United States Department of the Interior
Bureau of Land Management

Environmental Assessment-DOI-BLM-MT-C030-2012-363-EA
January 29, 2013

North Dakota Field Office Oil and Gas Leasing EA for January 2013
Location: North Dakota Field Office

Location: North Dakota Field Office (see attached Appendix A for list of lease parcels by number and legal description and Map 1.1.1)

U.S. Department of the Interior
Bureau of Land Management
North Dakota Field Office
99 23rd Ave W, Suite A
Dickinson, ND 58601
Phone: (701) 227-7700
Fax: (701) 227-7701

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
North Dakota Field Office
99 23rd Avenue West – Suite A
Dickinson, North Dakota 58601-2619
www.blm.gov/mt

In Reply Refer To:
1600/3100 (MTC030)

August 27, 2012

Dear Reader:

The Bureau of Land Management (BLM) North Dakota Field Office has prepared an environmental assessment (EA) to analyze the potential effects from offering 29 nominated lease parcels for competitive oil and gas leasing in a sale tentatively scheduled to occur on January 29, 2013.

The EA with an unsigned Finding of No Significant Impact (FONSI) is available for a 30-day public comment period. Written comments must be postmarked by September 25, 2012 to be considered. Comments may be submitted using one of the following methods:

Email: MT_North_DakotaFO_Lease_EA@blm.gov

Mail: North Dakota Field Office
Attn: Shelly Gerhart
99 23rd Avenue West, Suite A
Dickinson, ND 58601-2619

Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – will be available for public review. If you wish to withhold personal identifying information from public review or disclosure under the Freedom of Information Act (FOIA), you must clearly state, in the first line of your written comment, "CONFIDENTIALITY REQUESTED." While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so. All submissions from organizations, from businesses, and from individuals identifying themselves as representatives of organizations or businesses, will be available for public review.

Upon review and consideration of public comments, the EA will be updated as needed. Based on our analysis, parcels recommended for leasing in our assessment would be included as part of a competitive oil and gas lease sale tentatively scheduled to occur on January 29, 2013.

Prior to issuance of any leases, the Decision Record and FONSI will be finalized and posted for public review on our BLM website. Please refer to the Montana/Dakotas BLM website at www.blm.gov/mt. From this home page, go to the heading titled "Frequently Requested," where you will find a number of links to information about our oil and gas program. Current and updated information about our environmental assessments can be found on the link titled "Competitive Oil and Gas Lease Sale Information" listed under the heading "Frequently Requested". Once there, click on "2013", where you will find the NDFO EA for the January 29, 2013 lease sale for your review.

If you have any questions or would like more information about lease sale notices or the issuance of the EA, Decision Record and FONSI, please contact me at 701-227-7700.

Sincerely,

Donato J. Judice
Acting Field Manager

North Dakota Field Office Oil and Gas Leasing EA for January 2013

DOI-BLM-MT-C030-2012-363-EA

CONTENTS

Page

1.0 PURPOSE and NEED 1
1.1 Introduction.....1
1.2 Purpose and Need for the Proposed Action 3
1.3 Conformance with BLM Land Use Plan(s) 3
1.4 Public Scoping and Identification of Issues.....4
2.0 DESCRIPTION OF ALTERNATIVES, INCLUDING PROPOSED ACTION.....5
2.1 Alternative A – No Action 5
2.2 Alternative B- Proposed Action 5
2.3 Alternative C- BLM Preferred Action……..6
3.0 AFFECTED ENVIRONMENT 8
3.1 Introduction.....8
3.2 Air Resources 9
3.3 Soil Resources.....15
3.4 Water Resources 17
3.5 Vegetation Resources.....19
3.6 Special Status Species.....21
3.7 Fish and Wildlife.....27
3.8 Cultural Resources 29
3.9 Native American Religious Concerns……..……..31
3.10 Paleontology 32
3.11 Lands and Realty.....33
3.12 Minerals 34
3.13 Visual Resources……...38
3.14 Recreation and Travel Management……38
3.15 Economic Conditions……39
3.16 Social and Environmental Justice 43
4.0 ENVIRONMENTAL IMPACTS 46
4.1 Assumptions and Reasonably Foreseeable Development Scenario Summary 46
4.2 Air Resources.....53
4.3 Soil Resources.....59
4.4 Water Resources 60
4.5 Vegetation Resources 62
4.6 Special Status Species 63
4.7 Fish and Wildlife 68
4.8 Cultural Resources 69
4.9 Native American Religious Concerns……..……..…70
4.10 Paleontology 71
4.11 Lands and Realty.....73
4.12 Minerals……73

4.13 Visual Resources……...…74
4.14 Recreation and Travel Management……75
4.15 Economic Conditions……76
4.16 Social and Environmental Justice 78
4.17 Cumulative Impacts 79
5.0 CONSULTATION & COORDINATION 85
5.1 Persons, Groups, & Agencies Consulted 85
5.2 Summary of Public Participation 85
5.3 List of Preparers 86
6.0 REFERENCES 87

FIGURES

3.2.1.1 Trends in haze index (deciview) on haziest and clearest days, 2000-2004 to 2005-2009

TABLES

3.2.1. USEPA Air Quality Index Report (North Dakota); USEPA,(2009-2011)
3.2.2. Monitored Concentrations Representative of the Study Area
3.5.2.1. Noxious weeds in North Dakota
3.6.1 Aquatic sensitive or specials status wildlife species in the analysis area
3.6.2 List of sensitive bird species found in North Dakota
3.12.1 Existing Development Activity
3.12.2 Oil and Gas Leasing and Existing Development within Townships Containing Lease Parcels
3.15.6 Current Contributions of Federal Oil and Gas Leasing, Exploration, Development, and Production to the Local Economy
4.1.1 Disturbance associated with new drilled wells and existing new wells (short-term disturbance-two years; BLM NDFO)
4.1.2. Disturbance associated with new drilled wells and existing active wells (long-term disturbance; BLM NDFO)
4.2.1 BLM Projected Annual GHG Emissions Associated with Oil and Gas Exploration and Development Activity in the NDFO
4.2.2.1. Selected Methane Emission Reductions Reported Under the USEPA Natural Gas STAR Program
4.15.2 Comparison of Estimated Average Annual Economic Impacts
4.17.1 Projected non-BLM GHG emissions associated with the North Dakota FO Reasonably Foreseeable Development Scenario for fluid mineral exploration and development.
5.1.1 List of individuals, agencies, and organizations consulted regarding this EA
5.1.2 List of Preparers

MAPS

1.1.1 General Map of Nominated Lease Parcels
4.1.1 RFD Scenario for Development Potential

APPENDICES

Appendix A – Descriptions of Parcels and Lease Stipulations by Parcel

Appendix B – Stipulations Key

Appendix C – Parcel Maps by County

North Dakota Field Office Oil and Gas Leasing EA for January 2013

DOI-BLM-MT-C030-2012-363-EA

1.0 PURPOSE & NEED

1.1 Introduction

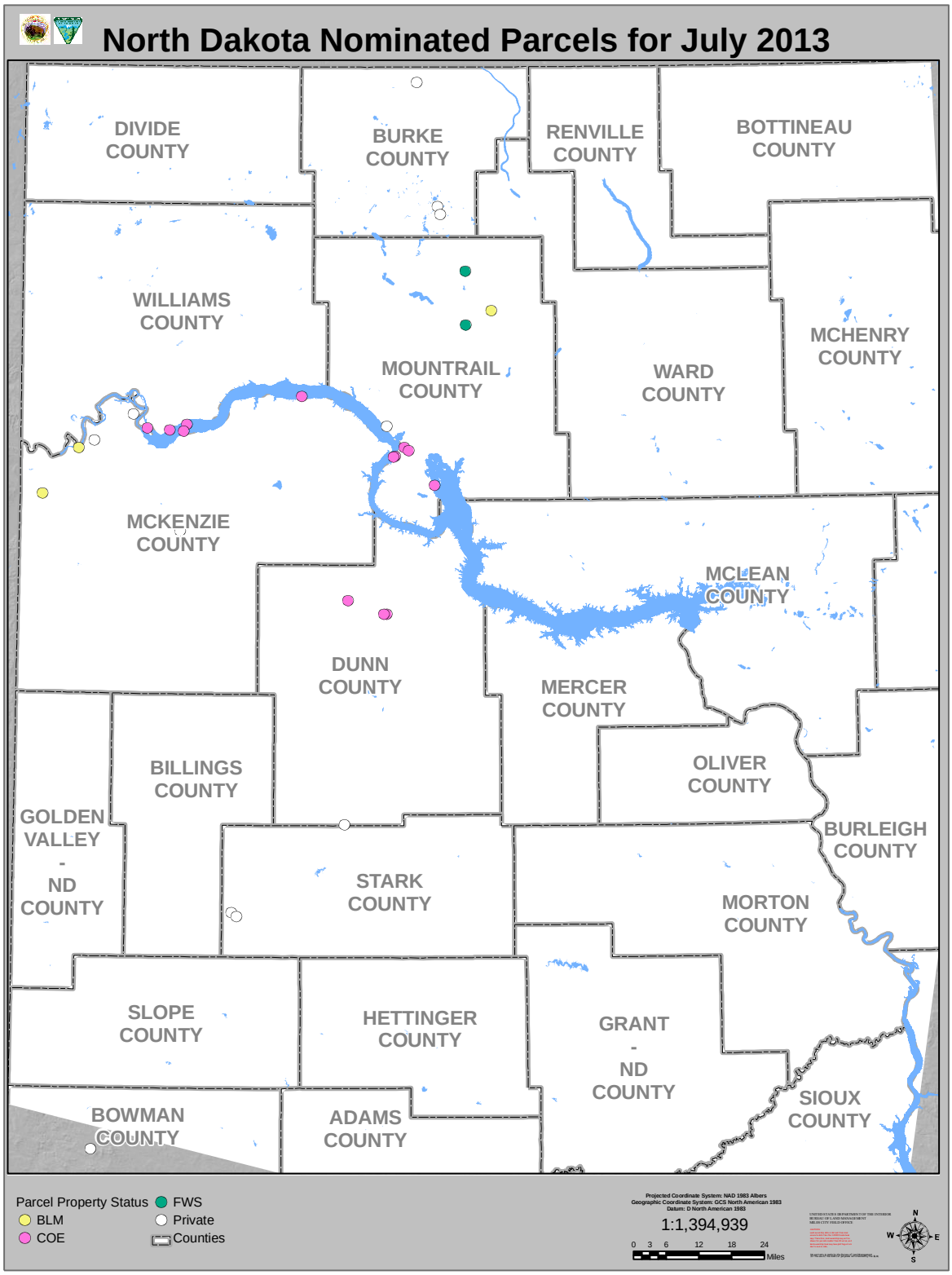
It is the policy of the Bureau of Land Management (BLM) to make mineral resources available for use and to encourage development of mineral resources to meet national, regional, and local needs. This policy is based on various laws, including the Mineral Leasing Act of 1920 and the Federal Land Policy 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.

The Montana State Office (MSO) conducts mineral estate lease auctions for lands managed by the federal government, whether the surface is managed by the Department of the Interior (BLM and US Fish and Wildlife), United States Forest Service (USFS), US Army Corps of Engineers (COE) or other departments and agencies. In some cases, the BLM holds subsurface mineral rights on split estate lands where the surface estate is owned by another party other than the federal government.

Oil and gas companies file Expressions of Interest (EOI) to nominate parcels for leasing by the BLM. From these EOIs, the MSO provides draft parcel lists to the appropriate field offices for review. BLM field offices then review legal descriptions of nominated parcels to determine: if they are in areas open to leasing; if new information has come to light which might change previous analyses conducted during the land use planning process; if there are special resource conditions of which potential bidders should be made aware; and which stipulations should be identified and included as part of a lease. Ultimately, all of the lands in proposed lease sales (including those covered by this Environmental Assessment [EA]) are nominated by the oil and gas industry and, therefore, represent areas of high interest.

This EA has been prepared to disclose and analyze the environmental consequences of leasing 29 parcels located in the North Dakota Field Office (NDFO) to be included in as part of a competitive oil and gas lease sale tentatively scheduled to occur January 29, 2013.

All 29 nominated parcels are located in western North Dakota within the NDFO planning area (see Map 1.1.1). Three parcels are located, in whole or in part, on BLM surface-controlled acreage. The 29 parcels (herein referred to as the "study area") are located within 7 counties in North Dakota. The counties included in the study area are: Bowman, Burke, Dunn, McKenzie, Mountrail, Stark and Williams.



Map 1.1.1 General Map of Nominated Lease Parcels

1.2 Purpose and Need for the Proposed Action

The purpose of offering parcels for competitive oil and gas leasing is to allow private individuals or companies to explore for and develop oil and gas resources for sale on public markets.

This action is needed to help meet the energy needs of the people of the United States. By conducting lease sales, the BLM provides for the potential increase of energy reserves for the U.S., a steady source of significant income, and at the same time meets the requirement identified in the Energy Policy Act, Sec. 362(2), Federal Oil and Gas Leasing Reform Act of 1987, and the Mineral Leasing Act of 1920, Sec. 17.

The decision to be made in the Proposed Action for this EA is whether or not to sell oil and gas leases on the parcels identified, and, if so, identify stipulations that would be included with specific lease parcels at the time of lease sale.

1.3 Conformance with Land Use Plan(s)

This EA is tiered to the information and analysis and conforms to the decisions contained in the North Dakota RMP (April 1988) and its associated Environmental Impact Statement (EIS), the governing land use plan for the NDFO. An electronic copy of the North Dakota RMP and its associated EIS can be located via the internet on the BLM home page, www.blm.gov/mt. On the home page, locate the heading titled *"Montana/Dakotas,"* then select *"What We Do"*, then click on the *"Planning"* link.

A more complete description of activities and impacts related to oil and gas leasing, development, production, etc. can be found on pages 9-10 in Chapter 2 of the RMP/EIS.

The parcels to be offered are within areas open to oil and gas leasing. Analysis of the 29 parcels is documented in this EA, and was conducted by NDFO resource specialists who relied on professional knowledge of the areas involved, review of current databases, site visits and file information to ensure that appropriate stipulations were recommended for a specific parcel. Analysis may also identify the need to defer entire or partial parcels from leasing pending further environmental review.

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. Assessment of projected activities and impacts was based on potential well densities discerned from the Reasonably Foreseeable Development (RFD) Scenario developed. The RFD contains projections of the number of possible oil and gas wells that could be drilled and produced in the NDFO area and used to analyze projected wells for the 29 nominated lease parcels. Detailed site-specific analysis of activities associated with any particular parcel would occur when a lease holder submits an application for permit to drill (APD).

Offering the parcels for sale and issuing leases would not be in conflict with any local, county, or state laws or plans.

1.4 Public Scoping and Identification of Issues

Public scoping for this project was conducted through a 15-day scoping period advertised on the BLM MSO website and posting on the NDFO website NEPA notification log (http://www.blm.gov/mt/st/en/fo/north_dakota_field.html. Scoping was initiated July 2, 2012. There were no scoping comments (written or verbal) received pertaining to oil and gas leasing.

2.0 DESCRIPTION OF ALTERNATIVES, INCLUDING PROPOSED ACTION

2.1 Alternative A – No Action

For EAs on externally initiated Proposed Actions, the No Action Alternative generally means that the Proposed Action would not take place. In the case of a lease sale, this would mean that all expressions of interest to lease (parcel nominations) would be denied or rejected.

The No Action Alternative would exclude all 29 parcels, covering 2,943 surveyed federal mineral acres, from the competitive oil and gas lease sale. Surface management would remain the same and ongoing oil and gas development would continue on surrounding federal, private, and state leases.

2.2 Alternative B – Proposed Action

The Proposed Action Alternative would be to offer 29 lease parcels of federal minerals for oil and gas leasing, covering 2,943 surveyed federal mineral acres, in conformance with the existing land use planning decisions. The parcels are located in western North Dakota. Parcel number, size, and detailed locations and associated stipulations are listed in Appendix A. Appendix C contains County maps indicating the location of each parcel.

Of the 2,943 acres of federal mineral estate considered in this EA, approximately 153 acres (3 parcels in whole or part) are managed by the BLM, and 1,183 acres (15 parcels in whole or part) are managed by other federal agencies. The remaining parcels are split estate.

In the instance of the parcels which are split estate, the BLM provided courtesy notification to private landowners that their lands would be included in this lease sale. If any activity were to occur on such split estate parcels, the lessee and/or operator would be responsible for adhering to BLM requirements as well as reaching an agreement with the private surface landowners regarding access, surface disturbance and reclamation.

Standard lease terms, conditions, and operating procedures, as well as additional stipulations listed in Appendix A would apply to the split estate parcels. Standard operating procedures for oil and gas development include measures to protect the environment and resources such as groundwater, air, wildlife, historical and prehistorical concerns, and others as mentioned in the 1988 RMP on pages 7 through 22. Lease stipulations (as required by 43 CFR 3131.3) 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 of the oil and gas within the lease boundaries, subject to the stipulations attached to the lease (43 CFR 3101.1-4).

Standard operating procedures, best management practices and required conditions of approval and the application of lease stipulations change over time to meet overall RMP objectives. In some cases new lease stipulations may need to be developed and these types of changes may require an RMP amendment.

Oil and gas leases would be issued for a 10-year period and would continue for as long thereafter as oil and gas is produced in paying quantities. If a lessee fails to produce oil and gas, does not make annual rental payments, does not comply with the terms and conditions of the lease, or relinquishes the lease; the lease would terminate and would be available for releasing in the future.

Drilling wells on a lease would not be permitted until the lease owner or operator secures approval of a drilling permit and a surface use plan specified at 43 CFR 3162.

2.3 Alternative C – BLM Preferred Action

Under the BLM Preferred Alternative 28 of the 29 lease parcels would be offered with RMP lease stipulations and/or lease notices as necessary (Appendix A) for competitive oil and gas lease sale and lease issuance.

Of the approximately 2,903 acres of federal mineral estate considered in this Alternative, approximately 153 acres (3 parcels in whole or part) are managed by the BLM, and 1,183 acres (15 parcels in whole or part) are managed by other federal agencies. The remaining parcels are split estate.

In the instance of the parcels which are split estate, the BLM provided courtesy notification to private landowners that their lands would be included in this lease sale. If any activity were to occur on such split estate parcels, the lessee and/or operator would be responsible for adhering to BLM requirements as well as reaching an agreement with the private surface landowners regarding access, surface disturbance and reclamation.

Standard lease terms, conditions, and operating procedures, as well as additional stipulations as listed in Appendix A would apply to the split estate parcels. Standard operating procedures for oil and gas development include measures to protect the environment and resources such as groundwater, air, wildlife, historical and prehistorical concerns, and others as mentioned in the 1988 RMP on pages 7 through 22. Lease stipulations (as required by 43 CFR 3131.3) 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 of the oil and gas within the lease boundaries, subject to the stipulations attached to the lease (43 CFR 3101.1-4).

Standard operating procedures, best management practices and required conditions of approval and the application of lease stipulations change over time to meet overall RMP objectives. In some cases new lease stipulations may need to be developed and these types of changes may require an RMP amendment.

One lease parcel (40.01 federal mineral acres) is located within priority sage-grouse habitat that has been established for North Dakota in conjunction with North Dakota Game and Fish Department. Greater sage-grouse conservation areas are being considered in the NDFO's on-

going planning efforts; therefore, the nominated lease parcel would be deferred at this time pending further review and analysis.

Nineteen lease parcels (1,834 federal mineral acres) in whole or in part have been found in areas classified as moderate to high according to the Potential Fossil Yield Classification (PFYC) system map. Areas with high potential paleontological yields will be further analyzed by the BLM North Dakota Archaeologist or the Montana/Dakotas Paleontologist during consultation on project specific site development for future APDs.

One lease parcel (13 federal mineral acres) has been found to contain two sensitive cultural sites. These two sites must remain undisturbed and avoided by any construction activities. Any further restrictions dealing with these two sites, and any stipulations dealing with TCPs identified by Tribal Nations for specific APD sites on any of the 29 lease parcels, will be brought forward by the BLM North Dakota Archaeologist during consultation on project specific site development for future APDs.

Federal oil and gas leases 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, does not comply with the terms and conditions of the lease, or relinquishes the lease, the minerals leased would revert back to the federal government and the lease could be resold.

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.

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

This chapter describes the existing environment (i.e., the physical, biological, social, and economic values and resources) within the analysis area, which includes the 29 nominated parcels in Bowman, Burke, Dunn, McKenzie, Mountrail, Stark, and Williams counties (Map 1.1.1), that could be affected by implementation of the alternatives described in Chapter 2.

The existing environment is described by the different resources found throughout the counties listed above. Within each resource description, lease parcels containing the resource will be listed and analyzed further in Chapter 4. If the lease parcel does not contain the resource, then the lease parcel will be omitted from the description of the specific resource.

Unless otherwise stated, resource analysis in this chapter, and Chapter 4, will be described in approximate acres due to the scaling and precision parameters associated with the Geographic Information System (GIS), in addition to being referenced to a different land survey.

All 29 parcels are located in western North Dakota, which is located in the Northern Mixed Grass Prairie, known for its high diversity of vegetation types and topography. Vegetation is comprised of both tall and short grass as well as both warm and cool season grasses. A variety of grass-like plants, forbs, shrubs, and trees also add to the vegetation diversity of this rangeland type.

Western North Dakota is comprised of gently rolling hills, buttes, badlands, wetlands, riparian areas, and river breaks. Lands in North Dakota are primarily privately owned and are mainly utilized for agricultural uses. Lands that are not restricted by topography or soil constraints generally have been cultivated for crop production. Lands that have limitations from crop production are generally rangelands or pasture lands. Rangelands and pasture lands can be native, but can also be improved or rehabilitated croplands. Rehabilitated croplands are usually evident due to their near monoculture of introduced cool season grasses such as crested wheatgrass or smooth brome.

Temperatures throughout North Dakota fluctuate widely on an annual, seasonal, and daily basis. Annual mean temperatures range from 37°F in the northeast to about 43°F in the southwest. Temperature extremes can range from below -40°F to over 110°F. Average July temperature is about 69°F, and average January temperature is 10°F. Average annual precipitation varies from 13 inches in the northwest to about 20 inches in the east with up to 70 percent of the precipitation falling as rain between May and July. Precipitation is mainly derived from air masses originating from the Gulf of Mexico. Winters are long and cold with snow accumulations from November or December through March. Windy conditions are common due to the greatly fluctuating temperatures and lack of physical barriers. Prevailing winds are from the north-northwest at an average speed of 12 miles per hour (mph). Winds of 25-30 mph will often last for six hours and can last as long as 15 hours. Winds in excess of 30 mph have lasted more than six hours. Severe weather may occur almost any time during the year. Blizzards are a common occurrence during winter and early spring. High winds and hail frequently occur in connection with summer thunderstorms (NDFO RMP, 1988).

Only those aspects of the existing environment that are potentially impacted by this project are described in detail. The following aspects of the existing environment were determined to not be present or not potentially impacted by this project include: Coal, Locatable Minerals, Livestock Grazing, Lands with Wilderness Characteristics, Cave and Karst Resources, Forest Products and Special Designations. Therefore; these resources and resource uses will not be discussed further in this EA.

3.2 Air Resources

Air resources include air quality, air quality related values (AQRVs), and climate change. As part of the planning and decision making process, BLM considers and analyzes the potential effects of BLM and BLM-authorized activities on air resources.

The U.S. Environmental Protection Agency (USEPA) has the primary responsibility for regulating air quality, including seven criteria air pollutants subject to National Ambient Air Quality Standards (NAAQS). Pollutants regulated under NAAQS include carbon monoxide (CO), lead, nitrogen dioxide (NO_2), ozone, particulate matter with a diameter less than or equal to 10 microns (PM_{10}), particulate matter with a diameter less than or equal to 2.5 microns ($PM_{2.5}$), and sulfur dioxide (SO_2). Two additional pollutants, nitrogen oxides (NO_x) and volatile organic compounds (VOCs), are regulated because they form ozone in the atmosphere. Air quality is determined by pollutant emissions and emission characteristics, atmospheric chemistry, dispersion meteorology, and terrain. AQRVs include effects on soil and water, such as sulfur and nitrogen deposition and lake acidification, and aesthetic effects, such as visibility.

In addition to USEPA federal regulations, air quality is also regulated by the North Dakota Department of Health, Division of Air Quality. This agency develops state-specific regulations and issues air quality permits to emission sources.

Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years. Climate change includes both historic and predicted climate shifts that are beyond normal weather variations.

3.2.1 Air Quality

Air quality is monitored within the following counties: Burke, Dunn, and McKenzie. The USEPA air quality index (AQI) is an index used for reporting daily air quality (http://www.epa.gov/oar/data/geosel.html) to the public. The index tells how clean or polluted an area's air is and whether associated health effects might be a concern. The USEPA calculates the AQI for five criteria air pollutants regulated by the Clean Air Act (CAA): ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each of these pollutants, USEPA has established NAAQS to protect public health. An AQI value of 100 generally corresponds to the primary NAAQS for the pollutant. The following terms help interpret the AQI information:

- **Good** – The AQI value is between 0 and 50. Air quality is considered satisfactory and air pollution poses little or no risk.

- **Moderate** – The AQI is between 51 and 100. Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people. For example, people who are unusually sensitive to ozone may experience respiratory symptoms.
- **Unhealthy for Sensitive Groups** – When AQI values are between 101 and 150, members of "sensitive groups" may experience health effects. These groups are likely to be affected at lower levels than the general public. For example, people with lung disease are at greater risk from exposure to ozone, while people with either lung disease or heart disease are at greater risk from exposure to particle pollution. The general public is not likely to be affected when the AQI is in this range.
- **Unhealthy** – The AQI is between 151 and 200. Everyone may begin to experience some adverse health effects, and members of the sensitive groups may experience more serious effects.
- **Very Unhealthy** – The AQI is between 201 and 300. This index level would trigger a health alert signifying that everyone may experience more serious health effects.

AQI data show that there is little risk to the general public from air quality in the analysis area (Table 1). Based on available aggregate data for Burke, Dunn, and McKenzie counties for years 2009–2011, at least 96 percent of the days were rated "good." The three-year median daily AQIs were 33.0, 32.5, and 34.0 for the Burke, Dunn, and McKenzie county monitors.

Table 3.2.1. USEPA Air Quality Index Report (2009-2011)

County[1]	# Days in Period	# Days Rated Good or No Data	Percent of Days Rated Good or No Data	# Days Rated Moderate	# Days Rated Unhealthy for Sensitive Groups	# Days Rated Unhealthy	# Days Rated Very Unhealthy
Burke	1,084	1,046	96%	36	2	0	0
Dunn	762	754	99%	8	0	0	0
McKenzie	1,095	1,070	98%	24	0	0	1

Source: USEPA 2012a. AirData website (http://www.epa.gov/airdata/ad_rep_aqi.html, accessed August 6, 2012).
[1] Monitor names and station identifiers are as follows:
The Burke County monitor is located in the Lostwood Wilderness (38-013-004).
The Dunn County monitor is located in Dunn Center (38-025-003).
The McKenzie County monitor is located at the Theodore Roosevelt National Park's North Unit (38-053-002).

The area managed by the NDFO is in compliance with all National Ambient Air Quality Standards (NAAQS). Maximum concentrations as a percentage of the NAAQS are summarized in Table 2. Gaseous pollutant concentrations are provided in terms of parts per million (ppm) or parts per billion (ppb), while particulate concentrations are provided in terms of micrograms per cubic meter ($\mu g/m^3$). Data are not provided for CO and lead, which are not monitored within the analysis area.

Table 3.2.2. Monitored Concentrations Representative of the Study Area

Pollutant	Averaging Time	Applicable Standard	Ambient Concentrations [a, b] (Burke, Dunn, McKenzie Counties)	Percentages of NAAQS (Burke, Dunn, McKenzie Counties)
NO_2	1 hour	100 ppb	17.3, 10.7, 9.0	17%, 11%, 9%
O_3	8 hour	0.075 ppm	0.061, 0.0555, 0.059	81%, 74%, 79%
PM_{10}	24 hour	150 μg/m^3	52, 74, 40	35%, 49%, 27%
$PM_{2.5}$	24 hour	35 μg/m^3	15.0, 14.0, 18.0 [b]	43%, 40%, 51% [b]
	Annual	15 μg/m^3	8.0, 6.4, 8.8 [b]	53%, 43%, 59% [b]
SO_2	1 hour	75 ppb	43.7, 13.0, 15.3	58%, 17%, 20%

Source: USEPA 2012a. AirData website (http://www.epa.gov/airdata/ad_rep_con.html, accessed August 6, 2012).

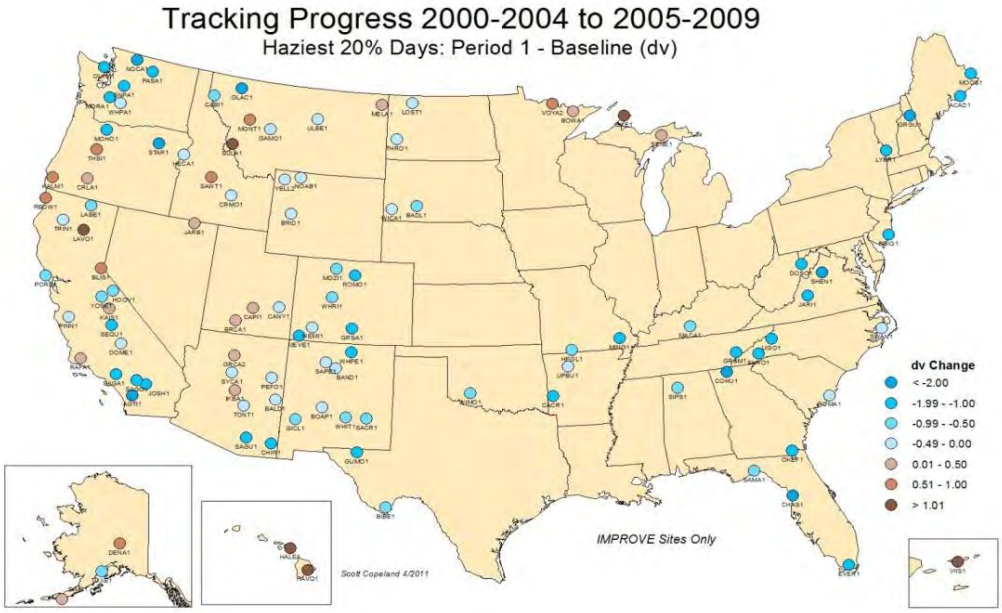
[a] Monitored concentrations are the three-year maximum second highest for 24-hour PM_{10}; three-year average of the annual 4th highest daily maximum for 8-hour O_3; three-year average of the 98th percentile for 24-hour $PM_{2.5}$ and 1-hour NO_2; three-year average of the 99th percentile for 1-hour SO_2; and three-year maximum arithmetic mean for annual $PM_{2.5}$.

