to take a hard look at how roads associated with oil and gas development may impact unoccupied habitat whose conservation may be needed for reintroductions or other conservation necessary to ensure the survival and recovery of lesser prairie chicken.	See response to letter 7 comment 140. The BLM has authority, according to the STCs of the leases, to attach conditions of approval (COAs) to the APD that reduce or avoid impacts to public land, resources, and/or resource values. Under 43 C.F.R. § 3101.12, 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 they do not require relocation of proposed operations by more than 800 meters (m) (656 feet); require that operations be sited off the leasehold; or prohibit new surface-disturbing operations for a period in excess of 90 days in any lease year. This could include citing of roads to minimize the impacts disclosed.
7	143	Wildlife - Lesser Prairie Chicken	The Draft EA fails to take a hard and site-specific look at how power lines associated with the development of the proposed, past, and potential future oil and gas lease parcels may impact lesser prairie-chicken. The Draft EA's failure to monitoring data to buttress estimates of occupied and unoccupied habitat effectively forecloses such an analysis by foreclosing an analysis of power line impacts to where birds actually occur. The Draft EA also fails to take a hard look at how power lines associated with oil and gas development may impact unoccupied habitat whose conservation may be needed for reintroductions or other conservation necessary to ensure the survival and recovery of lesser prairie chicken.	See response to letter 7 comment 140. Parcel 6848 is attached stipulation SENM-S-27 which requires a POD for the entirety of the lease. This plan must indicate planned access to well facilities (roads, pipelines, power lines), and the approximate location of well sites. Impacts to lesser prairie chicken, from powerlines specifically, would be analyzed within the site specific NEPA process when more information is known. See Appendix B for more information.
7	144	Wildlife - Lesser Prairie Chicken	The Draft EA fails to take a hard look at the impacts of climate change on lesser prairiechicken. The effects of climate change in the LPC's habitat are highly likely to exacerbate many existing challenges the species faces, particularly those related to its habitat. Climate change effects, including increased temperatures, drought, extreme weather events, vegetation changes, and the spread of parasites and disease, will likely further harm the LPC population by reducing its ability to nest, reproduce, obtain sufficient nourishment, and avoid deleterious predation.	The EA, Section 3.6.2, discusses GHG emissions and incorporates by reference information from the ARTR as well as the Annual GHG Report. Additionally, Section 3.3.3 explains that global climate models are unable to forecast local or regional effects on resources but that general projections regarding potential impacts to natural resources and plant and animal species may be attributed to GHG emissions over time. AIB-8 discusses potential climate impacts on special status species, including the LPC. See also response to letter 7 comment 129.
7	145	Wildlife - Lesser Prairie Chicken	The Draft EA fails to take a hard look at the impacts of increased temperatures on lesser prairie-chicken. Increased summer temperatures and above-average winter temperatures, predicted as a result of climate change, will likely contribute to a decline in LPC nest survival rates. Higher temperatures significantly contribute to lower daily brood survival. LPC populations in New Mexico and Texas are more vulnerable to climate change than	See responses to letter 7 comments 129 and 144.

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			their counterparts in Kansas, as they face temperatures 7°C warmer than the latter. Great Plains temperatures have already increased 1.5°F since the 1960s and 1970s baseline level. Experts predict temperature increases of 2.5°F to 6°F above this baseline by 2050, of 2.8°F to 3.5°F by 2060, and of 5°F to 13.5°F above the baseline by 2090. As a result of these temperature increases, LPC nest survival rates may fall below the level of viability for population persistence between 2050 and 2080. Furthermore, the expected increase in temperature variability across the LPC habitat due to climate change may decrease survival of adult and juvenile chickens, in part through heat stress.	
7	146	Wildlife - Lesser Prairie Chicken	The Draft EA fails to take a hard look at the impacts of drought on lesser prairie-chicken. In addition to increased and more variable temperatures, climate change will likely lead to increased drought in the southern Great Plains region, which will further harm the LPC's chances of survival. LPCs in New Mexico and Texas are more vulnerable to climate change than their counterparts in Kansas because they receive 7% less relative humidity than do the latter. Precipitation across the LPC habitat will likely decrease by 10% by 2060. Such decreased precipitation will further contribute to lower rates of adult and juvenile LPC survival. Moreover, population fluctuations resulting from prolonged periods of drought may further threaten the survival of fragmented LPC populations.	See responses to letter 7 comments 129 and 144.
7	147	Wildlife - Lesser Prairie Chicken	The Draft EA fails to take a hard look at the impacts of extreme weather events on lesser prairie-chicken. Extreme weather events, exacerbated by climate change, are expected to further threaten the LPC's habitat and survival. Weather events including tornadoes, hail storms, floods, heat waves, and cold waves will likely occur more frequently across the southern Great Plains due to climate change. These events may temporarily reduce the quality of LPC habitat or even remove such habitat. Extreme heat events, in addition to the trend of generally rising temperatures detailed above, are projected to increase throughout this century and increase mortality rates for both adult and juvenile LPCs. Intense storms during the nesting season may lead to significant declines in reproduction and survival rates for local LPC populations.	See responses to letter 7 comments 129 and 144.
7	148	Wildlife - Lesser Prairie Chicken	The Draft EA fails to take a hard look at the impacts of climate-induced vegetation changes on lesser prairie-chicken. Climate change-induced changes in quantity and quality of vegetation across LPC habitat will likely contribute to a decline in the species' population over the next 60 years.	See responses to letter 7 comments 129 and 144.

