



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

# Environmental Assessment

## Quarter 1 2025 Oil and Gas Lease Parcel Sale

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

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# 1 Introduction

## 1.1 Summary of Proposed Project

This environmental assessment (EA) was prepared to examine the potential environmental impacts of the proposed action and alternative actions to support informed decision-making. This analysis is consistent with the purpose and goals of NEPA; the requirements of the Council on Environmental Quality's (CEQ) implementing NEPA regulations at 40 CFR Parts 1500-1508; longstanding federal judicial and regulatory interpretations; the Department of the Interior's NEPA regulations (43 CFR Part 46); and Administration priorities and policies including Secretary's Order No. 3399 requiring bureaus and offices to use "the same application or level of NEPA that would have been applied to a proposed action before the 2020 Rule went into effect."

This EA has been prepared to disclose and analyze the potential environmental consequences from leasing 13 nominated lease parcels encompassing approximately 1,324.13 Federal mineral acres located across the Montana/Dakotas in the Bureau of Land Management's North Dakota Field Office (NDFO), Havre Field Office (Havre FO), Miles City Field Office (MCFO), and within the administrative boundaries of the United States Forest Service (USFS) Dakota Prairie Grasslands (DPG) McKenzie Ranger District, Bureau of Reclamation Missouri Basin Region 5 (BOR), and the U.S Army Corps of Engineers (USACE) Garrison Dam/Lake Sakakawea Project, Omaha District. The parcels would be included as part of a competitive oil and gas lease sale tentatively scheduled to occur during Quarter 1 of 2025. The proposed parcels are in Liberty, Roosevelt, and Richland counties in Montana and Dunn and McKenzie counties in North Dakota. Refer to parcel maps in **Appendix C**.

The Bureau of Land Management (BLM) Montana/Dakotas State Office conducts Oil and Gas Federal mineral estate lease auctions for lands managed by the Federal Government, whether the surface is managed by the Department of the Interior (BLM or Bureau of Reclamation (BOR)), United States Forest Service (USFS), or other departments and agencies. These auctions also include split estate lands, where the BLM holds subsurface mineral rights, but a party other than the Federal Government owns the surface estate. The Montana/Dakotas State Office has historically conducted four lease sales per year. The BLM's authority to conduct these lease sales is based on various laws including the Mineral Leasing Act of 1920, as amended, and the Federal Land Policy and Management Act of 1976. The Federal Onshore Oil and Gas Leasing Reform Act of 1987 Sec. 5102(a)(b)(1)(A) directs the BLM to conduct quarterly oil and gas lease sales in each state whenever eligible lands are available for leasing.

Members of the public file Expressions of Interest (EOI) to nominate parcels for leasing by the BLM. The BLM may also nominate a parcel if an existing well is draining Federal minerals or for other reasons. From these EOIs and BLM nominations, the Montana/Dakotas State Office prepares a preliminary parcel list and provides them to the field offices for review. The BLM also reviews parcels located in designated greater sage-grouse habitat to guide development to lower conflict areas and protect important habitat consistent with conservation objectives in the 2015 Rocky Mountain Region Record of Decisions and the applicable Approved Resource Management Plans (ARMPs), a court order in the U.S. District Court for the District of Montana (case 4:18-cv-00069-BMM filed 5/22/20), and Montana/Dakotas Instruction Memorandum MT-2020-018. Montana/Dakotas BLM reviews the parcels, and evaluates:

1. If they are in areas open to leasing;
2. If new information has come to light which might change previous analyses conducted during the land use planning process;

3. Whether there are site specific resource concerns that warrant not leasing a particular parcel,
4. If there are special resource conditions of which potential bidders should be made aware; and,
5. Which stipulations should be identified and included as part of a lease.

If the decision is made to offer lease parcels, the Montana/Dakotas State Office would publish a Notice of Competitive Oil and Gas Lease Sale (Sale Notice) at least 45 days before the auction is held. The Sale Notice will identify applicable lease stipulations for each parcel.

The offering and subsequent issuance of oil and gas leases would not result in immediate ground disturbance. However, once a lease is sold the lessee maintains the right to occupy, explore for, and develop oil and gas resources from the lease consistent with the lease terms and conditions and upon approval of a site-specific permit by the BLM authorized officer. These lease operations can result in surface disturbance and other impacts.

In accordance with BLM Handbook H-1624-1 (“Planning for Fluid Mineral Resources” January 28, 2013), the Federal Government retains certain rights when issuing an oil and gas lease. While the BLM may not unilaterally add a new stipulation to an existing lease that it has already issued, the BLM can subject development of existing leases to reasonable conditions, as necessary, through the application of Conditions of Approval (COAs) at the time of permitting. The new constraints must be in conformance with the applicable land use plan and not conflict with rights granted to the holder under the lease. See 30 U.S.C. § 226(g); 43 CFR § 3101.1-2. See also *Yates Petroleum Corp.*, 176 IBLA 144 (2008); *National Wildlife Federation*, 169 IBLA 146, 164 (2006).

BLM Montana/Dakotas has prepared this Environmental Assessment for the Quarter 1 2025 oil and gas lease sale, which considers two alternatives:

- Alternative A: No Action
  - The nominated parcels would not be offered for lease as part of a competitive oil and gas lease sale.
- Alternative B: Proposed Action
  - The BLM would offer 13 nominated lease parcels encompassing approximately 1,324.13 Federal mineral acres as part of a competitive oil and gas lease sale in the BLM North Dakota Field Office, BLM Havre Field Office, and BLM Miles City Field Office within the administrative boundary of the DPG McKenzie Ranger District, BOR Missouri Region, and the USACE Garrison Dam/Lake Sakakawea Project.

The BLM assigned lease stipulations to the parcels to address resources concerns. A Federal oil and gas lease would be issued for a 10-year period and would remain valid for as long thereafter as oil or gas is produced in paying quantities, required payments are made and lease operations are conducted in compliance with regulations and approved permits. If a lessee fails to produce oil and gas by the end of the initial 10-year period, does not make annual rental payments, or does not comply with the terms and conditions of the lease, the BLM will terminate the lease. The lessee can relinquish the lease. The oil and gas resources could be offered for sale at a future lease sale. Drilling of wells on a lease would not be permitted until the lessee or operator secures approval of a drilling permit and a surface use plan as specified in 43 CFR § 3162. This requires additional environmental reviews, by the BLM, at the time of application.

## 1.1 Purpose and Need

The purpose and need for this action are to respond to EOIs to lease parcels of land for oil and gas development as mandated by Federal laws, including the Mineral Leasing Act of 1920, as amended, Federal Land Policy and Management Act of 1976, and Federal Onshore Oil and Gas Leasing Reform Act of 1987.

Offering parcels for competitive oil and gas leasing provides opportunities for private individuals or companies to explore and develop federal oil and gas resources after receipt of necessary approvals, and to sell the oil and gas in public markets.

## 1.2 Decision to be Made

Based on this review and public comment, the BLM will determine whether to make lands available for leasing, and, if so, identify stipulations that would be included with specific lease parcels at the time of lease sale.

## 1.3 Land Use Plan Conformance

This Environmental Assessment (EA) is tiered to the information and analysis and conforms to the decisions contained in the North Dakota Resource Management Plan (ND RMP) of April 1988, the 2015 Rocky Mountain Region Record of Decisions and the applicable Approved Resource Management Plans, the HiLine ARMP and FEIS of September 2015, the Miles City ARMP and FEIS of September 2015 and the 2023 Draft MCFO SEIS. These plans are the governing land use plans for their respective geographic areas. The lease parcels to potentially be offered for sale are within an area determined to be open to oil and gas leasing in the RMPs. An electronic copy of these planning documents is available via the internet on the BLM e-Planning page: <https://www.blm.gov/programs/planning-and-nepa/eplanning>.

The NDFO is in the process of updating the RMP. The draft RMP was available for Public Comment on January 20, 2023. The proposed RMP/Final EIS is currently in the protest period. The Reasonable Foreseeable Development Plan (RFD) from the Draft RMP has been used to develop the RFD for this EA.

This EA is also tiered to the Dakota Prairie Grasslands Northern Great Plains Management Plans Revision Final Environmental Impact Statement for Oil and Gas Leasing (December 2020) and Record of Decision Oil and Gas Leasing USDA Forest Service Little Missouri National Grassland, Dakota Prairie Grasslands (December 2020) the BLM Record of Decision Adopting USDA Forest Service Final Supplemental Environmental Impact Statement for Oil and Gas Leasing, Little Missouri National Grassland, Dakota Prairie Grasslands (DOI-BLM-MT-2021-0001-OTHER\_NEPA) and in coordination with the BOR during the RMP's analysis incorporated BOR standard stipulations. This conformance applies only to the parcels on USDA Forest Service managed surface located within the administrative boundaries of the USDA Forest Service Dakota Prairie Grasslands.

This EA is also tiered to the information and analysis and conforms to the decisions contained in the USACE Garrison Dam/Lake Sakakawea Project Oil and Gas Management Plan (June 2020). This conformance applies only to the parcels located within the administrative boundaries of the USACE Garrison Dam/Lake Sakakawea Project.

In an opinion and amended order on March 26, 2018, the U.S. District Court for the District of Montana found that the BLM violated NEPA in the Final EISs for the Buffalo and Miles City RMPs (*Western Organization of Resource Councils (WORC) et al. v. BLM, Case 4:16-cv-00021-BMM, filed 3/23/18*) with respect to consideration of the amount of coal made available for lease and consideration of climate change impacts. On

July 31, 2018, the District Court issued an order directing the BLM to prepare a Supplemental EIS for the RMP, and to complete comprehensive environmental analysis in compliance with the Court's March 26, 2018, Order, and all existing procedural requirements under NEPA and the Administrative Procedures Act (APA) for any new or pending leases of coal, oil, or gas resources in the planning areas subject to the Buffalo RMP and the Miles City RMP. The BLM has prepared the Quarter 1 2025 Oil and Gas Lease Sale EA in compliance with the terms of the WORC Order, NEPA, and the APA.

## 1.4 Relationship to Statutes, Regulations, Other NEPA Documents

The mandate of the BLM is derived from various laws, including the Mineral Leasing Act (MLA) and the Federal Land Policy and Management Act of 1976 (FLPMA), as amended, to promote the exploration and development of oil and gas on the public domain. Additionally, the Federal Onshore Oil and Gas Leasing Reform Act of 1987 states lease sales shall be held for each State where eligible lands are available at least quarterly and more frequently if the Secretary of the Interior determines such sales are necessary.

The Inflation Reduction Act (IRA) of 2022 introduced several changes that affect oil and gas leasing on Federal lands. Section 50262 of the IRA updates the MLA, increasing onshore oil and gas royalty rates from 12.5 percent to 16.67 percent for newly issued leases, increasing onshore oil and gas leasing minimum bids from \$2 per acre to \$10 per acre, and increasing oil and gas rental rates from \$1.50 per acre for years 1-5 and \$2 for years 6-10 to \$3 per acre for years 1-2, \$5 for years 3-8, and \$15 for all years after. In addition, it introduced a fee for submitting expressions of interest for oil and gas leasing of \$5 per acre and eliminated noncompetitive leasing. Section 50265 establishes that the Secretary of the Interior may not issue a right-of-way for wind or solar energy development on Federal land unless a) an onshore lease sale has been held during the 120-day period ending on the date of the issuance of the right-of-way for wind or solar energy development; and b) the sum total of acres offered for lease in onshore lease sales during the 1-year period ending on the date of the issuance of the right-of-way for wind or solar energy development is not less than the lesser of 2,000,000 acres; and 50 percent of the acreage for which expressions of interest have been submitted for lease sales during that period.

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. Stipulations attached to the lease, restrictions deriving from specific, nondiscretionary statutes, and such reasonable measures may be required to minimize adverse impacts to other resource values (43 CFR §3101.1-2).

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

- 43 CFR § 3100 – Oil and Gas Leasing
- BLM Manual 3120 – Competitive Leasing
- BLM Competitive Leasing Handbook (H-3120-1)
- Directional Drilling into Federal Mineral Estate from Well Pads on Non-Federal Locations (WO IM 2018-014)
- Impacts of the Inflation Reduction Act of 2022 (Pub. L. No. 117-169) to the Oil and Natural Gas Leasing Program (WO IM 2023-008)
- Oil and Gas Leasing – Land Use Planning and Lease Parcel Review (WO IM 2023-010)
- On June 16, 2023, Onshore Orders (OOs) #1, #2, #6, and #6 were codified into the Code of Federal Regulations (CFRs) as follows: OO#1: 43 CFR § 3171, OO#2: 43 CFR § 3172, OO#6: 43 § CFR 3176. OO#7: 43 § CFR 3177.
- Instruction Memorandums MT-2020-018, IM-2023-007, IM-2023-008

❖ Evaluating Competitive Oil and Gas Lease Sale Parcels for Future Lease Sales (WO IM 2023-007): In accordance with Instruction Memorandum (IM) 2023-007, the BLM has evaluated the nominated lease parcels against five criteria to determine each parcel’s leasing preference (see **Appendix J**). As a result, of the 13 nominated parcels, the potential development is classified as follows: three (3) very high, nine (9) high, zero (0) moderate, one (1) low, and zero (0) very low. Of all the parcels nominated, nine were rated as low or very low potential for leasing based on one or more criteria (proximity to development, proximity to habitat, cultural resources, and development potential).

The IM states that the BLM will close all EOIs that have remained pending for three or more years, and that the Montana/Dakotas State Office will notify each EOI submitter of a planned closure; the notice will provide 30-days for the EOI submitter to express a continuing interest in the EOI(s) which would result in the EOI remaining active. There are no nominations that have been pending for three or more years on this lease sale. Furthermore, none of the EOIs tied to the lands in this sale were submitted anonymously.

This EA was prepared to thoroughly examine the potential environmental impacts of the proposed action in order to support informed decision-making. This EA is consistent with the purpose and goals of NEPA; the requirements of the Council on Environmental Quality’s (CEQ) implementing NEPA regulations at 40 CFR Parts 1500-1508; longstanding federal judicial and regulatory interpretations; the Department of the Interior’s NEPA regulations (43 CFR Part 46); and Administration priorities and policies including Secretary’s Order No. 3399 requiring bureaus and offices to use “the same application or level of NEPA that would have been applied to a proposed action before the 2020 Rule went into effect.”

## 1.5 Issues Identified for Analysis

Analysis issues include resource issues that could potentially be affected by oil and gas leasing. The BLM focuses its analysis on “issues that are truly significant to the action in question, rather than amassing needless detail” (40 CFR § 1500.1(b)). The BLM identified site-specific resource concerns and lease stipulations for proposed parcels through a preliminary review process conducted prior to a 30-day public scoping period. After scoping was completed, the BLM identified issues of concern identified by the public, determined how to address those concerns in this EA, and reviewed and edited lease stipulations as necessary. The following resources/issues will be analyzed in detail in this EA:

### 1.5.1 Issue 1 – Air Resources

What types of emissions would be generated from subsequent oil and gas development of leased parcels? What quantity of air pollutants would be produced based on the assumptions for analysis? How would air pollutant emissions from subsequent development of leased parcels affect air quality?

- Indicator: Tons per well and tons per year of PM<sub>10</sub>, PM<sub>2.5</sub>, NO<sub>x</sub>, SO<sub>2</sub>, CO, VOCs, HAPs

How would air emissions from subsequent development of leased parcels affect visibility at Class I Airsheds?

- Indicator: Change in deciviews, which is a unit of measurement to quantify human perception of visibility. It is derived from the natural logarithm of atmospheric light extinction coefficient. One deciview is roughly the smallest change in visibility (haze) that is barely perceptible.

### 1.5.2 Issue 2 – Greenhouse Gases

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

- Indicator: Metric tonnes (t) or megatonnes (Mt), and social cost of GHGs (\$)

### *1.5.3 Issue 3 – Socioeconomic Conditions, Environmental Justice, and Human Health*

How would the leasing and potential development of these parcels affect local economic activity and revenues for Federal, State, and local governments?

Would Environmental Justice populations be disproportionately adversely affected by the leasing of the proposed parcels?

- Indicator: Total revenue income and bonus bids over 10-year lease term
- Indicator: Disproportionate impacts from leasing parcels
- Indicator: Population groups of concern

Executive Order 12898 (Feb. 11, 1994), Federal Actions to Address Environmental Justice (hereby referred as EJ) in Minority and Low-Income Populations, provides that BLM shall identify and address disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, or Indian tribes that may experience common conditions of environmental exposure or effects associated with a plan or project.

- Indicator: Opportunity for meaningful involvement

Meaningful public engagement focuses on empowering vulnerable and affected populations to participate in decisions that have the potential to affect their lives, regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

### *1.5.4 Issue 4 – Water Resources*

What are the effects of potential oil and gas development, including hydraulic fracturing, on parcels that may be offered for lease on surface and groundwater quality and quantity?

- Indicator: Characterize the affected environment in the watersheds where parcels are proposed. Quantify estimated acres of surface disturbance and million gallons water used. Qualitatively assess effects to surface and groundwater resources from oil and gas development.

### *1.5.5 Issue 5 – Cultural Resources and National Historic Preservation Act*

How would the leasing and potential development of these parcels affect cultural resources to include Native American Religious Concerns and National Historic Landmarks and Trails?

- Indicator: Characterize the affected environment in the landscape where the parcels are proposed. Quantify estimated acres of surface disturbance and duration of development.

## **1.6 Issues Identified but Eliminated from Further Analysis**

The following resources/issues are not present and not considered in this EA: lands and realty conflicts, locatable and salable minerals, forest and woodland, cave and karst resources, wilderness study areas, ACECs, and wild and scenic rivers. Other resource issues BLM considered but eliminated from further analysis due to environmental impacts previously analyzed through prior NEPA reviews and/or lease notices or stipulations that were applied to avoid and minimize impacts are discussed below:

**Paleontology:** The application of lease terms and the paleontological lease notices (Standard 16-3, LN 14-12) at leasing provides protection to paleontological resources. The paleontological lease notice LN 14-3 and LN

14-12 is applied to all lease parcels that are within or could contain geological units with a PFYC Class of 3 or higher. Leased lands that fall into this category could require professional assessment which may include a field survey prior to surface disturbance. The results of the assessment and survey by a BLM-permitted paleontologist will serve as the basis for a mitigation plan during development. If the inventory resulted in the identification of paleontological resources, mitigation measures such as avoidance, professional monitoring, development of an Unanticipated Resource Discovery Plan or salvage would be initiated by BLM and the operator. Within the administrative boundaries of the USFS Dakota Prairie Grasslands, LMG2020-LN-04 is applied to protect these resources. Within the administrative boundaries of the USACE Garrison Project/Lake Sakakawea the stipulations COE 18-1, 18-2, 18-3, 18-4, is applied to protect these resources.

**Soils Resources and Vegetation:** The Standard Lease Stipulation (Standard 16-3) has been applied to all parcels to mitigate any impacts associated with leasing or development of these parcels. Controlled Surface Use Stipulations (CSU 12-24, CSU 12-62) have also been applied to applicable parcels. At the time of exploration or development the APD surface use plan of operations will include design features and mitigation measures to reduce, avoid, or minimize potential impacts to soil and vegetative resources consistent with the RMP for the respective planning area. Within the administrative boundaries of the USFS Dakota Prairie Grasslands, LMG2020-NSO-01 is applied to protect these resources. Within the administrative boundaries of the USACE Garrison Project/Lake Sakakawea the stipulations COE 18-1, 18-2, 18-3, 18-4, is applied to protect these resources.

**Riparian – Wetland Habitats:** The Standard Lease Stipulation (Standard 16-3) have been applied to all parcels to mitigate any impacts associated with leasing or development of these parcels. Stipulations CSU 12-25 and NSO 11-70 have been added to appropriate parcels to achieve the same objective. At the time of exploration or development, the APD surface use plan of operations will include design features and mitigation measures to reduce, avoid, or minimize impacts to riparian-wetland areas, consistent with the RMP for the respective planning area. Additionally, all stipulations related to setback distances from the edge of the wetlands, streams, and rivers will be adhered to and consistent with the RMP for the respective planning area. Within the administrative boundaries of the USFS Dakota Prairie Grasslands LMG2020-CSU-01, and LMG2020-LN-01 are applied to protect these resources. Within the administrative boundaries of the USACE Garrison Project/Lake Sakakawea the stipulations COE 18-1, 18-2, 18-3, 18-4, is applied to protect these resources.

**Visual Resources:** BLM is required to manage for visual resources on BLM owned surface lands. Each RMP contains Visual Resource Management (VRM) requirements and considerations specific for the geographical location to which they apply. VRM practices and standards will be implemented consistent with the respective RMP they are subject to. New oil and gas development would implement, as appropriate for the site, Best Management Practices (BMP's) to maintain visual qualities where possible. This includes, but would not be limited to, proper site selection, reduction of visibility, minimizing disturbance selecting color(s)/color schemes that blend with the background and reclaiming areas that are not in active use. Repetition of form, line, color, and texture when designing projects would reduce contrasts between landscape and development.

The application of Standard Lease Stipulation (Standard 16-3), Controlled Surface Use Stipulations and Lease Notice (LN 14-14) would be sufficient at the leasing stage to notify operators that additional measures may be necessary to reduce visual impacts from potential future development (at the APD stage). This provides for the protection and conservation of the visual resources on public lands. BLM visual resource classifications are only applied to BLM surface. For non-federal surface lands where there are federal minerals (commonly referred to as split estate), BLM does not have the authority to manage for VRM.

**Recreation:** The Standard Lease Stipulation (Standard 16-3) has been applied to all parcels to mitigate any impacts associated with leasing or development of these parcels. Additionally, Per the [USACE Oil and Gas Policy Critical Requirements](#) and USACE stipulations COE 18-1, 18-2, 18-3, 18-4, site selection or approval would occur after a review and potential onsite meeting. Some of the USACE critical requirements include no

exploratory or production activity within .5 miles of a recreation area. The leasing action would be considered in compliance with all relevant recreation regulations, protocols, and policies. Impacts on recreation from potential future exploration and development would be analyzed at the APD stage and included design features, and mitigation would be integrated to avoid or minimize potential impacts to recreation consistent with the RMP for the respective planning area.

**Aquatic Species and Terrestrial Wildlife:** The BLM screened parcels for sensitive species and species of concern and applied timing limit, controlled surface use, and no surface occupancy lease stipulations such as NSO 11-78 to avoid/minimize impacts to species. Within the administrative boundaries of the USFS Dakota Prairie Grasslands, LMG2020-NSO-05 are applied to protect these resources. Within the administrative boundaries of the USACE Garrison Project/Lake Sakakawea the stipulations COE 18-1, 18-2, 18-3, 18-4, is applied to protect these resources.

**Big Game:** North Dakota Game and Fish has documented ungulate migration areas in western North Dakota; there is no doubt that the species are present, however without the identification or location of specific habitats of concern this environmental assessment will use current available data to identify habitats that may be affected by oil and gas lease sales. Future data, if it becomes available during the APD stage, would be utilized to identify habitats or species of concern. North Dakota Fish and Game commented and identified Bighorn Sheep Lambing Habitat for parcel ND-2025-01-0750 and recommended a No Surface Occupancy (NSO) Stipulation. The USFS has applied an NSO, TL, and CSU to the entire parcel, see Section 2.2. The BLM, USACE, and USFS has screened parcels for sensitive species and species of concern and applied timing limitations, controlled surface use stipulations, and no surface occupancy lease stipulations to avoid/minimize impacts to species. The BLM and USFS placed various lease notices on parcels that provides a notice to a lessee that the BLM may require wildlife surveys at the APD stage, and that protective measures may be necessary. The BLM applied Lease Notice 14-40 to all MCFO parcels to protect lands that could contain big game winter range and migration corridors. Pre-disturbance surveys would be required at the time of proposed lease development in accordance with standard terms and conditions of the lease. The surveys would analyze potential effects on game and nongame species habitat. Avoidance, minimization, and/or mitigation measures would also be determined at that time. The BLM has the authority under standard terms and conditions to attach COAs at the site-specific level to minimize significant adverse effects on resource values at the time operations are proposed. The big game stipulations applied to the parcels are sufficient to avoid and minimize impacts based upon a review of the existing big game data from the State.

**Threatened and Endangered Species:** The BLM placed stipulation HQ-TES-1 (Endangered Species Act (ESA)Section 7 Consultation) on all parcels, which states that the BLM may require modifications to, or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. Within the administrative boundaries of the USFS Dakota Prairie Grasslands, LMG2020-LN-02 is also applied to protect these resources.

These notices state that a biological evaluation of the leased lands may be required prior to surface disturbance to determine if endangered, threatened, proposed, candidate or sensitive plant or animal species or their habitat are present within the administrative boundaries of the DPG. The 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 et seq., including completion of any required procedure for conference or consultation. The BLM completed a screen for threatened and endangered species and habitat presence in proposed parcels and identified applicable stipulations if the species or habitat may be present. Refer to **Table 1** below.

#### **Piping Plover and Dakota Skipper**

During the scoping process, commenters indicated that Dunn, McKenzie, Richland and Roosevelt counties contain suitable habitat for piping plover (*Charadrius melodus*) and Dakota skipper (*Hesperia dacotae*). In

addition to the stipulation HQ-TES-1, the USFWS would coordinate with the BLM Dakota Field Office to implement appropriate conservation measures for future site-specific development to ensure development is in compliance with the ESA. Including compliance with the Migratory Bird Act, there are other stipulations including the Standard 16-3 applied to the parcels known to contain moderate to high suitability habitat for Piping Plovers and Dakota Skipper. Applied stipulations can be found in Appendix A and would be enforced during the APD process to address migratory birds and other species with surveys, monitoring, and timing limitations for ground disturbance. These activities often involve collaboration and coordination with agencies and can provide appropriate mitigation for the listed species.

**Table 1.** USFWS Listed Species and Habitat occurrence in proposed MT/Dakotas Quarter 1 2025 Oil and Gas Lease Sale

Scientific Name	Common Name	Status	Species Present in Lease Parcels	Suitable Habitat Present	If species and/or habitat are present, identify stipulations that would avoid/minimize impacts to the species.
<b>Dunn County, ND</b>					
<i>Calidris canutus rufa</i>	Rufa Red Knot	LT	No	No	HQ-TES-1
<i>Charadrius melodus</i>	Piping Plover	LT, CH	No	Unlikely	HQ-TES-1
<i>Danaus plexippus</i>	Monarch Butterfly	C	Unknown	Unlikely	HQ-TES-1
<i>Grus americana</i>	Whooping Crane	LE	Unknown	Unlikely	HQ-TES-1, COA attached to the APD at project level
<i>Herperia dacotae</i>	Dakota Skipper	LT	Unknown	Unlikely	HQ-TES-1
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	LE	Unknown	Unlikely	HQ-TES-1
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE	Unknown	Unlikely	HQ-TES-1
<b>McKenzie County, ND</b>					
<i>Calidris canutus rufa</i>	Rufa Red Knot	LT	Unknown	Unlikely	HQ-TES-1
<i>Charadrius melodus</i>	Piping Plover	LT, CH	Unknown	Unlikely	HQ-TES-1
<i>Danaus plexippus</i>	Monarch Butterfly	C	Unknown	Yes	HQ-TES-1
<i>Grus americana</i>	Whooping Crane	LE	Unknown	Unlikely	HQ-TES-1, COA attached to the APD at project level
<i>Herperia dacotae</i>	Dakota Skipper	LT, CH	Unknown	Unlikely	HQ-TES-1
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	LE	Unknown	Unlikely	HQ-TES-1
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE	No	No	HQ-TES-1
<b>Liberty County, MT</b>					
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT	Unknown	Unlikely	HQ-TES-1
<i>Calidris canutus rufa</i>	Rufa Red Knot	LT	Unknown	Yes	HQ-TES-1
<i>Danaus plexippus</i>	Monarch Butterfly	C	Unknown	Yes	HQ-TES-1
<i>Pinus albicaulis</i>	Whitebark Pine	LT	No	No	HQ-TES-1
<b>Roosevelt County, MT</b>					
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	LT	Unknown	Unlikely	HQ-TES-1
<i>Charadrius melodus</i>	Piping Plover	LT, CH	Unknown	Yes	HQ-TES-1
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE	Unknown	Yes	HQ-TES-1
<i>Calidris canutus rufa</i>	Rufa Red Knot	LT	Unknown	Unlikely	HQ-TES-1
<i>Grus americana</i>	Whooping Crane	LE	Unknown	Unlikely	HQ-TES-1, COA attached to the APD at project level
<i>Danaus plexippus</i>	Monarch Butterfly	C	Unknown	Yes	HQ-TES-1
<b>Richland County, MT</b>					
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	LT	Unknown	Unlikely	HQ-TES-1
<i>Charadrius melodus</i>	Piping Plover	LT, CH	No	No	HQ-TES-1
<i>Grus americana</i>	Whooping Crane	LE	Unknown	Unlikely	HQ-TES-1, COA attached to the APD at project level
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE	No	No	HQ-TES-1
<i>Danaus plexippus</i>	Monarch Butterfly	C	Unknown	Yes	HQ-TES-1
C = Candidate PCH = Proposed Critical Habitat LT = Listed Threatened CH = Designated Critical Habitat LE = Listed Endangered P = Proposed XN = Experimental non-essential population					

## 2 Alternatives

This EA considers the effects of two alternatives: Alternative A – No Action and Alternative B – Proposed Action. The Proposed Action is based upon Expressions of Interest (EOIs) that were submitted to the BLM for the Quarter 1 2025 lease sale.

### 2.1 Alternative A – No Action Alternative

Under the No Action alternative, none of the EOIs to lease (parcel nominations) would be offered for sale. The No Action Alternative would exclude all parcels from the competitive oil and gas lease sale. No additional natural gas or crude oil would enter the public markets, and no royalties would accrue to the federal or state treasuries from the proposed parcel lands. The No Action Alternative would result in the continuation of the current land and resource uses on the lease parcels and would remain the same as the affected environment described in Chapter 3. Existing Federal leases for oil and gas properties would continue to generate rental income.

### 2.2 Alternative B - Proposed Action Alternative

The BLM would offer 13 lease parcels encompassing approximately 1,324.13 Federal mineral acres as part of a competitive oil and gas lease sale tentatively scheduled to occur on January 22, 2025, in conformance with the existing land use planning decisions.

- Dakota Prairie-Grasslands Administrative Boundary: two (2) parcels on USFS surface in McKenzie County, North Dakota (80 acres).
- U.S. Army Corps of Engineers – Garrison Dam/Lake Sakakawea Project Administrative Boundary: five (5) parcels on USACE surface in McKenzie and Dunn Counties, North Dakota (118.5 acres).
- Fee (Private) surface otherwise known as split-estate: six (6) parcels on Fee surface in Liberty, Richland, and Roosevelt counties in Montana (1,125.63).

A BLM, USFS, BOR, and USACE interdisciplinary team reviewed all parcels and applied stipulations and lease notices designed to avoid or minimize impacts to resources. The broad definitions of No Surface Occupancy, Controlled Surface Use, and Lease Notices are listed here:

#### No Surface Occupancy Stipulations (NSO):

Use or occupancy of the land surface for fluid minerals exploration or development and all activities associated with fluid minerals leasing are prohibited to protect identified resource values. The NSO stipulation is a category of major constraints. NSO areas are open to fluid minerals leasing, but surface occupancy or surface disturbing activities associated with fluid minerals leasing cannot be conducted on the surface of the land. Access to fluid mineral deposits would require directional drilling or drilling from outside the boundaries of the NSO area. This differs from areas identified as closed to leasing in which neither the surface area nor mineral estate is available for fluid minerals leasing.

#### Controlled Surface Use Stipulations (CSU):

CSU is a category of moderate constraint stipulations that allows some use and occupancy of public land while protecting identified resources or values. CSU areas are open to fluid minerals leasing, but the stipulation allows the BLM to require special operation constraints.

#### Timing Limitation Stipulations (TL):

Areas identified for TL, a moderate constraint, are closed to fluid minerals exploration and development,

surface-disturbing activities for periods that may exceed 60 days. This stipulation does not apply to operation and basic maintenance.

### Lease Notices

A lease notice (LN) provides more-detailed information concerning limitations that already exist in law, lease terms, regulations, or operational orders. An LN also addresses special considerations for lessees when they plan their operations, but it does not impose additional restrictions. LNs are not an RMP-level decision, and new LNs may be added to fluid minerals leases at the time of sale.

The application and definitions of all stipulations can be found in **Appendix A** and **B**.

Based upon calculations made in the Reasonably Foreseeable Development Scenarios, the BLM estimates that 2 new oil well could be drilled in the North Dakota Field Office, 1 new oil wells could be drilled in the Miles City Field Office, and 1 new oil well could be drilled in the Havre Field Office from this lease sale. Refer to **Table 2** and **Appendix D**.

## 2.3 Alternatives Considered but not Analyzed in Detail

NEPA requires the BLM to consider a reasonable range of alternatives to the proposed action. In this EA, the BLM considers one Action alternative and the No Action alternative. The alternatives would lease, or not lease parcels based upon specific resource concerns identified during analysis. The BLM received scoping comments asking for alternatives that did not fall within the range of alternatives already analyzed in the EA, including:

- An alternative that protects groundwater.

The BLM frequently receives comments asking for an alternative that would protect usable groundwater, defined under the Safe Drinking Water Act as an aquifer with water that contains less than 10,000 mg/L (10,000 ppm) of total dissolved solids. However, a separate alternative to protect usable groundwater is not warranted because protection of groundwater would be required for any APD that is approved on a lease parcel. Authorization of proposed projects would require full compliance with local, state, and federal directives and stipulations that relate to surface and groundwater protection, and the BLM would deny any APD that proposes drilling and/or completion processes that are insufficient to protect usable water, as required by 43 CFR §3162.5-2(d). Any proposed drilling/completion activities would have to comply with 43 CFR §3160 regulations and not result in a violation of a Federal and/or State laws that prohibit degradation of surface or groundwater quality.

- An alternative that that minimizes methane waste through both technology and regulatory authority.

Lease Notice 14-18 is applied to every BLM-administered parcel, which provides: The lessee/operator is given notice that prior to project-specific approval, additional air resource analyses may be required in order to comply with the NEPA, FLPMA, and/or other applicable laws and regulations. Analyses may include equipment and operations information, emission inventory development, dispersion modeling or photochemical grid modeling for air quality and/or air quality related value impact analysis, and/or emission control determinations. These analyses may result in the imposition of additional project- specific control measures to protect air resources. Application of the lease notice allows the BLM to mandate site-specific analysis of impacts to air resources at the APD stage, and to require project-specific control measures to protect air resources, including methane reduction technologies. As the BLM cannot write additional stipulations at the leasing stage, and methane reduction technologies may be required under LN 14-18, this alternative is therefore eliminated from further analysis.

## 2.4 General Information and Appendices

**Appendix A** provides a list of all the parcels by parcel number, and identifies the size, legal descriptions, and associated stipulations. **Appendix B** provides a description of Lease Stipulations and **Appendix C** identifies the location of each parcel.

**Table 2** identifies the number of parcels that would be offered by field office and county, acres of federal minerals (public domain or acquired lands) and summarizes development potential and estimated acres of surface disturbance based upon a sale specific Reasonably Foreseeable Development (RFD) scenario (see **Appendix D**).

