United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Lewistown Field Office
920 North East Main Street
Lewistown, Montana 59457-4079
www.blm.gov/mt

July 24, 2013

Dear Reader:

The Bureau of Land Management (BLM) Lewistown Field Office prepared an environmental assessment (EA, DOI-BLM-MT-060-2013-0015-EA) to analyze the potential effects from offering three nominated lease parcels for competitive oil and gas leasing in a sale that is tentatively scheduled to occur on October 22, 2013. The EA was available for a 30-day public comment period.

Based on our analysis and review of comments received, the EA has been updated (refer to Chapter 5 of the EA for a summary of public comments). A competitive oil and gas lease sale is tentatively scheduled to be held on October 22, 2013. It will be my recommendation to offer the three lease parcels in whole, 760 federal mineral acres with private surface, along with stipulations identified in the BLM preferred alternative in the updated EA, see Appendix A.

We anticipate preparing and finalizing our Decision Record after the October oil and gas lease sale, but prior to lease issuance. Upon finalization, the Decision Record and any required accompanying documents will be posted on the website listed below.

Please refer to the Montana/Dakotas BLM website at http://blm.gov/h2kd. Current and updated information about our EAs, Lease Sale Notices, and corresponding information pertaining to this sale can be found at the link referenced above. Once there, locate the October 22, 2013 lease sale to review the Lewistown Field Office EA and the parcel list with recommended stipulations.

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 406-538-1918.

Sincerely,

Geoff Beyersdorf

Geoff Beyersdorf
Field Manager

United States Department of the Interior
Bureau of Land Management

Environmental Assessment: DOI-BLM-MT-060-2013-0015-EA
July 24, 2013

Project Title:

Oil and Gas Lease Parcel Sale,
October 22, 2013

Location:

Central Montana District, Lewistown Field Office
(See attached Appendix A for a list of lease parcels and maps.)

Applicant/Address:

Lewistown Field Office
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Lewistown, MT 59457

Project Contact:

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Lewistown Field Office Oil and Gas Lease Sale EA
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1.0 PURPOSE AND NEED

1.1 Introduction

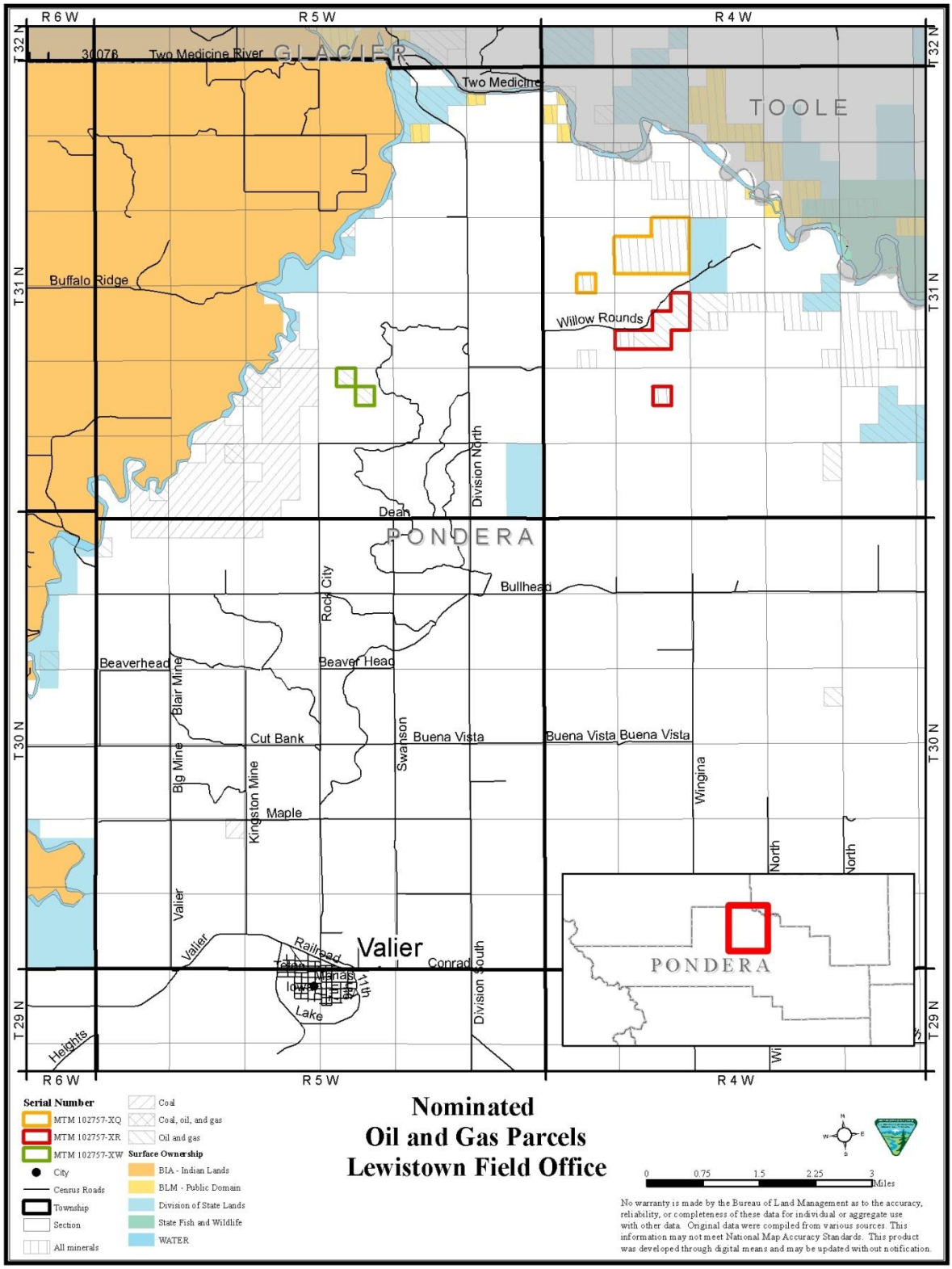
It is the policy of the Bureau of Land Management (BLM) to make mineral resources available for use and to encourage development of mineral resources to meet national, regional, and local needs. This policy is based on various laws, including the Mineral Leasing Act of 1920 and the Federal Land Policy 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 conducts mineral estate lease auctions for lands managed by the federal government, whether the surface is managed by the Department of the Interior (BLM or Bureau of Reclamation), United States Forest Service, 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. Federal mineral leases can be sold on such lands as well. The Montana State Office has historically conducted five lease sales per year.

Members of the public file Expressions of Interest (EOI) to nominate parcels for leasing by the BLM. From these EOIs, the Montana State Office 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 are nominated by private individuals, companies, or the BLM, and therefore represent areas of high interest.

This environmental assessment (EA) has been prepared to disclose and analyze the potential environmental consequences from leasing all three nominated lease parcels located in the Lewistown Field Office (LFO), to be included as part of a competitive oil and gas lease sale tentatively scheduled to occur in October, 2013.

The analysis area includes the three nominated parcels in Pondera County (See Figure 1. Preliminary Nominated Parcels Map).

Figure 1. Nominated Parcels Map



1.2 Purpose and Need for the Proposed Action

The purpose of offering parcels for competitive oil and gas leasing is to provide opportunities for private individuals or companies to explore for and develop federal oil and gas resources after receipt of necessary approvals and to sell the oil and gas in 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 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 is whether to sell and issue oil and gas leases on the lease 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, conforms to the decisions contained in the Butte District Oil & Gas Environmental Assessment of the BLM Leasing Program (approved September 1981) and the Headwaters Resource Management Plan (as approved in 1984). A more complete description of activities and impacts related to oil and gas leasing, development, production, etc. can be found in:

> Butte District Oil & Gas Environmental Assessment of BLM Leasing Program, approved September 1981: Leasing federal minerals administered by the Bureau of Land Management, Lewistown Field Office (area was then within the Butte District) for oil and gas exploration and development is specifically analyzed in the Butte District Oil & Gas Environmental Assessment of BLM Leasing Program, approved September 1981.
> Pertinent information in the EA: Chapter 1, Proposed Action, pages 9-35.
>
> Headwaters Resource Management Plan: As a general rule, public land outside the Rocky Mountain Front is available for oil and gas leasing. In many areas, oil and gas leases will be issued with only standard stipulations attached (Final Headwaters RMP/EIS, page 13). The Headwaters Resource Management Plan was approved in 1984 to guide management of all resources on BLM administered public lands that are now within the Lewistown Field Office (LFO) in portions of Cascade, Lewis and Clark, Meagher, Pondera and Teton counties, excluding lands now withdrawn from oil and gas leasing and development by section 403 (a) of Public Law 109-432 (January 8, 2007). The nominated parcels located within Pondera County fall under the authority of the Headwaters RMP are located within Management Unit 7. Under the final decision, no special stipulations are required for oil and gas leasing within Management Unit 7. Chapter 2, Management Guidance Common to All Alternatives, pages 12 and 13, Management Units map and Appendix B.

At the time of this review, it is unknown whether a particular parcel will be sold and a lease issued. It is unknown when, where, or if future well sites, roads, and facilities might be proposed. Assessment of potential activities and impacts was based on potential well densities discerned from the Reasonably Foreseeable Development (RFD) Scenario developed for the LFO. Detailed site-specific analysis and mitigation of activities associated with any particular lease would occur when a lease holder submits an application for permit to drill (APD). A more complete description of mitigation, BMPs, and conditions of approval related to oil and gas lease activities can be found in the Headwaters RMP pages 168-213, the Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development-The Gold Book, and online at http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/best_management_practices.html.

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 Montana State Office website and posted on the LFO website National Environmental Policy Act (NEPA) notification log. Scoping was initiated March 26, 2013; comments were received through April 9, 2013. One scoping comment letter pertained to general concerns related to the parcel leasing process and resource concerns from potential development of leased parcels. Refer to Chapter 5 of this EA for a more complete summary of the scoping comment received.

2.0 DESCRIPTION OF ALTERNATIVES

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 three parcels within the LFO administered area from the 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 the three parcels of federal minerals for oil and gas leasing, covering 760 acres administered by the LFO, in conformance with the existing land use planning decisions. The parcels are located in Pondera County, MT. Parcel number, size, and detailed locations and associated stipulations are listed in Appendix A. Lease Parcel Summary Table indicates the detailed location of each parcel.

Of the 760 acres of federal mineral estate considered in this EA, none of surface is public land managed by the BLM. All three of the subject parcels are split estate (private surface with federal mineral estate).

2.3 Additional Considerations

In the instance of the parcels which are split estate, the BLM provided courtesy notification to private landowners that their lands are considered in this NEPA analysis and would be considered for inclusion in an upcoming 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, stipulations, conditions, and operating procedures would apply to these parcels.

Standard operating procedures, best management practices, and required conditions of approval (COA) and the application of lease stipulations change over time to meet overall RMP objectives. The COA's would be attached to permits for oil and gas lease operations to address site-specific concerns or new information not previously identified in the land use planning process. In some cases new lease stipulations may need to be developed and these types of changes may require an RMP amendment. There is no relief from meeting RMP objectives if local conditions were to become drier and hotter during the life of the RMP. In this situation, management practices might need to be modified to continue meeting overall RMP management objectives. An example of a climate related modification is the imposition of additional conditions of approval to reduce surface disturbance and implement more aggressive dust treatment measures. Both actions reduce fugitive dust, which would otherwise be exacerbated by the increasingly arid conditions that could be associated with climate change.

Oil and gas leases would be issued for a 10-year period and would continue for as long thereafter as oil or 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, ownership of 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 lease owner or operator secures approval of a drilling permit and a surface use plan specified at 43 CFR 3162.

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

This chapter describes the affected existing environment (i.e., the physical, biological, social, and economic values and resources) within the analysis area, which includes the three nominated parcels in Pondera County (Figure 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 analysis area. 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 that 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.

Only those aspects of the affected environment that are potentially impacted by this project are described in detail. The following aspects of the existing environment were determined to be not present or not potentially impacted by this project include: lands with wilderness characteristics; cave and karst resources; wild and scenic rivers; wilderness study areas (WSAs); and hazardous wastes or solids. These resources and resource uses will not be discussed further in this EA.

3.2 Air Resources

Air quality and climate are the components of air resources, which include applications, activities, and management of the air resource. Therefore, the BLM must consider and analyze the potential effects of BLM and BLM-authorized activities on air resources as part of the planning and decision making process.

The Environmental Protection Agency (EPA) has the primary responsibility for regulating air quality, including seven nationally regulated ambient air pollutants. Regulation of air quality is also delegated to the Montana Department of Environmental Quality (MDEQ). Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology and terrain, and also includes smoke management and visibility. Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years.

3.2.1 Air Quality

Project area air quality is very good. The EPA air quality index (AQI) is an index used for reporting daily air quality (http://www.epa.gov/oar/data/geosel.html). It tells how clean or polluted an area's air is and whether associated health effects might be a concern. The AQI focuses on the potential health effects a person may experience within a few hours or days after breathing polluted air. The EPA calculates the AQI for the five major 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, EPA has established national air quality standards to protect public health. An AQI value of 100 generally corresponds to the national air quality standard for the pollutant, which is the level the EPA has set to protect public health. 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.

In 2012, the lands within the LFO met federal and state air quality standards. AQI data shown in Table 1 indicate that air quality is good at the Great Falls monitoring site in Cascade County. Between 2010 and 2012, 84 percent of the monitored days were rated "good" with 16 percent being "moderate."

Table 1. Air Data Air Quality Index

1. US EPA – Air Data Air Quality Index Report – Field Office Summary (2010-2012)							
County and Year	State	# Days with Data	# Days Rated Good	Percent of Days Rated Good	# Days Rated Mod	# Days Rated Unhealthy for Sensitive Groups	# Days Rated Unhealthy
Cascade 2012	MT	360	299	83	58	3	0
Cascade 2011	MT	347	287	83	60	0	0
Cascade 2010	MT	365	315	86	50	0	0
Cascade -All	MT	1,072	901	84	168	3	0

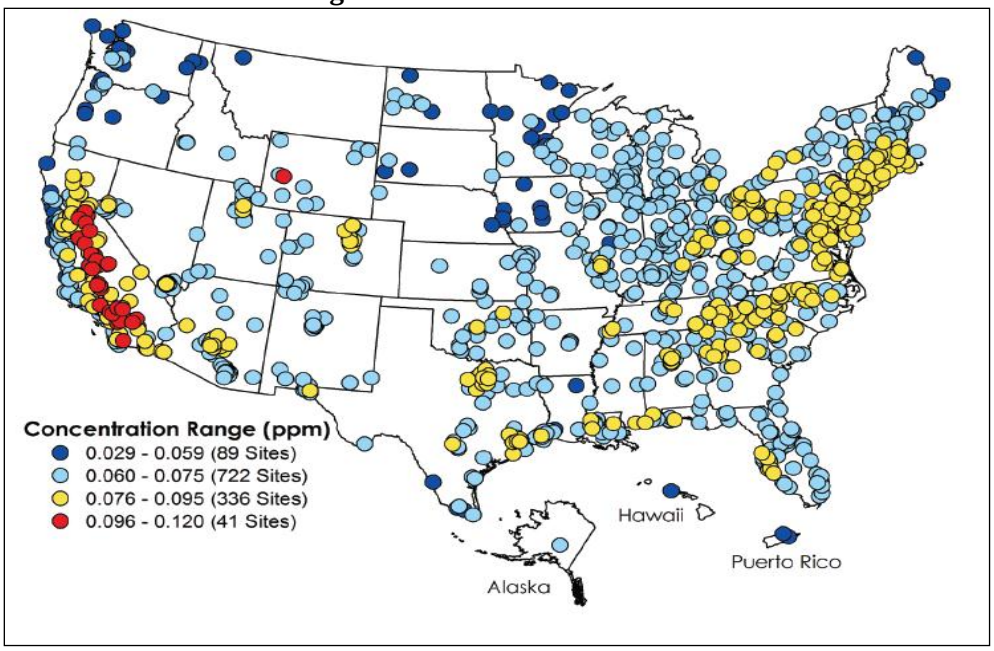
In the context of ozone, all areas throughout Montana and the Dakotas have a long history of meeting federal standards in all locations. Light and dark blue circles in Figure 2 indicate standards being met in 2008. Open circles in Figure 3 indicate static trends. Although ozone concentrations above the NAAQS have been monitored in some rural areas in other states with oil and gas activity, moderate ozone concentrations have been monitored in Montana oil and gas areas. A new ozone monitor installed in Lewistown during mid-2012 measured a maximum ozone concentration of 0.037 ppm from August 1, 2012 through the remainder of the year. This value is well below the ozone NAAQS of 0.075 ppm. During calendar year 2012, the highest 8-hour daily maximum average ozone measurement at the Siebens Flat NCore site in Lewis and Clark County was 0.053 ppm (MDEQ 2013).

In Cascade County, the primary pollutants are carbon monoxide (CO), sulfur dioxide (SO_2) and particulate matter ($PM_{2.5}$). The primary source of CO are light duty gas vehicles and motorcycles (39 percent), light duty gas trucks (29 percent), off-road gas vehicles (19 percent), and residential wood burning (5 percent). The primary sources of SO_2 are industrial gas combustion (64 percent), petroleum refining (8 percent), off-road diesel (7 percent), and industrial oil combustion (7 percent). The primary sources of $PM_{2.5}$ are fugitive dust (54 percent), agriculture and forestry (15 percent), residential wood consumption (12 percent), mineral products (7 percent), and off-road diesel (5 percent).