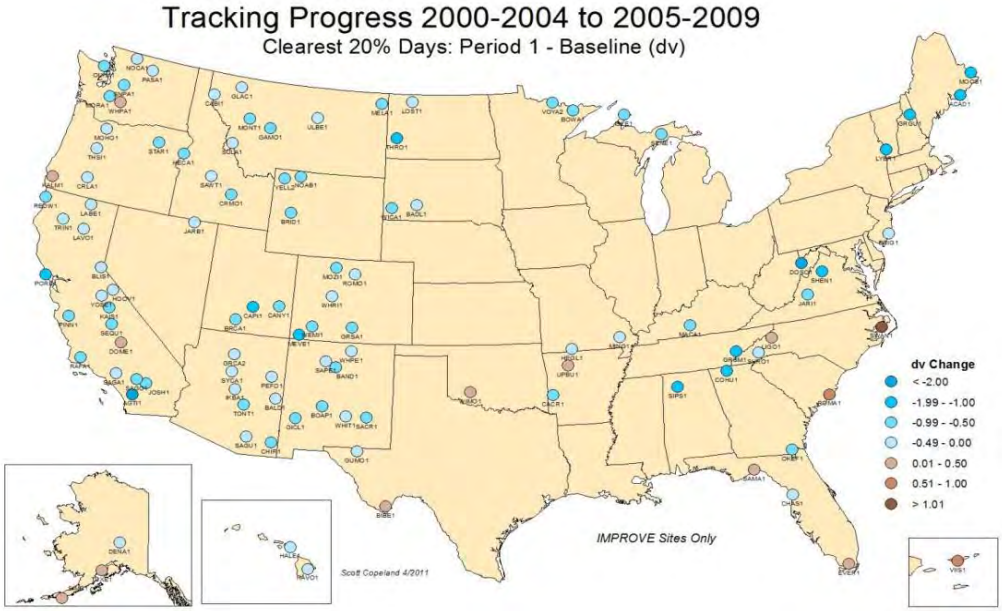
[b] Less than three years of $PM_{2.5}$ data are available. Values are based on data from 2010 and 2011 for the monitors in Burke and McKenzie counties and are based on 2011 data the monitor located in Dunn County.

Air resources also include visibility, which can be degraded by regional haze due primarily to sulfur, nitrogen, and particulate emissions. Based on trends identified during 2005-2009, visibility has improved slightly at the Lostwood Wilderness and Theodore Roosevelt National Park IMPROVE monitor stations on the haziest days (20 percent worse days), as shown in Figure A. On the 20 percent best (clearest) days, visibility at these monitors has been improving, with greater improvement at Theodore Roosevelt National Park.

A review of the USEPA 2008 National Emission Inventory (NEI) emissions in Burke, Bowman, Dunn, McKenzie, Mountrail, Stark, and Williams counties show that biogenic emissions from vegetation and soil are the primary sources of CO, NO_x, and VOC emissions, resulting in 32, 33, and 87 percent, respectively, of these pollutant emissions (USEPA 2012b). Approximately 81 percent of SO_2 emissions result from oil and gas production. With regard to PM_{10} and $PM_{2.5}$, approximately 69 percent and 71 percent of these emissions, respectively, are caused by fugitive dust from agricultural crops and livestock. As shown above, these emissions occur in an area with good air quality. Due to recent growth in oil and gas activity, current emissions from oil and gas production are likely to be underestimated by the 2008 NEI.

Figure 3.2.1.1. Trends in haze index (deciview) on haziest and clearest days, 2005-2009. Source: IMPROVE 2011.





3.2.2 Climate Change

Climate change is defined by the Intergovernmental Panel on Climate Change (IPCC) as "a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and persist for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity." (IPCC 2007). Climate change and climate science are discussed in detail in the *Climate Change Supplementary Information Report for Montana, North Dakota, and South Dakota*, Bureau of Land Management (BLM 2010). This document is often referred to as the "Climate Change SIR" and is incorporated by reference into this EA.

The Intergovernmental Panel on Climate Change (IPCC 2007) states, "Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level." Global average temperature has increased approximately 1.4°F since the early 20th century (BLM 2010). Warming has occurred on land surfaces, oceans and other water bodies, and in the troposphere (lowest layer of earth's atmosphere, up to 4-12 miles above the earth). Other indications of global climate change described by the IPCC (BLM 2010) include:

- Rates of surface warming increased in the mid-1970s and the global land surface has been warming at about double the rate of ocean surface warming since then;
- Eleven of the last 12 years rank among the 12 warmest years on record since 1850;
- Lower-tropospheric temperatures have slightly greater warming rates than the earth's surface from 1958-2005.

Earth has a natural greenhouse effect wherein naturally occurring gases such as water vapor, CO_2, methane, and N_2O absorb and retain heat. Without the natural greenhouse effect, earth would be approximately 60°F cooler (BLM 2010). Current ongoing global climate change is caused, in part, by the atmospheric buildup of greenhouse gases (GHGs), which may persist for decades or even centuries. Each GHG has a global warming potential that accounts for the intensity of each GHG's heat trapping effect and its longevity in the atmosphere (BLM 2010). The buildup of GHGs such as CO_2, methane, N_2O, and halocarbons since the start of the industrial revolution has substantially increased atmospheric concentrations of these compounds compared to background levels. At such elevated concentrations, these compounds absorb more energy from the earth's surface and re-emit a larger portion of the earth's heat back to the earth rather than allowing the heat to escape into space than would be the case under more natural conditions of background GHG concentrations.

A number of activities contribute to the phenomenon of climate change, including emissions of GHGs (especially CO_2 and methane) from fossil fuel development, large wildfires, activities using combustion engines, changes to the natural carbon cycle, and changes to radiative forces and reflectivity (albedo). It is important to note that GHGs will have a sustained climatic impact over different temporal scales due to their differences in global warming potential (described above) and lifespans in the atmosphere. For example, CO_2 may last 50 to 200 years in the atmosphere while methane has an average atmospheric life time of 12 years (BLM 2010).

Some information and projections of impacts beyond the project scale are becoming increasingly available. Chapter 3 of the Climate Change SIR (BLM 2010) describes impacts of climate change in detail at various scales, including the state scale when appropriate. The USEPA identifies western North Dakota as part of the Great Plains region. The following summary characterizes potential changes identified by the U.S. Climate Change Science Program (CCSP 2008) that are expected to occur at the regional scale, where the Proposed Action and its alternatives are to occur.

- The region is expected to experience warmer temperatures with less snowfall.
- Temperatures are expected to increase more in winter than in summer, more at night than in the day, and more in the mountains than at lower elevations.
- Earlier snowmelt means that peak stream flow would be earlier, weeks before the peak needs of ranchers, farmers, recreationalist, and others. In late summer, rivers, lakes, and reservoirs would be drier.
- More frequent, more severe, and possibly longer-lasting droughts are expected to occur.
- Crop and livestock production patterns could shift northward; less soil moisture due to increased evaporation may increase irrigation needs.
- Drier conditions would reduce the range and health of ponderosa and lodgepole pine forests, and increase the susceptibility to fire. Grasslands and rangelands could expand into previously forested areas.
- Ecosystems would be stressed and wildlife could be further stressed.

Other impacts could include:

- Increased particulate matter in the air as drier, less vegetated soils experience wind erosion.
- Shifts in vegetative communities which could threaten plant and wildlife species.
- Changes in the timing and quantity of snowmelt which could affect both aquatic species and agricultural needs.

Projected and documented broad-scale changes within ecosystems of the U.S. are summarized in the Climate Change SIR (BLM 2010). Some key aspects include:

- Large-scale shifts have already occurred in the ranges of species and the timing of the seasons and animal migrations. These shifts are likely to continue. Climate changes include warming temperatures throughout the year and the arrival of spring an average of 10 days to 2 weeks earlier through much of the U.S. compared to 20 years ago. Multiple bird species now migrate north earlier in the year.
- Fires, insect epidemics, disease pathogens, and invasive weed species have increased and these trends are likely to continue. Changes in timing of precipitation and earlier runoff would increase fire risks.

More specific to North Dakota, additional projected changes associated with climate change described in Section 3.0 of the Climate Change SIR (BLM 2010) include:

- Temperature increases in North Dakota are predicted to be between 3 to 5°F at mid-21st century. As the mean temperature rises, more heat waves are predicted to occur.

- Precipitation is expected to increase during winter and spring, decrease slightly in summer, and remain relatively unchanged in the fall.
- For the western portion of the state, annual median runoff is expected to decrease between 2 and 5 percent by mid-21st century, while runoff in the northeastern part of the state would increase by 5-10 percent.
- Crop yields may increase in North Dakota, associated with predicted temperature increases.
- North Dakota's Prairie Pothole wetlands are expected to decline in quality, due to their shallow depths and rapid evaporation rates. Shrinking wetlands may lead to decreases in waterfowl populations.
- Wildland fire risk is predicted to continue to increase due to climate change effects on temperature, precipitation, and wind. One study predicted an increase in median annual area burned by wildland fires in the western portion of North Dakota, based on a 1°C global average temperature increase, to be 393 percent.

While long-range regional changes will occur within this analysis area, it is impossible to predict precisely when these changes will occur.

3.3 Soil Resources

The soil-forming factors (climate, parent material, topography, biota, and age) are variable across the planning area, which results in soils with diverse physical, chemical, and biotic properties. Important properties of naturally functioning soil systems include biotic activity, diversity, and productivity; water capture, storage, and release; nutrient storage and cycling; contaminant filtration, buffering, degradation, immobilization, and detoxification; and biotic system habitat.

Reclamation suitability describes the ability of the soil resource to restore functional and structural integrity following disturbance. The rate and degree of recovery is dependent on the action, time of year, and various site characteristics. Soils poorly suited to successful reclamation contain characteristics that include high salt content, poor water-holding capacity, inadequate rooting depth, or highly erosive qualities. Sites poorly suited to reclamation, would require unconventional and/or site-specific reclamation measures.

The lease parcels are located within 7 watersheds [HUC 8 (Hydrological Unit Code); subbasins]: Des Lacs (HUC 09010002), Lake Sakakawea (HUC 10110101), Lower Little Missouri (HUC 10110205), Lower Yellowstone (HUC 10100004) Moose Mountain Creek-Souris River (HUC 09010008), Upper Heart (HUC 10130202), and Upper Little Missouri (HUC 10110201). The acreage of the lease parcels comprises less than 1 percent of each watershed. Soils that would be considered prime farmlands if irrigated occur within the all watershed-lease parcel areas. However, since dependable water is unavailable on these lands, they are not considered prime farmland. The following describes the common soil properties of lease parcels within each watershed:

The Des Lacs watershed contains proposed parcels NDM 97300-LE, LF, and LV; comprising less than 1 percent of the watershed. The lease parcels are located in Burke County. Parcel soils generally formed from fine loamy till. These soils are susceptible to water erosion. Ecological

sites are typically Thin Loamy (MLRA R053BY015ND) or Claypan (MLRA R053AY002ND). Terrain within the parcels is commonly till plain, moraine, hill or lake plain, till plain, swale.

The Lake Sakakawea watershed contains proposed parcels NDM 97300-KJ, KW, KH, KU, KV, JP, AQ, PA, MT, LQ, LY, MV, LT, L6, LL, IP, and LF; comprising less than 1 percent of the watershed. The lease parcels are located in Mountrail, McKenzie, and Burke Counties. Parcel soils generally developed from calcareous glacial till. These soils vary from nearly level to very steep slopes of glacial till plains, moraines and valley sides. Typically the soils within these parcels are susceptible to water erosion. Ecological sites are typically Thin Loamy (MLRA R054XY038ND) or Shallow Loamy (MLRA R054XY030ND). Terrain within the parcels is hill, ridges and knolls. Parcels NDM-97300 KJ, KH, KU, KV, JP, AQ, and PA have areas submerged in under water.

The Lower Little Missouri watershed contains proposed parcel NDM 97300-KC, KB, and KE; comprising less than 1 percent of the watershed. The lease parcel is located in Dunn and McKenzie Counties. Parcel soils generally formed from fine-loamy residuum weathered from sedimentary rock. These soils are susceptible to water erosion. The majority of the area within the parcels contain ecological site Shallow Loamy (MLRA R054XY030ND). Terrain within the parcel is hills, knolls and ridges. Parcels NDM 97300-KB, KC, and KE have areas submerged under water.

The Lower Yellowstone watershed contains proposed parcel NDM 79010-AZ; comprising less than 1 percent of the watershed. The lease parcel is located in McKenzie County. Parcel soils in this site are generally well drained and formed in soft siltstone, loess deposits or glacial till. The parcel has a majority of ecological site Thin Loamy (MLRA R054XY038ND). Terrain within the parcel is made up of hills, knolls and ridges.

The Moose Mountain Creek-Souris River watershed contains proposed parcels NDM 97300-LV; comprising less than 1 percent of the watershed. The lease parcel is located in Burke County. The majority of the soils in this parcel consist of numerous low, irregularly-shaped knolls with intervening swales, drainage ways, and poorly drained depressions. The dominant soils formed in medium textured glacial till. There is not an approved Ecological Site Description for sites in this parcel.

The Upper Heart watershed contains proposed parcels NDM 97300-LK, LM, and MW; comprising less than 1 percent of the watershed. The lease parcels are located in Stark and Dunn Counties. Parcel soils generally developed from clayey residuum weathered from shale. These soils are susceptible to water erosion. Ecological sites are commonly Clayey (MLRA R054XY020ND). Terrain within the parcels is commonly alluvial fans, alluvial flats and hills.

The Upper Little Missouri watershed contains proposed parcels NDM 97300-LW; comprising less than 1 percent of the watershed. The lease parcel is located in Bowman County. Parcel soils generally developed from clayey residuum weathered from shale. These soils are susceptible to water erosion. Ecological sites are typically Shallow Loamy (MLRA R54XY030ND). Terrain within the parcels is commonly hills, knolls and ridges.

3.4 Water Resources

3.4.1 Surface Hydrology

Surface water resources across the NDFO are present as lakes, reservoirs, rivers, streams, wetlands, and springs. Water resources are essential to the residents of western North Dakota to support agriculture, public water supplies, industry, and recreation. Water resources and riparian areas are crucial to the survival of many BLM-sensitive fish, reptiles, birds, and amphibians.

Perennial streams retain water year-round and have variable flow regimes. Intermittent streams flow during the part of the year when they receive sufficient water from springs, groundwater, or surface sources such as snowmelt or storm events. Ephemeral streams flow only in direct response to precipitation. Intermittent and ephemeral streams play an important role in the hydrologic function of the ecosystems within the lease parcels by transporting water, sediment, nutrients, and debris and providing connectivity within a watershed. They filter sediment, dissipate energy from snowmelt and storm water runoff, facilitate infiltration, and recharge groundwater (Levick et al. 2008). The pools of intermittent prairie streams retain water in the summer months, supporting riparian vegetation, providing habitat for aquatic wildlife (fish, amphibians, reptiles, and invertebrates), and provide water resources for wildlife and livestock.

Stream morphology is influenced by a number of factors including: stream flow regime, geology, soils, vegetation type, climate, and land use history. Stream conditions reflect a number of historic and current impacts, ranging from agriculture to mining. Surficial geology is generally represented by Tertiary sandstones, siltstones, and shales, with some alluvium and glacial till which tends to form fine grain soils (loams to clays), that are highly erosive. Streambeds consist typically of sand and silt, with few bedrock channels. Stream morphology is highly influenced by the presence and type of riparian vegetation because streambeds and stream banks generally lack control features (e.g., rocks, cobles, bedrock). Condition of associated uplands is also an important factor due to velocity of water and amount of sediment entering the streams.

The lease parcels are located within 7 watersheds [HUC 8 (Hydrological Unit Code); subbasins]: Des Lacs (HUC 09010002), Lake Sakakawea (HUC 10110101), Lower Little Missouri (HUC 10110205), Lower Yellowstone (HUC 10100004) Moose Mountain Creek-Souris River (HUC 09010008), Upper Heart (HUC 10130202), and Upper Little Missouri (HUC 10110201). The acreage of the lease parcels comprises less than 1 percent of each watershed.

The Des Lacs watershed contains proposed parcels NDM 97300-LE, LF, and LV; comprising less than 1 percent of the watershed. The lease parcels are located in Burke County.

The Lake Sakakawea watershed contains proposed parcels NDM 97300-KJ, KW, KH, KU, KV, JP, AQ, PA, MT, LQ, LY, MV, LT, L6, LL, IP, and LF; comprising less than 1 percent of the watershed. The lease parcels are located in Mountrail, McKenzie, and Burke Counties.

The Lower Little Missouri watershed contains proposed parcel NDM 97300-KC, KB, and KE; comprising less than 1 percent of the watershed. The lease parcel is located in Dunn and McKenzie Counties.

The Lower Yellowstone watershed contains proposed parcel NDM 79010-AZ; comprising less than 1 percent of the watershed. The lease parcel is located in McKenzie County.

The Moose Mountain Creek-Souris River watershed contains proposed parcels NDM 97300-LV; comprising less than 1 percent of the watershed. The lease parcel is located in Burke County.

The Upper Heart watershed contains proposed parcels NDM 97300-LK, LM, and MW; comprising less than 1 percent of the watershed. The lease parcels are located in Stark and Dunn Counties

The Upper Little Missouri watershed contains proposed parcels NDM 97300-LW; comprising less than 1 percent of the watershed. The lease parcel is located in Bowman County

Any beneficial use of produced water requires water rights to be issued by North Dakota State Water Commission as established by law. This water has been used for watering livestock, irrigation, drilling operations, and industrial applications.

3.4.2 Groundwater

The quality and availability of groundwater varies greatly across the region. Residents in western North Dakota commonly get their ground water from aquifers consisting of unconsolidated, alluvial valley-fill materials, glacial outwash, or consolidated sedimentary rock formations and some coal beds.

Alluvial aquifers within the area and generally consist of Quaternary alluvium and undifferentiated Quaternary/Tertiary sediments, which include sand and gravel deposits. Alluvial aquifers occur in terrace deposits and within the floodplains, and along the channels of larger streams, tributaries, and rivers, and are among the most productive sources of groundwater. They are typically 0-40 feet thick. The quality of groundwater from alluvial aquifers is generally good, but can be highly variable [approximately 100 mg/l to 2,800 mg/l TDS, specific conductance (SC) of 500 to 125,000 microsiemens/centimeter (uS/cm), and sodium adsorption ratio (SAR) of 5.0 to 10]. Wells completed in coarse sand and gravel alluvial aquifers can yield as much as 100 gallons per minute (gpm), although the average yield is 15 gpm. Alluvial deposits associated with abandoned river channels or detached terraces are topographically isolated and have limited saturation and yield as much as 20 gpm (Zelt et al. 1999).

Within the analysis area, the primary bedrock aquifers occur in sandstones and lignites of the Tertiary Fort Union Formation (Cenozoic rocks) (including Sentinel Butte, Cannonball, and Slope Formations) and the sandstones of the Cretaceous Hell Creek and Fox Hills formations (Mesozoic rocks). Wells within the Fort Union formation aquifers are typically 100 to 200 feet deep, but can be up to 1500 feet in depth. These wells may produce as much as 40 gpm, but yields of 15 gpm are typical. Where aquifers are confined and artesian conditions exist, wells in the Fort Union Formation will generally flow less than 10 gpm. Well depths to the Hell Creek and Fox Hills formation aquifers are highly variable, but typically range from 200 to 1,000 feet in depth. Groundwater yields from these aquifers may be as much as 200 gpm, but are generally

less than 100 gpm. Artesian wells within these aquifers may flow as high as 20 gpm (Zelt et al. 1999). Groundwater yields from the deeper Paleozoic Madison formation aquifer can range from 20 to 6,000 gpm, or can be higher, in karst areas. The depth to the Madison formation aquifer in the planning area can exceed 6,000 feet. Due to the extreme depth of this aquifer, it is rarely accessed for water use. Water quality of this aquifer is highly variable and is dependent on depth, bedrock type, recharge rate, and other factors. North Dakota State Water Commission well log searches in areas close to the proposed parcels showed domestic/stockwater well depths of 28-500 feet and outputs of 4.5-40 gpm.

3.5 Vegetation Resources

As described in the Introduction to this EA, all the lease parcels are located in western North Dakota, which is located in the Northern Mixed Grass Prairie. The Northern Mixed Grass Prairie is known for its diverse vegetation types, soil types, and topography. Vegetation is comprised of both tall and short grass as well as both warm and cool season grasses. A variety of grass-like plants, forbs, shrubs, and trees also add to the vegetation diversity of this rangeland type. Many of these plant species are found in woody draws and riparian/wetland zones.

Existing influences on local distribution of plant communities include soils, topography, surface disturbance, availability of water, management boundary fence lines, and soil salinity. Vegetation communities have been affected by human activities for over a century. Some of these activities include: infrastructure developments (roads, powerlines, pipelines, etc.), chemical applications, livestock grazing, farming, and wildlife rehabilitation, prevention, manipulation, and suppression.

3.5.1 Vegetation Communities

Six major vegetation communities have been identified for the study area: native mixed grass prairie, wooded draws, agricultural lands, improved or restored pastures, riparian-wetlands, and other disturbed vegetative communities.

As a whole, the North Dakota landscape is comprised of a mosaic pattern. Settlement and privatization of most of the state has led to this pattern; therefore, large blocks of vegetative communities free of human disturbances are rare.

3.5.1.1 Native Mixed Grass Prairie

The native mixed grassland community is dominated by perennial grasses. Perennial grasses can be both warm season and cool season grasses, and they can also be both tall and short grasses. Some of the more common grasses include: western wheatgrass (*Pascopyrum smithii*), needle-and-thread (*Hesperostipa comata*), green needlegrass (*Nassella viridula)*, blue grama (*Bouteloua gracilis)***,** and prairie junegrass (*Koeleria macrantha)*. Various forbs and shrubs are present but occur as a minor species composition component throughout the community. Many of these species occur in woody draws.

3.5.1.2 Wooded Draw

The wooded draw habitat type develops in ravines where the microclimate, primarily greater moisture, is suitable for the growth and development of trees. The major species include green

ash, American elm, cottonwood, and quaking aspen. Wooded draws also support a variety of shrub species including chokecherry, American plum, western snowberry, buffaloberry, red-osier dogwood, Missouri gooseberry, and juneberry. (North Dakota RMP/EIS, 1988).

3.5.1.3 Improved or Restored Pasture

Improved pastures consists of cultivated areas planted with introduced forage species, including crested wheatgrass and smooth brome *(Bromus inermis)* and intermediate wheatgrass *(Thinopyrum intermedium)* and alfalfa *(Medicago sativa*), planted specifically for the improved forage production for livestock consumption.

Restored pastures may include sub-marginal agricultural lands that have been restored due to poor crop production and/or high erosion potential. Historically, restored pastures were dominated by a monoculture of crested wheatgrass. These crested wheatgrass seedings are still present today and are essentially unchanged from when they were planted. They can be visible on aerial photographs, and grass, forb, and shrub species composition are similar from one crested seeding to another. More recent restoration activities of agricultural lands use a combination of crested wheatgrass, smooth brome, intermediate wheatgrass, or species native to Northern Mixed Grass Prairie.

3.5.1.4 Agriculture

The agriculture community is comprised of monocultures of crops which may include small grains, alfalfa, corn, sunflowers, or other crops grown primarily as supplemental feed sources for livestock production operations. These areas have been completely disturbed from the native vegetation potentials.

3.5.1.5 Riparian-Wetlands

Riparian-wetland areas are among the most productive and important ecosystems, comprising approximately one percent of all national public lands. Characteristically, riparian-wetland areas display a greater diversity of plant, fish, wildlife, and other animal species and vegetative structure than adjoining ecosystems. Some of the more common vegetative species that occur in these areas include: prairie cordgrass, switchgrass, Canada wildrye, western wheatgrass, sedges (*Carex spp.*), rushes (*Juncus spp.*), willow, chokecherry, buffaloberry, and plains cottonwood. Healthy riparian systems filter and purify water as it moves through the riparian-wetland zone, reduce sediment loads and enhance soil stability, provide micro-climate moderation when contrasted to temperature extremes in adjacent areas, and contribute to ground water recharge and base flow (USDI, BLM, 1987b).

Prairie potholes are depressional wetlands created by the scouring action of glaciers. The formerly glaciated landscape within the study area is pockmarked with a number of these potholes, which fill with snowmelt and rain in the spring. Some prairie pothole marshes are temporary, while others may be essentially permanent. Submerged and floating aquatic plants take over the deeper water in the middle of the potholes, while bulrushes and cattails grow closer to shore.

3.5.1.6 Other Disturbed Vegetation Communities

Other disturbed vegetation communities include human disturbances or alterations to the landscape. These disturbances include, but are not limited to: infrastructure developments (e.g., roads, powerlines, pipelines, and fences), chemical applications, livestock grazing, farming and ranching, and industrial and commercial facilities. Invasive, non-native grasses such as smooth brome and crested wheatgrass are commonly found on these disturbed areas. For example, smooth brome was planted in many road ditches and has encroached into areas bordering road ditches. This is often true for native prairie sites adjacent to roadways; therefore, these sites often have a smooth brome component due to its ability to spread by creeping rhizomes.

Wildfire prevention, manipulation, and suppression activities are also human alterations on natural processes that have altered vegetation communities in western North Dakota.

3.5.2 Noxious Weeds

Noxious weeds occur randomly in isolated pockets within the study area. No known populations are located within the parcels, but all of North Dakota has the potential for infestation. The following table (Table 3.5.2.1) shows the noxious weeds in North Dakota.

Table 3.5.2.1. Noxious weeds in North Dakota

Common Name	Scientific Name
Absinth wormwood	*Artemisia absinthium*
Canada thistle	*Cirsium arvense*
Dalmatian toadflax	*Linaria genistifolia*
Diffuse knapweed	*Centaurea diffusa*
Field bindweed	*Convolvulus arvensis*
Leafy spurge	*Euphorbia esula*
Musk thistle	*Carduus nutans*
Purple loosestrife	*Lythrum salicaria*
Russian knapweed	*Acroptilon repens*
Saltcedar	*Tamarix ramosissima*
Spotted knapweed	*Centaurea maculosa*

3.6 Special Status Species

3.6.1 Special Status Animals Species

A number of animal species are priority species for BLM and could be found occupying habitats associated with the proposed lease nominations. Special status species (SSS) are species that are limited in number or that have observed a steady decline in their numbers across their range. The **Special Status Species** designation includes **sensitive** and **state listed** as well as federally **proposed, listed**, and **candidate** species.

Sensitive species are those designated as sensitive by a BLM state director, usually in cooperation with the state agency responsible for managing the species and state natural heritage programs. They are those species that: (1) could become endangered in or extirpated from a state or within a significant portion of its distribution; (2) are under status review by the U.S.

Fish and Wildlife Service (FWS); (3) are undergoing significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution; (4) are undergoing significant current or predicted downward trends in population or density such that federal listed, proposed, candidate, or state-listed status may become necessary; (5) typically have small and widely dispersed populations; (6) inhabit ecological refugia or other specialized or unique habitats; or (7) are state-listed but which may be better conserved through application of the BLM Sensitive Species Status.

State Listed (or Species of Conservation Priority) this designation includes species in decline at the state level whose population levels are not well known but are thought to be in decline.

Proposed species are species that have been officially proposed for listing as threatened or endangered by the Secretary of the Interior, and a proposed rule has been published in the Federal Register.

Listed species are designated as threatened or endangered by the Secretary of the Interior under the provisions of the Endangered Species Act, and a final rule for the listing has been published in the Federal Register.

Candidate species are designated as candidates for listing as threatened or endangered by the FWS, and listings have been published in the Federal Register.

3.6.1.1 Aquatic Wildlife

The analysis area contains sufficient habitat for five fish, one amphibian, and one reptile that are special status species. All of these species depend on perennial and intermittent streams or rivers with intact floodplains, wetlands and riparian areas that are properly functioning. Threats to the aquatic species include but are not limited to habitat modification, exotic or non-native species, small population size, limited natural reproduction, hybridization, pollution and contaminants.

Table 3.6.1. Aquatic sensitive or specials status wildlife species in the analysis area

Species	USFWS Status	BLM Sensitive	In Range	Suitable Habitat present
Blue sucker	none	Sensitive	Yes	Yes
Northern Redbelly X Finescale Dace	none	Sensitive	Yes	Yes
Paddlefish	none	Sensitive	Yes	Yes
Sicklefin Chub	none	Sensitive	Yes	Yes
Sturgeon Chub	none	Sensitive	Yes	Yes
Snapping Turtle	none	Sensitive	Yes	Yes
Plains spadefoot	none	Sensitive	Yes	Yes

3.6.1.2 Terrestrial Wildlife

Evaluation of wildlife values at the landscape scale as a first step is key to understanding potential impacts of a large project. Various agencies and non-governmental organizations have

evaluated wildlife values, including terrestrial conservation species, species richness, game quality, etc. and have been mapped to various degrees at the landscape level.

Lease parcels were reviewed utilizing these GIS overlays to assess potential aquatic, terrestrial and other habitat values. This course-scale landscape analysis of wildlife resources provides one tool for understanding the context of the wildlife values at a large scale. Fine-scaled tools, data, and resource information based on inventory and monitoring data, as well as local knowledge from BLM and NDGF employees, are used to further examine resource issues at the site-specific level.

The analysis area covers a wide variety of habitat consistent with the Northern Great Plains. Lease parcels are located within sagebrush grasslands, short and mixed grass prairies, riparian and woody draw habitats, wetland habitats and others. See section 3.5 for a detailed description of vegetation.