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7	149	Wildlife - Lesser Prairie Chicken	The Draft EA fails to take a hard look at the impacts of parasites and disease on lesser prairie-chicken. Here, climate change may further threaten the LPC by leading to an increase in parasites including the West Nile Virus (hereinafter, WNV) across their habitat. The WNV may decrease LPC hens' ability to nourish themselves, and the quality of their eggs, thus reducing rates of chick survival. Climate change may exacerbate the transmission speed of the WNV through the LPC habitat by enabling increased mosquito speed and activity, enhanced adult mosquito survival, and faster development of the virus within mosquitoes. Furthermore, since the increased drought resulting from climate change will likely lead to a higher concentration of LPCs around rarer, diminishing water sources, mosquitoes are predicted to benefit from an increase in their food supply - of LPC individuals around stagnant water	See responses to letter 7 comments 129 and 144.
7	150	Wildlife - Lesser Prairie Chicken	The Draft EA fails to take a hard look at the impacts of noise from past, proposed, and potential future oil and gas leasing and development on lesser prairie-chicken. New oil and gas drilling would create new and significant noise pollution, posing a serious threat to nearby LPC populations. Drilling and its associated activities produce many noises not normally found in nature: the sounds of drilling, construction, and maintenance, along with the increase in extremely loud heavy-duty truck traffic necessary to transport people, drilling materials, and extracted oil and gas to and from drilling sites. This noise pollution has been shown to be particularly disruptive to LPC leks and their successful reproduction. In one study, researchers created recordings of sounds associated with oil and gas drilling and played them near leks in the wild, while observing other, unaffected lek sites as a control. The study found a strong negative effect on both male and female attendance at the leks subjected to the noise, as compared to the control group. Some of the leks subjected to the noises of oil and gas development showed a drop in female attendance of over 70 percent. These results have been supported by multiple other studies, including a study showing a statistically significant difference of 4 dB greater noise pollution at abandoned leks than active leks. Sound disturbance at lek sites is likely to be "devastating to breeding efforts," and any further development of oil and gas drilling in current LPC habitat would pose a serious risk to the population's survival.	See response to letter 7 comment 129 and 136.
7	151	Wildlife - Lesser Prairie Chicken	The Draft EA fails to take a hard look at the impacts of pollution from past, proposed, and potential future oil and gas leasing and development on lesser prairie-chicken. New oil and gas drilling, and any new hydraulic fracturing, will also likely increase LPC exposure to hazardous chemicals, and may very lead to	See responses to letter 7 comments 129 and 150.

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			damaging changes to their habitat. Spills and emissions from oil and gas well pads, from the trucks that transport drilled oil and gas, and from trucks transporting fluids and compounds necessary for drilling are routine. Researchers have documented LPC deaths in other areas "from sludge pits and poisonous gases" attributed to oil and gas drilling. No new hydraulic fracturing should happen in the BLM lands up for leasing until the impact of fracking on the LPC has been further studied. While there is no research yet on the direct impact of hydraulic fracturing on the LPC, southeastern New Mexico is increasingly viewed as a prime area for hydraulic fracturing. However, multiple studies have found environmental impacts of fracking on the environment, from increased erosion, to chemical spills, to polluting the water supply. Until there is further research done, considering all the threats already facing the LPC, there should be no further disruption of the LPC's ecosystem with potentially hazardous activities.	
7	152	NEPA Compliance	BLM improperly limited the context and scope of the potentially affected environment in which the proposed leasing actions, and their cumulative impacts, will occur. Significance assessments under NEPA require consideration of "context," meaning the significance of the proposed action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. Despite these requirements for considering the context of the proposed lease sale and despite the global nature and impacts of cumulative GHG emissions and climate change, BLM's Draft EA limits the consideration of context to the localities wherein the oil and gas development would take place, if authorized, and finds that the impacts of oil and gas development would not have international, nation, regional, or state-wide importance. We request BLM consider a wide array of contexts, including society as whole, global, national, and regional contexts, that reflect the cumulative and global nature of climate change impacts.	The BLM provided a wide range of potential impact contexts in the Annual GHG Report, which was incorporated by reference into the EA. The Specialist Report presents the life-cycle representation of federal onshore mineral estate GHG emissions relative to various local, state, national, and global emissions and impact contexts. The BLM analyzes the impacts associated with the alternatives using the best available information, which is typically not monetized estimates of benefits or costs. At this time, BLM has not developed a standard or emissions budget that it can apply uniformly to make a determination of significance based on GHG emissions. Until the BLM develops tools to analyze the relative emissions impact of its activities nationwide, the BLM can disclose GHG emissions and climate impacts, and provide context and analysis for those emissions and impacts; the BLM cannot determine significance for a proposed action based on GHG emissions or climate impacts alone. Additionally, the BLM provided a wide range of potential impact contexts in the Annual GHG Report, which was incorporated by reference into each analysis. The Annual GHG Report presents the life-cycle representation of the federal onshore mineral estate GHG emissions relative to various state, national and global emissions, and context of impacts.
7	153	Climate Change, Green House Gases, and Social Cost of Carbon	BLM's Draft EA does not adequately evaluate and discuss the impacts of GHG emissions and climate change on public health and safety, and we request BLM clearly address these impacts in an EIS. The 2022 BLM Specialist Report describes both the existing health threats caused by climate change and the predicted intensification and new emerging health threats caused by continued GHG emissions. BLM should thoroughly analyze	The BLM considers this comment non-substantive because it has not alleged with any specificity how the BLM has erred in analyzing climate or human health impacts. But see generally responses to letter 7 comments 80 and 107.