Hazardous air pollutants (HAPs) would also be emitted from oil and gas operations, including well drilling, well completion, and gas and oil production. Recent air quality modeling performed for the HiLine District north of the LFO indicates that concentrations of benzene, ethylbenzene, formaldehyde, n-hexane, toluene, and xylene would be less than 15 percent of applicable health-based standards and that the additional risk of cancer would be less than 0.26 in one million (BLM 2013).

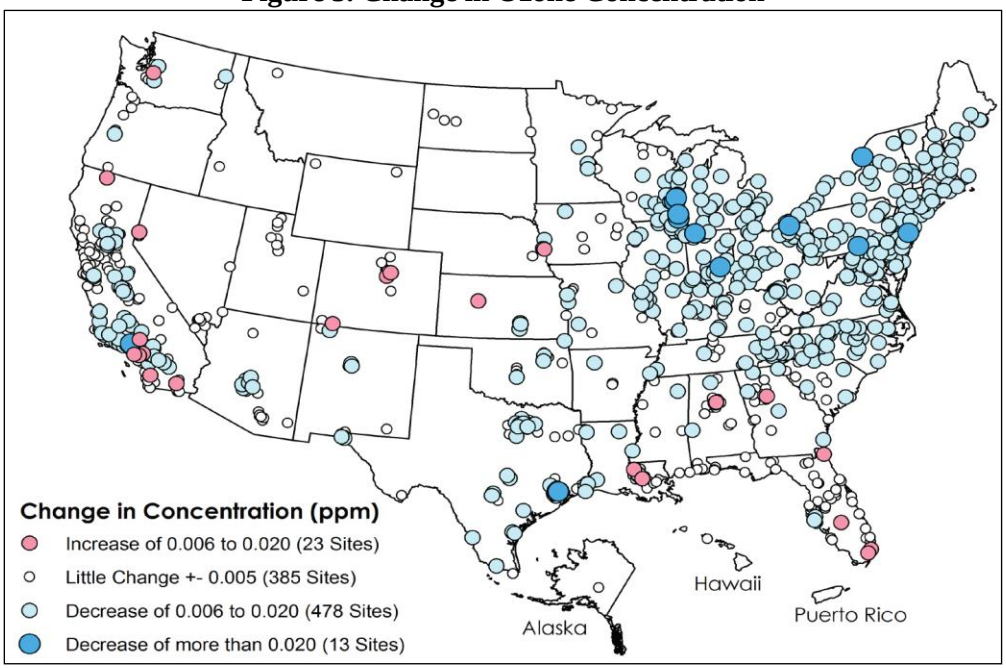
For haze, trends appear to be improving for the clearest days (Figure 4), while there are no apparent trends for the haziest days (Figure 5).

Figure 2. Ozone Concentration



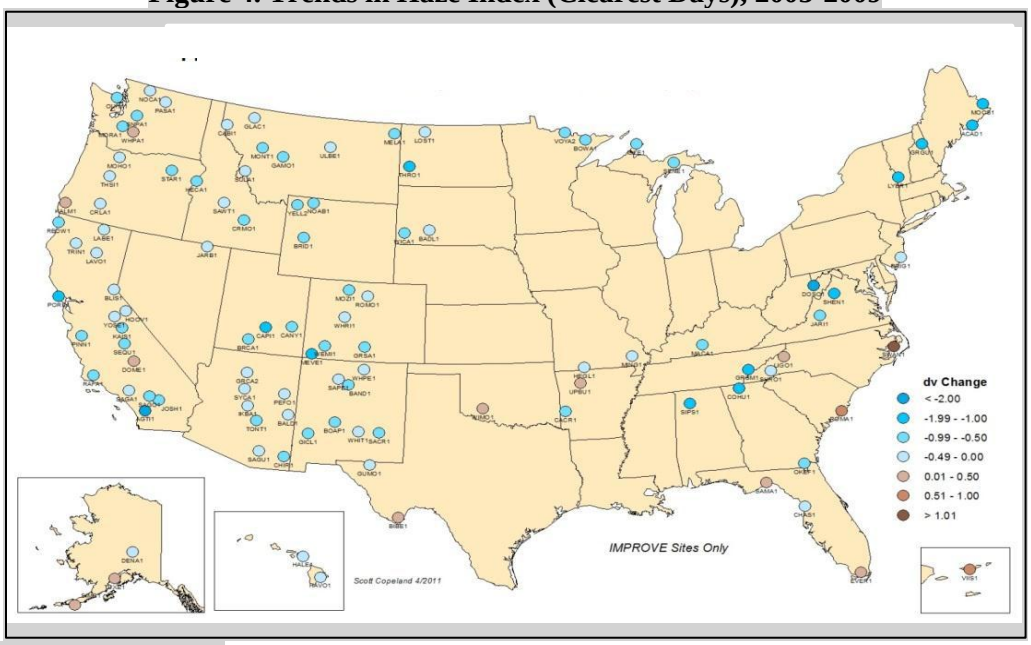
Ozone concentrations in ppm, 2008 (fourth highest daily maximum 8-hour concentration).

Figure 3. Change in Ozone Concentration



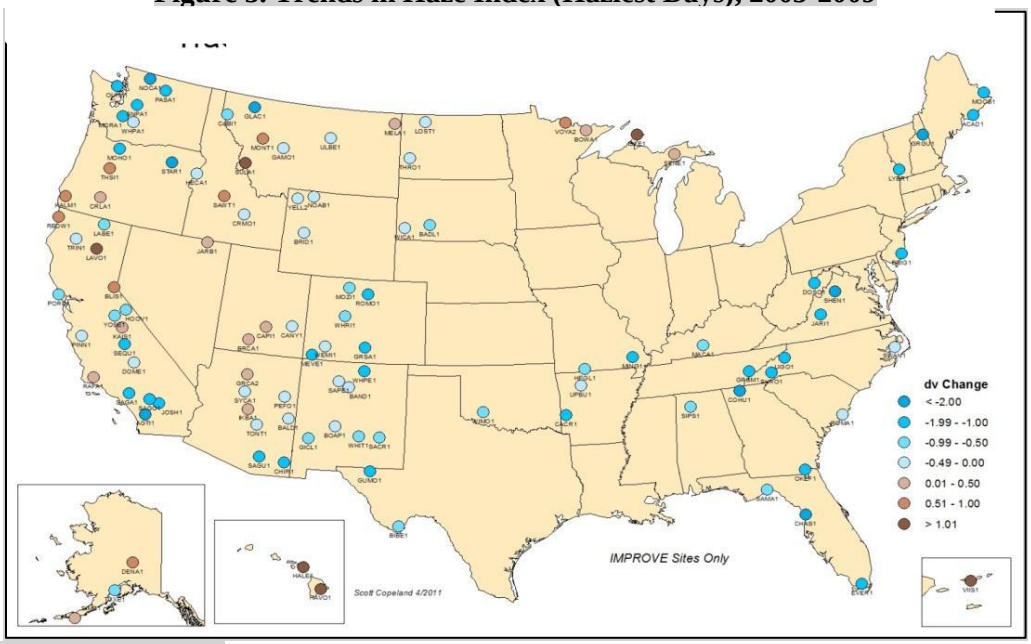
Change in ozone concentrations in ppm, 2001-2003 vs. 2006-2008 (three-year average of the annual fourth highest daily maximum 8-hour concentrations).

Figure 4. Trends in Haze Index (Clearest Days), 2005-2009



Source: IMPROVE 2011.

Figure 5. Trends in Haze Index (Haziest Days), 2005-2009



Source: IMPROVE 2011.

The UL Bend Wilderness in the Charles M. Russell National Wildlife Refuge is within the LFO. The parcels considered for leasing are approximately 110 miles from this wilderness area.

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 2007a). 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 (Climate Change SIR 2010). This document is incorporated by reference into this EA.

The IPCC (Climate Change SIR, 2010) states that "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 (Climate Change SIR, 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 IPCC 2007b (Climate Change SIR, 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; and
- Lower-tropospheric temperatures have slightly greater warming rates than the earth's surface from 1958-2005.

As discussed and summarized in the Climate Change SIR, 2010, 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 (Climate Change SIR, 2010). Current ongoing global climate change is believed by scientists to be linked to 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 (Climate Change SIR, 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 carbon dioxide and methane) from fossil fuel development, large wildfires, and 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 proper may last 50 to 200 years in the atmosphere while methane has an average atmospheric life time of 12 years (Climate Change SIR, 2010).

North Dakota, Montana and South Dakota are all in the lower third of GHG emitting states (by volume). North Dakota ranks 37, Montana ranks 42, and South Dakota ranks 43. Only Hawaii and Idaho have lower emissions than Montana and South Dakota among western states (http://assets.opencrs.com/rpts/RL34272_20071205.pdf, Ramseur 2007). Montana, North Dakota, and South Dakota combine for 1.8 percent of the United States' (U.S.) greenhouse gas emissions.

Some information and projections of impacts beyond the project scale are becoming increasingly available. Chapter 3 of the Climate Change SIR describes impacts of climate change in detail at various scales, including the state scale when appropriate. The following bullet points summarize potential changes identified by the EPA (EPA, 2008) that are expected to occur at the regional scale, where the proposed action and its alternatives are to take place. The EPA identifies this area as part of the Mountain

West and Great Plains region
(http://www.epa.gov/Region8/climatechange/pdf/ClimateChange101FINAL.pdf):

- 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 such as the mountain lion, black bear, long-nose sucker, marten, and bald eagle 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. 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 two 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 increase fire risks.
- Insect epidemics and the amount of damage that they may inflict have also been on the rise. The combination of higher temperatures and dry conditions have increases insect populations such as pine beetles, which have killed trees on millions of acres in the western U.S. and Canada. Warmer winters allow beetles to survive the cold season, which would normally limit populations, while concurrently, drought weakens trees, making them more susceptible to mortality due to insect attack.

More specific to Montana, additional projected changes associated with climate change described in Section 3.0 of the Climate Change SIR include:

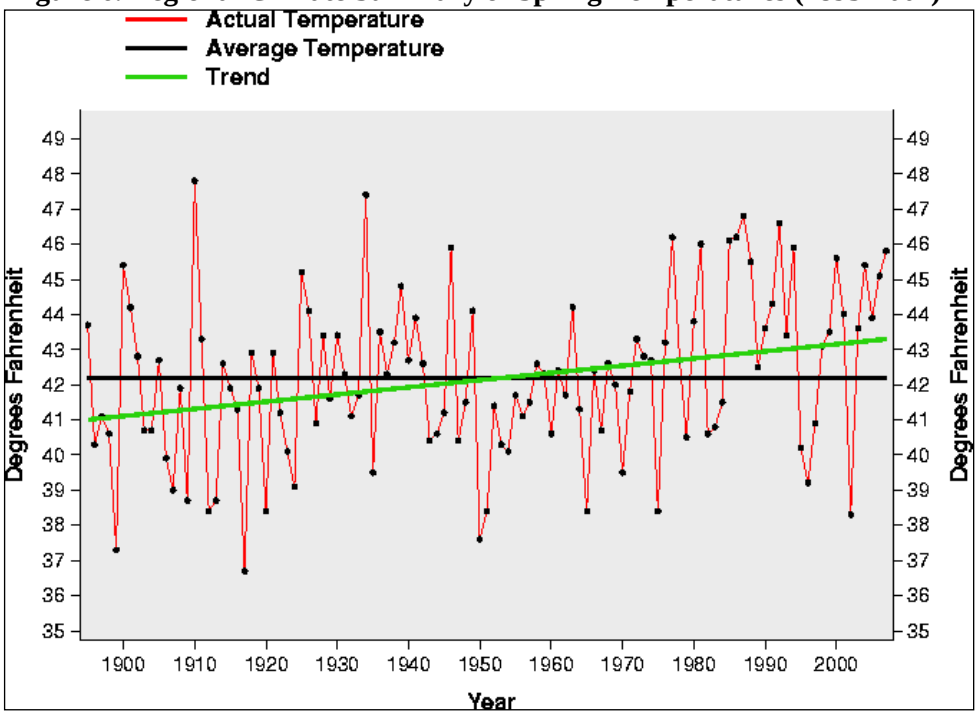
- Temperature increases in Montana are predicted to be between 3 to 5°F at mid-21st century and between 5 to 9°F at the end of the 21st century. As the mean temperature rises, more heat waves are predicted to occur. In the late 21st century, the number of days per year with temperatures above 100°F is predicted to be between 10 and 45, depending on the level of GHG emissions, with the largest increase in the number days over 100°F occurring in the eastern portion of the state.
- Precipitation increases in winter and spring in Montana may be up to 25 percent in some areas. Precipitation decreases of up to 20 percent may occur during summer, with potential increases or

decreases in the fall. In the fall western Montana may see little change in precipitation while the northwestern portion of the state may experience 5 to 10 percent increases.

- For most of Montana, annual median runoff is expected to decrease between 2 and 5 percent, but northwestern Montana may see little change in annual runoff. Mountain snowpack is expected to decline, reducing water availability in localities supplied by meltwater.
- Glaciers are already known to be melting, and all glaciers in Glacier National Park are expected to be completely melted by 2030 or sooner.
- Wind power production potential is predicted to decline in Montana based on modeling focused on the Great Falls area.
- Conditions in Montana wetlands across much of the northern part of the state are predicted to remain relatively stable, although some wetland habitat near Cut Bank is predicted to degrade to less favorable conditions.
- Water temperatures are expected to increase in lakes, reservoirs, rivers, and streams. Fish populations are expected to decline due to warmer temperatures, which could also lead to more fishing closures.
- 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 Montana based on a 1°C global average temperature increase to be 241 to 515 percent.

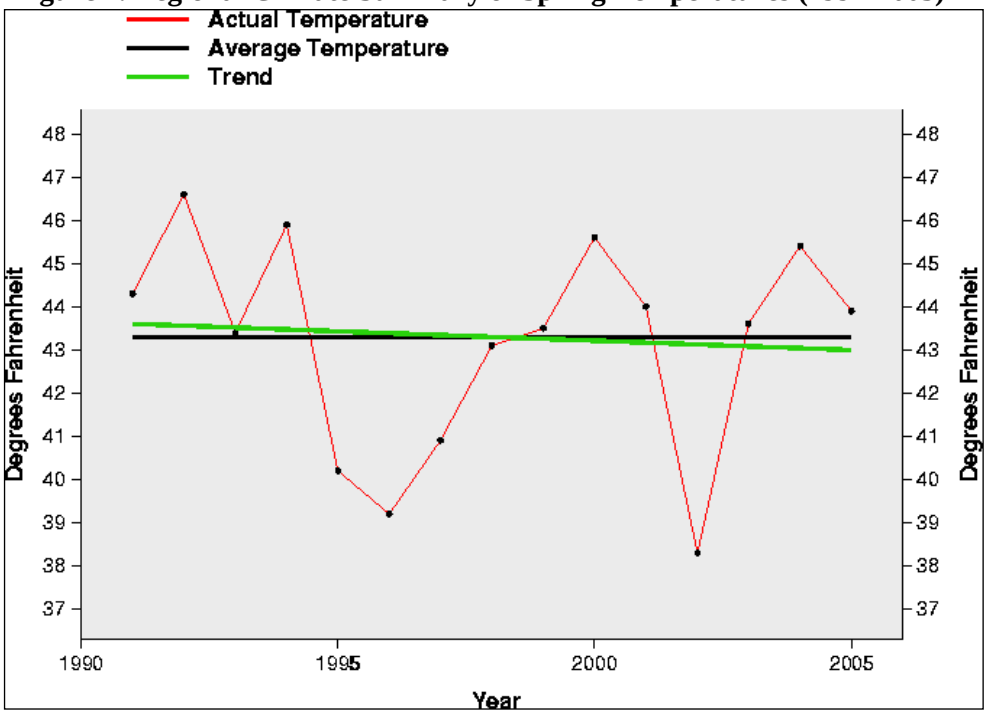
While long-range regional changes might occur within this project area, it is impossible to predict precisely when they could occur. The following example summarizing climate data for the West North Central Region (MT, ND, SD, and WY) illustrates this point at the regional scale. A potential regional effect of climate change is earlier snowmelt and associated runoff. This is directly related to spring-time temperatures. Over a 112-year record, overall warming is clearly evident with temperatures increasing 0.21 degrees per decade (Figure 6). This would suggest that runoff may be occurring earlier than in the past. However, data from 1991-2005 indicates a 0.45 degree per decade cooling trend (Figure 7). This example is not an anomaly, because several other 15-year windows can be selected to show either warming or cooling trends. Some of these year-to-year fluctuations in temperature are due to natural processes, such as the effects of El Niños, La Niñas, and the eruption of large volcanoes (Climate Change SIR, 2010). This information illustrates the difficulty of predicting actual regional or site-specific changes or conditions which may be due to climate change during any specific time frame.

Figure 6. Regional Climate Summary of Spring Temperatures (1895-2007)



Regional climate summary of spring temperatures (March-May) for the West North Central Region (MT, ND, SD, WY), from 1895-2007. (Source: NOAA website – http://www.ncdc.noaa.gov/oa/climate/research/cag3/wn.html)

Figure 7. Regional Climate Summary of Spring Temperatures (1991-2005)



Regional climate summary of spring temperatures (March-May) for the West North Central Region (MT, ND, SD, WY), from 1991-2005. (Source: NOAA website – http://www.ncdc.noaa.gov/oa/climate/research/cag3/wn.html)

3.3 Soil Resources

All three proposed lease parcels are split estate, with the surface rights being retained by private landholders. Soils were identified from the United States Department of Agriculture's Natural Resources Conservation Service's (USDA-NRCS) Soil Survey Geographic (SSURGO) dataset and the Soil Data Mart (SDM) website (http://soildatamart.nrcs.usda.gov/). Soil surveys were performed by the USDA-NRCS according to National Cooperative Soil Survey (NCSS) standards. The three major ecological sites relative to the proposed lease parcels are: R052XN162MT (clayey 10-14" p.z.), R052XN178MT (shallow 10-14" p.z.), and R052XN168MT (silty steep 10-14" p.z.).