3.6.1.2.1 Grassland Birds

Several of the proposed lease nomination areas provide quality-habitat for a suite of sensitive bird species associated with northern mixed-grass and short-grass prairie habitats. The mixed-grass prairie contains both warm season grasses and cool season grasses such as blue grama, needle-and-thread, prairie junegrass, western snowberry, and western wheatgrass.
Some of the more common species which depend on these habitats are: Swainson's hawk (*Buteo swainsoni*), ferruginous hawk (*Buteo regalis*), golden eagle (*Aquila chrysaetos*), long-billed curlew (*Numenius americanus*), marbled dodwit (*Limosa fedoa*), burrowing owl (*Athene cunicularia*), Sprague's pipit (*Anthus spragueii*), Le Conte's sparrow (*Ammodramus leconteii*), Baird's sparrow *(Ammodramus bairdii*), logger-head shrike (*Lanius ludovicianus*), black tern (*Chlidonias niger*), Nelson's sharp-tailed sparrow (*Ammodramus nelsonii*), willet (*Catoptrophorus semipalmatus*), Wilson's phalarope (*Phalaropus tricolor*), and the yellow rail (*Coturnicops noveboracensis*). [see table 3.6.2 for a complete list]

Most birds found within the analysis area are migratory. Populations of some of these species are declining as a consequence of land use practices and other factors. Many species of grassland birds nest and raise their young on these lease parcels. Neo-tropical migrants exhibit quite variable habitat requirements and are found in most habitat types.

3.6.1.2.2 Mammals and Reptiles

Four sensitive species of mammals and three species of reptiles have the potential to be found within the analysis area. Several species of bats which are commonly found in close relation to conifer stands and rocky outcroppings, prairie dogs and the swift fox completes the list. Swift fox sightings were last observed in Mercer and Golden Valley Counties in 1976 and 1990 respectively.

Table 3.6.2. presents sensitive bird/mammal/reptile species found in North Dakota and includes their global, state, and North Dakota Game and Fish (NDGF) ranks.

Birds	Scientific Name	Global Rank	State Rank	NDGF Rank
Baird's Sparrow	*Ammodramus bairdii*	G4	SU	Level 1
Black Tern	*Chlidonias niger*	G4	SU	Level 1
Brewer's Sparrow	*Spizella breweri*	G5	S3	Level 3
Burrowing Owl	*Athene cunicularia*	G4	SU	Level 2
Chestnut-collared Longspur	*Calcarius ornatus*	G5	SU	Level 1
Common Loon	*Gavia immer*	G5	S4	Not Ranked
Dickcissel	*Spiza americana*	G5	SU	Level 2
Ferruginous Hawk	*Buteo regalis*	G4	SU	Level 1
Franklin's Gull	*Larus pipixcan*	G4, G5	SU	Level 1
Golden Eagle	*Aquila chrysaetos*	G5	S3	Level 2
Greater Sage-grouse	*Centrocercus urophasianus*	G4	SU	Level 2
Le Conte's Sparrow	*Ammodramus leconteii*	G4	SU	Level 2
Loggerhead Shrike	*Lanius ludovicianus*	G4	SU	Level 2
Long-billed Curlew	*Numenius americanus*	G5	S2	Level 1
Marbled Godwit	*Limosa fedoa*	G5	SU	Level 1
McCown's Longspur	*Calcarius mccownii*	G4	S2	Level 3
Nelson's Sharp-tailed Sparrow	*Ammodramus nelsonii*	G5	SU	Level 1
Northern Goshawk	*Accipiter gentilis*	G5	SU	Not Ranked
Peregrine Falcon	*Falco peregrinus*	G4, T4	S1	Level 3
Sedge Wren	*Cistothorus platensis*	G5	SU	Level 2
Sprague's Pipit	*Anthus spragueii*	G4	S3	Level 1
Swainson's Hawk	*Buteo swainsoni*	G5	SU	Level 1
White-faced Ibis	*Plegadis chihi*	G5	SU	Not Ranked
Willet	*Catoptrophorus semipalmatus*	G5	SU	Level 1
Wilson's Phalarope	*Phalaropus tricolor*	G5	SU	Level 1
Yellow Rail	*Coturnicops noveboracensis*	G4	S2	Level 1
Snapping Turtle	*Chelydra serpentine*	n/a	n/a	Level 2
Western Hog-nosed snake	*Heterodon nasicus*	n/a	n/a	Level 3

Long-legged myotis	***Myotis volans***	**n/a**	**n/a**	**Level 3**
Long-eared myotis	***Myotis evotis***	**n/a**	**n/a**	**Level 3**
Black-tailed Pr. Dog	***Cynomys ludovicianus***	**n/a**	**n/a**	**Level 1**
Swift Fox	***Vulpes velox***	**n/a**	**n/a**	**Level 2**

The State of North Dakota employs the standardized ranking system to denote global (or range-wide) and state status (Nature Serve, 2006). NDGF assigns numeric ranks ranging from 1 (highest risk, greatest concern) to 5 (demonstrably secure), reflecting the relative degree of risk to the species' viability, based on available information.

3.6.1.3 Threatened, Endangered, Candidate, and Proposed Species
Threatened, endangered, candidate, or proposed bird species may occupy habitat infrequently or seasonally within the analysis area. These species include:

Interior Least Tern--S*terna antillarum athalassos* (Endangered)
Whooping Crane--*Grus Americana* (Endangered)
Piping Plover --*Charadrius melodus* (Threatened)
Pallid Sturgeon-- *Scaphirhynchus albus* (Endangered)
Dakota Skipper Butterfly-- *Hesperia dacotae* (Candidate)
Greater Sage Grouse-- *Centrocercus urophasianus* (Candidate)
Spragues pipit--*Anthus spraguii* (Candidate)

The Black-footed Ferret (*Mustela nigripes*) and the Gray Wolf (*Canis lupis*) are not known to occur within the planning area. Occasional sightings of wolves have been reported, but no documented home range has been identified.

3.6.1.3.1 Interior Least Tern
The interior least tern was listed as endangered in 1985. From mid-May to mid-August, interior least terns use sparsely vegetated sandbars or shoreline salt flats of lakes along the Missouri River system including Lake Sakakawea. They are not found on any other water body or waterway in North Dakota.

3.6.1.3.2 Whooping Crane
The whooping crane was listed as endangered in 1967. North Dakota lies directly in the middle of the major migratory path utilized by the remaining wild bird population. Sightings have been recorded in all the counties within the study area with the exception of McKenzie and Bowman counties. Palustrine wetland and cropland ponds are used during the migration for feeding and roosting. There has not been any recording nesting activity in North Dakota for more than 90 years. Recovery actions to protect and restore whooping cranes are outlined in the 2005 FWS Recovery Plan and can be found at: (http://ecos.fws.gov/docs/recovery_plan/070604_v4.pdf

3.6.1.3.3 Piping Plover
Preferred habitat for the piping plover is generally characterized as exposed, sparsely vegetated shores and islands of shallow alkali lakes and impoundments. Salt-encrusted, alkali, or sub-

saline semi-permanent lakes, ponds, and rivers with wide shorelines of gravel, sand, or pebbles are preferred.

The piping plover was listed as threatened in 1985. Critical habitat was designated in North Dakota in 2002 for the entire Lake Sakakawea boundary, the Missouri River as well as areas in Mountrail, Williams, Ward and Burke counties. Several parcels were identified as having critical habitat associated with them. The FWS estimated approximately 2,000 breeding pairs were located in North Dakota in 1993, compared to 11,000 breeding pairs in 1967 (http://www.fws.gov/mountain-prairie/species/birds/pipingplover/)

3.6.1.3.4 Pallid Sturgeon

The pallid sturgeon was listed in 1990. Pallid sturgeons are found in the upper reaches of the Missouri River in North Dakota near the confluence with the Yellowstone River and in the Yellowstone River proper. However, the confluence is continuous with Lake Sakakawea, and this species may be found throughout the entire system. The pallid sturgeon is adapted for living close to the bottom of large, silty rivers with swift currents. They prefer habitat consisting of sand flats and gravel bars.

3.6.1.3.5 Dakota Skipper Butterfly – Candidate Species

The Dakota skipper butterfly species may occupy habitat infrequently or seasonally within the analysis area, however, it is not known to occupy any nominated lease parcels. The following counties in the analysis area have recorded sightings: Burke, Bottineau, Dunn, McHenry, McKenzie, Mountrail, and Ward.

The Dakota skipper can survive only in undisturbed, tall grass and mid-grass prairie. In the western part of North Dakota, the skipper can be found in ungrazed native pastures with little bluestem, needle-and-thread, and purple coneflower. Bluestem grass is a favorite food plant for the larval stage of the skipper. Dakota skippers rarely travel more than one-half mile in their entire lifetime.

3.6.1.3.6 Sprague's Pipit – Candidate Species

A 12 month finding for the Sprague's Pipit was published in the Federal Register by the Fish and Wildlife Service (USFWS) on September 15, 2010, warranting the listing of the Sprague's Pipit as a Federal protected species, but precluded the listing due to higher priority species. The species is currently on the candidate species list.

The Sprague's pipit is a relatively small (4–6 inches long and weighs 0.8-0.9 ounces) passerine endemic to the North American grasslands. It has a plain buff colored face with a large eye-ring. The Sprague's pipit is a ground nester that requires grassland habitats, preferably larger non-fragmented undisturbed habitat, at least 80 acres in size. It feeds mostly on insects, spiders, and some seeds.

Sprague's pipits are strongly tied to native prairie (land which has never been plowed) throughout their life cycle (Owens and Myres 1973, pp. 705, 708; Davis 2004, pp. 1138-1139; Dechant et al. 1998, pp. 1-2; Dieni et al. 2003, p. 31; McMaster et al. 2005, p. 219). They are

rarely observed in cropland (Koper et al. 2009, p. 1987; Owens and Myres 1973, pp. 697, 707; Igl et al. 2008, pp. 280, 284) or land in the Conservation Reserve Program (a program whereby marginal farmland is planted primarily with grasses) (Higgins et al. 2002, pp. 46-47). Sprague's pipits will use nonnative planted grassland (Higgins et al. 2002, pp. 46-47; Dechant et al. 1998, p. 3; Dohms 2009, pp. 77-78, 88). Vegetation structure may be a better predictor of occurrence than vegetation composition (Davis 2004, pp. 1135, 1137).

Potential habitats for the Sprague's Pipit exist throughout western North Dakota.

3.6.1.3.7 Greater Sage-Grouse – Candidate Species
On March 5, 2010, USFWS concluded sage grouse warrants protection under the Endangered Species Act. However, USFWS determined the listing of the species is precluded by the need to take action on higher priority species. Sage grouse was placed on the list of species that are candidates under the Endangered Species Act.

Sage grouse are a native prairie grouse species that are considered sagebrush obligates and depend on sagebrush for survival. In addition to sagebrush grasslands, sage grouse may also use mesic areas during brood rearing or during the summer/late summer season for habitat. Sage grouse habitat delineations have been developed for the sage grouse conservation alternatives being considered in the NDFO RMP amendment planning effort. This delineation effort resulted in the identification of sage grouse habitat characteristics important to the conservation of the species. These characteristics may include nesting habitat, brood rearing habitat, winter habitat, and connectivity to those habitats. Sage grouse are only found in Bowman, Slope and southern Golden Valley counties in North Dakota.

Bowman County has one parcel nominated that is located in Sage Grouse Core habitat as defined by ND Game and Fish Department and BLM. The nominated parcel is located in close proximity to known active and/or historic leks and contain significant sage grouse habitat.

3.6.2 Special Status Plant Species
There are no known threatened or endangered plant species in the study area and no special status plant species identified for North Dakota.

3.7 Fish and Wildlife
A diversity of wildlife habitat, topography, and vegetation types exists across the analysis area. This diversity across western North Dakota and the analysis area provides habitat for many wildlife species in addition to those previously mentioned.

Current and historic land uses across the lease parcels include grazing, farming, hunting, energy development, and others. Consequently, some areas contain large contiguous blocks of well-functioning habitats, while other areas are composed of small, fragmented patches of native habitats. In some areas, existing anthropogenic disturbance at some frequency has been attributed to reducing habitat suitability for some species of wildlife intolerant to human activities.

Wildlife species and habitat surveys have been conducted throughout the analysis area at various times and for various species. The entire area has not been comprehensively surveyed for all wildlife resources; however, a combination of past surveys provides insight into what species have been documented, and what other species are expected within those habitat types.

Big game species in the analysis area include mule deer, white-tailed deer, pronghorn antelope, Bighorn sheep and elk.

White-tailed deer are the most abundant big game species and use the greatest variety of habitats, generally preferring riparian corridors, along creeks and rivers, as well as woody draws and grasslands (NDGF web site). Habitat diversity appears to be a good indicator of intensity of deer use. In mule deer habitats, diversity of vegetation usually followed topographic diversity; thus, rugged topography may be the ultimate factor influencing mule deer use of an area (Mackie et. al, 1998).

Winter range is often part of year-round habitat in western North Dakota. Winter ranges are typically in areas of rougher topography and are often dominated by shrub species that provide crucial browse during winter months. Escape and thermal cover are also important for maintenance and survival. Thick stands of ponderosa pine and juniper are examples of important escapes and thermal cover used by mule deer in the analysis area while woody draws, shelterbelts and farmsteads provide winter cover for white-tailed deer.

Pronghorn antelope are sparsely distributed across the analysis area with Bowman County being the core area. They are generally associated with grasslands and shrublands, but they will also use agricultural fields. Winter ranges for pronghorn antelope generally occur within sagebrush grasslands with at least greater densities of big sagebrush than the surrounding areas.

Elk are primarily associated with the timbered portion of the breaks and the riparian bottoms along the river corridors. The riparian areas are used in conjunction with the upland areas for forage and security purposes. The riparian bottoms become increasingly important during the drought periods when upland reservoirs become dry.

The potential for big game movements or migrations through western North Dakota are not fully understood. At a local level, it is reasonable to assume big game movements occur at least seasonally. Migration corridors have not been identified through any of the lease parcels.

The analysis area provides habitat for sharp-tailed grouse, turkeys, Hungarian partridge, and pheasants.

In addition to sage grouse, sharp-tailed grouse are the other native prairie grouse species in the analysis area. Sharp-tailed grouse generally prefer hardwood draws, riparian areas, and prairie grasslands intermixed with shrubs such as chokecherry and buffaloberry. NDGF survey data on sharp-tailed grouse leks is sporadic throughout much of the study area. No known sharp-tailed grouse leks are located on the existing lease parcels.

Wild turkeys, pheasants, and Hungarian partridge are all species that have been introduced to western North Dakota and would be expected to utilize available habitats within some of the lease parcels.

3.7.1 Waterfowl

A portion of the lease parcels are north of the Missouri River and fall within the Prairie Pothole Region of North Dakota. Statewide, this region encompasses nearly 37,000 square miles and is one of the most important waterfowl-producing areas within North America. Region wide, more than half of all the annual duck production in North America occurs within the entire 300,000 square miles of prairie potholes.

From the mid-1950s to the mid-1970s, approximately 458,000 acres per year of wetland habitat was lost to agriculture and drainage within the Prairie Pothole Region. This loss has increased the importance of wetland habitat, even though the study area makes up less than 1/10 percent of the pothole region in North America. While natural wetlands are crucial for waterfowl nesting, reservoirs become increasingly important during the dry years. Often, they are the only water sources for waterfowl during extended drought periods.

Most species of North American waterfowl have been found nesting within the study area, and many of these species are common migrants. Common nesters found here include: mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), gadwall (*Anas strepera*), blue-winged teal (*Anas discors*), and northern shoveler (*Anas clypeata*).

The North American Waterfowl Management Plan was developed in 1988 because of the decline of waterfowl production in the United States and Canada (FWS, August 15, 2007; http://library.fws.gov/Bird_Publications/nawmp_98.pdf). The plan has been divided into various localized "Joint Ventures" such as the Prairie Pothole Joint Venture and the Great Plains Joint Venture, which encompass the entire study area. Joint venture projects not only benefit waterfowl but also provide needed habitat for various guilds of resident and migratory birds.

3.8 Cultural Resources

The Bureau of Land Management (BLM) manages and protects cultural resources on public land for the purpose of public interpretation, cultural importance to Native American Indians or other cultural groups, and for scientific research. Mandatory legislation is outlined for the protection of cultural resources in 36 CFR 800. Under Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, historic properties are evaluated for their significance or "eligibility" for nomination to the National Register of Historic Places. Potential effects to sites evaluated as eligible, potentially eligible, and Traditional Cultural Properties must be considered. Protection or mitigation treatments are used to avoid or reduce adverse effects.

Common prehistoric archaeological site types in North Dakota are lithic artifact scatters, earthlodge villages, stone circles (tipi ring camps), short-term camp sites, stone cairns, rock art, and Knife River Flint tool stone quarries. Also common to a lesser degree are animal bone concentrations resulting from game drives, vision quest stations, eagle-trapping pits, stone alignments, and scatters of artifacts that include ceramics or factory-made trade goods. Well-

stratified, multiple-component sites, which are typically significant sites, have been found in remnant alluvial fans, stream terraces, and spring deposits, and in the terraces lining the Missouri and Little Missouri rivers. Common historic archaeological sites in the state are the remains of homesteads, farmsteads, dumps, school and churches, roads, railroad grades, trails, trading posts, and military forts.

A literature search (Class I) of records at the North Dakota State Historical Society was conducted for all of the nominated lease parcels and immediate vicinity to determine what types and number of known cultural resources are present within or adjacent to the nominated lease parcels (Howell 2012; Peters 2012). Additional cultural resource information was reviewed for the general area in the North Dakota RMP/EIS and the North Dakota Statewide Comprehensive Historic Preservation Plan (North Dakota Historical Society: Peters 2012). Requests for additional cultural information, culturally sensitive areas, or areas of concern were made to the tribal historic preservation offices and other interested tribes in North Dakota, Montana, and Minnesota.

Following are the results of the Class I inventories. Of the 29 lease parcels being reviewed for Alternatives B, and C, 23 lease parcels have been partially covered by previous cultural resource inventories. Many of the proposed leases are located along the Missouri River Corridor. This corridor area or Missouri River shoreline has been surveyed in sample form since the 1940s (T. Adamczyk; G. Leaf, R. Mattison; G. Metcalf and T. White; B. Noisat etal; and R. P. Winham etal.) Early 1940's and 1950's shoreline inventories were considered more of an overview than a field survey. Other projects conducted in the mid-1970's and mid-1980's are reconnaissance or sample type surveys also in the trench areas. Although these inventories documented the majority of the sites known for this area; the age of the project and type of ground surface coverage does not meet with today's standards for Class III cultural resource survey coverage. Therefore; acres of coverage from these projects inside the lease parcels were not calculated or considered for these parcels.

Other surveys conducted inside the proposed lease parcels consist primarily of linear surveys with narrow corridors such as highways, roads, transmission, telephone, and fiber optic cable lines, water, gas and oil pipelines, seismic lines, and a fence. Other surveys that also do not offer much survey coverage area were completed for small recreation areas; 10-acre oil well pads; gravel and borrow pits; a wind farm and communication tower; dams; boat ramps; and a water treatment plant.

Federal land projects including adjustments, exchanges, acquisitions, and surface tract inventories offer more opportunity for larger block surveys; however, projects completed inside the nominated lease parcels still do not offer much coverage. Based on the age and type of previous large block river shoreline surveys, and the small scale of other previous projects, it is estimated less than 10 percent of the leases have received adequate cultural resource coverage.

3.8.1. Previous Cultural Resource Surveys in Lease Parcels

Previous surveys projects documented a large number of cultural resources within and adjacent to the proposed lease parcels. The radius adjacent to the lease was also reviewed for sites, and in

high site density areas this review radius was moved out to 1-mile. There are 23 nominated parcels that contain 82 cultural resource sites and isolates in and within a 1-mile radius of the parcel. Most of these sites are located on the Missouri and Little Missouri River terraces with some completely inundated or close to the water's edge.

3.8.2. Cultural Resource Types and Numbers inside Lease Parcels.

Other cultural resource projects completed in the nominated parcels include historic overviews and paleontological reviews; cemetery and historic sites surveys; historic bridges; phase I projects for recreation areas and trails; and site evaluation, mitigations, and monitoring projects. Only 16 cultural resource evaluation projects or mitigation projects have been conducted. With so little evaluation of cultural sites, many or approximately 36 of the sites known inside and within a 1-mile radius of the nominated parcels are unevaluated for the National Register of Historic Places (NRHP).

Inventory data is not available for 6 of the nominated parcels and portions of the remaining 23 parcels. Based on topography in and surrounding the nominated lease parcels, and known cultural summary information, it was determined that inventory considerations could be deferred until a specific development is proposed. A professional assessment of the lease parcels' potential for cultural resources eligible to the NRHP will be conducted during on-the-ground inventories of proposed developments prior to issuance of a permit for development. In all cases, the standard lease notice and the following stipulation identified in IM-2005-003 should be attached to the leases:

> This lease may be found to contain historic properties and/or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O. 13007, or other statutes and executive orders. The BLM will not approve any ground disturbing activities that may affect any such properties or resources until it completes its obligations under applicable requirements of the NHPA and other authorities. The BLM may require modification to exploration or development proposals to protect such properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized or mitigated.

3.9 Native American Religious Concerns

BLM's management of Native American Religious concerns is guided through its 8120 Manual: *Tribal Consultation Under Cultural Resources Authorities* and 8120 Handbook: *Guidelines for Conducting Tribal Consultation*. Further guidance for consideration of fluid minerals leasing is contained in BLM Washington Office Instruction Memorandum 2005-003: Cultural Resources, Tribal Consultation, and Fluid Mineral Leasing. The 2005 memo notes leasing is considered an undertaking as defined in the National Historic Preservation Act. Generally areas of concern to Native Americans are referred to as "Traditional Cultural Properties" (TCPs) which are defined as cultural properties eligible for the National Register because of its association with cultural practices or beliefs that (a) are rooted in that community's history and (b) are important in maintaining the continuing cultural identity of the community.

Based on a settlement agreement between the BLM and the Mandan, Hidatsa, and Arikara Nation (MHAN), additional guidance for lease parcel reviews is provided in BLM Instruction Memorandum MT-2009-14: The agreement provides that upon receipt of lease nominations inside the exterior boundary of the Fort Berthold Indian Reservation, the NDFO will notify by letter the MHAN Tribal Chairperson and Tribal Historic Preservation Officer. The locations of lease parcels that are being reviewed must be presented so MHAN representatives can offer information on TCPs or other sensitive areas or concerns.

A packet that included a formal cover letter, an official list and maps of the lease parcels, and Class I site and survey information for each lease parcel were sent certified mail to the tribal historic preservation officer (THPO) and tribal chairmen for each of the Turtle Mountain Band of the Chippewa (TMBC) Tribe; the Standing Rock Sioux Tribe (SRST); the Mandan Hidatsa, and Arikara Nation (MHAN); the Spirit Lake Tribe of Fort Totten, ND; the Northern Cheyenne Tribe, of Lamedeer MT; and the Lower Sioux Indian Community of Morton, MN (June 2012). The tribal chairman and THPOs from each of the six above mentioned Tribal Nations received and signed for the packet on July 2nd or July 3rd, 2012. To date no TCPs have been brought to the attention of the BLM archaeologist by the Tribal Nations mentioned above.

3.10 Paleontology

According to Section 6301 of the Paleontological Resource Protection Act of 2009 Omnibus Public Lands Bill, Subtitle D, SEC. 6301, defines paleontological resources as "any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest and that provide information about the history of life on earth" All vertebrate fossils, be they fossilized remains, traces, or imprints of vertebrate organisms, are considered significant.

The geologic formations containing paleontological resources in the western part North Dakota extend into several of the neighboring states and Canada, with only minor sedimentary or depositional differences. The formations encompass the last of the dinosaurs in the Cretaceous Period to the rapid development of early mammals in the Paleocene and Eocene Epochs of the Tertiary Period. These formations are found in eastern Montana, northeastern Wyoming, northwestern Nebraska, western South Dakota and North Dakota, and southernmost Saskatchewan and Manitoba.

The late Cretaceous/early Tertiary formations in the northern Great Plains region are world renowned for their dinosaur and early mammal fossils; most of the major museums in the United States have fossils from this region. Historically, most of the research and collecting occurred in Montana and Wyoming; however, recent finds have shown that similar fossils are preserved in equivalent formations in North and South Dakota. The Eocene/Oligocene/Miocene formations have also produced a huge number of significant mammal fossils over the last 130 years. Most paleontologic localities recorded with BLM offices resulted from researchers performing field work. A few localities have been found during BLM-required mitigation of surface-disturbing activities. Some localities are simply local knowledge. The investigation of illegal collecting activities has revealed the location of some fossils.

Areas in North Dakota were grouped together where the exposed or underlying bedrock had the potential to produce significant numbers of the material of interest. Values were assigned based on potential fossil yield of vertebrates or other scientifically significant fossils in bedrock formations known for North Dakota. These values are as follows:

(1) ***Very Low*** – Class 1: Igneous and metamorphic geologic units-not likely to contain recognizable fossils.
(2) ***Low*** – Class 2: Sedimentary geologic units- not likely to contain vertebrate fossils or scientifically significant non-vertebrate fossils.
(3) ***Moderate or Unknown*** –Class 3: Fossiliferous sedimentary geologic units – content varies in significance, abundance, and predictable occurrence. Some units of unknown potential.
(4) ***High*** –Class 4: are considered Class 5 fossils that do not have the potential for human or natural degradation.
(5) ***Very High*** –Class 5: Highly fossiliferous geologic units- regularly produce vertebrate fossils or scientifically significant vertebrate fossils. Situated to be subject to human or natural degradation.

A review of Potential Fossil Yield Category (PFYC) formations indicates that 19 of the 29 lease parcels are located within PFYC formations rated 3 or 4. The parcels were identified within two of the five geologic formations that are considered significant PFYC formations to the field office; Bullion Creek and Sentinel Butte. Previous research projects on BLM land and paleontological surveys in southwestern North Dakota have located significant fossil remains.

3.11 Lands and Realty

The lands proposed for competitive leasing of the federal mineral estate are a mix of BLM administered lands (federal surface and minerals), other federal agencies, and private lands overlying -federal minerals, and located in western North Dakota within the NDFO planning area. Of the 29 parcels nominated for leasing, 3 parcels are located, in whole or in part, on BLM surface containing approximately 153 acres. These parcels are located in the counties of McKenzie and Mountrail.

Parcels NDM 79010-AZ and NDM 97300-MV have authorized BLM issued rights-of-way, to include roads and buried telephone cable. These encumbered parcels are within the counties listed above.

Parcel NDM 79010-AZ: T. 151 N., R. 104 W., Sec. 35, SWNE, 5th PM, McKenzie County, North Dakota. One ROW NDM 084995 issued to North Dakota Department of Transportation for a portion of ND State Highway 200 running across BLM administered lands. This involves 2.76 acres. The ROW was issued in April 1996 and is granted in perpetuity.

Parcel NDM 97300-MV: T. 153 N., R. 93 W., Sec. 26, SENE, 5th PM, Mountrail County, North Dakota. One ROW NDM 073742 issued to Reservation Telephone Cooperative, Parshall, ND for buried telephone cable.

Three of the nominated lease parcels, approximately 280 acres, are either U.S. Fish and Wildlife Service (FWS) property or have a wetland or grassland easements encumbering the surface.

Wetland easements restrict draining, burning, filling, or leveling of wetlands and the grassland easement protects the native grasslands from being disturbed. The easements are perpetual. The following nominated parcel is encumbered with an easement: NDM 97300-LF.

Renewable energy includes biomass, geothermal, solar power, and wind. As demand has increased for clean and viable energy, the opportunity for renewable energy sources available on BLM public lands is considered as part of our multiple use objectives. Developing renewable energy projects depends on market trends and market value. The primary limiting factors in site selection include access to power transmission interconnects, acquisition of permits, and power purchase agreements between the producer and owner of the power lines.

Currently, there is no biomass, geothermal, solar power, or wind projects within the study area of the aforementioned parcels.

3.12 Minerals

3.12.1 Fluid Minerals

It is the policy of the BLM to make mineral resources available for disposal and to encourage development of these resources to meet national, regional, and local needs, consistent with national objectives of an adequate supply of minerals at reasonable prices. At the same time, the BLM strives to assure that mineral development occurs in a manner which minimizes environmental damage and provides for the reclamation of the lands affected.

Federal Oil and Gas Lease Information and Federal, State and Private Oil and Gas Development Activity within the External Boundaries of the NDFO

The USFS manages large areas of land within the boundaries of the NDFO that contain federal oil and gas lease acreage. Currently, there are 3,769 federal oil and gas leases covering approximately 1,051,029 acres in the State of North Dakota. Existing production activity holds approximately 36 percent of this lease acreage (824 leases; total of 382,464 acres). Approximately 86 percent of this federal oil and gas lease acreage is within the boundaries of the USFS Dakota Prairie National Grasslands (657 leases; 330,156 acres).

Information regarding the numbers and status of wells on federal, private/State, and Indian lands within the external boundary of the NDFO is displayed in Table 3.12.1. Numbers of townships, lease acres within those townships, and development activity for all jurisdictions are summarized in Table 3.12.2.

If a lease parcel receives interest and oil and gas lease sales lead to lease issuance, exploration or development activity could occur during the term of the lease. Exploration and development proposals in the future would require a separate environmental document to consider specific proposals and address site-specific resource concerns.