The terms and conditions of the standard federal lease and federal regulations would apply to the parcels offered for sale in the Proposed Action. Stipulations shown in **Appendix A** would be included with the identified parcel offered for sale. Standard operating procedures for oil and gas development include measures to protect the environment and resources such as groundwater, air, wildlife, cultural resource concerns, and others specified in the respective RMP or LUP for each planning area.

Lease stipulations would be attached to the parcels to address site specific concerns or new information not previously identified in the land use planning process. Once sold, the lease purchaser would have the right to use as much of the leased lands as is reasonably necessary to explore and drill for all the oil and gas within the lease boundaries, subject to the stipulations attached to the lease (43 CFR §3101.1-4).

Conditions of Approval (COAs) would be attached to permits issued to explore and develop the parcels to address site specific concerns or new information once an APD is analyzed in future NEPA documents.

Standard operating procedures, best management practices (BMPs), and COAs can change over time to meet RMP objectives, resource needs or land use compatibility.

A Federal oil and gas lease would be issued for a 10-year period and would remain valid for as long thereafter as oil or gas is produced in paying quantities, required payments are made and lease operations are conducted in compliance with regulations and approved permits. If a lessee fails to produce oil and gas by the end of the initial 10-year period, does not make annual rental payments, or does not comply with the terms and conditions of the lease, the BLM will terminate the lease. The lessee can relinquish the lease. The oil and gas resources could be offered for sale at a future lease sale.

Drilling of wells on a lease would not be permitted until the lessee or operator secures approval of a drilling permit and a surface use plan as specified in 43 CFR § 3162. This requires additional environmental reviews, by the BLM, at the time of application.

Upon cessation of lease operations, the BLM's regulations and the terms of the lease agreement require the lessee to plug the well(s) and abandon any facilities on the lease. The surface must be reclaimed to the satisfaction of the BLM authorized officer, in accordance with 43 CFR §3170 Onshore Oil and Gas Production.

**Table 2.** Quarter 1 2025 Lease Sale: Parcels by County, Public Domain & Acquired Lands, Development Potential, and Estimated Surface Disturbance<sup>1</sup>

County	Alternative B					Development Potential	Estimated # of Wells	Estimate Acres of Surface Disturbance (short/long term)
	# Parcels	BLM Surface	Non-Federal Surface (Split Estate)	USFS Surface	USACE Surface			
<b>North Dakota Field Office</b>								
Dunn	3	0.00	0.00	0.00	86.79	0 – Very Low 0 - Low 0 - Moderate 4 - High 3 - Very High	2 oil	2.6 acres ST 2.6 acres LT
McKenzie	4	0.00	0.00	80.00	31.71			
<b>Total</b>	<b>7</b>	<b>0.00</b>	<b>0.00</b>	<b>80.00</b>	<b>118.50</b>			
<b>Havre Field Office</b>								
Liberty	1	0.00	40.00	0.00	0.00	0 – Very Low 1 - Low 0 - Moderate 0 - High 0 - Very High	1 oil	5.2 acres ST 0.92 acres LT
<b>Total</b>	<b>1</b>	<b>0.00</b>	<b>40.00</b>	<b>0.00</b>	<b>0.00</b>			
<b>Miles City Field Office</b>								
Richland	4	0.00	1,028.2	0.00	0.00	0 – Very Low 0 - Low 0 - Moderate 5 - High 0 - Very High	1 oil	3 acres ST 1 acre LT
Roosevelt	1	0.00	57.43	0.00	0.00			
<b>Total</b>	<b>5</b>	<b>0.00</b>	<b>1,085.63</b>	<b>0.00</b>	<b>0.00</b>			
<b>Grand Total</b>	<b>13</b>	<b>1,324.13 acres</b>				0 – Very Low 1 - Low 0 - Moderate 9 - High 3 - Very High	4 oil	10.8 acres ST 4.52 acres LT

<sup>1</sup>Total number of wells estimated based on the RFD and rounded to the nearest whole number

### 3 Affected Environment and Environmental Consequences

This chapter describes the affected environment (i.e., the physical, biological, and socioeconomic values and resources) and environmental consequences to resources that could be affected by implementation of the proposed action. This analysis is tiered to the respective RMP for each geographic location of the nominated parcels, and the analysis of the reasonably foreseeable effects of oil and gas development contained in those RMPs are incorporated by reference into this analysis.

Each RMP determined which areas are available for oil and gas leasing and under what conditions those leases would be offered and sold. All the lease parcels included in the proposed action are within areas that are open to oil and gas leasing in their respective RMP.

The act of leasing parcels would not cause direct effects to resources because no surface disturbance would occur. The only direct effects of leasing are the creation of valid existing rights and impacts related to revenue generated by the lease sale receipts.

Future lease exploration and development activities proposed through individual APD submission would be subject to future BLM decision-making and NEPA analysis. Upon receipt of an Application for a Permit to Drill (APD), the BLM would initiate a site-specific NEPA analysis that considers the reasonably foreseeable effects of a specific action. At that time, detailed information about proposed wells and facilities would be provided for specific leases. In all potential exploration and development scenarios, the BLM would require the use of BMPs documented in “Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development” (USDOJ 2007), also known as the *Gold Book*, available online at <https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/operations-and-production/the-gold-book>. The BLM could also identify Conditions of Approval (COAs), based on site-specific analysis that could include moving the well location, restrict timing of the project, or require

other reasonable measures to minimize adverse impacts (43 CFR § 3101.1-2 Surface use rights; Lease Form 3100-11, Section 6) to protect sensitive resources, and to ensure compliance with laws, regulations, and land use plans.

BLM resource specialists prepared this EA to document the analysis of the lease parcels and recommended appropriate stipulations based upon professional knowledge of the areas involved, review of current databases, scientific literature, and file information. The analysis focuses on the resource impact indicator(s) identified for each resource issue in Chapter 1.

At the time of this review, it is unknown whether a particular parcel will be sold, and a lease issued. It is also unknown when, where, or if future well sites, roads, and facilities might be proposed. Therefore, the types, magnitude and duration of potential impacts cannot be precisely quantified at this time and would vary according to many factors.

The BLM analyzed potential impacts from oil and gas development in the Final Environmental Impact Statement (FEIS) for each of the applicable ARMPs based upon potential well densities discerned from the Reasonably Foreseeable Development (RFD) Scenario developed for each Field Office. The BLM utilized information from the RFD in the ARMP to estimate the number of possible oil and gas wells that could be drilled and produced on parcels in the Quarter 1 2025 sale. The sale specific RFD was used to analyze effects of the proposed action. Refer to **Appendix D** for a detailed description of the sale specific RFD.

### 3.1 General Setting

The analysis area varies by resource, and generally includes the 13 lease parcels of Federal minerals for oil and gas leasing, covering approximately 1,324.13 Federal mineral acres in Liberty, Richland, and Roosevelt counties in Montana and Dunn and McKenzie counties in North Dakota, as well as a larger area around the parcels to capture all reasonably foreseeable effects. The temporal scale of effects includes the 10-year period of a lease term, unless the lease is held by production, in which case the temporal scale is extended to the life of the producing well. If the lease parcels are developed, short-term impacts would be stabilized or mitigated rapidly (within two to five years). Long-term impacts are those that would substantially remain for more than five years.

### Geologic Formations

#### Williston Basin

**(Richland, Roosevelt counties in MT and Dunn, McKenzie counties in ND)**

Parcels proposed in Richland, Roosevelt, Dunn, and McKenzie counties are located within the Williston Basin unconventional Bakken/Three Forks development area. The Williston Basin parcels are surrounded by horizontal Bakken/Three Forks development wells which have also been predominantly drilled in the past 10 years. The Bakken/Three Forks is a true unconventional reservoir where the wells target organic rich shale intervals.

#### Liberty County

The area is defined by the Sweetgrass arch which is a large anticline that trends north and south through this area and results in numerous oil and gas fields that have continually produced since the early 1900's. There are numerous oil and gas fields producing from the Upper and Lower Cretaceous sands, Jurassic, and Upper Devonian across these lease parcels.

The most recent developments in the area focus on the Upper Devonian Nisku formation and deeper objectives. The Sweetgrass Arch is being considered as a potential target for helium accumulations above fractured basement rock. Thor Resources USA has spud and completed one well in the Utopia field adjacent to leases in southern Liberty County. Another company Avanti Helium has permitted wells in 36N 6E, and 37N 4E. The parcels in northern Liberty County are adjacent to these helium exploration projects. The likely development scenario for parcels in Liberty County are continued helium exploration in formations Nisku and deeper. Vertical helium development which does not involve large multistage hydraulic fractures found in unconventional oil wells and does not pose a significant risk to groundwater.

## 3.2 Methodology and Assumptions

Analysis of issues brought forward in this assessment was completed using reasonably foreseeable development (RFD) scenarios created for the proposed lease parcels. RFD scenarios for the proposed lease parcels were developed using the Minerals Appendices from the RMPs for the respective field offices. The RMPs contain the number of potential oil and gas wells that could be drilled and produced in each field office area, and this was used to analyze the potential number of wells drilled for the nominated lease parcels. These well numbers are only an estimate based on historical drilling, geologic data, resource expertise, and current development in the area.

## 3.3 Issue 1 – Air Resources

### 3.3.1 *Affected Environment*

The Environmental Protection Agency (EPA) established primary and secondary National Ambient Air Quality Standards (NAAQS) for six principal air pollutants (or criteria air pollutants) which may be harmful to the public health and environment including carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), sulfur dioxide (SO<sub>2</sub>), and lead (Pb) ([NAAQS Table | US EPA](#)). Primary standards set limits to protect public health, including the health of at-risk populations such as people with pre-existing heart or lung disease, children, and older adults. Secondary standards, on the other hand, set limits to protect public welfare, including visibility impairment and damage to animals, crops, vegetation, and buildings.

Determining compliance with the NAAQS can be evaluated using a variety of methods such as ambient air quality monitoring stations, air quality design values, air diffusion modeling, and/or photochemical grid modeling. Pollutant concentrations that are below the NAAQS are designated as attainment or unclassifiable, and air quality is generally considered to be good. Locations in which monitored pollutant concentrations are higher than the NAAQS are designated nonattainment, and air quality is generally considered unhealthy. For this proposed action, an approximate 50 kilometers (km) (31.1 miles) radius around the lease parcels were used to help assess regulatory compliance because the maximum distance recommended to predict compliance of the NAAQS using the preferred EPA air diffusion modeling software is 50 km. Any evaluation and discussion outside the approximate 50 km radius around the parcels are provided as additional background information.

The EPA is the delegated authority, under the Clean Air Act (CAA), for individual states to complete various activities such as air quality permitting, compliance monitoring, and air quality monitoring. Similarly, Tribal governments have the authority to develop and implement air quality programs through the Tribal Authority Rule under the provisions of CAA. In Montana, the Department of Environmental Quality (MT DEQ) implements air quality permitting and compliance programs, an oil or gas well registration program, and conducts ambient air quality monitoring throughout the state (MT DEQ, 2024a). In North Dakota, the Department of Environmental Quality (ND DEQ) Division of Air Quality (DoAQ) is responsible air quality permitting and compliance, oil or gas well registrations, and ambient air quality

monitoring under the CAA (ND DoAQ, 2024). Both North Dakota and Montana have developed a network of ambient air quality monitoring sites to assess NAAQS compliance and **Table 3**. Criteria Pollutant Design Values-2020-2022 provides air pollutant concentrations measured at the ambient air quality sites located near or within the proposed lease areas using design values. The design value is the annual arithmetic mean concentrations, averaged over 3 years, and describes the air quality status of a given location relative to the NAAQS. Design values are used to designate and classify nonattainment areas, as well as assess progress towards meeting the NAAQS. For Montana and North Dakota, all lease parcels are in areas that are currently designated attainment or unclassifiable for each NAAQS. Counties without monitoring stations have an unclassifiable attainment status and are assumed to have good air quality with pollutant concentrations below the NAAQS. The Federal Land Manager (FLM) is responsible for defining Air Quality Related Values (AQRVs), including visual air quality (haze) and atmospheric deposition for an area, and establishing criteria to determine an adverse impact on the AQRVs. AQRVs are not threshold standards, but a FLM may identify levels of concern and provide recommendations to the permitting authority.

**Table 3.** Criteria Pollutant Design Values-2020-2022

Pollutant	Site Name/Monitor Location/County	Averaging Time	Design Value Concentration <sup>(1)</sup>	NAAQS	% NAAQS
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Cutbank, MT (Glacier County)	Annual	4.2	9	47%
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Malta, MT (Phillips County)	Annual	6	9	67%
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Lewistown, MT (Fergus County)	Annual	5.4	9	60%
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Sidney, MT (Richland County)	Annual	6.2	9	69%
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Lostwood Nwr, ND (Burke)	Annual	6.4	9	71%
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Trnp-Nu Waterford City, ND (McKenzie)	Annual	5.4	9	60%
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Lake Ilo, ND (Dunn)	Annual	5.8	9	64%
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Painted Canyon, ND (Billings)	Annual	4.9	9	54%
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Cutbank, MT (Glacier County)	24-hour	32	35	91%
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Malta, MT (Phillips County)	24-hour	32	35	91%
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Lewistown, MT (Fergus County)	24-hour	31	35	89%
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Sidney, MT (Richland County)	24-hour	29	35	83%
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Lostwood Nwr, ND (Burke)	24-hour	23	35	66%
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Lake Ilo, ND (Dunn)	24-hour	22	35	63%
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Trnp-Nu Waterford City, ND (McKenzie)	24-hour	22	35	63%
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Painted Canyon, ND (Billings)	24-hour	17	35	49%
O <sub>3</sub> (ppm)	Malta, MT (Phillips County)	8-hour	0.058	0.070	83%
O <sub>3</sub> (ppm)	Lewistown, MT (Fergus County)	8-hour	0.063	0.070	90%
O <sub>3</sub> (ppm)	Sidney, MT	8-hour	0.063	0.070	90%

	(Richland County)				
O <sub>3</sub> (ppm)	Lake Ilo, ND (Dunn)	8-hour	0.058	0.070	83%
O <sub>3</sub> (ppm)	Lostwood Nwr, ND (Burke)	8-hour	0.055	0.070	79%
O <sub>3</sub> (ppm)	Trnp-Nu Waterford City, ND (McKenzie)	8-hour	0.056	0.070	80%
O <sub>3</sub> (ppm)	Painted Canyon, ND (Billings)	8-hour	0.058	0.070	83%
NO <sub>2</sub> (ppb)	Malta, MT (Phillips County)	1-hour	12	100	12%
NO <sub>2</sub> (ppb)	Lewistown, MT. (Fergus County)	1-hour	9	100	9%
NO <sub>2</sub> (ppb)	Sidney, MT (Richland County)	1-hour	12	100	12%
NO <sub>2</sub> (ppb)	Lake Ilo, ND (Dunn)	1-hour	12	100	12%
NO <sub>2</sub> (ppb)	Lostwood Nwr, ND (Burke)	1-hour	10	100	10%
NO <sub>2</sub> (ppb)	Trnp-Nu Waterford City, ND (McKenzie)	1-hour	9	100	9%
SO <sub>2</sub> (ppb)	Sidney, MT (Richland County)	1-hour	6	75	8%
SO <sub>2</sub> (ppb)	Lake Ilo, ND (Dunn)	1-hour	6	75	8%
SO <sub>2</sub> (ppb)	Lostwood Nwr, ND (Burke)	1-hour	19	75	25%
SO <sub>2</sub> (ppb)	Trnp-Nu Waterford City, ND (McKenzie)	1-hour	4	75	5%
Source: EPA Design Values <a href="#">Air Quality Design Values   US EPA</a> Source: MDEQ State of Montana Air Quality Annual Monitoring Network Plan, June 2024. <a href="#">MTDEQ 2024 Network Plan</a> (1) Dataset includes all values including flagged exceptional events.					

Oil and gas development activities may impact ambient air concentrations of PM<sub>10</sub>, PM<sub>2.5</sub>, O<sub>3</sub>, CO, NO<sub>x</sub>, volatile organic compounds (VOC), hydrogen sulfide (H<sub>2</sub>S), and SO<sub>2</sub>. Particulate matter comes from a variety of sources such as construction activities, unpaved roads, cars, trucks, or other operations that burn fossil fuels. On the other hand, O<sub>3</sub> is not emitted directly into the air but created from pollutants such as NO<sub>x</sub> and VOC that chemically react in the presence of sunlight. In addition, other particles may form in the atmosphere because of complex reactions from SO<sub>2</sub> and NO<sub>x</sub>. Along with oil and gas well operations, pollutants such as SO<sub>2</sub> and NO<sub>x</sub> are also emitted from power plants and automobiles whereas sources of CO are mostly from cars, trucks, or machinery that burn fossil fuels. Similarly, SO<sub>2</sub> emissions from oil and gas well facilities may also be created from the combustion (e.g., flaring) of gas containing H<sub>2</sub>S. Although there is not a Federal NAAQS for H<sub>2</sub>S, Montana and North Dakota do have an ambient air quality standard for H<sub>2</sub>S. In North Dakota, the standard was developed in response to elevated sulfur during petroleum production in the 1980s; however, emissions of H<sub>2</sub>S have reduced over time as production from the older facilities declined. In addition, the Bakken Formation, which has been the focus of the most recent oil and gas activity in Montana and North Dakota, generally has low concentrations (if any) of H<sub>2</sub>S compared to non-Bakken Formations. For Montana and North Dakota, the owner or operator of any oil or gas well production facility must install and maintain pollution controls necessary to ensure that emissions comply with both national and state ambient air quality standards.

EPA also regulates emissions of hazardous air pollutants (HAPs) which includes a list of 188 air toxics. EPA is required to develop regulations to control emissions for all industries that emit one or more listed HAPs in substantial quantities (EPA, 2024). Since 1990, EPA has issued regulations limiting emissions of

air toxics from more than 174 categories of major industrial sources including crude oil and natural gas production sources. Because HAPs are released from oil and gas operations (including from well drilling, well completion, and operation), the EPA established technology-based emission standards to help control HAP emissions. HAPs associated with the oil and gas industry may include compounds such as formaldehyde, benzene, toluene, ethyl benzene, xylene, and normal-hexane (n-hexane). In 2016, New Source Performance Standards (NSPS) 40 CFR Part 60 Subpart OOOOa (Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015) created emission standards and compliance requirements for the control of VOC and SO<sub>2</sub> emissions from affected facilities.

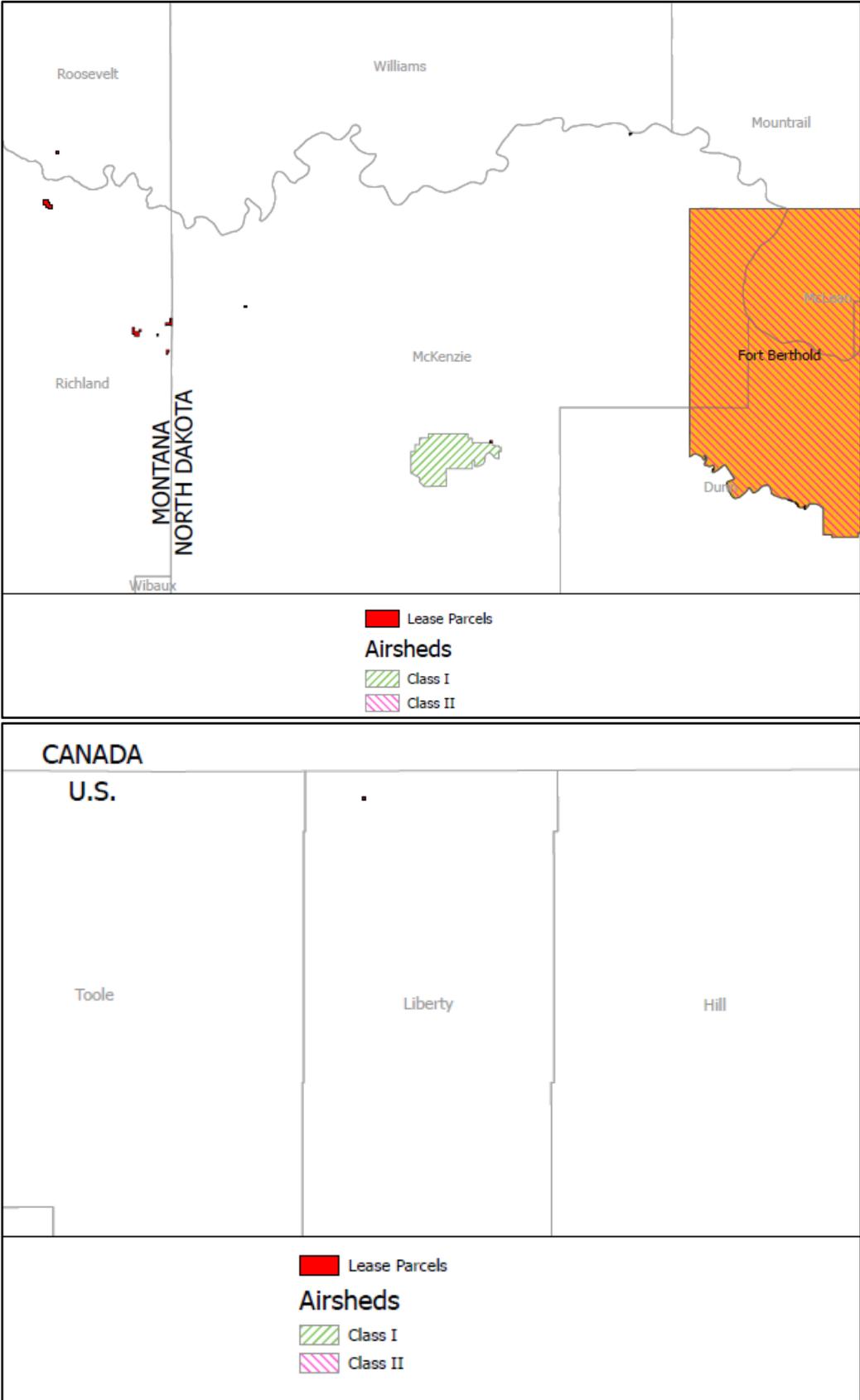
Similarly, on December 2, 2023, the EPA announced a final rule that will reduce emissions of methane and other harmful air pollution from oil and natural gas operations from new, modified, and reconstructed sources. First, EPA finalized NSPS OOOOb regulating GHG (in the form of a limitation on emissions of methane) and VOCs emissions for the Crude Oil and Natural Gas source category pursuant to CAA section 111(b)(1)(B). Second, EPA finalized the presumptive standards in emission guidelines NSPS OOOOc to limit GHGs emissions (in the form of methane limitations) from designated facilities in the Crude Oil and Natural Gas source category. Third, EPA finalized requirements under the CAA section 111(d) for states to follow in developing, submitting, and implementing state plans to establish performance standards as well as finalized several related actions stemming from the joint resolution of Congress, adopted on June 30, 2021, under the congressional review act (CRA), disapproving the 2020 Policy Rule. Fourth, EPA finalized a protocol under the general provisions of 40 CFR part 60 related to optical gas imaging (OGI). On June 11, 2024, EPA issued an interim final rule to make technical corrections the final rule published in March 2024 and took comments on the interim final rule for 30 days after it was published in the Federal Register. In addition, on April 10, 2024, BLM published in the Federal Register the final rule titled Waste Prevention, Production Subject to Royalties, and Resource Conservation which would replace the BLM's current requirements governing natural gas venting and flaring contained in NTL-4A. The rule became final on June 10, 2024, and will help curb waste from flaring, venting, and leaks as well as generate royalties for taxpayers, Tribes, and states ([Waste Prevention Rule | Bureau of Land Management \(blm.gov\)](https://www.blm.gov)).

Furthermore, the EPA also developed a National Toxics Assessment Tool (AirToxScreen) ([2020 AirToxScreen | US EPA](https://www.epa.gov/airtoxscreen)) to evaluate impacts from existing HAP emissions across the nation. However, EPA AirToxScreen was not designed to assess specific risk values at local levels but best used as a tool to prioritize pollutants, emissions sources, and locations of interest for further investigation. Using the EPA AirToxScreen, the total cancer risk for Montana and North Dakota, was below the upper limit of acceptable lifetime risk of 100 in 1 million people to develop cancer, as described in 40 CFR § 300.430. For Liberty County, Richland County, and Roosevelt County in Montana, the total cancer risks were estimated to be between 10 to 20 in 1 million people while in Dunn County and McKenzie County in North Dakota, the total cancer risks were estimated to be between 10 to 30 in 1 million people. In addition, the noncancer hazard index for Montana and North Dakota were below 1.0, indicating that air toxics will not likely cause adverse noncancer health effects.

Similarly, the EPA Prevention of Significant Deterioration (PSD) program was designed to protect human health and environment by demonstrating that new emissions will not cause or contribute to a violation of any applicable NAAQS or PSD increments. A PSD increment is the amount of pollution allowed to increase to prevent air quality from deteriorating that would cause a violation of the NAAQS. The parcels in this lease sale could be located near and/or in Class I or Class II areas. Most areas throughout the United States are categorized as Class II which allow for some air quality deterioration under PSD. However, for Class I areas, PSD provides additional stringent air quality and visibility protection to national parks and national wilderness areas. As shown on **Figure 1**, the Class I areas or other areas of potential interest nearest to the proposed parcels include areas such as the Fort Peck Reservation (Approximately 14 miles), Medicine Lake Wilderness Area (Approximately 24 miles), Blackfeet Reservation (Approximately 50

miles), Fort Belknap Reservation (Approximately 14 miles), located in Montana while, in North Dakota, Class I areas or other areas of interest include the Theodore Roosevelt National Park (North) (Adjacent), Lostwood National Wildlife Refuge Wilderness (Approximately 34 miles), and Fort Berthold Reservation (Adjacent).

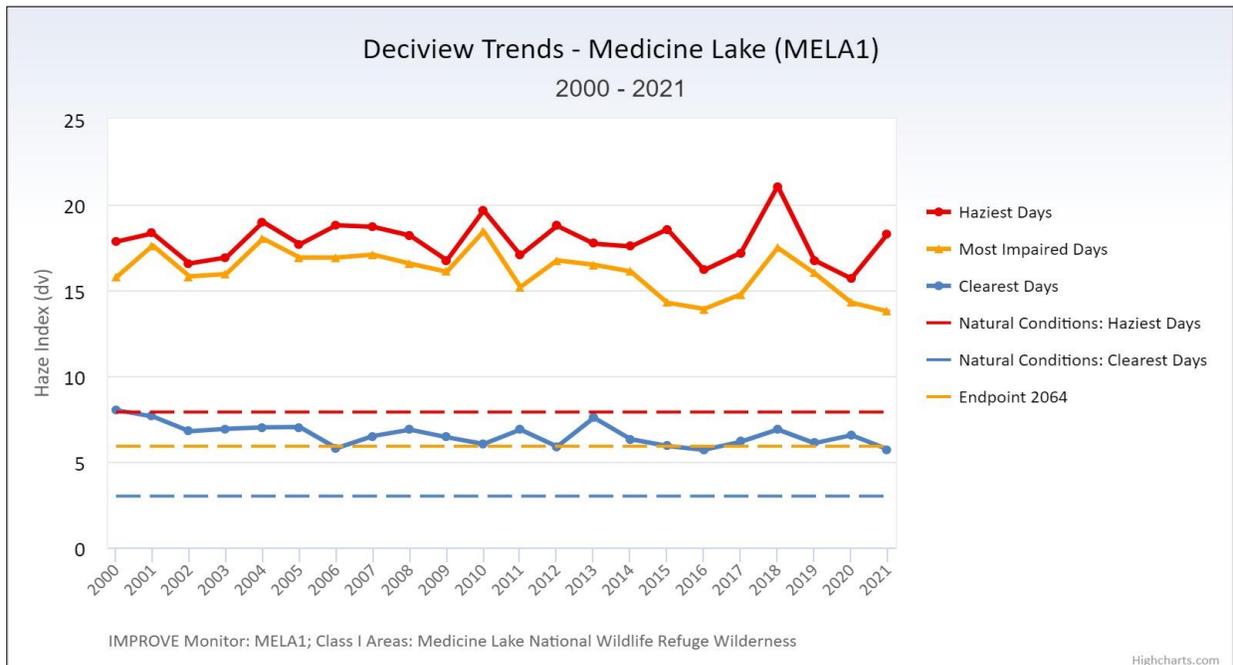
**Figure 1.** Class 1 Areas Relative to Proposed Parcels



The Federal Land Manager (FLM) is responsible for defining Air Quality Related Values (AQRVs), including visual air quality (haze) and atmospheric deposition for an area. Atmospheric visibility is a measure of how far and how well an observer can see a distant and varied scene. The visual range is the greatest distance in miles that a person can see a large dark object viewed against the horizon sky. Light extinction or attenuation is a nonlinear measure of visibility and occurs in the atmosphere as a result of scattering and absorption. Pollutants from natural and anthropogenic sources contribute to haze by scattering and absorbing light. A deciview (dv) is a unit of measurement used to quantify human perception of visibility and is calculated from the natural logarithm of atmospheric light extinction. One (1) deciview is roughly the smallest change in visibility (haze) that is barely perceptible. Because visibility at any one location is highly variable throughout the year, visibility is characterized by three groupings: 1.) clearest 20% days, 2.) average 20% days, and 3.) haziest 20% days. Average visual range is 60 to 90 miles (100 to 150 kilometers) in many Class I areas in the western United States, equivalent to 9.6 to 13.6 deciview (dv), or about 50 to 70 percent of the visual range that would exist without anthropogenic air pollution from stationary and mobile sources (64 Fed. Reg. 35714).

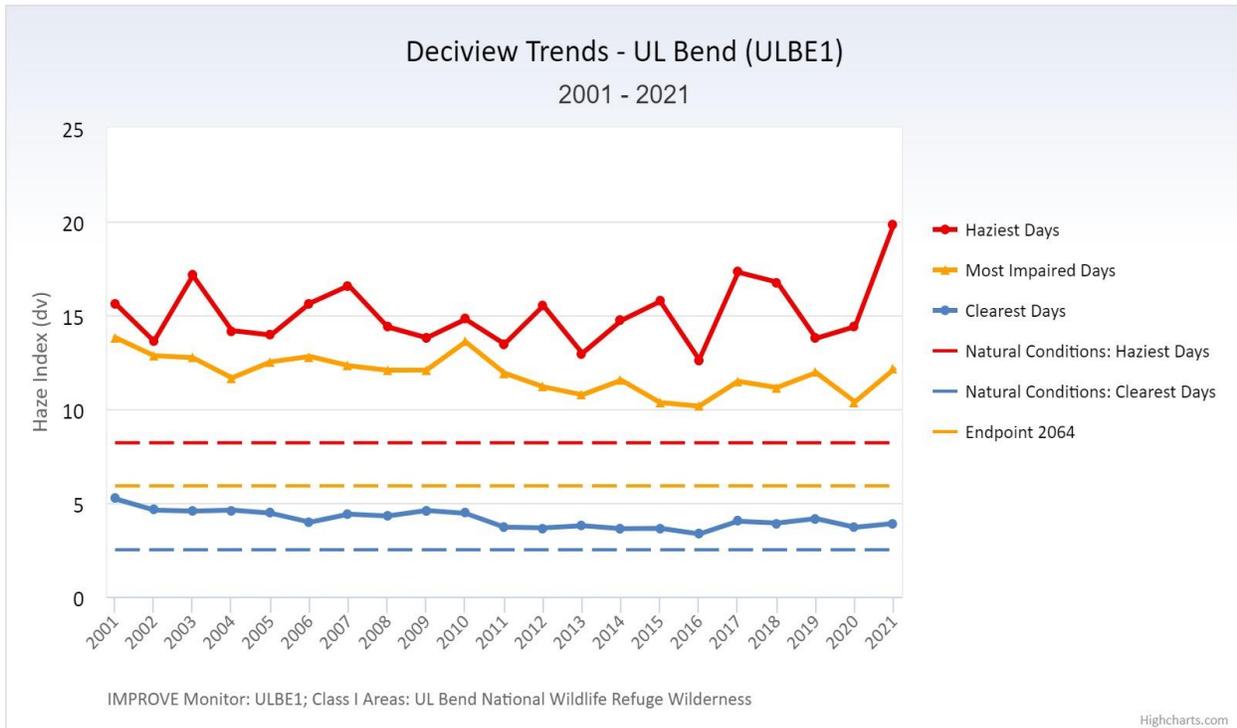
The Interagency Monitoring of Protected Visual Environments (IMPROVE) Program collects and identifies visibility and composition trends throughout the nation. **Figure 2-6** provide a graphical representation of annual visibility trends for the nearest IMPROVE monitoring sites to the proposed lease parcels. Based on the data, visibility trends do not appear to have changed significantly over the monitoring period; however, it does seem to reveal an improving trend for the clearest and most impaired days at the monitoring sites.