R052XN162MT (clayey 10-14" p.z.)

This site usually consists of deep soils on flood plains and fans, and moderately deep soils on uplands. Slopes vary from 1- 15%, but are usually less than 8%. Elevations generally range from 2,000 to 3,500 feet. These soils formed in place in glacial till underlain by shale. Some of the soils formed in material derived from shale or in alluvium derived from glacial till or shale. The alluvium was deposited in the valleys on some of the bordering uplands, low terraces, fans and flood plains. The light brownish gray clay surface layer of these soils is usually less than 5 inches in depth. The clay soils are more than 20 inches deep. Soils are well drained. Permeability is very slow. Soil ph varies from 6.6-8.4.

R052XN178MT (shallow 10-14" p.z.)

This site occurs on undulating to rolling hills on the sedimentary and sandstone uplands with outcrops of shale, sandstone or rock. Slopes usually vary from 4 to 35 percent, but can be as steep as 65%. Elevations normally vary from 2,500 to 3,500 feet. These soils are 10 to 20 inches deep. Sandstone bedrock or weakly consolidated sedimentary beds begin at 10-20 inches. Most herbaceous roots extend less than 20 inches below the soil surface. The Cabba, Cabbart, Ernem, Castner, Cheadde, and Rentsac soil components characterize this site. Loam and silt loam are the dominant textures. Soil ph varies from 7.4 – 9.0.

R052XN168MT (silty steep 10-14" p.z.)

This site occurs on slopes of rolling till plains**,** hills and hill slopes. Slopes are in excess of 15%. This site occurs on all exposures. Elevations normally range from 2000 to 3500 feet. These soils formed in glacial till. The surface layer of these soils vary from 0-3 inches in depth and typically have loam, silt loam, gravelly loam or silty clay loam texture. Underlying material, to a depth of 60 inches or more, has a clay loam texture. Permeability is moderate to moderately slow, and available water capacity is high. Effective rooting depth is greater than 60 inches. Where this soil is under native vegetation, the average wetting depth is about 24 inches. Runoff is medium to very high rapid, and the hazard of water erosion is high. The hazard of soil blowing is also high. Soils are often calcareous. The following soil taxonomic units characterize this site are: Zahill and Hillon. Soil ph normally ranges from 7.4 to 8.4.

3.4 Water Resources

3.4.1 Surface Hydrology

The nominated lease parcels are located within the Marias River-Appott Coulee subwatershed (6^{th}-code HUC 100302030101). The roughly 48 square mile subwatershed may be misnamed because most of the subwatershed is drained by a stream identified as Abbott Coulee on topographic maps. The Marias River, a perennial river within the subwatershed, is fully supporting water quality beneficial uses between the confluence of Two Medicine River and Cutbank Creek and Tiber Reservoir (MDEQ, 2012). No water quality determinations have been made for any other streams or lakes within the subwatershed.

Lease parcels/development would be subject to stipulations that protect within 500' or the 25-year flood plain from reservoirs, lakes, and ponds and intermittent, ephemeral or small perennial streams and 1,000' or the 100-year flood plain from larger perennial streams, rivers, and domestic water supplies. Areas with

slopes over 30 percent are also subject to the controlled or limited surface use stipulation. Table 2 shows the approximate acres within these special areas of each lease parcel.

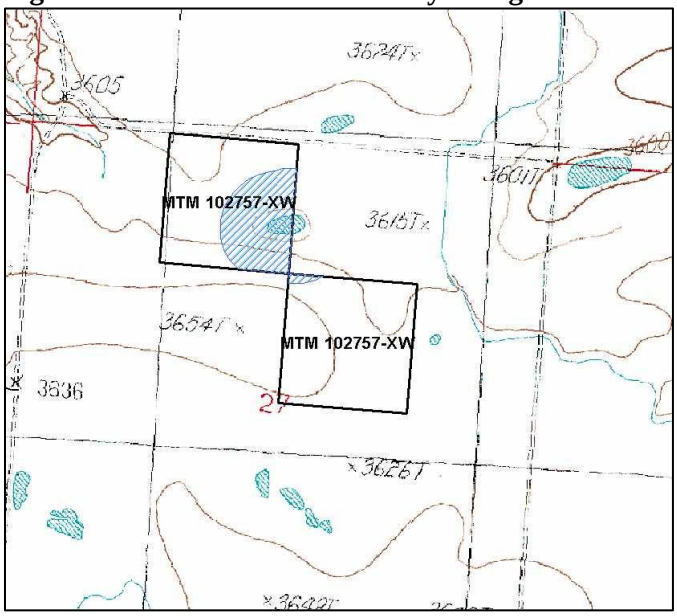
Table 2. Surface Hydrology Acreage Summary

Lease Parcel	Parcel Acres	Acres within 500' of small streams or ponds	Percent of lease parcel	Acres of area of slope greater than 30 percent	Percent of Lease Parcel
MTM 102757-XW	80	16	20	0	0
MTM 102757-XR	280	237	85	24	9
MTM 102757-XQ	440	257	58	9	2

Approximate acres within 500' of streams and ponds and slopes greater than 30 percent special areas for each lease parcel.

Parcel MTM 102757-XW does not contain any streams or slopes greater than 30 percent. However, there is one special area under the lease stipulations, a seasonal pond. Figure 8 below shows parcel MTM 102757-XW with a 500' buffer around the seasonal pond. The 500' buffer is identified by the blue hash marks.

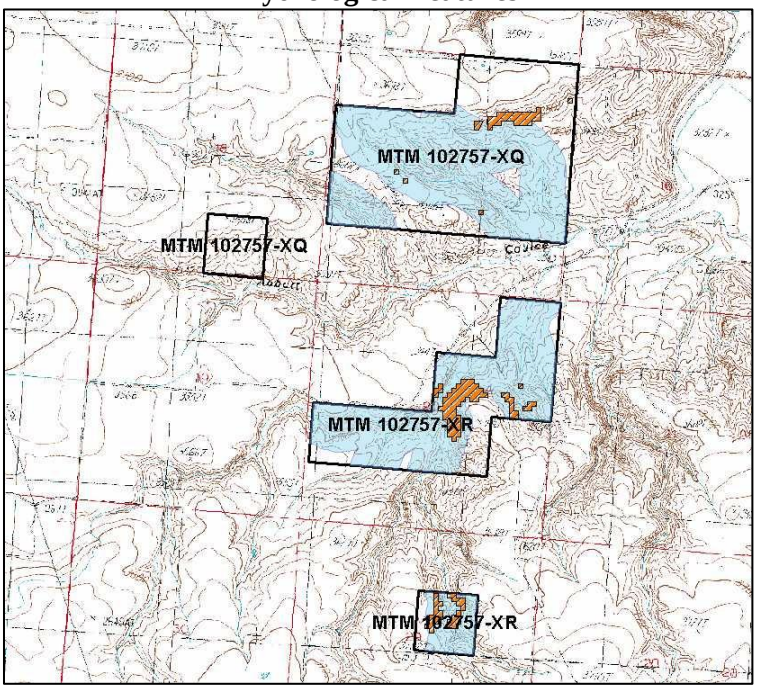
Figure 8. MTM 102757 Surface Hydrological Feature



500 ft buffer around the Seasonal Pond.

Lease parcels MTM 102757-XR and MTM 102757-XQ contain both small streams and slopes greater than 30 percent. These special areas are identified in the figure below (Figure 9) by blue shade for areas within 500' of streams and orange hash marks for slopes greater than 30 percent.

Figure 9. MTM 102757-XR and MTM 102757-XQ Surface Hydrological Features



500 ft buffer around streams and slopes greater than 30 percent.

3.4.2 Groundwater

The quality and availability of ground water varies greatly across the three-state region (Montana, North Dakota, and South Dakota). Residents in eastern Montana and the Dakotas commonly get their ground water from aquifers consisting of unconsolidated, alluvial valley-fill materials, glacial outwash, or consolidated sedimentary rock formations. Aquifers that residents most commonly use in the area covered in this EA include the Fort Union, Hell Creek, Fox Hills, Judith River, and Eagle consolidated formations. In some areas east of the Rocky Mountains, near-surface thick shale deposits such as those of the Colorado Group and Bearpaw (Pierre) Shale severely limit the economic availability of water to wells, or provide water of quality too poor for most uses. Eastern Montana aquifers typically yield less water and produce more salty, or mineralized, water compared to those in western Montana. The water in some eastern aquifers is suitable only for livestock consumption.

The nominated parcels are located in Pondera County. Besides surficial aquifers in Quaternary sands and gravels, principal aquifers near the parcels are primarily aquifers in Mesozoic rocks and deposits, including the Kootenai Formation and the Ellis Group. The water quality is extremely variable; however, the specific conductance (microsiemens/centimeter at 25 degrees C) is often in Class II (1000-2500). Total dissolved solids range from 200 to 500 mg/L in the Kootenai Formation and are generally less than 600 mg/L in the Ellis Group.

3.5 Vegetation Resources

All surface rights of the proposed lease parcels are under private control, most of the historic vegetative communities have been modified as cropland (wheat) or seeded with the non-native *Agropyron cristatum* (crested wheatgrass) for livestock grazing purposes. Beyond noting invasive brome grasses, no noxious weeds were seen within the proposed lease parcels.

MTM 102757-XW is all cropland and the majority of MTM 102757-XQ is currently planted in *Agropyron cristatum* or is in cropland. MTM 102757-XR contains the most Historic Climax Plant

Community (HCPC) vegetation; however, there are areas within the parcel that are in cropland or that have been seeded with the non-native *Agropyron cristatum.*
The ecological sites most associated within the proposed lease parcels were originally developed under the Northern Great Plains climatic condition, geological parent material, fire biotic factors, and under the natural influence of herbivory. The following descriptions of the ecological sites speak to vegetative communities as they are found in their climax state.

R052XN162MT (clayey 10-14" p.z.)
The vegetative communities associated with this ecological site developed under Northern Great Plains climatic conditions, geological parent materials, fire, biotic factors, and under the natural influence of herbivory. The interpretive plant community for this site is the HCPC. Cool season, tall and mid-grasses (such as bluebunch wheatgrass, green needlegrass, western wheatgrass, and thickspike wheatgrass) dominate the HCPC. Prairie junegrass is the most common short grass. Other short grasses and sedges include plains reedgrass, threadleaf sedge and needleleaf sedge. Bluebunch wheatgrass is a dominant species on the Clayey 10-14" p.z. site in the northern Glaciated Plains. Blue grama is the only common warm season grass. The range inventories on Fort Peck and Fort Belknap Reservations (2001-2004) did not report any sideoats grama or little bluestem on this site. Grasses represent about 80% of the total annual production in the community.

Dotted gayfeather, American vetch, white prairie clover and purple prairie clover are warm season forbs that commonly occur on these Clayey 10-14" p.z. sites. American vetch and the prairie clovers are nitrogen-fixing species, and are also valuable forage producing plants. Groundplum milkvetch, scurfpea and prairie thermopsis are lower-successional forbs that have the ability to fix nitrogen. White milkwort, biscuitroot, wild onion and western yarrow may be present as minor components of the plant community. Forbs represent about 15% of the total annual production.

Winterfat and Nuttall's saltbush are common warm and cool season shrubs, respectively. They are valuable forage for wildlife and livestock. Silver sagebrush and fringed sagewort, two additional warm season shrub species, may represent a minor component of the HCPC. One would not expect to find more than a trace of broom snakeweed and pricklypear cactus in the HCPC. Very few cool season shrubs grow on the site. Overall, shrubs account for about 5% of the annual plant production.

Range inventory data collected (in 2001 and 2004) on the Fort Peck and Fort Belknap Indian Reservations, and previous clipping studies by the NRCS indicate total annual production averages 1300 lbs/ac during normal years. Production varies from 900 to 1800 lbs/ac in unfavorable and favorable years, respectively. Average annual production is expected to increase and decrease, respectively on more mesic and xeric portions of the Glaciated plains.

R052XN178MT (shallow 10-14" p.z.)
The HCPC is comprised of a mixture of cool and warm season grasses and shrubs. About 70% of the annual production is from grasses and sedges, most of which is produced during the cool season. Forbs and shrubs contribute 10 and 20%, respectively, to total annual production. Total vegetative production averages 900 lbs/ac in normal years, 600 lbs/ac in "unfavorable" years, and 1100 lbs/ac in "favorable" years.

Bluebunch wheatrgrass, western/thickspike wheatgrass, green needlegrass, little bluestem, and needleandthread are the most common grasses in this community. Bluebunch wheatgrass is more prevalent in the western portion, rather than the eastern portion of the Glaciated Plains. These tall and mid, cool season grasses account for 60-70 percent of the total production.

Two warm season, short grasses (plains muhly and blue grama) and a mix of cool season short grasses (prairie junegrass, plains reedgrass, and sandberg bluegrass) commonly occur in the HCPC. Total production by short grasses usually represents less than 10% of the total production. Needleandthread, a mid-successional cool season bunchgrass, may produce from 10-20% of the total annual production.

American vetch (cool season) and purple and white prairie clover (warm season) are native, nitrogen-fixing legumes. They are valuable forage plants and are also an integral part of the HCPC. Milkvetch and prairie thermopsis are two additional legumes that fix nitrogen. However, they are generally rated as fair and poor forage for livestock, respectively. Bastard toadflax, aster, and hoods phlox should be no more than a minor component of the forb community.

Skunkbush sumac and winterfat, respectively, are important cool and warm season shrubs. They should be present in the HCPC. Shrubs such as creeping juniper, broom snakeweed, prickly pear cactus and fringed sagewort should be no more than a minor component of the community. Similarity indices >75% are associated with this community.

Tall and mid cool season grasses generally dominate the HCPC. However, the Shallow 10-14" p.z. ecological site is not characterized by a precise assemblage of species that remains constant from place to place or from year to year. Variability is apparent in productivity and occurrence of individual species. For example, little bluestem and sideoats grama production is favored on north and east aspects, while bluebunch wheatgrass and needleandthread growth is favored on south and west aspects. Little bluestem and needleandthread also prefer coarse textured soils, rather than fine textured soils.

R052XN168MT (silty steep 10-14" p.z.)
Cool season tall and mid-grasses (such as bluebunch wheatgrass, green needlegrass, western wheatgrass, thickspike wheatgrass, porcupine grass and needleandthread grass) dominate the HCPC. These cool season grasses represent about 75% of the total annual plant production in the community. Bluebunch wheatgrass is the dominant bunchgrass on Silty-Steep sites in the northern Glaciated plains.

Less common species in the HCPC include short grasses and sedges (plains muhly, prairie junegrass, threadleaf sedge, plains reedgrass and blue grama). These short grasses and grasslike plants contribute about 10% of the annual production. Dotted gayfeather, scurfpeas, and prairie clovers are important warm season forbs. American vetch may be the most important cool season forb. In addition to being desirable forage, it also fixes nitrogen. Total forb production normally represents less than 5% of the total annual production.

Winterfat is a common warm season shrub that is highly prized as browse for livestock and wildlife. Rose and snowberry, two cool season shrubs often are present on the site. Silver sagebrush and fringed sagewort, two warm season shrubs may also be found on the site. Overall, shrubs account for about 10% of the annual plant production.

Annual production of the Historic Climax Plant Community (HCPC) on Silty-Steep 10-14" p.z. ecological sites in the Glaciated Plains is not fully documented by either range inventory data collected (in 2001 and 2004) on the Fort Peck or Fort Belknap Indian Reservations, or with soil-vegetation correlation data (NRCS-417 Forms) in Northeastern Montana. Inventory data indicates that Similarity indices (SI) of 55-75% were associated with annual production estimates of 925 lbs/ac. Thus, 1200 lb/ac is accepted as a reasonable average production estimate for the HCPC, as inventoried and reported in the August 1981 range site description. Average annual production is expected to increase and decrease, respectively on more mesic and xeric portions of the northern Glaciated plains.

3.6 Special Status Species
3.6.1 Special Status Animal Species
3.6.1.1 Aquatic Wildlife
BLM sensitive fish species do not occur in any of the proposed lease parcels. Small, shallow stock ponds occur on parcels XR and XQ, but no water flows from the parcels into the Marias River.

3.6.1.2 Threatened, Endangered, Candidate, and Proposed Species
No formal surveys/inventories for wildlife have been completed in the offered parcels. LFO Wildlife Biologist, Matt Comer, attended site visits to the parcels on March 27, 2013. Potential habitats and species needs were evaluated. The parcels contain low potential habitat in and adjacent for the Threatened grizzly bear and Candidate Sprague's pipit.

Based on information obtained from the Montana Natural Heritage Program website (MNHP 2013), there are no known occurrences of federally threatened or endangered species within offered parcels. No FWS critical habitat has been designated in any of the proposed lease parcels.

Recent years have seen grizzly bears (*Ursus arctos*) expanding use east onto the plains. Mike Madel's (MFWP) April 21, 2012 telemetry flight found a sow and two yearlings feeding along the Dry Fork of the Marias River in the Marias Wildlife Management Area. Parcels XR and XQ are in close proximity (about 6 miles) to this location. The Northern Continental Divide Ecosystem (NCDE) grizzly bear recovery zone is approximately 10 to 15 miles west of all the parcels.