Table 3.12.1 Existing Development Activity

	FEDERAL WELLS	PRIVATE AND STATE WELLS	INDIAN
Drilling Well(s)	76	455	99
Producing Gas Well(s)	114	94	2
Producing Oil Well(s)	876	6,155	275
Water Injection Well(s)	202	461	0
Shut-in Well(s)	30	67	5
Temporarily Abandoned Well(s)	61	316	3

	Bowman	Burke	Dunn	McKenzie	Mountrail	Stark	Williams
Townships	T130N R104W	T159N R91W T163N R91W	T141N R95W T149N R94W T147N R95W	T150N R99W T151N R104W T152N R102W T152N R103W T153N R100W	T151N R92W T152N R92W T152N R93W T153N R93W T156N R89W T156N R90W T157N R90W	T138N R99W	T153N R99W T154N R95W
Number of Townships Containing Lease Parcels	1	2	3	5	7	1	2
Total Acres Within Applicable Township(s)	22,963	45,913	68,672	113,723	162,585	22,944	45,943
Acres Federal O&G Minerals	754	1,557	7,239	3,924	17,127	476	4,846
Percent of Township(s)	3.3%	3.4%	10.5%	3.5%	10.5%	2.1%	10.5%
Acres Leased Federal O&G Minerals	714	797	6,794	3,047	13,505	0	4,186
Percent of Township(s)	3.1%	1.7%	9.9%	2.7%	8.3%	0%	9.1%
Acres Leased Federal O&G Minerals Suspended	0	0	0	0	0	0	0
Percent of Township(s)	0%	0%	0%	0%	0%	0%	0%
Federal Wells	1 POW 1 GIW	7 POW 1 TA	0	2 POW 1 DRG	17 POW 6 DRG	0	13 POW 2 DRG

Private and State Wells	30 POW 15 GIW 2 AIW 2 WIW 2 TA 1 WDW	64 POW 7 DRG 2 WDW 2 TA	48 POW 4 DRG 1 WDW 1 TA	73 POW 50 DRG 11 TA 4 WDW 2 OSI 1 GIW 1 WIW	98 POW 52 DRG	4 POW 1 WDW	19 POW 18 DRG 2 WDW 2 TA
Indian Wells	0	0	4 DRG	0	14 POW 1 OSI	0	0

Table 3.12.2. Oil and Gas Leasing and Existing Development within Townships Containing Lease Parcels

Acronym	Description
AIW	Air Injection Well
DRG	Drilling Well
GIW	Gas Injection Well
OSI	Oil Well-Shut In
POW	Producing Oil Well
TA	Temporarily Abandoned
WDW	Water Disposal Well
WIW	Water Injection Well

Table 3.12.3 Oil and Gas Leasing and Existing Development Abbreviations Key

3.12.2 Solid Minerals
3.12.2.1 Salable Minerals
Salable minerals are common varieties of mineral materials such as sand, gravel, and stone, as well as petrified wood. Common mineral materials may be sold or disposed of through free use permits under the provision of the Materials Act of July 31, 1947, amended July 23, 1955, and September 25, 1962. Salable minerals will be dealt with at the application for permit to drill (APD) stage.

3.13 Visual Resources
BLM Visual Resource classifications are only applied to BLM surface, as such; the affected environment for visual resources only consists of approximately 153 acres of BLM -administered surface in the analysis area.

A Class II VRM area classification means that the character of the landscape has unique combinations of visual features such as land, vegetation, and water. The existing character of the landscape should be retained. Activities or modifications of the environment should not be evident or attract the attention of the casual observer. Changes caused by management activities must repeat the basic element of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

A Class III VRM area classification means the level of change to the character of the landscape should be moderate. Changes caused by management activities should not dominate the view of the casual observer and should not detract from the existing landscape features. Any changes made should repeat the basic elements found in the natural landscape such as form, line, color and texture.

A Class IV VRM area classification means that the characteristic landscape can provide for major modification of the landscape. The level of change in the basic landscape can be high. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

The NDFO does not currently have Visual Resource Classifications established for any lands found within the analysis area.

3.14 Recreation and Travel Management
BLM only manages recreational opportunities and experiences on BLM-administered surface. The affected environment consists of approximately 153 acres of BLM-administered public lands (surface). Recreational activities enjoyed by the public on BLM lands within the analysis area include hunting, hiking, camping, fishing, photography, off-road vehicle activities, picnicking, and winter activities such as snowmobiling. Benefits and experiences enjoyed by

recreational users include opportunities for solitude, spending time with families, enhancing leisure time, improving sports skills, enjoying nature and enjoying physical exercise.

Much of the approximately 153 BLM-administered acres proposed for lease consist of small and scattered tracts with limited legal public access (i.e., no public easements or rights-of-way across private property). The lack of public access limits use of the BLM parcels for recreational use by the general public. The types of limited public use on these lease parcels can be characterized as casual dispersed recreational activities including hiking, hunting, camping, and wildlife viewing.

3.15 Economic Conditions

3.15.1 Introduction

Certain existing demographic and economic features influence and define the nature of local economic and social activity. Among these features are the local population, the presence and proximity of cities or regional business centers, longstanding industries, infrastructure, predominant land and water features, and unique area amenities. The affected local economy is made up of seven North Dakota counties with parcels nominated for oil and gas leasing (Bowman, Burke, Dunn, McKenzie, Mountrail, Stark, and Williams), and three neighboring counties (Billings, Golden Valley and Slope) based on the connectivity of oil and gas industries within the BLM ND Field Office boundaries that have federal oil and gas leases. The distribution of these economic effects is based on acres leased and levels of production as well as business patterns.

3.15.2 Affected Environment

The 10-county local economy had an estimated 2010 population of 68,715 people. Total employment was estimated to be 59,265 jobs; there were an estimated 30,848 households; there were 185 NAICS industrial sectors represented in the local economy; average income per household was $134,223; and total personal income was $4,140 million (IMPLAN, 2010). Within this local economy, there were 1.16 people per job and 0.52 households per job.

3.15.3 Nature of the Oil and Gas Industry in North Dakota

A total of 608 wells were drilled in 2009. Of these, 580 were oil wells, 2 were gas wells, and 26 were reported as dry holes. Total production in 2009 in North Dakota was 75,200,000 bbls of oil and 18,388 MMCF of natural gas. North Dakota had 155 active operators in 2009. The average cost of drilling and equipping a well was $13,887,020 (oil), $2,359,507 (gas), and $8,688,205 (dry holes) (IPAA, 2010). Average 2009 wellhead price in North Dakota for crude oil was $53.75 per bbl and $3.74 per MCF for natural gas.

Local economic effects of leasing federal minerals for oil and gas exploration, development, and production are influenced by the number of acres leased, number of wells drilled, and amount of oil and gas produced. These activities influence local employment, income, and public revenues which are indicators of economic impacts.

3.15.4 Leasing

In June 19, 2012, there were 231, 113 acres of federal minerals leased for oil and gas in the 7-county area of the ND Field Office with nominations. Currently, annual lease rental is paid on 83,923 acres that are not held by production. Estimated annual average lease and rental revenue to the federal government was about $147,000. Lease rents were not paid on 147,190 acres that were held by production. Instead, royalties are paid on oil and gas production from these leases.

In addition to annual rents, federal oil and gas leases generate a one-time lease bid. The minimum lease bid is $2.00 per acre; lease rental is $1.50 per acre per year for the first five years and $2.00 per acre per year thereafter. Recent (July 2012) federal lease sales in North Dakota generated average bonus bids of $3,498 per acre. Typically, oil and gas leases expire after 10 years unless held by production. Annual lease rentals continue until one or more wells are drilled that result in production and associated royalties. Within the ND Field Office, about 64 percent of BLM-managed acres are held by production. Forty-nine percent of the federal leasing revenues from public domain minerals are distributed to the state. The state of North Dakota distributes 50 percent of the revenues received from federal oil and gas leasing and rents to the counties where the leased parcels are located. The other 50 percent of funds that North Dakota receives is distributed to school districts (ND state code 15.1-27-25).

3.15.5 Production

About 10 percent of the oil and 8 percent of the gas produced in North Dakota comes from federal minerals (Table Econ.1). In 2009, production from federal minerals in the ND Field Office equaled 7,600,996 barrels of oil and 7,513,698 MCF of natural gas (ONRR, 2010).

Oil and gas leasing and production influences fiscal conditions of local governments and school districts through contributions to oil/gas production taxes, and distribution of federal mineral royalty payments on production from public mineral estate. Local oil and gas exploration, development, and production as well as oil and gas transmission all support jobs and income in the local economy.

Federal oil and gas production in North Dakota is subject to production taxes or royalties. On public domain lands, these federal oil and gas royalties generally equal 12.5 percent of the value of production (43 CFR 3103.3.1). Forty-nine percent of these royalties from public domain minerals are distributed to the state. In North Dakota, 50 percent of the royalty revenues that the state receives are redistributed to the counties of production (North Dakota Code 15.1-27-25). The amounts of federal minerals, and the contributions of that production to local economies, vary among the counties. Table Econ.2 displays the amount of 2009 oil and gas mineral royalties for each county. The counties that received the largest federal payments were Dunn ($6.159 million), Bowman ($3.464 million), McKenzie ($1.607 million), and Billings ($1.046 million).

Table Econ.1 2009 North Dakota Oil and Gas Leasing and Production

County/Area	Federal Oil Produced (Barrels)*	Total Oil Produced (Barrels)**	Federal Percent of Total (Oil)	Federal Natural Gas Produced (MCF)*	Total Gas Produced (MCF) **	Federal Percent of Total (Gas)
North Dakota	7,600,996	79,254,301	0.10	7,513,698	92,444,798	0.08

* MMS, 6/23/2010

**North Dakota Industrial Commission, Department of Mineral Resources, Oil and Gas Division

Table Econ.2 2009 North Dakota Oil and Gas Mineral Royalties by County*

County	Total Mineral Royalty		County	Total Mineral Royalty
Billings	$1,046,544		McKenzie	$1,606,605
Bowman	$3,464,093		Mountrail	$195,869
Burke	$61,720		Slope	$142,478
Dunn	$6,159,098		Stark	$140,736
Golden Valley	$175,727		Williams	$98,255

* Includes leasing, rent, and royalty payments

North Dakota Office of State Treasurer, 7/9/2010

North Dakota State Auditor's Office, Dennis Roller, 7/13/2010

3.15.6 Local Economic Contribution

The economic contribution of oil and gas leasing to a local economy is measured by estimating the employment and labor income generated by 1) payments to counties associated with the leasing, rent, and production of federal minerals, 2) local royalty payments associated with production of federal oil and gas, and 3) economic activity generated from drilling and associated activities. Activities related to oil and gas leasing, exploration, development, and production form a basic industry that brings money into the state and region and creates jobs in other sectors. Extraction of oil and natural gas (IMPLAN sector 20), drilling oil and gas wells (IMPLAN sector 28), and support activities for oil and gas operations (IMPLAN sector 29)

supported an estimated 8,733 total jobs and $779.8 million in total employee compensation and proprietor's income in the local economy of the 10 county area (IMPLAN, 2010).

Federal revenues distributed to 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 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.

The estimated annual economic contribution within the state associated with federal leases, rents, drilling, production, and royalty payments combined to support about 2,575 total jobs and $173.5 million in labor income, respectively in the state (IMPLAN, 2010). This amounts to less than one percent of total state employment and income. The aggregated economic sectors that experience the most influence from oil and gas related leasing, exploration, development, and production are Mining, Health Care & Social Assistance and Retail Trade. Table Econ. 3 shows the current contributions of leasing federal oil and gas minerals and the associated exploration, development, and production of federal oil and gas minerals to the local economy.

Table Econ.3.15.6. Current Contributions of Federal Oil and Gas Leasing, Exploration, Development, and Production to the North Dakota Economy

Industry	Employment (jobs)		Labor Income (Thousands of 2011 dollars)	
	Area Totals	Federal O&G -Related	Area Totals	Federal O&G-Related
Agriculture	41,468	3	$1,829,407	$209
Mining	13,078	1,278	$1,097,964	$122,184
Utilities	3,491	7	$406,634	$866
Construction	28,470	12	$1,471,086	$594
Manufacturing	23,061	11	$1,355,763	$630
Wholesale Trade	21,313	68	$1,395,061	$4,472
Transportation & Warehousing	16,180	55	$969,317	$3,287

Retail Trade	53,306	201	$1,421,229	$5,089
Information	7,822	22	$442,363	$1,102
Finance & Insurance	30,044	122	$1,343,983	$5,239
Real Estate & Rental & Leasing	15,090	59	$237,909	$1,378
Prof, Scientific, & Tech Services	19,981	105	$1,036,190	$6,019
Mngt of Companies	4,309	32	$341,694	$2,549
Admin, Waste Mngt & Rem Serv	15,959	50	$396,156	$1,194
Educational Services	5,081	22	$130,567	$535
Health Care & Social Assistance	59,341	206	$2,719,539	$9,731
Arts, Entertainment, and Rec	7,671	29	$103,729	$395
Accommodation & Food Services	32,337	121	$499,185	$1,811
Other Services	24,485	98	$718,000	$2,651
Government	84,747	74	$4,639,598	$3,560
Total	507,232	2,575	$22,555,373	$173,496
Federal O&G as Percent of Total	---	0.51%	---	0.77%

Production to the Local Economy (Source: IMPLAN, 2010)

IMPLAN: The IMPLAN Model is the most flexible, detailed and widely used input-output impact model system in the U.S. It provides users with the ability to define industries, economic relationships and projects to be analyzed. It can be customized for any county, region or state, and used to assess "multiplier effects" caused by increasing or decreasing spending in various parts of the economy. This can be used to assess the economic impacts of resource management decisions, facilities, industries, or changes in their level of activity in a given area. The current IMPLAN input-output database and model is maintained and sold by MIG, Inc. (Minnesota IMPLAN Group). The 2010 data set was used in this analysis.

3.16 Social and Environmental Justice

This section focuses on ten counties in western North Dakota where most of the social impacts associated with leasing these parcels would occur. These counties include Bowman, Burke, Dunn, McKenzie, Mountrail, Stark, and Williams which have areas nominated for sale, and three

neighboring counties (Billings, Golden Valley and Slope) based on the connectivity of oil and gas industries within the BLM ND Field Office boundaries. The occurrence of social effects is based on communities near oil and gas activity, especially communities where workers would reside.

Local populations, employment, number of households, average income per household, and total personal income are presented in the previous economics section. Dickinson (Stark Co.) and Williston (Williams Co.) are the largest communities with populations over 20,000. Much of the oil and gas related business activities, employment, and households are located here. Several other counties have populations of fewer than 5,000 people. Oil and gas exploration and/or production already occurs the vicinity of the proposed leases. Farming and ranching is another long-standing influence on local business, culture, and social activities in the area.

The current oil boom in North Dakota associated with oil and gas exploration, development, and production from the Bakken formation limits housing availability, increases traffic, increases pressure on existing infrastructure, and generally affects the quality of life for long-time residents as well as new residents attracted to the area by the oil boom.

Housing availability is very limited and this causes housing prices to be high compared to similar rural areas in North Dakota and Montana outside the influence of the Bakken oil boom. Many people live in man camps (similar to college dormitories), commute relatively long distances to work, or live in what otherwise may be considered substandard housing. For example, there are stories of workers living in cars because of the cost and availability of housing.

Traffic associated with the Bakken oil boom is currently an issue. Increased truck traffic hauling heavy equipment, fracking fluids, and water as well as increased traffic associated with oil workers and increased populations cause more traffic congestion, increase commuting times, and affect public safety.

The Bakken boom has also increased infrastructure pressure. Demand for better roads, upgrades to waste water treatment, increased police protection, more hospital and school services, and other public services is apparent in many communities.

The general quality of life for long-time residents is changing in many communities. The character of many local communities and availability or access to public services is changing; e.g. housing availability is decreasing and housing costs are increasing; the amount of traffic and commute times are increasing; community services and infrastructure is inadequate in some areas; air quality is degraded near oil developments and along traffic routes; noise related to traffic and oil field activities has increased; and there is a concern that fracking could pollute aquifers that provide agricultural, residential, and municipal water.

The social environment of these counties is described in detail in North Dakota Resource Management Plan Analysis of the Management Situation (2009).

4.0 ENVIRONMENTAL IMPACTS

4.1 Assumptions and Reasonably Foreseeable Development Scenario (RFD) Summary

At this stage of the leasing process, the act of leasing parcels would not result in any ground-disturbing activity that might affect various resources. Even if parcels are leased, it remains unknown whether development would actually occur, and if so, where specific wells would be drilled and where facilities would be placed. This would not be determined until the BLM receives an APD in which more detailed information about proposed wells and facilities would be provided for particular leases. Therefore, this EA discusses potential effects that could occur in the event of development.

Upon receipt of an APD, the BLM would initiate a more site-specific NEPA analysis to more fully analyze and disclose site-specific effects of specifically identified activities. In all potential exploration and development scenarios, the BLM would require the use of best management practices (BMPs) documented in "Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development" (USDI and USDA 2007), also known as the "Gold Book." The BLM could also identify APD 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.

For split-estate leases, the BLM would notify the private landowners that oil and gas exploration or development activities are proposed on their lands and they are encouraged to attend the onsite inspection to discuss the proposed activities. In the event of activity on such split estate leases, the lessee and/or operator would be responsible for adhering to BLM requirements as well as reaching an agreement with the private surface landowners regarding access, surface disturbance, and reclamation.

Environmental consequences are discussed below by alternative to the extent possible at this time for the resources described in Chapter 3. As per NEPA regulations at 40 CFR 1502.14(f), 40 CFR 1502.16(h), and 40 CFR 1508.20, mitigation measures to reduce, avoid, or minimize potential impacts of the proposed action are identified by resource below.

The RFD for this EA is based on information contained in the RFD developed in 2009 and revised in 2011 for the NDFO RMP. The RFD prepared for the NDFO RMP contains the number of possible oil and gas wells that could be drilled and produced in the NDFO area and used to analyze the possible number of wells drilled for the 29 nominated parcels. These well numbers are only an estimate based on historical drilling and geologic data.

4.1.1 Alternative B and C Assumptions

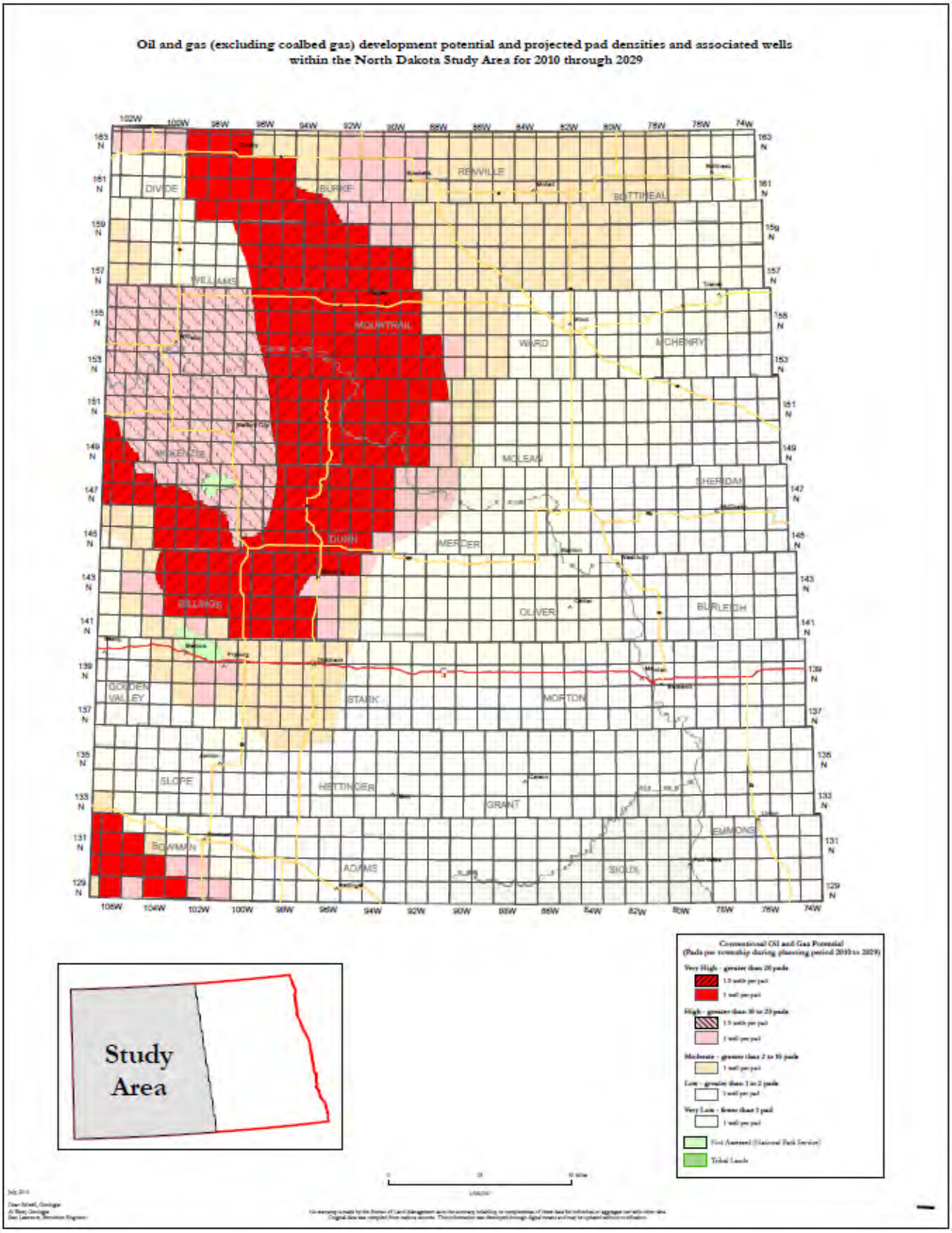
The following assumptions are from the RFD developed for the NDFO RMP revision http://www.blm.gov/mt/st/en/fo/north_dakota_field/rmp/RFD.html.) The BLM administers approximately 324,269 acres of federal minerals (for fluid minerals) within the NDFO. The RFD forecasts and maps the oil and gas development potential in the North Dakota planning area.

A version of this map is reproduced with this EA as **Map 4.1.1**. For the RFD, very high potential forecasts more than 20 well pads per township; high potential forecasts 10 to 20 well pads per township; moderate potential forecasts two to 10 well pads per township; low potential forecasts one to two well pads per township; and very low potential forecasts less than one well per township over the life of the plan.

A coalbed natural gas (CBNG) play is assumed in the planning area in the Williston Basin. Pilot projects would contain 16 to 25 wells. A total of 150 wells are forecasted allowing for some exploration activity and preliminary development.

Directional and horizontal drilling has, in the past several years, become important in the planning area. Drilling depths (measured depth) are from 4,413 to 21,727 feet for oil wells and 4,173 to 19,954 feet for gas wells. However, most of the oil wells have a measured depth of between 13,000 and 16,000 feet, and the measured depths of gas wells are typically within the 13,000 to 16,000 foot range.

The majority of the oil and gas wells in the planning area have historically been drilled vertically. However, of the 2,983 wells spud in the planning area between January 1998 and December 2007, only 787 were vertical wells. Vertical well depths in North Dakota range from a few hundred feet in the northeast part of the study area to over 15,000 feet in the central Williston Basin. Disturbance projections from the RFD are presented in Tables 4.1.1 and 4.1.2. Measured depths in the southwest part of the state range from 1,300 feet to 9,500 feet.



Map 4.1.1. RFD Scenario for Development Potential

Table 4.1.1. Disturbance Associated With Existing Well Pads and Projected Active Well Pads for the Baseline Scenario (Short-Term Disturbance)

Well Pads			Acres of Surface Disturbance			
Type	**Total**	**BLM Managed**	**Access Roads**	**Well Pad**	**Total**	**BLM Managed**
New Exploratory and Development Coalbed Gas Well Pads (2010-2029)	150	7	0.6	0.5	165	8
New Exploratory and Development Gas Well Pads (2010-2029)	315	34	0.6	0.5	347	40
New Exploratory and Development Oil Well Pads; 1.5 wells/pad (2010-2029)	3,691	402	2.9	4.2	26,206	2,945
New Exploratory and Development Oil Well Pads 1.0 wells/pad (2010-2029)	2,609	284	2.9	4	18,002	2,023
Total New Exploratory and Development Well Pads	***6,765***	***727***			***44,720***	***5,017***
Existing Active Gas Well Pads (as of August 2010)	211	121	0.3	0.25	116	71
Existing Active Oil Well Pads (as of August 2010)	6,760	851	1.5	1.75	21,970	2,857
Total Existing and Projected Well Pads	***6,971***	***972***			***22,086***	***2,928***
Total Well Pads	**13,736**	**1,699**	**Total Short-Term Disturbance**		**66,806**	**7,945**

Table 4.1.2. Disturbance Associated With Existing Well Pads and Projected Producing Well Pads for the Baseline Scenario (Long-Term Disturbance)

Well Pads			Acres of Surface Disturbance			
Type	Total	BLM Managed	Access Roads	Well Pad	Total	BLM Managed
New Producing Coalbed Gas Well Pads (2010-2029)	135	6	0.3	0.25	74	4
New Producing Gas Well Pads (2010-2029)	293	21	0.3	0.25	161	12
New Producing Oil Well Pads; 1.5 wells/pad (2010-2029)	3,248	353	1.5	1.75	10,556	1,186
New Producing Oil Well Pads; 1.0 wells/pad (2010-2029)	2,035	221	1.5	1.75	6,614	743
Total New Producing Well Pads	*5,711*	*602*			*17,405*	*1,945*
Existing Active Gas Well Pads (as of August 2010)[1]	203	116	0.3	0.25	111	68
Existing Active Oil Well Pads (as of August 2010)[1]	5,881	740	1.5	1.75	19,114	2,486
Total Existing and Projected Well Pads	*6,084*	*857*			*19,225*	*2,554*
Total Well Pads	11,795	1458	Total Long-Term Disturbance		36,631	4,499

[1]minus abandonments during August 2010-December 2029 period

New oil and gas wells projected to be drilled in the NDFO RFD from 2010 through 2029 total as many as 8,460 in the planning area. Up to 150 of these wells could be coalbed gas wells. Of the other remaining wells (those drilled in areas of very high, high or moderate potential areas) the majority are projected to be drilled in and around existing fields in the deeper portion of the Williston Basin and along the Cedar Creek anticline. Those wells drilled in areas of low or very low potential are projected for areas generally not proven productive by historical drilling, but which still may contain hydrocarbons based on U.S. Geological Survey assessment data. The BLM component of oil and conventional gas activity within the RFD is expected to be approximately 11.4 percent of all activity.

No surface disturbance would occur as a result of issuing leases. For analysis purposes, the potential number of acres disturbed by exploration and development activities is shown in Tables 4.1.1 and 4.1.2. The potential acres of disturbance reflect acres typically disturbed by construction, drilling, and production activities, including infrastructure installation throughout the NDFO. Typical exploration and development activities and associated acres of disturbance were used as assumptions for analysis purposes in the EA. (Note: The assumptions were not applied to Alternative A because the lease parcels would not be offered for lease; therefore, no wells would be drilled or produced on the lease parcels, and no surface disturbance would occur on those lands from exploration and development activities).

The context of alternatives considered in this EA relative to these assumptions is described below.

4.1.1.1 Alternative A – No Action

Under the No Action Alternative, the proposed parcels would not be leased. There would be no new impacts from oil and gas production on the parcel lands. No additional natural gas or crude oil would enter the public markets, and no royalties would accrue to the federal or state treasuries. The No Action Alternative would result in the continuation of the current land and resource uses on the parcels.

Unless specifically indicated by resource area, no further analysis of the No Action Alternative is presented in the following sections.

4.1.1.2 Alternative B – Proposed Action

By itself, the act of leasing the parcels would have no impact on any natural resources in the area administered by the NDFO. Standard terms and conditions as well as special stipulations would apply to the lease parcels. All impacts would link to as yet undetermined future levels of lease development.

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. The 29 parcels are located in Bowman, Burke, Dunn, McKenzie, Mountrail, Stark and Williams counties.

All parcels are within that portion of the NDFO where a hypothetical CBNG play could occur according to the RFD projection. The RFD assumes a total projection of 150 CBNG wells for the entire planning area, primarily for exploration purposes.

Thirteen parcels (approximately 841 acres) are located in an area of very high potential. Projected development within the very high potential area is greater than 20 well pads per year.

Thirteen parcels (approximately 1,576 acres) are located in an area of high potential. Projected development within the high potential area is 10 to 20 well pads per year.

Three parcels (approximately 527 acres) are located in an area of moderate potential. Projected development within the moderate potential area is 2 to 10 well pads per year.

For the purposes of this EA and based on the location of these parcels in the Williston Basin, any future development activity that would occur would probably be oil production. Short-term disturbance would be 2.9 acres for access roads and flow lines and four acres per well pad. Long-term disturbance would be 1.5 acres for access roads and 1.75 acres per well pad. Many of the parcels would probably require the formation of a communitization agreement (CA) to facilitate development. A CA provides for the pooling of federal and/or Indian lands, with other lands, when separate tracts under such federal and Indian lands cannot be independently developed and operated in conformity with an established well-spacing program. Actual well drilling and surface disturbance activity may occur on fee or state lands, not on the federal lease parcels.

4.1.1.3 Alternative C – BLM Preferred Action

By itself, the act of leasing the parcels in Alternative C would have no impact on any natural resources in the area administered by the NDFO. Standard terms and conditions as well as special stipulations would apply to the lease parcels. All impacts would link to as yet undetermined future levels of lease development. The same assumptions would be applied from Alternative A for the 1 parcel being deferred in this alternative.

The remaining 28 parcels are located in Burke, Dunn, McKenzie, Mountrail, Stark and Williams counties. 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.

All parcels are within that portion of the NDFO where a hypothetical CBNG play could occur according to the RFD projection. The RFD assumes a total projection of 150 CBNG wells for the entire planning area, primarily for exploration purposes.

Twelve parcels (approximately 801 acres) are located in an area of very high potential. Projected development within the very high potential area is greater than 20 well pads per year.

Thirteen parcels (approximately 1,576 acres) are located in an area of high potential. Projected development within the high potential area is 10 to 20 well pads per year.

Three parcels (approximately 527 acres) are located in an area of moderate potential. Projected development within the moderate potential area is >2 to 10 well pads per year.

For the purposes of this EA and based on the location of these parcels in the Williston Basin, any future development activity that would occur would probably be oil production. Short-term disturbance would be 2.9 acres for access roads and flow lines and 4 acres per well pad. Long-term disturbance would be 1.5 acres for access roads and 1.75 acres per well pad. Many of the parcels would probably require formation of a communitization agreement (CA) to facilitate development. A CA provides for the pooling of federal and/or Indian lands, with other lands, when separate tracts under such federal and Indian lands cannot be independently developed and operated in conformity with an established well-spacing program. Actual well drilling and surface disturbance activity may occur on fee or state lands, not on the federal lease parcels.

4.2 Air Resources

4.2.1 Direct and Indirect Effects

4.2.1.1 Alternative A – No Action

No action to lease these parcels would be taken; therefore, there would be no effects to air quality.

4.2.1.2 Alternative B – Proposed Action

Leasing the subject parcels would have no direct impacts on air quality. Any potential effects on air quality from activities on these lease parcels would occur if and when the leases were developed.