**Figure 2.** Medicine Lake (MELA1) - Visibility Trends at Medicine Lake National Park, Montana



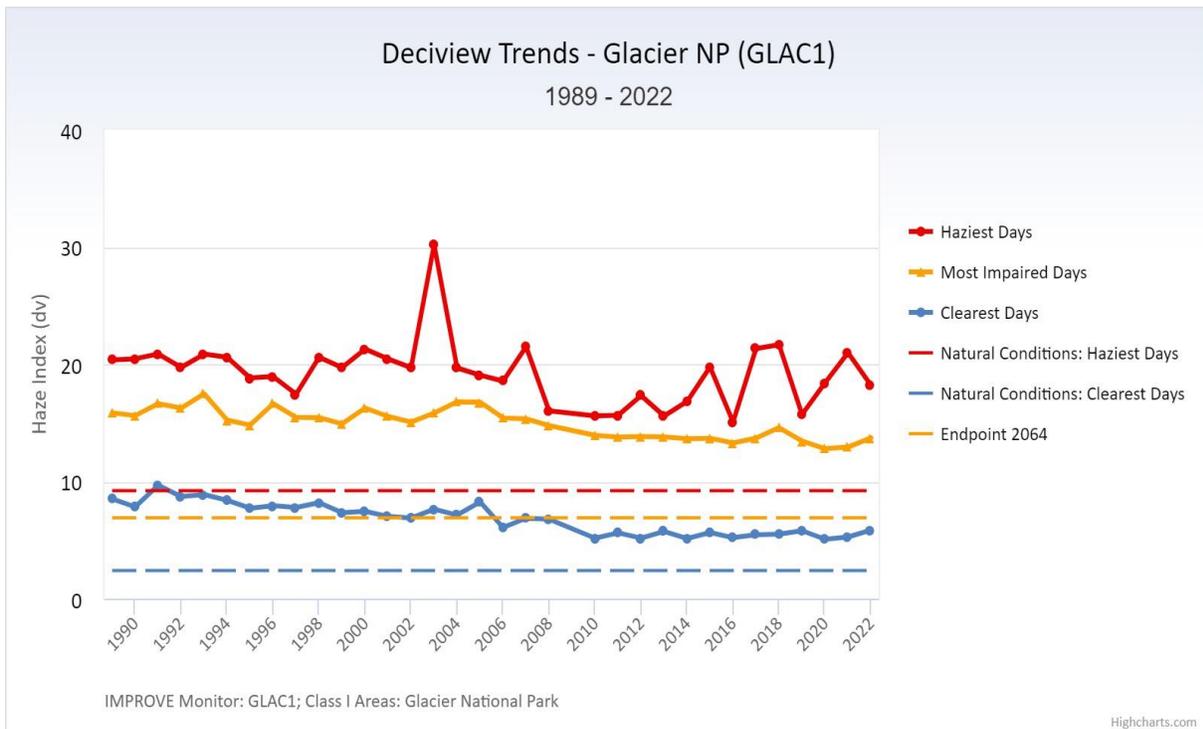
Source: Federal Land Manager Environmental Database, 2024

**Figure 3. UL Bend (ULBE1)- Visibility Trends at UL Bend Wilderness, Montana**



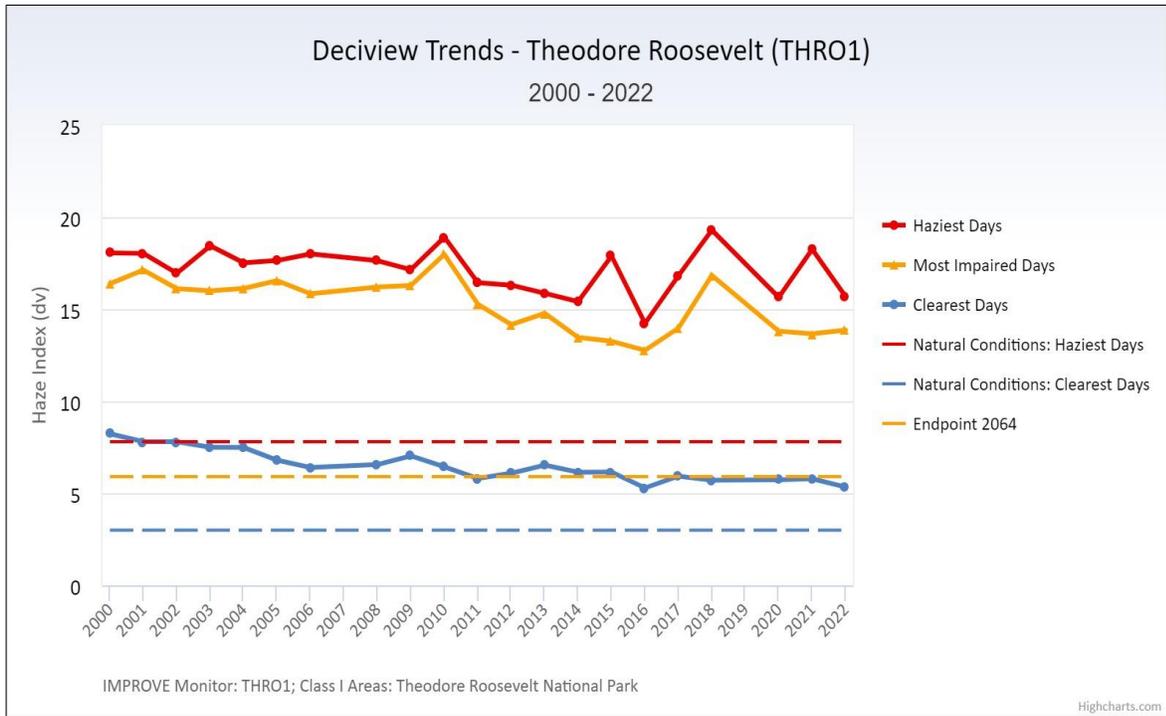
Source: Federal Land Manager Environmental Database, 2024

**Figure 4. Glacier NP (GLAC1) - Visibility Trends at Glacier National Park, Montana**



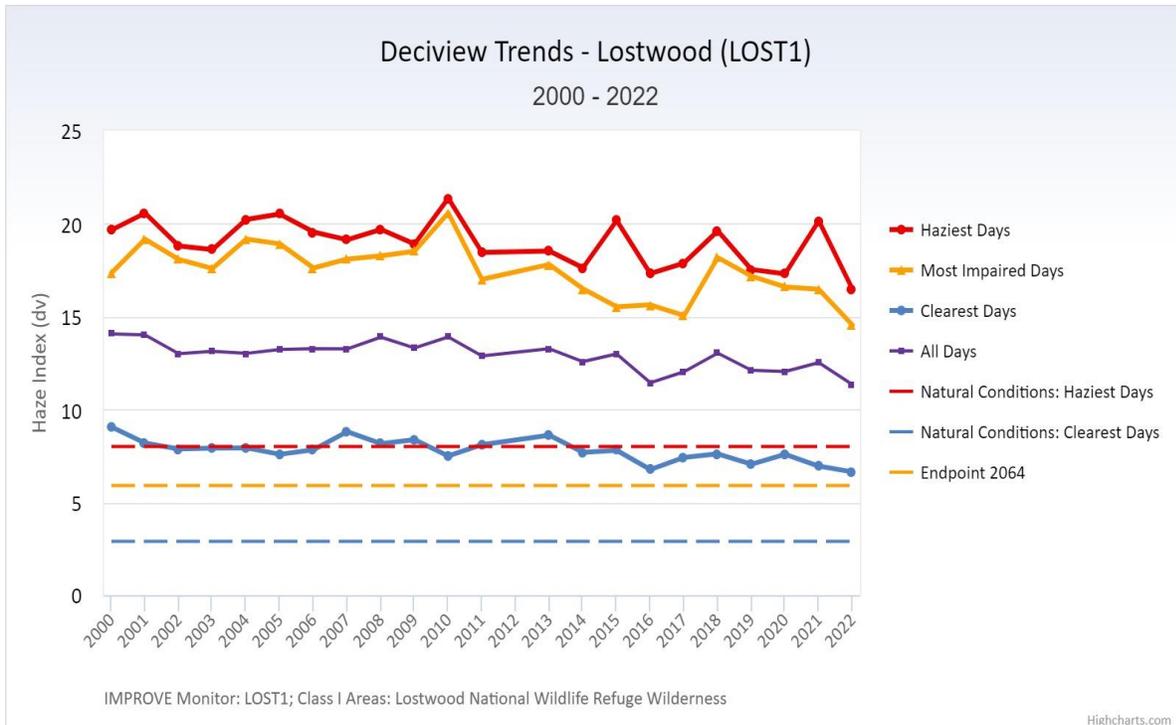
Source: Federal Land Manager Environmental Database, 2024

**Figure 5.** Theodore Roosevelt (THRO1) - Visibility Trends at Theodore Roosevelt National Park, North Dakota



Source: Federal Land Manager Environmental Database, 2024

**Figure 6.** Lostwood (LOST1) - Visibility Trends at Lostwood National Wildlife Refuge Wilderness, North Dakota



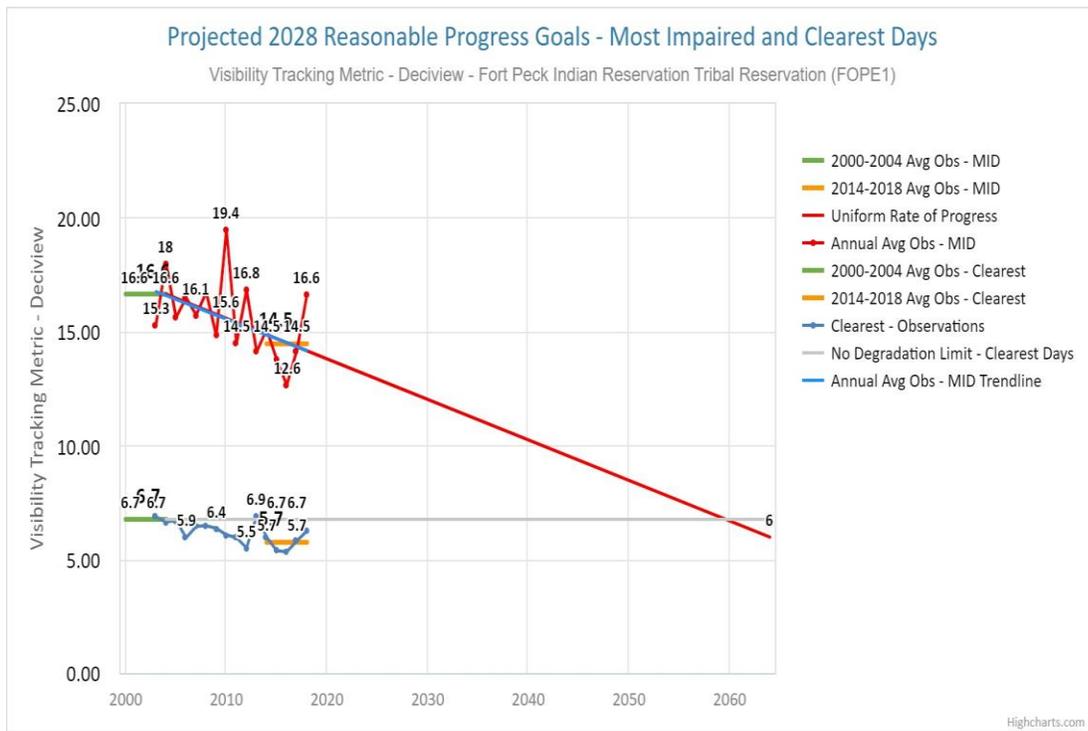
Source: Federal Land Manager Environmental Database, 2024

In addition to IMPROVE, the Western Regional Air Partnership (WRAP) Technical Support System (TSS) is an online portal that provides advanced data acquisition and analytical tools for the development of State and Tribal Implementation Plans to help track progress and improve visibility in Class I areas related to EPA’s Regional Haze Rule ([\(TSS Home \(colostate.edu\)\)](http://TSS Home (colostate.edu))). The TSS summarizes results and consolidates information about air quality monitoring; meteorological and receptor modeling data analyses; emissions inventories and models; and gridded air quality/visibility regional modeling simulations. The projected 2028 reasonable progress goal for the most impaired and clearest days for Medicine Lake Wilderness Area (MELA1), Fort Peck Reservation (FOPE1), Theodore Roosevelt National Park (THRO1), and Lostwood National Wildlife Refuge Wilderness (LOST1) are provided in **Figure 7, 8, 9, and 10**. The figures illustrate the Uniform Rate of Progress (URP) Glidepath as defined by EPA guidance, compared to IMPROVE measurements for the period 2000-2018. The URP glidepath is constructed for the 20% most impaired days (MID) or clearest days using observations from the IMPROVE monitoring site. In general, the URP glidepath starts with the IMPROVE MID for the 2000-2004 5-year baseline and draws a straight line to estimated natural conditions in 2064. For clearest days, the goal is no degradation of visibility from the 2000-2004 5-year baseline, therefore glidepath for clearest days is a straight line from the 2000-2004 baseline to 2064. In the second regional haze planning period, 2064 natural conditions estimates are the same as the 15-year average of natural conditions on most impaired days or clearest days in each year 2000-2014. IMPROVE annual average values are presented as points and 5-year average values are presented as solid lines covering the periods 2000-2004 and 2014-2018.

**Figure 7.** Projected Reasonable Progress Goals – Medicine Lake Wilderness Area (MELA1), Montana



**Figure 8.** Projected Reasonable Progress Goals – Fort Peck Reservation (FOPE1), Montana



**Figure 9.** Projected Reasonable Progress Goals - Theodore Roosevelt National Part (THRO1), North Dakota





Statement (EIS) (BLM, 2023), and MCFO Proposed Resource Management Plan Amendment/Final Supplemental Environmental Impact Statement (SEIS) (BLM, 2024).

The MCFO and NDFO RMPs evaluated impacts to air quality from oil and gas development as well as projections of visibility within the region and assessed regional impacts to air quality from future oil and gas development on BLM administered mineral estate in Montana, North Dakota, and South Dakota. The MCFO RMP modelled cumulative impacts in the Montana were predicted to be below the NAAQS for NO<sub>2</sub> and SO<sub>2</sub> while cumulative impacts for O<sub>3</sub>, PM<sub>2.5</sub>, and PM<sub>10</sub> exceeded the NAAQS in isolated areas throughout the state, mostly from natural source group such as fires, biogenic emissions, windblown dust, and lightning NO<sub>x</sub>. The contributions from federal oil and gas and federal coal development were less than 1 percent at the location of the exceedances. However, the NDFO RMP modeling study predicted impacts to visibility at Class I areas in eastern Montana and western North Dakota in which a portion of the predicted impacts can be attributed to future federal oil and gas development (more than 0.5 and 1.0 dv thresholds) at the Theodore Roosevelt, Fort Peck, and Medicine Lake Class I areas as well as predicted the potential for minor impacts attributed to atmospheric deposition of nitrogen compounds in the same region. The North Dakota RMP/EIS reported modeled air quality contributions of new federal oil and gas development (i.e., 2020 onward) including ambient air concentrations of selected criteria pollutants and AQRV contributions for acidic deposition, visibility change, and the ozone W126 index. Peak modeled cumulative values, percent contribution of new federal oil and gas development and time period of the peak value, and peak contribution were discussed. According to the North Dakota RMP, new federal oil and gas wells were expected to contribute between approximately 0.0 percent and 11 percent by pollutant to the maximum cumulative value across North Dakota. The largest fraction would be for hourly NO<sub>2</sub> in the Williston Basin caused primarily by NO<sub>x</sub> emissions from drill rigs and off-road equipment. Class I areas would also experience some air quality impact from federal oil and gas development with the highest impacts observed at the Fort Berthold Indian Reservation. Predicted concentrations for all modeled contaminants were below the NAAQS; however, the peak cumulative modeled concentrations of 1-hour NO<sub>2</sub> and 24-hour PM<sub>10</sub> were close to the NAAQS. Therefore, potential impact would be addressed through appropriate lease notices and stipulations and/or near-field air modeling for proposed projects. Furthermore, modeled acute and chronic noncarcinogenic HAPs were below the Reference Exposure Levels (RELs) and the estimated incremental cancer risks were also below a one per one million for the carcinogenic HAPs benzene and formaldehyde.

Finally, as a result of the 2023 U.S. Court of Appeals for the Tenth Circuit (*Diné CARE II*) ruling, BLM completed the *Cumulative Hazardous Air Pollutants Modeling Final Report* to assess HAP emissions from BLM-authorized oil and gas development activities (Ramboll 2023a). The modeling effort was completed using the same emission inventories as the BLM Western US Photochemical Air Quality Modeling for 2032. 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 on public health for existing federal, new federal, and non-federal oil and gas sources that includes six key HAPs (e.g., benzene, toluene, ethylbenzene, xylene, n-hexane, and formaldehyde) since they are common in the oil and gas sector and consistent with regulatory requirements described in the Environmental Protection Agency's New Source Performance Standards (NSPS).

Based on these previous modeling efforts, HAP emissions and concentrations as well as associated cancer risk, hazard index, and hazard quotient values for the modeling grid cell were used to develop an interactive web-based tool to provide potential effects on public health from oil and gas leasing and permitting decisions ([iART Toolkit \(blm.gov\)](https://blm.gov/iART-Toolkit)). Utilizing the web-based tool, the average long-term (annual) concentrations were assessed for cancer risk and noncancer effects from inhalation for the three oil and gas production source groups (e.g., existing federal, new federal, and total non-federal) comprising the geographic area corresponding to the lease sale including Liberty County, Richland County, and Roosevelt County in Montana and Dunn County and McKenzie in North Dakota (See **Table 4 and Table**

5.). Total average lifetime cancer risk from the exposure to three HAPs (benzene, ethylbenzene, and formaldehyde) were calculated by summing the individual cancer risks for each pollutant. On the other hand, chronic noncancer hazards were assessed by calculating the individual hazard quotients (HQ) of each pollutant and the overall hazard index (HI). As shown in **Table 4 and 5**, total cumulative cancer risks were below 100 in 1 million while the noncancer hazard index for oil and gas production in each county was below one. The highest calculated potential cancer and noncancer impacts appear to be from nonfederal oil and gas well production for each county.

**Table 4.** Estimated Average Total Cancer Risk from Circa 2032 Oil and Gas Production.

County	Cancer Risk <sup>(1)</sup> from Existing Federal Wells	Cancer Risk <sup>(1)</sup> from New Federal Wells	Cancer Risk <sup>(1)</sup> from Nonfederal Wells	Cancer Risk <sup>(1)</sup> from Cumulative Oil and Gas Production	Adjusted Cancer Risk <sup>(1)(2)</sup> From Cumulative Oil and Gas Production
Liberty	0.02	0.03	0.18	0.23	0.06
Richland	0.16	0.48	4.34	4.97	1.00
Roosevelt	0.08	0.30	2.75	3.13	0.75
Dunn	0.5132	1.68	31.49	33.69	7.80
McKenzie	0.7918	2.48	39.27	42.54	6.26

(1) Total Average Cancer risk from emissions of benzene, ethylbenzene, and formaldehyde per million people.  
(2) Adjusted residency risk based on residency factors by county (17 years for Liberty County, 14.2 years for Richland County, 16.7 years for Roosevelt County, 16.2 years for Dunn County, 10.3 years for McKenzie County).

**Table 5.** Estimated Average Noncancer Hazard Quotients and Hazard Index from Circa 2032 Oil and Gas Production.

Source	Hazard Quotient (HQ)						Hazard Index (HI)
	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	
Liberty County							
Existing Federal	0.00002	0.00000	0.00000	0.00001	0.00000	0.00011	0.00014
New Federal	0.00002	0.00000	0.00000	0.00000	0.00000	0.00020	0.00023
Non-Federal	0.00015	0.00000	0.00001	0.00004	0.00002	0.00107	0.00130
Cumulative	0.00019	0.00000	0.00001	0.00005	0.00003	0.00139	0.00167
Richland County							
Existing Federal	0.00012	0.00000	0.00001	0.00004	0.00002	0.00093	0.00113
New Federal	0.00019	0.00000	0.00001	0.00003	0.00004	0.00337	0.00364
Non-Federal	0.00275	0.00002	0.00030	0.00120	0.00053	0.02723	0.03204
Cumulative	0.00307	0.00003	0.00032	0.00128	0.00059	0.03153	0.03681
Roosevelt County							
Existing Federal	0.00005	0.00000	0.00000	0.00002	0.00001	0.00050	0.00058
New Federal	0.00010	0.00000	0.00000	0.00002	0.00002	0.00214	0.00228
Non-Federal	0.00110	0.00001	0.00008	0.00035	0.00023	0.01909	0.02086
Cumulative	0.00126	0.00001	0.00009	0.00038	0.00026	0.02172	0.02373
McKenzie County							
Existing Federal	0.00023	0.000002	0.00002	0.00008	0.00004	0.00569	0.0061
New Federal	0.00056	0.000003	0.00002	0.00013	0.00011	0.01828	0.0191
Non-Federal	0.00821	0.000058	0.00045	0.00231	0.00179	0.29050	0.3033
Cumulative	0.00900	0.000064	0.00050	0.00253	0.00195	0.31450	0.3285
Dunn County							
Existing Federal	0.00014	0.00000	0.00001	0.00005	0.00003	0.00370	0.00393
New Federal	0.00038	0.00000	0.00001	0.00008	0.00007	0.01242	0.01298
Non-Federal	0.00669	0.00005	0.00040	0.00199	0.00144	0.23270	0.24310
Cumulative	0.00721	0.00005	0.00043	0.00213	0.00153	0.24880	0.26000

### 3.3.2 *Environmental Effects - No Action Alternative*

Under the No Action Alternative, there would be no impact on air resources and greenhouse gas emissions compared to the proposed action. If the parcels are not available to be leased and potential development on the proposed parcels would not occur, then no increase in estimated emissions would be expected from potential oil and gas development. The No Action Alternative would result in the continuation of already-approved land uses and would not result in new impacts related to exploration of the proposed oil and gas lease parcels.

### 3.3.3 *Environmental Effects - Proposed Action Alternative*

As previously described, the effects from oil and gas development on air resources in Montana and North Dakota have been analyzed and described in numerous documents such as the 2015 Miles City RMP (BLM, 2015), Montana/Dakotas (BLM-MT/DK) State Office Photochemical Grid Model (PGM) Modeling Study (BLM, 2016), North Dakota Field Office Draft RMP/EIS (BLM, 2023), and BLM Cumulative Hazardous Air Pollutants Modeling Final Report (BLM 2023), and MCFO SEIS (BLM 2024) .

Potential effects to air quality from the sale of lease parcels would only occur when the issued leases are developed and does not authorize or guarantee the number of wells described and analyzed in the EA. The drilling of wells on a lease parcel would not be permitted until the BLM approved an Application for Permit to Drill (APD). Any APDs received by BLM would be subject to site specific NEPA review; however, the EA would help inform the decision of the APD. In addition, there is a degree of uncertainty in estimating the amount of potential air emissions (including GHGs) for the EA. The oil properties, site geology, drilling and completion methodology, on-site equipment, project acreage, and construction plans are among several variables required to generate emissions estimates. Thus, the BLM may conduct additional air quality analysis during the APD process.

The analysis of air resources in this EA includes a discussion of short-term and long-term impact to air quality from potential oil and gas development on the lease parcels. Short-term impacts would occur from the construction of the well, well pad, access roads, pipelines, and other single occurrence activities. For example, motor vehicles would emit various pollutants such as CO, NO<sub>x</sub>, HCs, and PM as well as increase fugitive dust through increase vehicle traffic and increase wind erosion in areas of soil disturbance while drill rig and fracturing operations would result in an increase in NO<sub>2</sub>, CO, HAPs, VOCs, and SO<sub>2</sub> emissions. In addition, flaring or venting maybe necessary during drilling and well completion that would also result in increased emissions of pollutants such as NO<sub>2</sub>, CO, VOC, and SO<sub>2</sub>; however, the facilities must operate in compliance with all applicable federal and state air quality regulations and permits. Similarly, throughout the long-term operation of the facility, NO<sub>2</sub>, CO, VOCs, and HAPs emissions would result from various equipment such storage tanks, pumps, separators, flares, and other equipment as well as road dust produced by vehicles servicing the facilities. Potential air emissions of PM<sub>10</sub>, PM<sub>2.5</sub>, NO<sub>x</sub>, SO<sub>2</sub>, CO, VOC, and HAPs for the lease sale are provided in **Table 6** and **Table 7** in which the construction and production emissions are listed separately. The construction process is short-term and would be completed within a few months while other intermittent emissions and production and maintenance emissions would occur throughout the life of the well. Calculations are based on typical development and production scenarios as estimated for the MCFO RMP air analysis. The calculations for pollutant emissions use the number of wells that may be developed within 10 years if the parcels were leased. EPA Tier 4 engine emission factors are used based on previous air emissions modeling using AERMOD indicating potential exceedance of the 1-hour NO<sub>2</sub> NAAQS, but non-Tier 4 engines could be used if current NO<sub>x</sub> to NO<sub>2</sub> conversion factors and modeling demonstrate compliance with the NO<sub>2</sub> NAAQS.

**Table 6.** Estimated Air Pollutant Emissions from Well Development and Production

Activity	# of Wells <sup>(1)</sup>		PM <sub>10</sub>		PM <sub>2.5</sub>		NO <sub>x</sub>		SO <sub>2</sub>	
	Oil	Gas	Emission Factor <sup>(2)</sup> (tons/well)	Estimated Emissions (tons)	Emission Factor <sup>(2)</sup> (tons/well)	Estimated Emissions (tons)	Emission Factor <sup>(2)</sup> (tons/well)	Estimated Emissions (tons)	Emission Factor <sup>(2)</sup> (tons/well)	Estimated Emissions (tons)
<b>Montana and North Dakota Field Office <sup>(3)</sup></b>										
Construction (short-term)	4	0	0.51	2.04	0.06	0.24	0.53	2.12	0.11	0.44
Operations (long-term)	4	0	0.08	0.32	0.03	0.12	0.36	1.44	0.0005	0.002
<b>Total Estimated Emissions:</b>				<b>2.36</b>		<b>0.36</b>		<b>3.56</b>		<b>0.442</b>

1. Well numbers based on RFD for this lease sale.
2. Emission factors used in estimated emission calculations developed from the 2015 MCFO RMP.
3. Emission factors are consistent across all counties.

**Table 7.** Estimated Air Pollutant Emissions from Well Development and Production

Activity	# of wells <sup>1</sup>		CO		VOC		HAPs	
	Oil	Gas	Emission Factor <sup>2</sup> (tons/well)	Estimated Emissions (tons)	Emission Factor <sup>2</sup> (tons/well)	Estimated Emissions (tons)	Emission Factor <sup>2</sup> (tons/well)	Estimated Emissions (tons)
<b>Montana and North Dakota Field Office <sup>(3)</sup></b>								
Construction (short-term)	4	0	2.76	11.54	0.36	1.44	0.03	0.12
Operations (long-term)	4	0	1	4	0.95	3.8	0.08	0.32
<b>Total Estimated Emissions:</b>				<b>15.04</b>		<b>5.24</b>		<b>0.44</b>

1. Well numbers based on RFD for this lease sale.
2. Emission factors used in estimated emission calculations developed from the 2015 MCFO RMP.
3. Emission factors are consistent across all counties.

### 3.3.4 Reasonably Foreseeable Actions

These leases are not expected to occur contemporaneously and represent only a small fraction of the potential development that was included in the various air quality modeling studies for the Montana and Dakotas. Therefore, this lease sale would be expected to have little to no impact on air quality, visibility, or atmospheric deposition in the area. Additional detailed information on air pollutant emissions can be found in a variety of documents such as the 2015 Miles City RMP (BLM, 2015), Montana/Dakotas (BLM-MT/DK) State Office Photochemical Grid Model (PGM) Modeling Study (BLM, 2016), MCFO SEIS (BLM 2024), North Dakota Field Office RMP/EIS (BLM, 2023), and BLM Cumulative Hazardous Air Pollutants Modeling Final Report (BLM 2023). For example, the 2015 MCFO RMP assessed visibility impacts from the exhaust from drill rig engines on Class I areas located approximately 1 km away in which predicted impacts on color difference and contrast to be less than thresholds used to identify impacts. The 2015 MCFO RMP further analyzed far-field visibility impacts on Class I areas using the CALPUFF dispersion model. The CALPUFF model predicted visibility impacts estimated to be below the 0.5 deciviews ( $\Delta dv$ ) threshold included in guidance developed by the National Park Service, US Forest Service, and the U.S. Fish and Wildlife Service (FWS) (FLAG 2010). At each receptor and for each year, zero days were predicted to occur when the 98th percentile change in deciviews would equal or exceed 0.5. Predicted impacts were 9-26 percent of the 0.5 threshold, much below the requirement for further analysis. Based on the results of the 2015 MCFO RMP modeling, oil and gas development is not considered to directly contribute to regional haze or result in visibility impairment.

Similarly, the Air Quality Technical Support Documents for the Montana MCFO RMP and North Dakota RMP/EIS utilized photochemical grid modelling for the future year circa 2028. The MCFO RMP modelled cumulative impacts in the Montana were predicted to be below the NAAQS for  $NO_2$  and  $SO_2$  while cumulative impacts for  $O_3$ ,  $PM_{2.5}$ , and  $PM_{10}$  exceeded the NAAQS in isolated areas throughout the state, mostly from natural source group such as fires, biogenic emissions, windblown dust, and lightning  $NO_x$  but the contributions from federal oil and gas and federal coal development were less than 1 percent at the location of the exceedances. For North Dakota, the modeling results indicated that NAAQS or state ambient air quality standards would not be exceeded across North Dakota from the cumulative total of all sources modeled with federal oil and gas development contributing approximately up to 4% of  $O_3$ , 11% of  $NO_2$ , 2% of  $PM_{2.5}$ , 0.5% of  $PM_{10}$  and 10% of  $SO_2$ . The largest cumulative concentrations for most pollutants would be impacted by either natural sources or anthropogenic sources other than federal oil and gas development and federal coal-related actions. However, oil and gas wells in North Dakota may be located near Class I areas in which elevated impacts were observed in visibility and deposition. For example, tribal oil and gas sources located within Fort Berthold Indian Reservation revealed potential adverse impacts on nitrogen deposition and visibility in the area. New federal oil and gas development has a maximum potential impact of 1  $\Delta dv$  at the federal Class I areas (Lostwood Wilderness and Theodore Roosevelt NP) while the modeled maximum impact of the new federal oil and gas sector was greater than 1  $\Delta dv$  for 24 days at Fort Berthold Indian Reservation, 1 day at Lostwood Wilderness, and 0 days at all other Class I areas. Additional detailed information on estimated air pollutant emissions can be found in the Montana and North Dakota RMP Air Resource Technical Support Documents. At the APD stage of the process, site specific information such as well pad location and construction equipment specifications will be available to further analyze and mitigate potential impacts.

### 3.3.5 Mitigation of Impacts

#### 3.3.5.1 BLM Best Management Practices (BMPs)

The BLM encourages industry to incorporate and implement BMPs to reduce impacts to air quality by reducing emissions, surface disturbances, and dust from field production and operations. In addition, Lease Notice LN 14-18 would be applied to all parcels included in this proposed lease sale for conservation of air

resources. The lease notice states, “*The lessee/operator is given notice that prior to project-specific approval, additional air resource analyses may be required in order to comply with the NEPA, FLPMA, and/or other applicable laws and regulations. Analyses may include equipment and operations information, emission inventory development, dispersion modeling or photochemical grid modeling for air quality and/or air quality related value impact analysis, and/or emission control determinations. These analyses may result in the imposition of additional project-specific control measures to protect air resources.*”

If NEPA review reveals air quality impacts, additional control measures may include:

- Use of a Tier 4 non-road diesel engine that meets EPA NOx emission standards or equivalent for each diesel-fueled non-road engine with greater than 200 horsepower design rating to be used during drilling or completion activities;
- Reduction in fugitive dust from roads and construction areas by using water, dust suppressants, surfacing, and other means;
- Develop strategies to minimize or eliminate venting using the most efficient means possible, using low or no bleed pneumatics, and promoting instrument air driven equipment, or equipment that is actuated by other means;
- Use of intelligent design and siting of dehydrators so that the number of distributed dehydrators can be reduced, and larger more efficient dehydrators can be used and promote designs that consider cost effective controls for dehydrator vents; and
- Capture for beneficial use or destruction of separated gas from the oil/condensate/produced water streams.

Similarly, one or more of the following measures could be imposed at the development/APD stage if NEPA review showed the potential for significant impacts to air quality:

- Emission control equipment with minimum 95 percent volatile organic compound (VOC) control efficiency;
- Low-emitting drill rig engines, such as Tier 4 diesel engines or natural gas or electric drill rig engines;
- Gas or electric turbines for compression rather than internal combustion engines;
- Replacement of older internal combustion engines with low-emitting engines that meet EPA New Source Performance Standards;
- Water or chemical suppressant application and reduced speed limits to control fugitive dust emissions;
- Multi-well pads to reduce surface disturbance and traffic;
- Replacement of diesel-fired pump jack engines with electrified engines;
- Reinjection of waste gas into no-producing wells or other underground formations;
- Infrared (FLIR) technology to detect fugitive VOC and methane emissions and repair leaking equipment quickly; and
- Additional technologies for reducing methane emissions as recommended by EPA’s natural gas STAR program.

## 3.4 Issue 2 – Greenhouse Gases

Future development of lease parcels under consideration could lead to emissions of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) which are the three most common greenhouse gases 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 effects of the proposed leasing action on climate change by estimating and analyzing potential GHG emissions from projected oil and gas development on the parcels proposed for leasing using estimates based on past oil and gas development and available information from existing development within the state. Further discussion of climate change science and predicted impacts, as well as the reasonably foreseeable and cumulative GHG emissions associated with BLM's oil and gas leasing actions and methodologies are included in the *2023 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends* (BLM, 2024) (Annual GHG Report). This report presents the estimated emissions of greenhouse gases attributable to development and consumption of fossil fuels produced on lands and mineral estate managed by the BLM. The Annual GHG Report is incorporated by reference as an integral part of this analysis and is available at <https://www.blm.gov/content/ghg/2022>.

### 3.4.1 Affected Environment

Climate change is a global process that is affected by the GHGs in the Earth's atmosphere. GHGs trap longer wave radiation emitted from the Earth's surface and act as a positive radiative forcing component which 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 Earth's surface no matter their point of origin. The buildup of these gases has contributed to the current changing climate equilibrium towards warming. A discussion of past, current, and projected future climate change impacts is described in Chapters 4, 8, and 9 of the Annual GHG Report which describe observed climate impacts globally, nationally, and in each state, and present a range of projected impact scenarios based on future GHG emission levels.

The incremental contribution to global GHGs from a single proposed land management action currently cannot be accurately translated into a potential effect on global climate change or any localized effects in the area specific to the action. Currently, global climate models are unable to forecast local or regional effects on resources 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 climate change resulting from the accumulation of GHG emissions over time.

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 to provide context of their potential contribution to climate change. **Table 8** shows the total estimated GHG emissions from fossil fuels at the global, national, and state scales over a six-year period. Emissions are shown in megatonnes (Mt) per year of carbon dioxide equivalent (CO<sub>2</sub>e). Chapter 3 of the Annual GHG Report contains additional

information on GHGs and an explanation of CO<sub>2</sub>e. State and national energy-related CO<sub>2</sub> emissions include emissions from fossil fuel use across all sectors (residential, commercial, industrial, transportation, and electricity generation) and are released at the location where the fossil fuels are consumed.

Additional information on current state, national, and global GHG emissions as well as the methodology and parameters for estimating emissions from BLM fossil fuel authorizations and cumulative GHG emissions is included in the Annual GHG Report (see Chapters 5,6, and 7).

**Table 8.** Global, U.S., North Dakota, and Montana GHG Emissions 2017 - 2022 (Mt CO<sub>2</sub>/yr)

Scale	2017	2018	2019	2020	2021	2022
Global	---	---	50,200	47,800	50,100	50,600
U.S.	6,551.0	6,752.8	6,590.1	6,001.8	6,328.8	6,343.2
North Dakota	82.8	91.9	94.7	82.2	88.4	---
Montana	67.4	66.0	69.4	55.6	62.4	---
Source: Annual GHG Report, Chap. 5, Table 5-1 (Global and U.S.) and Table 5-2 (State). Source: <a href="#">State GHG Emissions and Removals   U.S. EPA.</a> Mt (megatonne) = 1 million metric tons NA = Not Available						

### 3.4.2 Environmental Effects - No Action Alternative

Under the No Action Alternative, the BLM would not offer any of the nominated parcels in the lease sale. 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 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.

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 would likely 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 (AEO, 2023). Coal and renewable energy sources are stronger substitutes for natural gas in electricity generation. The effect of substitution between different fuel sources on indirect GHG emissions depends on the replacement energy source. For example, coal is a relatively more carbon intense fuel than natural gas and hydroelectricity is the least carbon intense energy source (See Table 10-3 of the Annual GHG Report.) (BLM, 2024). In the transportation sector, alternatives to oil are likely to be less carbon intensive.

Finally, substitution across energy sources or oil and gas production from other locations may not fully meet the energy needs that would otherwise have been realized through production from these leases. Price effects may lower the market equilibrium quantity demanded for some fuel sources. This would lead to a reduction in indirect GHG emissions. These three effects are likely to occur in some combination under the 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.