Sprague's pipit (*Anthus spragueii*) is a candidate species, and listing is warranted but precluded. All nominated parcels that had potential nesting habitat on the surface were deferred per the RMP oil and gas protest resolution. Portions of Parcels XQ and XR contain potential Sprague's pipit habitat with low suitability but the rest is unsuitable. Breeding evidence has been documented approximately 15 miles away in Toole County. A bird was also documented during a survey just two miles northeast on the Marias Wildlife Management area in June, 2011, although breeding evidence was not documented (MNHP 2013).

3.6.1.3 Sensitive Species and Migratory Birds
During the site visit, a Golden eagle (*Aquila chrysaetos*) nest was discovered on Parcel XR. Two other BLM Sensitive Species have been documented through the Montana Natural Heritage Program (MNHP 2013) in the proposed lease parcel vicinity. These include: Bald eagle (*Haliaeetus leucoephalus*), and Peregrine falcon (*Falco peregrinus*). Habitat may occur within the offered parcels that may support the species mentioned, as well as other BLM sensitive birds, migratory birds, herpetofauna and bats that have not been recorded or observed. Appendix C lists special status species with potential to occur in the project area, and Table 3 lists parcels containing potential habitat for species identified in Appendix C.

Table 3. Potential Threatened and Sensitive Species within the Analysis Area

Species	XQ	XR	XW
Great Plains toad	✓	✓	
Northern leopard frog	✓	✓	
Plains spadefoot	✓	✓	
Greater short-horned lizard	✓	✓	✓
Western hog-nosed snake	✓	✓	✓
Baird's sparrow	✓	✓	
Bobolink	✓	✓	
Chestnut-collared longspur	✓	✓	
Ferruginous hawk	✓	✓	✓
Golden eagle	✓	✓	✓
Loggerhead shrike	✓	✓	
Long-billed curlew	✓	✓	
Marbled godwit	✓	✓	
McCown's longspur	✓	✓	
Peregrine Falcon		✓	
Sprague's pipit	✓	✓	
Swainson's hawk	✓	✓	✓
Fringed myotis		✓	
Grizzly bear	✓	✓	✓
Long-eared myotis		✓	
Long-legged myotis		✓	
Swift fox	✓	✓	✓

3.6.2 Special Status Plant Species

No surveys for special status species have been completed on nominated lease parcels. Austin's knotweed and Crawe's sedge are BLM Sensitive Species known to occur in Pondera County. There is no potential habitat for Austin's knotweed near the Pondera County parcels. Habitat for Crawe's sedge includes wet, gravelly or sandy soil along streams or pond margins If Crawe's sedge were to be found, proposed lease parcel MTM 102757-XR would be the most likely to contain the species. However, portions of the proposed lease parcel have already been converted to non-native vegetative species for agriculture use or livestock grazing which could reduce the likelihood of the proposed lease parcel to contain Crawe's sedge. Surface ownership of the parcel remains in private control.

3.7 Fish and Wildlife

Terrestrial game species with potential to occur in and adjacent to the parcels include antelope (*Antilocapra americana*), black bear (*Ursus americanus*), mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), sharp-tailed grouse (*Tympanuchus phasianellus*), ring-necked pheasant (*Phasianus colchicus*), and gray partridge (*Perdix perdix*). Table 4 shows the terrestrial game occurrence within offered parcels and type/seasons of potential use (if known/mapped).

Table 4. Terrestrial Game Species Occurrence within Offered Lease Parcels

Game Species	Parcels		
	XQ	XR	XW
Antelope	G*	G	G
Black Bear	G	G	G
Gray Partridge	✓	✓	✓
Mule Deer	G	G	G
Pheasant	Fair	Fair	Fair
Sharp-tailed grouse	✓	✓	✓
White-tailed deer	G	G	G

*G = General Habitat; W = Winter Habitat; ✓= Within Mapped Distribution; Pheasant Relative Habitat Quality was Delineated

3.8 Cultural Resources

The BLM is responsible for identifying, protecting, managing, and enhancing cultural resources which are located on public lands, or that may be affected by BLM undertakings on non-Federal lands, in accordance with the National Historic Preservation Act (NHPA) of 1966, as amended. The procedures for compliance with the NHPA are outlined in regulation under 36 CFR 800. Cultural resources include archaeological, historic, and architectural properties, as well as traditional life-way values and/or traditional cultural properties important to Native American groups.

Cultural resources are discussed in the Headwaters Final RMP/EIS on page 16. To update and supplement that data, in 2010 the BLM completed a Class I Overview of the historic, prehistoric, and paleontological resources present throughout the Central Montana District. That document is on file at the LFO.

The BLM broadly defines cultural resources as any traditional lifeway belief or cultural property. Cultural properties are defined as distinct evidence in areas of past human occupation, activity, and use. Traditional lifeway beliefs are defined as traditional value systems of religious beliefs, cultural practices, or social exchange that are not closely and tangibly defined or identified with definite locations (Headwaters RMP, 1983).

Early peoples in the study area were mobile hunters and gatherers throughout and up until the historic period. The following brief overview explains changes through time as summarized by other archaeologists (Friesen 2010; Ruebelmann 1983).

Cultural sites can be considered significant for several reasons; some because information about the past can be learned through methodical study of the sites, while other sites communicate a sense of a particular time period they represent in history. Finally, sites can be considered to be important because of the current use or values associated with the location.

An important consideration for management actions in this area is preserving the values of the cultural properties contained within. In order to preserve the integrity of a cultural property, it is sometimes necessary to preserve the location in which the cultural property is found. This is an important consideration when the management actions have the potential to affect the location of a cultural property, thus affecting the overall integrity of the cultural property.

The Montana Historical Society's State Historic Preservation Office, through funding provided by the BLM for a cultural resource data sharing project, maintains the State Antiquities Database. This database maintains records of all sites recorded and all cultural resource inventories completed on federal, state, and private lands. The legal descriptions of the lease parcels were compared against this database to

determine the potential for effects resulting from the leasing of the parcels. None of the private land has been inventoried.

For the western part of the district, which at the time of the Class I Overview of the BLM Central Montana District (2010) included Pondera, Teton, and northern Lewis & Clark Counties, 32.6% of federal lands had been inventoried, with the majority of that being in Lewis & Clark and Teton counties. The amount of private land inventoried statewide tends to be significantly lower since requirements to conduct inventories only involve federal undertakings, which tend to occur primarily on federal lands. In the last Montana Historic Preservation Plan (2013:i) the Montana State Historic Preservation Office stated that "only about 5.5% of Montana has been inventoried for heritage properties."

In 2013, the LFO archaeologist visited all of the Pondera County parcels to make an initial assessment on site probability and the potential for cultural resources to be present:

- MTM 102757-XQ has not been inventoried. Initial assessment work identified one historic period property.
- MTM 102757-XR has not been inventoried. Initial assessment work identified no cultural sites.
- MTM 102757-XW has not been inventoried. Initial assessment work identified no cultural sites. This parcel has evidence of recent agricultural use.

The general area of all of the parcels is known to have been used by the Blackfeet as well as by the Metis.

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.

None of the Indian tribes with whom we consult have identified traditional cultural properties or sacred areas within the analysis area. The Blackfeet have dominated the area, and still have a strong presence with the Blackfeet Indian Reservation being within five miles of all of the parcels. Métis and the Salish and Kootenai have used this area as well. Geographic features near the analysis area of known importance to various tribes include the Marias River, and within the general viewshed Ear Mountain, the Rocky Mountain Front in general, and the Sweetgrass Hills. This area has been used as collection sites for plants, as a sacred area, and for camping and habitation.

3.10 Paleontological Resources

The subject oil and gas lease parcels are located within areas of varying potential fossil yield classifications (PFYC) that are assigned from associated geologic units. The paleontological resource potentials are evaluated based on Montana Bureau of Mines and Geology geologic maps, field verification, and the LFO Class I Overview (Hanna 2009).

The surface geology in the area of the lease parcels is dominated by the Late Cretaceous sedimentary layers deposited by the ingressing and regressing epeiric seaway of that time. The youngest outcropping geologic unit is the Two Medicine Formation. This unit is well known for producing fossils and is designated as a class 5 formation under the PFCY system for its highly fossiliferous nature. One hundred and seven localities (97 vertebrate, 10 nonvertebrate) have been documented for the Two Medicine

Formation within the LFO area, but none of these sites are located in any of the parcels. The geologic unit itself outcrops in all three parcels, atop the flatter benches of higher elevation. Generally, these benches are overlain by a thin layer of glacial gravels if not agriculturally tilled. In the case of parcel MTM 102757 - XW, the surface geology consists entirely of Two Medicine Formation.

In the eastern two parcels, MTM 102757 - XQ and XR, the drainages incise the flat-lying Two Medicine, exposing the underlying Virgelle Formation. The thick layers of Virgelle sandstone are the most prominent geologic feature of the area's landscape, forming the steep, lightly colored rocky outcrops and cliffs. The Virgelle Formation is classified as a 3b geologic unit under the PFYC system because it has yielded some significant fossils but remains poorly studied or documented.

The Telegraph Creek Formation underlies the Virgelle sandstone, outcropping along the bottom of the drainages in parcels MTM 102757 - XQ and XR. The Telegraph Creek has a low potential for producing fossils and is considered to be a class 2 formation under the PFYC system.

3.11 Visual Resources

VRM only applies to BLM surface. Based on the surroundings, the private parcels are located in an area similar to VRM Class IV. 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 elements 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.

From MTM 102757-XR, 40+ turbines, measuring approximately 200+ feet with blade, can be seen northeast of the parcel and 70+ foot powerlines can be seen west of the parcel. From the northern portion of MTM 102757-XQ, 90+ turbines can be seen. Other disturbances within the proximity of these parcels include 3 to 4-wire fences and bladed roads.

3.12 Forest and Woodland Resources

No Forests or Woodlands exist on the subject parcels; therefore, there are no potential affects to these resources. No further analysis is needed.

3.13 Livestock Grazing

Livestock grazing is currently a use within two of the three proposed lease parcels (MTM 102757-XQ, MTM 102757-XR). As surface ownership is under private control, kind/type of livestock, season of use or Animal Unit Months (AUMs) is unknown.

3.14 Recreation and Travel Management

BLM only manages recreational opportunities and experiences on BLM-administered surface. The affected environment consists of approximately 760 acres of private surface. No further analysis is needed.

3.15 Lands and Realty

All parcels within this environmental analysis are privately owned surface, and therefore, the surface is not administered by the BLM. A records search shows the following:

Parcel MTM-102727-XQ (both parcels) was patented in September, 1939, reserving all minerals to the United States at the time of patent. There are currently no right-of-ways or other land use authorizations which have been issued by the BLM.

Parcel MTM-102727-XW (both parcels) was patented in June, 1950, reserving oil and gas to the United States at the time of patent. There are currently no right-of-ways or other land use authorizations which have been issued by the BLM.

Parcel MTM-102727-XR (Section 29 parcel and NWSW of Section 20 parcel) was patented in September of 1925, reserving all minerals to the United States. There are currently no right-of-ways or other land use authorizations which have been issued by the BLM.

Parcel MTM-102727-XR (remaining Section 20 parcels) was patented in November 1923, reserving oil and gas to the United States. There are currently no right-of-ways or other land use authorizations which have been issued by the BLM. It is not a BLM authorization; however, the BLM's surface management Valier map indicates a pipeline travels through this parcel in the SE¼NE¼ of Section 20. An overhead power line corridor also runs north-south along the section line of 19 and 20, just outside the parcel boundary.

3.16 Minerals

3.16.1 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.

Currently there are 253 federal oil and gas leases covering approximately 201,868 acres in the LFO. The number of acres leased and the number of leases can vary on daily basis as leases are relinquished, expired, or terminated. Existing production activity occurs on approximately 14.6 percent of this lease acreage. Information on numbers and status of wells on these leases and well status and numbers of private and state wells within the external boundary of the field office is displayed in Table 5. Numbers of townships, leases acres within those townships, and development activity for all jurisdictions are summarized in Table 6.

Exploration and development activities would only occur after a lease is issued and the appropriate permit is approved. Exploration and development proposals would require completion of a separate environmental document to analyze specific proposals and site-specific resource concerns before BLM approved the appropriate permit.

Table 5. Existing Development Activity

	Federal Wells	Indian Trust Wells	Private and State Wells
Drilling Well(s)	0	0	3
Producing Gas Well(s)	0	0	78
Producing Oil Well(s)	0	12	178
Water Injection Well(s)	0	1	32
Shut-in Well(s)	5	14	194
Temporarily Abandoned Well(s)	0	20	20

Table 6. Oil and Gas Leasing and Existing Development

	Pondera County
Number of Townships Containing Lease Parcels	2
Total Acres Within Applicable Township(s)	46,047
Acres of Federal Oil and Gas Minerals	5,460
Percent of Township(s)	11.9
Acres of Leased Federal Oil and Gas Minerals	0
Percent of Township(s)	0
Acres of Leased Federal Oil and Gas Minerals Suspended	0
Percent of Township(s)	0
Federal Wells	No Drilling, producing, shut in, or TA wells.
Indian Trust Wells	No Drilling wells, 3 POWs, 1 PGW, 3 OSI wells.
Private and State Wells	No Drilling, No producing, 2 shut in, and No TA wells.
POW – Producing Oil Well, INJEOR – Water Injection Well Enhanced Oil Recovery, OSI – Oil Shut-in, GSI – Gas Shut-in, WSW- Water Source Well, COMP. – Completed well-unknown current status, WWR – Water Well Released, WDW – Water Disposal Well	

Data displayed is within Townships containing the subject lease parcels

3.16.2. Solid Minerals

3.16.2.1. Coal

There is no current coal production in the lease parcel areas. Information was verified utilizing the economic coal deposits GIS layer. No proposed lease parcels are lying over any leased coal deposits.

3.16.2.2. Locatable Minerals

Locatable minerals are subject to provisions of the 1872 Mining Law. These generally include metallic minerals such as gold and silver and other materials not subject to lease or sale. There is currently no locatable mineral production or potential identified for production in the lease parcel areas.

3.16.2.3. Salable Minerals

Salable minerals (mineral materials) are those common varieties of sand, stone, gravel, cinders, pumice, pumicite, and clay that may be acquired under the Materials Act of 1947. Mineral materials are disposed of by free-use and community/common-use permits granted to municipalities or non-profit entities, respectively. Contracts for sale of mineral materials are offered to private entities on both a competitive and non-competitive basis. Disposal of salable minerals is a discretionary decision of the BLM authorized officer. Future potential resource development conflicts would be avoidable either by not issuing sales contracts in oil and gas development locations or conditioning the APD or salable mineral contracts in a manner to avoid conflicts between operations.

None of the lease parcels proposed to be leased for oil and gas in the Project Area conflict with current permits and contracts for salable minerals awarded on federal lands. Therefore, this subject will not be further analyzed in this document.

3.17 Special Designations

3.17.1 National Historic/Scenic Trails

Lewis and Clark National Historic Trail is located approximately 2 miles west of MTM 10257-XW and approximately 2.5 miles northeast of MTM 102757-XQ. The parcels would not be viewable from the Lewis and Clark National Historic Trail. Thus, no further analysis is needed.

3.17.2 Areas of Critical Environmental Concern (ACECs)/Wilderness Study Areas (WSAs)

No ACECs or WSAs exist within the vicinity of the proposed parcels. No further analysis is needed.

3.18 Social and Economic Conditions

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 local economic impact area for this analysis includes (Cascade, Hill, Pondera, and Toole Counties). In addition to Pondera County, the other three counties are included because of the oil and gas related businesses that are based in Shelby, Havre, and Great Falls that work in oil and gas exploration, development, and production. While public revenues from oil and gas leasing, rent, and production addressed in this EA would only be distributed to Pondera County, direct and indirect economic activity as well as employment and income effects would occur in the other counties as well.

The four-county economy had an estimated 2010 population of 110,187 people. Total employment was estimated to be 70,047 jobs; there were an estimated 43,789 households; and there were 186 industrial sectors represented (IMPLAN, 2010). There were 1.57 people per job and 0.63 households per job.

Nature of the Oil and Gas Industry:
In March 2013, BLM had leases in effect covering 36,240 acres in Pondera County. Annual lease rent is paid on 23,766 acres that are not held by production on leases with oil/gas being produced from one or more wells. Estimated annual average lease bonus and rental revenue to the Federal government is about $71,000. Lease rent was not paid on 12,474 acres that were held by production. Instead, royalties are paid on oil and gas production from these leases.

A portion of the oil and gas-related revenues collected by the Federal government is distributed to the state and counties. The amount that is distributed is determined by the Federal authority under which the Federal minerals are being managed. The leased acres changes daily as some leases expire and other parcels are leased. Within the field office boundary, public domain Federal minerals account for about 68 percent of the acres leased; acquired lands/minerals, mostly Bankhead-Jones lands, account for about 32 percent of acres leased. The leased acres changes daily as leases expire and other parcels are leased.

Forty-nine percent of these Federal leasing revenues from public domain minerals are distributed to the state and the state distributes 25% back to the counties (Title 17-3-240, Montana Code Annotated). Twenty-five percent of the Federal leasing revenues from acquired minerals are distributed to the counties of production.

Leasing:
Federal oil and gas leases generate a one-time lease bonus bid as well as annual rents. The minimum lease bid is $2.00 per acre. If parcels do not receive the minimum bids they may be leased later as noncompetitive leases that don't generate bonus bids. Between 2005 and 2011, average BLM bonus bids in Pondera County were $8.18 per acre.

Lease rent is $1.50 per acre per year for the first five years and $2.00 per acre per year thereafter. Typically, oil and gas leases expire after 10 years unless held by production. Annual lease rent continues until one or more wells are drilled that result in production and associated royalties.