Potential impacts of development could include increased airborne soil particles blown from new well pads or roads; exhaust emissions from drilling equipment, compressors, vehicles, and dehydration and separation facilities, as well as potential releases of GHGs and VOCs during drilling and production activities. Increased emissions cannot be precisely quantified at this time since it is not known for certain how many wells might be drilled, the types of equipment needed if a well were to be completed successfully (e.g., compressor, flare, separator, gas dehydrator), or what technologies may be employed by a given company for drilling any new wells. The degree

of impact would also vary according to the characteristics of the geologic formations from which production occurs, as well as the scope of specific activities proposed in an APD.

Current monitoring data show that criteria pollutant concentrations are below applicable air quality standards, indicating good air quality. The potential level of development and mitigation described below is expected to maintain this level of air quality by limiting emissions. In addition, pollutants would be regulated through the use of state-issued air quality permits or air quality registration processes developed to maintain air quality.

4.2.1.3 Alternative C – BLM Preferred Action

Air quality impacts could be slightly less than those for Alternative B. The 40.1 fewer leased acres could result in less future development and fewer emissions than Alternative B.

4.2.2 Greenhouse Gas Emissions at the NDFO and Project Scales

4.2.2.1 Alternative A – No Action

No action to lease these parcels would be taken; therefore, there would be no effects to climate change.

4.2.2.2 Alternative B – Proposed Action

Sources of GHGs associated with development of lease parcels could include construction activities, operations, and facility maintenance in the course of oil and gas exploration, development, and production. Estimated GHG emissions are discussed for these specific aspects of oil and gas activity because the BLM has direct involvement in these steps. However, the current proposed activity is to offer parcels for lease. No specific development activities are currently proposed or potentially being decided upon for any parcels being considered in this EA. Potential development activities would be analyzed if the BLM receives an APD on any of the parcels considered here.

Anticipated GHG emissions presented in this section are taken from the Climate Change SIR (BLM 2010). Data are derived from emission calculators developed by air quality specialists at the BLM National Operations Center in Denver, Colorado, based on methods described in the Climate Change SIR (BLM 2010). Table 4.2.1 discloses projected annual GHG source emissions from BLM-permitted activities on non-tribal mineral estate associated with the RFD for the entire NDFO.

Table 4.2.1. BLM Projected Annual GHG Emissions Associated with Oil and Gas Exploration and Development Activity in the NDFO.

Source	BLM Long-Term GHG Emissions in tons/year				Emissions (metric tons/yr)
	CO_2	CH_4	N_2O	CO_2e	CO_2e
Conventional Natural Gas	563	117	0.01	3,016	2,737
Coal Bed Natural Gas	3822	49	0.07	4,877	4,425
Oil	547,165	1,132	7.4	573,247	520,188
Total	**551,550**	**1,298**	**7.5**	**581,140**	**527,350**

To estimate GHG emissions associated with the action alternatives, the following approach was used:

1. The proportion of each alternative relative to the total RFD was calculated based on total acreage of parcels under consideration for leasing relative to the total acreage of federal mineral acreage available for leasing in the RFD.
2. This ratio was then used as a multiplier with the total estimated GHG emissions for the entire RFD (with the highest year emission output used) to estimate GHG emissions for that particular alternative.

Under Alternative B, approximately 2,943 acres of lease parcels with federal minerals would be leased. These acres constitute approximately 0.30 percent of the total federal mineral estate of approximately 986,324 acres identified in the NDFO RFD. Therefore, based on the approach described above to estimate GHG emissions, 0.30 percent of the RFD for this EA total estimated BLM emissions of approximately 527,350 metric tons/year would be approximately 1,582 metric tons/year of CO_2e if the parcels within Alternative B were to be developed.

The assessment of GHG emissions and climate change is in its formative phase. As summarized in the Climate Change SIR (BLM 2010), climate change impacts can be predicted with much more certainty over global or continental scales. Existing models have difficulty reliably simulating and attributing observed temperature changes at small scales. On smaller scales, natural climate variability is relatively larger, making it harder to distinguish changes expected due to external forcings (such as contributions from local activities to GHGs). Uncertainties in local forcings and feedbacks also make it difficult to estimate the contribution of GHG increases to observed small-scale temperature changes (BLM 2010).

It is currently not possible to know with certainty the net impacts from lease parcel development on climate. The inconsistency in results of scientific models used to predict climate change at the global scale, coupled with the lack of scientific models designed to predict climate change on regional or local scales, limits the ability to quantify potential future impacts of decisions made

at this level. It is therefore beyond the scope of existing science to relate a specific source of GHG emission or sequestration with the creation or mitigation of any specific climate-related environmental effects. Although the effects of GHG emissions in the global aggregate are well-documented, it is currently impossible to determine what specific effect GHG emissions resulting from a particular activity might have on the environment. For additional information on environmental effects typically attributed to climate change, please refer to the cumulative effects discussion below.

While it is not possible to predict effects on climate change of potential GHG emissions discussed above in the event of lease parcel development for alternatives considered in this EA, the act of leasing does not produce any GHG emissions in and of itself. Releases of GHGs could occur at the exploration/development stage.

4.2.2.3 Alternative C – BLM Preferred Action

Climate change impacts could be slightly less than those for Alternative B. Fewer leased acres could result in less future development and fewer GHG emissions than Alternative B.

4.2.2.3.1 Mitigation

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. Measures would also be required as COAs on permits by either the BLM or the applicable state air quality regulatory agency. The BLM also manages venting and flaring of gas from federal wells as described in the provisions of Notice to Lessees (NTL) 4A, Royalty or Compensation for Oil and Gas Lost.

Some of the following measures could be imposed at the development/APD stage:

- flare or incinerate hydrocarbon gases;
- operate emission control equipment with minimum 95 percent volatile organic compound (VOC) control efficiency on petroleum storage tank batteries;
- operate low-emitting drill rig engines, such as Tier 4 diesel engines or natural gas or electric drill rig engines;
- operate gas or electric turbines for natural gas compression rather than internal combustion engines;
- replace older internal combustion engines with low-emitting engines that meet EPA New Source Performance Standards;
- apply water or chemical suppressants to dirt and gravel roads during periods of high use and control speed limits to reduce fugitive dust emissions;
- perform interim reclamation to re-vegetate areas of well pads not required for ongoing production facilities.

- construct multiwall pads using directional drilling and horizontal completion technologies to reduce surface disturbance and traffic;
- replace diesel-fired pump jack engines with electrified engines;
- reinject CO_2 and methane into no-producing wells or other underground formations; and
- use forward looking infrared (FLIR) technology to detect fugitive VOC and methane emissions and repair leaking equipment quickly.

More specific to reducing GHG emissions, Section 6 of the Climate Change SIR identifies and describes in detail commonly used technologies to reduce methane emissions from natural gas, coal bed natural gas, and oil production operations. Technologies discussed in the Climate Change SIR and as summarized below in Table 4.2.2.1 (reproduced from Table 6-2 in Climate Change SIR) display common methane emission technologies reported under the USEPA Natural Gas STAR Program and associated emission reduction, cost, maintenance and payback data.

Table 4.2.2.1. Selected Methane Emission Reductions Reported Under the USEPA Natural Gas STAR Program [1]

Source Type / Technology	Annual Methane Emission Reduction [1] (Mcf/yr)	Capital Cost Including Installation ($)	Annual Operating and Maintenance Cost ($)	Payback (Years or Months)	Payback Gas Price Basis ($/Mcf)
Wells					
Reduced emission (green) completion	7,000 [2]	$1K – $10K	>$1,000	1 – 3 yr	$3
Plunger lift systems	630	$2.6K – $10K	NR	2 – 14 mo	$7
Gas well smart automation system	1,000	$1.2K	$0.1K – $1K	1 – 3 yr	$3
Gas well foaming	2,520	>$10K	$0.1K – $1K	3 – 10 yr	NR
Tanks					
Vapor recovery units on crude oil tanks	4,900 – 96,000	$35K – $104K	$7K – $17K	3 – 19 mo	$7
Consolidate crude oil production and water storage tanks	4,200	>$10K	<$0.1K	1 – 3 yr	NR
Glycol Dehydrators					
Flash tank separators	237 – 10,643	$5K – $9.8K	Negligible	4 – 51 mo	$7
Reducing glycol circulation rate	394 – 39,420	Negligible	Negligible	Immediate	$7
Zero-emission dehydrators	31,400	>$10K	>$1K	0 – 1 yr	NR

Table 4.2.2.1. Selected Methane Emission Reductions Reported Under the USEPA Natural Gas STAR Program [1]

Source Type / Technology	Annual Methane Emission Reduction [1] (Mcf/yr)	Capital Cost Including Installation ($)	Annual Operating and Maintenance Cost ($)	Payback (Years or Months)	Payback Gas Price Basis ($/Mcf)
Pneumatic Devices and Controls					
Replace high-bleed devices with low-bleed devices					
End-of-life replacement	50 – 200	$0.2K – $0.3K	Negligible	3 – 8 mo	$7
Early replacement	260	$1.9K	Negligible	13 mo	$7
Retrofit	230	$0.7K	Negligible	6 mo	$7
Maintenance	45 – 260	Negl. to $0.5K	Negligible	0 – 4 mo	$7
Convert to instrument air	20,000 (per facility)	$60K	Negligible	6 mo	$7
Convert to mechanical control systems	500	<$1K	<$0.1K	0 – 1 yr	NR
Valves					
Test and repair pressure safety valves	170	NR	$0.1K – $1K	3 – 10 yr	NR
Inspect and repair compressor station blowdown valves	2,000	<$1K	$0.1K – $1K	0 – 1 yr	NR
Compressors					
Install electric compressors	40 – 16,000	>$10K	>$1K	>10 yr	NR
Replace centrifugal compressor wet seals with dry seals	45,120	$324K	Negligible	10 mo	$7
Flare Installation	2,000	>$10K	>$1K	None	NR

Source: Multiple USEPA Natural Gas STAR Program documents. Individual documents are referenced in Climate Change SIR (BLM 2010).
[1] Unless otherwise noted, emission reductions are given on a per-device basis (e.g., per well, per dehydrator, per valve, etc).
[2] Emission reduction is per completion, rather than per year.
K = 1,000
mo = months
Mcf = thousand cubic feet of methane
NR = not reported
yr = year

In the context of the oil sector, additional mitigation measures to reduce GHG emissions include methane reinjection and CO_2 injection. These measures are discussed in more detail in Section 6.0 of the Climate Change SIR (BLM 2010).

In an effort to disclose potential future GHG emission reductions that might be feasible, the BLM estimated GHG emission reductions based on the RFD for the Miles City Field Office (MCFO), which abuts the western boundary of the NDFO. For emission sources subject to BLM (federal) jurisdiction, the estimated emission reductions represent approximately 51 percent

reduction in total GHG emissions compared to the estimated MCFO federal GHG emission inventory (BLM 2010, Section 6.5 and Table 6-3). The emission reductions technologies and practices are identified as mitigation measures that could be imposed during development.

4.3 Soil Resources

4.3.1 Direct and Indirect Effects

At this stage (lease sale), there are no impacts on soil resources. Impacts (both direct and indirect) could occur if and when the lease is developed in the future. The potential
Leasing the parcels would have no direct impacts on soil resources. Any potential effects from the sale of leases could occur at the time the leases are developed.

4.3.1.1 Alternative A – No Action

No action to lease these parcels would be taken; therefore, there would be no effects to soil resources.

4.3.1.2 Alternative B – Proposed Action

Surface use activities associated with oil and gas exploration and development could cause surface disturbances. Such acts result in reduced ground cover, soil mixing, compaction, or removal, exposing soils to accelerated erosion by wind and water, resulting in the irretrievable loss of topsoil and nutrients and potentially resulting in mass movement or sedimentation. Surface disturbances also change soil structure, heterogeneity (variable characteristics), temperature regimes, nutrient cycling, biotic richness, and diversity. Along with this, mixed soils have decreased bulk density, and altered porosity, infiltration, air-water relationships, salt content, and pH (Perrow and Davy, 2003; Bainbridge 2007). Soil compaction results in increased bulk density, and reduced porosity, infiltration, moisture, air, nutrient cycling, productivity, and biotic activity (Logan 2001; 2003; 2007). Altering such characteristics reduces the soil system's ability to withstand future disturbances (e.g., wildfire, drought, high precipitation events, etc.).

The probability and magnitude of these effects are dependent upon local site characteristics, climatic events, and the specific mitigation applied to the project. Within 2-5 years following reclamation, vegetative cover and rates of erosion would return to pre-disturbance conditions (USDI BLM 2008). Exceptions would be sites poorly suited to reclamation which could require unconventional and/or site-specific reclamation measures.

4.3.1.2.1 Mitigation

Measures would be taken to reduce, avoid, or minimize potential impacts to soil resources from exploration and development activities. Prior to authorization, proposed actions would be evaluated on a case-by-case basis and would be subject to mitigation measures in order to maintain the soil system. Mitigation would include avoiding areas poorly suited to reclamation,

limiting the total area of disturbance, rapid reclamation, erosion/sediment control, soil salvage, decompaction, revegetation, weed control, slope stabilization, surface roughening, and fencing.

4.3.1.3 Alternative C – BLM Preferred Action
Direct and indirect impacts would be the same as Alternative B; however, the area potentially impacted would be reduced by 1.3% due to approximately 40.1 acres of parcel NDM 97300-LW proposed for deferral pending further review.

4.3.1.3.1 Mitigation
Mitigation would be the same as Alternative B.

4.4 Water Resources
4.4.1 Direct and Indirect Effects
4.4.1.1 Alternative A – No Action
No action to lease these parcels would be taken; therefore, there would be no effects to soil resources.

4.4.1.2 Alternative B – Proposed Action
Leasing the parcels would have no direct impacts on water resources. Any potential effects from sale of lease parcels could occur at the time the leases are developed.

The magnitude of potential impacts from exploration and development of oil and gas to water resources would be dependent on the specific activity, season, proximity to waterbodies, location in the watershed, upland and riparian vegetation condition, effectiveness of mitigation, and the time until reclamation success. Surface disturbance effects typically are localized, short-term, and have the potential to be reduced through vegetation reestablishment. As acres of surface-disturbance increase within a watershed, so could the effects on water resources.

Oil and gas exploration and development of a lease parcel could cause the removal of vegetation, soil compaction, and soil disturbance in uplands within the watershed, 100-year floodplains of non-major streams, and non-riparian, ephemeral waterbodies. The potential effects from these activities could be 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, which in turn changes flow characteristics, reduces groundwater recharge, and increases sedimentation and erosion (DEQ 2007).

Spills or produced fluids could potentially impact surface and ground water resources in the long term. Oil and gas exploration/development could contaminate aquifers with salts, drilling fluids,

fluids and gases from other formations, detergents, solvents, hydrocarbons, metals, and nutrients; change vertical and horizontal aquifer permeability; and increase hydrologic communication with adjacent aquifers (EPA 2004). Groundwater removal could result in a depletion of flow in nearby streams and springs if the aquifer is hydraulically connected to such features. Typically produced water from conventional oil and gas wells is from a depth below useable aquifers or coal seams (FSEIS 2008).

4.4.1.2.1 Mitigation

Stipulations addressing waterbodies, streams, 100-year floodplains of major rivers, riparian areas, and wetlands would minimize potential impacts and would be included with the lease when necessary (Appendix A). In the event of exploration or development, measures would be taken to reduce, avoid, or minimize potential impacts to water resources including application of appropriate mitigation. Mitigation measures that minimize the total area of disturbance, control wind and water erosion, reduce soil compaction, maintain vegetative cover, control nonnative species, and expedite rapid reclamation (including interim reclamation) would minimize negative impacts to water resources.

Methods to reduce erosion and sedimentation could include: reducing surface disturbance acres; installing and maintaining adequate erosion control; proper road design, road surfacing, and culvert design; road/infrastructure maintenance; use of low water crossings; and use of isolated or bore crossing methods for waterbodies and floodplains. In addition, applying mitigation to maintain adequate, undisturbed, vegetated buffer zones around waterbodies and floodplains could reduce sedimentation and maintain water quality. Appropriate well completion, the use of Spill Prevention Plans, and Underground Injection Control regulations would mitigate groundwater impacts. Site-specific mitigation and reclamation measures would be described in the COAs.

4.4.1.3 Alternative C – BLM Preferred Action

Direct and indirect impacts would be the same as Alternative B; however, the area potentially impacted would be reduced by 1.3% due to approximately 40.1 acres of parcel NDM 97300-LW proposed for deferral pending further review.

The potentially impacted acres on water resources would be decreased by 40.1 acres.

4.4.1.3.1 Mitigation

Mitigation would be the same as Alternative B.

4.5 Vegetation Resources

4.5.1 Direct and Indirect Effects

4.5.1.1 Alternative A – No Action

No action to lease these parcels would be taken; therefore, there would be no effects to vegetation resources.

4.5.1.2 Alternative B – Proposed Action

At this stage (lease sale) there are no impacts to vegetation resources. Impacts (both direct and indirect) would occur when the lease is developed in the future. The potential impacts would be analyzed on a site-specific basis at the APD stage prior to development.

Although there are no direct or indirect impacts to vegetation resources at the leasing stage, the following assumptions can be made about potential future direct and indirect effects at the time of development.

Impacts to vegetation depend on the vegetation type/community, soil community, topography and the level of disturbance of the lease parcels. Disturbance to vegetation is of concern because protection of soil resources, maintenance of water quality, and conservation of wildlife habitat could be diminished or lost over the long-term through direct loss of vegetation (including direct loss of both plant communities and specific plant species).

Other direct impacts, such as invasive species invasion, could result in loss of desirable vegetation. Invasive species and noxious weeds could also reduce wildlife habitat quality and native species diversity. In addition, invasive species are well known for changing fire regimes.

Additionally, surface disturbing activities directly affect vegetation by destroying habitat, churning soils, impacting biological crusts, disrupting seedbanks, burying individual plants, and generating sites for competitive species. In addition, other vegetation impacts could also be caused from soil erosion and result in loss of the supporting substrate for plants, or from soil compaction resulting in reduced germination rates. Impacts to plants occurring after seed germination but prior to seed set could be particularly harmful as both current and future generations would be affected.

Fugitive dust generated by construction activities and travel along dirt roads could affect nearby plants by depressing photosynthesis, disrupting pollination, and reducing reproductive success. Oil, fuel, wastewater or other chemical spills could contaminate soils as to render them temporarily unsuitable for plant growth until cleanup measures were fully implemented. If cleanup measures were less successful, longer term vegetation damage could be expected.

The lease parcels contain a combination of native prairie, riparian, agricultural lands, improved pastures, and woodland vegetation communities. Habitat disturbance in grasslands generally has

less of an impact than disturbance in riparian-wetlands and woodlands. Since shrubs and trees take longer to reestablish, rehabilitation times are expected to be longer than those in grass-dominated areas. Riparian-wetlands can be very sensitive, but natural vegetation can reestablish very quickly as long as disturbances do not alter the structural and functioning components of the site. Agricultural, improved pastures, restored pastures, and other disturbed sites have all been manipulated and disturbed. To return these lands back to their current existing environment would be easier then restoring native vegetation communities. These areas are already seeded with plant species that are competitive in nature that were selected for their ability to establish effectively. Overall, the impacts associated with well pads and roads would be very site-specific and are not expected to significantly affect this vegetation at the community scale.

4.5.1.2.1 Mitigation

Mitigation would be addressed at the site specific APD stage of exploration and development. If needed, COAs would potentially include, but not limited to, revegetation with desirable plant species, soil enhancement practices, direct live haul of soil material for seed bank revegetation, reduction of livestock grazing, fencing of reclaimed areas, and the use of seeding strategies consisting of native grasses, forbs, and shrubs.

4.5.1.3 Alternative C – BLM Preferred Action

Direct and indirect impacts would be the same as Alternative B; however, the area potentially impacted would be reduced by 1.3% due to approximately 40.1 acres of parcel NDM 97300-LW proposed for deferral pending further review.

4.6 Special Status Species

At this stage (lease sale) there are no impacts to special status species. Impacts (both direct and indirect) could occur if and when the lease is developed in the future. The potential impacts would be analyzed on a site-specific basis at the APD stage prior to development.

The use of standard lease terms and stipulations on these lands (refer to Appendix A) would minimize, but not preclude impacts to wildlife. Oil and gas development which results in surface disturbance could directly and indirectly impact aquatic and terrestrial wildlife species. These impacts could include loss or reduction in suitability of habitat, improved habitat for undesirable (non-native) competitors, species or community shift to species or communities more tolerant of disturbances, nest abandonment, mortalities resulting from collisions with vehicles and power lines, electrocutions from power lines, barriers to species migration, habitat fragmentation, increased predation, habitat avoidance, and displacement of wildlife species resulting from human presence. The scale, location, and pace of development, combined with implementation of mitigation measures and the specific tolerance of the species to human disturbance all influence the severity of impacts to wildlife species and habitats, including Threatened, Endangered, Candidate, Proposed, and other special status species.

4.6.1 Direct and Indirect Effects

Although there are no direct or indirect impacts to wildlife resources at the leasing stage, the following assumptions can be made about potential future direct and indirect effects at the time of development.

4.6.1.1 Piping Plover/Least Turn

Critical habitats have been established for North Dakota for piping plovers. Lease parcels located along the Missouri River and Lake Sakakawea all are within these established critical habitats. Four additional parcels in Mountrail County also have critical habitat associated with them.

Existing stipulations from the North Dakota RMP (1988) requires a No Surface Occupancy (NSO) stipulation associated with all wetlands (for analysis purposes, Lake Sakakawea is viewed as a wetland by BLM). The stipulation would not allow surface disturbance/development activities to occur within 200 feet of known wetlands. The 200 feet could also be adjusted to accommodate site specific concerns at the APD stage. As a result of this stipulation, impacts are not expected to nesting habitats within these areas. Due to the NSO stipulation associated with wetlands and the identified critical habitats, issuing the proposed lease parcels would have no effect on piping plovers and least terns. Twelve of the 29 nominated parcels are associated with designated critical habitat for plovers.

4.6.1.2 Pallid Sturgeon

Potential impacts from development could include: overland oil spills, underground spills from activities associated with horizontal drilling or other practices, spills from drilling mud or other extraction and processing chemicals, and surface disturbance activities that create a localized erosion zone. Oil spills and other pollutants from the oil extraction process could harm the endangered pallid sturgeon in two different ways. First, toxicological impacts from direct contact could have immediate lethal effects to eggs, juveniles, and adults. Second, toxic effects to lower food web levels (e.g. aquatic macro-invertebrates) would indirectly affect the pallid sturgeon species by degrading water quality and degrading or eliminating food resources. Other aquatic species would experience the same type of direct and indirect impacts.

Currently, in the North Dakota RMP there are no stipulations specific to Pallid sturgeon habitat. However, a floodplain stipulation (NSO 11-39 and NSO 11-36, see Appendix A) would not allow surface occupancy in the 100-year floodplain boundary of the Missouri and Yellowstone Rivers, respectively. Additionally, Pallid Sturgeons would be protected by stipulation NSO 11-33 (see Appendix A) which would not allow surface disturbance/development activities to occur within 200 feet of known wetlands. BLM considers the Yellowstone and Missouri Rivers wetlands habitat.

BLM has determined that issuing leases for the parcels along the Missouri River and Lake Sakakawea will have no effect on the pallid sturgeon. If development were to occur, additional mitigation would be included as conditions of approval at the APD stage. These conditions could include the placement of earthen berms and oil skimmers (a culvert device placed in drainages which is intended to block oil from entering streams) which should help protect pallid sturgeon habitat in case of oil spills by greatly reducing the potential for spills to reach pallid sturgeon habitat.

4.6.1.3 Whooping Crane

The majority of the parcels occur in the whooping crane migratory corridor through North Dakota, excluding those in Bowman County. BLM has determined that the act of issuing leases within the whooping crane migration corridor will not affect the whooping crane. However, impacts to whooping cranes are possible from subsequent oil and gas development activities that would be permitted at the APD stage. At this time, stipulations are limited to protect any known whooping crane migration staging areas. Line strikes, collisions with vehicles, habitat fragmentation, and other anthropogenic activities can disturb, displace, or cause direct mortality of whooping cranes.

Therefore, if development of these leases in known whooping crane feeding/staging/resting areas is proposed, BLM would work with the USFWS pursuant to section 7(a)(2) of ESA. An outcome of the conferencing process may be that conditions of approval are attached to the permit or the permit may not be approved. Other BMP's would also be developed through consultation, including minimizing disturbance, adherence to Avian Powerline Interaction Committee (APLIC) guidelines, and others as deemed appropriate.

4.6.1.4 Dakota Skipper Butterfly

The majority of the parcels occur in counties where the Dakota Skipper (skipper) has been positively identified. Burke, Dunn, McKenzie, Mountrial, and Ward counties all have remaining native prairies required for the skipper to varying degrees. BLM has determined the act of issuing leases within these counties will not affect the skipper. However, impacts to skippers are possible from subsequent oil and gas development activities should the lease be developed, and would be analyzed at the APD stage. At this time, stipulations are limited to protect any known skipper habitats. Drilling pads, roads, collisions with vehicles, habitat fragmentation, and other anthropogenic activities can disturb, displace, or cause direct mortality of skippers.

Therefore, if development of these leases in known skipper areas is proposed, BLM would work with the USFWS pursuant to section 7(a)(2) of ESA. An outcome of the conferencing process may be that conditions of approval are attached to the permit or the permit may not be approved. Other BMP's would also be developed through consultation, including minimizing disturbance, adherence to conservation plans and others as deemed appropriate.

4.6.1.5 Sprague's Pipit

Energy development (oil, gas, and wind) and associated roads and facilities increase the fragmentation of grassland habitat. A number of studies have found that Sprague's pipits appear to avoid non-grassland features in the landscape, including roads, trails, oil wells, croplands, woody vegetation, and wetlands (Dale et al. 2009, pp. 194, 200; Koper et al. 2009, pp. 1287, 1293, 1294, 1296; Greer 2009, p. 65; Linnen 2008, pp. 1, 9-11, 15; Sutter et al. 2000, pp. 112-114). Sprague's pipits avoid oil wells, staying up to 350 meters (m)[1148 feet (ft)] away (Linnen 2008, pp. 1, 9-11), magnifying the effect of the well feature itself. Oil and gas wells, especially at high densities, decrease the amount of habitat available for breeding territories. ([Federal Register: September 15, 2010 (Volume 75, Number 178)]

The leasing action will have no effect on the pipit however, potential suitable habitat exists for the Sprague's pipit across the entire lease area, excluding those parcels inundated by Lake Sakakawea; however, inventories have not been conducted within the parcels. Therefore, wildlife inventories would need to be conducted at APD stage of development to determine the presence or absence of Sprague's pipits. The ESA Section 7 Stipulation (16-3) and lease notice is issued with those leases and would be applied if Sprague's pipits are found in the area. If Sprague's pipits are found in the proposed development area, informal consultation with USFWS would be initiated, and Conditions of Approval would be applied for the protection of habitat to ensure there would be no measurable direct negative effect to Sprague's pipits.

4.6.1.6 Sage Grouse

Research indicates oil and gas development negatively impacts sage grouse. Based on recent research, the current oil and gas stipulations for sage grouse are considered ineffective to ensure that sage grouse can persist within fully developed areas. With regard to existing restrictive stipulations applied by the BLM, (Walker et al. 2007a) research has demonstrated that the 0.4-km (0.25 miles) NSO lease stipulation is insufficient to conserve breeding sage-grouse populations in fully developed gas fields because this buffer distance leaves 98 percent of the landscape within 3.2 km (2 miles) open to full-scale development. Full-field development of 98 percent of the landscape within 3.2 km (2 miles) of leks in a typical landscape in the Powder River Basin reduced the average probability of lek persistence from 87 percent to 5 percent (Walker et al. 2007a).

Other studies also have assessed the efficacy of existing BLM stipulations for sage grouse. Impacts to leks from energy development are most severe near the lek, and remained discernable out to distances more than 6 km (3.6 miles) (Holloran 2005, Walker et al. 2007a), and have resulted in the extirpation of leks within gas fields (Holloran 2005, Walker et al. 2007a). Holloran (2005) shows that lek counts decreased with distance to the nearest active drilling rig, producing well, or main haul road, and that development influence counts of displaying males to a distance of between 4.7 and 6.2 km (2.9 and 3.9 miles). All well-supported models in Walker et al. (2007a) indicate a strong effect of energy development, estimated as proportion of

development within either 0.8 km (0.5 miles) or 3.2 km (2 miles), on lek persistence. Buffer sizes of 0.25 mi., 0.5 mi., 0.6 mi. and 1.0 mi. result in an estimated lek persistence of 5 percent, 11 percent, 14 percent, and 30 percent. Lek persistence in the absence of CBNG development averages approximately 85 percent. Models with development at 6.4 km (4 miles) had considerably less support, but the regression coefficient indicated that impacts were still apparent out to 6.4 km (4 miles) (Walker et al. 2007a). Tack (2009) found impacts of energy development on lek abundances (numbers of males per lek) out to 7.6 miles.

Under Alternative B, the nominated parcel has a Lease Notice attached to it. It is located in Preliminary Priority Habitat, important Greater Sage-Grouse habitat, and the operator may be required to implement specific measures to reduce impacts of oil and gas operations. Such measure would be developed during the application for permit to drill process. Under Alternative C the nominated parcel within the sage grouse core area would be deferred for further analysis.

BLM Sensitive Animal Species and Other Fish and Wildlife. Approximately 25-30 of the sensitive species listed for North Dakota have the potential to occur within the study area. Species occurrence and densities tend to be dynamic in nature especially during the seasonal changes experienced within the study area. Annual statewide surveys are completed for trends and do not reflect on individual parcels. Impacts would be dependent on the location of surface disturbance if any drilling activities would take place and would be relative to populations of the species in question.

Should drilling occur on the lease parcels, impacts could include loss of habitat from development infrastructure, mortalities resulting from collisions with vehicles and power lines, electrocution on power lines, and displacement of wildlife species from initial disturbance caused by human presence. Indirect impacts would include habitat fragmentation and subsequent vehicle traffic, human presence, and other continual development activities.