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			and disclose those threats as they relate to this lease sale and the federal oil and gas program in an EIS. As discussed throughout these comments, NEPA, FLPMA, and the APA require BLM to do more than acknowledge possible effects or risks in general terms. BLM must take a hard look at these risks and effects, factor them into its decision-making, and articulate a rational connection between the facts found and the choices made with respect to this lease sale and the federal oil and gas program.	

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7	154	Climate Change, Green House Gases, and Social Cost of Carbon	BLM's consideration of uncertainty in the Draft EA is inadequate. The Draft EA mentions uncertainty—for example in the context of factors that may affect actual GHG emissions and associated impacts, Draft EA at 82—but fails to fully analyze the uncertainty. The 2022 BLM Specialist Report also identifies countless areas of uncertainty regarding the analysis of GHGs and climate change, including: • [Global warming potentials] have a large uncertainty: ± 26 percent and ± 11 percent for the 20-year and 100-year CH₄ GWPs, respectively, and ± 118 percent and ± 130 percent for the 20-year and 100-year N₂O GWPs, respectively. • The earth's climate system is complex and interwoven in ways that are not yet fully understood. There are several known climate feedback mechanisms that add uncertainty in terms of timing (fast and slow feedbacks) and overall sensitivity within the evaluation of the climate system. • As with the forcing components, there are also positive and negative feedback mechanisms, and there is a relatively large range of uncertainty concerning estimates of the climate sensitivity that leaves the subject open to further investigation. • Melting glaciers are likely to produce uncertainties for hydrologic power generation, which is an important resource in Alaska. • The latest [carbon] budget estimates made by the Global Carbon Project suggests that current emissions rates the world has a 50% chance of exceeding the 1.5°C temperature target in roughly 8 years. Analysis by IPCC scientists in AR6 suggest the 1.5°C temperature target is likely to be exceeded by 2030, which is in line with the carbon budget estimates. These estimates contain uncertainties that are characteristic of scientists' current understanding of the earth's climate-influencing systems, such as feedbacks and the forcing and response associated with the non-CO₂ GHG species, and historical emissions accounting. The uncertainty range associated with the latest estimates is approximately ± 400 Gt CO₂. Staying within the 1.5°C carbon budget implies that CO₂ emissions need to start declining this decade to maintain reasonable progress to reach net zero by about 2050, or 2100 for the 2°C budget.	The BLM considers this comment non-substantive because it has not alleged with any specificity how the BLM has erred in analyzing climate change or human health impacts as they pertain to the decision being reviewed. In general, the BLM provided a wide range of potential impact contexts in the Annual GHG Report, which was incorporated by reference into the EA. The Annual GHG Report presents the life-cycle representation of federal onshore mineral estate GHG emissions relative to various local, state, national, and global emissions and impact contexts. The BLM analyzes the impacts associated with the alternatives using the best available information, which is typically not monetized estimates of benefits or costs. At this time, BLM has not developed a standard or emissions budget that it can apply uniformly to make a determination of significance based on GHG emissions. Until the BLM develops tools to analyze the relative emissions impact of its activities nationwide, the BLM can disclose GHG emissions and climate impacts, and provide context and analysis for those emissions and impacts; the BLM cannot determine significance for a proposed action based on GHG emissions or climate impacts alone.