### 3.4.3 Environmental Effects - Proposed Action Alternative

While the leasing action does not directly result in development that will generate GHG emissions, emissions from potential future development of the leased parcels are reasonably foreseeable and can be estimated for the purposes of this lease sale. There are four general phases of post-lease development that would generate GHG emissions: 1) well development (well site construction, well drilling, and well completion), 2) well production operations (extraction, separation, gathering), 3) mid-stream (refining, processing, storage, and transport/distribution), and 4) end-use (combustion or other uses) of the fuels produced. While well development and production operation emissions (phases 1 and 2) occur on-lease and the BLM has program authority over these activities, mid-stream and end-use emissions (phases 3 and 4) typically occur off-lease where the BLM has no program authority.

Emissions inventories at the leasing stage are imprecise as a result of uncertainties such as 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. Because of these uncertainties, the BLM applies several assumptions to estimate emissions at the leasing stage. The number of estimated well numbers per parcel are 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 methane (a more potent GHG than CO<sub>2</sub> in the short term) from pipeline and equipment leaks, storage, and maintenance activities. These sources of emissions are highly speculative at the leasing stage, therefore, the BLM has chosen to assume that mid-stream emissions associated with 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) (NETL, 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 using the BLM Lease Sale Emissions Tool and lease development analysis. Emissions are presented for each of the four phases of post-lease development described above.

- Well development emissions occur over a short period and may include emissions from heavy equipment and vehicle exhaust, drill rig engines, completion equipment, pipe venting, and well treatments such as hydraulic fracturing.
- Well production operations, mid-stream, and end-use emissions occur over the entire production life of a well, which is assumed to be 30 years for this analysis based on the productive life of a typical oil/gas field.
- Production emissions may result from storage tank breathing and flashing, truck loading, pump engines, heaters and dehydrators, pneumatic instruments or controls, flaring, fugitives, and vehicle exhaust.
- Mid-stream emissions occur from the transport, refining, processing, storage, transmission, and distribution of produced oil and gas. Mid-stream emissions are estimated by multiplying the estimated

ultimate recovery (EUR) of produced oil and gas with emissions factors from NETL life cycle analysis of U.S. oil and natural gas. Additional information on emission factors can be found in the Annual GHG Report (Chapter 6, Table 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 CFR §98). Additional information on emission factors and EUR factors can be found in the Annual GHG Report (Chapter 6).

Error! Reference source not found. **and 10** shows the estimated maximum year and average year GHG emissions over the life of the lease for both 100-yr and 20-yr global warming potentials (GWP) for Montana and North Dakota. Section 3.4 of the Annual GHG Report provides a detailed explanation of GWP.

**Table 9.** Montana - Estimated Direct and Indirect Emissions from Lease Parcels on an Annual and Life of Lease Basis (tonnes).

Year	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e (100-yr)	CO <sub>2</sub> e (20-yr)
<b>Max Emissions, Year 6</b>	44,232	23.68	0.365	45,037	46,285
<b>Average Year</b>	7,446	5.17	0.061	7,617	7,890
<b>Life of Lease</b>	245,734	170.67	2.001	251,366	260,361

**Table 10.** North Dakota - Estimated Direct and Indirect Emissions from Lease Parcels on an Annual and Life of Lease Basis (tonnes).

Year	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e (100-yr)	CO <sub>2</sub> e (20-yr)
<b>Max Emissions, Year 7</b>	96,011	63.89	0.755	98,121	101,488
<b>Average Year</b>	13,490	10.76	0.104	13,840	14,407
<b>Life of Lease</b>	445,186	355.11	3.434	456,706	475,420

**Table 11 and 12** lists the estimated direct (well development and production operations) and indirect (mid-stream and end-use) GHG emissions in metric tonnes (t) for the subject leases over the average 30-year production life of the lease for Montana and North Dakota. In summary, potential GHG emissions from the Proposed Action could result in GHG emissions of approximately 0.74 MMt CO<sub>2</sub>e.

**Table 11.** Montana - Estimated Life of Lease Emissions from Well Development, Well Production Operations, Mid-stream, and End-use (tonnes)

Activity	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e (100-yr)	CO <sub>2</sub> e (20-yr)
Well Development	1,104	0.52	0.013	1,123	1,150
Well Production Operations	6,572	41.54	0.056	7,825	10,014
Mid-Stream	28,351	120.92	0.460	32,080	38,453
End-Use	209,708	7.69	1.471	210,338	210,744
<b>Total (Life of Lease)</b>	245,734	170.67	2.001	251,366	260,361
Source: BLM Lease Sale Emissions Tool					

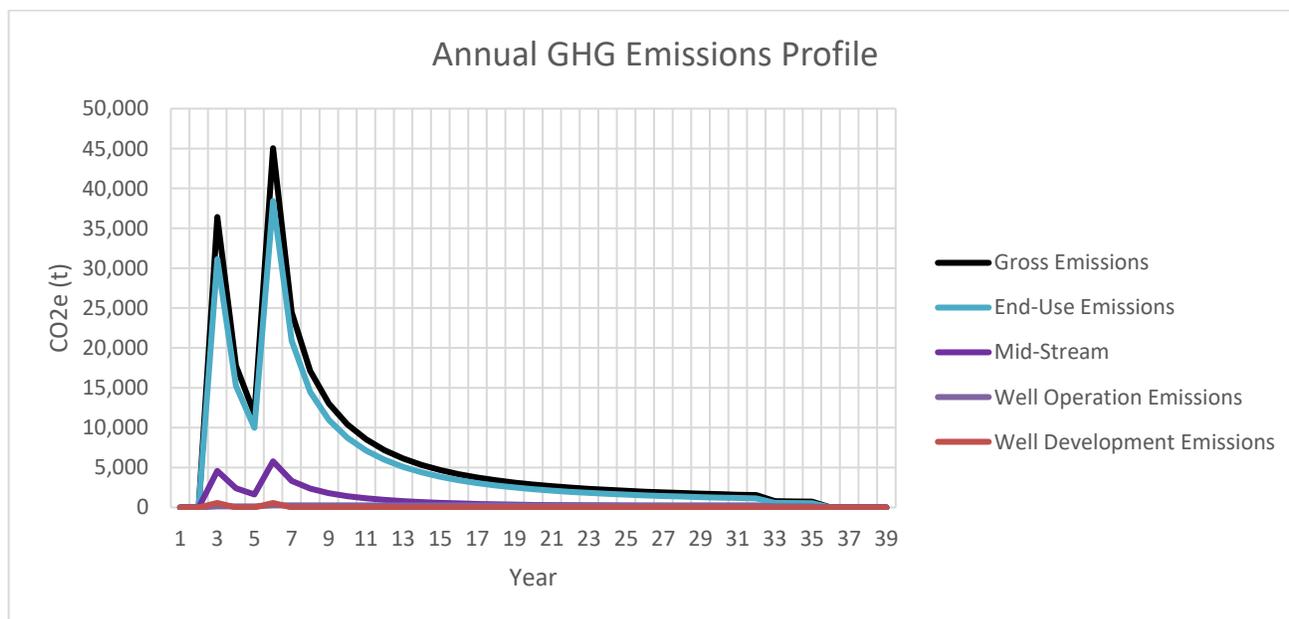
**Table 12.** North Dakota - Estimated Life of Lease Emissions from Well Development, Well Production Operations, Mid-stream, and End-use (tonnes)

Activity	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e (100-yr)	CO <sub>2</sub> e (20-yr)
Well Development	1,104	0.52	0.013	1,123	1,150
Well Production Operations	6,572	41.54	0.056	7,825	10,014
Mid-Stream	53,635	299.62	0.855	62,797	78,587
End-Use	383,875	13.44	2.510	384,961	385,669
<b>Total (Life of Lease)</b>	<b>445,186</b>	<b>355.11</b>	<b>3.434</b>	<b>456,706</b>	<b>475,420</b>

Source: BLM Lease Sale Emissions Tool

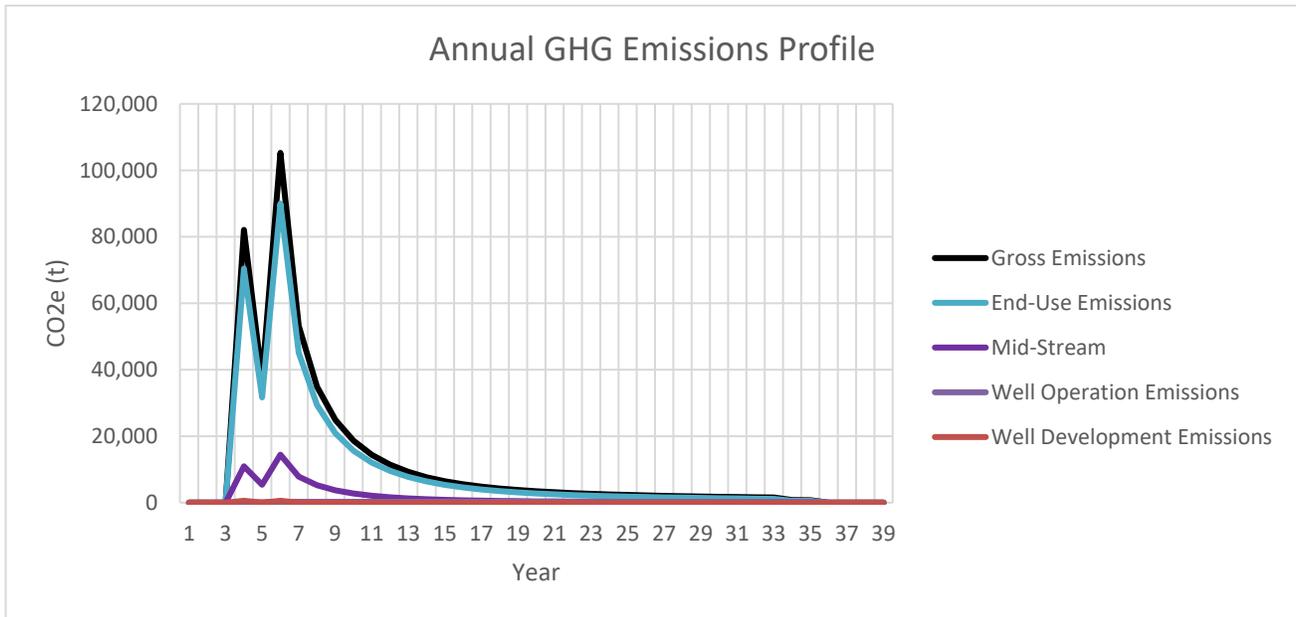
Because of declining production rates over time GHG emissions vary annually over the production life of a well. **Figure 11 and 12** shows the estimated GHG emissions profile over the production life of the proposed action including well development, well production operations, mid-stream, end-use, and gross (total of well development, well production, mid-stream, and end-use) emissions.

**Figure 11.** Montana - Estimated annual GHG emissions profile over the life of a lease.



Source: BLM Lease Sale Emissions Tool

**Figure 12.** North Dakota - Estimated annual GHG emissions profile over the life of a lease.



Source: BLM Lease Sale Emissions Tool

To put the estimated GHG emissions for this lease sale in a relatable context, potential emissions that could result from development of the lease parcels for this sale can be compared to other common activities that generate GHG emissions. The EPA GHG equivalency calculator (EPA , 2022) can be used to express the potential average year GHG emissions on a scale relatable to everyday life (<https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>). For instance, the projected average annual GHG emissions from potential development of the subject leases are equivalent to 5,992 gasoline-fueled passenger vehicles driven for one year, or the emissions that could be avoided by operating 2 wind turbines as an alternative energy source or offset by the carbon sequestration of 26,059 acres of forest land.

**Table 13** 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 13.** Comparison of Lease Sale Emissions to Other Sources (Megatonnes)

Reference	Mt CO2e <sup>1</sup> (Per Year)
MT - Lease Emissions (Maximum Year)	0.045
ND - Lease Emissions (Maximum Year)	0.105
MT Onshore Federal (O&G) <sup>2</sup>	2.52
MT Onshore Federal (Oil, Gas and Coal) <sup>2</sup>	33.05
ND Onshore Federal (O&G) <sup>2</sup>	33.32

<b>ND Onshore Federal (Oil, Gas and Coal)<sup>2</sup></b>	40.90
<b>U.S. Onshore Federal (Oil &amp; Gas)<sup>2</sup></b>	542.06
<b>U.S. All<sup>3</sup> Onshore and Offshore Federal (Oil &amp; Gas)<sup>2</sup></b>	933.87
<b>U.S. Federal Onshore (Oil, Gas and Coal)<sup>3</sup></b>	1,033.21
<b>U.S. Total (Oil, Gas, &amp; Coal)<sup>4</sup></b>	6,899.49

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

2 – Federal values come from the BLM Specialist Report on Annual Greenhouse Gas Emissions. Tables ES-1 and ES-2. U.S Federal-All includes offshore and onshore oil and gas production.

3 – All includes both onshore and offshore Federal oil & gas.

4 - U.S. Total is the total emissions from all the oil gas and coal produced in the U.S. This value may differ from EPA values based on foreign consumption.

### 3.4.4 Monetized Impacts from GHG Emissions

The “social cost of carbon,” “social cost of nitrous oxide,” and “social cost of methane”, also referred to as the “social cost of greenhouse gases” (SC-GHG), are estimates of the monetized damages associated with incremental increases in GHG emissions in a given year. These numbers were monetized; however, they do not constitute a complete cost-benefit analysis, nor do the SC-GHG numbers present a direct comparison with other impacts analyzed in this document. SC-GHG is provided only as a useful measure of the benefits of GHG emissions reductions to inform agency decision-making. For Federal agencies, the best currently available estimates of the SC-GHG are the interim estimates of the social cost of carbon dioxide, methane, and nitrous oxide developed by the Interagency Working Group (IWG) on the SC-GHG.

**Table 14** present the SC-GHGs associated with estimated emissions from future potential development of the lease parcels. The IWG’s SC-GHG estimates are based on complex models describing how GHG emissions affect global temperatures, sea level rise, and other biophysical processes; how these changes affect society through, for example, agricultural, health, or other effects; and monetary estimates of the market and nonmarket values of these effects. One key parameter in the models is the discount rate, which is used to estimate the present value of the stream of future damages associated with emissions in a particular year. A higher discount rate assumes that future benefits or costs are more heavily discounted than benefits or costs occurring in the present (i.e., future benefits or costs are a less significant factor in present-day decisions). The current set of interim estimates of SC-GHG have been developed using three different annual discount rates: 2.5%, 3%, and 5% (IWG 2021).

To address uncertainty in the estimates, the IWG recommends reporting four SC-GHG estimates in any analysis. Three of the SC-GHG estimates reflect the average costs from the multiple simulations at each of the three discount rates. The fourth value represents higher-than-expected economic impacts from climate change. Specifically, it represents the 95th percentile of impacts estimated, applying a 3% annual discount rate for future economic effects. This is a low probability, but high impact scenario, and represents an upper bound of impacts within the 3% discount rate model.

The estimates below follow the IWG recommendations and represent the present value (from the perspective of 2021) of future market and nonmarket costs associated with CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O emissions from potential well development and operations and potential end-use. Estimates are calculated based on

IWG estimates of social cost per metric ton of emissions for a given emissions year and BLM’s estimates of emissions in each year, rounded to the nearest \$1,000.

**Table 14.** SC-GHG’s Associated with Future Potential Development

	Social Cost of GHGs (\$)			
	Average Value, 5% discount rate	Average Value, 3% discount rate	Average Value, 2.5% discount rate	95 <sup>th</sup> Percentile Value, 3% discount rate
<b>Development and Operations</b>	\$216,000	\$806,000	\$1,213,000	\$2,414,000
<b>Mid-Stream and End-Use</b>	\$12,347,000	\$44,734,000	\$66,927,000	\$135,312,000
<b>Total</b>	\$12,563,000	\$45,540,000	\$68,140,000	\$137,726,000

### 3.4.5 *Estimated GHG Emissions for Reasonably Foreseeable Environmental Trends and Planned Actions*

The analysis of GHGs contained in the EA includes estimated emissions from the proposed leases. An assessment of GHG emissions from other BLM fossil fuel authorizations, including coal leasing and oil and gas leasing and development, is included in Chapter 7 of the BLM Specialist Report. 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 fossil fuel leasing program based on actual production and statistical trends as they are presently known.

The methodologies used in Annual GHG Report provide estimates of foreseeable short-term and projected long-term GHG emissions from activities across the BLM’s oil and gas program. The foreseeable short-term methodology includes a trends analysis of (1) leased federal lands that are held-by-production <sup>1</sup>(2) approved applications for permit to drill (APDs), and (3) leased lands from competitive lease sales projected to occur over the next annual reporting cycle (12 months). The data is 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 Energy Information Administration (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 15** 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

<sup>1</sup> [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.

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 15.** GHG Emissions from Past, Present, and Reasonably Foreseeable Federal Onshore Lease Development (Mt CO<sub>2</sub>e)

State	Existing Wells (Report Year)	Existing Wells (Projected)	Approved APDs	New Leasing	Short-Term Totals	Long-Term Totals
AL	0.51	7.56	0.00	0.18	7.74	15.28
AK	1.31	19.47	23.13	34.70	77.31	39.67
AZ	0.00	0.00	0.00	0.00	0.00	0.00
AR	0.55	8.72	0.24	0.24	9.19	16.63
CA	4.92	67.90	5.93	2.13	75.96	151.15
CO	46.16	399.35	30.80	23.95	454.10	1,395.90
ID	0.00	0.00	0.00	0.29	0.30	0.01
IL	0.01	0.11	0.00	0.02	0.13	0.26
IN	0.00	0.00	0.00	0.02	0.02	0.00
KS	0.26	3.81	0.00	0.11	3.92	7.80
KY	0.01	0.07	0.00	0.03	0.10	0.25
LA	3.84	48.54	44.95	13.11	106.60	115.95
MD	0.00	0.00	0.00	0.00	0.00	0.00
MI	0.07	1.36	0.00	0.58	1.94	2.11
MS	0.12	1.59	0.38	0.38	2.35	3.62
MT	2.52	25.68	0.42	12.63	38.73	77.12
NE	0.02	0.22	0.00	0.03	0.25	0.47
NV	0.13	1.01	0.01	0.19	1.22	4.07
NM	326.00	2,318.83	745.21	119.12	3,183.17	9,961.81
NY	0.00	0.01	0.00	0.00	0.01	0.01
ND	33.32	279.03	57.62	3.57	340.22	1,020.91
OH	0.40	3.83	0.00	4.64	8.47	12.20
OK	1.25	12.23	0.95	1.66	14.83	37.81
OR	0.00	0.00	0.00	0.12	0.12	0.00
PA	0.00	0.06	0.00	0.67	0.72	0.12
SD	0.11	1.77	0.11	0.11	1.98	3.23
TN	0.00	0.00	0.00	0.00	0.00	0.00
TX	3.31	36.52	19.00	1.97	57.49	99.95
UT	13.90	175.34	16.33	36.75	228.41	421.63

State	Existing Wells (Report Year)	Existing Wells (Projected)	Approved APDs	New Leasing	Short-Term Totals	Long-Term Totals
VA	0.01	0.14	0.00	0.03	0.16	0.27
WV	0.00	0.06	0.00	0.59	0.65	0.14
WY	103.34	920.76	178.16	317.98	1,416.91	3,134.55
<b>Total Onshore Federal</b>	<b>542</b>	<b>4,334</b>	<b>1,123</b>	<b>576</b>	<b>6,033</b>	<b>16,523</b>

Source: BLM Annual GHG Report, Section 7

As detailed in the 2022 Annual GHG Report, which the BLM has incorporated by reference, the BLM also looked at other tools to inform its analysis, including the [Model for the Assessment of Greenhouse Gas Induced Climate Change \(MAGICC\)](#) (See Section 9.0 of the Annual GHG Report.). BLM conducted MAGICC runs evaluating potential contributions to global climate change and related values for two climate change projection scenarios. These two scenarios were chosen because they most closely approximate or frame the desired outcomes of the Paris Climate Accord and would also reflect the greatest contribution as a percent of BLM's authorized cumulative emissions relative to the global emissions levels contained in the scenarios. IPCC's most optimistic scenario evaluates global CO<sub>2</sub> emissions cut to net zero around 2050. This is the only scenario that meets the Paris Agreement's goal of keeping global warming to around 1.5 degrees Celsius above pre-industrial temperatures. The second "middle of the road" scenario leaves global CO<sub>2</sub> 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 degrees C by 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.

The short-term energy outlook (STEO) published by the EIA (<https://www.eia.gov/outlooks/steo/>) (EIA, 2023) predicts that the world's oil and gas supply and consumption will increase over the next 18-24 months. The latest 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. The most recent STEO includes the following projections for the next two 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 Bcf/d in 2024, decreasing slightly to 89.21 Bcf/d in 2025.
- U.S. LNG exports are expected to increase from 11.9 billion cubic feet/day (Bcf/d) in 2023 to 12.34 Bcf/d in 2024 and 14.43 Bcf/d in 2025.

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, etc.) regarding short-term domestic supply disruptions and shortages or sudden increases in demand demonstrate that reducing domestic supply (in the near-term under the current supply and demand scenario) will likely lead to the import of more oil and natural gas from other countries, including countries with lower

environmental and emission control standards than the United States (EIA, 2023). 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 (<https://www.eia.gov/outlooks/aeo/>) projects energy consumption increases through 2050 as population and economic growth outweighs 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 is expected to 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 CO<sub>2</sub> emissions are expected to fall 25% to 38% below 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 BLM GHG Report.

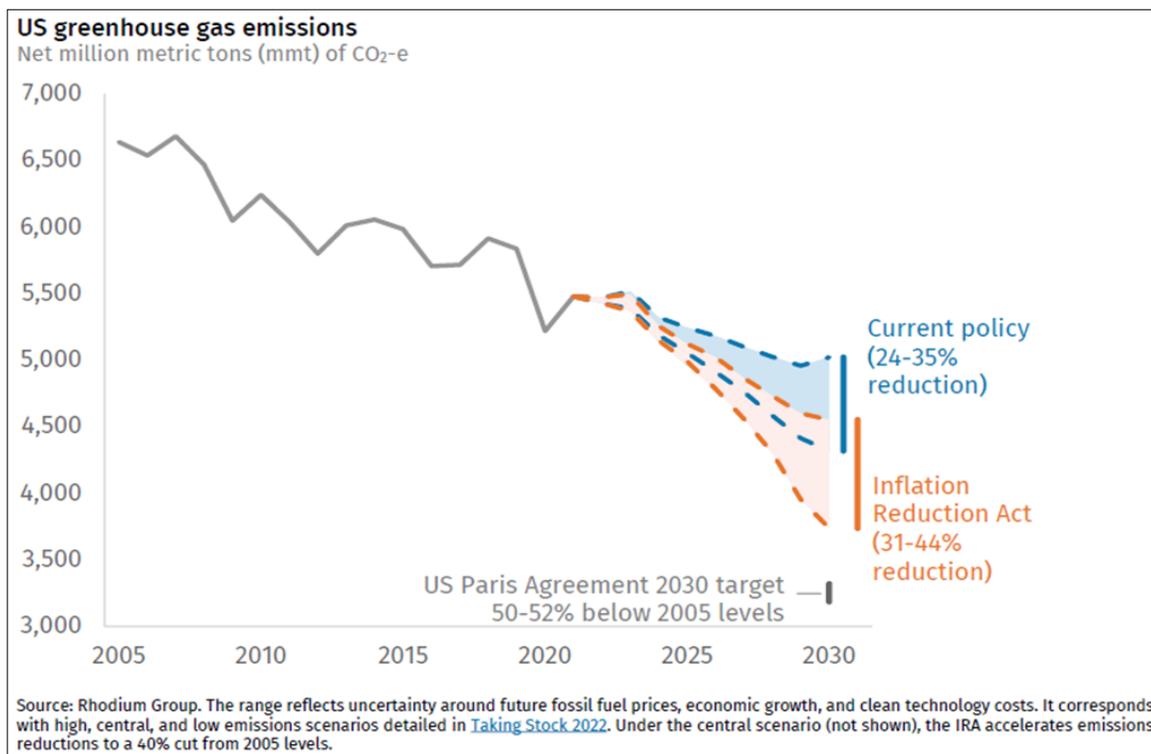
Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad" (January 27, 2021), directs the executive branch to establish policies or rules that put the United States on a path to achieve carbon neutrality, economywide, by no later than 2050. This goal is consistent with IPCC's recommendation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

Carbon budgets are an estimate of the amount of additional GHGs that could be emitted into the atmosphere over time to reach carbon neutrality while still limiting global temperatures to no more than 5°C or 2°C above preindustrial levels (See section 9.1 of the Annual GHG Report.). The IPCC Special Report on Global Warming of 1.5°C is the most widely accepted authority on the development of a carbon budget to meet the goals of the Paris Agreement. None of the global carbon budgets or pledges that countries have committed to stay within as part of the Paris Agreement are binding. 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 lease sale stage, as it is unclear what portion of the budget applies to emissions occurring in the United States.

The Council on Environmental Quality (CEQ) discourages Federal agencies from comparing emissions from an action to global or domestic levels as "such comparisons and fractions also are not an appropriate method for characterizing the extent of a proposed action's and its alternatives' contributions to climate change because this approach does not reveal anything beyond the nature of the climate change challenge itself (CEQ, 2023). However, 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. In the interest of public disclosure, Table 9-1 in the Annual GHG Report provides an estimate of the potential emissions associated with Federal fossil fuel authorizations in relation to IPCC carbon budgets. Total Federal fossil fuel authorizations including coal, natural gas and oil represents approximately 1.37 % of the remaining global carbon budget of 380 GtCO<sub>2</sub> needed to limit global warming to 1.5 C.

While continued fossil fuel authorizations will occur over the next decade to support energy demand and remain in compliance with the leasing mandates in the Inflation Reduction Act (IRA) passed in 2022, the U.S. Energy Information Administration International Energy Outlook expects renewable energy consumption to double between 2020 and 2050 and nearly equal liquid fuels consumption by 2050 (See **Figure 13**). The U.S. has committed to the expansion of renewable energy through infrastructure investments in clean energy transmission and grid upgrades include in the Bipartisan Infrastructure Investment and Jobs Act as well as clean energy investments and incentives included in the Inflation Reduction Act.

**Figure 13.** Projected Short-Term Emissions Reductions Associated with the IRA.



### 3.4.6 Mitigation Strategies

The relationship between GHG emissions and climate impacts is complex, but a project’s potential to contribute to climate change is reduced as its net emissions are reduced. When net emissions approach zero, the project has little or no contribution to climate change. Net-zero emissions can be achieved through a combination of controlling and offsetting emissions. Emission controls (e.g., vapor recovery devices, no-bleed pneumatics, leak detection and repair, etc.) can substantially limit the amount of GHGs emitted to the atmosphere, while offsets (e.g., sequestration, low carbon energy substitution, plugging abandoned or uneconomical wells, etc.) can remove GHGs from the atmosphere or reduce emissions in other areas. Chapter 10 of the Annual GHG Report provides a more detailed discussion of GHG mitigation strategies.

Several Federal agencies work in concert to implement climate change strategies and 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 such as the New Source Performance Standard for Crude Oil and Natural Gas Facilities (40 CFR 60, OOOOa); Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After November 15, 2021 (40 CFR 60, OOOOb); NSPS OOOOc to limit GHGs emissions (in the form of methane limitations) from designated facilities in the Crude Oil and Natural Gas source category; and Waste Emissions Charge for Petroleum and Natural Gas Systems (40 CFR 99). These regulations impose emission limits, equipment design standards, and/or monitoring requirements on oil and gas facilities as well as a charge on methane emissions that exceed 25,000 metric tonnes of CO<sub>2</sub>e for applicable petroleum and natural gas facilities currently required to report under the Greenhouse Gas Reporting Rule. A detailed discussion of existing

regulations and Executive Orders 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. In addition, on April 10, 2024, BLM published in the Federal Register the final rule titled *Waste Prevention, Production Subject to Royalties, and Resource Conservation* which would replace the BLM's current requirements governing natural gas venting and flaring contained in NTL-4A ([Federal Register :: Waste Prevention, Production Subject to Royalties, and Resource Conservation](#)). The Waste Prevention rule became final on June 10, 2024, and require operators of oil and gas leases to minimize waste from venting, flaring, and leaks.

In addition to Federal regulations, states have also implemented air quality and greenhouse gas regulations for the oil and gas industry. The Montana Board of Oil and Gas Conservation (MBOGC) implements Montana's oil and gas laws by promoting conservation and waste prevention in the recovery of resources; and regulating oil and gas exploration and production. The Montana Department of Environmental Quality (MDEQ) also administers rules and regulations to implement the Montana Environmental Policy Act and the Montana Clean Air Act. MBOGC regulations related to air impacts from oil and gas operations can be found in Title 36, Chapter 22 of the Administrative Rules of Montana (ARM) and include regulation ARM 36.22.1207 which prohibits the storage of waste oil and oil sludge in pits and open vessels. MDEQ rules for air quality permitting and/or registration of oil and gas operations can be found in Title 17, Chapter 8 of the ARM. For example, Chapter 17.8, Subchapter 17.8.7 (Permit, Construction, and Operation of Air Contaminant Sources) requires a facility with a Montana air quality permit to install the maximum air pollution control that is technically practicable and economically feasible. Chapter 17.8, Subchapter 17.8.17 (Registration of Air Contaminant Sources) requirements for oil or gas well facilities include controlling VOC vapors at 95% or greater control efficiency, using submerged fill technology for loading and unloading of hydrocarbon liquids using, and equipping internal combustion engines with nonselective catalytic reduction or oxidation catalytic reduction control devices. The North Dakota Department of Mineral Resources - Oil and Gas Division, regulates the drilling and production of oil and gas including regulations that ban the venting of natural gas and require that vented casinghead gas be burned through a flare (North Dakota Administrative Code 43-02-03-45). The North Dakota Industrial Commission (NDIC) has jurisdiction over the volume of gas flared at a well site to conserve mineral resources and established Order No. 24665 for reducing gas flaring. The Order requires producers to submit a gas capture plan with every drilling permit application. The North Dakota Department of Environmental Quality—Division of Air Quality established registration and reporting requirement and emissions control requirements for oil and gas facilities under North Dakota Air Pollution Control Rules Chapter 33.1-15-20 as well as submerged fill and flare requirements in Chapter 33.1-15-07.

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 (e.g., 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 Best Management Practices (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 Conditions of Approval, 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, are provided in Chapter 10 of the Annual GHG Report.

## 3.5 Issue 3 – Socioeconomic Conditions, Environmental Justice, and Human Health

### 3.5.1 *Affected Environment*

Environmental Justice is an initiative that culminated with President Clinton’s February 11, 1994, Executive Order 12898 “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” and an accompanying Presidential memorandum. Executive Order 12898 requires the analysis of disproportionately high and adverse human health effects and environmental effects on environmental justice populations. Environmental effects may include “ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment” (CEQ 1997 page 26) and that each Federal agency consider environmental justice to be part of its mission. Specific to the NEPA process, the EO requires that proposed projects are evaluated for “disproportionately high adverse human health and environmental effects on minority populations and low-income populations.

The Environmental Protection Agency (EPA 2016) guidelines for evaluating the potential environmental effects of projects require specific identification of minority populations when either (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (CEQ 1997). Additionally, the EPA states that “A minority population exists “if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds” (CEQ 1997). For minority populations, the BLM generally defines “meaningfully greater” as 10 percent above the minority population size of the comparison geography. A potential low-income population is identified by the BLM if either 1) low-income populations of the area of analysis exceed 50% of the population, or 2) the low-income population is less than or equal to twice (200%) of the federal “poverty level”. Indigenous communities of concern are present if the percentage of the population identified as indigenous, including non-tribal-affiliated persons who identify as indigenous or a combination of indigenous and another ethnicity, is equal to or greater than that of the reference population(s) (see Federal Interagency Working Group on Environmental Justice and NEPA Committee 2016; BLM 2022).

The social and economic environment of the counties containing the parcels proposed are described in detail in their associated RMP and FEIS. BLM [IM 2022-059](#) (Environmental Justice Implementation) provides minimum requirements for elevating EJ under the National Environmental Policy Act (NEPA). Consistent with BLM IM 2033-059 and the guidance, principles, and practices provided within: 1) EJ is being considered and incorporated in the reviews of all proposed actions, 2) screening is performed to identify minority populations, low-income populations, and Tribes, 3) determinations are made in regard to actions and alternatives that could adversely and disproportionately impact minority populations, low income populations, and Tribes, 4) provide opportunities for meaningful involvement of minority populations, low-income populations, and Tribes in BLM decision-making processes that affect their lives, livelihoods, and health, and 5) examination of EJ during NEPA development, reviews, alternative assessment and potential mitigation measures as part of a land use planning process. This section provides updated estimates of environmental justice indicators within the study area, which includes all the counties containing the Federal parcels covered in this EA.

When evaluating potential EJ concerns under NEPA, one “may consider as a community either a group

of individuals living in geographic proximity to one another, or a geographically dispersed/transient set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect” (CEQ 1997). The reference areas are the states of North Dakota and Montana.

The BLM used the EPA’s EJScreen tool, the headwaters Socioeconomic Profiling Tool (US DOC 2022), and the BLM Socioeconomic Profile (SEP) to collect data presented **Table 16**. Low-income, minority, and indigenous populations exist within the study area and may be disproportionately affected by project actions. Some populations identify as more than one environmental justice indicator and may warrant special attention, outreach, and meaningful involvement.

**Table 16. Minority, Low-Income, and Total Populations**

Headwaters Economic Profile System and BLM Socioeconomic Profile (SEP)** Data						EPA EJ Screen		
County	Pop. 2000 2022 % change	Race	Pop. By race	% of total pop by race	% total minority population **	% low-income**	% People of color ND average = 16% MT average = 15%	% Low-income ND average = 26% MT average= 32%
North Dakota								
Dunn	3,605 4,015 +11.4%	W	3,282	81.1%	21.7%	18.5%	22%	20%
		B/AA	30	0.7%				
		AI	464	11.5%				
		A	8	0.2%				
		NH/OPI	2	0.0%				
		O	59	1.5%				
		2+	204	5.0%				
HoLH	253	6.2%						
McKenzie	6,625 13,908 +143.1%	W	11,236	79.8%	24.7%	32.3%	25%	30%
		B/AA	303	2.2%				
		AI	1,507	10.7%				
		A	78	0.6%				
		NH/OPI	0	0.0%				
		O	200	1.4%				
		2+	757	5.4%				
HoLH	1,488	10.6%						
Montana								
Liberty	2,168 1,972 -9.0%	W	1,947	97.7%	2.9%	49.9%	2%	40%
		B/AA	0	0.0%				
		AI	7	0.4%				
		A	0	0.0%				
		NH/OPI	0	0.0%				
		O	7	0.4%				
		2+	32	1.6%				
HoLH	11	0.6%						
Roosevelt	10,623 10,572 -0.5%	W	3,586	33.2%	67.6%	54.5%	67%	54%
		B/AA	35	0.3%				
		AI	6,298	58.3%				
		A	79	0.7%				
		NH/OPI	1	0.0%				
		O	39	0.4%				
		2+	761	7.0%				
HoLH	396	3.7%						
Richland	9,619 11,237 +16.8	W	10,278	90.4%	12.3%	26.5%	12%	26%
		B/AA	22	0.2%				
		AI	18	0.2%				
		A	13	0.1%				
		NH/OPI	109	1.0%				
		O	340	3.0%				
		2+	586	5.2%				
HoLH	658	5.8%						
W = White alone B/AA = Black or African American alone AI = American Indian alone A = Asian alone NH/OPI = Native Hawaiian or Other Pacific Is. Alone O = Some other race 2+ = 2 or more races HoLH = Hispanic or Latino Heritage **For the purposes of this analysis, SEP data does not include Hispanic or Latino Heritage in the percentage of total minority population. See Appendix O								

Source: <https://headwaterseconomics.org/apps/economic-profile-system/>, [ejscreen.epa.gov/mapper/](https://ejscreen.epa.gov/mapper/), and [headwaterseconomics.org/tools/blm-profiles/](https://headwaterseconomics.org/tools/blm-profiles/)  
 Accessed 11.1.2023.