Based on the RFD, a wide range of direct habitat loss is possible. Initial disturbance would change the occupation of those areas to disturbance-oriented species (i.e. horned larks), or species with more tolerance for disturbances. These changes would also be expected to decrease the diversity of wildlife. Although bladed corridors would be reclaimed after the facilities are constructed, some changes in vegetation would occur along the reclaimed areas. The goal of reclamation is to restore disturbed areas to pre-disturbed conditions. The outcome of reclamation, unlike site restoration, will therefore not always mimic pre-disturbance conditions and offer the same habitat values to wildlife species. Sagebrush obligates, including some species of songbirds and sage grouse, would be most affected by this change.

It is anticipated that some development may occur adjacent to existing disturbances of some type. Depending on proximity and species tolerance, wildlife species within these areas would

either have acclimated to the surrounding conditions, previously been displaced by construction activities, or may be caused to be displaced to other areas with or without preferred habitat.

4.6.1.6.1 Mitigation

Additional mitigation will occur as conditions of approval at the APD stage. The mitigation measures might include the placement of earthen berms and oil skimmers (in ephemeral drainages where fish passage will not be blocked) which should help protect aquatic wildlife habitat in case of oil spills.

Should future drilling occur, mitigation measures would consider the types of impact, the rareness of the species, the population size, and the species' potential response to the disturbance. Additional COAs would be developed to minimize habitat disturbance; lowering impacts on sensitive animal species at the site-specific scale. On the landscape scale impacts would be negligible.

Stipulations protecting Golden Eagles and Ferruginous hawks have been placed on three nominated parcels: KW, MV, and LT. The stipulation prohibits construction, seismic exploration, or other development from taking place between February 15 and July 15 and March 15 to July 15 respectively. Additional measures would be taken to prevent, minimize, or mitigate impacts to fish and wildlife animal species from exploration and development activities at the APD stage. Prior to authorization, activities would be evaluated on a case-by-case basis, and the project would be subject to mitigation measures. Mitigation could include rapid re-vegetation, project relocation, or pre-disturbance wildlife species surveying. If oil and gas development is proposed in suitable habitat for threatened or endangered species, consultation with the USFWS would occur to determine if additional terms and conditions would need to be applied.

4.7 Fish and Wildlife

At this stage (lease sale), there are no impacts to fish and wildlife. Impacts (both direct and indirect) could occur if and when the lease is developed in the future. The potential impacts would be analyzed on a site-specific basis at the APD stage prior to development.

4.7.1 Direct and Indirect Effects

Should any or all of the nominated parcels be developed in the future, it is expected there would be limited impacts as stated in Section 4.6. However, the BLM would address applications for permits to drill on a case-by-case basis where clear, precise locations can be analyzed for potential impacts. Currently, special stipulations would be placed on the lease nominations where applicable to facilitate resource protection (refer to Appendix A).

4.8 Cultural Resources

4.8.1 Direct and Indirect Effects

At this stage (lease sale), there are no impacts to cultural resources. Impacts (both direct and indirect) could occur if and when the lease is developed in the future. The potential impacts would be analyzed on a site-specific basis at the APD stage prior to development. Potential impacts to cultural resources at the APD stage include damage to archaeological sites through construction activities and the possible removal of, or damage to, archaeological materials due to increased human activity.

4.8.1.1 Alternative A – No Action

No action to lease these parcels would be taken; therefore, there would be no effects to cultural resources.

4.8.1.2 Alternative B – Proposed Action

The Proposed Action Alternative would be to offer 29 parcels of federal minerals for oil and gas leasing, covering 2943 acres administered by the NDFO. The parcels are located in western North Dakota. Parcel number, size, and detailed locations and associated stipulations are listed in Appendix A.

Of the 29 parcels, 23 contain known cultural sites. Of the 52 sites, 1 site on the National Register of Historic Places (NRHP); 1 site considered eligible for the NRHP; 36 sites are unevaluated or have an unknown status; and 16 sites have been evaluated for the NRHP.

4.8.1.3 Alternative C – BLM Preferred Action

Under the BLM Preferred Alternative 28 (2,903 acres) of the 29 lease parcels would be offered with RMP lease stipulations and/or lease notices as necessary (Appendix A) for competitive oil and gas lease sale and lease issuance.

Of the 29 parcels, 23 contain known cultural sites. Of the 52 sites, 1 site on the National Register of Historic Places (NRHP); 1 site considered eligible for the NRHP; 36 sites are unevaluated or have an unknown status; and 16 sites have been evaluated for the NRHP but no formal decision has been made.

Lease parcel AZ (12.95 acres) contains to 1 sites on the NRHP. This site is the 32MX820 Fairview Lift Bridge/Great Northern Railway Bridge. This parcel also contains site 32MZ819 Railroad Tunnel, considered eligible for the NRHP. These two sites must remain undisturbed and avoided by any construction activities (refer to Cultural Resource Lease Stipulation 16-1).

4.8.1.3.1 Mitigation

Specific mitigation measures, including but not limited to, site avoidance, excavation or data recovery would have to be determined when site-specific development proposals are received. However, in most surface-disturbing situations cultural resources would be avoided by project redesign or relocation. Should a cultural property be unavoidable, significant properties would be site-specifically mitigated prior to implementation of a project.

Where there are large concentrations of cultural resources and important archaeological sites along the river banks and bluff tops adjacent to the Missouri and Little Missouri Rivers, Garrison Reservoir, and Lake Sakakawea measures would be implemented to avoid these areas. The use of directional and horizontal drilling techniques could provide the ability to locate surface facilities away from the shoreline and would reduce impacts to these resources.

Inventory data is not available for 6 of the nominated parcels and portions of the remaining 23 parcels. Based on topography in and surrounding the nominated lease parcels, and known cultural summary information, it was determined that inventory considerations could be deferred until a specific development is proposed. A professional assessment of the lease parcels' potential for cultural resources eligible to the NRHP will be conducted during on-the-ground inventories of proposed developments prior to issuance of a permit for development. In all cases, the standard lease notice and the following stipulation identified in IM-2005-003 should be attached to the leases:

> This lease may be found to contain historic properties and/or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O. 13007, or other statutes and executive orders. The BLM will not approve any ground disturbing activities that may affect any such properties or resources until it completes its obligations under applicable requirements of the NHPA and other authorities. The BLM may require modification to exploration or development proposals to protect such properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized or mitigated.

Each nominated lease parcel would have the standard lease notice attached and the special cultural resource stipulation as written in IM 2005-003. Refer to Appendix A of this document for pertinent parcel-specific lease stipulations as needed.

4.9 Native American Religious Concerns

4.9.1 Direct and Indirect Effects

At this stage (lease sale), there are no impacts to Native American religious practices and Traditional Cultural Properties (TCPs). Impacts (both direct and indirect) could occur if and when the lease is developed in the future. The potential impacts would be analyzed on a site-specific basis at the APD stage prior to development.

The BLM WO IM-2005-003 notes that while a lease does not authorize specific on-the-ground activities, and no ground disturbance can occur without further authorization from BLM and the surface management agency, but unless proscribed by stipulation, lessees can expect to drill somewhere on a lease unless precluded by law. A lease sale would not interfere with the performance of traditional ceremonies and rituals pursuant to the American Indian Religious Freedom Act (AIRFA) or EO 13007. It would not prevent tribes from visiting sacred sites or prevent possession of sacred objects.

A review of the lease parcels in Appendix A indicates that no previously reported TCPs would be directly or indirectly impacted, however some of the lease parcels are located inside the exterior boundary of the Fort Berthold Indian Reservation. Information pertaining to TCP's and culturally sensitive areas was requested for parcels that are located inside the boundary of the reservation. To this date no TCPs have been brought to the attention of the BLM by any of the six Tribal Nations to whom consultation packets were sent, including the MHAN.

No action to lease these parcels would be taken; therefore, there would be no effects in Alternative A. Direct and indirect impacts would further analyzed for both Alternative C and Alternative B, based on the recommendations brought forward by the MHAN THPO during consultation on project specific site development for future APDs.

4.10 Paleontology

4.10.1 Direct and Indirect Effects

Significant paleontological resources occur regularly on land underlain by the Hell Creek and Ludlow formations in western North Dakota. The surface disturbances associated with oil and gas exploration and development activities could have direct and indirect effects to paleontological resources primarily in areas classified as Potential Fossil Yield Classification (PFYC) 4 or 5 areas. Mitigation will be a consideration for all surface-disturbing activities. The Niobrara, Pierre Shale, Fox Hills, Bullion Creek, Arikaree formations and the White River Group, are known for significant fossil finds in North Dakota; however, these finds are not common. Isolated significant finds can also occur in most of the geologic formations or units in the state; however, these finds are typically rare.

As a section of the Omnibus Public Lands Act (March 30, 2009), the Paleontological Resources section of the Act (Title VI, Subtitle D) specifically addressed management of paleontological resources on public lands. As a result of this act, a map of the planning area which shows the area according to its potential fossil yield was developed to provide a tool for predicting the potential management areas have for fossil locales. The BLM PFYC classification system outlines BLM's approach to assessment and mitigation of paleontological resources. The PFYC system uses five classes for geologic units: Class 1: Very Low; Class 2, Low; Class 3, Moderate (3a), or Unknown (3b); Class 4, High; and Class 5, Very High. This classification approach is meant to reflect the probability of impacting significant fossils. The intent of the classification

system is to eliminate or reduce adverse impacts to paleontological resources from authorized actions.

4.10.1.1 Alternative A – No Action

No action to lease these parcels would be taken; therefore, there would be no effects to Paleontological resources.

4.10.1.2 Alternative B – Proposed Action

Of the 29 nominated lease parcels, 19 parcels (1,834 federal mineral acres) are in areas classified as moderate (3) to high (4) according to the PFYC system map. The remaining nominated parcels are located in areas considered low or unknown. Presently, there are known localities of previous research areas for significant fossil or paleontological resources inside or adjacent to these nominated parcels; therefore, the potential for direct or indirect affects to paleontological resources is high.

4.10.1.3 Alternative C – BLM Preferred Action

Nineteen lease parcels (1,834 federal mineral acres) in whole or in part are within areas classified as moderate (3) to high (4) according to the PFYC. Presently, there are known localities of previous research areas for significant fossil or paleontological resources inside or adjacent to these nominated parcels; therefore, the potential for direct or indirect affects to paleontological resources is high. Areas with high (4) potential paleontological yields will be brought forward by the BLM North Dakota Archaeologist or the Montana/Dakotas Paleontologist during consultation on project specific site development for future APDs.

4.10.1.3.1 Mitigation

Specific mitigation measures could include, but are not limited to, site avoidance or excavation. These measures would be determined when site-specific development proposals are received. For known highly significant paleontological resources, the act of leasing a nominated parcel would not impact paleontological resources; however, subsequent development could have impacts on those resources. For areas known to contain or have the potential to contain paleontological resources a survey should be conducted when a specific development may impact those resources.

As per Washington Office Instruction Memorandums (IM) 2008-009, 10/15/2007 and 2009-011, 10/10/2008, each nominated lease parcel would have the standard lease notice and special paleontological resource stipulation attached. Refer to Appendix B for Lease Notice 14-12 for the standard paleontological lease notice).

4.11 Lands and Realty

4.11.1 Direct and Indirect Effects

Leasing the parcels would have no direct impacts on lands and realty. Any potential effects from the sale of leases would occur at the time the leases are developed.

4.11.1.1 Alternative A – No Action

No action to lease these parcels would be taken; therefore, there would be no effects on lands and reality.

4.11.1.2 Alternative B – Proposed Action

Facilities associated with oil and gas development on the parcels could cause disturbance to the existing rights-of-way on federal surface on two of the tracts (Parcels NDM 97300-AZ and NDM 97300-MV). Additional rights-of-way could be required across federal surface for "off-lease" or third party facilities required for potential development of the parcel.

4.11.1.2.1 Mitigation

Measures would need to be taken to avoid disturbance to or impacting the two existing rights-of-way on federal surface on parcels NDM 97300-AZ and NDM 97300-MV in the event of any exploration and development activities on the leased parcels. Any new "off-lease" or third party rights-of-way required across the federal surface for future exploration and/or development would be subject to stipulations to protect other resources as determined by environmental analyses which would be completed on a case-by-case basis.

4.11.1.3 Alternative C – BLM Preferred Action

Direct and indirect impacts would be the same as Alternative B. The lease parcel proposed for deferral pending further review is split estate, and does not contact an existing rights-of-way easement.

4.11.1.3.1 Mitigation

Mitigation would be the same as Alternative B.

4.12 Minerals

4.12.1 Fluid Minerals

Stipulations applied to various areas with respect to occupancy, timing limitation, and control of surface use would have the greatest effects on oil and gas exploration and development. Leases issued with major constraints such as no surface occupancy may decrease some lease values, increase operating costs, and, to a lesser extent, require relocation of well sites and modification of field development. Leases issued with moderate constraints such as timing limitations and controlled surface use stipulations may result in similar but reduced impacts and delays in operations and uncertainty on the part of operators regarding restrictions.

If areas are deferred, some development plans could be delayed, relocated, or completely dropped because of the need to include federal acreage as part of an exploration or development plan.

4.12.1.1 Direct and Indirect Effects

Under the Proposed Action, all of the lease parcel areas would be recommended for oil and gas leasing at this time. Approximately 79 percent of the areas would be offered for lease subject to major constraints. Approximately 21 percent would be offered for lease subject to moderate constraints. No parcels would be offered for lease subject only to standard terms and conditions.

Deferring lease parcels would result in delays of some development plans, relocation of development to state or private leases, or possibly eliminate development plans because of the need to include federal acreage as part of a plan. In addition, less natural gas or crude oil would enter the public markets.

4.12.2 Solid Minerals

4.12.2.1 Direct and Indirect Effects

4.12.2.2 Salables

Salable minerals will be dealt with at the APD stage. However, disposal of salable minerals is a discretionary decision of the authorized officer and thus future potential resource development conflicts would be avoided either by not issuing sales contracts in oil and gas development locations or conditioning the APD or sand and gravel contract to avoid conflicts between operations.

4.13 Visual Resources

4.13.1 Direct and Indirect Effects

4.13.1.1 Alternative A – No Action

No action to lease these parcels would be taken; therefore, there would be no effects to visual resources.

4.13.1.2 Alternative B – Proposed Action

Leasing the parcels would have no direct impacts on visual resources. Any potential effects from the sale of leases would occur at the time the leases are developed.

While the act of leasing federal minerals produces no visual impacts, development of a lease parcel could result in some level of modification to the existing landscape at the time of development.

4.13.1.2.1 Mitigation

All new oil and gas development would implement, as appropriate for the site, BLM Best Management Practices for Visual Resource Management (VRM), regardless of the VRM class.

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. Wherever practical, no new development would be allowed on ridges or mountain tops. Overall, the goal would be to maintain the visual qualities or scenic value that currently exists.

4.13.1.3 Alternative C – BLM Preferred Action

Direct and indirect impacts would be the same as Alternative B. The lease parcel proposed for deferral pending further review is split estate, therefore no BLM surface acres would be impacted.

4.13.1.3.1 Mitigation

Mitigation would be the same as Alternative B.

4.14 Recreation and Travel Management

4.14.1 Direct and Indirect Effects

Leasing the parcels would have no direct impacts on recreation and travel management. Any potential effects from the sale of leases would occur at the time the leases are developed.

Recreation impacts may exist where oil and gas development and recreational user conflicts may occur. In areas where a high level of oil and gas development is likely, there may be user conflicts between motorized recreationists (OHV activities), hunting, target shooting, camping, fishing, picnicking, and winter activities such as snowmobiling and the oil and gas/industrial activities. The intensity of these impacts is moderate and could exist in both the short-term (exploration and construction phases of oil and gas development) and in the long-term (producing wells, maintenance of facilities, etc.).

Where there are other land use activities occurring, including oil and gas development, in areas frequented by recreationists, the public may perceive these areas as inaccessible or unavailable because of the facilities or recreationists may use lease roads to access areas for recreational activities. Potential public safety hazards/risks include: moving equipment, operator vehicles, transport vehicles for oil and gas, oil and gas wells, etc. However, this will be addressed in more detail at the development stage.

As oil and gas development occurs, new routes may be created which often attract recreationists seeking additional or new areas to explore for motorized recreational opportunities. Motorized recreational opportunities could be enhanced through the additional opportunities to explore; however, user conflicts and public safety issues could result from the use of the new travel routes. The creation of routes from oil and gas activities could lead to a proliferation of user-created motorized routes, resulting in adverse impacts to the scenic qualities of the area and

increased level of surface disturbance. These impacts would be isolated to BLM-administered public lands and could be minimized and avoided through mitigation and reclamation of industrial routes when no longer needed.

Foreseeable changes in recreation use levels include demand for recreational use of public land to increase. Increases could be expected in, but not limited to, hunting, fishing, hiking, camping, and wildlife viewing, and dispersed recreational uses. This could increase the incidence of conflict between recreationists involved in motorized activities and non-motorized activities.

4.15 Economic Conditions

4.15.1 Direct and Indirect Effects

4.15.1.1 Alternative A – No Action

The basis for economic impacts is the number of acres leased, rents paid, and level of production by alternative. The economic contribution to a local economy is measured by estimating the employment and labor income generated by 1) payments to counties associated with the leasing and rent of federal minerals, 2) royalty payments associated with production of federal oil and gas, and 3) economic activity generated from drilling and associated activities. Activities related to oil and gas leasing, exploration, development, and production form a basic industry that brings money into the state and region and creates jobs in other sectors.

Economic effects are summarized and displayed in comparative form in Table Econ. 4. Under Alternative A, none of the parcels would be leased. Consequently, no additional federal, state, or local revenues could be generated from leasing, rents, or royalties associated with production. No additional employment or income could be generated if none of the parcels are leased.

Table Econ. 4. Summary Comparison of Estimated Average Annual Economic Impacts

Alternative	Acres Leased	Change in Local Revenue to Counties	Change in Total Employment (full and part-time jobs)	Change in Total Labor Income ($1,000)	Change in Population	Change in Number of Households
A	0	0	0	0	0	0
B	2,943	300,504	28.2	437,900	33	15
C	2,903	296,420	28.1	437,600	33	15

4.15.1.2 Alternative B – Proposed Action

The basis for economic impacts is the number of acres leased, rents paid, and level of production by alternative. The economic contribution to a local economy is measured by estimating the employment and labor income generated by 1) payments to counties associated with the leasing and rent of federal minerals, 2) royalty payments associated with production of federal oil and gas, and 3) economic activity generated from drilling and associated activities. Activities related

to oil and gas leasing, exploration, development, and production form a basic industry that brings money into the state and region and creates jobs in other sectors. Table Econ 4 is a summary of local revenues, employment, income, population, and household impacts of each alternative.

Total average annual federal revenues related to leasing an additional 2,943 acres of federal minerals and associated annual rent and royalty revenues related to average annual production of federal minerals would increase by an estimated $1.21 million. Of this, an estimated $455,000 would be disbursed to the state. Total estimated revenues distributed to the counties would be about $301,000.

The estimated combined total average annual employment would likely increase from current levels by an estimated 28 jobs and income supported by the additional federal oil and gas leasing, distributions of royalties to local governments, drilling wells, and production would increase by about $438,000 within the 10-county local economy (IMPLAN, 2010). There would also be an increase in local population (33 people) and households (15).

Total federal contribution of Alternative B and anticipated related exploration, development, and production of oil and gas would affect local population, total local employment, total number of households, average income per household, and total personal income. The economic effects would be spread unevenly among the counties. Most of the revenue would go to the seven counties with lease parcels. Leasing approximately 2,943 acres and associated exploration, development, and production under Alternative B would provide additional funds (about $300,000) for 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 keeping records. Other county functions that could be funded include administering primary and secondary education and operating clinics/hospitals, county libraries, county airports, local landfills, and county health systems. Local education would receive the largest share of these funds. Demand for these services would also increase. Leasing approximately 2,943 acres and anticipated exploration, development, and production would change local economic diversity (as indicated by the number of economic sectors), economic dependency (where one or a few industries dominate the economy), and economic stability (as indicated by seasonal unemployment, sporadic population changes and fluctuating income rates) very little across the 10-county area because oil and gas exploration, development, and production is well established in the local economy.

4.15.1.3 Alternative C – BLM Preferred Action

Economic impacts associated with Alternative C would be very similar to those described for Alternative B. Under this alternative, leasing approximately 2,903 acres of federal minerals would increase average annual leasing, rent and royalty revenues by an estimated $1.2 million. Total average annual revenues from leasing, rent, and royalties distributed to the state would

increase by an estimated $445,000. The amount distributed to the counties would increase by an estimated $296,000.

The estimated combined total average annual employment and income supported by additional federal oil and gas leasing, distributions of royalties to local governments, drilling wells, and production would amount to an estimated 28 total jobs (full and part-time) and $438,000 within the local economy (IMPLAN, 2010). There would be an estimated increase in local population (33 people) and households (15).

Total federal contribution under Alternative C and anticipated related exploration, development, and production of oil and gas would cause local population, total local employment, number of households, average income per household, and total personal income would be very similar to impacts expected from Alternative B. The economic effects would continue to be spread unevenly among the counties. Most of the local revenue would go to the seven counties with lease parcels. Leasing the approximately 2,903 acres and anticipated exploration, development, and production under alternative C would provide additional funds for county functions such as enforcing laws, administering justice, collecting and disbursing tax funds, providing for orderly elections, maintaining roads and highways, providing fire protection, or keeping records. Here too, more revenue would be allocated to education that any other service. Demand for these services would also increase along with the population. Leasing additional acres and anticipated exploration, development, and production would likely change local economic diversity (as indicated by the number of economic sectors), economic dependency (where one or a few industries dominate the economy), or economic stability (as indicated by seasonal unemployment, sporadic population changes and fluctuating income rates) across the 10-county area very little because oil and gas exploration, development, and production is well established in the local economy.

4.16 Social and Environmental Justice

4.16.1 Direct and Indirect Effects

No alternative would affect the demographics, social trends, or social organization in the area.

4.16.1.1 Alternative A

The No Action alternative would result in the continuation of the current land and resource uses and would cause no social or environmental justice impacts.

4.16.1.2 Alternative B

While the act of leasing federal minerals itself would result in no social impacts, subsequent development of a lease may generate impacts to people living near or using the area in the vicinity of the lease.

Oil and gas exploration, drilling, or production could create additional inconvenience to these people due to increased traffic and traffic delays, noise and visual impacts. This could be most noticeable in rural areas where oil and gas development has been minimal. The amount of inconvenience would depend on the activity affected, traffic patterns within the area, noise levels, length of time, and season these activities occurred, etc. Creation of new access roads into an area could allow increased public access and exposure of private property to vandalism. For leases where the surface is privately owned and the subsurface is federally owned, surface owner agreements, standard lease stipulations, and BMPS could address many of the concerns of private surface owners.

An anticipated increase in local employment (about 28 jobs) would also cause increases in local population (about 33) and demand for housing (about 15). These local impacts would be spread over a 10-county area. While the increased population would also increase demand for additional housing, increase traffic, increase infrastructure pressures, and may decrease the quality of life within local communities, all these effects would also be spread over a 10-county area. The net effect of leasing an additional 2,943 acres and associated oil development would depend on the distribution of the development. New employment, additional population, and associated social impacts may be noticed in smaller communities, if it is noticed at all. See Direct and indirect Effects to Economic Conditions.

There would be no disproportionate effects to low income or American Indian populations from leasing. However, concerns about lease development were received from interested Tribes. There are low income people in the counties, but they do not appear to be associated with any specific BLM resources or activities.

4.16.1.3 Alternative C

The social effects would be similar to those described for Alternative B.

4.17 Cumulative Impacts

Cumulative impacts are those impacts resulting from the incremental impact of an action when added to other past, present, and reasonably foreseeable actions regardless of what agency or person undertakes such other actions (40 CFR 1508.7). This section describes cumulative impacts associated with this project on resources. The ability to assess the potential cumulative impacts at the leasing stage for this project is limited for many resources due to the lack of site-specific information for potential future activities. Upon receipt of an APD for any of the lease parcels addressed in this document, more site-specific planning would be conducted in which the ability to assess contributions to cumulative impacts in a more detailed manner would be greater due to the availability of more refined site-specific information about proposed activities.

4.17.1 Past, Present and Reasonably Foreseeable Future Actions

Past, present, or reasonably foreseeable future actions that have or could affect the same components of the environment as the Proposed Action in project area include mineral exploration and development, road construction, agriculture, recreational activities, subdivision of private lands, energy/utility infrastructure development, vehicle travel, wild and prescribed fire activities and water flow alterations and diversions. Much of this activity has, and is expected to continue, occurred on private surface lands, which comprise a majority of the total land ownership in the project area.

4.17.2 Cumulative Impacts by Resource

4.17.2.1 Air Resources

4.17.2.1.1 Air Quality

Air pollutant emissions from oil and gas development resulting from BLM-authorized leases would be small in comparison to total emissions in the NDFO, which include oil and gas emissions from private mineral estate and emissions from all other activities occurring in the area. As discussed in Chapter 3, the largest categories of non-SO_2 emission sources were biogenic sources (including soil) and agricultural sources according to the USEPA's 2008 National Emission Inventory (NEI). For SO_2, oil and gas production was the largest emission source in the relevant counties. Given the good air quality described in Chapter 3, incremental emissions from BLM-authorized oil and gas activity are not expected to cause exceedances of NAAQS.

4.17.2.1.2 Greenhouse Gas Emissions and Cumulative Impacts on Climate Change

The cumulative effects analysis area for GHG emissions and climate change is the NDFO, with additional discussion at statewide, national, and global scales for GHG and climate change.

This section incorporates an analysis of the contributions of the Proposed Action to GHG emissions, followed by a general discussion of potential impacts to climate change. Potential emissions relate to those derived from potential exploration and development of fluid minerals. Additional emissions beyond the control of the BLM, and outside the scope of this analysis, would also occur during any needed refining processes as well as the end uses of final products.

Projected GHG emissions for this project and the NDFO RFD are compared below with recent, available inventory data at the state, national, and global scales. GHG emissions inventories can vary greatly in their scope and comprehensiveness. State, national, and global inventories are not necessarily consistent in their methods or in the variety of GHG sources that are inventoried (BLM 2010). However, comparisons of emissions projected by the BLM for its oil and gas production activities are made with those from inventories at the state and national level provide a context for the potential contributions of GHGs associated with this project.

As discussed in the Air Quality section of Chapter 4, total long-term projected BLM GHG emissions from the RFD are 527,350 metric tons/year CO_2e. Potential emissions under Alternative B would be approximately 0.30 percent of this total. Table 4.18.1 displays projected GHG emissions from non-BLM activities included in the NDFO RFD. Total projected emissions of non-BLM activities in the RFD are 4,369,454 metric tons/year of CO_2e. When combined with projected annual BLM emissions, this totals 4,371,036 metric tons/year CO_2e. Potential GHG emissions under Alternative B would be 0.04 percent of the estimated emissions for the combined federal and non-federal RFD. Potential incremental emissions of GHGs from exploration and development of fluid minerals under Alternatives B and C would be minor in the context of projected GHG contributions from the entire RFD for the NDFO.

Table 4.17.1. Projected non-BLM GHG emissions associated with the NDFO Reasonably Foreseeable Development Scenario for fluid mineral exploration and development.

Source	Non-BLM Long-Term Greenhouse Gas Emissions in tons/year				Emissions (metric tons/yr)
	CO_2	CH_4	N_2O	Co_2e	CO_2e
Conventional Natural Gas	4,273	851	0.05	22,156	20,106
Coal Bed Natural Gas	32,407	412	0.58	41,243	37,426
Oil	4,538,510	17,153	52.69	4,751,739	4,311,922
Total	**4,575,190**	**18,416**	**53.32**	**4,815,138**	**4,369,454**

4.17.2.1.3 North Dakota's Contribution to U.S. and Global Greenhouse Gases (GHGs)
While the state of North Dakota has not completed a GHG inventory, the Congressional Research Service Report for Congress entitled "State Greenhouse Gas Emissions Comparison and Analysis" estimates that North Dakota emissions are 57 million metric tons of carbon equivalent ($MMTCO_2E$), compared to 6,737 million metric tons nationally (CRS 2007). North Dakota's GHG emissions are approximately 0.8 percent of U.S. and 0.1 percent of global emissions.

The USEPA published an inventory of U.S. GHG emissions that indicated gross U.S. 2010 emissions of 6,821.8 million metric tons and net emissions of 5,747.1 million metric tons (when CO_2 sinks were considered) of CO_2e (USEPA 2012c). Potential annual BLM-authorized emissions under Alternative B would amount to approximately 0.00002 percent of gross U.S. total emissions. Global GHG emissions for 2004 (IPCC 2007) indicated approximately 49 gigatonnes (10^9 metric tons) of CO_2e emitted. Potential annual emissions under Alternative B would amount to approximately 0.000003 percent of this global total.

As indicated in the Air Quality section of Chapter 4 above, although the effects of GHG emissions in the global aggregate are well-documented, it is currently not credibly possible to

determine what specific effect GHG emissions resulting from a particular activity might have on climate or the environment. If exploration and development occur on the lease parcels considered under Alternative B, potential GHG emissions described above would incrementally contribute to the total volume of GHGs emitted to the atmosphere, and ultimately to climate change.

Mitigation measures identified in the Air Quality section of Chapter 4 above may be in place at the APD stage to reduce GHG emissions from potential oil and gas development as a result of this project. This is likely because many operators working in North Dakota are currently USEPA Natural Gas STAR Program Partners and new USEPA regulations will require GHG emission reductions from oil and gas production activities.

4.17.2.2 Cumulative Impacts of Climate Change

As previously discussed in section 4.1.1, climate change impacts on specific resources within the project area cannot be quantified. Some information and climate change impact projections are becoming increasingly available; however, they do not address the type of small localized GHG emission increases associated with Alternative B. Chapter 3 of the Climate Change SIR (BLM 2010) describes impacts of climate change at much larger scales. Effects of climate change on resources are described in Chapter 3 of this EA and in Climate Change SIR (BLM 2010).

4.17.2.3 Cumulative Impacts of Other Resources

Although impacts are discussed by pertinent resource below, the Proposed Action, when considered in combination with other past, present and reasonably foreseeable activities occurring on federal, state, and private lands, would not significantly contribute to any cumulative impacts. The ability to assess the potential cumulative impacts at the leasing stage for this project is limited for many resources due to the lack of site-specific information for potential future activities. Upon receipt of an APD for any of the lease parcels addressed in this document, more site-specific planning would be conducted in which the ability to assess contributions to cumulative impacts in a more detailed manner would be greater due to the availability of more refined site-specific information about proposed activities.