Currently, the Federal government collects an estimated annual average of about $71,000 in lease bids and rent in Pondera County; of which about $29,000 is distributed to the state/county (Pondera) governments.

Production:
Federal oil and gas production in Montana is subject to production taxes or royalties. 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 the royalties from public domain Federal minerals are distributed to the state, of which 25 percent is distributed back to the county of production (Title 17-3-240, MCA).

In 2010, 3,842 MCF of natural gas was produced from BLM-administered Federal minerals in the Pondera County. This amounted to about one percent of total natural gas production in the county. No oil was produced from Federal leases. Natural gas production from federal minerals produced less than $2,000 in federal royalty revenue and less than $1,000 was disbursed to the county.

Local Economic Contribution:
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, 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 737 total jobs and $26.4million in total employee compensation and proprietor income in the local economy (IMPLAN, 2010).

Total average annual Federal revenues from Federal oil and gas leasing, rents, and royalty payments in Pondera County are an estimated $73,000. Federal revenues distributed to the state of Montana amount to an estimated $30,000 per year. The state redistributes an estimated $12,000 to Pondera County per year. These revenues help fund traditional county functions such as enforcing laws, administering justice, collecting and disbursing tax funds, providing for orderly elections, maintaining roads and highways, providing fire protection, and/or keeping records. Other county functions that may be funded include administering primary and secondary education and operating clinics/hospitals, county libraries, county airports, local landfills, and county health systems.

The estimated annual local economic contribution associated with Federal leases, rents, drilling, production, and royalty payments combined to support less than one local job and about $6,000 in local labor income, respectively. These contributions also equal less than one percent of the local employment and about local income. Table 7 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 7. Current Contributions of Federal Oil and Gas to the Local Economy
Leasing, Exploration, Development, and Production

Industry	Employment (jobs)		Labor Income (Thousands of 2010 dollars)	
	Area Totals	Federal O&G - Related	Area Totals	Federal O&G- Related
Agriculture	4,008	0	$28,282	$0
Mining	810	0	$31,425	$0
Utilities	300	0	$29,130	$0
Construction	4,261	0	$199,464	$0
Manufacturing	1,153	0	$67,785	$0
Wholesale Trade	1,885	0	$107,053	$0
Transportation & Warehousing	2,221	0	$152,165	$0
Retail Trade	8,233	0	$212,286	$0
Information	1,152	0	$53,150	$0
Finance & Insurance	4,505	0	$192,617	$0
Real Estate & Rental & Leasing	2,200	0	$26,314	$0
Prof, Scientific, & Tech Services	2,786	0	$139,865	$0
Mngt of Companies	106	0	$6,932	$0
Admin, Waste Mngt & Rem Serv	2,183	0	$56,052	$0
Educational Services	845	0	$20,175	$0
Health Care & Social Assistance	8,654	0	$445,607	$0
Arts, Entertainment, and Rec	1,807	0	$20,715	$0
Accommodation & Food Services	5,130	0	$80,702	$0
Other Services	3,768	0	$118,210	$0
Government	14,040	0	$927,094	$2
Total	70,047	0	$2,915,025	6
Federal O&G as Percent of Total		0.00%		0.00%

IMPLAN, 2010 database

4.0 ENVIRONMENTAL IMPACTS

4.1 Assumptions and Reasonably Foreseeable Development Scenario Summary

At this stage of the leasing process, the act of leasing parcels would not result in any activity that might affect various resources. Even if lease 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 detailed information about proposed wells and facilities would be provided for particular leases. Therefore, this EA discusses potential indirect 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 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 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, based on site-specific analysis that could include moving the well location, restrict timing of the development, 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.

Environmental consequences are discussed below by alternative to the extent possible at this time for the resources described in Chapter 3, as well as potential indirect effects from leasing.

4.1.1 Reasonably Foreseeable Development Scenario Summary

The following assumptions are from the RFD developed for the Lewistown Field Office. The BLM administers approximately 1,329,799 acres of federal minerals (for fluid minerals) available for leasing within the LFO. The RFD forecasts the following level of development in the Lewistown Field Office area.

All parcels within the analysis area are in the portion of the LFO that was included in the Judith Resource Area and the JVP RMP. An RFD scenario was prepared for this RMP. After review, it has been determined that the development potential portrayed within the RMP is still valid. Only six townships in Fergus and Petroleum Counties have high development potential for oil and gas. The rest of the area is moderate potential for oil and gas.

The validation included a review of the drilling and production histories for both counties for the prior 20 years using the Montana Board of Oil and Gas Conservation online database and PI/Dwights information. Between 1992 and 2012, the drilling of approximately 81 wells occurred in Pondera County, with 29 drilled and abandoned as dry holes or without production; 26 were completed as producing oil or gas wells; 19 are currently shut-in oil or gas wells; 3 are currently in drilling status; 1 water injection well; 1 water disposal well and 2 plugged oil or gas depleted producers. Recently, within the previous two years, seven wells have been drilled within Pondera County that currently has the statuses of the following: 3 drilling, 1 oil shut-in and 3 drilled and abandoned dry holes. Production in Pondera County includes oil, associated gas, gas well gas (natural gas) and condensate oil. There are currently 272 wells actively producing oil and gas in Pondera County. This can be further broken down into the following: 198 oil wells producing approximately 11,332 BOPM and no associated gas; 74 gas wells producing approximately 16,849 MCFPM and 60 BOPM of condensate.

4.1.2 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.

4.1.3 Analysis Assumptions for Alternative B

No surface disturbance would occur as a result of issuing leases. The potential number of acres disturbed by exploration and development activities is based upon the 80 acre spacing of wells within the analysis area. The potential acres of disturbance reflect acres typically disturbed by construction, drilling, and production activities, including infrastructure installation throughout the LFO. Typical exploration and development activities and associated acres of disturbance were used as assumptions for analysis purposes in this EA. (Note: The assumptions were not applied to Alternative A because the lease parcels would not be recommended for lease; therefore, no wells would be drilled or produced on the lease parcel, and no surface disturbance would occur on those lands from exploration and development activities).

The information concerning the RFD assumption by parcel is as follows:

> Parcel MTM 102757 - XQ (T31N, R4W, Pondera County, Sec 17, (NE, S2NW, N2S2); 18 (SWSE) are all located 4.6 to 4.8 miles from the nearest active gas well in the Marias River Field. Being that the parcels of land are located outside of a general productive area of the Marias River Field, the potential for discovering and developing future oil and gas production is low to moderate. This was given a low to moderate potential rating, not only for the above discussion, but also because of the number of dry holes drilled throughout the township and the geology of the area not yielding high potential opportunity for discovery.
>
> Parcel MTM 102757 – XR (T31N, R4W, Pondera County, Sec 20, NENE, S2NE, N2SW, NWSE; Sec. 29: SWNE) is located approximately 4.6 miles from the nearest active gas well in the Marias River Field. The tract of land is 4.0 miles from the boundary of the Marias River Field. Potential for this area to experience further drilling opportunities is moderate; however, the potential for discovering a commercial well is low to moderate because of the number of dry holes drilled throughout the township and the geology of the area not yielding high potential opportunity for discovery.
>
> Parcel MTM 102757 - XW (T31N, R5W, Pondera County, Sec 27, SWNE, NENW) is located approximately 4.1 miles from the nearest active gas well in the Marias River Field. The tract of land is 2.0 miles from the boundary of the Cut Bank Field. Potential for this area to experience further drilling opportunities is moderate; however, the potential for discovering a commercial well is low to moderate because of the number of dry holes drilled throughout the township and the geology of the area not yielding high potential opportunity for discovery.

By itself, the act of leasing the parcels would have no impact on any natural resources in the area administered by the LFO. 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.

4.2 Alternative A (No Action)

4.2.1 Direct Effects Common to All Resources

Under Alternative A, the three parcels would not be offered for competitive oil and gas lease sale. Under this alternative, the state and private minerals could still be leased in surrounding areas.

There would be no new impacts from oil and gas exploration or production activities on the federal lease 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 from the parcel lands. The No Action Alternative would result in the continuation of the current land and resource uses on the lease parcels.

Except for Economic resources, described below, no further analysis of the No Action Alternative is presented.

4.2.2 Economics

4.2.2.1 Direct and Indirect Effects

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 8 is a summary of local revenues, employment, income, population, and household impacts of each alternative.

Economic effects are displayed in Table 8 (Change in Estimated Average Annual Economic Impacts), Table 9**,** and Table 10. With Alternative A none of the parcels considered would be leased. Consequently, no additional Federal, state, or local revenues would be generated from leasing, rents, or royalties associated with production. No additional employment or income would be generated if none of the parcels are leased.

Table 8. Change in Estimated Average Annual Economic Impacts

Alternative	Change in Acres Recommended for Lease	Change in Local Revenue to Counties ($)	Change in Total Employment (full and part-time jobs)	Change in Total Labor Income ($)	Change in Population Change	Change in Change in Number of Households
A	0	0	0	0	0	0
B	800	$300	0	0	0	0

4.2.2.2 Cumulative Effects

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.3 and Table Econ. 4. The cumulative demographic and economic characteristics of the local economy would not change if the parcels being considered are not leased.

Table 9. Summary Comparison of Cumulative Annual Economic Impacts

Activity	Alternative	
	A	B
Existing Acres leased*	36,240	36,240
Acres that would be leased based on this EA	0	800
Total acres leased	36,240	37,040
Acres held by production*	12,474	12,474
Total acres leased for which lease rents would be paid	23,766	24,566
Total average annual Federal lease and rental revenue	$71,271	$73,289
Average annual distribution to State/local government	$29,449	$30,459
Average annual gas production (MCF)**	3,842	3,927
Total Average annual Federal O&G royalties	$1,748	$1,787
Average annual distribution to State/local government	$722	$738
Total average annual Federal Revenues	$73,019	$75,076
Total average annual State/Local Revenues	$30,172	$31,197
Total average annual revenue distributed to counties	$11,924	$12,260

Table 10. Employment and Income Related to BLM Oil and Gas Management

Industry	Total Jobs Contributed		Total Income Contributed ($)	
	Alt. A	Alt. B	Alt. A	Alt. B
Total Federal Contribution	0	0	$6,000	$6,000

4.3 Alternative B (Proposed Action)

Under Alternative B, the three parcels, 760 federal mineral acres (all private surface), would be offered for competitive oil and gas lease sale. No parcels would need to be deferred under the RMP oil and gas protest resolution.

4.3.1 Direct Effects Common to All Resources

The action of leasing the parcels in Alternative B would, in and of itself, have no direct impact on resources. Any potential effects on resources from the sale of leases would occur during lease exploration and development activities. At the time of this review, it is unknown whether a particular lease parcel would be sold and a lease issued.

4.3.2 Indirect Effects Common to All Resources

Oil and gas exploration and development activities such as construction, drilling, production, infrastructure installation, vehicle traffic and reclamation are indirect effects from leasing the parcels in Alternative B. It is unknown when, where, how, or if future surface disturbing activities associated with oil and gas exploration and development such as well sites, roads, facilities, and associated infrastructure would be proposed. It is also not known how many wells, if any, would be drilled and/or completed, the types of technologies and equipment would be used and the types of infrastructure needed for production of oil and gas. Thus, the types, magnitude, and duration of potential impacts cannot be precisely quantified at this time, and would vary according to many factors. The potential impacts from exploration and development activities would be analyzed after receipt of an APD or sundry notice.

Typical impacts to resources from oil and gas exploration and development activities such as well sites, roads, facilities, and associated infrastructure are described in the Headwaters RMP, 1983.

4.3.3 Air Resources
4.3.3.1 Direct and Indirect Effects
4.3.3.1.1 Air Quality
Leasing the parcels would have no direct impacts on air quality. Any potential effects on air quality from sale of lease parcels would occur at the time the leases are 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 volatile organic compounds during drilling or production activities. The amount of 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, separator, 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 the criteria pollutants fall well below applicable air quality standards indicating very 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 below applicable standards.

4.3.3.1.2 Greenhouse Gas Emissions at the Lewistown Field Office and Project Scales
Sources of GHGs associated with development of lease parcels may 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 in a separate NEPA analysis effort if the BLM receives an APD on any of the parcels considered here.

Anticipated greenhouse gas emissions presented in this section are taken from the Climate Change Supplementary Report for Montana, North Dakota, and South Dakota (Climate Change SIR 2010). Data are derived from emissions calculators developed by air quality specialists at the BLM National Operations Center in Denver, Colorado, based on methods described in the Climate Change SIR (2010). Based on the assumptions summarized above for the Lewistown FO RFD, Table 11 discloses projected annual greenhouse gas source emissions from BLM-permitted activities associated with the RFD.

Table 11. Projected Greenhouse Gas Emissions

Source	BLM Projected Greenhouse Gas Emissions in tons/year from Lewistown FO RFD			Emissions (metric tons/yr)
	CO_2	CH_4	N_2O	CO_2e
Conventional Natural Gas	593.9	2.1	0.0	580.9
Coal Bed Natural Gas (none forecasted in RFD)	0.0	0.0	0.0	0.0
Oil	727.6	1.4	0.0	696.6
Total	**1,321.5**	**3.5**	**0.0**	**1,277.5**

BLM RFD projected annual emissions of greenhouse gases associated with oil and gas exploration and development activity in the Lewistown Field Office RFD.

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

1. The proportion of each project level action 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 the Proposed Action, approximately 760 acres of lease parcels with federal minerals would be leased. These acres constitute 0.06 percent of the total federal mineral estate of approximately 1,329,799 acres identified in the Lewistown FO RFD. Therefore, based on the approach described above to estimate GHG emissions, 0.06 percent of the Lewistown FO RFD total estimated BLM emissions of 1,277.5 metric tons/year would be approximately 0.73 metric tons/year of CO_2e if the parcels were to be developed.

4.3.3.1.3 Climate Change

The assessment of GHG emissions and climate change is in its formative phase. As summarized in the Climate Change SIR, 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 (Climate Change SIR 2010).

It is currently not possible to know with certainty the net impacts from developing lease parcels 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 greenhouse gas emission or sequestration with the creation or mitigation of any specific climate-related environmental effects. Although the effects of greenhouse gas 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 would occur at the exploration/development stage.

4.3.3.2 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 may 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 stage:

- flare or incinerate hydrocarbon gases at high temperatures to reduce emissions of incomplete combustion;

- install emission control equipment of a minimum 95 percent efficiency on all condensate storage batteries;
- install emission control equipment of a minimum 95 percent efficiency on dehydration units, pneumatic pumps, produced water tanks;
- vapor recovery systems where petroleum liquids are stored;
- tier II or greater, natural gas or electric drill rig engines;
- secondary controls on drill rig engines;
- no-bleed pneumatic controllers (most effective and cost effective technologies available for reducing volatile organic compounds (VOCs));
- gas or electric turbines rather than internal combustions engines for compressors;
- nitrogen oxides (NOx) emission controls for all new and replaced internal combustion oil and gas field engines;
- water dirt and gravel roads during periods of high use and control speed limits to reduce fugitive dust emissions;
- interim reclamation to re-vegetate areas of the pad not required for production facilities and to reduce the amount of dust from the pads.
- co-locate wells and production facilities to reduce new surface disturbance;
- directional drilling and horizontal completion technologies whereby one well provides access to petroleum resources that would normally require the drilling of several vertical wellbores;
- gas-fired or electrified pump jack engines;
- install velocity tubing strings;
- cleaner technologies on completion activities (i.e. green completions), and other ancillary sources;
- centralized tank batteries and multi-phase gathering systems to reduce truck traffic;
- forward looking infrared (FLIR) technology to detect fugitive emissions; and
- air monitoring for NOx and ozone (O_3).

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 12 (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 12. 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
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 (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 (2010).

In an effort to disclose potential future GHG emissions reductions that might be feasible in individual field offices, the BLM estimated GHG emissions reductions based on the RFD for the MCFO. For

analysis purposes, the Miles City FO RFD was selected based on the high potential development scenario. Similar emissions reductions may be possible in other Montana, North Dakota and South Dakota Field Offices. For emissions sources subject to BLM (federal) jurisdiction, the estimated emissions reduction represent approximately 51 percent reduction in total GHG emissions compared to the estimated MCFO federal GHG emissions inventory (Climate Change SIR, as updated October 2010, Section 6.5 and Table 6-3). The emissions reductions technologies and practices are identified as mitigation measures that could be imposed during development. (Note: except for the light-duty vehicle GHG emission standards, no federal or state regulations mandate these GHG emissions reductions).

4.3.4 Soil Resources

4.3.4.1 Direct and Indirect Effects

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.

Construction and operation of well pads, access roads, pipelines, powerlines, reserve pits, and other facilities would result in the exposure of mineral soil, soil compaction and rutting, mixing of soil horizons, loss of soil productivity, and increased susceptibility to wind and water erosion. The likelihood and magnitude of these occurrences is dependent upon local site characteristics, climatic events, and the specific mitigation applied. Effects would be both short-term (well pads and pipelines) and long-term (production areas and access roads). Areas needed for production, access roads, and facilities would require a long-term commitment of the soil resource. These sites remain non-productive and continue to be at risk of erosion and compacted until abandonment and final reclamation.

Generally sites would be revegetated and erosion would return to natural rates within 5 years. Exceptions would be sites poorly suited for reclamation. These areas, once disturbed, are the most difficult and costly to stabilize and reclaim. Lease parcels/development would be subject to stipulations that protect soils on slopes over 30 percent, erodible soil on slopes over 20 percent, slumping soils, and/or wet soils (see Table 13).