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7	155	Climate Change, Green House Gases, and Social Cost of Carbon	Well-documented scientific research and BLM's own analysis demonstrate that the potential effects of climate change are highly uncertain and involve unique and unknown risks. BLM must properly address this NEPA intensity factor in light of these impacts, and we request BLM do so for all of the 2024 lease sales in a single EIS.	Under NEPA, an agency need not prepare an EIS if it determines the action will not have significant effect on the human environment or where such effects may be mitigated by adoption of appropriate measures. See also responses to letter 7 comments 15 and 154.
7	156	Climate Change, Green House Gases, and Social Cost of Carbon	BLM's omission of the intensity factor of controversy in the Draft EA is improper. As the global body of scientific research and understanding of climate change reflects, there is controversy concerning critical aspects of the nature and effect of GHG emissions and their impact on climate change. This controversy is exemplified by the BLM's conclusions that the emissions from the proposed lease sales and the cumulative emissions from the federal fossil fuel program are not significant as compared to a robust scientific literature, indicating current and foreseeable fossil fuel development is not aligned with the GHG reductions necessary to prevent warming exceeding 1.5°C. We request BLM address the NEPA intensity factor for controversy and do so for all of the 2024 lease sales in a single EIS.	At this time, the BLM has not developed a standard or emissions budget that it can apply uniformly to make a determination of significance based on GHG emissions. Until the BLM develops tools to analyze the relative emissions impact of its activities nationwide, the BLM can disclose GHG emissions and climate impacts, and provide context and analysis for those emissions and impacts; the BLM cannot determine significance for a proposed action based on GHG emissions or climate impacts alone. There is no significant scientific controversy as to whether or not anthropogenic GHGs influence the climate resulting in adverse impacts to the environment, which is why the BLM developed the Annual GHG Report. Climate impacts are among many factors that are considered in the NEPA analysis to evaluate the significance of a proposed action and the BLM's exercise of its discretion in deciding on leasing actions. In addition, the lease sales are distinct actions. The FONSI will include an examination of this lease sale as it relates to all potentially affected resources, including GHGs.
7	157	Climate Change, Green House Gases, and Social Cost of Carbon	BLM fails to evaluate the estimated GHG emissions from the proposed lease sale in the Draft EA. The omission of this NEPA intensity factor is astounding given the seriousness and cumulative nature of climate change. Considering both the impacts of climate change that are already occurring as a result of historic anthropogenic emissions of GHGs and forecast impacts of continued GHG emissions, it is clear that significant cumulative effects are expected from the proposed oil and gas lease sale. We request BLM fully inform the public and the decision makers by providing a complete and comprehensive justification for how the agency reached its significance determination on this NEPA intensity factor. See <i>Dine Citizens Against Ruining Our Env't v. Haaland</i> , 59 F.4th 1016.	The BLM has analyzed the GHG emissions from the Proposed Action and provided context for those emissions compared to existing federal onshore GHG emissions in the state and nationally in Sections 3.6.1 and 3.6.2 of the EA. The BLM has included an evaluation of the climate impacts that could result from the Proposed Action and incorporated by reference the Annual GHG Report, which provides a more detailed assessment of cumulative emissions, climate impacts, and reputable climate science sources. If and when a proposed action for development is submitted, the BLM can determine appropriate mitigation measures to reduce or offset GHG emissions that are not already required by law or proposed by the operator. Climate impacts are one of many factors that are considered in the NEPA analysis to evaluate the significance of a proposed action and the BLM's exercise of its discretion in deciding leasing actions.
7	158	Climate Change, Green House Gases, and Social Cost of Carbon	BLM also fails to adequately indicate how the lease action will violate federal or state law and policy, but there are several federal and state government laws and policies that set GHG emission reduction targets or commitments, which authorization of the proposed leases will likely threaten. On the federal side, President Biden announced a goal to achieve net-zero emissions by 2050, as well as a target to reduce GHG emissions by 50-52%	The leasing action will not violate any laws or policies. Instead, the BLM makes federal mineral resources, such as oil and gas, available for development in accordance with laws including the MLA and FLPMA. See EA Sections 1.2 and 1.4 for information regarding the BLM's requirements under the MLA, FLPMA, and other statutes and regulations. As stated in EA Section 1.4.2, purchasers of oil and gas leases are also required to comply with all applicable federal, state, and

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			by 2030, compared to 2005 levels. In addition, the United States is a signatory to the 2015 Paris Agreement, committing to a goal of limiting global temperature increase well below 2 C, pursuing efforts to limit the increase to 1.5 C, and committing to reaching global peaking of GHGs as soon as possible.	local laws and regulations. Chapter 2 of the Annual GHG Report, incorporated in the EA by reference, discusses the relationship between BLM's coal, oil, and gas leasing programs with other laws and policies at the federal and state level.
7	159	Climate Change, Green House Gases, and Social Cost of Carbon	On the state side, for example, both Colorado and New Mexico have statutes and executive orders setting emission reduction goals. In Colorado, HB19-1261 requires the state to reduce GHG emissions by at least 26 percent in 2025, at least 50 percent by 2030, and at least 90 percent by 2050, relative to 2005 pollution levels. In New Mexico, Executive Order 2019-003 declares the state's support of the 2015 Paris Agreement goals and orders the state to achieve statewide reduction of GHG emissions of at least 45% by 2030, relative to 2005 levels. BLM's EA for this proposed lease sale must discuss and evaluate how the proposed lease sale and its estimated GHG emissions may threaten violation of these federal and state laws and policies. For the reasons set forth above, all 7 parcels in the New Mexico Q1 '25 lease sale, listed in Appendix A, in addition to all parcels proposed to date for lease in 2024, require a NEPA analysis.	See response to letter 7 comment 158.
7	160	Policy and Legal Compliance	BLM's proposed Q1 '25 New Mexico lease sale violates FLPMA. As a result, the Agency should withdraw all 7 parcels listed in Appendix A.	To the extent the comment does not allege a specific error in the BLM's analysis, the BLM considers it non-substantive. See also response to letter 7 comment 158.
7	161	Policy and Legal Compliance	The Federal Land Policy and Management Act ("FLPMA"), 43 U.S.C. § 1701 et seq., directs that "the public lands be managed in a manner that will protect the quality of [critical resource] values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use." 43 U.S.C. § 1701(a)(8). This substantive mandate requires that BLM not elevate the development of oil and gas resources above other critical resource values in the planning area. To the contrary, FLPMA requires that where oil and gas development would threaten the quality of critical resources, conservation of these resources should be the preeminent goal. Congress has declared through FLPMA that it is the policy of the United States that "the public lands [shall] be managed in a manner that will protect the quality of ... air and atmospheric ... values." 43 U.S.C. § 1701(a)(8). Under FLPMA's "multiple use and sustained yield" management directive, id. § 1701(a)(7), the federal government must manage public lands and resources in a	The BLM considers this comment non-substantive because it seeks to interpret legal authorities that are the best evidence of their contents, rather than alleging a specific error or material omission in the BLM's analysis or contributing new information that the BLM could consider.