The counties with proposed parcels in North Dakota have an estimated population of 17,923, counties in Montana have an estimated population of 23,781 as shown on **Table 16** for a combined estimated population of 41,704 (Appendix L). In Montana, Roosevelt County is the home for American Indian populations that meet the criteria for Environmental Justice populations. In Montana 58.3% of the population of Roosevelt County are American Indian while Montana’s overall population of American Indian’s represents 5.8% of the total statewide population. The Fort Peck Tribes (Assiniboine and Sioux Tribes) encompasses lands within the boundaries of Roosevelt County. Furthermore, the next largest American Indian populations existing in the project area resides in Dunn County at 11.5% and McKenzie County at 10.7%. Note, the Fort Berthold Reservation of the Three Affiliated Tribes takes in land within the boundaries of McLean, McKenzie, Mountrail, and Dunn counties. Similarly, 10.6% of McKenzie County’s population is Hispanic or Latino Heritage (any race), while the percentage of North Dakota’s overall population from this cohort is 4.3%. In Richland County, the Hispanic or Latino population stands at 5.8%, compared to Montana's 4.2% for this group (Appendix O).

**Economic Conditions**

The social and economic environment of the counties containing the parcels proposed are described in detail in their associated RMP and FEIS. This section focuses upon economic aspects related to the potential Federal oil and gas lease sales.

Mineral rights can be owned by private individuals, corporations, Indian tribes, or by local, State, or Federal Governments. Typically, companies specializing in the development and extraction of oil and gas lease the mineral rights for a particular parcel from the owner of the mineral rights. Federal oil and gas leases are generally issued for 10 years unless drilling activities result in one or more producing wells.

Once production has begun on a federal lease, the lease is held by production and the lessee is required to make royalty payments to the Federal Government.

**Table 17.** Total and Average Annual Bonus Bid and Rental Payments for Existing Oil and Gas Leases on Non-Indian Federal Mineral Estates (2020-2024)

County	Bonus Bids <sup>1</sup>	Rents	Total	Average Annual
Dunn, ND	\$3,389,842.00	\$7,572.83	\$3,397,414.83	\$849,353.71
McKenzie, ND	\$17,938,056.9	\$139,261.82	\$18,077,318.72	\$4,519,329.68
Liberty, MT	\$0.00	\$2,880.00	\$2,880.00	\$720.00
Richland, MT	\$234,284.00	\$129,032.61	\$363,316.61	\$90,829.15
Roosevelt, MT	\$18,306	\$3,113.00	\$21,419.00	\$5,354.75
Grand Total	\$21,580,488.90	\$281,860.26	\$21,862,349.16	\$5,465,587.29

Source: ONRR data, <https://revenue.data.doi.gov/downloads/federal-revenue-by-location/> accessed 08/19/2024.

<sup>1</sup> Negative Bonus Bid values may be due to companies correcting errors in royalty, rental and bonus bid payments. If the correction takes place in a different year than the original payment, it appears as a negative entry in the total.

**Table 17.** Total and Average Annual Bonus Bid and Rental Payments for Existing Oil and Gas Leases on Non-Indian Federal Mineral Estates (2020-2024) provides information on rental and bonus bid revenue from existing oil and gas leases for the counties that have parcels nominated for the proposed leasing action. Existing Federal oil and gas leases on Federal non-Indian properties located in these counties produced \$281,860 dollars in rental income between 2020 and 2024. The leasing of these minerals supports local employment and income and generates public revenue for surrounding communities. The economic contributions of Federal fluid mineral leasing actions are largely influenced by the number of acres leased, and can be measured in terms of the jobs, income, and public revenue generated. Additional details on the economic contribution of Federal

fluid minerals are discussed in the RMP and FEIS covering the location of the parcel.

Leasing mineral rights for the development of Federal minerals generates public revenue through the bonus bids paid at competitive lease auctions and annual rents collected on leased parcels not held by production. Nominated parcels approved for oil and gas leasing are offered by the BLM at a minimum bid rate of \$10 per acre at the competitive lease sale. In addition to bonus bids, lessees are required to pay rent annually until production begins on the leased parcel, or until the lease expires. These rent payments are equal to \$3.00 an acre for the first two years, \$5.00 an acre for years 3 through 8, and \$15.00 an acre for the years 9 and beyond (for a lease not held in production). Additionally, Federal oil and gas production in Montana is subject to production taxes or royalties. The Federal oil and gas royalties on production from public domain minerals equal 16.7 percent of the value of production (43 CFR § 3103.3.1).

A portion of these Federal revenues are distributed to the State and counties where the parcels are located. The amount that is distributed is determined by the Federal authority under which the Federal minerals are being managed. Forty-nine percent of Federal revenue associated with oil and gas from public domain lands are distributed to the State. For example, in Montana, 25% of the rental and bonus bid revenues that the State receives are redistributed to the counties of production (Title 17-3-240, MCA). Twenty-five percent of bonus bid, and rental revenues associated with oil and gas development from Bankhead-Jones lands are distributed to counties where the parcels are located. Distribution of Federal royalties and leasing revenues to the State for oil and gas development on other Federal acquired lands differs based upon the authority associated with those lands. Generally, the revenue associated with oil and gas leasing and development that is received by the State and counties help fund traditional county functions such as enforcing laws, administering justice, collecting, and disbursing tax funds, providing for orderly elections, maintaining roads and highways, providing fire protection, and/or keeping records. Other county functions that may be funded include administering primary and secondary education and operating clinics/hospitals, county libraries, county airports, local landfills, and county health systems.

### **Environmental Justice Populations**

Based on **Table 16**. Minority, Low-Income, and Total Populations, we can determine that Liberty, Roosevelt, and McKenzie counties have a percentage of low-income populations, the percentages are higher than the state average. The low-income, minority, and indigenous communities of potential concern within the analysis area constitute potential populations at risk for adverse health outcomes due to demographic or socioeconomic factors (Headwaters Economics 2024). The EPA has also concluded that the most severe harms from climate change fall disproportionately upon historically underserved communities (EPA 2021b). Aside from ethnicity and poverty status, other factors contributing to increased health risks for potential communities of concern in the analysis area include, but are not limited to, age, education, and employment.

While the determination of potential adverse and disproportionate historical effects from specific previous actions may initially be the assessment of the BLM, this assessment should not be assumed to be the position of specific, potentially affected communities of concern. The BLM realizes that additional adverse impacts may be identified by local communities as specific development locations and types that are proposed. Identified communities of potential concern would also be provided opportunities to identify any perceived adverse environmental and socioeconomic impacts at the time of site-specific analysis during the APD stage. This discussion addresses only the effects for the issues identified by the BLM during scoping and public comment periods of this specific lease sale. The BLM would continue to work with potentially affected communities of concern to identify and

address additional environmental justice issues as they arise.

### Potential Populations at Risk for Disproportionate Impacts in the Project Area

Per [headwaterseconomics.org](http://headwaterseconomics.org), some populations are more likely to experience adverse social, health, and economic outcomes due to their race, age, gender, socioeconomic status, and other indicators, such as language proficiency. The North Dakota and Montana indicators analyzed, in addition to minority and low-income data presented previously, (see Appendix L, N, O) include educational attainment, language proficiency, households receiving public assistance, labor participation, housing affordability, potentially vulnerable households (elderly living alone, single female households, single female households with children), and potentially vulnerable people (noninstitutionalized and disabled or those without health insurance).

While low-income and minority indicators were analyzed to establish an environmental justice baseline for populations in the project area, impacts to these populations can be further exacerbated by other, concurrently present population risk indicators. For example, low-income populations are more likely to have inadequate housing, live and/or work in areas with greater exposure to environmental hazards, have an overall lack of access to resources that leads to poorer health outcomes and a lesser likelihood of having health insurance. Taking the example further, low-income households receiving public assistance may use a larger amount of their household budget to meet the basic necessities of life, including housing, food, and transportation. Housing affordability data is also a useful population indicator for potential disproportionate impacts, as housing affordability typically does not affect all populations equally given variable ratios of monthly income vs. rent or mortgage costs in an area. Last, households with potentially vulnerable populations (including people over the age of 65, single females, and households with children under the age of 18) are more likely to live in poverty, experience food insecurity, tend to be less educated, and are typically disproportionately affected by heat-related illnesses and social isolation (**Appendix M Populations at Risk**).

**Table 18** shows us that potential populations at risk for some disproportionate impacts exist where risk indicator values are greater than respective state averages for educational attainment, labor participation, affordable housing, and potentially vulnerable households and people in nearly all counties within the project area. In all counties excluding Richland the risk indicator values for Educational Attainment exceed North Dakota and Montana's averages of 6.5% and 5.5% respectively. In the category of Language Proficiency Dunn and McKenzie counties exceed the State's average of 0.7%. In Montana, the counties meet or are slightly lower than the State's average of 0.3%. Dunn, McKenzie, Liberty and Roosevelt counties exceed the state average in the Supplemental Security Income category. The Labor Participation risk indicator values are greater than the state average in all counties within the project area excluding Richland. Regarding Housing Affordability Dunn, McKenzie, Liberty and Roosevelt counties values exceed the state average in their mortgage cost being greater than 30% of their household income. In the categories of Single female households with children younger than 18 years old McKenzie, Liberty and Roosevelt counties have values greater than the state average. Potentially Vulnerable People with disabilities values exceed the state average in Dunn and Liberty counties. Lastly, Potentially Vulnerable people without health insurance exceed the state average in Dunn, McKenzie, and Roosevelt counties. As previously mentioned, this information can be found in Appendix M.

**Table 18.** Potential Populations at Risk for Disproportionate Impacts in the Project Area

Potential Populations at Risk for Disproportionate Impacts in the Project Area				
	Educational Attainment	Language Proficiency	Households Receiving Public Assistance (SSI, Cash, SNAP)	Labor Participation
<b>State Average</b>	ND = 6.5% MT = 5.5%	ND = 0.7% MT = 0.3%	ND = 3.1%, 1.9%, 6.3% MT = 3.7%, 2.6%, 8.6%	ND = 14.0% MT = 18.5%
<b>County</b>				
Dunn	9.4%	2.7%	4.3%, 1.4%, 3.4%	20.0%
McKenzie	7.3%	1.2%	3.2%, 1.5%, 2.7%	19.6%
Liberty	23.4%	0.3%	5.0%, 0.7%, 5.8%	31.4%
Roosevelt	6.8%	0.1%	7.0%, 7.5%, 11.1%	41.7%
Richland	4.3%	0.3%	3.0%, 2.5%, 4.7%	16.9%
	Housing Affordability	Potentially vulnerable households (>65yo, sf,<18yo)	Potentially Vulnerable People (N + disabled, N+ no insurance)	
<b>State Average</b>	ND = 19.7%, 36.0% MT = 28.9%, 40.4%	ND = 11.8%, 7.5%, 5.5% MT = 13.4%, 7.8%, 5.1%	ND = 11.4%, 7.2% MT = 14.1%, 8.4%	
<b>County</b>				
Dunn	27.0%, 14.2%	15.8%, 3.8%, 3.1%	14.9%, 18.4%	
McKenzie	24.6%, 26.5%	7.7%, 7.0%, 5.6%	9.8%, 15.7%	
Liberty	34.1%, 35.4%	26.9%, 7.9%, 5.9%	19.8%, 5.7%	
Roosevelt	33.9%, 28.1%	13.1%, 14.9%, 9.4%	13.8%, 31.3%	
Richland	25.4%, 30.2%	13.5%, 6.4%, 5.1%	13.2%, 7.1%	
*Educational Attainment - % of the population that <i>has not</i> achieved a high school education or equivalent				
*Language Proficiency - % of people who speak English “not well”				
*Households Receiving Public Assistance – Social Securing Income, Cash assistance, Supplemental Nutrition Assistance Program				
*Labor Participation - % of the population that did <i>not</i> work				
*Housing Affordability – Mortgage > 30% of household income, and Rent > 30% of household income				
*Potentially vulnerable households – greater than 65 years old living alone, Single female households, households with children under the age of 18				
*Potentially vulnerable people – noninstitutionalized and disabled, noninstitutionalized without health insurance				

Source: See Appendix M. Data sources US Department of Commerce, 2022. Census Bureau, American Community Survey Office, Washington DC. <https://headwaterseconomics.org/apps/economic-profile-system/> Accessed 07.10.2023.

## Human Health

Literature has indicated that there are many effects to human health associated with oil and gas development, particularly (but not exclusively) in areas that are proximal to high development. Some of these effects are:

- Reproductive harms including birth defects, low birth weight, preterm births, and miscarriages
  - McKenzie et. al (2014) analyzed the association between density and proximity of natural gas wells within a 10-mile radius of a maternal residence. The study suggested that there was an association between density of and proximity to natural gas wells and increased birth defects.
  - Tran, et al (2021) monitored births to mothers in eight California counties between 2006 and 2015 where the individuals were exposed to hydraulic fracturing by at least one well within one kilometer of their residence during pregnancy. The study suggests that although hydraulic fracturing exposure may influence birth outcomes there are other factors involved including urban

ambient air pollution that may affect the birth weight and size.

- Respiratory health effects including asthma, lung disease, and breathing difficulty
  - Outdoor air pollutants, including ozone, particulate matter, nitrogen dioxide, and sulfur dioxide, are recognized causes of asthma (Rasmussen et al. 2016).
- Possible disruption of the endocrine system
  - Kassotis, et al (2016) determined that the contamination of surface and groundwater was one source of Endocrine-disrupting chemicals to the human body via contamination of sources of drinking water, the other being air as the route of exposure for humans by means of inhalation exposure from surface spills and associated oil and gas infrastructure.
- Cancer (lung cancer and other types of cancer);
  - Carcinogens associated with oil and gas development include aromatic petroleum hydrocarbons (benzene, toluene, ethyl benzene, and xylenes (BTEX)) and diesel exhausts (Adgate et al 2014).
- Injuries
  - 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:
    - The most common type of accident were traffic and single-vehicle rollovers (Adgate et. al 2014);
  - Fatalities from explosions, fires, spills, and leaks;
    - ...the fatality rate is 2.5 times the rate of the construction industry and 7x higher than the general industry rate from 2005 to 2009. Adgate et.al (2014)
- Trauma and psychological stress.
  - Malin (2020) indicates that stressors and mental health from the institutional mechanisms associated with fossil fuel development are associated with 1) uncertainty, due to inaccessible, opaque information about environmental and public health risks and 2) powerlessness to meaningfully impact regulatory or zoning processes.
- Climate Change and Greenhouse Gases
  - Based on a 100-year global warming potential, future potential development of the nominated lease parcels is estimated to result in 57,565 metric tons of carbon dioxide equivalent (CO<sub>2</sub>e) from construction and operation and 3,312,760 metric tons of CO<sub>2</sub>e from downstream GHG emissions.

### *3.5.2 Environmental Effects - No Action Alternative*

#### **Economic Effects—No Action Alternative**

Under the No Action Alternative, none of the nominated parcels would be offered for sale and no Federal bonus bid or rental incomes would be received for the parcels awarded leases. Existing Federal leases for oil and gas properties would continue to generate rental income.

#### **Environmental Justice and Human Health Effects – No Action Alternative**

Under the No Action Alternative, none of the nominated parcels would be offered for sale and no additional disturbance or effects would result from the lack of sale. Under the No Action alternative, it is not anticipated that there would be any specific disproportionate adverse impacts to EJ populations living within the analysis area.

### *3.5.3 Environmental Effects - Proposed Action Alternative*

#### **Economic Effects – Proposed Action Alternative**

Under Alternative B, the complete set of proposed parcels would be offered for sale. Those parcels that are successfully leased will generate Federal bonus bid revenue and annual rents, which will be collected on leased parcels not held by production. As described in **Economic Conditions**, these revenues are collected by the Federal government, which then distributes a portion of the revenues collected to the State and counties. The amount that is distributed is determined by the Federal authority under which the Federal minerals are being managed.

#### **Economic Model**

The bidding process for the Quarter 1 2025 lease sale are modeled to follow the minimum bonus bids (\$10 per acre) and rental prices (\$3 per acre in years 1-2, \$5 per acre in years 3-8, and \$15 per acre in years 9 and 10). It is assumed that all the offered parcels successfully sell for these minimum values. This is a conservative assertion. It is assumed that the winning bidder for a lease parcel must pay the first-year rental fees and the bonus bid and continue to pay all rental fees for the full 10 years of a lease. Over the past several years the inflation-adjusted average bonus bid per acre at MT/DK lease sales has ranged from \$6 to over \$200. Most sales included multiple parcels with winning bonus bids below the new minimum of \$10 per acre and it is unclear how many of these parcels would have been bid on and leased under the updated price schedule.

**Table 19.** Alt B – Estimated Federal Revenue Associated with the Quarter 1 2025 Lease Sale

<u>Field Office</u>	<u>County</u>	<u># Parcels</u>	<u>Total Acres</u>	<u>Rental over 10 Years</u>	<u>Bonus Bid (Min. \$10.00/acre)1,2</u>	<u>Federal</u>	<u>State</u>	<u>County/Local</u>	<u>Total</u>
North Dakota	Dunn	3	86.79	\$5,728	\$868	\$367	\$266	\$86	\$719
	McKenzie	4	111.71	\$7,373	\$1,117	\$1,550	\$1,125	\$365	\$3,040
	FO/ND Total	7	198.5	\$13,101	\$1,985	\$59,375	\$43,076	\$13,970	\$116,421
Havre	Liberty	1	40	\$2,640	\$400	\$1,550	\$1,125	\$365	\$3,040
Miles City	Roosevelt	1	57.43	\$3,790	\$574	\$65,590	\$47,585	\$15,433	\$128,607
	Richland	4	1028.2	\$67,861	\$10,282	\$13,955	\$10,124	\$3,283	\$27,362
	FO/MT Total	6	1125.63	\$74,292	\$11,256	\$156,694	\$113,680	\$36,869	\$307,243
Total		13	1,324.13	\$87,393	\$13,241	\$216,068	\$156,756	\$50,840	\$423,664

In this analysis, Federal leasing revenue estimates (lease rent and bonus bids) are based upon the number of acres being offered. There are no guarantees that any of the parcels offered for lease will receive bids, and until the lease sale is conducted it is unknown which and how many of the offered parcels will be leased.

Due to energy market volatility and the dynamics of the oil and gas industry, the BLM cannot predict the exact economic effects of this leasing action. These effects are specific to which successfully leased parcels will be developed and which developed parcels will produce paying quantities of Federal fluid minerals.

Given this uncertainty, in this analysis revenue estimates are limited to the direct effects of leasing and are calculated under the following assumptions:

1. All of the proposed parcels will be sold.
2. Federal rental income will be collected during the full term of the leases (10 years).
3. All parcels are leased at the regulatory minimum bonus bid and rental rates.

The estimates based upon these assumptions are provided in **Table 19** Alternative B would generate bonus bids totaling \$13,241 and annual rental income totaling \$87,393. The total value of all rentals and bonus bids received over 10-year leases for all parcels would be \$100,634.

As noted above, Federal rental income and bonus bids from the lease sale described in Alternative B would be shared with the State and county where the parcel is located. During the term of these leases the Federal government would collect \$216 thousand in revenue while the states would collect \$156 thousand, and the analyzed ND and MT counties and local governments would receive a combined \$51 thousand from the new leasing. State and county revenues to ND total \$116 thousand while in MT state and local governments additional revenues total \$307 thousand.

### **Environmental Justice and Human Health Effects – Proposed Action Alternative**

The reasonably foreseeable development (RFD) scenario for the proposed action is 4 oil and/or gas wells for all parcels nominated (See **Table 2** and **Appendix D**) for the North Dakota Field Office, Havre Field Office, Miles City Field Office, (Dunn, McKenzie, Liberty, Richland, Roosevelt counties). Unique properties could exist near the proposed lease parcels. It is undetermined at this time if these properties are residences, and if so, if the residences are occupied as of the date of this analysis. For all parcels, an attempt to mitigate any disproportionately high and adverse human health and environmental effects of development near these residences is required through the application of 43 CFR § 3101.1-2. The setback requirement from residences or occupied dwellings of 500 feet (152.4m) stems from 43 CFR § 3101.1-2 Surface Use Rights, where the Authorized Officer may require reasonable measures to minimize adverse effects to other resource values, land uses, and uses not address in lease stipulations at the time operations are proposed. 43 CFR § 3101.1-2, Surface Use Rights, allows the authorized officer to move the proposed operations as far as 656 feet (200m) from the proposed action. This lease notice is also applicable to all related facilities. Additionally, Standard Lease Notice STD 16-3 specifies that development is generally restricted within a quarter mile of occupied dwellings and within 500 feet of riparian habitats and wetlands, perennial water sources (rivers, springs, water wells, etc.) and/or floodplains. Intensity of impact is likely dependent on the density of development and surrounding, proximal populations.

The likelihood of additional disproportionately high and/or adverse human health and environmental effects to the identified populations is quite low, based on the reasonably foreseeable development

scenarios for all parcels. Many of the human health issues identified above are associated with populations who live in close proximity to dense, long-term oil and natural gas development. The studies referenced analyzed rural populations that are comparable or larger than many of the largest cities in the states of North Dakota and Montana although the effects of living in close proximity to oil and natural gas development cannot be discounted, these scenarios may not be the case in this lease sale. Although the counties included in this sale have at-risk, low income, and minority populations (SEP data, **Table 16**), oil and natural gas development in these areas would affect only immediately proximal communities or residences for a short period of time to a likely smaller degree.

While the determination of potential adverse and disproportionate effects from specific actions may initially be the assessment of the BLM, this assessment should not be assumed to be the position of specific, potentially affected communities of concern. The BLM realizes that additional adverse impacts may be identified by local communities as specific development locations and types are proposed. Therefore, identified communities of concern would be provided opportunities to identify any perceived adverse environmental impacts at the time of site-specific analysis during the APD stage. As a result, this discussion assesses only the effects for the issues identified by the BLM. The BLM would continue to work with potentially affected communities of concern to identify and address additional EJ issues as they arise.

Potential adverse impacts associated with oil and gas developments can be different for different communities. As discussed previously, the populations displaying higher risk indicators (presented in **Table 18**) are more likely to experience adverse health outcomes due to the presence of these indicators including educational attainment, language proficiency, households receiving public assistance, labor participation, housing affordability, potentially vulnerable households, and potentially vulnerable people. Therefore, immediately proximal communities of potential concern may be more sensitive to the impacts from potential health and safety risks associated with future potential and proximal development of the lease parcels relative to immediately proximal non-EJ communities. Similarly, quality of life impacts could be greater for the residents or communities in close proximity to future potential development. As stated above, it is possible that there are unique properties near the proposed lease parcels. It is undetermined if these properties are residences, and if so, if the residences are occupied as of the date of this analysis. It should be noted that the proposed lease parcels are located in remote rural areas.

Air quality, greenhouse gases, climate change, and water use and availability are all issues that could potentially disproportionately affect the populations identified in **Table 16** and **Table 18**. Fugitive dust and diesel exhaust emissions from construction would result in criteria pollutant, VOC, and HAP emissions in the short-term. These emissions would occur for 30-60 days and would most likely impact locations near where these activities occur. Air quality impacts and associated health impacts can disproportionately affect potential populations of concern in the analysis area who are already socially vulnerable and likely have greater difficulty accessing healthcare facilities, paying for medical treatment, and typically have a higher propensity for pre-existing health conditions (EPA 2021b). While any climate change-related effects from the future potential development of the parcels themselves would be minimal, climate change is the result of collective and global actions. Any climate change-related impact would be regional in nature but may still disproportionately affect individuals within potential communities of concern in the analysis area who are already vulnerable (EPA 2021b). While any climate change-related effects from the future potential development of the parcels themselves would be minimal, climate change is the result of collective and global actions. Any climate change-related impact would be regional in nature but may still disproportionately affect individuals within potential communities of concern in the analysis area who are already vulnerable (EPA 2021b)

Groundwater resources are also regional in nature and water withdrawals are not anticipated to affect domestic water sources (see section 3.6 for water resources discussion). 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 or agricultural use. Best Management Practices (BMPs) and Conditions of Approval (COAs) to an APD would be implemented to minimize this risk. Should a spill occur, the BLM would work with operators to immediately remediate spills in accordance with federal and state standards. See appendices A and B for applied stipulations.

Additional analysis of potential disproportionately adverse impacts, including to human health and safety, would be conducted at the time of proposed lease development. When evaluating placement of wells at the lease development stage, standard design features, standard terms, BMPs, and COAs applied at the time of APD approval could include additional measures to reduce health and safety effects on nearby communities of potential concern. Future potential development would also be subject to relevant rules and regulations (federal and state) regarding public health and safety.

### 3.6 Issue 4 – Water Resources

What are the direct, indirect, and cumulative effects of potential oil and gas development, including hydraulic fracturing, on parcels that may be offered for lease on surface and groundwater quality and quantity?

BLM Montana/Dakotas developed a hydraulic fracturing (fracking) white paper that describes industry practices commonly associated with fracking, as well as regulations designed to protect water resources. This white paper is included as **Appendix F** to this EA, and the information is incorporated by reference into this water resources analysis.

Montana Department of Natural Resources and Conservation and North Dakota Office of the State Engineer & State Water Commission regulate the right to use surface and groundwater in their respective states. State laws require that water rights be established for all beneficial uses of water, including that used for oil well development (drilling and hydraulic fracturing). Depending on location, new water rights or changes to existing water rights may apply ([http://dnrc.mt.gov/divisions/water/water-rights/docs/oil-gas/water\\_options\\_oil\\_development.pdf](http://dnrc.mt.gov/divisions/water/water-rights/docs/oil-gas/water_options_oil_development.pdf)).

In addition, the states administer numerous water quality regulations including the Clean Water Act of 1977, the Water Resources Planning Act of 1962, the Pollution Prevention Act of 1990, and the Safe Drinking Water Act of 1977. The Antidegradation Policy in the Clean Water Act mandates the maintenance of the level of water quality that has been identified as being necessary to support the existing uses of a waterbody (40 CFR Section 131.12(a)). Waste water will be disposed of in accordance with state, local and federal regulations, including HB1409-38-11.2-07 (North Dakota) and [ARM Rules 36.22.1005 & 36.22.1226](#) (Montana).

Split estate parcels would be subject to management decisions contained in their applicable Land Use Plan or Resource Management Plan including the 1988 North Dakota RMP, the 2015 Rocky Mountain Region Record of Decisions and the applicable Approved Resource Management Plans, the HiLine ARMP and FEIS of September 2015, the Miles City ARMP and FEIS of September 2015, the 2023 Draft MCFO SEIS and Bureau of Reclamation Missouri Basin Region 5. These RMPs designate areas open or closed to fluid mineral leasing and assigns standard terms and conditions as well as stipulations to conserve water resource values.

#### 3.6.1 *Affected Environment*

##### **Surface Landcover**

The 13 lease parcels (1,324.13 acres) associated with the Quarter 1 2025 lease sale are located in McKenzie and Dunn counties in North Dakota (7 parcels), and Richland, Roosevelt, and Liberty counties in Montana (6

parcels).

### **Dunn and McKenzie Counties**

Two (2) of seven (7) parcels in North Dakota are located in the Little Missouri National Grassland (LMG), which encompasses about 1.0 million acres in the western region of North Dakota. The LMG is divided into two ranger districts: the McKenzie District in the north and the Medora District in the south. The applicable lease parcels on the Quarter 1 2025 lease sale are located in the McKenzie District, and all are within the Badlands Geographic Area. The semi-arid continental climate of the geographic area consists of erratic precipitation, but averages about 15 inches per year, with about half of that precipitation falling from May through July. Short but intense thunderstorms, sometimes accompanied by hail, are a frequent occurrence between April and September. Moisture deficits are critical during the summer months. Drought cycles are typical, some lasting as long as 10 to 15 years. Yearly temperatures range between -35°F to 100°F. Snowfall averages about 30 inches per year, but winds, averaging about 10 miles per hour, usually create deep accumulations in draws.

The topography of the Badlands Geographic area includes intricately dissected drainages and draws dropping from grassy ridgelines or butte-like hills and color-banded mounds typical of a badlands landscape. Large slumps and earth flows, typical of a highly erodible landscape, can also be identified. Small inclusions of rolling prairie are also typical of this geographic area. Multi-layered soils are extensively exposed as are soft rock or rock-like substances such as siltstones, clay stones, shale, and sandstones. Other erosion-resistant rocks, such as lignite seams and scoria, are also prevalent. “True” badlands, characterized by largely unvegetated slopes greater than 40 percent are found within this geographic area. Butte escarpments provide unique locations of biologic, geologic, cultural, and archaeological resources.

The desired landscape condition is to maintain the undeveloped character and scenic integrity of the badlands and maintain streams in properly functioning condition or in an upward trend. Long-term soil productivity and properly functioning water cycles are maintained. Properly functioning water cycles are characterized by high infiltration rates, low soil compaction, and minimal overland flows. Energy flow and nutrient cycling are functioning properly to maintain diverse, native plant and animal communities.

### **Richland and Roosevelt Counties**

Richland and Roosevelt Counties border North Dakota in northeastern Montana. Elevations range from 1,800 feet near the Yellowstone and Missouri Rivers to about 2,900 feet. The Yellowstone river runs north and east across the county and the Missouri River marks the northern border of Richland County; The Missouri River is the southern border of Roosevelt County. Average temperature is 44°F, and precipitation averages 14 inches per year. Snowfall accumulates November through April and averages 24 inches.

The land in these counties can be described as Great Plains mixed-grass Prairie, as there are rolling hills intermittent with vast, wide, glaciated plains. Grasses that typically comprise this area include western wheatgrass, thickspike wheatgrass, green needlegrass, blue grama, and needle and thread. Forb diversity is typically high. In areas where sagebrush steppe borders the mixed grass prairie, common plant associations include Wyoming big sagebrush. Wooded draws are found closer to steep slopes or canyon bottoms and support deciduous trees like green ash and chokecherry. These wooded areas provide habitat for several bird species, small mammals, and deer.

Soils are generally smectitic, well drained, clayey or loamy. Many of the coarse textured soils have exposed caprock sandstone formations; These soils can be highly erodible, leading to badland-type landscapes that have highly eroded, rugged landforms with sparse vegetation.

## **Liberty County**

The planning area associated with the Hilina RMP consists of mainly grassland ecosystems that have, in places, been converted to agriculture. Known as the Northwestern Glaciated Plains ecoregion, and more specifically the North Central Brown Glaciated Plains (Liberty and Hill counties) and the Glaciated Northern Grasslands (Blaine and Toole counties), about 60% of the lands on the Hilina remain in native vegetation, with approximately 25% of these lands being managed by the BLM.

The topography of the Northwestern Glaciated Plains region is generally level towards the east and irregular towards the south as this area represents the southern boundary of the continental glaciation and soils are derived from glacial drift. Hummocky moraines locally occur and are characterized by seasonal and semi-permanent ponds and wetlands. Land use is devoted to cattle ranching and farming.

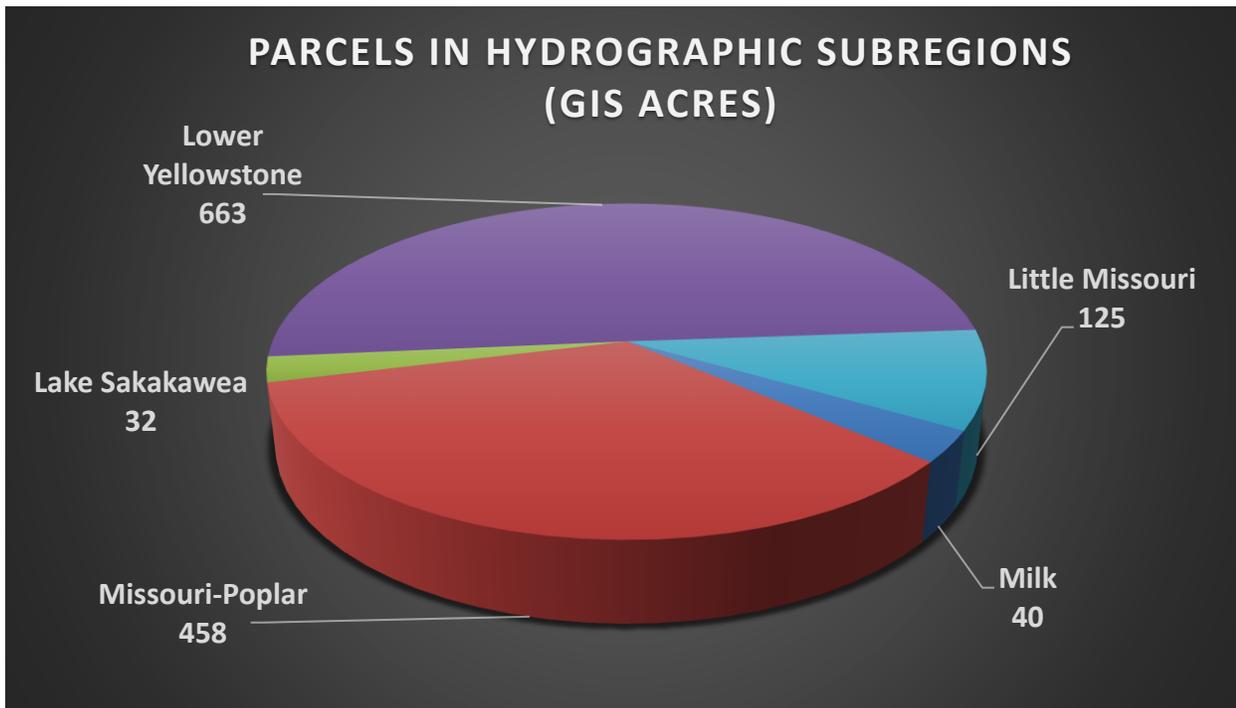
Although changes in terrain, land use, surficial deposits, and soils are evident throughout the Northwestern Glaciated Plains region, it is understood that the general ecoregion extends eastward from the foothills of the Rocky Mountains for hundreds of miles. Dark brown soils are used for crops and range, important for grain farming and grazing. Groundwater can be taken from glacial alluvial deposits and bedrock. ([gaftp.epa.gov](http://gaftp.epa.gov)).

Linear features on the Hilina include roads, railroads, trails, and irrigation systems, including flood control reservoirs and associated water distribution systems. Many of the smaller flood control reservoirs are part of a larger prairie river system that are usually direct tributaries of the Missouri and Yellowstone rivers. Low to mid elevation locations channel rivers with a low gradient into long runs and continuous pools, where many creeks and streams appear to be ephemeral. Substrate characteristics are typically cobble/pebble riffles, when present, and can include large woody debris, deep pools, and undercut banks. ([MT Field Guide, Medium Prairie River](#))

## **Surface Water**

Lease parcels associated with the Quarter 1 2025 lease sale are distributed throughout the hydrographic subregions (HUC-6) identified in **Figure 14** below. Of these subregions, 50% percent of the leasable area is located in the Lower Yellowstone subregion, 35% percent is in the Missouri-Poplar subregion, 9% percent is in the Little Missouri subregion, 3% is in the Milk subregion, and 2% in the Lake Sakakawea.