4.3.4.2 Mitigation

In the event of exploration/development, a number of measures would be taken to prevent, minimize, or mitigate effects to soil resources. 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. Typical measures include, but are not limited to:

- Avoiding areas poorly suited to reclamation;
- Limiting the total area of disturbance;
- Stripping and stockpiling topsoil separate from sub-soils/spoil;
- Applying erosion/sediment control/containment products and structures, such as mulch,
- straw wattles, water bars, rolling dips, silt fence, bale filters, erosion control blankets and
- mats, cover crops, etc;
- Alleviating compaction;
- Applying soil amendments, when necessary;
- Re-contouring to approximate original contours or blend with surrounding topography;
- Re-seeding with native vegetation;
- Completing interim reclamation on all disturbed areas associated with producing well locations and associated facilities; and
- Monitoring for reclamation success and applying additional measures as needed.

Measures included in the Gold Book (USDI-BLM 2007) would be applied. Additional mitigation measures and/or BMPs, if necessary, would be applied once a site-specific plan of development is

proposed. Upon abandonment of wells and/or when access roads are no longer needed, the authorized officer would issue instructions and/or orders for surface reclamation/restoration of the disturbed areas.

4.3.5 Water Resources

4.3.5.1 Direct and Indirect Effects

Leasing the parcels would have no direct impacts on water resources. Any potential effects on water resources from sale of lease parcels would occur at the time the leases are developed.
The magnitude of the impacts 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 occur from implementation through the time of vegetation reestablishment. As acres of surface-disturbance increase within a watershed, so could the effects on water resources.

Lease parcels/development would be subject to stipulations that protect within 500 ft or the 25-year flood plain from reservoirs, lakes, and ponds and intermittent, ephemeral or small perennial streams and 1,000 ft or the 100-year flood plain from larger perennial streams, rivers, and domestic water supplies. Areas with slopes over 30 percent are also subject to the controlled or limited surface use stipulation. Table 13 shows the approximate acres within these special areas of each lease parcel.

Table 13. Mitigation Buffer for Water Resources and Slopes

Lease Parcel	Lease Parcel Acres	Acres within 500 ft of small streams or ponds	Percent of lease parcel	Acres of area of slope greater than 30 percent	Percent of Lease Parcel
MTM 102757-XW	80	16	20	0	0
MTM 102757-XR	280	237	85	24	9
MTM 102757-XQ	440	257	58	9	2

Approximation of acres within 500 ft of streams and ponds and slopes greater than 30 percent special areas for each lease parcel.

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 and decreases infiltration, which in turn changes flow characteristics, reduces groundwater recharge, and increases sedimentation and erosion (MDEQ 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.

Ground Water:
The eventual drilling of the proposed parcels would most likely pass through useable groundwater. Potential impacts to groundwater resources could occur if proper cementing and casing programs are not followed. This could include loss of well integrity, surface spills, or loss of fluids in the drilling and completion process. It is possible for chemical additives used in drilling activities to be introduced into the water producing formations without proper casing and cementing of the well bore. Changes in

porosity or other properties of the rock being drilled through can result in the loss of drilling fluids. When this occurs, drilling fluids can be introduced into groundwater without proper cementing and casing. Site specific conditions and drilling practices determine the probability of this occurrence and determine the groundwater resources that could be impacted. In addition to changing the producing formations' physical properties by increasing the flow of water, gas, and/or oil around the well bore; hydraulic fracturing can also introduce chemical additives into the producing formations. Types of chemical additives used in drilling activities may include acids, hydrocarbons, thickening agents, lubricants, and other additives that are operator and location specific. These additives are not always used in these drilling activities and some are likely to be benign such as bentonite clay and sand. Concentrations of these additives also vary considerably since different mixtures can be used for different purposes in oil and gas development and even in the same well bore. If contamination of aquifers from any source occurs, changes in groundwater quality could impact springs and residential wells that are sourced from the affected aquifers. Onshore Order #2 requires that the proposed casing and cementing programs shall be conducted as approved to protect and/or isolate all usable water zones.

Known water bearing zones in the lease area are protected by drilling requirements and, with proper practices, contamination of ground water resources is highly unlikely. Casing along with cement is extended well beyond fresh-water zones to insure that drilling fluids remain within the well bore and do not enter groundwater.

Potential impacts to ground water at site specific locations are analyzed through the NEPA review process at the development stage when the APD is submitted. This process includes geologic and engineering reviews to ensure that cementing and casing programs are adequate to protect all downhole resources.

All water used would have to comply with Montana state water rights regulations and a source of water would need to be secured by industry that would not harm senior water rights holders.

4.3.5.2 Mitigation

Stipulations addressing steep slopes, 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 (refer to Appendix B). 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 maintain 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. Given the fore mentioned mitigation measures, no adverse impacts to water quality are expected. Riparian-wetland conditions may be affected but not below proper functioning condition (PFC), which is the minimum standard required for all uses of public lands.

4.3.6 Vegetation Resources

4.3.6.1 Direct and Indirect Effects

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

to vegetation would depend on the vegetation type/community, soil community and the topography of the lease parcels. Disturbance to vegetation is of concern because protection of soil resources, maintenance of water quality, conservation of wildlife habitat, and livestock production capabilities may 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 and noxious weed invasion could result in loss of desirable vegetation. Invasive species and noxious weeds may also reduce livestock grazing forage, wildlife habitat quality, and native species diversity. Cheatgrass is an invasive species well known for completely replacing native vegetation and 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 non-native plants including weedy 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 can 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.

Riparian-Wetland Habitats

Leasing the parcels would have no direct impacts on riparian-wetland habitats. Any potential effects on riparian-wetland habitats from sale of lease parcels would occur at the time the leases are developed. The exploration and development of oil and gas within uplands or adjacent to riparian-wetland areas could reduce riparian/wetland functionality by changing native plant productivity, composition, richness, and diversity; accelerating erosion; increasing sedimentation; and changing hydrologic characteristics. Impacts that reduce the functioning condition of riparian and wetland areas would impair the ability of riparian/wetland areas to reduce nonpoint source pollution (MDEQ 2007) and provide other ecosystem benefits. The magnitude of these effects would be dependent on the specific activity, season, proximity to riparian-wetland areas, location in the watershed, upland and riparian-wetland vegetation condition, mitigation applied, and the time until reclamation success. Erosion increases typically are localized, short term, and occur from implementation through vegetation reestablishment. As acres of surface-disturbance increase within a watershed, so would the effects on riparian-wetland resources.

4.3.6.2 Mitigation

Mitigation would be addressed at the site specific APD stage of exploration and development. If needed, COAs would potentially include revegetation with desirable plant species, soil enhancement practices, direct live haul of soil material for seed bank revegetation, fencing of reclaimed areas, and the use of seeding strategies consisting of native grasses, forbs, and shrubs, would be identified and addressed at the APD stage. A noxious/invasive weed program could be implemented to include factors such as a weed control program(s) which could include spraying for weeds up to three years, and/or vehicle washing stations to help prevent spread of weeds.

Stipulations addressing steep slopes, 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 (refer to Appendix B). In the event of exploration or development, site-specific mitigation measures would be identified which would avoid or minimize potential impacts to riparian-wetland areas

at the APD stage. Mitigation measures that minimize the total area of disturbance, control wind and water erosion, reduce soil compaction, maintain vegetative cover, control nonnative species, maintain biodiversity, maintain vegetated buffer zones, and expedite rapid reclamation (including interim reclamation) would maintain riparian/wetland resources.

4.3.8 Wildlife

4.3.8.1 Direct and Indirect Effects (General Discussion Applicable to Fish and Wildlife)

The project area is the footprint of the offered lease parcels. The analysis area includes the lease parcels and the adjacent 1500 meters. Leasing the parcels would have no direct impacts on wildlife. Any potential effects from the sale of lease parcels could occur indirectly at the time the leases are developed. Oil and gas development (well pad establishment and drilling) is typically short-term, while production is generally less intensive and long-term (multiple decades). The sections below that refer to "oil and gas development" are intended to include both the short-term construction and drilling and long-term production as part of the indirect effects analysis. Additional NEPA is required at the APD stage prior to lease development and associated production.

Based on the RFD scenarios, direct habitat loss is possible. 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 (Naugle 2011). 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.

The use of standard lease terms and stipulations on these lands (Appendix A) would minimize, but not preclude impacts to wildlife. The recent book Energy Development and Wildlife Conservation in Western North America states: "noise…from drilling and maintenance activities took 500 meters (EnCana 2007) to fall at or below the suggested maximum threshold of 49 decibels in the vicinity of breeding songbirds and raptors (Wyoming Fish and Game Department 2009) and was still greater than 25 decibels at the furthest distance measured (1.5 kilometers)" (Naugle 2011).

Table 14 shows 3,532 and 10,122 acres of various habitats within 500 meters and 1500 meters respectively of offered lease parcels. Cultivated cropland is the dominant habitat type within 1500 meters of the offered parcels (5,338 acres), followed by mixed grass prairie (2,546 acres) and introduced upland grasses and forbs (1,037 acres).

The infrastructure associated with oil and gas development fragments habitat as well. This infrastructure has been shown to negatively affect some grassland birds. A study in Alberta, Canada showed that Sprague's pipit territories were less likely to cross linear development features than should occur by chance, and more often these features formed territorial boundaries (Hamilton 2009 in Bayne and Dale 2011). Similar impacts (although magnitudes would likely differ) would also be expected for other species that exhibit negative responses to habitat fragmentation and increased traffic/disturbance.

Previous disturbance on or adjacent to the lease parcels has already affected wildlife. Depending on proximity and species tolerance, wildlife species within these areas could either have acclimated to the surrounding conditions or been displaced by previous disturbance activities. Access (gravel roads) already exists to all parcels and a large overhead powerline and underground oil pipeline are adjacent to parcels XR and XQ. Parcel XW has already been converted almost completely into cultivated cropland.

Over 88 percent of the 500 meter buffer around this parcel and over 79 percent of the 1500 meter buffer are currently in cultivated cropland. Only 5 acres (less than 0.01 percent) in the 500 meter buffer zone and only 364 acres (0.12 percent) of the 1500 meter zone do not show any previous disturbance. Parcels XQ and XR have a much higher percent of undisturbed habitat, most of that being Northwestern Great Plains Mixedgrass Prairie. Much of this habitat would not have ground disturbance as a result of standard stipulations due to slopes over 30%. Oil and gas infrastructure on these two parcels would have additional direct and indirect effects to wildlife relative to previous disturbance.

Table 14. Acres of Mapped ReGap Habitat

ReGap Habitat Classifications (Level 3)	500 m Buffer			1500 m Buffer		
	XW	XQ+XR	Total	XW	XQ+XR	Total
Cultivated Cropland	574	564	**1,138**	2,297	3,042	**5,338**
Developed, Low Intensity	2	0	**2**	7	9	**17**
Developed, Open Space	14	5	**20**	65	43	**108**
Inter-Mountain Basins Greasewood Flat	0	1	**1**	0	1	**1**
Introduced Upland Vegetation - Perennial Grassland and Forbland	50	481	**531**	153	884	**1,037**
North American Arid West Emergent Marsh	0	0	**0**	24	1	**24**
Northwestern Great Plains Floodplain	0	0	**0**	0	198	**199**
Northwestern Great Plains Mixedgrass Prairie	0	1,607	**1,607**	242	2,304	**2,546**
Northwestern Great Plains Riparian	5	22	**27**	34	51	**85**
Open Water (Fresh)	0	0	**0**	15	13	**28**
Pasture/Hay	0	0	**0**	0	200	**200**
Western Great Plains Badland	0	93	**93**	0	319	**319**
Western Great Plains Cliff and Outcrop	0	13	**13**	0	46	**46**
Western Great Plains Closed Depression Wetland	0	0	**0**	47	1	**47**
Western Great Plains Open Freshwater Depression Wetland	0	4	**4**	2	4	**7**
Western Great Plains Sand Prairie	0	26	**26**	0	31	**31**
Western Great Plains Wooded Draw and Ravine	0	69	**69**	0	88	**88**
TOTAL	647	2,885	**3,532**	2,886	7,236	**10,122**

Acres within 500 and 1500 meters of Offered Lease Parcel

Potential impacts to aquatic species 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 aquatic wildlife species in two different ways if the spill substances enter the habitat. First, toxicological impacts from direct contact could have immediate lethal effects to eggs, larvae, juveniles, and adults. Second, toxic effects to lower food web levels (e.g. aquatic macro-invertebrates) could indirectly affect fish, amphibian, and reptile species by degrading water quality and degrading or eliminating food resources. Although no aquatic habitat was mapped within the parcels, small stock reservoirs occur in parcels XR and XQ. Parcels XQ and XW are both less than one mile from rivers, and Parcel XR is less than 1.5 miles. Parcels XQ and XR both have drainages that flow toward the Marias River.

4.3.8.1.1 Threatened, Endangered Proposed, and Candidate Species

Even though grizzly bears have been migrating east onto the plains, it is unlikely that bears would be found on any of the parcels. In and of themselves, the parcels would be insufficient for extended use by grizzly bears because of their small size and their separation from suitable habitat along the Two Medicine and Marias Rivers. These parcels are found in the area east of Hwy. 89, outside the NCDE grizzly bear recovery zone; this area is not managed to provide grizzly bear habitat. The area is highly fragmented with agricultural development and associated roads. There was a sighting of grizzly bears approximately six miles from Parcels XQ and XR in April of 2012 along the Marias River. Access to these parcels from the Marias River corridor could possibly follow the Willow Rounds road; however this path would take them near a residence and through agricultural fields. Therefore, oil and gas development

on these parcels would be consistent with other anthropogenic activity that occurs in the vicinity, and for this reason we have determined that issuing leases for possible future oil and gas development would have no effect on the grizzly bear. Future applications for permits to drill on these parcels would be subject to consultation pursuant to section 7(a)(2) of the Endangered Species Act of 1973, as amended.

Sprague's pipits have been shown to require large expanses of native grassland habitat for nesting. One study in Saskatchewan showed that the pipit required native habitat area of 470 acres or larger to nest (MNHP and MFWP 2013). Parcel XW has no native grassland and is therefore completely unsuitable. Parcels XQ and XR have native grasslands, but other factors such as steep slopes reduce their suitability as Sprague's pipit nesting habitat. The Montana Natural Heritage Program created a habitat suitability model for the Sprague's pipit in October 2012. The model rated the suitability in four categories: Optimal, Medium, Low, and Unsuitable. Parcel XW is completely rated Unsuitable. Parcels XQ and XR contain only Unsuitable and Low Suitability ratings (MNHP 2013a). Over fifty percent of both parcels are considered unsuitable and neither has a block of suitable habitat meeting the 470 acres minimum. Standard stipulations would be able to further minimize potential effects to Sprague's pipit and potential development would most likely occur on currently disturbed lands. Potential development of the offered tracts would not be expected to affect the population or listing status. Potential site-specific effects would be addressed in more detail at the APD stage.

4.3.8.1.2 Other Special Status Species

Bald eagles, Golden eagles, Ferruginous and Swainson's hawk

Potential foraging habitat for these raptors covers most non-forested portions of the state and development would not impact use of the area. Other impacts could include raptors' use of buildings for perches. Raptors that may utilize these perches include bald eagles, golden eagles, Swainson's hawk, and ferruginous hawk. This may result in increased predation on small mammals and birds since this will provide a perch for raptors in an area that previously did not provide perches. Potential site-specific effects would be addressed in more detail at the APD stage.

A golden eagle nest was discovered on Parcel XR during the March 27, 2013 site visit. Standard stipulations for timing and no surface occupancy (NSO) within one-quarter mile of the nest would provide adequate protections for continued use. Potential site-specific effects would be addressed in more detail at the APD stage.

Bats

No known roosts occur in the vicinity of the proposed lease parcels. The highest potential for use occurs at standing water bodies, followed by potential roosting habitat located in Parcel XR. Standard stipulations would preclude surface occupancy proximate to water and on slopes greater than 30% (potential roosts) in all proposed parcels. Potential site-specific effects would be addressed in more detail at the APD stage.

Amphibians

Northern leopard frogs, Great Plains toads and Plains spadefoot all have potential breeding habitat within the proposed lease parcels. Standard stipulations would preclude surface occupancy proximate to water and on slopes greater than 30% in all proposed parcels. Additional potential site-specific effects would be addressed in more detail at the APD stage.

Reptiles

Greater short-horned lizards are likely to occur at all lease parcels. Little is known about western hog-nosed snakes in Montana, with only a handful of observations. Minimizing ground disturbance associated with development would minimize potential impacts. Standard stipulations would preclude

surface occupancy proximate to water and on slopes greater than 30% in all proposed parcels. Additional potential site-specific effects would be addressed in more detail at the APD stage.

Migratory Birds

Numerous species of birds were identified as inhabitants across the analysis area. Table 14 shows 3,532 and 10,122 acres of various habitats within 500 meters and 1500 meters respectively of offered lease parcels. MNHP 2013 contains an exhaustive list of species commonly and occasionally associated with the habitat types identified in Table 14.

Effects to migratory birds from oil and gas development could include direct loss of habitat from roads, well pads and other infrastructure, disturbance (both noise and human presence), powerline strikes and accidental direct mortality, fragmentation of habitat, change in use of habitats, and potential threats and competition from edge species. Field surveys for nesting birds at proposed development sites would be conducted for activities planned between May 1 and August 30. Mitigation measures would be assigned at the APD stage to ensure there would be no measurable negative effect on migratory bird populations, in compliance with Executive Order 13186 and the Migratory Bird Treaty Act (MBTA). These mitigation measures would be required as Conditions of Approval. An NSO stipulation for oil and gas surface disturbing activities in riparian and wetland areas would prohibit any potential oil and gas development in those habitats unless approval was granted through the "Waivers, Exceptions, and Modifications" (WEM) process. BLM would coordinate WEMs with USFWS to ensure MBTA compliance.