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			manner that “takes into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land[.]” Id. § 1702(3) (emphasis added). BLM’s obligation to manage for multiple use does not mean that development must be allowed. Rather, [d]evelopment is a possible use, which BLM must weigh against other possible uses—including conservation to protect environmental values[.]” New Mexico ex rel. Richardson v. Bureau of Land Mgmt., 565 F.3d 683, 710 (10th Cir. 2009) (emphasis original). Under these authorities, BLM is required not only to evaluate the impacts that federal fossil fuel leasing has on public lands, waters, and wildlife resources, but to avoid harm to those resources whenever possible. These directives are not simply aspirational, but grounded in the substantive requirements of FLPMA. “In managing the public lands,” the agency “shall, by regulation or otherwise, take any action necessary to prevent unnecessary or undue degradation of the lands.” 43 U.S.C. § 1732(b). Written in the disjunctive, BLM must prevent degradation that is “unnecessary” and degradation that is “undue.” Mineral Policy Ctr. v. Norton, 292 F.Supp.2d 30, 41-43 (D.D.C. 2003). This protective mandate applies to BLM planning and management decisions, and should be considered in light of its overarching mandate that the agency employ “principles of multiple use and sustained yield.” 43 U.S.C. § 1732(a); see also, Utah Shared Access Alliance v. Carpenter, 463 F.3d 1125, 1136 (10th Cir. 2006) (finding that BLM’s authority to prevent degradation is not limited to the RMP planning process). While these obligations are distinct, they are interrelated and highly correlated. The Bureau must balance multiple uses in its management of public lands, including “recreation, range, timber, minerals, watershed, wildlife and fish, and [uses serving] natural scenic, scientific and historical values.” 43 U.S.C. § 1702(c). It must also plan for sustained yield—“control [of] depleting uses over time, so as to ensure a high level of valuable uses in the future.” Norton v. S. Utah Wilderness Alliance, 542 U.S. 55, 58 (2004).	
7	162	Policy and Legal Compliance	the actions that BLM must determine meet the substantive requirements of FLPMA as outlined above include: (1) the programmatic resumption of oil and gas leasing on federal lands; and (2) the decision of whether or not to offer to sell and issue oil and gas leases on each of the specific parcels identified. Critically,	See response to letter 7 comment 161.