4.17.2.3.1 Fish and Wildlife

Generally speaking construction of roads, production well pads, and other facilities would result in long term (>5 years) loss of habitat and forage in the analysis area if the leases are developed. This would be in addition to acres disturbed, or habitats fragmented from various other adjacent activities. As new development occurs, direct and indirect impacts would continue to stress wildlife populations, most likely displacing the larger, mobile animals into adjacent habitat, and increasing competition with existing local populations. Non-mobile animals would be affected by increased habitat fragmentation and interruptions to preferred nesting habitats.

Certain species are localized to some areas and rely on very key habitats during critical times of the year. Disturbance or human activities that would occur in winter range for big game, nesting and brood-rearing habitat for grouse and raptors could displace some or all of the species using a particular area or disrupt the normal life cycles of species. Wildlife and habitat in and around the project would be influenced to different degrees by various human activities. Some species and/or a few individuals from a species group may be able to adapt to these human influences over time.

With the addition of various forms of stipulations, mitigation, and terms and conditions applied during the development stage, the assessed resources of concern are not expected to approach conditions where additional stresses associated with the proposed action and, past, present and future foreseeable actions will have consequential cumulative effects.

4.17.2.4 Economics

4.17.2.4.1 Alternative A – No Action

Cumulative economic impacts associated with Alternative A would be similar to those described in the economic section of the Affected Environment. The cumulative effects of federal mineral leasing, exploration, development and production within the local economy are summarized in Table Econ. 5 and Table Econ. 6. The cumulative demographic and economic characteristics of the local economy would not change if none of the proposed parcels are leased.

Table Econ 5. Summary Comparison of Cumulative Annual Economic Impacts by Alternative

	Alternative		
Activity	**A**	**B**	**C**
Existing Federal acres leased based on BLM management*	231,113	231,113	231,113
Acres that would be leased based on this EA **	0	2,943	2,903
Total acres leased	231,113	234,056	234,016
Acres held by production*	147,190	147,190	147,190
Total acres leased for which lease rents would be paid	83,923	86,866	86,826
Average annual oil production (bbl)***	1,968,742	1,993,812	1,993,471
Average annual gas production (MCF)***	1,927,301	1,951,843	1,951,509
Total Average annual Federal O&G royalties	$14,138,339	$14,318,377	$14,315,930
Average annual distribution to State/local government	$5,299,050	$5,366,528	$5,365,611
Total average annual Federal Revenues	$14,285,205	$15,499,854	$15,483,345
Total average annual State/Local Revenues	$5,354,095	$5,809,345	$5,803,158
Total average annual revenue distributed to counties	$3,534,160	$3,834,664	$3,830,580

*LR2000, BLM, August 2012
**Parcel nominations August, 2012
***Based on average annual production 2005-2010, Office of Natural Resource Revenue, 2011

Table Econ 6. Summary Comparison of Employment and Income by Alternative

Industry	Total Jobs Contributed			Total Income Contributed (2011 dollars)		
	Alt. A	Alt. B	Alt. C	Alt. A	Alt. B	Alt. C
Total Federal Contribution	0	28.2	28.1	0	437,900	437,600

IMPLAN, 2010

4.17.2.4.2 Alternative B – Proposed Action

Cumulative economic impacts associated with Alternative B would be similar to those described for Alternative A and also described in the economic section of the Affected Environment. The cumulative effects of federal mineral leasing, exploration, development and production within the local economy are summarized in Table Econ. 5 and Table Econ. 6.

4.17.2.4.3 Alternative C – BLM Preferred Action

Cumulative economic impacts associated with Alternative C would be similar to those described in the economic section of the Affected Environment and in the cumulative effects description of Alternative B. The cumulative effects of federal mineral leasing, exploration, development and production within the local economy are summarized in Table Econ. 5 and Table Econ. 6.

5.0 CONSULTATION AND COORDINATION:

5.1 Persons, Agencies, and Organizations Consulted

Table 5.1.1 lists persons, agencies, and organizations that were consulted or coordinated with during development of this EA along with the findings and conclusions associated with consultations.

Table 5.1.1. List of individuals, agencies and organizations consulted or coordinated with regarding on this EA

Name	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
U.S. Army Corps of Engineers	COE Surface – SME	Stipulation Recommendations
U.S. Fish and Wildlife Service	T&E Species	Addressed with 2006 "backlog" consultation and 1988 (RMP) Section 7 consultation. Further comments to be addressed during comment period.
North Dakota Game and Fish Department	Resident species and habitats	To be addressed during comment period
Tribal Historic Preservation Officer, and Review and Compliance Officer for the Mandan, Hidatsa, and Arikara Nation	National Historic Preservation Act, Section 106 Reference (36 CFR 800)	To this date no TCP's have been brought to the attention of the BLM.
Tribal Historic Preservation Officer from the Turtle Mountain Band of Chippewa Indians	National Historic Preservation Act, Section 106 Reference (36 CFR 800)	To this date no TCP's have been brought to the attention of the BLM.
Tribal Historic Preservation Officer from the Standing Rock Sioux Tribe	National Historic Preservation Act, Section 106 Reference (36 CFR 800)	To this date no TCP's have been brought to the attention of the BLM.
Tribal Chair Person Spirit Lake Sioux	National Historic Preservation Act, Section 106 Reference (36 CFR 800)	To this date no TCP's have been brought to the attention of the BLM.
Tribal Historic Preservation Officer Lower Sioux Indian Community (Minnesota)	National Historic Preservation Act, Section 106 Reference (36 CFR 800)	To this date no TCP's have been brought to the attention of the BLM.

5.2 Summary of Public Participation Scoping

Public scoping for this proposed leasing project was conducted through a 15-day scoping period advertised on the BLM Montana State Office website and posting on the NDFO website NEPA notification log. Scoping was initiated July 2, 2012; however, scoping comments were received through August 3, 2012. Surface owner notification letters were also distributed briefly

explaining the oil and gas leasing process and planning process. The surface owner notification letter requested written comments regarding any issues or concerns that should be addressed in the environmental analysis. A total of 13 surface owner notification letters were distributed for the oil and gas leasing analysis process for the NDFO.

The BLM did not receive any written or verbal comments pertaining to oil and gas leasing in North Dakota.

Table 5.1.2. List of Preparers

Name	Title	Responsible for the Following Section(s) of this Document
Justin Peters	Cultural Resources Specialist	Cultural Resources, Native American Religious Concerns, and Paleontology
Josh Halpin	Rangeland Management Specialist	Soil Resources
Phil Reierson	Rangeland Management Specialist	Hydrology
Shelly Gerhart	Natural Resources Specialist	Fluid Minerals, Solid Minerals, Vegetation, Visual Resources, Recreation and Travel Management, Noxious Weeds, Livestock Grazing and EA Lead
Tim Zachmeier	Wildlife Biologist	Fish & Wildlife, Special Status Animal and Plant Species
Linda Gisvold	Realty Specialist	Lands & Realty
John Thompson	Planning & Environmental Specialist	Economic Conditions, Social Conditions
Susan Bassett	Air Resource Specialist	Air, Climate
Jennifer Nagy	Natural Resources Specialist – GIS	GIS Support/Maps
Corrine Walter	IT Specialist	GIS Support/Maps

In addition to the primary preparers listed above, the following individuals provided document review:

Donato J. Judice	Acting Field Manager
Allen Ollila	Petroleum Engineer

6.0 REFERENCES

Bald Eagle Protection Act of 1940 (16 U.S.C. 668-668d, 54 Stat. 250) as amended -- Approved June 8, 1940, and amended by P.L 86-70 (73 Stat. 143) June 25, 1959; P.L. 87-884 (76 Stat. 1346) October 24, 1962; P.L. 92-535 (86 Stat. 1064) October 23, 1972; and P.L. 95-616 (92 Stat. 3114) November 8, 1978.

Bainbridge, DA. 2007. A Guide for Dryland Restoration: New Hope for Arid Lands. Island Press. Washington, DC.

Canadian Wildlife Service and U.S. Fish and Wildlife Service. 2007. International recovery plan for the whooping crane. Ottawa: Recovery of Nationally Endangered Wildlife (RENEW), andU.S. Fish and Wildlife Service, Albuquerque, New Mexico. 162 pp. http://ecos.fws.gov/docs/recovery_plan/070604_v4.pdf

CCSP. 2008. The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity in the United States. U.S. Climate Change Science Program (CCSP). May.

CRS. 2007 . State Greenhouse Gas Emissions: Comparison and Analysis. Congressional Research Service (CRS). December 5. http://assets.opencrs.com/rpts/RL34272_20071205.pdf

Dale, B.C., T.S. Wiens, and L.E. Hamilton. 2009. Abundance of three grassland songbirds in an area of natural gas infill drilling in Alberta, Canada. Pages 194-204 *in* T.D. Rich, C. Arizmendi, D.W. Demarest, and C. Thompson, editors. Proceedings of the 4th International Partners in Flight Conference. 13-16 February 2008. McAllen, Texas. http://www.partnersinflight.org/pubs/McAllenProc/index.cfm (9 July 2010).

Davis, S.K. 2004. Area sensitivity in grassland passerines: effects of patch size, patch shape, and vegetation structure on bird abundance and occurrence in southern Saskatchewan. Auk 121:1130-1145.

Dieni, J.S. and S.L. Jones. 2003. Grassland songbird nest site selection patterns in northcentral Montana. Wilson Bulletin 115:32-40.

Distribution of Mineral Royalty by County. (2010). Retrieved July 21, 2010 from Office of North Dakota State Treasurer: http://www.nd.gov/ndtreas/index.htm.

Dohms, K.M. 2009. Sprague's Pipit (*Anthus spragueii*) nestling provisioning and growth rates in native and planted grasslands. M.S. thesis, University of Regina, Regina, Saskatchewan, Canada.

Hagen, S.K., P.T. Isakson, and S.R. Dyke. 2005. North Dakota comprehensive wildlife conservation strategy. North Dakota Game and Fish Department. Bismarck, North Dakota http://gf.nd.gov/conservation/cwcs.html (12 october 2006)

Higgins, K.F., D.E. Naugle, and K.J. Forman. 2002. A case study of changing land use practices in the Northern Great Plains, U.S.A.: an uncertain future for waterbird conservation. Waterbirds 25:Special Publication 2:45-50.

Holloran, M. J, and S. H. Anderson. 2005b. Spatial Distribution of Greater Sage-Grouse nests in Relatively Contiguous Sagebrush Habitats. *The Condor,* 107:742–752.

Holloran, M.J. 2005. Greater Sage Grouse (*Centrocercus urophasianus*) population response to natural gas field development in westernWyoming. Dissertation, University of Wyoming, Laramie, USA.

Holloran, M.J. 2005. Greater Sage-Grouse (*Centrocercus urophasianus*) Population Response to Natural Gas Development in Western Wyoming. December, 2005. (Doctoral Dissertation, University of Wyoming). Laramie, WY. Available at: http://www.uwyo.edu/wycoopunit/showthesis.asp?thesisid=182.

Holloran, M.J. and S.H. Anderson. 2005a. Greater sage-grouse population response to natural gas development in western Wyoming: are regional populations affected by relatively localized disturbances? In Wildlife Management Institute (Ed.), *Transactions from the 70th North American Wildlife and Natural Resources Conference* (March 16–19, 2005, Arlington, VA). Wildlife Management Institute.

Igl, L.D. and D.H. Johnson. 1997. Changes in breeding bird populations in North Dakota: 1967-1992-93. Auk 114:74-92.

IMPLAN, 2010. Minnesota IMPLAN Group 2010.

IMPROVE 2011. *Spatial and Seasonal Patterns and Temporal Variability of Haze and its Constituents in the United States: Report V*. Interagency Monitoring of Protected Visual Environments (IMPROVE). June 2011.

Independent Petroleum Association of America, The Oil and Gas Producing Industry in Your State 2010-2011, ND, p. 80-81.

IPCC. 2007. *Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report: Climate Change 2007.* http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml

Koper, N., D.J. Walker, and J. Champagne. 2009. Nonlinear effects of distance to habitat edge on Sprague's pipits in southern Alberta, Canada. Landscape Ecology 24: 1287-1297.

Linnen, C.G. 2008. Effects of oil and gas development on grassland birds. Unpublished report, prepared for Petroleum Technology Alliance Canada. Saskatoon, Saskatchewan, Canada.

Logan R. 2001. Water Quality BMPs for Montana Forests. Montana State University Extension Service. Bozeman, MT.

Mackie, R.J., D. Pac, K. Hamlin, and G. Dusek. 1998. Ecology and Management of Mule Deer and White-tailed Deer in Montana. Fed. Aid in Wildlife Restor. Proj. W-120-R. Mont. Dept. Fish, Wildl. And Parks, Helena. 180 pgs.

McMaster. D.G., J.H., and S.K. Davis. 2005. Grassland birds nesting in haylands of southern Saskatchewan: landscape influences and conservation priorities. Journal of Wildlife Management 69:211-221.

Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755) as amended by: Chapter 634; June 20, 1936; 49 Stat. 1556; P.L. 86-732; September 8, 1960; 74 Stat. 866; P.L. 90-578; October 17, 1968; 82 Stat. 1118; P.L. 91-135; December 5, 1969; 83 Stat. 282; P.L. 93-300; June 1, 1974; 88 Stat. 190; P.L. 95-616; November 8, 1978; 92 Stat. 3111; P.L. 99-645; November 10, 1986; 100 Stat. 3590 and P.L. 105-312; October 30, 1998; 112 Stat. 2956.

Minerals Management Service (MMS). (2010). Retrieved July 21, 2010 from Total Reported Royalty by Revenues, North Dakota, FY2009: http://www.mms.gov/index.htm.

Morrisssette, Joe, North Dakota Office of Management and Budget, 7/8/2010

Natural resources Conservation Service (NRCS), United States Department of Agriculture (USDA). 2012. Web Soil Survey. <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>. (accessed August 1, 2012).

Natural Resources Conservation Service (NRCS), United States Department of Agriculture (USDA). 2012. Ecological Site Descriptions. <http://esis.sc.egov.usda.gov/Welcome/pgReportLocation.aspx?type=ESD> (accessed August 1, 2012).

Natural Resources Conservation Service (NRCS). United States Department of Agriculture (USDA). 2012. Soils Data Mart. < http://soildatamart.nrcs.usda.gov/> (accessed August 1, 2012).

North Dakota Office of the State Treasurer, 7/9/2010

North Dakota QuickFacts. (2010). Retrieved July 13, 2010 from U.S. Census Bureau: http://quickfacts.census.gov/qfd/index.html

North Dakota State Auditor's Office, Dennis Roller, 7/13/2010

North Dakota State Historic Preservation Office (NDSHPO), Archaeology and Historic Preservation Division. *HISTORIC PRESERVATION IN NORTH DAKOTA*, 2010-2015: *A Statewide Comprehensive Plan*, December 2009. State Historical Society of North Dakota, http://www.history.nd.gov/hp/plancopy.html.

Office of Natural Resources Revenue (ONRR), Total Reported Royalty Revenues, ND 2009, 2010

Owens, R.A., and M.T. Myers. 1973. Effects of agriculture upon populations of native passerine birds of an Alberta fecue grassland. Canadian Journal of Zoology 51:697-713.

Perrow, MR and AJ Davy. 2003. Handbook of Ecological Restoration: Vol. 1 Principles of Restoration. Cambridge University Press. New York, NY.

Sutter, G.C., S.K. Davis, and D.C. Duncan. 2000. Grassland songbird abundance along roads and trails in southern Saskatchewan. Journal of Field Ornithology 71:110-116.

Tack, J.D. 2010. Sage Grouse and the Human Footprint: Implications for Conservation of Small and Declining Populations. Thesis. University of Montana, Missoula, MT. USA.

U.S. Department of the Interior Bureau of Land Management. 2008. Final Supplement to the Montana Statewide Oil and Gas Environmental Impact Statement and Proposed Amendment of the Powder River and Billings Resource Management Plans. U.S. Department of the Interior, Bureau of Land Management, Miles City Field Office. MT

U.S. Department of the Interior Bureau of Land Management. 2010. Climate Change Supplementary Information Report for Montana, North Dakota, and South Dakota, Bureau of Land Management. October.

U.S Department of the Interior Bureau of Land Management, 2012. BLM LR2000, 2012, Authorized Leases/Leases Held by Production, August 2012.

U.S Department of the Interior Bureau of Land Management, 2009. Instruction Memorandum No. MT-2009-039. 2009 Montana/Dakota's Special Status Species List.

U.S Department of the Interior Bureau of Land Management, Instruction Memorandum No. 2003-253, August 21, 2003.

U.S Department of the Interior Bureau of Land Management, 1988, North Dakota Resource Management Plan and Environmental Impact Statement, April 22, 1988.

U.S. Department of the Interior Bureau of Land Management, 2009, *Oil & Gas Reasonable Foreseeable Development (RFD) Scenario.* (2009). Retrieved from Bureau of Land Management Website : http://www.blm.gov/mt/st/en/fo/north_dakota_field/rmp/rfd.html.

U.S. Department of the Interior Bureau of Land Management,1987b, Riparian area management policy: national policy statement, January 22, 1987.

U.S. Department of the Interior Bureau of Land Management, 1992, Miles City District Oil and Gas RMP/EIS Amendment, December 1992.

U.S. Department of the Interior and United States Department of Agriculture. 2007. Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development. BLM/WO/ST-06/021+3071/REV 07. Bureau of Land Management. Denver, Colorado. 84 pp.

USDA, NRCS. 2010. The PLANTS Database (http://plants.usda.gov, 9 November 2010). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

U.S. Department of Mineral Management Service (MMS). 2008. Stacy Browne 2008.

USEPA. 2012a. AirData website. U.S. Environmental Protection Agency (USEPA). Accessed August 7, 2012.
http://www.epa.gov/airdata/

USEPA. 2012b. The National Emissions Inventory (NEI), Version 2 updated April 10, 2012. U.S. Environmental Protection Agency (USEPA). Accessed August 7, 2012.
http://www.epa.gov/ttn/chief/net/2008inventory.html

USEPA. 2012c. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2010. U.S. Environmental Protection Agency (USEPA). EPA 430-R-12-001. April 15. http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html

U. S. Fish and Wildlife Service. 2010. Black-footed ferret website http://www.fws.gov/mountain-prairie/species/mammals/blackfootedferret/

U.S. Fish and Wildlife Service (USFWS) 2010. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, Washington, DC. FWS/OBS-79/31. http://www.fws.gov/wetlands/ USGS 2009. National Hydrography Dataset (NHD). http://nhd.usgs.gov/ accessed 11/2009.

U.S Fish and Wildlife Service (USFWS) 2010. Pallid Sturgeon species description and ESA status and review. http://www.fws.gov/mountain-prairie/missouririver/moriver_pallidsturgeon.htm

U.S. Fish and Wildlife Service. 1989. Black footed ferret survey guidelines for compliance with the Endangered Species Act. 15 pgs.

U.S. Fish and Wildlife Service. 2002. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Northern Great Plains Breeding Population of the Piping Plover; Final Rule5 0 CFR Part 17. 57638 Federal Register / Vol. 67, No. 176. http://www.fws.gov/mountain-prairie/species/birds/pipingplover/.

U.S. Fish and Wildlife Service. 2010. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to List Sprague's Pipit as Endangered or Threatened throughout Its Range.

Walker, B. L., D, E. Naugle, K.E. Doherty. 2007. Greater Sage Grouse Population Response to Energy Development and Habitat Loss. Journal of Wildlife Management 71(8):2644-2654; 2007).

APPENDIX A

PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	PROPOSED FOR LEASING IF EA INCLUDES ALTERNATIVE C	PROPOSED FOR DEFERRAL-NO LEASING
NDM 97300-LL	T. 156 N, R. 89 W, 5TH PM, ND SEC. 7 LAKEBED RIPAR TO LOTS 1,2 DESC BY M&B; MOUNTRAIL COUNTY 46.64 AC PD	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS)	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS)	NONE
NDM 97300-IP	T. 156 N, R. 90 W, 5TH PM, ND SEC. 20 SESW,SWSE; MOUNTRAIL COUNTY 80.00 AC PD	**CR 16-1** (ALL LANDS) **NSO 11-33** (ALL LANDS) **NSO 11-59** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS)	**CR 16-1** (ALL LANDS) **NSO 11-33** (ALL LANDS) **NSO 11-59** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS)	NONE
NDM 97300-FE	T. 157 N, R. 90 W, 5TH PM, ND SEC. 3 LOT 1; MOUNTRAIL COUNTY 40.32 AC PD	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **NSO 11-59** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS)	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **NSO 11-59** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS)	NONE
NDM 97300-LE	T. 159 N, R. 91 W, 5TH PM, ND SEC. 2 LOTS 1,2; SEC. 2 S2NE; BURKE COUNTY 161.16 AC **50% U.S. MINERAL INTEREST** ACQ	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS)	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS)	NONE
NDM 97300-LF	T. 159 N, R. 91 W, 5TH PM, ND SEC. 12 SW; BURKE COUNTY 160.00 AC **50% U.S. MINERAL INTEREST** ACQ	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **LN 14-13** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS)	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **LN 14-13** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS)	NONE

APPENDIX A

PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	PROPOSED FOR LEASING IF EA INCLUDES ALTERNATIVE C	PROPOSED FOR DEFERRAL-NO LEASING
NDM 97300-LV	T. 163 N, R. 91 W, 5TH PM, ND SEC. 10 NW,S2SW; BURKE COUNTY 240.00 AC **50% U.S. MINERAL INTEREST** ACQ	**CR 16-1** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS)	**CR 16-1** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS)	NONE
NDM 97300-AQ	T. 151 N, R. 92 W, 5TH PM, ND SEC. 24 W2NW; MOUNTRAIL COUNTY 80.00 AC PD	**CR 16-1** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	**CR 16-1** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	NONE
NDM 97300-LY	T. 152 N, R. 92 W, 5TH PM, ND SEC. 18 WEST 55 AC IN S2SE; SEC. 18 LOT 3 EXCL EAST 5 AC OF NE 10 AC; SEC. 18 LOT 4; SEC. 18 SWSWNESW,SESW; MOUNTRAIL COUNTY 161.28 AC ACQ	**CR 16-1** (ALL LANDS) **NSO 11-33** SEC. 18 LOTS 3,4; SEC. 18 SESW **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	**CR 16-1** (ALL LANDS) **NSO 11-33** SEC. 18 LOTS 3,4; SEC. 18 SESW **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	NONE
NDM 97300-LQ	T. 152 N, R. 93 W, 5TH PM, ND SEC. 13 S2NENE,NWNE,SENW; MOUNTRAIL COUNTY 100.00 AC ACQ	**CR 16-1** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	**CR 16-1** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	NONE

APPENDIX A

PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	PROPOSED FOR LEASING IF EA INCLUDES ALTERNATIVE C	PROPOSED FOR DEFERRAL-NO LEASING
NDM 97300-PA	T. 152 N, R. 93 W, 5TH PM, ND SEC. 22 ACCRETION TO LOT 6; SEC. 27 ACCRETION TO LOTS 1,3; MOUNTRAIL COUNTY 64.14 AC PD	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	NONE
NDM 97300-MT	T. 152 N, R. 93 W, 5TH PM, ND SEC. 22 LOT 6; MOUNTRAIL COUNTY 43.54 AC PD	**CR 16-1** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	**CR 16-1** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	NONE
NDM 97300-MV	T. 153 N, R. 93 W, 5TH PM, ND SEC. 26 SENE,NESE; MOUNTRAIL COUNTY 80.00 AC PD	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (SEC. 26 NESE) **NSO 11-38** (SEC. 26 SENE) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-24** (SEC. 26 SENE)	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (SEC. 26 NESE) **NSO 11-38** (SEC. 26 SENE) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-24** (SEC. 26 SENE)	NONE

APPENDIX A

PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	PROPOSED FOR LEASING IF EA INCLUDES ALTERNATIVE C	PROPOSED FOR DEFERRAL-NO LEASING
NDM 97300-KB	T. 147 N, R. 94 W, 5TH PM, ND SEC. 24 ACCRETION TO LOTS 1,5 (10.69 AC); SEC. 24 ACCRETION TO LOT 2 LESS 6.506 AC IN FORMER BED LTL MO RVR IN NDM 103237 (2.394 AC); SEC. 24 BED LTL MO RVR RIPAR TO ACCRETION TO LOTS 1,2,5 (3.24 AC); DUNN COUNTY 16.324 AC PD	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **NSO 11-39** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **NSO 11-39** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	NONE
NDM 97300-KC	T. 147 N, R. 94 W, 5TH PM, ND SEC. 24 ACCRETION TO LOTS 3,4,6 (46.20 AC); SEC. 24 BED LTL MO RVR RIPAR TO ACCRETION TO LOTS 3,4 (5.68 AC); DUNN COUNTY 51.88 AC ACQ	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	NONE
NDM 97300-MW	T. 141 N, R. 95 W, 5TH PM, ND SEC. 31 SE; SEC. 32 SW; DUNN COUNTY 320.00 AC **50% U.S. MINERAL INTEREST** ACQ	**CR 16-1** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS)	**CR 16-1** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS)	NONE

APPENDIX A

PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	PROPOSED FOR LEASING IF EA INCLUDES ALTERNATIVE C	PROPOSED FOR DEFERRAL-NO LEASING
NDM 97300-KE	T. 147 N, R. 95 W, 5TH PM, ND SEC. 2 BED LTL MO RVR RIPAR TO LOTS 4-7 DESC BY M&B (17.33 AC); DUNN COUNTY 17.33 AC ACQ	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	NONE
NDM 97300-JP	T. 154 N, R. 95 W, 5TH PM, ND SEC. 32 LOTS 3,4; WILLIAMS COUNTY 65.71 AC PD	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	NONE
NDM 97300-LK	T. 138 N, R. 99 W, 5TH PM, ND SEC. 20 SE; STARK COUNTY 160.00 AC **50% U.S. MINERAL INTEREST** ACQ	**CR 16-1** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS)	**CR 16-1** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS)	NONE
NDM 97300-LM	T. 138 N, R. 99 W, 5TH PM, ND SEC. 28 E2; STARK COUNTY 320.00 AC **50% U.S. MINERAL INTEREST** ACQ	**CR 16-1** (ALL LANDS) **CSU 12-5** SEC. 28 S2NE, N2SE; **NSO 11-33** SEC. 28 N2NE, SENE, NESE, SWSE; **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** SEC. 28 S2NE, N2SE	**CR 16-1** (ALL LANDS) **CSU 12-5** SEC. 28 S2NE, N2SE; **NSO 11-33** SEC. 28 N2NE, SENE, NESE, SWSE; **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** SEC. 28 S2NE, N2SE	NONE

APPENDIX A

PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	PROPOSED FOR LEASING IF EA INCLUDES ALTERNATIVE C	PROPOSED FOR DEFERRAL-NO LEASING
NDM 97300-LX	T. 150 N, R. 99 W, 5TH PM, ND SEC. 31 LOT 4; MCKENZIE COUNTY 39.02 AC PD	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS)	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS)	NONE
NDM 97300-KU	T. 153 N, R. 99 W, 5TH PM, ND SEC. 26 ACCRETION TO LOT 2 DESC BY M&B (11.64 AC); SEC. 26 LOT 2; WILLIAMS COUNTY 27.24 AC PD	**CR 16-1** (ALL LANDS) **NSO 11-33** (ALL LANDS) **NSO 11-39** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	**CR 16-1** (ALL LANDS) **NSO 11-33** (ALL LANDS) **NSO 11-39** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	NONE
NDM 97300-KH	T. 153 N, R. 99 W, 5TH PM, ND SEC. 31 ACCRETION TO LOT 3 (90.40 AC); SEC. 31 LOT 3; WILLIAMS COUNTY 110.30 AC PD	**CR 16-1** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	**CR 16-1** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	NONE
NDM 97300-KV	T. 153 N, R. 99 W, 5TH PM, ND SEC. 34 LOTS 1-4; WILLIAMS COUNTY 119.10 AC PD	**CR 16-1** (ALL LANDS) **NSO 11-33** (ALL LANDS) **NSO 11-39** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	**CR 16-1** (ALL LANDS) **NSO 11-33** (ALL LANDS) **NSO 11-39** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	NONE

APPENDIX A

PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	PROPOSED FOR LEASING IF EA INCLUDES ALTERNATIVE C	PROPOSED FOR DEFERRAL-NO LEASING
NDM 97300-KW	T. 153 N, R. 100 W, 5TH PM, ND SEC. 18 LOT 3; SEC. 18 NESW; MCKENZIE COUNTY 79.85 AC PD	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-17** (ALL LANDS) **NSO 11-33** SEC. 18 NESW **NSO 11-38** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-5** (ALL LANDS) **TL 13-24** (ALL LANDS)	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-17** (ALL LANDS) **NSO 11-33** SEC. 18 NESW **NSO 11-38** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-5** (ALL LANDS) **TL 13-24** (ALL LANDS)	NONE
NDM 97300-KJ	T. 153 N, R. 100 W, 5TH PM, ND SEC. 27 LOT 3; SEC. 28 LOT 5; SEC. 33 LOTS 1,2,3; SEC. 33 NENE; SEC. 34 LOTS 1,2; MCKENZIE COUNTY 206.20 AC PD	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS) **COE 18-1** (ALL COE LANDS) **COE 18-2** (ALL COE LANDS) **COE 18-7** (ALL COE LANDS)	NONE
NDM 97300-L6	T. 152 N, R. 102 W, 5TH PM, ND SEC. 9 SWNW; MCKENZIE COUNTY 40.00 PD	**CR 16-1** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS)	**CR 16-1** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS)	NONE
NDM 97300-LT	T. 152 N, R. 103 W, 5TH PM, ND SEC. 13 LOTS 6,7; SEC. 14 LOT 5; MCKENZIE COUNTY 59.85 AC PD	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **NSO 11-38** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS) **TL 13-24** (ALL LANDS)	**CR 16-1** (ALL LANDS) **CSU 12-5** (ALL LANDS) **NSO 11-33** (ALL LANDS) **NSO 11-38** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-15** (ALL LANDS) **TL 13-24** (ALL LANDS)	NONE

APPENDIX A

PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	PROPOSED FOR LEASING IF EA INCLUDES ALTERNATIVE C	PROPOSED FOR DEFERRAL-NO LEASING
NDM 97300-LW	T. 130 N, R. 104 W, 5TH PM, ND SEC. 6 LOT 1; BOWMAN COUNTY 40.10 AC PD	**CR 16-1** (ALL LANDS) **LN 14-11** (ALL LANDS) **NSO 11-33** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS)	**DEFER** (ALL LANDS)	**DEFER** (ALL LANDS) Sage Grouse
NDM 79010-AZ	T. 151 N, R. 104 W, 5TH PM, ND SEC. 35 POR SWNE OUTSIDE FS BOUNDARY; MCKENZIE COUNTY 12.95 AC PD	**CR 16-1** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS)	**CR 16-1** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS)	NONE

APPENDIX B- Stipulations Key

Stipulation Number	STIPULATION NAME/BRIEF EXPLANATION
CSU 12-5	**CONTROLLED SURFACE USE STIPULATION**
	Surface occupancy or use would be subject to the following special operating constraint: No disturbance of Riparian areas of wetlands, intermittent, ephemeral, or perennial streams and rivers would be allowed except for essential road and utility crossings.
Cultural Resources 16-1	**CULTRURAL RESOURCES LEASE STIPULATION**
	This lease may be found to contain historic properties and/or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O. 13007, or other statutes and executive orders. The BLM will not approve any ground disturbing activities that may affect any such properties or resources until it completes its obligations under applicable requirements of the NHPA and other authorities. The BLM may require modification to exploration or development proposals to protect such properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized or mitigated.
Lease Notice 14-11	**LEASE NOTICE**
	The lease may in part, or in total contain important Greater Sage-Grouse habitats as identified by the BLM, either currently or prospectively. The operator may be required to implement specific measures to reduce impacts of oil and gas operations on the Greater Sage-Grouse populations and habitat quality. Such measures shall be developed during the application for permit to drill on-site and environmental review process and will be consistent with the lease rights granted.
Lease Notice 14-12	**LEASE NOTICE**

	Paleontological resource inventory requirement: surface occupancy or use is subject to the following special operating constraints: the lessee/operator is given notice that this lease has been identified as being located within geologic units rated as being moderate to very high potential for containing significant paleontological resources. The locations identified meet the conditions 1 and/or 2 as set forth in the potential fossil yield classification system, IM 2008-009, Attachment 2-2. The BLM is responsible for assuring that the leased lands are examined to determine if paleontological resources are present and to specify mitigation measures. Guidance for application of this requirement can be found in IM 2008-009, 10/15/2007 and IM 2009-011, 10/10/2008. The project proponent may be required to conduct a paleontological inventory prior to any surface disturbance. If inventory is required, the project proponent must engage the services of a qualified paleontologist, acceptable to the BLM, to conduct the inventory. An acceptable inventory report is to be submitted to the BLM for review and approval at the time a surface-disturbing plan of operations is submitted. Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee or project proponent shall contact the BLM to determine if a paleontological resource inventory is required. if an inventory is required then;
	1.) The lessee or project proponent will complete the required inventory. The lessee or project proponent may engage the services of a paleontological resource consultant acceptable to the BLM to conduct a paleontological resource inventory of the area of proposed surface disturbance. The project proponent will, at a minimum, inventory a 10-acre area or larger to incorporate possible project relocation which may result from environmental or other resource considerations.
	2.) Paleontological inventory may identify resources that may require mitigation to the satisfaction of the BLM as directed by IM 2009-011, 10/10/2008.
NSO 11-33	**NO SURFACE OCCUPANCY STIPULATION**
	No surface occupancy (NSO) or use would be allowed within 200 feet of wetlands, lakes, and ponds.
NSO 11-36	**NO SURFACE OCCUPANCY STIPULATION**
	No surfance occupancy (NSO) would be allowed in the floodplain of the Yellowstone River.
NSO 11-38	**NO SURFACE OCCUPANCY STIPULATION**
	No surface occupancy (NSO) or use would be allowed within one-half mile of Golden Eagle nests known to have been occupied at least once within the seven previous years.
NSO 11-39	**NO SURFACE OCCUPANCY STIPULATION**
	No surface occupancy (NSO) of those lands within the floodplain of the Missouri River.
NSO 11-59	**NO SURFACE OCCUPANCY STIPULATION**
	Surface occupancy and use is prohibited on lands administered by the U.S. Fish and Wildlife Service (FWS).