Impacts to BLM sensitive species would be similar to those described above, unless they are afforded protective measures from other regulations such as the MBTA (16 U.S.C. 703) or the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668c). BLM does not consult with the USFWS on "sensitive" species and likewise would not receive terms and conditions from USFWS requiring additional protections of those species.

Stipulations do not exist specifically for the protection of BLM sensitive songbirds. The MBTA prohibits the take, capture or kill of any migratory bird, any part, nest or eggs of any such bird (16 U.S.C 703 (a)). NEPA analysis pursuant to Executive Order 13186 (January 2001) requires BLM to ensure that MBTA compliance and the effects of Bureau actions and agency plans on migratory birds are evaluated, which should reduce take of migratory birds and contribute to their conservation.

All raptor species known to exist within the analysis area are considered migratory under MBTA. Take of bald and golden eagles and any other migratory raptors is not anticipated through this action; however, take may occur indirectly as a result of vehicle collisions and other related actions associated with development. Field surveys for raptors at proposed development sites would be conducted for activities planned between April 15 and August 30. Mitigation measures would be assigned at the APD stage to ensure there would be no measurable negative effect on raptor populations, including bald and golden eagles. These mitigation measures would be required as Conditions of Approval. The application of stipulations and COA's at the project level is expected to comply with MBTA and BGEPA.

4.3.8.1.3 Other Fish and Wildlife

Generally oil and gas development impacts ungulates (deer and antelope) by displacing them from roads, reducing habitat quality/availability in these areas and causing them to avoid other areas of human disturbance (Hebblewhite 2011). Mule deer avoided areas close to development, with responses occurring within one year of development and avoidance increasing over the course of the three year study. "Sawyer et al. (2006) reported lower predicted probabilities of use within 2.7-3.7 kilometers of well sites, confirming that indirect habitat losses far exceeded direct losses. Over the study, areas classified as high-quality habitat before development changed to low quality, and vice versa, showing that mule deer shifted their habitat use away from high-quality habitats to marginal habitats in response to

development" (Naugle 2011). In a related mule deer study densities declined by about 47 percent over a 4 year period (Sawyer et al. 2005b, 2006 in Naugle 2011).

Oil and gas development and associated fragmentation/disturbance would be expected to disturb and displace ungulates with secondary effects to associated predators. These parcels fall within general habitat, not winter range, for ungulates and are therefore less critical to their survival. The area is also already fragmented by infrastructure development, including roads and a powerline. Noticeable effects on ungulate populations from further development would not be expected. Additional potential site-specific effects would be addressed in more detail at the APD stage.

Game birds would also be affected, but to a lesser extent than ungulates. This is primarily due to pheasants and gray partridge thriving in an agricultural environment (which would be minimally affected from development). Additional potential site-specific effects would be addressed in more detail at the APD stage.

4.3.8.2 Mitigation

Stipulations in Appendix B would be implemented to prevent, minimize, or mitigate impacts to fish and wildlife animal species from exploration and development activities. 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 revegetation, project relocation, and/or pre-disturbance wildlife species surveying. Additional mitigation could occur as COAs at the APD stage. These conditions could include the placement of earthen berms and oil skimmers (in ephemeral drainages where fish passage will not be blocked) to help protect aquatic wildlife habitat in case of oil spills.

4.3.9 Special Status Plant Species

4.3.9.1 Direct and Indirect Effects

Leasing the parcels would have no direct impacts on special status plant species. Any potential effects from the sale of leases would occur at the time the leases are developed. Negative impacts to these species on previously disturbed sites are unlikely. Should surface disturbing activities associated with the proposed development take place within the vicinity of Crawe's sedge, stipulations applied to waterbodies or stream sources would provide protection.

4.3.9.2 Mitigation

Stipulations applied to wildlife resources, steep slopes, waterbodies, streams, 100-year floodplains of major rivers, riparian areas, and wetlands would likely also provide protections for special status plant species. Proposed development would be analyzed on a site-specific basis prior to approval of oil and gas exploration or development activities at the APD stage**.** Mitigation would also be addressed at the site-specific APD stage. Surveys to determine the existence of federally listed species could occur on BLM-administered surface or minerals prior to approval of exploration and development activities at the APD stage.

4.3.10 Cultural Resources

4.3.10.1 Direct and Indirect Effects

Leasing a nominated parcel gives a basic right to the operator to develop the lease in accordance with any stipulations incorporated into the terms of the lease for the protection of resource values. However, it is during surface disturbing activities associated with the proposed development of the lease that there is a potential for cultural resources to be affected by the proposed action. It is only when the decision is made to develop the lease that drilling locations are known and cultural resource investigations can be completed for the proposed development and any other ancillary activities such as roads, transmission lines, and pipelines.

When the Application for a Permit to Drill (APD) is received, specific oil and gas development actions are proposed, the resulting area of potential effect (APE) is defined, and then assessments of the impacts on cultural resources can be undertaken in order to comply with Section 106 of the National Historic Preservation Act (NHPA). A Class III cultural resource inventory will be necessary for those parcels where the proposed APE has not been previously surveyed and/or for those parcels where the APE has been judged inadequately surveyed in the past. Lease Notice 14.2 will apply to all parcels (Appendix A). In the event that cultural resources are identified within the APE, an evaluation of National Register eligibility will occur for each identified cultural property. Measures for the protection of cultural resources determined to be eligible to the National Register of Historic Places (NRHP) will have to be followed for those cultural resources directly and/or indirectly impacted by the proposed development in accordance with Lease Notice 16-1 (Appendix A).

Direct and indirect impacts are not anticipated from leasing nominated parcels. It is at the APD stage of development that specific impacts can be correctly assessed. Potential direct impacts to cultural resources at the APD stage include damage to archaeological sites through construction activities (e.g. pad construction, road building, well drilling, etc.). Other effects to cultural resources from surface disturbance activities include the destruction, damage, or alteration to all or part of the cultural resource and diminishing the property's significant historic features as a result of the introduction of visual, atmospheric, or audible elements. This could include altering or diminishing the elements of a National Register eligible property and diminish an eligible property's eligibility status.

Potential indirect impacts from lease development may include increased erosion resulting from surface disturbing activities, increased vandalism resulting from improved access to the area, abrasive dust and vibrations from drilling equipment and damage to rock art sites from gas emissions. Indirect effects from development activities have the potential to alter the characteristics of a significant cultural or historic property by diminishing the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Conversely, cultural resource investigations associated with development potentially adds to our understanding of the prehistory/history of the area under investigation and discovery of sites that would otherwise remain undiscovered due to lack of inventory or investigation. Climate change may have an effect on cultural resources by changing the frequency and severity of natural events, such as heavy rain and wildfires (Agee 1993; Maslin 2004). Heavy rain increases the likelihood of flooding and soil erosion which could impact an archaeological site by exposing, removing, and displacing archaeological materials. Wildfires can affect the morphology of artifacts through fracturing and discoloration which can reduce an artifact's ability to render information about the past (Winthrop 2004). Wildfires can also destroy organic materials such as bone, wood, and pollen that provide information about past environments and subsistence. Furthermore, fire suppression activities (e.g. fire retardant and fire line construction) and increased artifact exposure from vegetation burn-off, can also have an adverse impact on archaeological sites.

Lease parcels MTM 102757 XQ, XR and XW are located in Pondera County and include 760 acres. Based upon modeling results for Pondera County, as displayed in the Class I Overview of the BLM Central Montana District, the parcels might contain up to 22 cultural sites with three sites having the potential to be eligible or considered eligible for listing on the National Register of Historic Places. This analysis does not break out urban areas (i.e. Conrad, the county seat), and is limited by including only those areas that have been inventoried, so the actual number of sites on these rural parcels most likely would be lower than the county's projection.

4.3.10.2 Mitigation

Under this alternative it is recommended that lease parcels MTM 102757- XQ, XR, and XW be leased with cultural resource Lease Notice 14-2. See Appendix A for specific legal location description and Appendix B for description of Lease Stipulations. In addition to specific Lease Stipulations to protect

known resource values, additional site specific avoidance and/or mitigation measures, would have to be determined after project specific development proposals are received and Class III cultural resource inventories have been completed. In almost all situations, direct impacts to cultural resources will be avoided by project redesign and/or relocating the surface disturbing activities (e.g., roads, well pads and pipelines, etc.). Given the overall size of the lease parcel and the relatively small percentage or number of acres to be disturbed by anticipated development, avoidance of impacts to significant cultural resources being the primary concern, it is unlikely that it would be necessary to mitigate adverse impacts to archaeological sites through data recovery efforts. It should be noted that BLM has discretional control over mitigation stipulations measures imposed on a project. Although a lessee has a right to develop a lease, BLM may require development activities to be moved up to 200 meters in any direction. This should allow nearly all cultural properties to be avoided. Should development uncover subsurface sites, the lessee is required to halt all work until the site can be evaluated and proper mitigation measures can be implemented

The use of standard lease terms, the cultural no surface occupancy (NSO) stipulation, and the cultural lease notice, protect significant cultural resource values on these lease parcels (refer to Appendix A). The application of these requirements at the leasing phase provide protection to cultural values or at least notification to the lessee that potentially valuable cultural resource values are or are likely to be present on the lease parcels.

4.3.11 Native American Religious Concerns

4.3.11.1 Direct and Indirect Effects

Leasing the parcels would have no direct impacts on Native American religious concerns. Any potential effects from the sale of leases would occur at the time the leases are developed.

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. Leasing would not have an impact on TCPs and/or areas of religious or cultural importance to tribes. 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. Indirect effects from site specific development proposals could have an impact to Native American religious practices and TCPs.

4.3.11.2 Mitigation

Cultural Resources Lease Stipulation 16-1 will apply to all lease parcels. The application of Stipulation 16-1 to all lease parcels ensures that BLM's obligations under NHPA, American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O. 13007, and other statutes as applicable will be met. At the APD stage when specific oil and gas development actions are proposed, the area of potential effect (APE) will be defined and federally recognized tribes will be consulted if necessary. Additional Stipulations (NSO or CSU) may be necessary if TCPs or properties of religious and cultural importance are identified at the APD stage.

4.3.12 Paleontological Resources

4.3.12.1 Direct and Indirect Effects

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

The surface disturbances associated with oil and gas exploration and development activities could have indirect effects to paleontological resources primarily in areas classified as Potential Fossil Yield

Classification (PFYC) 3, 4, or 5 areas. Surface-disturbing activities could potentially alter the characteristics of paleontological resources through damage, fossil destruction, or disturbance of the stratigraphic context in which paleontological resources are located, resulting in the loss of important scientific data. However, in most surface-disturbing situations, paleontological resources would be avoided by project redesign or relocation before project approval which would negate the need for the implementation of mitigation measures.

Conversely, surface-disturbing activities can also potentially lead to the discovery of paleontological localities that would otherwise remain undiscovered due to burial or omission during review inventories. The scientific study to retrieve and interpret important paleontological resource information provides a better understanding of the nature and distribution of those resources. The retrieval and interpretation of information is most successful and meaningful when a site is left intact.

Once a parcel is leased, the application of standard lease terms (movement of activities by 200 meters or delay of up to 60 days) would protect vulnerable significant paleontological resource values on these lease parcels. In most instances this may be sufficient to provide the necessary protection to paleontological values. However, the application of standard lease terms may not always adequately protect paleontological values. In order to protect paleontological values, paleontological resources management relies on the application of Lease Notice MT-14-12, applied at the leasing phase to provide protection to paleontological resources or at least notification to the lessee that potentially significant paleontological resources are or are likely to be present on the lease parcels should the lease parcel fall within one of the designated PFYC Class 4 or 5 significant geologic formations which have a record of producing significant fossils.

The paleontological lease notice would be applied to those lease parcels that fall within the PFYC 4 or 5 areas, requiring a field survey prior to surface disturbance. Paleontological resource surveys conducted prior to surface-disturbing activities could locate additional paleontological resources and would result in a better understanding of the nature and distribution of those resources.

4.3.12.2 Mitigation

The use of standard lease terms, the NSO stipulation and the lease notice protect paleontological resource values on these lease parcels (refer to Appendix A). The application of these requirements at the leasing phase provides protection to paleontological values. The paleontological lease notice would be applied to those lease parcels that fall within the PFYC 4 or 5 areas, requiring a field survey prior to surface disturbance. These inventory requirements should result in the identification of paleontological resources and avoidance or mitigation of significant localities before permit approval and prior to surface disturbance. However, the application of standard lease terms only allows the relocation of activities up to 200 meters, unless documented in the NEPA document, and cannot result in moving the activity off lease.

Specific mitigation measures could include, but are not limited to, site avoidance or excavation. Avoidance of paleontological properties would be a best management practice. However, should a paleontological locality be unavoidable, significant properties would be mitigated prior to implementation of a project. These measures would be determined when site specific development proposals are received.

4.3.13 Visual Resources

4.3.13.1 Direct and Indirect Effects

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, subsequent development (indirect effects) of a lease parcel would result in some level of modification to the existing landscape.

4.3.13.2 Mitigation

All new oil and gas development would implement, as appropriate for the site, BLM Best Management Practices for VRM, regardless of the VRM class. This includes, but would not be limited to, proper site selection, reduction of visibility, minimizing disturbance, selecting a color that blends with the background and reclaiming areas that are not in active use. It is recommended to choose one color for all equipment, which includes Carlsbad Canyon, Covert Green or Shale Green; dependent on which blends the best with the surrounding environment. These colors can be found in the BLM Standard Environmental Colors Chart, CC-001. Repetition of form, line, color and texture when designing projects would reduce contrasts between landscape and development. Wherever practical, no new development would be recommended on ridges or mountain tops. Overall, the goal would be to not reduce the visual qualities or scenic value that currently exists.

Specifically, visual impacts could be minimized by the use of the lease stipulation. The stipulation states "all surface-disturbing activities, semi-permanent and permanent facilities in VRM Class II, areas may require special design, including location, painting, and camouflage, to blend with the natural surroundings and meet the visual quality objectives for the area." In addition those modifications should follow the existing form, line, color and texture of the current landscape.

4.3.14 Forest and Woodland Resources

4.3.14.1 Direct and Indirect Effects

Leasing the parcels would have no direct and indirect impacts on forest and woodland resources due to the resources not being present within the subject lease parcels.

4.3.15 Livestock Grazing

4.3.15.1 Direct and Indirect Effects

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

Oil and gas development could result in a loss of vegetation for livestock grazing (e.g., direct removal, introduction of unpalatable plant species, etc.), decrease the palatability of vegetation due to fugitive dust, disrupt livestock management practices, involve vehicle collisions, and decrease grazing capacity. Direct losses of forage could also result from construction of roads, well pads and associated infrastructure and would vary depending on the extent of development. These impacts could vary from short-term impacts to long-term impacts depending on the type of exploration or development, the success of reclamation, and the type of vegetation removed for the oil and gas activities.

4.3.15.2 Mitigation

Measures would be taken to prevent, minimize, or mitigate impacts to livestock grazing from exploration and development activities. Prior to authorization, activities would be evaluated on a case-by-case basis, and the project would be subject to mitigation measures. Mitigation could potentially include controlling livestock movement by installation of fences, maintaining fence line integrity, fencing of facilities, revegetation of disturbed sites, and fugitive dust control.

4.3.16 Recreation and Travel Management

4.3.16.1 Direct and Indirect Effects

Leasing the parcels would have no direct or indirect impacts on recreation and travel management due to all parcels being private surface. Any potential effects from the sale of leases would occur at the time the leases are developed.

4.3.17 Lands and Realty
4.3.17.1 Direct and Indirect Effects
Leasing the parcels would have no direct impacts on lands and realty due to all subject parcels being private surface ownership.

4.3.18 Minerals
4.3.18.1 Fluid Minerals
4.3.18.1.1 Direct and Indirect Effects
Leasing the parcels would have no direct impacts on fluid minerals. Any potential effects from the sale of leases would occur at the time the leases are developed.

Issuing a lease provides opportunities to explore for and develop oil and gas. Additional natural gas or crude oil produced from any or all of the three parcels would enter the public markets. The production of oil and gas results in the irreversible and irretrievable loss of these resources. Royalties and taxes would accrue to the federal and state treasuries from the lease parcel lands.
There would be a reduction in the known amount of oil and gas resources.

Stipulations applied to various areas with respect to occupancy, timing limitation, and control of surface use could affect oil and gas exploration and development, both on and off the federal parcel. Leases issued with major constraints (NSO stipulations) may decrease some lease values, increase operating costs, and require relocation of well sites, and modification of field development. Leases issued with moderate constraints (timing limitation and controlled surface use (CSU) stipulations) may result in similar but reduced impacts, and delays in operations and uncertainty on the part of operators regarding restrictions.

Under Alternative B, all of the lease parcels would be offered for lease subject to major (NSO) or moderate (CSU) constraints and/or standard lease terms and conditions.

Fracking on BLM Montana Well Sites:
Fracturing (known as "fracking" in the oil and gas industry) is a process that uses high pressure pumps to develop pressure at the bottom of a well to crack the hydrocarbon formation. This aids extraction of oil and gas deposits that might be left behind by conventional oil and gas drilling and pumping technology.

Hydraulic fracturing is a 60-year-old process that is now being used more commonly as a result of advanced technology.