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			however, BLM's consideration of these substantive requirements must not be viewed in the abstract, but within the specific "context" of the agency's analysis and the scientific information available to it. 40 C.F.R. §§ 1502.24 (requiring "scientific integrity" of analysis), 1508.27(a) (requiring consideration of "both short and long-term effects" (1978)). Accordingly, and of foundational importance, is whether the continued leasing and development of oil and gas will result in unnecessary and undue degradation to lands, resources, and species as a result of climate impacts.	
7	163	Climate Change, Green House Gases, and Social Cost of Carbon	As discussed above, BLM has endeavored to satisfy the requirement to consider the cumulative climate impacts of its leasing decisions by preparing the 2020 and 2021 Specialist Reports. Setting aside the deficiencies of the Specialist Report, discussed above, the underlying conclusions are chilling. Annual greenhouse gas emissions from existing federal fossil fuel production totals 913.9 MTCO ₂ e, with total projected cumulative "life-of-project" emissions of 3,774.2 MTCO ₂ e over the next 12 months. 2021 Specialist Report at Executive Summary, Table ES-1, Table ES-2; Table ES-3; 7.0 Emissions Analysis, Table 7-1. Already permitted but not yet producing leases add 800.6 MTCO ₂ e to this total over the next 12 months. Report at Executive Summary, Table ES-3. And the long-term onshore fossil fuel emissions projection is 24,298.99 MTCO ₂ e. Report at Executive Summary, Table ES-4; 5.0 GHG Emissions and Projections from BLM-Authorized Actions, Table 5-18. BLM also applies these emissions in the context of the remaining Global Carbon Budget, which recognizes that there are 420 GtCO ₂ that remain for a 66% chance to prevent warming above a 1.5C threshold. Report at 7.2 Carbon Budgets and Carbon Neutrality. With a federal fossil fuel emissions estimate of 2.24 GtCO ₂ during that timeframe, this represents 1.47% of the total remaining global budget to avoid catastrophic warming. The 2021 Specialist Report at 7.2 Carbon Budgets and Carbon Neutrality, Table 7-3. In other words, any additional emissions are entirely incompatible with maintaining a livable planet. The 2021 Specialist Report also details past and present climate impacts, at Section 8.3, projected future climate impacts under varying mitigation pathways, at Sections 7.2 and 9.2, as well as state specific climate projections, at Sections 8.4 and 9.4. What the agency fails to do, however, is apply this analysis to its substantive duty to avoid unnecessary and undue degradation under FLPMA. 43 U.S.C. § 1732(b).	This comment applies to federal-level BLM policy compliance under FLPMA and is therefore outside the scope of this NEPA analysis.
7	164	Policy and Legal Compliance	These requirements are distinct from BLM's requirements under NEPA. "A finding that there will not be significant impact [under NEPA] does not mean either that the project has been reviewed for unnecessary and undue degradation or that unnecessary or	See responses to letter 7 comments 1 and 161.

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			undue degradation will not occur.” <i>Ctr. for Biological Diversity v. United States DOI</i> , 623 F.3d 633, 645 (9th Cir. 2010) (quoting <i>Kendall's Concerned Area Residents</i> , 129 I.B.L.A. 130, 140 (1994)). In the instant case, the BLM's failure to specifically account for unnecessary and undue degradation in its decision to continue the leasing and development of oil and gas—which is distinct from its compliance under NEPA—is actionable on procedural grounds and must occur before the leasing decision is approved.	
7	165	Policy and Legal Compliance	BLM must therefore take sufficient measures to prevent degradation unnecessary to, or undue in proportion to, its oil and gas leasing decisions. See <i>Theodore Roosevelt Conservation Partnership</i> , 661 F.3d at 76. BLM must define what constitutes “unnecessary or undue degradation” in the context of continued oil and gas leasing and development, either at a programmatic level or within these specific sales—and with particular consideration of greenhouse gas emissions and resulting climate impacts—and explain why its chosen alternative will not result in such degradation, as required by FLPMA, 43 U.S.C. § 1732(b). BLM does not even mention its obligations with respect to preventing unnecessary and undue degradation—or mention it at all in the EA. BLM also cannot defer the fulfillment of this substantive duty to the APD stage. BLM's failure to define, analyze, or take action to prevent the unnecessary or undue degradation of lands in the context of climate impacts from this lease sale and the federal fossil fuel program as a whole would be arbitrary and capricious agency action, an abuse of discretion, and action without observance of procedures required by law, pursuant to the APA. 5 U.S.C. § 706(2).	To the extent this comment applies to federal-level BLM policy compliance under FLPMA, it is outside the scope of the decision under review. In general, the BLM makes federal mineral resources, such as oil and gas, available for development in accordance with laws including the MLA and FLPMA. See EA Sections 1.2 and 1.4 for information regarding the BLM's requirements under the MLA, FLPMA, and other statutes and regulations. Chapter 2 of the Annual GHG Report, incorporated in the EA by reference, discusses the relationship between BLM's coal, oil, and gas leasing programs with other laws and policies at the federal and state level.