Standard 16-3	**STANDARD LEASE STIPULATION**
TES 16-2	**ENDANGERED SPECIES ACT SECTION 7 CONSULTATION STIPULATION**
	The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development, and require modifications to or disapprove proposed activity that is likely to result in jeopardy to proposed or listed threatened or endangered species or designated or proposed critical habitat.
TL 13-5	**TIMING LIMITATION STIPULATION**
	No surface use would be allowed within one-half mile of occupied Ferruginous Hawk nests known to be occupied at least once within the seven previous years during the following time period: March 15 to July 15
TL 13-15	**TIMING LIMITATION STIPULATION**
	No seismic exploration would be allowed within 500 feet of waterfowl nesting habitat during the following time period(s): March 1 - July 1
TL13-24	**TIMING LIMITATION STIPULATION**
	Surface use is prohibited within one-half mile of occupied Golden Eagle nests known to be occupied at least once within the seven previous years during the following time period(s): February 15 - July 15
COE 18-1	**CORPS OF ENGINEERS** - Agency Lease Stipulation
COE 18-2	**CORPS OF ENGINEERS** - Agency Lease Stipulation
COE 18-7	**CORPS OF ENGINEERS** - Agency Lease Stipulation

UNITED STATES DEPARTMENT OF THE INTERIOR
Bureau of Land Management
5001 Southgate Drive
Billings, Montana 59101-4669

OIL AND GAS LEASE STIPULATIONS

ESTHETICS--To maintain esthetic values, all surface-disturbing activities, semipermanent and permanent facilities may require special design including location, painting and camouflage to blend with the natural surroundings and meet the intent of the visual quality objectives of the Federal Surface Managing Agency (SMA).

EROSION CONTROL--Surface-disturbing activities may be prohibited during muddy and/or wet soil periods.

CONTROLLED OR LIMITED SURFACE USE STIPULATION --This stipulation may be modified, consistent with land use documents, when specifically approved in writing by the Bureau of Land Management (BLM) with concurrence of the SMA. Distances and/or time periods may be made less restrictive depending on the actual on-ground conditions. The prospective lessee should contact the SMA for more specific locations and information regarding the restrictive nature of this stipulation.

The lessee/operator is given notice that the lands within this lease may include special areas and that such areas may contain special values, may be needed for special purposes, or may require special attention to prevent damage to surface and/or other resources. Possible special areas are identified below. Any surface use or occupancy within such special areas will be strictly controlled, or **if absolutely necessary**, excluded. Use or occupancy will be restricted only when the BLM and/or the SMA demonstrates the restriction necessary for the protection of such special areas and existing or planned uses. Appropriate modifications to imposed restrictions will be made for the maintenance and operations of producing oil and gas wells.

After the SMA has been advised of specific proposed surface use or occupancy on the leased lands, and on request of the lessee/operator, the Agency will furnish further data on any special areas which may include:

100 feet from the edge of the rights-of-way from highways, designated county roads and appropriate federally-owned or controlled roads and recreation trails.

500 feet, or when necessary, within the 25-year flood plain from reservoirs, lakes, and ponds and intermittent, ephemeral or small perennial streams: 1,000 feet, or when necessary, within the 100-year flood plain from larger perennial streams, rivers, and domestic water supplies.

500 feet from grouse strutting grounds. Special care to avoid nesting areas associated with strutting grounds will be necessary during the period from March 1, to June 30. One-fourth mile from identified essential habitat of state and federal sensitive species. Crucial wildlife winter ranges during the period from December 1 to May 15, and in elk calving areas during the period from May 1 to June 30.

300 feet from occupied buildings, developed recreational areas, undeveloped recreational areas receiving concentrated public use and sites eligible for or designated as National Register sites.

Seasonal road closures, roads for special uses, specified roads during heavy traffic periods and on areas having restrictive off-road vehicle designations.

On slopes over 30 percent or 20 percent on extremely erodable or slumping soils.

See Notice on Back

NOTICE

APPLICATIONS FOR PERMIT TO DRILL (APDs)--The appropriate BLM field offices are responsible for the receipt, processing, and approval of APDs. The APDs are to be submitted by oil and gas operators pursuant to the requirements found in Onshore Oil and Gas Order No. 1 -- Approval of Operations on Onshore Federal and Indian Oil and Gas Leases (Circular No. 2538). Additional requirements for the conduct of oil and gas operations can be found in the Code of Federal Regulations Title 43, Part 3160. Copies of Onshore Oil and Gas Order No. 1, and pertinent regulations, can be obtained from the BLM field offices in which the operations are proposed. Early coordination with these offices on proposals is encouraged.

CULTURAL AND PALEONTOLOGICAL RESOURCES--The SMA is responsible for assuring that the leased lands are examined to determine if cultural resources are present and to specify mitigation measures. Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee or operator, unless notified to the contrary by the SMA, shall:

1. Contact the appropriate SMA to determine if a site-specific cultural resource inventory is required. If an inventory is required, then:

2. Engage the services of a cultural resource specialist acceptable to the SMA to conduct a cultural resource inventory of the area of proposed surface disturbance. The operator may elect to inventory an area larger than the area of proposed disturbance to cover possible site relocation which may result from environmental or other considerations. An acceptable inventory report is to be submitted to the SMA for review and approval no later than that time when an otherwise complete application for approval of drilling or subsequent surface-disturbing operation is submitted.

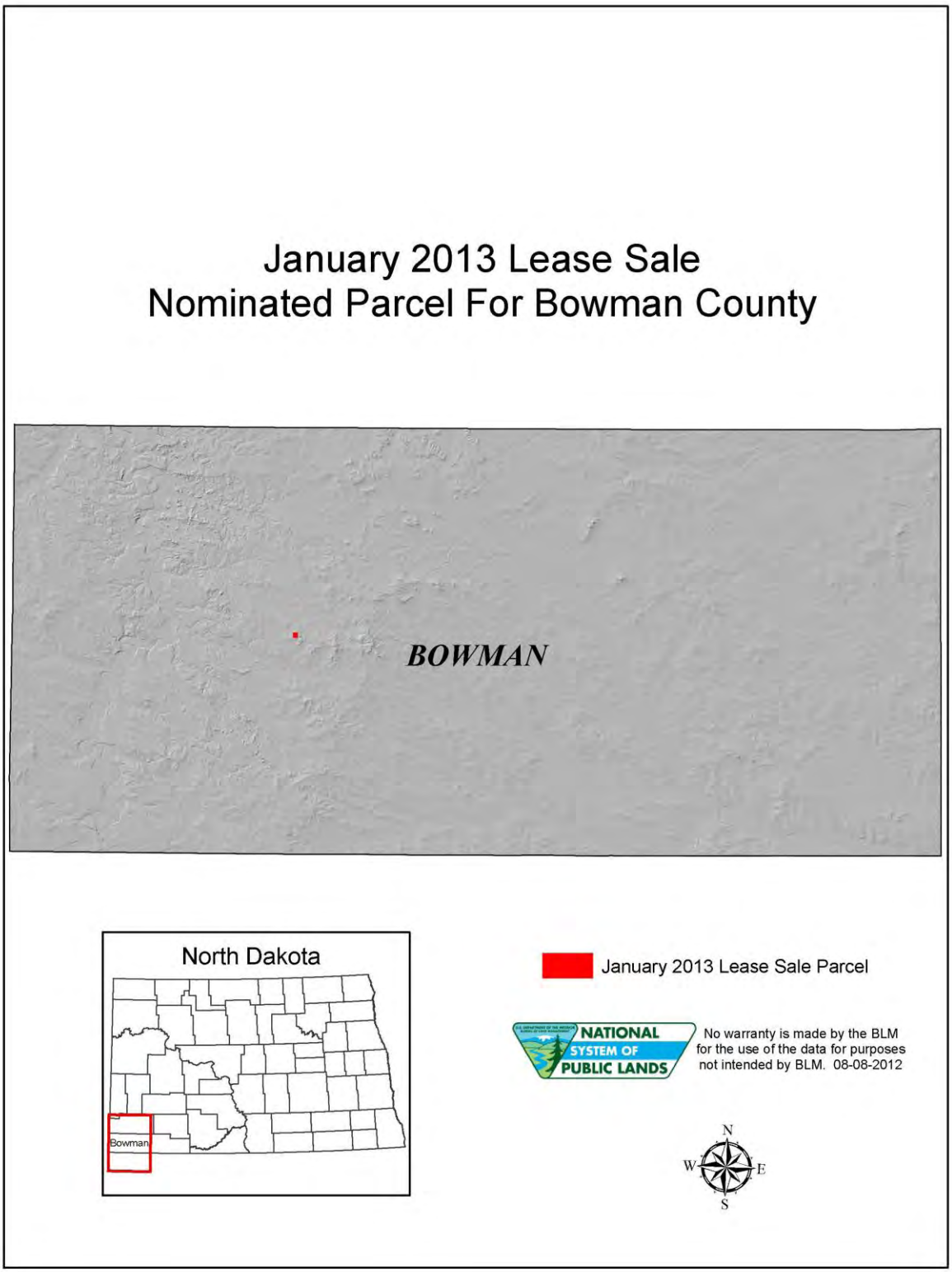
3. Implement mitigation measures required by the SMA. Mitigation may include the relocation of proposed lease-related activities or other protective measures such as testing salvage and recordation. Where impacts to cultural resources cannot be mitigated to the satisfaction of the SMA, surface occupancy on that area must be prohibited.

The operator shall immediately bring to the attention of the SMA any cultural or paleontological resources discovered as a result of approved operations under this lease, and not disturb such discoveries until directed to proceed by the SMA.

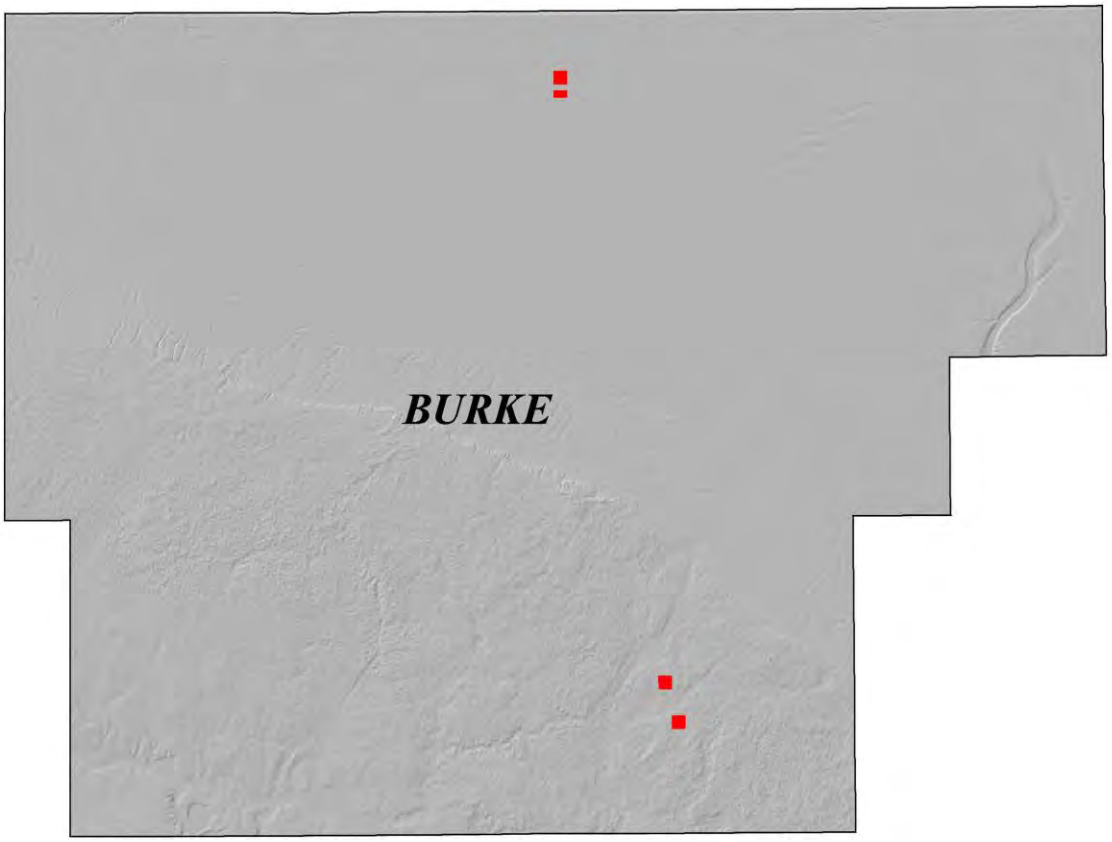
ENDANGERED OR THREATENED SPECIES--The SMA is responsible for assuring that the leased land is examined prior to undertaking any surface-disturbing activities to determine effects upon any plant or animal species, listed or proposed for listing as endangered or threatened, or their habitats. The findings of this examination may result in some restrictions to the operator's plans or even disallow use and occupancy that would be in violation of the Endangered Species Act of 1973 by detrimentally affecting endangered or threatened species or their habitats. The lessee/operator may, unless notified by the authorized officer of the SMA that the examination is not necessary, conduct the examination on the leased lands at his discretion and cost. This examination must be done by or under the supervision of a qualified resources specialist approved by the SMA. An acceptable report must be provided to the SMA identifying the anticipated effects of a proposed action on endangered or threatened species or their habitats.

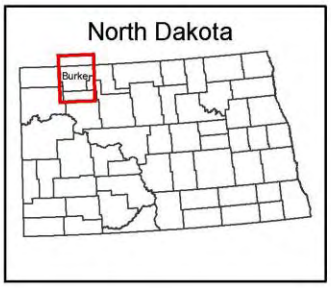
Standard 16-3

Appendix C—Parcel Maps by County



January 2013 Lease Sale
Nominated Parcels For Burke County



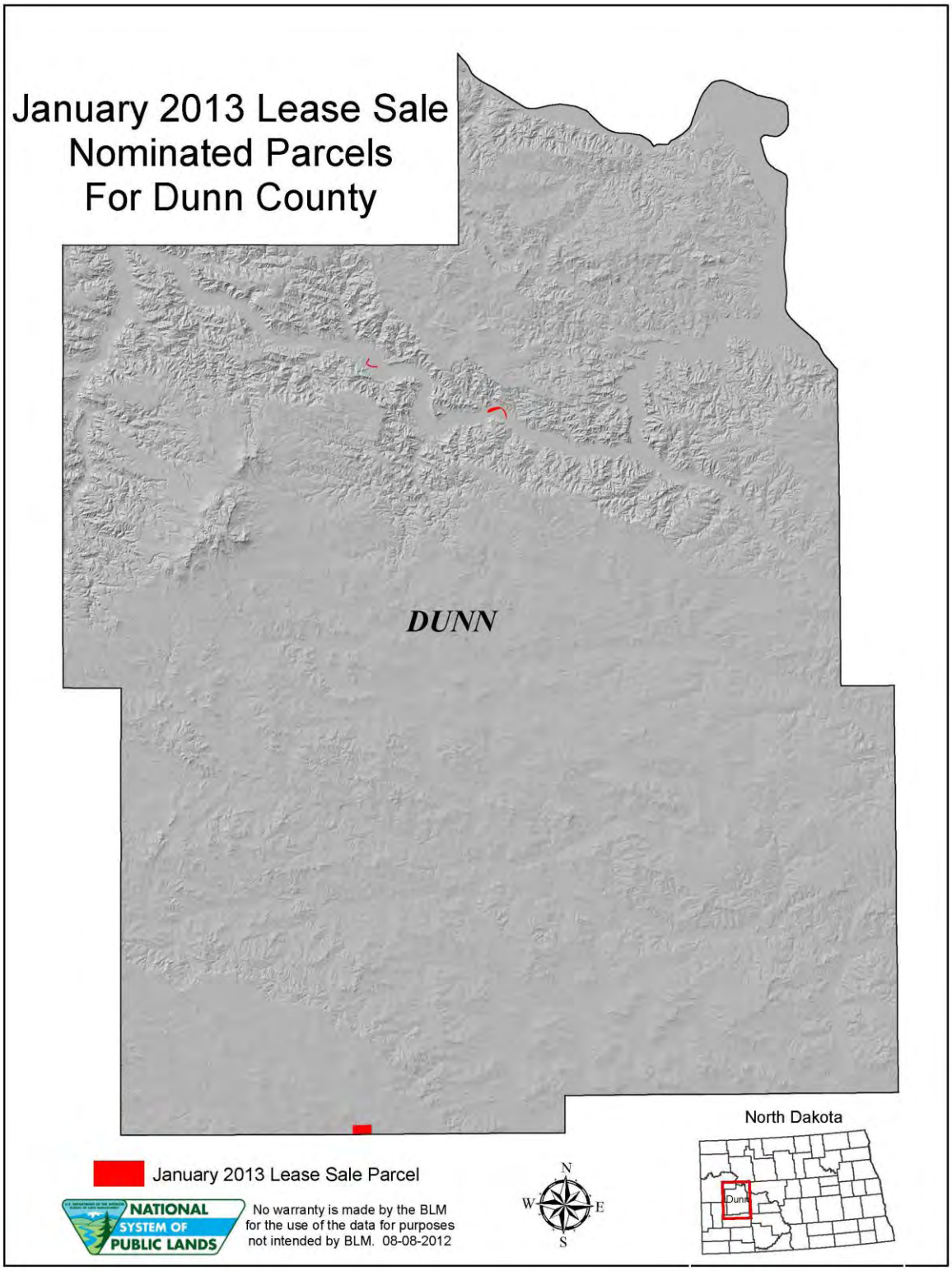


January 2013 Lease Sale Parcel

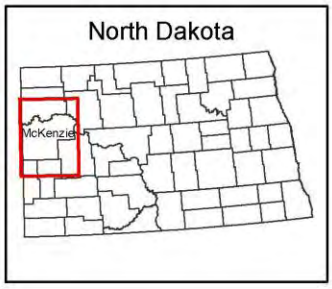
NATIONAL SYSTEM OF PUBLIC LANDS

No warranty is made by the BLM for the use of the data for purposes not intended by BLM. 08-08-2012

N
W
E
S


January 2013 Lease Sale
Nominated Parcels
For Dunn County
DUNN
North Dakota
Dunn
January 2013 Lease Sale Parcel
NATIONAL
SYSTEM OF
PUBLIC LANDS
No warranty is made by the BLM
for the use of the data for purposes
not intended by BLM. 08-08-2012
N
W
E
S

January 2013 Lease Sale
Nominated Parcels For McKenzie County

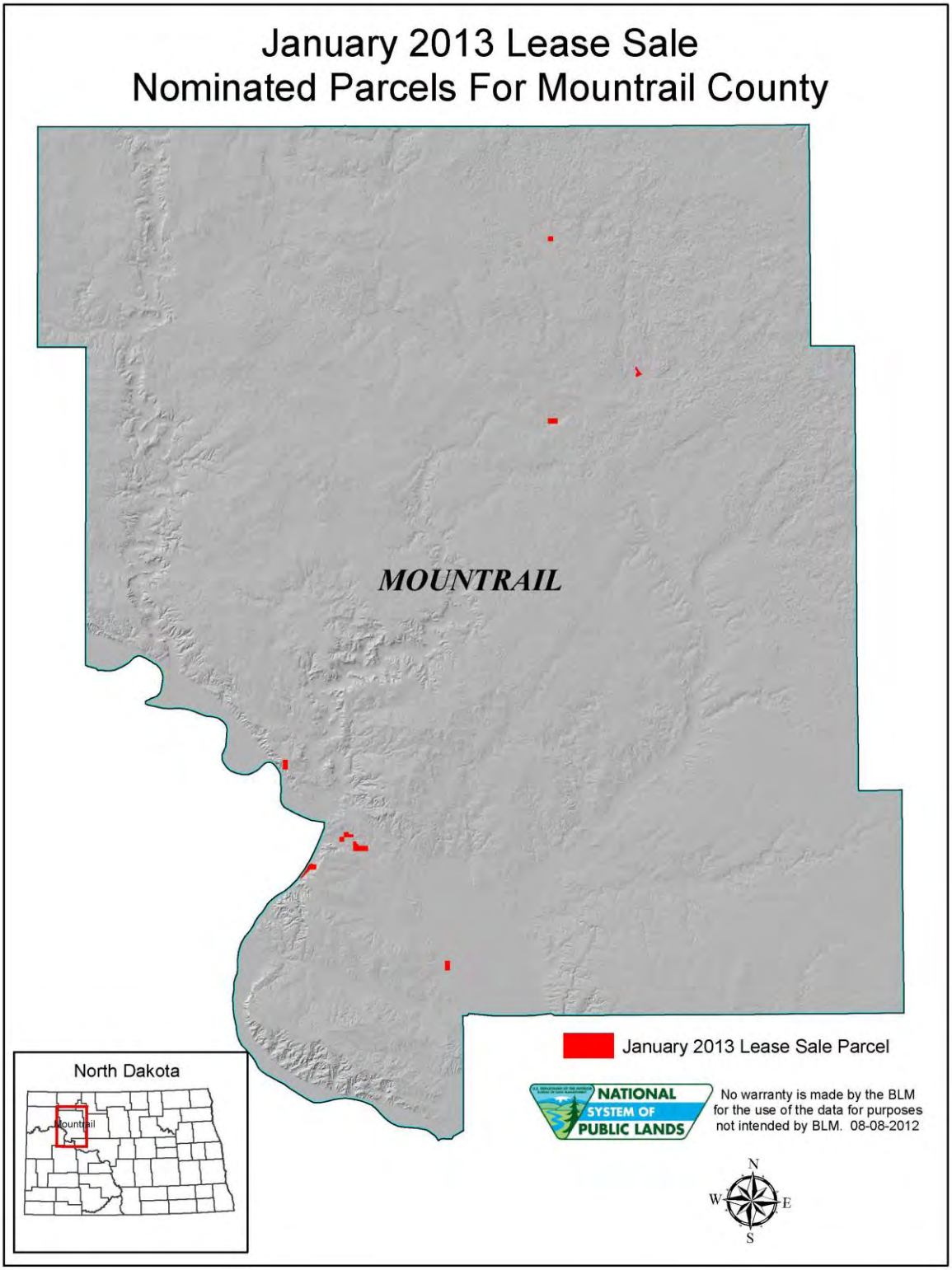


January 2013 Lease Sale Parcel

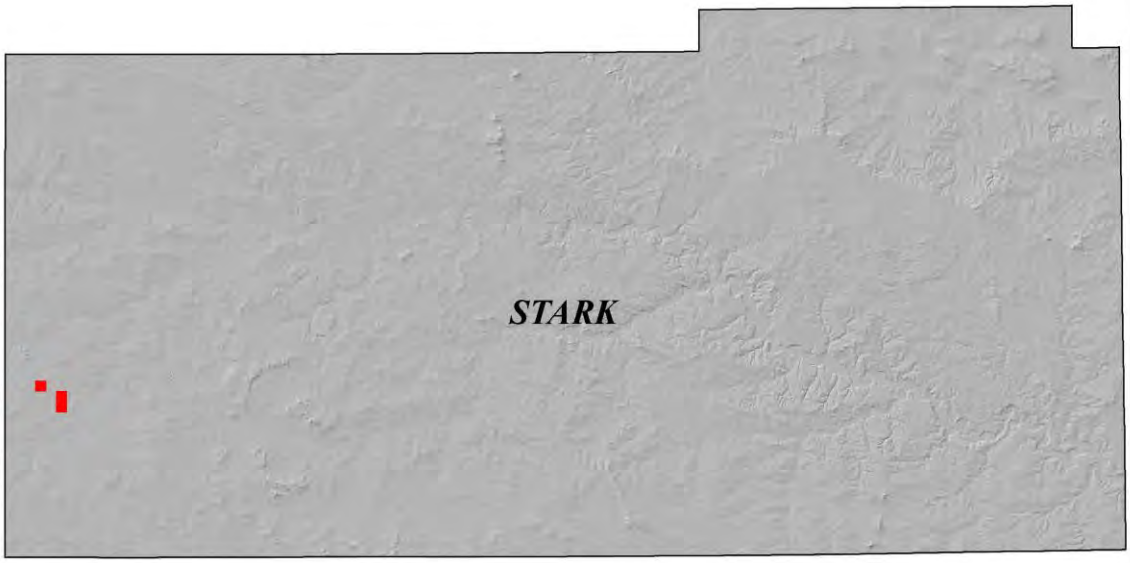
NATIONAL SYSTEM OF PUBLIC LANDS

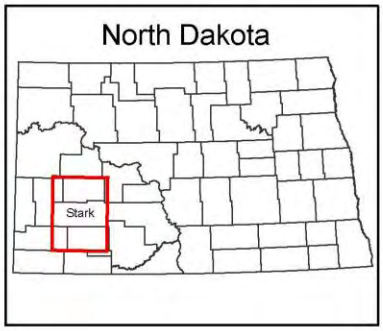
No warranty is made by the BLM for the use of the data for purposes not intended by BLM. 08-08-2012

N
W
E
S


January 2013 Lease Sale
Nominated Parcels For Mountrail County
MOUNTRAIL
North Dakota
Mountrail
January 2013 Lease Sale Parcel
NATIONAL SYSTEM OF PUBLIC LANDS
No warranty is made by the BLM for the use of the data for purposes not intended by BLM. 08-08-2012
N
W
E
S

January 2013 Lease Sale
Nominated Parcels For Stark County





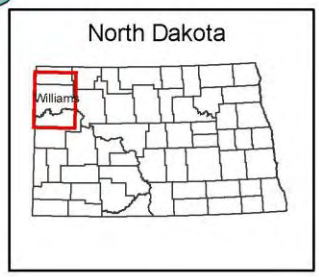
January 2013 Lease Sale Parcel

NATIONAL SYSTEM OF PUBLIC LANDS

No warranty is made by the BLM for the use of the data for purposes not intended by BLM. 08-08-2012

N
W
E
S

January 2013 Lease Sale
Nominated Parcels For Williams County



January 2013 Lease Sale Parcel

NATIONAL SYSTEM OF PUBLIC LANDS

No warranty is made by the BLM for the use of the data for purposes not intended by BLM. 08-08-2012

N
W E
S