**Figure 14.** Distribution of Lease Parcels throughout the Hydrographic Subregions associated with the Quarter 1 2025 lease sale. (Note: Subregions represent the 4-digit hydrologic unit codes associated with the USGS' Watershed Boundary Dataset, 2017)



Most of the consumptive water use in the region comes from surface water, which is especially critical for agricultural operations. According to the National Hydrography Dataset (NHD High\_92V.210), the parcels contain approximately:

- 0.6 miles of perennial streams
- 4.1 miles of intermittent/ephemeral streams
- 1.5 miles of canals and ditches
- 4.2 acres of intermittent lakes/ponds
- 99.1 acres of perennial lakes/ponds
- 0 springs and seeps
- 0 acres of swamp/marsh

Numerous lease parcels in North Dakota and Montana, MT-2025-01-0358, 6950, ND-2025-01-0748, 0244, 0246, and 0747, are within the high-water marks of the Missouri River, Yellowstone River, or Little Missouri River. Access to mineral interests on this lease parcel will have to be accessed by directional or horizontal wells that are already commonly used in the surrounding acreage. The remaining lease parcels are not within the 100-year floodplain as mapped by the FEMA flood hazard maps or within the high-water marks of the Missouri River. All parcels are within areas defined as “Areas of Minimal Flood Hazard” or in areas that have not been mapped for flood hazards by FEMA. Mapping by FEMA is incomplete across the majority of these leases, especially in remote areas where impacts to life and property are limited (relative to areas with more substantial human development). Site specific assessments of flood hazard would be completed for any subsequent Surface Use Plan of Operations.

The BLM has identified project area surface waters, including streams, tributaries, lakes, and emergent wetlands; the lands are reflected in **Appendix P** in association with each parcel. Riverine systems include wetlands contained within a channel with the exception of those wetlands dominated by trees, shrubs,

persistent emergent, emergent mosses, or lichens. Water is usually, but not always, flowing in the riverine systems. Emergent wetlands, scrub-shrub wetlands, and forested wetlands may occur adjacent to the riverine system. (FWS.gov)

## **Stressors and impairments**

Streamflow in the area varies seasonally, with the largest flows commonly occurring in the spring or early summer. Water quality is often indirectly tied to streamflow, as it is largely dependent on the relative contributions of runoff and groundwater. Water quality affects the degree to which water can be used for a beneficial use and monitoring indicates that water quality in the region has been affected by a suite of factors; While the sources of water quality impairment vary considerably among waterbodies, nonpoint source pollution, nutrients, stream alteration, total suspended solids and metals are often listed as the primary causal factors, 2020; *North Dakota Integrated Section 305(b) Water Quality Assessment Report, 2018. Montana DEQ 2020 Final Water Quality Integrated Report.*

## **Groundwater and Consumptive Uses**

Groundwater plays an important role in meeting regional demands for water and the type, source, and volume of water varies within and between hydrographic subregions. For example, while less than three percent of water diverted in Montana for beneficial uses in calendar year 2000 was from groundwater, 95 percent of the rural, self-supplied domestic systems operate on groundwater sources (Montana Department of Natural Resources, *Water Fact Sheet #4*). Local groundwater conditions within the vicinity of the lease parcels are highly variable and the quality and availability of groundwater varies greatly across the region. Residents commonly get their groundwater from aquifers consisting of unconsolidated, alluvial valley-fill materials, glacial outwash, consolidated sedimentary rock formations, and some coal beds.

Aquifers in Western Montana are typically in unconsolidated, alluvial valley-fill materials within intermontane valleys. These intermontane valley aquifers often yield relatively large quantities of high-quality water to relatively shallow water wells. Conversely, within the Northern Great Plains (eastern Montana & Western North/South Dakota), bedrock aquifers are often an important source of groundwater (especially in the non-glaciated zone). These aquifers generally support low-producing domestic and stock water wells that have relatively poor water quality from deep beneath the earth's surface (100's of feet).

Aquifers associated with preglacial alluvial channels, however, are also an important source of water, especially in the non-glaciated areas of the Northern Great Plains. Similarly, alluvial terrace deposits associated with modern streams often provide groundwater for nearby domestic, stock, and municipal uses, especially along the Yellowstone and other larger rivers in the region. In fact, across the lease area, groundwater stored in modern alluvial stream deposits often represents the most reliably productive aquifers. This is noteworthy, as unconfined aquifers are also among the most susceptible to contamination because they tend to lack confining layers that would otherwise slow/halt the transmission of contaminants from the surface and shallow subsurface directly into the aquifer.

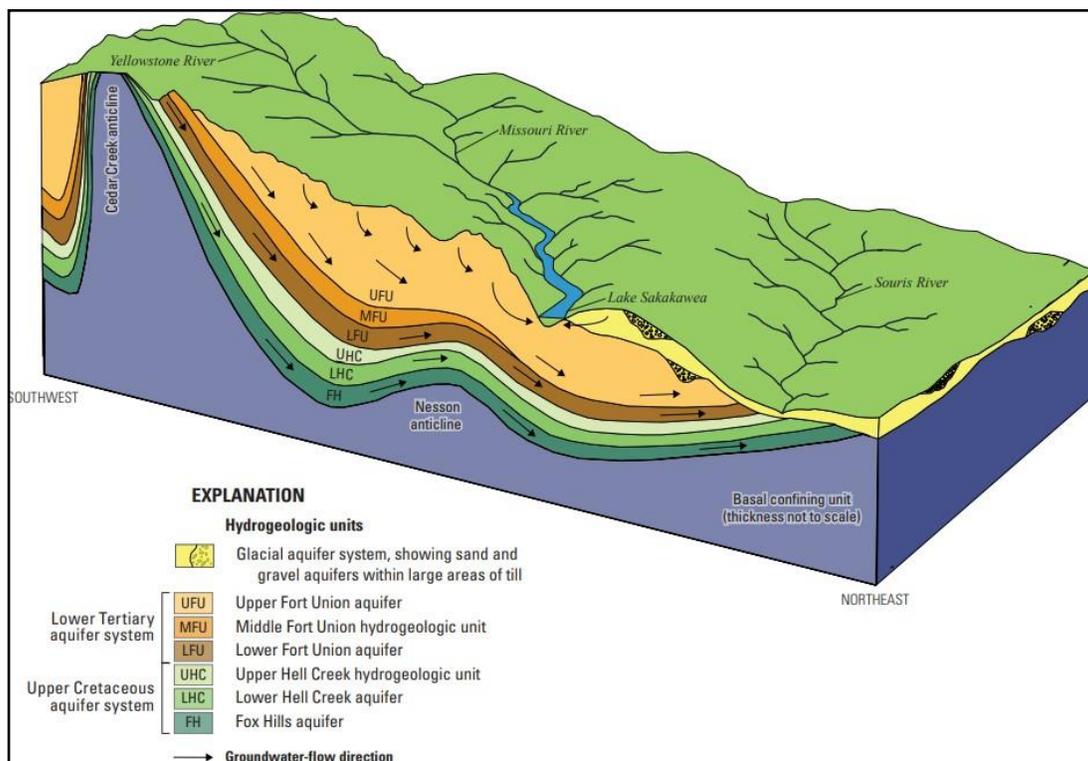
The Williston Basin aquifer is often divided into three units; the uppermost glacial till, lower Tertiary, and the Upper Cretaceous. These three aquifer systems cover 91,000 square miles throughout the Williston Basin with a maximum thickness of 2,900 feet deep in the center and thinning towards the edge of the basin. It is underlaid by 800 – 3,000 feet of relatively impermeable marine shales that serve as the basal confining unit. The main components of recharge to groundwater are precipitation and infiltration from streams and reservoirs. Most groundwater discharge is to streams and reservoirs, groundwater pumping is a small part (less than 5 percent) but increasing withdrawals from 1960-2005 have caused groundwater levels to drop locally. (USGS Groundwater availability of the Williston Basin, 2018), (Potential effects of energy development on environmental resources of the Williston Basin in Montana, North Dakota, and South Dakota — Water resources: U.S. Geological Survey Scientific Investigations Report 2017–5070–C). (Potential effects of

energy development on environmental resources of the Williston Basin in Montana, North Dakota, and South Dakota — Water resources: U.S. Geological Survey Scientific Investigations Report 2017–5070–C).

Most water used in hydraulic fracturing comes from surface water sources such as lakes, rivers, and municipal supplies. As of 2018 industrial water use which includes hydraulic stimulation made up 10.1% of all consumptive water use within North Dakota. North Dakota’s Office of the State Engineer is responsible for managing the State’s water resources as directed under Chapter 61-04 of North Dakota’s Century Code, and Article 89-03 of the State Administrative Code. Water intended for hydraulic stimulation requires a temporary water permit which necessitates a point of diversion review by a state hydrologist which is either granted or denied based on Chapter 61-04-06. Temporary water permits and reviews are publicly available under the ND.GOV website ([https://www.swc.nd.gov/reg\\_approp/waterpermits/](https://www.swc.nd.gov/reg_approp/waterpermits/))

The amount of water used in hydraulic fracturing, particularly in shale gas formations, may appear substantial but is often small when compared to other water uses such as agriculture and municipal supply. Groundwater can be used to augment surface water supplies where it is available in sufficient quantities; however, in 2013 the North Dakota office of the State Engineer formalized a policy that restricted industrial uses from utilizing groundwater from the Fox Hills Aquifer. This policy had already been enforced on a case- by-case basis since the early 1980’s. (Wanek 2009; pg.90) This aquifer has sufficient hydraulic head to naturally flow to the surface without the use of pumps and ranchers have drilled approximately 500 wells into this aquifer to water livestock in the western part of North Dakota, allowing the watering of livestock in areas with no electrical infrastructure. The rate of decline of hydraulic head has decreased at 1.5-3ft per year since 1995 centered in McKenzie County North Dakota (Wanek 2009). In the next 100 years it is expected that the majority of these naturally flowing wells will cease to flow.

**Figure 15.** Groundwater aquifers and flow in the Williston Basin region (From Long et al., 2018)



The BLM frequently receives comments asking for an alternative that would protect usable groundwater, defined under the Safe Drinking Water Act as an aquifer with water that contains less than 10,000 mg/L (10,000 ppm) of total dissolved solids. However, a separate alternative to protect usable groundwater is not

warranted because protection of groundwater would be required for any APD that is approved on a lease parcel. Authorization of proposed projects would require full compliance with local, state, and federal directives and stipulations that relate to surface and groundwater protection, and the BLM would deny any APD that proposes drilling and/or completion processes that are insufficient to protect of usable water, as required by 43 CFR § 3162.5-2(d). Any proposed drilling/completion activities would have to comply with Onshore Order No. 2, 43 CFR § 3160 regulations, and not result in a violation of a Federal and/or State laws that prohibit degradation of surface or groundwater quality.

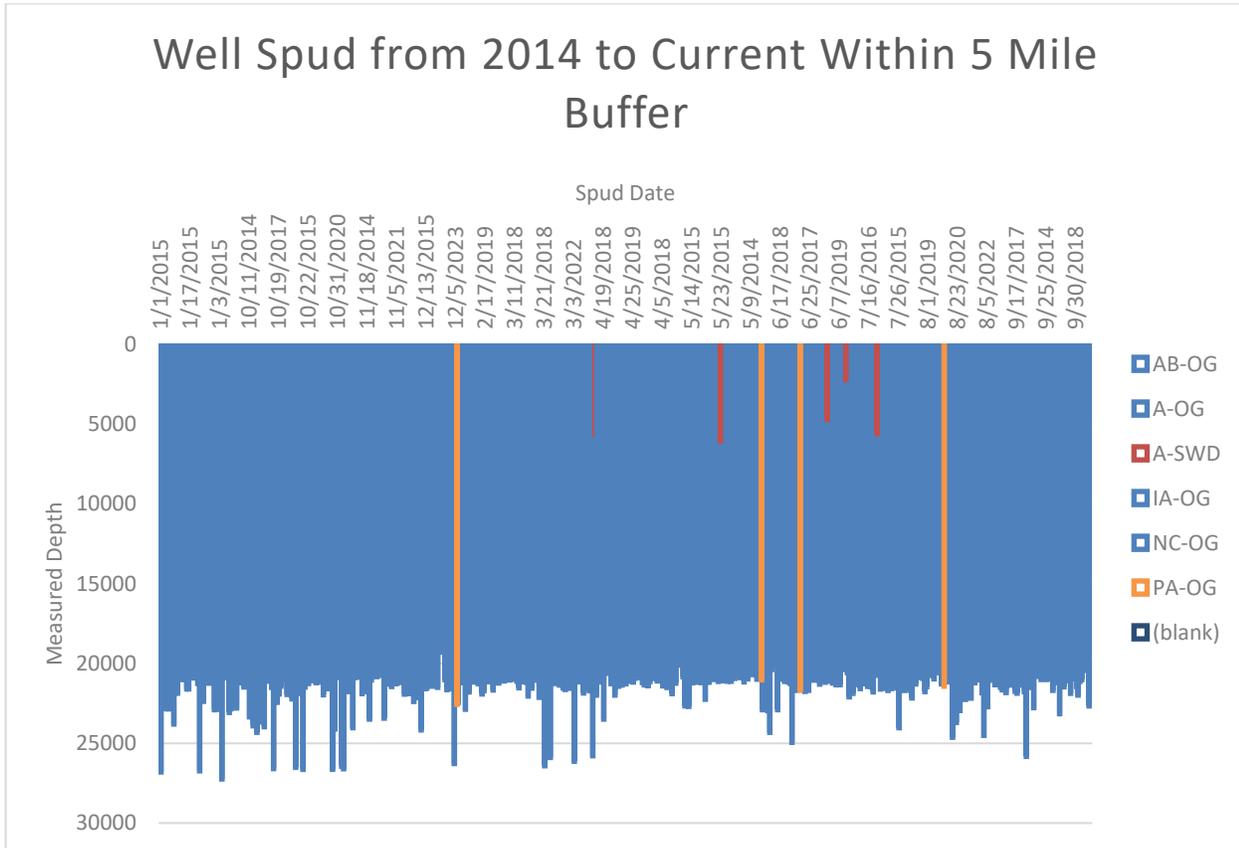
Lease parcels for the Quarter 1 2025 lease sale parcels within Richland, Roosevelt, McKenzie, and Dunn counties are within the Williston Basin development area. The lone parcel in Liberty County is likely related to vertical helium exploratory development.

**Williston Basin:**

Parcels for the Quarter 1 2025 lease sale within Richland, Roosevelt, McKenzie, and Dunn counties are part of the Williston Basin unconventional Bakken/Three Forks development area. The probable development scenario is continued horizontal well development within the Bakken and Three Forks formations.

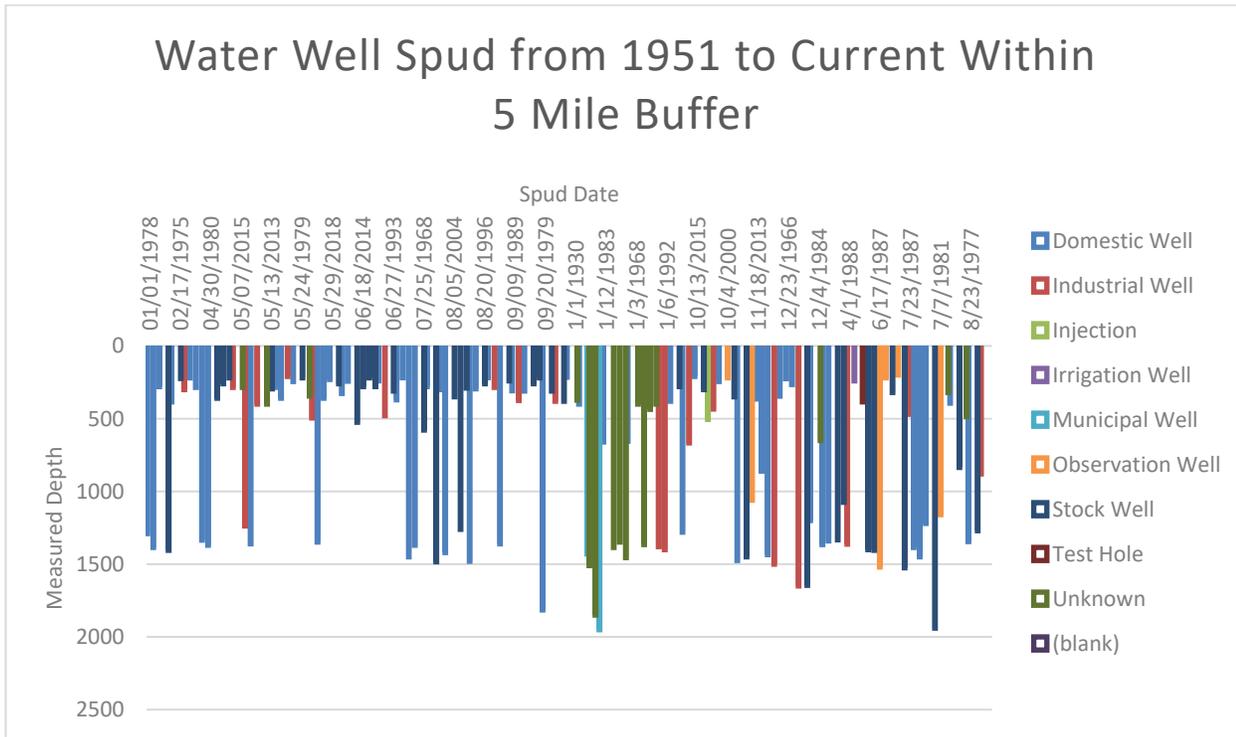
Due to the large number of wells and increasing activity in this area; only well data after 2014 was used to display in the graph. Older data was considered and looked at but the amount of development and focus on the Bakken and Red River since 2010 has not changed and we don't foresee it to change in the immediate future. **Figure 16** shows a large number of wells at >10,000ft measure depth. These are all horizontal Bakken Oil and Gas (OG), Three Forks, or Red River wells. There have also been wells drilled to ~5000ft that are used as saltwater disposal injection (SWD) wells into the Cretaceous sand intervals.

**Figure 16.** Graph of total depth of Oil and Gas wells within 5 miles of Quarter 1 2025 North Dakota parcels colored by use. Saltwater disposal wells start at approximately 5000'ft or deeper. Wells 10,000ft or deeper are targeting the Bakken and Three Forks formation.

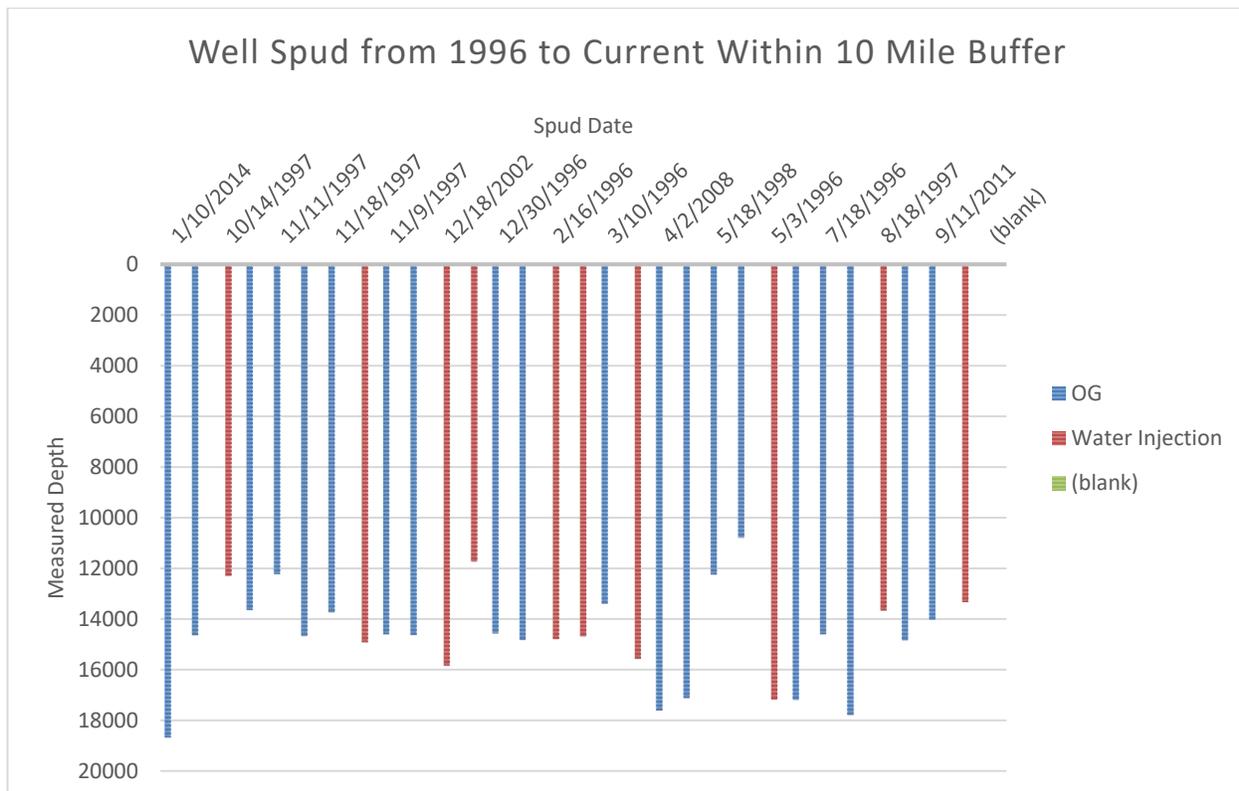


**Figure 17.** shows surrounding consumptive use groundwater wells that are 1000's of feet shallower than the horizontal well development in Williston Basin. Water wells within 5 miles of these lease parcels are all less than 2000ft deep.

**Figure 17.** Graph of total depth of water wells within 5 miles of Quarter 1 2025 North Dakota lease parcels colored by use.

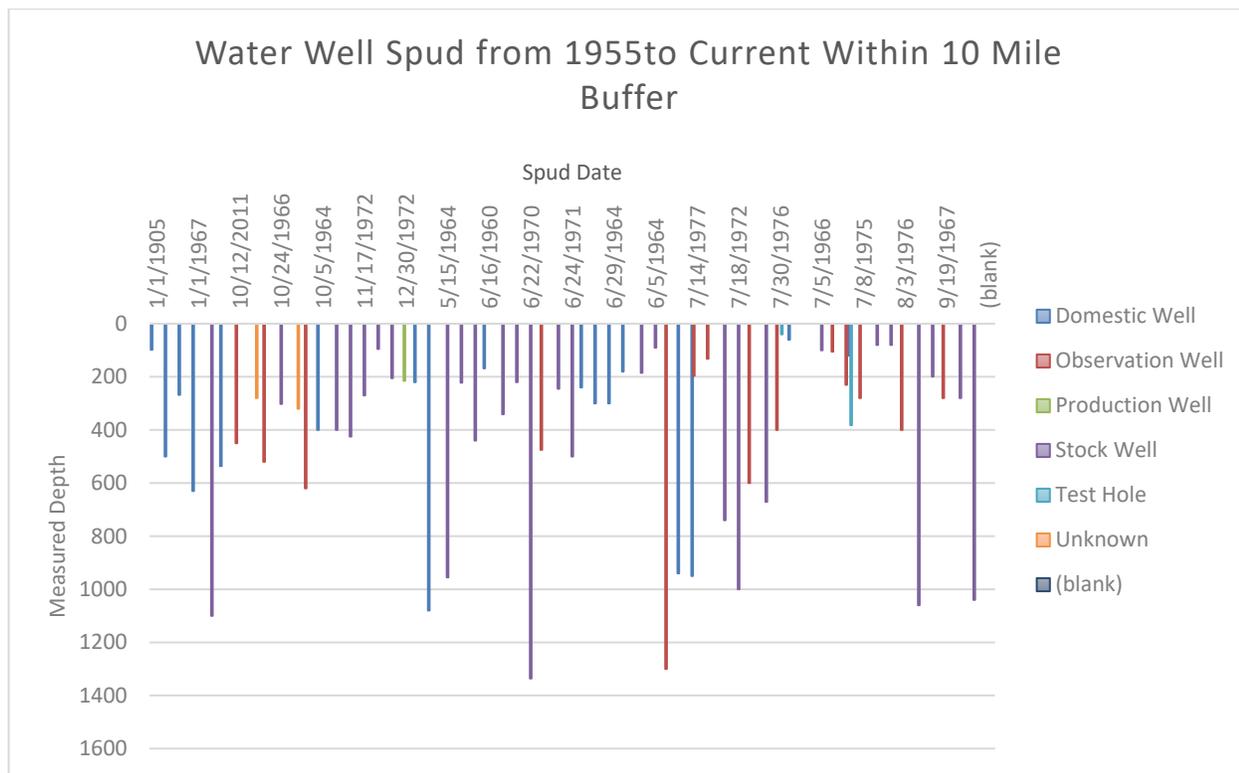


**Figure 18.** Graph of total depth of Oil and Gas wells within 10 miles of Quarter 1 2025 parcels colored by use. Wells 10,000ft or deeper are targeting the Bakken/Three Forks formations or Red River dolomites.



Water wells within 5 miles of these lease parcels are all <2500ft deep. **Figure 19** shows surrounding consumptive use groundwater wells are 1000's of feet shallower than the horizontal well development in Williston Basin.

**Figure 19.** Graph of total depth of Water wells within 10 miles of North Dakota Slope County lease parcels colored by use.



**Liberty County:**

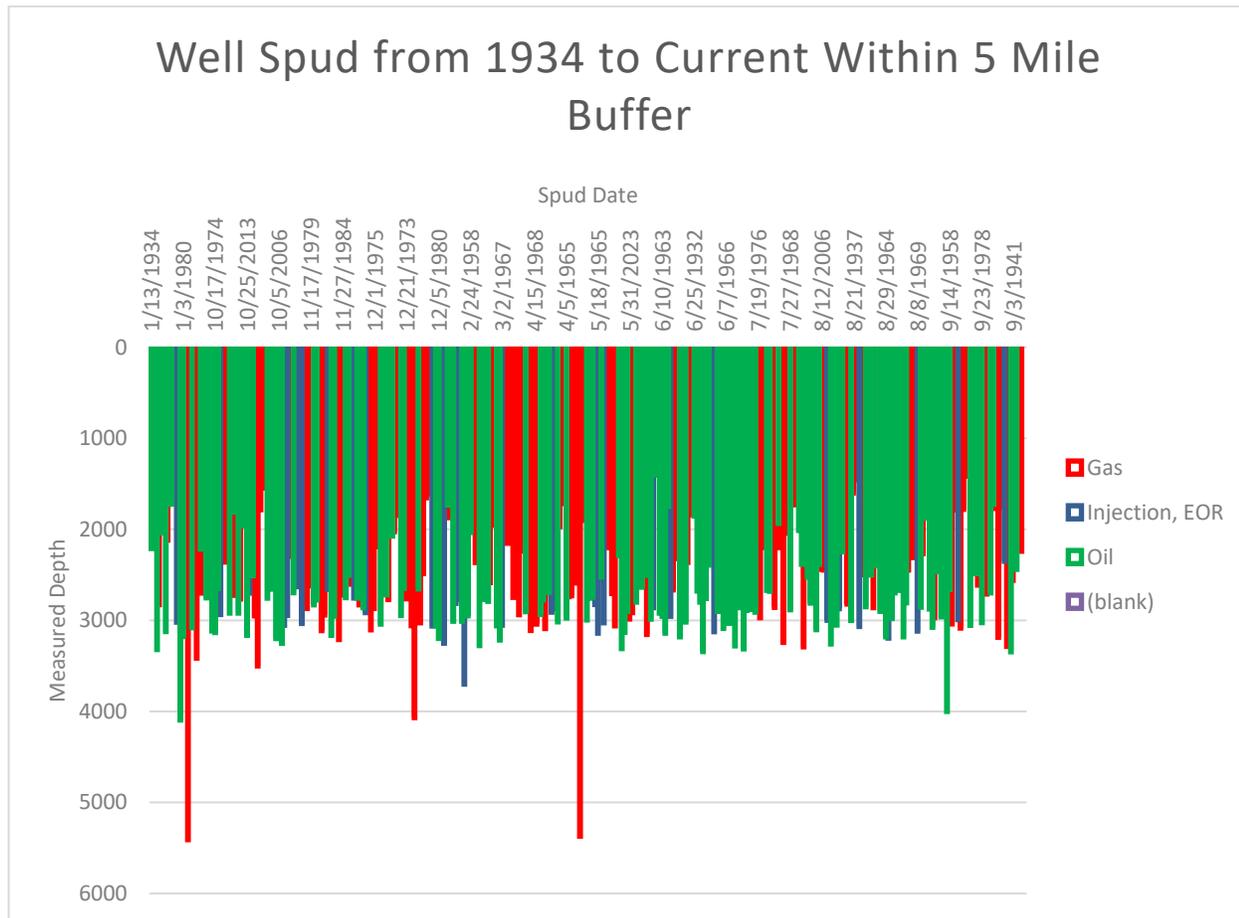
There is one parcel available for lease in the Quarter 1 2025 lease sale within Liberty County. This area is defined by the Sweetgrass arch which is a large anticline that trends north and south through this area and results in numerous oil and gas fields that have continually produced since the early 1900's. There are numerous oil and gas fields producing from the Upper and Lower Cretaceous sands, Jurassic, and Upper Devonian in fields adjacent to this parcel.

The most recent developments in the area focus on the Upper Devonian Nisku formation and deeper objectives. The Sweetgrass Arch is being considered as a potential target for helium accumulations above fractured basement rock. Thor Resources USA has spud and completed one well in the Utopia field south of this parcel also in Liberty County. Another company Avanti Helium has permitted wells in 36N 6E, and 37N 4E. This parcel in northern Liberty County is adjacent to these helium exploration projects. The likely development scenario for the parcel in Liberty County is continued helium exploration in formations Nisku and deeper based on surrounding recent permits. Vertical helium development does not involve large multistage hydraulic fractures found in unconventional oil wells and does not pose a significant risk to groundwater. The shallowest target for this type of development would be the Nisku formation at ~3000ft across this township which is deeper than the majority of surrounding oil and gas development. **Figure 20** shows the depths of surrounding oil and gas wells.

[https://www.fairfieldsuntimes.com/news/national/fractured-basement-rocks-targeted-at-kevin-sunburst/article\\_7e8d8424-97bd-11ea-ad7f-77f47f65270c.html](https://www.fairfieldsuntimes.com/news/national/fractured-basement-rocks-targeted-at-kevin-sunburst/article_7e8d8424-97bd-11ea-ad7f-77f47f65270c.html)

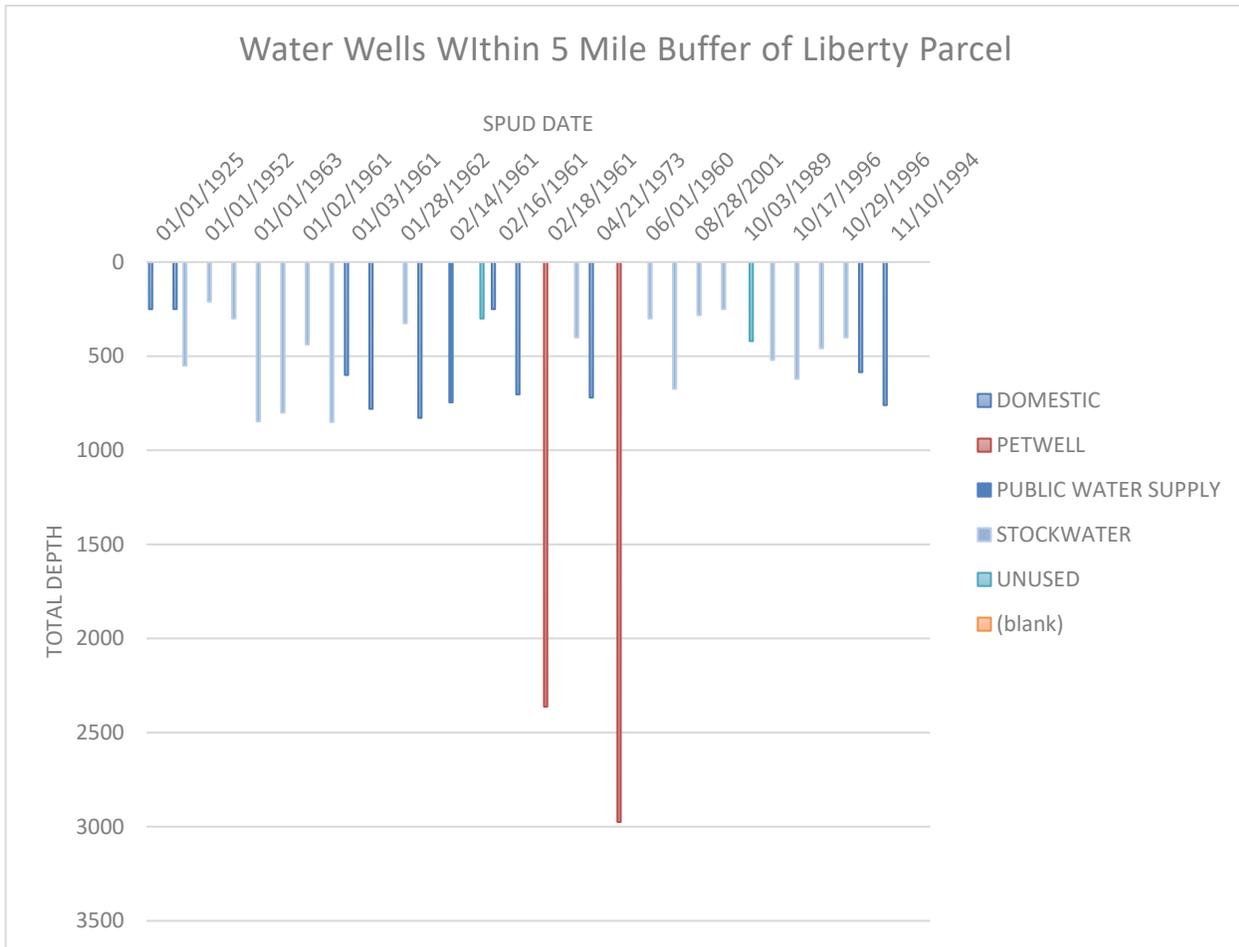
<https://avantihelium.com/news/avanti-helium-announces-significant-updated-resource-estimate-for-greater-knappen/>

**Figure 20.** Graph showing oil and gas wells from 1934 to current within 5 miles of the Liberty County lease parcel.



Water wells within 5 miles of these lease parcels are all <1000ft deep. **Figure 21** shows surrounding consumptive use groundwater wells are 1000's of feet shallower than the surrounding oil and gas development wells and shallower than any proposed helium well. This dataset contains two petroleum wells (petwell) that were not used for consumptive groundwater use.