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7	166	Policy and Legal Compliance	As discussed above, methane represents an opportunity for BLM to meaningfully reduce GHG emissions associated with the federal oil and gas program. BLM is not only required to analyze alternatives that address this highly potent short-term GHG, it also has substantive mandates under FLPMA to prevent, reduce, or mitigate methane emissions, independent of the agency's MLA duty to prevent waste. We note in particular FLPMA's mandates that Interior: • Protect "air and atmospheric" values (43 U.S.C. § 1701(a)(8)); • Account for "the long-term needs of future generations" (43 U.S.C. § 1702(c)); • Prevent "permanent impairment of the productivity of the land and quality of the environment" (43 U.S.C. § 1702(c)); and • "[T]ake any action necessary to prevent unnecessary or undue degradation of the lands." (43 U.S.C. § 1732(b)). These statutory directives enable Interior to take action before lease rights are conferred, whether at the planning or leasing stages, that will eliminate methane emissions and otherwise protect public lands. That includes the authority and responsibility to (1) reduce acres available for leasing to address the contribution of methane emissions to the climate crisis and the impacts of the crisis to public lands, (2) attach methane and other harmful emission reduction stipulations to an oil and gas lease to protect air and atmospheric resources and to mitigate climate impacts to public lands, and (3) condition lease development at the permitting stage. See 43 C.F.R. § 3101.1-2. In the absence of existing methane waste and air quality regulations, and even following the conclusion of current EPA and BLM rulemaking efforts with regard to methane, BLM has a duty to leverage its considerable authority under FLPMA to the fullest extent permitted by law, including by identifying stipulations and conditions of approval for all of the proposed 2024 lease sales, to minimize, reduce, and mitigate methane impacts to the greatest extent possible.	To the extent this comment applies to federal-level BLM policy compliance under FLPMA, it is outside the scope of the decision under review. See also response to letter 7 comment 33.
7	167	Policy and Legal Compliance	While BLM provides an analysis of the potential greenhouse gas emissions associated with this lease sale—and calculates the social cost of greenhouse gases resulting from the lease sale, which are estimated to run into the millions of dollars, Draft EA at 89—the EA arbitrarily ignores an important aspect of the problem: what justification does BLM have for proceeding with the lease sale, given the enormous social and environmental costs of that sale? The Draft EA's Analysis of the costs of the lease sale is minimal and inadequate.	The Proposed Action, to offer for lease parcels for oil and gas development, and its effects have been evaluated in a manner consistent with NEPA. See 42 U.S.C. § 4336 ("An agency shall prepare an environmental assessment with respect to a proposed agency action that does not have a reasonably foreseeable significant effect on the quality of the human environment, ... Such environmental assessment shall be a concise public document prepared by a Federal agency to set forth the basis of such agency's finding of no significant impact or determination that an environmental impact statement is necessary."); see also 43 C.F.R. § 46.300. See also response to letter 7 comment 56.

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7	168	Consultation and Coordination - Endangered Species Act	BLM must ask FWS whether any listed or proposed species may be present in the area of the agency action. 16 U.S.C. § 1536(c)(1); 50 C.F.R. § 402.12. If listed or proposed species may be present, BLM must prepare a "biological assessment" to determine whether the listed species may be affected by the proposed action. Id. The biological assessment must generally be completed within 180 days. 16 U.S.C. 1536(c)(1); 50 C.F.R. § 402.12(i). The threshold for a "may affect" determination and the required Section 7(a)(2) consultation is low so as to ensure that listed species are not jeopardized. Karuk Tribe of Cal. V. U.S. Forest Serv., 681F.3d 1006, 1027 (9th Cir. 2012).	The BLM considers this comment non-substantive to the extent that it seeks to interpret legal authorities that are the best evidence of their contents, rather than alleging a specific error or material omission in the BLM's analysis or contributing new information for the BLM to consider. Generally, Section 4.1 of the EA discusses how the Proposed Action would comply with threatened and endangered species management guidelines outlined in applicable RMPs and the September 2006 Biological Assessment, as well as FLPMA, NEPA, and ESA Section 7 consultation requirements. In addition, as described in AIB-7, Threatened and Endangered Species, the BLM continues to review the available climate science in connection with its statutory responsibilities, including under NEPA.
7	169	Consultation and Coordination - Endangered Species Act	To complete formal consultation, FWS must provide BLM with a "biological opinion" explaining how the proposed action will affect the listed species or habitat. 16 U.S.C. § 1536(b); 50 C.F.R. § 402.14. Consultation must generally be completed within 90 days from the date on which consultation is initiated. 16 U.S.C. § 1536(b)(1)(A); 50 C.F.R. § 402.14. Where the FWS concludes that the proposed action "will jeopardize the continued existence" of a listed species, the biological opinion must outline "reasonable and prudent alternatives." 16 U.S.C. § 1536(b)(3)(A). An action is deemed to jeopardize the continued existence of a species if it "reasonably" would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery" of the species. 50 C.F.R. § 402.02. Thus, an agency is prohibited from taking any action that will reduce appreciably the likelihood of the species' survival or recovery. Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv., 524 F.3d 917, 931 (9th Cir. 2008); see also NMFS, The Habitat Approach, Implementation of Section 7 of the Endangered Species Act for Actions Affecting the Habitat of Pacific Anadromous Salmonids, 3(1999) ("[I]n order for an action to not 'appreciably reduce' the likelihood of survival, it must not prevent or appreciably delay recovery.").	See response to letter 7 comment 168.
7	170	Consultation and Coordination - Endangered Species Act	In addition, if FWS concludes that the action is not likely to jeopardize the continued existence of a listed species, and will not result in the destruction or adverse modification of critical habitat, either as proposed or through the implementation of the reasonable and prudent alternatives described in the biological opinion, FWS must provide an "incidental take statement," specifying the amount or extent of such incidental taking on the listed species, and any "reasonable and prudent measures" that FWS considers necessary or appropriate to minimize such impact, and setting forth the "terms and conditions" that must be complied with by BLM to implement those measures. 16 U.S.C. § 1536(b)(4); 50 C.F.R. § 402.14(i). Taking of listed species without	See response to letter 7 comment 168.

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			the coverage of an incidental take statement is a violation of Section 9 of the ESA. 16 U.S.C. § 1538.	
7	171	Consultation and Coordination - Endangered Species Act	Agencies must reinitiate consultation on agency actions over which the federal agency retains, or is authorized to exercise, discretionary involvement or control under these circumstances: (a) If the amount or extent of taking specified in the incidental take statement is exceeded; (b) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (c) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or (d) If a new species is listed or critical habitat designated that may be affected by the identified action. 50 C.F.R. § 402.16.	See response to letter 7 comment 168.
7	172	Consultation and Coordination - Endangered Species Act	During the consultation process, BLM is prohibited from making irreversible or irretrievable commitment of resources with respect to the proposed leasing that may foreclose the formulation or implementation of any reasonable and prudent alternative measures. 16 U.S.C. § 1536(d). This means that BLM may not proceed in its proposed leasing activities unless it completes Section 7 consultation.	See response to letter 7 comment 168.
7	173	Consultation and Coordination - Endangered Species Act	Compliance with the Section 7 consultation process is integral to compliance with the substantive requirements of the ESA — that an agency's action will not jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat. According, BLM must initiate Section 7 consultation with FWS for any listed endangered or threatened species, including the DSL and LPC.	See response to letter 7 comment 168.
7	174	Consultation and Coordination - Endangered Species Act	For every discretionary action, Section 7(a)(2) of the Endangered Species Act ("ESA") requires each federal agency, in consultation with the nation's wildlife agencies, to "insure that any action authorized, funded, or carried out by such agency ... is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species" using the best scientific data available. 16 U.S.C. § 1536(a)(2). The Supreme Court has unequivocally stated that the Act's "language, history, and structure" made clear "beyond doubt" that "Congress intended endangered species to be afforded the highest of priorities" and endangered species should be given "priority over the 'primary missions' of federal agencies" especially during such consultations. <i>Tenn. Valley Auth. v. Hill</i> , 437 U.S. 153, 174, 185 (1978). Even with a global threat to biodiversity such as climate change, "the plain intent of Congress in enacting this statute was	See response to letter 7 comment 168.

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			to halt and reverse the trend toward species extinction, whatever the cost." Id. at 184 (emphasis added). Because resuming federal oil and gas leasing will have an appreciable, cumulative impact on climatethreatened species, BLM must include these species as part of its consultation with both the National Marine Fisheries Service and the U.S. Fish and Wildlife Service (collectively the "Services"). While many of the ESA's provisions work to effectuate the conservation goals of the statute, the "heart of the ESA" is the interagency consultation requirements of Section 7 of the ESA. <i>W. Watersheds Project v. Kraayenbrink</i> , 632 F.3d 472, 495 (9th Cir. 2011); 16 U.S.C. § 1536. At the first step of the consultation process, an action agency must determine if its action either "may affect" listed species or will have "no effect" on listed species within the action area. Under the ESA, "action" is broadly defined to include "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas" and include, but are not limited to "(a) actions intended to conserve listed species or their habitat; (b) the promulgation of regulations; (c) the granting of licenses, contracts, leases, easements, rights-of-way, permits, or grants-in-aid; or (d) actions directly or indirectly causing modifications to the land, water, or air." 50 C.F.R. § 402.02. Similarly, the "action area" is equally broadly defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." 50 C.F.R. § 402.02 (emphasis added). For this proposed action, it is clear that the anticipated greenhouse gas pollution from federal oil and gas leasing will harm listed species far beyond the immediate area of the proposed activity in a manner that is attributable to the agency action.	
7	175	Consultation and Coordination - Endangered Species Act	[...] it is clear that the anticipated greenhouse gas pollution from federal oil and gas leasing will harm listed species far beyond the immediate area of the proposed activity in a manner that is attributable to the agency action. Pending consultation, BLM should postpone the New Mexico Q1 '25 lease sale.	See response to letter 7 comment 168. Additionally, to the extent this comment concerns federal-level policy compliance with the ESA, it is outside the scope of the decision under review.
7	176	NEPA Compliance	Prior to any decision to conduct new leasing of federal public lands for fluid mineral development, BLM must comply with its obligations under the National Environmental Policy Act, the Federal Land Policy and Management Act, and the Endangered Species Act, to consider the impacts of its nationwide policy with respect to federal fossil fuel production on resources including global climate, environmental justice, health, wildlife habitat, air quality, and surface and groundwater quality. BLM's current plan-and lease-level NEPA compliance cannot support a decision to lawfully engage in new leasing, and therefore all new leasing must	This comment relates to revising federal or agency-wide policy and is outside the scope of the decision being reviewed.

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			be deferred until BLM prepares a comprehensive environmental review, including an analysis of the cumulative impacts of past, ongoing, and reasonably foreseeable fossil fuel development. In order to comply with the United States' legal and moral obligations to its citizens, and to future generations, that review must include meaningful consideration of alternatives that could allow the Department of Interior to fulfill its role in putting the nation on a path towards an emissions future compatible with limiting warming to 1.5°C and mitigating the worst effects of global climate change. The Conservation Groups appreciate your consideration of the information and concerns addressed in this letter regarding all 7 parcels offered in the New Mexico Q1 '25 lease sale, as well as the information included in the attached exhibits, sent under separate cover.	