**Figure 21.** Graph of total depth of Water wells within 5 miles of Liberty lease parcels colored by use.



**Field Development Summary:**

Lease parcels for the Quarter 1 2025 lease sale parcels within Richland, Roosevelt, McKenzie, and Dunn counties are within the Williston Basin development area. The lone parcel in Liberty County is likely related to vertical helium exploratory development.

The probable development scenario for the Quarter 1 2025 lease sale parcels within Richland, Roosevelt, McKenzie, and Dunn Counties are horizontal unconventional wells into the Bakken and Three Forks formations. This has been the predominate development scenario for the last 13 years and will likely continue. The Bakken and Three Forks formations are all greater than 10,000 feet deep while all the water wells used for consumptive use are shallower than 2,000 feet deep. Between the water wells and oil producing horizons are layers Cretaceous sands that are often used for saltwater disposal wells.

While there is sufficient vertical separation between existing groundwater wells and horizontal wells to make vertical fracture growth between the two zones highly unlikely, the higher permeability sands between the two zones makes the vertical propagation of hydraulic fluid past this zone even less likely. There is not a conflict between groundwater aquifers and horizontal well development due to hydraulic vertical fractures in this group of lease parcels.

The lone parcel in Liberty County is adjacent to parcels that are being permitted for helium gas development targeting the Upper Devonian Nisku, Duperow, and Souris River formations. Well development has been vertical or directional targeting structural closures. The likely development scenario will be continued vertical helium wells in the Nisku and deeper which does not conflict with existing groundwater usage.

### *3.6.2 Environmental Effects - No Action Alternative*

There would be no impacts to groundwater or surface water resources from the No Action Alternative because no parcels would be offered for sale.

### *3.6.3 Environmental Effects - Proposed Action Alternative*

#### **Surface Water**

Future oil and gas exploration and development of a lease parcel could affect surface water resources by causing the removal of vegetation, soil compaction, and soil disturbance in uplands within the watershed. The potential effects from this are accelerated erosion, increased overland flow, decreased infiltration, increased water temperature, channelization, and water quality degradation associated with increased sedimentation, turbidity, nutrients, metals, and other pollutants. Erosion potential can be further increased in the long term by soil compaction and low permeability surfacing (e.g., roads and well pads), which increases the energy and amount of overland flow by decreasing infiltration, and in turn changes flow characteristics, reduces groundwater recharge, and increases sedimentation and erosion. As acres of surface disturbance increase within a watershed, effects on water resources could correspondingly increase. However, due to the footprint of disturbance associated with the RFD (10.8 acres short term disturbance, and 4.52 acres long-term disturbance over 13 parcels), these potential impacts to water resources are expected to be minor. Furthermore, site specific effects would be more fully analyzed upon receipt of an APD and minimized through vegetation reestablishment and the application of BMPs and other conditions of approval to mitigate impacts of development.

Future oil and gas exploration and development of a lease parcel could also result in spills or produced fluids that could potentially affect surface and/or groundwater resources in the short and/or long term. These spills from oil and gas exploration/development have the potential to contaminate aquifers with salts, drilling fluids, fluids and gases from other formations, detergents, solvents, hydrocarbons, metals, naturally occurring radioactive materials, and nutrients; change vertical and horizontal aquifer permeability; and increase hydrologic communication with adjacent aquifers (EPA 2004).

From January 2023 through April 2024, ND Department of Environmental Quality reported 281 incidents that were not contained, for example, an overflow of the facility boundaries or a leak from a facility pipeline. The Department reported another 753 incidents that were contained within the boundaries of the production or exploration facility during the same time period. The ND Department of Environmental Quality receives their data from the Oil and Gas Division whenever an Oilfield Environmental Incident Report is filed. All spills are reported; volumes from 3 gallons to >300 bbls are listed. Spill materials include fluids (diesel, oil, produced water, frac fluids, fresh water), solids (bentonite), and gases (propane). Not all spills may reach or impact a drinking water resource. For example, on 10/03/2021, 220 barrels of brine spilled onto a cultivated field 1,320 feet from the nearest water well. Actions were taken to recover the fluid, and it was removed for disposal. The incident report notes that the produced water pooled within the field and that the area had been flagged for monitoring. The area was excavated and follow up readings will be taken as necessary to determine if any other actions will be needed (incident 764). All of these incident reports are available online at: <https://northdakota.hazconnect.com/ListIncidentPublic.aspx>.

The size of the spill and site characteristics will influence whether a spill reaches a drinking water resource.

Sandier soils and more permeable rock can increase the potential for spills to reach groundwater or migrate into surface water bodies. Spill prevention and response factors would be incorporated as COAs at the APD stage and may reduce the frequency and severity of impacts to surface water resources.

Some surface waters associated with the lease parcels are currently impaired from natural and anthropogenic features **Appendix H** and are discussed in the Affected Environment section. Fluid mineral development could additionally affect water resources during exploration, drilling, production, and/or abandonment. The magnitude of these impacts would depend largely on the specific activity, season, proximity to waterbodies, location in the watershed, density of development, hydrogeologic characteristics of the affected area, effectiveness of mitigation, time until reclamation success, and characteristics of any hydrologically connected aquifers. Adherence to applicable regulations (i.e., 43 CFR §3171 – §3177; wastewater disposal, water right, and water quality laws, etc.), as well as stipulations regarding steep slopes, erosive soils, streams, waterbodies, floodplains, and wetlands would minimize impacts that may be associated with future development (see Appendix A and B).

Alterations in watershed hydrology outside of the no surface occupancy zones could affect the water resources in these systems relative to the size of the watershed in which the disturbance were to occur. Produced water from conventional oil and gas development could impact the quality of surface water and groundwater through impoundments, injection, and discharge. Left untreated, produced water discharge and infiltration, or leaking produced water disposal pits could reach stream channels via subsurface flow, which could decrease water quality. However, use of produced water/waste pits are rigorously regulated for use in the State of North Dakota and since 2012 pits as a form of disposal are seldom used and must be approved by the Director (North Dakota Century Code 38-12-02). Proper wastewater disposal methods, including siting and design of disposal pits in accordance with state and federal regulations, would minimize or avoid these impacts.

## **Groundwater**

Potential effects to deeper aquifers may include cross-aquifer mixing through the wellbore or along fractures that extend between aquifers. All wells would be cased and cemented pursuant to North Dakota Department of Health (NDDH) rules, Montana Board of Oil and Gas (MBOGC) 36.22, Montana Code Annotated (MCA) Title 82, Montana Department of Environmental Quality (MDEQ), and 43 CFR § 3171, and 43 CFR § 3172. All wells also would be constructed according to relevant NDDH regulations to prevent cross-aquifer contamination. There would be minor potential for commingling of waters during well construction if proper well drilling procedures and completion techniques are employed. Refer to **Appendix F**, Fracking White Paper, and **Appendix F2** (Bakken) for further discussion.

BLM reviewed existing groundwater and oil/gas well data to identify any multiple use conflicts between groundwater use and petroleum development around the lease acreage that is scheduled to be made available for fluid minerals development in the Quarter 1 2025 lease auction. The large caveat to this assessment is that prior to lease sale, it cannot be guaranteed which geologic formation will be targeted in any one area. However, BLM can make an inference based on prior petroleum activity in the area.

BLM produced a series of maps for the proposed lease parcels showing the true vertical depth of surrounding oil and gas wells. There are points on each of these maps representing the location and depth of surrounding water wells. Refer to **Appendix G**. Furthermore, underground injection control regulations would isolate injection zones from potentially useable aquifers, which would limit the potential for adverse impacts to surface or groundwater resources.

The use of any specific water source on a federally administered well requires review and analysis of the proposal through the NEPA process, which will be completed at the APD stage. The Gold Book, Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (BLM and USFS 2007)

would be followed, and site-specific mitigation measures, BMPs, design features, and reclamation standards would be implemented and monitored to minimize effects to water resources. All proposed actions must comply with local, state, and federal regulations, including North Dakota and Montana water laws.

### **Water Quality**

Offering the parcels for lease would have no direct impact to surface or groundwater resources. Any potential effects on water from the sale of lease parcels would occur at the time the leases are developed (at the APD stage) and could be both short and long-term. Potential indirect and cumulative impacts from oil and gas leasing on water resources are also discussed in the applicable ARMP and FEIS for each field office and incorporated here by reference.

Pursuant to CWA section 303(d)(1), 33 U.S.C. § 1313(d)(1), each state is further required to identify those waters that do not meet water quality standards—called the “303(d)(1) list.” The 303(d) list is short for a state’s list of impaired and threatened waters. States are required to submit their list for EPA approval every two years. For each water on the list, the state identifies the pollutant causing the impairment, when known. Natural impairment features include Nitrogen, total dissolved solids (TDS), mercury, and an increase or decrease in specific conductivity because of background soil characteristics. Anthropogenic features include highways, roads, bridges; dams and impoundments that impact hydrostructure flow; agriculture, which contributed nutrients (**Appendix H, P**) to a water body; grazing, which can introduce pathogens (E. Coli) and/or physical alterations to a water body; and crop production that can affect the salinity, TDS, and sulfate levels of a water body.

The BLM is required to comply with state water quality standards and utilizes BMPs and design features to avoid, minimize, or mitigate potential impacts that could contribute to water quality impairment; Therefore, the BLM has identified, through the EPA WATERS Geoviewer website, which parcels nominated for this lease sale have proximity to impaired water bodies (See **Appendix H**):

Parcels ND-2025-01-0748, 0235, 0244, 0246, and 0747 are within Lake Sakakawea which is 303D impaired due to methylmercury. The contamination is due to burning of materials that contain mercury including coal, oil, and wood.

Parcel MT-2025-01-0412 is within the First Hay Creek which is impaired due to Total Dissolved Solids (TDS), Nitrogen, Phosphorus, Copper, Lead, Iron, and Nitrate which are caused by irrigated crop production and the transfer of water from an outside watershed.

[https://deq.nd.gov/publications/WQ/3\\_WM/TMDL/1\\_IntegratedReports/2018\\_Final\\_ND\\_Integrated\\_Report\\_20190426.pdf](https://deq.nd.gov/publications/WQ/3_WM/TMDL/1_IntegratedReports/2018_Final_ND_Integrated_Report_20190426.pdf)

*(Final 2020 Water Quality Integrated Report)*

[https://deq.mt.gov/files/Water/WQPB/CWAIC/Reports/IRs/2020/Appendix\\_A\\_Final.pdf](https://deq.mt.gov/files/Water/WQPB/CWAIC/Reports/IRs/2020/Appendix_A_Final.pdf)

There are no Hydromodifications associated with the lease parcels or in proximity to the waters associated with the lease parcels. There are no state-designated source-water protection areas or municipal supply watersheds associated with the nominated parcels of this lease sale. There are no public supply water wells associated with the nominated parcels of this lease sale. There are no sensitive areas and no areas of critical environmental concern, or other valued areas where important aquatic resources may be impacted associated with the nominated parcels of this lease sale.

A Reasonably Foreseeable Development (RFD) scenario for oil and gas leasing at the plan level was analyzed in the RMP for the North Dakota field office. The BLM used the plan level RFD to develop an RFD for this lease sale, which is summarized in **Table 20** below, and further described in **Appendix D**. The associated estimates of surface disturbance relate to the potential scope and magnitude of impacts to surface hydrology

and are used to provide context in this EA. The RFD for this lease sale estimates surface disturbance over the 10-year leases associated with the Quarter 1 2025 lease sale as 4.52 acres of long term (LT) disturbance.

**Table 20.** Reasonable Foreseeable Development Scenario

County	Alternative B					Development Potential	Estimated # of Wells	Estimate Acres of Surface Disturbance (short/long term)
	# Parcels	BLM Surface	Non-Federal Surface (Split Estate)	USFS Surface	USACE Surface			
<b>North Dakota Field Office</b>								
Dunn	3	0.00	0.00	0.00	86.79	0 – Very Low 0 - Low 0 - Moderate 4 - High 3 - Very High	2 oil	2.6 acres ST 2.6 acres LT
McKenzie	4	0.00	0.00	80.00	31.71			
<b>Total</b>	<b>7</b>	<b>0.00</b>	<b>0.00</b>	<b>80.00</b>	<b>118.50</b>			
<b>Havre Field Office</b>								
Liberty	1	0.00	40.00	0.00	0.00	0 – Very Low 1 - Low 0 - Moderate 0 - High 0 - Very High	1 oil	5.2 acres ST 0.92 acres LT
<b>Total</b>	<b>1</b>	<b>0.00</b>	<b>40.00</b>	<b>0.00</b>	<b>0.00</b>			
<b>Miles City Field Office</b>								
Richland	4	0.00	1,028.2	0.00	0.00	0 – Very Low 0 – Low 0 - Moderate 5 - High 0 - Very High	1 oil	3 acres ST 1 acre LT
Roosevelt	1	0.00	57.43	0.00	0.00			
<b>Total</b>	<b>5</b>	<b>0.00</b>	<b>1,085.63</b>	<b>0.00</b>	<b>0.00</b>			
<b>Grand Total</b>	<b>13</b>	<b>1,324.13 acres</b>				0 – Very Low 1 - Low 0 - Moderate 9 - High 3 - Very High	4 oil	10.8 acres ST 4.52 acres LT

<sup>1</sup>Total number of wells estimated based on the RFD and rounded to the nearest whole number

Produced water from conventional oil and gas development could impact the quality of surface water and groundwater through impoundments, injection, and discharge. Left untreated, produced water discharge and infiltration, or leaking produced water disposal pits could reach stream channels via subsurface flow, which could decrease water quality. Proper wastewater disposal methods, including siting and design of disposal pits in accordance with state and federal regulations, would minimize or avoid these impacts. Underground injection control regulations would isolate injection zones from potentially useable aquifers, which would limit the potential for adverse impacts to surface or groundwater resources.

Standard stipulation 16-3 requires the Agency to furnish data on any special areas, which may include domestic water supplies within 1,000 feet of parcels and stipulates that surface use or occupancy will be controlled to prevent damage to surface or other resources.

The use of any specific water source on a federally administered well requires review and analysis of the proposal through the NEPA process, which will be completed at the APD stage. The Gold Book, Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (BLM and USFS 2007) would be followed, and site-specific mitigation measures, BMPs, and reclamation standards would be implemented and monitored in order to minimize effects to water resources. All proposed actions must comply with local, state, and federal regulations, including Montana and North Dakota water laws.

### Water Quantity

Oil and gas drilling operations could affect available quantities of surface water and groundwater. Hydraulic fracturing uses billions of gallons of water every year at the national and state scales however, when expressed relative to total water use or consumption, hydraulic fracturing generally accounts for only a small percentage,

usually less than 1%. (USEPA, 2016, page 4-46).

The BLM estimated future water consumption associated with the Quarter 1 2025 lease sale based on the sale specific RFD. The estimates were made with the following assumptions: (1) all wells ultimately put into production as a result of this lease sale utilize hydraulic fracturing, (2) the underlying factors used to estimate future development under the sale specific RFD scenario persist, and (3) actual water use per well is similar to the state median water use estimates as noted in **Appendix F**, Fracking White Paper. All estimates are approximate and could vary substantially based on site characteristics and other factors like the length of horizontal laterals and hydrocarbon extraction intensity.

- North Dakota: 198.5 lease acres = 2 projected wells. 2 wells \* 5 million gallons/well = 10 million gallons
- Montana: 1,125.63 lease acres = 2 projected wells. 2 wells \* 5 million gallons/well = 10 million gallons

If drilling technology improves and economic considerations increase the average lateral length of horizontal wells and hydrocarbon extraction intensity, future water use and wastewater production would likely correspondingly increase, as would the potential for adverse impacts to water resources.

While many areas within the lease sale are experiencing low or medium to high water stress and estimated water consumption associated with the RFD scenario is minor (relative to existing uses & available supply), some areas are experiencing high Baseline Water Stress. Areas with higher baseline water stress would be more likely to experience depletion of surface and groundwater resources and/or competition among users from additional future development than areas with lower baseline water stress.

The potential for impacts associated with future development depends on the combination of water withdrawals and water availability at a given withdrawal location, as well as factors such as wastewater disposal methods and amounts. For example, where water withdrawals are relatively low compared to water availability, adverse impacts are unlikely to occur. Where water withdrawals are relatively high compared to water availability, impacts are more likely. Areas reliant on declining groundwater are particularly vulnerable to more frequent and severe impacts from cumulative water withdrawals, including withdrawals for hydraulic fracturing. Among surface water sources, smaller streams are more vulnerable to frequent and severe impacts from withdrawals. Seasonal or long-term drought can also make impacts more frequent and severe for surface water and groundwater sources.

Water withdrawals could lead to reduced aquifer water levels, reduced streamflow (through direct withdrawals or drawdown of aquifers that are hydraulically connected to nearby streams or springs), altered hydroperiods, and impacts to water quality parameters associated with stream flow. Typically, produced water from conventional oil and gas wells would originate from a depth below useable aquifers or coal seams and would be unlikely to adversely affect freshwater resources.

Potential site-specific effects would be analyzed at the time of a receipt of an Application for a Permit to Drill. In the event of exploration or development, site-specific mitigation measures would be identified to avoid or minimize potential impacts to water resources prior to land disturbance. Compliance with state regulations and implementation of BMPs, operator committed measures, design features, and COAs at the APD stage would help minimize the impacts of water withdrawals on surface and groundwater by ensuring that water rights are established for all beneficial uses of water, ensuring that water resources are not over-appropriated, and considering the impacts of water withdrawals to groundwater wells and hydraulically connected surface waters. A lessee/operator would be required to obtain valid water rights from the states prior to operation, which would help to minimize the potential for impacts to the hydrologic system, other water users, and related ecological processes. Additional information on water rights and the availability of water resources in

the project area can be obtained at the local North Dakota State Water Commission (NDSWC).

### **Application and implementation of lease stipulations**

The applied lease stipulations provide guidance and parameters for the development of each lease. Lease stipulations described here and in Appendices A and B are specific for the protection of surface and groundwaters. Oil and gas lease stipulations are established for erosion control, soil, and water preservation specifically include: The BLM's Standard 16-3 stipulation which is an overarching, general stipulation applied to all of the leases being analyzed. Standard 16-3 includes sections for esthetics, erosion control, controlled or limited surface use, APDs, cultural and paleontological resources, and endangered and threatened species. The stipulations that specifically impact surface water (and soils) would include erosion control measures and controlled surface use (CSU).

During the commencement of the APD process the project and proposed location, to include all surface disturbing activity, is assessed for potential impacts to the site. Controlled surface use is utilized if the lease and proposed project location includes a special area with special values and require special attention for certain resources that includes surface water. There are specific setbacks in the Standard 16-3 stipulation for all waterbodies, rivers, streams, domestic water supplies and flood plains including 500 feet within the 25-year flood plain from reservoirs, lakes, and ponds and intermittent, ephemeral, or small perennial streams; 1,000 feet within the 100-year flood plain from larger perennial streams, rivers, and domestic water supplies. This stipulation allows for project placement to be strictly controlled and even excluded. Further, modifications can be made for those restrictions for the maintenance and operations of oil and gas wells.

Much like the BLM stipulations, other Surface Management Agencies (SMA), such as the USFS provide stipulations for parcels within their jurisdictional boundaries. In conjunction with the erosion control and setback authorities listed in the Standard 16-3, the USFS stipulations mitigate for erosion by prohibiting projects on slopes of greater than 40%. Stipulation LMG2020-NSO-01 states "Surface occupancy and use is prohibited on slopes greater than 40 percent to protect soil resources from loss of productivity, prevent erosion on steep slopes, soil mass movement, and resultant sedimentation". The application of this stipulation and the additional assessment of the lands at APD commencement mitigate any effects to surface waters that may be impacted by soil conditions and erosion.

Similar to the above stipulations, CSU 12-5 prohibits surface disturbance of riparian areas of wetlands, intermittent, ephemeral, or perennial streams and rivers, with the exception of essential road and utility crossings. NSO 11-33 (no surface occupancy), provides for no surface occupancy within 200 feet of wetlands, lakes, and ponds. As previously mentioned, these stipulations are applied during the lease process; enforcement of these authorities in the field and at the APD stage would require field observations and data review of the existing conditions and resources. This field review allows for the appropriate placement of well pads, roads, utilities, and ancillary facilities therefore mitigating any effects to surface waters as implied by the lease stipulation.

Comparable to Standard 16-3 the USFS stipulation LMG2020-LN-01 gives notice to potential lessees that proposed activities may contain lands with riparian ecosystems and that development in that area could be highly restricted in order to preserve, restore, and enhance the values provided by floodplains and wetlands.

The DPG personnel apply and enforce their stipulations in an equivalent manner as the BLM by conducting field visits, completing data reviews of the existing conditions and resources, and coordinating with lessees to modify their proposed project to protect the resource.

The application and enactment of all SMA stipulations may be achieved through field (onsite) and data reviews of soil types, average rainfall, stormwater management, engineered drawings, GIS, etc. Specialists and interdisciplinary personnel commonly perform these reviews. Project constraints such as placement,

timing, and design could be altered from the initial proposal based on these observations, reviews, and the known potential impacts that are typical of oil and gas development. Equally important are potential BMP's and design features that may be added. The modifications to the project, if approved, would be documented and part of any approval.

### **Cumulative Impacts**

Given the limited disturbance estimated in the reasonably foreseeable development scenario (see **Table 20**), the potential for future development associated with the Quarter 1 2025 lease sale to contribute to the cumulative impacts of water resources is correspondingly limited and likely negligible (relative to other water uses and potential sources of contamination).

However, with more oil and gas wells being developed in proximity to fresh water, there is a potential for groundwater and surface water decline, as well as an increased possibility for nonpoint source pollution associated with ground disturbance to adversely affect water quality in receiving waterbodies. The vulnerability of the decline and related impacts to existing water users and environmental processes is directly associated with the water need, the quantity and quality of the groundwater, and the cumulative withdrawals and is likely correlated to existing and predicted Baseline Water Stress within the potentially affected basins. Water used to develop any of the proposed parcels could have a cumulative depletion effect, especially if other oil and gas development and regional water uses exceed recharge rates in the basins, potentially affecting surface flows and groundwater elevations. Such effects could be exacerbated during periods of drought. BMPs and design features to reduce runoff, erosion, and potentially associated nonpoint source pollution to downstream waterbodies would minimize cumulative effects to water quality.

Groundwater recharge rates can be extremely low, and groundwater pumping can exceed recharge rates in many areas of the country (Konikow, 2013). Cumulative drawdowns can affect surface waterbodies since groundwater can be the source of base flow in streams and alter groundwater quality by mobilizing chemicals from geologic sources, among other means (DeSimone et al., 2014).

Aquifers can be affected directly and indirectly by increasing the number of wells in an area. Direct impacts are a result of direct use of the groundwater. Indirect ramifications could result from declines in surface water resources (or vice versa) which could lead to increased groundwater withdrawals and net cumulative depletions of groundwater (Castle et al., 2014; Georgakakos et al., 2014; Konikow, 2013; Famiglietti et al., 2011).

It should be noted that cumulative impacts on water quality findings associated with hydraulic fracturing appear inconclusive at this time, but localized impacts to surface water quality associated with dense surface disturbance have been observed elsewhere. It has been observed that pumping can promote changes in reduction-oxidation (redox) conditions and thereby mobilize chemicals from geologic sources (DeSimone et al., 2014). Similar patterns of groundwater quality degradation associated with prolonged aquifer depletion (i.e., salinization and contamination) have also been observed. (U.S. Environmental Protection Agency; 2016a).

As studies are conducted and ramifications are analyzed they will be instrumental in developing better science to determine cumulative impacts to the environment. When the science of these studies is complete, they will be incorporated to the analysis of oil and gas lease sales to determine the best course of action according to the science.

## **3.7 Issue 5 – Cultural Resources**

How would the leasing and potential development of these parcels affect cultural resources to include Native American Religious Concerns and National Historic Landmarks and Trails?

The BLM screened parcels and gathered comments to determine if any parcels would affect cultural resources. Parcels that were identified as being in close proximity (.05-3 miles) to the Lewis and Clark National Historic Trail (L&C NHT) administered by the National Park Service include MT-2025-01-0358, -0412, -6950, -6952, -6953 and ND-2025-01-0747 and -0748. The L&C NHT, is approximately 3,700 miles, extending from Wood River, Illinois, to the mouth of the Columbia River in Oregon and is administered by the National Park Service (NPS) through partnerships with federal, state, and local agencies; tribal nations; nonprofit organizations; and private landowners. The L&C NHT follows the outbound and inbound routes of the 1803 to 1806 Lewis and Clark Expedition also known as the Corps of Discovery. Specifically, in the project area the L&C NHT is located in the Missouri River valley in North Dakota and divides into two separate routes at the confluence of the Yellowstone and Missouri Rivers. In Montana the northern route of the trail continues to follow the Missouri River while the southern route of the trail meanders along the Yellowstone River. The L&C NHT honors the diverse cultures and experiences that were documented to include interactions with over 50 Native American Tribes on the expedition (<https://www.nps.gov/lecl/learn/historyculture/index.htm>).

### *3.7.1 Affected Environment*

Parcels in the project area that are in close proximity to the L&C NHT include MT-2025-01-0358, -0412, -6950, -6952, and -6953 and ND-2025-01-0747 and -0748. The trail in the project area consists of a water route that runs along the Missouri (Lake Sakakawea Reservoir) and Yellowstone Rivers and an auto tour route that is part of existing highways in North Dakota and Montana. The [auto tour route](#), consists of State Highway 23, State Highway 200, State Highway 1804, State Highway 1806, State Highway 58, US Highway 85, US Highway 2, and Interstate 94. Contemporary and commercial development in the area includes hydroelectric dams, recreational locations, private cabin sites, agricultural infrastructure, oil and gas well pads, and municipal infrastructure. The water route passes through the North Dakota townsites of New Town, Four Bears Village, and Williston, and the Montana townsites of Poplar, Wolf Point, Sidney, Glendive, Miles City, and Forsyth. The trail also passes through four reservations in the project area: Fort Berthold Reservation and Trenton Indian Service Area in North Dakota and Fort Peck Reservation in Montana.

### *3.7.2 Environmental Effects - No Action Alternative*

Under the No Action Alternative, the BLM would not offer any of the nominated parcels in this lease sale. 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. If the parcels are not available to be leased and potential development on or near the proposed parcels would not occur, then no impacts to cultural resources would be expected from potential oil and gas development. The No Action Alternative would result in the continuation of already-approved land uses and would not result in new impacts related to exploration of the proposed oil and gas lease parcels.

### *3.7.3 Environmental Effects - Proposed Action Alternative*

Under Alternative B, 13 parcels encompassing approximately 1,324.13 acres would be offered for sale. Those parcels that are successfully leased will generate Federal bonus bid revenue and annual rents, which will be collected on leased parcels not held by production. While the leasing action does not directly result in development that would generate surface disturbance, potential future development of the leased parcels is reasonably foreseeable and can be estimated for the purposes of this lease sale.

Due to horizontal directional drilling on fee land, federal and private mineral interests on lease parcels can be reached from a surface location near, but not on, federal property. Some of the parcel's surface is submerged

by water. For this reason and per the BLM lease stipulations, BOR Lease Stipulations, USACE Oil and Gas Policy and lease stipulations to include no surface occupancy, any proposed development scenario would likely come from a pre-existing pad off-lease.

There are many existing anthropogenic impacts such as municipalities, roads, reservoirs, etc. along much of the Lewis and Clark Trail. The BLM, BOR, and USACE have applied stipulations to the lease parcels for the protection of the historic and cultural resources that include HQ-CR-1 which would require the BLM to complete its obligations under NHPA and other authorities to include consultation with the NPS, and Standard 16-3 which requires the submission of an APD and potentially a site-specific cultural resource inventory prior to any proposed surface disturbance. Specifically, Lease Notice (LN 14-2), Lease Notice (LN 14-14), Lease Notice (LN 14-22), No Surface Occupancy Stipulation (NSO 11-83), BOR 17-1 and BOR Special Stipulation 17-2 have been applied to the applicable previously mentioned parcels to protect the trail resources.

At the time of development, the APD and proposed surface use plan of operations will include design features and mitigation measures to reduce, avoid, or minimize potential impacts to the historic and cultural resources based on results of the prerequisites of the stipulations. Additionally, per the [USACE Oil and Gas Policy Critical Requirements](#), site selection or approval would occur after a review and potential onsite meeting. Some of the USACE critical requirements include no exploratory or production activity within 0.5 miles of a recreation area and no exploratory or production activity within 300 feet of any National Register eligible cultural site or American Indian Traditional Use Area. For a complete list, reference the [USACE Oil and Gas Policy](#) and Appendices A and B.

### **Cultural resources and Native American Religious Concerns**

Consultation, collaboration, and coordination for the identification of cultural resources and mitigation of disturbance or detrimental effects is robust and ongoing. The BLM has applied lease terms and stipulations to proposed parcels that include HQ-CR-1, LN 14-2, and Standard 16-3 (see Appendix B for definitions). The result of applying these stipulations at leasing provides protection to cultural resources. The BLM will not approve any ground disturbing activities that may affect such properties or resources until it completes its obligations associated with the stipulations that are applied to each respective parcel as well as applicable requirements of the National Historic Preservation Act and any 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. Within the administrative boundaries of the USFS Dakota Prairie Grasslands, LMG2020-LN-03 is applied to protect these resources on parcels ND-2025-01-0749 and -0750.

Native American Religious Concerns: Native American belief systems and traditional practices can vary widely across traditional tribal lands and require ongoing consultation and coordination to ensure that an action authorized by the BLM will not impede upon or impair practices or locations that are deemed as Traditional Cultural Properties or are otherwise important. The BLM applied HQ-CR-1 to all parcels that may have possible historic properties and/or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O 13007, or other statutes and executive orders. The purchaser of a lease is entitled to develop the parcel consistent with lease stipulations and must have an approved Application for Permit to Drill (APD), including a plan of operations and a review and consideration of Native American religious concerns, before ground disturbing activities can begin. The BLM may require modification to exploration or development proposals to protect unevaluated, eligible, or other such properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized, or mitigated.

### **Cumulative Effects**

Given the limited disturbance estimated in the reasonably foreseeable development scenario (See Chapter 2, **Table 2**), the potential for future development associated with the Quarter 1 2025 lease sale to contribute to the cumulative impacts of cultural resources is correspondingly limited and likely negligible. The mitigation discussed for the L&C NHT is applied to the lease parcels and the likelihood of off-lease development negates any negative impacts to the L&C NHT as a result of leasing the listed parcels. Any off-lease development will be authorized by the BLM at the time of APD approval and will be administrated through BLM guidance, specifically BLM IM 2018-014.

As previously stated, Tribal consultation and coordination is ongoing for all BLM projects. Chapter 4 contains a summary of consultation and coordination for this analysis, as well as a list of all tribal entities, governments, and historic preservation officers contacted to participate in the writing of this EA. There were no scoping comments received from Tribal entities. A list of comments received during the comment period and BLM response is available in Appendix K. The stipulations applied to each lease parcel (specifically HQ-CR-1 and STD 16-3) and applicable laws prohibit surface disturbance on any lands that may have possible historic properties and/or protected resources. These resources include, but are not limited to: locations associated with the traditional beliefs of Native American groups about its origins, culture history, and nature of the world; a location where Native American religious practitioners have historically gone, and are known to go today to perform ceremonial activities in accordance with traditional cultural rules of practice; a location where an identifiable community has carried out economic, artistic, and other cultural practices important in maintaining its historical identity, or any other Traditional Cultural Property not described here. As such, with continued coordination and consultation and adherence to laws and regulations, any detrimental effects to Cultural and Native American Religions concerns could be fully mitigated.

## 4 Consultation and Coordination

### 4.1 Summary of Consultation and Coordination

The BLM coordinates with Montana Fish, Wildlife, and Parks (MTFWP), North Dakota Game and Fish (NDGF) and the U.S. Fish and Wildlife Service (USFWS) to identify wildlife concerns, protective measures, and apply stipulations and lease notices associated with oil and gas lease sales. While the BLM manages habitat on BLM lands, the state agencies are responsible for managing all wildlife species populations. The USFWS also manages some wildlife populations but only those federal trust species managed under mandates such as the Endangered Species Act, Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act. The BLM mailed letters to NDGF and USFWS informing them of scoping and EA comment periods. The BLM also communicated informally with NDGF. No scoping comments were received from USFWS.

The BLM consults with Native Americans under various statutes, regulations, and executive orders, including the American Indian Religious Freedom Act, the National Historic Preservation Act, the Native American Graves Protection and Repatriation Act, the National Environmental Policy Act, and Executive Order 13175-Consultation and Coordination with Indian Tribal Governments. The BLM notified consulting tribes of the oil and gas lease sale and invited them to identify any issues or concerns that the BLM should consider in this EA.

The BLM coordinates with the USFS DPG McKenzie and Medora Ranger Districts to identify resource concerns and apply stipulations and lease notices to lease parcels proposed within the administrative boundary of the DPG McKenzie Ranger District, the USACE to identify resource concerns and apply stipulations and lease notices to lease parcels proposed within the administrative boundary of the Garrison Dam/Lake Sakakawea Project, and the Bureau of Reclamation Missouri Basin Region 5. Refer to **Table 21**

for the list of Tribes and Agencies contacted.

**Table 21.** Tribes and Agencies Contacted

<b>Blackfoot Nation</b>	<b>THPO</b>	<b>John Murray</b>
<b>Blackfoot Tribe</b>	Chairman	Illiff "Scott" Kip Sr.
<b>Cheyenne River Sioux Tribe</b>	THPO	Steve Vance
<b>Cheyenne River Sioux Tribe</b>	Tribal Chairman	Ryman LeBeau
<b>Chippewa Cree Tribe</b>	THPO	Jonathan Windy Boy
<b>Chippewa Cree Tribe</b>	Tribal Chairman	Harlan Gopher
<b>Comanche Nation</b>	Chairman	Mark Woommavovah
<b>Comanche Nation</b>	THPO	Martina Minthorn
<b>Confederated Salish &amp; Kootenai Tribes</b>	Chairman	Mike Dolson
<b>Confederated Salish &amp; Kootenai Tribes</b>	THPO	
<b>Confederated Salish &amp; Kootenai Tribes</b>	Tribal Preservation Specialist	Mike Durglo
<b>Confederated Tribe of the Umatilla Indian Reservation</b>	Chairman	N. Kathryn Brigham
<b>Confederated Tribe of the Umatilla Indian Reservation</b>	THPO	Carey Miller
<b>Confederated Tribes of the Colville Indian Reservation</b>	Chairman	Jarred-Michael Erickson
<b>Confederated Tribes of the Colville Indian Reservation</b>	THPO	Guy Moura
<b>Crow Creek Sioux Tribe</b>	Chairperson	Peter Lengkeek
<b>Crow Creek Sioux Tribe</b>	THPO	Merle Marks
<b>Crow Tribe</b>	Chairman	Frank White Clay
<b>Crow Tribe</b>	THPO	Aaron Brien
<b>Eastern Shoshone Tribe</b>	Chairman	John St. Claire
<b>Eastern Shoshone Tribe</b>	THPO	Josh Mann
<b>Flandreau Santee Sioux Tribe</b>	President	Anthony Reider
<b>Flandreau Santee Sioux Tribe</b>	THPO	Gerrie Kills A Hundred
<b>Fort Peck Tribe</b>	Chairman	Justin Gray Hawk
<b>Fort Peck Tribe</b>	THPO	Dyan Youpee
<b>Ft. Belknap Tribe</b>	Acting THPO	Michael J. Black Wolf
<b>Ft. Belknap Tribe</b>	CAO	Delina Cuts The Rope
<b>Ft. Belknap Tribe</b>	Environmental Protection Manager	Ina Nez Perce
<b>Ft. Belknap Tribe</b>	President	Jeffery Stiffarm
<b>Kiowa Nation</b>	Chairman	Lawrence Spottedbird
<b>Kiowa Nation</b>	THPO(Acting)	Amanda Hill
<b>Little Shell Chippewa Tribe</b>	Chairman	Gerald Gray
<b>Little Shell Chippewa Tribe</b>	THPO	Dwayne Reid

<b>Lower Brule Sioux Tribe</b>	Chairman	Clyde Estes
<b>Lower Brule Sioux Tribe</b>	Cultural Resources	Boyd Gourneau
<b>Lower Sioux Indian Community</b>	President	Robert Larson
<b>Lower Sioux Indian Community</b>	THPO	Cheyenne St. John
<b>Nez Perce Tribe</b>	Chairman	Shannon Wheeler
<b>Nez Perce Tribe</b>	NAGPRA Coordinator	Robert Taylor
<b>Nez Perce Tribe</b>	THPO	Keith "Pat" Baird
<b>Nez Perce Tribe</b>	Tribal Archaeologist	Josiah Pinkham
<b>Northern Arapaho Nation</b>	Chairman	Lloyd Goggles
<b>Northern Arapaho Nation</b>	THPO	Crystal Cbearing
<b>Northern Cheyenne Tribe</b>	THPO	Teanna Limpy
<b>Northern Cheyenne Tribe</b>	President	Serena Wietherelt
<b>Oglala Sioux Tribe</b>	President	Frank Star Comes Out
<b>Oglala Sioux Tribe</b>	Project Coordination	Justin Pourier
<b>Rosebud Sioux Tribe</b>	President	Scott Herman
<b>Rosebud Sioux Tribe</b>	THPO	Ione Quigley
<b>Santee Sioux Tribe of Nebraska</b>	Chairman	Alonzo Denney
<b>Santee Sioux Tribe of Nebraska</b>	THPO	Larry Thomas
<b>Shoshone-Bannock Tribes Fort Hall Reservation</b>	Chairman	Lee Juan Tayler
<b>Shoshone-Bannock Tribes Fort Hall Reservation</b>	Cultural Resources Director	Louise E. Dixey
<b>Shoshone-Bannock Tribes Fort Hall Reservation</b>	Environmental Program Manager	Christina Cuttler
<b>Sisseton-Wahpeton Oyate Tribe</b>	Chairman	J. Garret Renville
<b>Sisseton-Wahpeton Oyate Tribe</b>	THPO	Dianne Desrosiers
<b>Spirit Lake Sioux Tribe</b>	Chairman	Lonna Jackson Street
<b>Spirit Lake Sioux Tribe</b>	THPO	Kenny (KJ) Gray Water
<b>Standing Rock Sioux Tribe</b>	Chairperson	Janet Alkire
<b>Standing Rock Sioux Tribe</b>	THPO	Tyrel Iron Eyes
<b>Three Affiliated Tribes</b>	Chairman	Mark Fox
<b>Three Affiliated Tribes</b>	THPO	Allen Demaray
<b>Turtle Mountain Band of Chippewa</b>	Chairman	Jamie Azure
<b>Turtle Mountain Band of Chippewa</b>	THPO	Jeff Desjarlais Jr.
<b>Yankton-Sioux Tribe</b>	Chairperson	Robert Flying Hawk
<b>Yankton-Sioux Tribe</b>	Project Coordination	Colton Archambeau
<b>LCTHF</b>	Executive Director	Lindy Hatcher
<b>US Environ. Protection Agency Reg 8</b>	Helena office	
<b>Montana DNRC</b>	Northern District Field Office	
<b>National Wildlife Federation</b>	Northern Rockies Proj. Office	
<b>Army Corps of Engineers</b>	Omaha District	
<b>Earthjustice</b>	Rocky Mountain	

<b>Montana DNRC</b>	Trust Land Management HQ	
<b>Center for Biological Diversity</b>		Randi Spivak
<b>ConocoPhillips Company</b>		Pushpa Nellikkattil
<b>Dept. of Env. Quality</b>		Christopher Dorrington
<b>Div of Ecological Services</b>		Jodi Bush
<b>DNRC MT board of O&amp;G</b>		Tom Richmond
<b>DNRC-Eastern Land Office</b>		Chris Pileski
<b>EPA Region 8 NEPA Program</b>		Amelia Platt
<b>Friends of the Earth</b>		Nicole Ghio
<b>Ft. Peck Army Corps of Engineers</b>		Darin McMurry
<b>Lewis &amp; Clark National Historic Trail</b>		Denise Nelson
<b>Little Missouri National Grassland</b>		Cale Bickerdyke
<b>Mariah Energy</b>		Lenny Behm
<b>Montana Environmental Information Center</b>		Derf Johnson
<b>Montana Historical Society</b>		Dr. Mark Baumler
<b>Montana Trout Unlimited</b>		
<b>Montana Wilderness Association</b>		
<b>MT Fish, Wildlife, and Parks</b>		Deb O'Neill
<b>MT Preservation Alliance</b>		Chere Justio
<b>ND Game and Fish</b>		Patrick T. Isakson
<b>North Blaine Cooperative State Gazing Distrcit</b>		Cheryl Schuldt
<b>North Dakota Dept of Trust Lands</b>		
<b>North Dakota Office</b>		USFWS
<b>Northern Plains Resource Council</b>		Adam Haight
<b>Public Lands Solutions</b>		Jason Keith
<b>South Dakota Dept. of Game, Fish and Parks</b>		
<b>State Historical Society of ND</b>		Claudia Berg
<b>The Wilderness Society</b>		Ben Tettlebaum
<b>Theodore Roosevelt Conservation Partnership</b>		
<b>Theodore Roosevelt National Park</b>		Heidi Riddle
<b>USFS NPNHT Admin.</b>		Sandi McFarland
<b>USFS NPNHT CMP</b>		Sandra Broncheau-McFarland
<b>USFS NPNHT PAO</b>		Roger M. Peterson
<b>Western Energy Alliance</b>		Esther Wagner
<b>Western Env. Law Center</b>		Morgan O'Grady

## 4.2 Summary of Public Participation

Public scoping for this project was conducted through a 30-day scoping period from June 26 to July 26, 2024, as described in a Press Release issued by the Montana/Dakotas State Office, advertised on the BLM Montana/Dakotas State Office website, and posted online in the BLM NEPA e-Planning website. The BLM also mailed letters to local, state, and federal agencies, Tribal entities, and private surface owners informing them of the lease sale and seeking comments. The mailing list is included in the project record.

A 30-day public comment period will be open from August 27 to September 27, 2024, and described in a Press Release issued by the Montana/Dakotas State Office, advertised on the BLM Montana/Dakotas State Office website, and posted online in the BLM NEPA e-Planning website. The BLM will mail letters to local, state, and federal agencies, Tribal entities, and private surface owners informing them of the lease sale and seeking comments. The mailing list is included in the project record and can be viewed in **Table 21**.

### 4.2.1 Section 208 Report

In November 2021, the Department of the Interior released a Report on the Federal Oil and Gas Leasing Program (Report). The Report made specific recommendations to address documented deficiencies in the program to meet three programmatic goals:

- Providing a fair return to the American public and States from Federal management of public lands and waters, including for development of energy resources;
- Designing more responsible leasing and development processes that prioritize areas that are most suitable for development and ensure lessees and operators have the financial and technical capacity to comply with all applicable laws and regulations; and
- Creating a more transparent, inclusive, and just approach to leasing and permitting that provides meaningful opportunity for public engagement and Tribal consultation.

The Report also recommends: As an overarching policy, BLM should ensure that oil and gas is not prioritized over other land uses, consistent with BLM's mandate of multiple-use and sustained yield. The BLM should carefully consider what lands make the most sense to lease in terms of expected yields of oil and gas, prospects of earning a fair return for U.S. taxpayers, and conflicts with other uses, such as outdoor recreation and wildlife habitat. The BLM should always ensure it is considering the views of local communities, Tribes, businesses, State and local governments, and other stakeholders. While the leasing decisions for this lease sale result from the BLM's exercise of its discretion based on its analysis and review of the record, they are also consistent with the recommendations in the Report, as well as numerous reports issued by the Governmental Accountability Office and Congressional Budget Office, including: ensuring public participation and Tribal consultation, addressing conflicts with other resources, avoiding lands with low potential for oil and gas development, focusing leasing near existing development and ensuring a fair return to taxpayers.

This lease sale and NEPA process have included a 30-day scoping period, 30-day comment period on the environmental assessment and 30-day protest period. The BLM has also ensured applicable Tribal consultation is current. The BLM's leasing decisions take into account comments received during this process and will further evaluate points raised in any protests received. As a result of public comments

received on the sale and consistent with recommendations in the November 2021 report, BLM undertook additional review and has not identified any additional parcels which warrant deferral. Details of this review is included in **Appendix J**.

## 5 List of Preparers

**Table 22.** List of Preparers

<b>Name</b>	<b>Title</b>	<b>Resource Area</b>
Cale Bickerdyke	Mineral and Lands Supervisor, USFS	USFS DPG Coordination
Tyler Croft	Petroleum Engineer	Water Resources
Greg Liggett	Geologist (Paleontology)	Paleontology
Marcus Lorusso	GIS Specialist	GIS
Jessica McDermott	Geospatial Ecologist	Big Game
Mark Peterson	Air Resources Specialist	Air Resources, GHG Emissions
Scott Rickard	Economist	Socioeconomics, Environmental Justice
Tessa Wallace	Natural Resource Specialist	Coordination, Editor Environmental Justice and Human Health
Omar Goyzueta	Natural Resource Specialist	Coordination, Editor
Hattie Payne	Natural Resource Specialist	Project Lead and Coordination, Editor
Dave Wood	Wildlife Biologist	Wildlife, Listed Species (Greater Sage-grouse)
Karsyn Lamb	Economist	Environmental Justice and Human Health

## 6 Table of Issues and Resources Considered

Table 23. Issues and Resources Considered

Determination*	Issue	Rationale for Determination
NI	Access	No issues from act of leasing.
PI	Air Quality	Potential impacts; will be analyzed.
NP	Areas of Critical Environmental Concern	Not present per review of GIS data.
NP	Backcountry Conservation Areas	Not present per review of GIS data.
PI	Climate	Potential impacts; will be analyzed.
PI	Cultural Resources	Potential impacts; will be analyzed.
PI	Environmental Justice	Potential impacts; will be analyzed.
NI	Farmlands (Prime or Unique)	Not present per review of GIS data.
NI	Fire Management	No issues from act of leasing.
NI	Fish Habitat	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Floodplains	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Forests and Rangelands	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Forestry Resources and Woodland Products	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
PI	Greenhouse Gases and Climate	Potential impacts; will be analyzed.
PI	Human health and safety concerns	Potential impacts; will be analyzed.
NI	Invasive, Non-native Species	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Lands and Realty	The act of leasing is in accordance with current management plans and is consistent with current land use.
NP	Lands with Wilderness Characteristics	Not present per review of GIS data.
NI	Livestock Grazing Management	No issues from act of leasing.
NI	Migratory Birds	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Native American Religious Concerns	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Noise Resources	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Paleontological Resources	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.

<b>Determination*</b>	<b>Issue</b>	<b>Rationale for Determination</b>
NI	Recreation Resources	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NP	Sage Grouse Habitat	Not present per review of GIS data.
PI	Socioeconomics	Potential impacts; will be analyzed.
NI	Soils	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Threatened, Endangered or Candidate Plant or Animal Species	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Vegetation	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Visual Resources	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Wastes, Hazardous or Solid	No issues from act of leasing. Stipulation application and regulatory requirements will adequately mitigate potential impacts at APD stage.
PI	Water	Potential impacts; will be analyzed.
NI	Wetlands/Riparian Zones	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NP	Wild Horses and Burros	Not present per review of GIS data.
NI	Wild and Scenic Rivers	Not present per review of GIS data.
NP	Wilderness and Wilderness Study Areas	Not present per review of GIS data.
NI	Wildlife	. No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
<p>*NP = not present in the area impacted by the proposed or alternative actions.  NI = present, but not affected to a degree that detailed analysis is required.  PI = present and may be impacted. Will be analyzed in affected environment and environmental effects. For consistency, the term 'effects' is used throughout the EA, but we use the term 'impacts' just in this table. (NOTE: PI does not necessarily mean effects are likely to be significant, only that there are effects to this issue, resource, or use. Significance will be determined through analysis and documented in a Finding of No Significant Impact or Environmental Impact Statement.)</p>		

## 7 Acronyms and Abbreviations

ACEC	Area of Critical Environmental Concern
AERMOD	American Meteorological Society / EPA Regulatory Model
APA	Administrative Procedures Act
APD	Application for Permit to Drill
AQRV	Air Quality Related Value
ARMP	Approved Resource Management Plan
ARPA	Archeological Resources Protection Act
ARTSD	Air Resource Technical Support Document
ATV	All-Terrain Vehicle
AUM	Animal Unit Month
BBCS	Bird and Bat Conservation Strategy
BCC	Birds of Conservation Concern
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	Best Management Practice
BOR	Bureau of Reclamation
BTV	Blue-tongue Virus
CAA	Clean Air Act
CALPUFF	California Puff Model
CAP	Criteria Air Pollutant
CBNG	Coal Bed Natural Gas
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO <sub>2</sub> eq	Carbon Dioxide Equivalent
COA	Condition of Approval
CSU	Controlled Surface Use
DEQ	Department of Environmental Quality
DM	Departmental Manual
DoAQ	Division of Air Quality
DPG	Dakota Prairie Grasslands
DR	Decision Record
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EOI	Expression of Interest
EOR	Enhanced Oil Recovery
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESD	Ecological Site Description
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FLIGHT	Facility Level Information on Greenhouse Gas Tool
FLIR	Forward Looking Infrared
FLPMA	Federal Land Policy Management Act of 1976, as amended
FONSI	Finding of No Significant Impact
FOOGLRA	Federal Onshore Oil and Gas Leasing Reform Act of 1987
GHG	Greenhouse Gas
GHMA	General Habitat Management Area

GIS	Geographic Information Systems
GWP	Global Warming Potential
HAP	Hazardous Air Pollutant
HD	Hunting District
HMA	Herd Management Area
HQT	Habitat Quantification Tool Technical Manual
IB	Information Bulletin
IBLA	Interior Board of Land Appeals
IDT	Interdisciplinary Team
IM	Instruction Memorandum
IMPROVE	Interagency Monitoring of Protected Visual Environments
IPCC	Intergovernmental Panel on Climate Change
KOP	Key Observation Point
LN	Lease Notice
LTA	Long-Term Averages
MAAT	Mean Annual Air Temperature
MACT	Maximum Achievable Control Technologies
MAF	Master Address File
MAP	Mean Annual Precipitation
MBOGC	Montana Board of Oil and Gas Conservation
MBTA	Migratory Bird Treaty Act of 1918
MCFO	Miles City Field Office
MDEQ	Montana Department of Environmental Quality
MDNRC	Montana Department of Natural Resources and Conservation
MFP	Management Framework Plan
MLA	Mineral Leasing Act
MMT	Million Metric Tons
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MSGOT	Montana Sage Grouse Oversight Team
MTDB	MAF/TIGER Database
MTFWP	MT Fish, Wildlife and Parks
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NDDH	North Dakota Department of Health
NDFO	North Dakota Field Office
NDGF	North Dakota Game and Fish
NDSWC	North Dakota State Water Commission
NEPA	National Environmental Policy Act
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NHT	National Historic Trails
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSO	No Surface Occupancy
NSPS	New Source Performance Standards
OHV	Off-Highway Vehicle
PEIS	Programmatic Environmental Impact Statement
PFC	Proper Functioning Condition
PGM	Photochemical Grid Modeling

PHMA	Priority Habitat Management Area
P.L.	Public Law
PM	Particulate Matter
PSD	Prevention of Significant Deterioration
RAC	Resource Advisory Council
RFD	Reasonably Foreseeable Development
RFFA	Reasonably Foreseeable Future Action
RHMA	Restoration Habitat Management Area
RMP	Resource Management Plan
RMPA	Resource Management Plan Amendment
ROD	Record of Decision
ROW	Right-of-way
SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Office
SRP	Special Recreation Permit
T&E	Threatened and Endangered
TIGER	Topologically Integrated Geographic Encoding and Referencing
TL	Timing Limitation
TRNP	Theodore Roosevelt National Park
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOI	U.S. Department of the Interior
USFS	U.S. Department of Agriculture Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
VOC	Volatile Organic Compound
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WEM	Waivers, Exceptions, or Modifications
WHB	Wild Horse and Burro
WO	Washington Office
WSA	Wilderness Study Area

## 8 List of References

### 8.1 General References

**U.S. Department of Interior, BLM. 2007.** Surface Operating Standards and Guidelines for Oil and Gas Exploration and Developments, The Gold Book, Fourth Edition-Revised 2007.

<https://www.blm.gov/sites/blm.gov/files/uploads/The%20Gold%20Book%20-%204th%20Ed%20-%20Revised%202007.pdf>

### 8.2 BLM Planning References

**US Department of the Interior, Bureau of Land Management. 2015.** Record of Decision and Approved Resource Management Plan Amendments for the Rocky Mountain Region, Including the Greater Sage-Grouse Sub-Regions of Lewistown, North Dakota, Northwest Colorado, Wyoming, and the Approved Resource Management Plans for Billings, Buffalo, Cody, HiLine, Miles City, Pompeys Pillar National Monument, South Dakota, and Worland.

**US Department of the Interior, Bureau of Land Management. 2015.** Miles City Field Office Proposed Resource Management Plan and Final Environmental Impact Statement, June 2015.

**US Department of the Interior, Bureau of Land Management. 1988.** North Dakota Proposed Resource Management Plan and Final Environmental Impact Statement.

**US Department of the Interior, Bureau of Land Management. April 1988.** North Dakota Resource Management Plan and Environmental Impact Statement Record of Decision.

**US Department of the Interior, Bureau of Land Management. May 2019.** Miles City Field Office, Draft Supplemental Impact Statement and Resource Management Plan Amendment.

### 8.3 Air Resources

**Bureau of Land Management (BLM) 2015.** Bureau of Land Management Miles City Field Office, *Proposed Resource Management Plan and Final Environmental Impact Statement*, June 2015.

**BLM 2016.** Bureau of Land Management Montana/Dakotas State Office PGM Modeling Study Air Resource Impact Assessment, Final report, Ramboll Environ US Corporation, Kleinfelder, Inc, #06- 632912, Sept. 2016. Available at [EplanningUi \(blm.gov\)](#).

**BLM 2019.** Miles City Field Office RMP Supplemental EIA/Plan Amendment – DOI-BLM-MT- C020-2019-0004-RMP-EIS ([EplanningUi \(blm.gov\)](#))

**BLM 2023.** North Dakota Field Office Draft Resource Management Plan (RMP) and Environmental Impact Statement (EIS) (BLM, 2023). Available at [EplanningUi \(blm.gov\)](#).

**BLM 2024.** 2023 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends. Retrieved from <https://www.blm.gov/content/ghg/>

**BLM 2024.** Miles City Field Office Proposed Resource Management Plan Amendment and Final Supplemental Environmental Impact Statement – BLM\_MT\_FRN\_MO4500178570 [EplanningUi \(blm.gov\)](#).

**CEQ. 2023.** National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change. 86 Federal Register 1196 (Jan. 9, 2023). Accessible at <https://www.federalregister.gov/documents/2023/01/09/2023-00158/national-environmental-policy-act-guidance-on-consideration-of-greenhouse-gas-emissions-and-climate>

**Environmental Protection Agency (EPA) 2014.** AQI Air Quality Index: A Guide to Air Quality and Your Health, EPA-456/F-14-002. [Air Quality Index - A Guide to Air Quality and Your Health. Brochure 2014. EPA-456/F-14-002 \(airnow.gov\)](#)

**EPA 2024.** Overview of the Clean Air Act and Air Pollution, [Overview of the Clean Air Act and Air Pollution | US EPA](#) Accessed July 26, 2024.

**EPA 2024.** NAAQS Table. <https://www.epa.gov/criteria-air-pollutants/naaqs-table>. Retrieved July 26, 2024.

**EPA 2024.** AirData Website. <https://www.epa.gov/outdoor-air-quality-data> Accessed July 26, 2024.

**EPA 2024.** Regional Haze Regulations, 40 CFR Part 51, [eCFR :: 40 CFR 51.308 -- Regional haze program requirements](#).

**EPA 2024.** Hazardous Air Pollutants. <https://www.epa.gov/haps> Accessed July 26, 2024.

**Federal Land Manager's Air Quality Related Values Work Group (FLAG) 2010.** Federal Land Manager's Air Quality Related Values Work Group (*FLAG*): *Phase I Report – Revised (2010)*.

**Federal Land Manager Environmental Database 2024.** [TSS Home \(colostate.edu\)](#) Accessed July 26, 2024.

**Montana Department of Environmental Quality (MT DEQ) 2024a.** About Air. <http://deq.mt.gov/Air> Accessed July 3, 2024.

**Montana Department of Environmental Quality (MT DEQ) 2024b.** Air Quality Monitoring Network Plan (Plan) [Air Quality Monitoring | Montana DEQ \(mt.gov\)](#) Accessed **July 26**, 2024.

**National Park Service (NPS).** National Park Service, Air Quality Conditions and Trends. [Air Quality Conditions & Trends - Air \(U.S. National Park Service\) \(nps.gov\)](#)

Accessed July 26, 2024.

**North Dakota Division of Air Quality (ND DoAQ) 2022.** Annual Report North Dakota Ambient Monitoring Network Plan/Assessment With Data Summary 2023, <https://deq.nd.gov/AQ/monitoring/> Accessed July 3, 2024.

**ND DoAQ 2024.** Division of Air Quality (DoAQ). <https://deq.nd.gov/aq/> Accessed July 3, 2024.

**Ramboll. 2023a.** BLM Cumulative Hazardous Air Pollutants Modeling, Final Report, <https://eplanning.blm.gov/eplanning-ui/project/1505069/570>.

## 8.4 Greenhouse Gases

**Bureau of Land Management (BLM). 2023.** *2022 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends*. Retrieved from <https://www.blm.gov/content/ghg/2022>

**Council on Environmental Quality (CEQ). (2023, 1 8).** *Guidance: National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change*. Retrieved from <https://www.regulations.gov/document/CEQ-2022-0005-0001>

**NETL, 2009.** *2008 Development of Baseline Data and Analysis of Life Cycle Greenhouse Gas Emissions of Petroleum-Based Fuels. Tables 3-10, 4-55, and 5-10*. DOE/NETL-2009/1346.

**NETL, 2019.** *Life Cycle Analysis of Natural Gas Extraction and Power Generation. Appendix F, Table F-31*. DOE/NETL-2019/2039.

**U.S. Energy Information Administration (EIA). 2021.** Supply disruptions and rising demand boosted East Coast petroleum product imports in March, <https://www.eia.gov/todayinenergy/detail.php?id=48316>

**EIA, (2023, 3 7).** *Short-Term Energy Outlook*. Retrieved from <https://www.eia.gov/outlooks/steo/>

**U.S. Environmental Protection Agency (EPA). 2023.** Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021, <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks>

**U.S. Environmental Protection Agency (EPA), 2024.** GHG equivalency calculator. Available online at: <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>.

## 8.5 Socio-Economic Conditions, Environmental Justice, and Human Health

**Adgate, J. L., Godstein, B. D., McKenzie, L. M. 2014.** Potential Public Health Hazards, Exposures and Health Effects from Unconventional Natural Gas Development. Environmental Science & Technology. Understanding the Risks of Unconventional Shale and Gas Development. doi.org/10.1021/es404621d |

**CEQ 1997.** Environmental Justice Guidance Under the National Environmental Policy

- Act. <http://www.whitehouse.gov/CEQ/> December 10, 1997
- EPA 2014.** 2014 National Air Toxics Assessment Summary of Results. [www.epa.gov/nata](http://www.epa.gov/nata)
- EPA 2016.** Technical Guidance for Assessing Environmental Justice in Regulatory Analysis.
- Executive Order 12898** Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. Federal Register. Vol. 59, No. 32. Wednesday, February 16, 1994.
- Kassotis, C. D., Tillitt, D. E., Davis, W., Hormann, A., M., Nagel, S. C. 2013.** Estrogen and Androgen Receptor Activities of Hydraulic Fracturing Chemicals and Surface and Ground Water in a Drilling-Dense Region. *Endocrinology*, March 2014, 155(3):897–907 [endo.endojournals.org](http://endo.endojournals.org). doi: 10.1210/en.2013-1697
- Malin, Stephanie A. 2020.** Depressed democracy, environmental injustice: Exploring the negative mental health implications of unconventional oil and gas production in the United States. *Energy Research & Social Science* 70 (2020) 101720. <https://doi.org/10.1016/j.erss.2020.101720>
- McKenzie LM, Guo R, Witter RZ, Savitz DA, Newman LS, Adgate J. L., 2014.** Birth outcomes and maternal residential proximity to natural gas development in rural Colorado. *Environ Health Perspect* 122:412–417; <http://dx.doi.org/10.1289/ehp.1306722>
- Office of National Resource Revenue (ONRR) 2020.** <https://revenue.data.doi.gov/downloads/federal-revenue-by-location/> Accessed 17 October 2021.
- Rasmussen, S. G., Ogburn, E. L., McCormack, M., Casey, J. A., Bandeen-Roche, K., Mercer, D. G., Schwartz, B. S. 2017.** Asthma Exacerbations and Unconventional Natural Gas Development in the Marcellus Shale. *JAMA Intern Med.* 2016 September 01; 176(9): 1334–1343. doi:10.1001/jamainternmed.2016.2436.
- Tran, K. V., Casey, J. A., Cushing, L. J., Morello-Frosch, R., 2020.** Residential Proximity to Oil and Gas Development and Birth Outcomes in California: A Retrospective Cohort Study of 2006-2015 Births. *Environmental Health Perspectives*. 128(6) June 2020. 067001-1-13. <https://doi.org/10.1289/EHP5842>.
- U.S. Census Bureau, 2020.** Annual Estimates of the Resident Population by Sex, Race, and Hispanic Origin for the United States, States, and Counties: April 1, 2010, to July 1, 2018. U.S. Census Bureau, Population Division. Accessed 17 October 2021 from: <https://www.census.gov/newsroom/press-kits/2019/detailed-estimates.html>
- U.S. Census Bureau, 2019.** Income and Poverty in the United States: 2018. Report No. P60-266. Release date September 10, 2019. Accessed 17 October 2021 from: <https://www.census.gov/library/publications/2019/demo/p60-266.html>

## 8.6 Water and Geological Resources

- Castle, S.L., Thomas, B.F., Reager, J.T., Rodell, M., Swenson, S.C., and J.S. Famiglietti. 2014.** Groundwater depletion during drought threatens future water security of the Colorado River Basin: *Geophysical Research Letters*, v. 41, p. 5904-5911. <http://dx.doi.org/10.1002/2014GL061055>. Considerations when appropriating water use from the Fox Hills aquifer, 2013. Office of the State Engineer, North Dakota State Water. [https://www.swc.nd.gov/pdfs/fox\\_hills\\_policy.pdf](https://www.swc.nd.gov/pdfs/fox_hills_policy.pdf)

- DeSimone, L.A., McMahon, P.B., and M. R. Rosen 2014.** The quality of our nation's water; Water quality in principal aquifers of the United States, 1991-2010: U.S. Geological Survey Circular 1360, Reston, Virginia. <https://dx.doi.org/10.3133/cir1360>.
- Famiglietti, J.S., Lo, M., Ho, S.L., Bethune, J., Anderson, K.J., Syed, T.H., Swenson, Fischer, Kimberly. 2013.** Groundwater flow model inversion to assess water availability in the Fox Hills-Hell Creek aquifer: North Dakota State Water Commission, North Dakota Water Resource Investigation 54, 325 p. [Also available at <http://www.swc.nd.gov/4dlink9/4dcgi/GetContentPDF/PB-2246/WRI%2054.pdf>.]
- Georgakakos, A., P. Fleming, M. Dettinger, C. Peters-Lidard, T. C. Richmond, K. Reckhow, K. White, and D. Yates 2014.** Water resources, in Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, T. C. Richmond, and G. W. Yohe, chap. 3, pp. 69– 112, U.S. Global Change Research Program, New York.
- Haines, Seth S. et. al. 2017.** Assessment of Water and Proppant Quantities Associated with Petroleum Production from the Bakken and Three Forks Formations, Williston Basin Province, Montana, and North Dakota, 2016. Fact Sheet 2017–3044, June 2017. U.S. Department of the Interior U.S. Geological Survey. (Available at: <https://doi.org/10.3133/fs20173044>). Accessed March 2, 2023.
- Konikow, L.F. 2013.** Groundwater depletion in the United States (1990-2008): U.S. Geological Survey Scientific Investigations Report 2013-5079, Reston, Virginia. <http://pubs.usgs.gov/sir/2013/5079>
- Long, A.J., Thamke, J.N., Davis, K.W., and Bartos, T.T., 2018,** Groundwater availability of the Williston Basin, United States and Canada: U.S. Geological Survey Professional Paper 1841, 42 p., <https://doi.org/10.3133/pp1841>.
- Montana Department of Environmental Quality 2021.** Montana Final 2020 Water Quality Integrated Report.
- Montana Department of Natural Resources and Conservation 2015a.** Montana State Water Plan. A Watershed Approach to the 2015 Montana State Water Plan.
- Montana Department of Natural Resources and Conservation 2015b.** Water Fact Sheets (April 2015) [https://static1.squarespace.com/static/5498382ce4b015fce7f847a2/t/57c7244c9f7456b915e34ccf/1472\\_668\\_777218/WaterFactSheets\\_ALL.pdf](https://static1.squarespace.com/static/5498382ce4b015fce7f847a2/t/57c7244c9f7456b915e34ccf/1472_668_777218/WaterFactSheets_ALL.pdf) Accessed March 2, 2023.
- Montana Department of Natural Resources and Conservation 2012.** Water Use Options for Oil Well Development. Downloaded from <https://leg.mt.gov/content/committees/interim/2011-2012/Water-Policy/minutes/July-12-2012/Exhibit11.pdf>. Accessed March 2, 2023.
- Montana Department of Natural Resources and Conservation 1999.** Final Order in the Matter of the Designation of the Powder River Basin Controlled Groundwater Area.
- North Dakota Department of Health 2019.** North Dakota 2018 Integrated Section

305(b) Water Quality Assessment Report and Section 303(d) List of Waters Needing Total Maximum Daily Loads.

**North Dakota State Water Commission 2016.** Facts about North Dakota Fracking & Water Use.

**Onshore Order No. 1 (1996); replaced by 43 CFR 3171**

**Onshore Order No. 2 (1988); replaced by 43 CFR 3172**

**Post van der Burg, Max & Symstad, Amy & Igl, Lawrence & Mushet, David & Larson, Diane & Sargeant, Glen & Harper, David & Farag, Aida & Tangen, Brian & Anteau, Michael. (2022).** Potential effects of energy development on environmental resources of the Williston Basin in Montana, North Dakota, and South Dakota—Species of conservation concern. 10.3133/sir20175070D.

**Sackett et al., 2010.** *Does proximity to coal-fired power plants influence fish tissue mercury?* *Ecotoxicology* (2010) 19;1601-1611. Springer Science + Business Media, LLC 2010

**Thamke et al., 2018.** Williston Basin Groundwater Availability, United States and Canada. USGS Water Availability and Use Science Program. Available online at: <https://pubs.usgs.gov/fs/2018/3046/fs20183046.pdf> Accessed March 2, 2023.

**U.S. Department of Interior, Bureau of Land Management 2007:** Surface Operating Standards and Guidelines for Oil and Gas Exploration and Developments, The Gold Book, Fourth Edition-Revised 2007. <https://www.blm.gov/sites/blm.gov/files/uploads/The%20Gold%20Book%20-%204th%20Ed%20-%20Revised%202007.pdf> Accessed March 2, 2023.

**US DOI BLM 1988** Onshore Order No. 2

**U.S. Environmental Protection Agency (USEPA) 2016.** Hydraulic fracturing for oil and gas: Impacts from the hydraulic fracturing water cycle on drinking water resources in the United States: EPA-600-R-16-236Fa, p. 4-46. <http://www.epa.gov/hfstudy> Accessed March 2, 2023.

**US EPA 2009.** National Water Quality Inventory Report to Congress, 2004 Reporting Cycle. [https://www.epa.gov/sites/production/files/2015-09/documents/2009\\_01\\_22\\_305b\\_2004report\\_2004\\_305breport.pdf](https://www.epa.gov/sites/production/files/2015-09/documents/2009_01_22_305b_2004report_2004_305breport.pdf) Accessed March 2, 2023.

**US EPA 2008.** Model-based Analysis and Tracking of Airborne Mercury Emissions to Assist in Watershed Planning. Watershed Branch (4503-T) Office of Wetlands, Oceans, and Watersheds. USEPA. 2008. <http://www.epa.gov/tmdl/model-based-analysis-and-tracking-airborne-mercury-emissions-assist-watershed-planning-report>. Accessed March 2, 2023.

**US EPA 2021.** 303d Impaired Waters Data. <https://www.epa.gov/waterdata/waters-geoviewer> Accessed March 1, 2023.

**Wanek, Alan. 2009.** Recommended Decision for *City of Alexander Water Permit*.

Application No. 5990. Office of the State Engineer, North Dakota State Water.  
[https://www.swc.nd.gov/info\\_edu/reports\\_and\\_publications/pdfs/wr\\_investigations/wr54\\_report.pdf](https://www.swc.nd.gov/info_edu/reports_and_publications/pdfs/wr_investigations/wr54_report.pdf) pg.140. Accessed March 2, 2023.

### 8.6.1 Groundwater Assessment Data Sources:

<http://mbmaggwic.mtech.edu/> - Source of Montana ground water well data

[https://mslservices.mt.gov/Geographic\\_Information/Data/DataList/](https://mslservices.mt.gov/Geographic_Information/Data/DataList/) - Source of Shapefiles.

[http://www.swc.nd.gov/info\\_edu/map\\_data\\_resources/groundsurfacewater/](http://www.swc.nd.gov/info_edu/map_data_resources/groundsurfacewater/) - North Dakota Ground water data

<https://www.ngwa.org/docs/default-source/default-document-library/states/nd.pdf> - NGWA The Groundwater Association, USGS, NDSWC, US EPA

<https://www.dmr.nd.gov/default.asp> - North Dakota horizontal well data

**Davies, RJ, SA Mathia, J Moss.** Hydraulic fractures: How far can they go? *Mar Pet Geology* 37: 1-6.

**Jasechko, Scott, Debra Perrone.** Hydraulic fracturing near domestic water wells. *Proceedings of the National Academy of Sciences* Dec 2017, 114 (50) 13138-13143; DOI:10.1073/pnas.1701682114