Wells are often treated during completion to improve the recovery of hydrocarbons by increasing the rate and volume of hydrocarbons moving from the natural oil and gas reservoir into the wellbore. These processes are known as well-stimulation treatments, which create new fluid passageways in the producing formation or remove blockages within existing passageways. They include fracturing, acidizing, and other mechanical and chemical treatments often used in combination. The results from different treatments are additive and complement each other. This makes it possible to introduce fluids carrying sand, walnut hulls, or other small particles of material into the newly created crevices to keep the fractures open when the pressure is relieved. This process increases the flow rate and volume of reservoir fluids that move from the producing formation into the wellbore. The fracking fluid is typically more than 99 percent water and sand, with small amounts of readily available chemical additives used to control the chemical and mechanical properties of the water and sand mixture.

The State of Montana, Department of Natural Resource and Conservation, Oil and Gas Conservation Division, Board of Oil and Gas Conservation (MBOGC), and regulations ensure that all resources including groundwater are protected. The MBOGC regulations require new and existing wells which will

be stimulated by hydraulic fracturing must demonstrate suitable and safe mechanical configuration for the stimulation treatment proposed. If the operator proposes hydraulic fracturing through production casing or through intermediate casing, the casing must be tested to the maximum anticipated treating pressure. The MBOGC considers a casing pressure test to be considered successful if the pressure applied has been held for 30 minutes with no more than ten percent pressure loss. A pressure relief valve(s) must be installed on the treating lines between pumps and wellhead to limit the line and the well must be equipped with a remotely controlled shut-in device unless waived by the board administrator. Finally, the surface casing valve must remain open while hydraulic fracturing operations are in progress; the annular space between the fracturing string and the intermediate or production casing must be monitored and may be pressurized to a pressure not to exceed the pressure rating of the lowest rated component that would be exposed to pressure should the fracturing string fail.

To ensure that hydraulic fracturing is conducted in a safe and environmentally sound manner, the BLM approves and regulates all drilling and completion operations, and related surface disturbance on Federal public lands. Operators must submit Applications for Permit to Drill (APDs) to the agency. Prior to approving an APD, the BLM identifies all potential subsurface formations that will be penetrated by the wellbore. This includes all groundwater aquifers and any zones that would present potential safety or health risks that may need special protection measures during drilling, or that may require specific protective well construction measures.

Once the geologic analysis is completed, the BLM reviews the company's proposed casing and cementing programs to ensure the well construction design is adequate to protect the surface and subsurface environment, including the potential risks identified by the geologist and all known or anticipated zones with potential risks.

Before hydraulic fracturing takes place, all surface casing and some deeper, intermediate zones are required to be cemented from the bottom of the cased hole to the surface. The cemented well is pressure tested to ensure there are no leaks and a cement bond log is run to ensure the cement has bonded to the casing and the formation. If the fracturing of the well is considered to be a "non-routine" fracture for the area, the BLM will always be onsite during those operations as well as when abnormal conditions develop during the drilling or completion of a well.

4.3.18.2 Solid Minerals

4.3.18.2.1 Direct and Indirect Effects

Leasing the parcels would have no direct impacts solid minerals. As described in Chapter 3, none of the parcels proposed to be leased for oil and gas in the analysis area conflict with currently active or existing claims, patents, permits or leases for all solid materials issued on federal lands within the analysis area.

4.3.19 Special Designations

4.3.19.1 Direct and Indirect Effects

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

4.3.20 Social and Economic Conditions

4.3.20.1 Social

4.3.20.1.1 Direct and Indirect Effects

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

Exploration, drilling or production could create an inconvenience to people living adjacent to leases due to increased traffic and traffic delays, and light, noise and visual impacts. This could be especially

noticeable in rural areas where oil and gas development has not occurred previously. The amount of inconvenience would depend on the activity affected, traffic patterns within the area, noise and light levels, length of time and season these activities occur, etc. In addition, competition for housing could occur in some communities. However, residents living in areas that have been experiencing ongoing population losses may support the increased employment and population related to oil and gas development. Their communities would also benefit from the additional revenues to counties due to oil and gas leasing and development.

There would be no disproportionate effects to low income or minority populations, except possibly to American Indians. There are some leases near the Missouri River in the vicinity of the Fort Peck Indian Reservation. Consultation with potentially affected Tribes would occur at the APD stage.

4.3.20.2 Economics

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 8 is a summary of local revenues, employment, income, population, and household impacts of each alternative.

4.3.20.2.1 Direct and Indirect Effects

Under this alternative, leasing an additional 800 acres of Federal minerals would increase average annual oil and gas leasing and rent revenues to the Federal government by an estimated $2,000. Average annual leasing and rent revenues that would be distributed to state/local governments would increase by about $1,000. Estimated average annual Federal oil and gas royalties would increase by less than $50 with Alternative B compared to current levels. Estimated average annual royalties distributed to the state/counties would increase by less than $20 compared to current levels.

Total average annual Federal revenues related to leasing an additional 800 acres of Federal minerals and associated annual rent and royalty revenues related to average annual production of Federal minerals would amount to about $2,000. Estimated total average annual revenues from leasing, rent, and royalties distributed to the state and counties would be about $1,000. Total estimated revenues distributed to the counties would be less than $400.

The estimated combined total average annual employment and income supported by Federal oil and gas leasing, distributions of royalties to local governments, drilling wells, and production would not change from current levels (IMPLAN, 2010). Nor would there be a change in population and number of households.

Total Federal contribution of Alternative B (leasing an additional 800 acres of Federal minerals) and anticipated related exploration, development, and production of oil and gas would have little effect on local population, total local employment, number of households, average income per household, and total personal income. The economic effects would be spread unevenly among the counties. Leasing the additional acres and anticipated exploration, development, and production under alternative B would provide very little 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, keeping records, administering primary and secondary education and operating clinics/hospitals, county libraries, county airports, local landfills, and county health systems. Demand for these services would change very little since the population and number of households would change

little. Leasing the additional acres and anticipated exploration, development, and production would not 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 entire 10-county area.

Disclosure of the direct, indirect, and cumulative effects of GHG emissions provides information on the potential economic effects of climate change including effects that could be termed the "social cost of carbon" (SCC). The EPA and other federal agencies developed a method for estimating the SCC and a range of estimated values (EPA 2013b). The SCC estimates damages associated with climate change impacts to net agricultural productivity, human health, property damage, and ecosystems. Using a 3 percent average discount rate and year 2020 values, the incremental SCC is estimated to be $46 per metric ton of annual CO_2e increase. Based on the GHG emission estimate provided in Section 4.3.3.1.2, the annual SCC associated with potential development on lease sale parcels is $34 (in 2011 dollars). The estimated SCC is not directly comparable to economic contributions reported above, which recognize certain economic contributions to the local area and governmental agencies but do not include all contributions to private entities at the regional and national scale. Direct comparison of SCC to the economic contributions reported above is also not appropriate because costs associated with climate change are borne by many different entities.

4.3.21 Cumulative Impacts- Alternative B

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. 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.

4.3.21.1 Past, Present and Reasonably Foreseeable Future Actions

Past, present, or reasonably foreseeable future actions that affect the same components of the environment as the Proposed Action are: grazing, roads, wildfire and prescribed fire, range improvement projects, and utility right-of-ways.

4.3.21.2 Cumulative Impacts by Resource

Cumulative effects for all resources in the Lewistown Field Office are described in the Headwaters Resource Management Plan. Anticipated exploration and development activities associated with the lease parcels considered in this EA are within the range of assumptions used and effects described in this cumulative effects analysis for resources other than air, climate, and socio-economics resources. This previous analysis is hereby incorporated by reference for resources other than for air, climate, and socio-economics resources.

4.3.21.2.1 Cumulative Impacts to Soils

In general, the aforementioned actions would have cumulative impacts on soil resources by causing surface disturbances contributing to soil compaction, erosion, and subsequent sedimentation. It is not expected that the surface disturbance associated with the proposed action and, past, present and future foreseeable actions would have consequential cumulative effects due to the implementation of stipulations, mitigation measures, BMPs, and adherence to standards and guidelines.

4.3.21.2.2 Cumulative Impacts of Climate Change

As previously discussed in the Air Quality section of Chapter 4, it is difficult to impossible to identify specific impacts of climate change on specific resources within the analysis area. As summarized in the Climate Change SIR (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 (IPCC 2007b, as cited by the Climate Change SIR 2010). Effects of climate change on resources are described in Chapter 3 of this EA and in the Climate Change SIR (2010).

4.3.21.3 Cumulative Impacts to Wildlife

Cumulative impacts are those impacts on the environment which result "from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions." (40 CFR 1508.7). In this case, past and presently on-going actions and activities in the project vicinity include oil and gas development, fire, farming, livestock grazing, traffic, and any other form of human and natural disturbances.

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. 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.

4.3.21.4 Cumulative Impacts to Economic Conditions

The cumulative effects of Federal mineral leasing within the local economy as well as the specific effects of leasing an additional 800 acres under Alternative B are summarized in Table 9 and Table 10. These tables also display, in comparative form, the cumulative effects of Alternatives A. The total demographic and economic characteristics of the local economy would not change from current levels.

The annual SCC associated with cumulative oil and gas development is $1,657 (in 2011 dollars) based on 37,040 cumulative acres leased. As noted earlier, the estimated SCC is not directly comparable to economic contributions.

5.0 CONSULTATION AND COORDINATION

5.1 Persons, Agencies, and Organizations Consulted

Coordination with MFWP was conducted for the three lease parcels being reviewed. Coordination with the USFWS occurred in 2012 for grizzly bear analysis that is also relevant to the current parcels. BLM has coordinated with MFWP and USFWS in the completion of this EA in order to prepare analysis, identify protective measures, and apply stipulations associated with these parcels being analyzed.

The BLM consults with Native Americans under Section 106 of the National Historic Preservation Act. BLM sent letters to tribes in Montana, North and South Dakota and Wyoming at the beginning of the 15 day scoping period informing them of the potential for the three parcels to be leased and inviting them to submit issues and concerns BLM should consider in the environmental analysis. Letters were sent to the Tribal Chairperson/Presidents and THPO or other cultural contacts for the Confederated Salish and Kootenai Tribes, Blackfeet Nation, Rocky Boy (Chippewa Cree), Ft. Belknap Indian Community (Assiniboine and Gros Ventre), and Ft. Peck Indian Tribes (Sioux and Assiniboine). BLM will send a second letter to the tribes informing them about the 30 day public comment period for the EA and soliciting any information BLM should consider before making a decision whether to offer any or all three parcels for sale.

BLM also met with THPOs and other cultural resource specialists from the Confederated Salish and Kootenai Tribes. BLM provided an overview of the federal oil and gas leasing process as well as specific information about the three parcels nominated for the October 2013 competitive oil and gas lease sale.

5.2 Summary of Public Participation

In response to scoping and preliminary EA/draft FONSI comments the BLM Montana State Office website was modified to more clearly reflect opportunities for the public to comment on lease sale documents. The modifications include links to documents and clearly defined dates for comment submittal.

Public scoping for this project was conducted through a 15-day scoping period advertised on the BLM Montana State Office website and posting on the field office website NEPA notification log. Scoping was initiated March 26, 2013, ending April 9, 2013. One written submission and no verbal comments were received after the 15-day scoping period, which resulted in 39 substantive comments.

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. Landowners were also contacted by phone prior to specialist field visit to the nominated lease parcels. No landowner comments were received by the LFO in written or verbal response.

On May 20, 2013, the EA, along with an unsigned FONSI, was made available for a 30-day public comment period. A total of 1 written submission was received after the 30-day comment period, which resulted in 84 individually-coded substantive comments. After review and consideration of the comments, some modifications have been made to the EA. Changes made to the analysis are noted with gray-scale shading and/or strikeout so the modifications to the EA can easily be identified.

The following is a summary of some of the issues and/or changes made to the EA as a result of the 30-day public comment period:

- Clarification of the MSO website which reflect the opportunity for the public to comment
- A discussion of hydraulic fracturing
- A discussion of air quality and climate change
- Additional data regarding ozone and hazardous air pollutants
- A description of the social cost of carbon (SCC)

After the 30-day protest period, but before lease issuance, the BLM will issue the Decision Record and signed Finding of No Significant Impact for this EA. This information, along with other updates and Lease Sale Notice information can be found on 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 and lease sale notices can be found on the link titled "Oil and Gas Lease Sale Information."

Table 15. List of Preparers

Name	Title	Responsible for the Following Section(s) of this Document
Susan Bassett	Air Resources Specialist	Air Resources and Climate
Geoff Beyersdorf	Lewistown Field Office Manager	Review, Concurrence, and Signature
Dan Brunkhorst	Environmental Coordinator	Oversight, NEPA Compliance, Review
Adam Carr	Supervisory NRS	Oversight, Review
Matt Comer	Wildlife Biologist	Wildlife Resources, Special Status Wildlife Species
Tom Darrington	Rangeland Management Specialist	Livestock, Vegetation, Sensitive Plants, Soils
Zane Fulbright	Archaeologist	Cultural Resources, Native American Religions Concerns
Monica Ketcham	Wildlife Biologist	Wildlife Resources, Special Status Wildlife Species
Chad Krause	Hydrologist	Water Resources
Dale Manchester	Petroleum Engineer	Fluid Minerals
Kelly McGill	Outdoor Recreation Planner	Recreation, Travel Management, VRM, ACEC
Bruce Reid	Forester	Forest and Woodland Resources
Chris Rye	Geologist, Project Lead	Paleontology, Solid Minerals, Document Completion
Steve Smith	Rangeland Management Specialist	Weeds Concurrence
John Thompson	Planning &Environmental Specialist	Economic Analysis
Deb Tucek	Realty Specialist	Lands and Realty

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7.0 DEFINITIONS

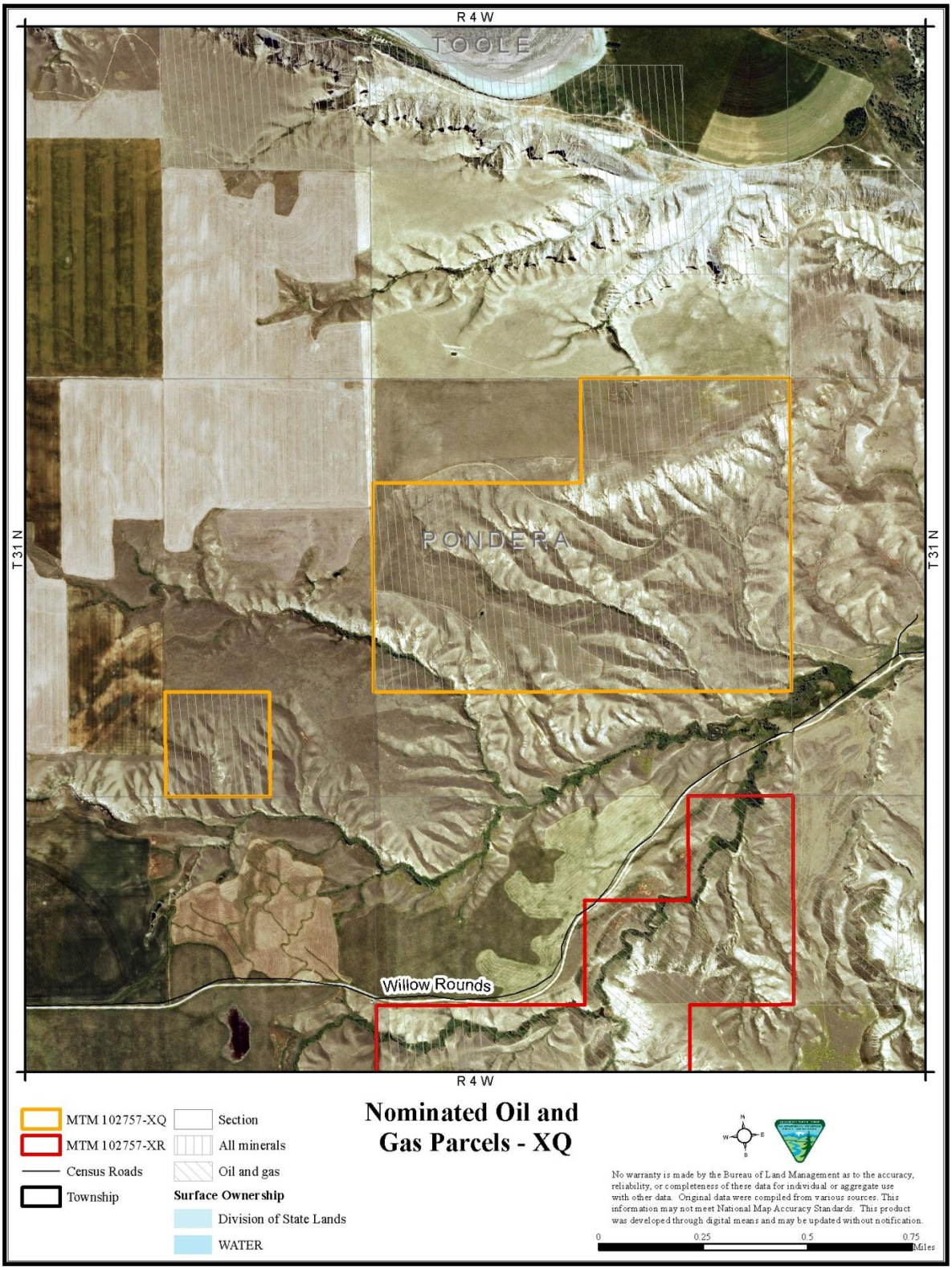
The North American Industry Classification System (NAICS) is the standard used by federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. NAICS was developed under the auspices of the Office of Management and Budget (OMB), and adopted in 1997 to replace the Standard Industrial Classification (SIC) system and to allow for a high level of comparability in business statistics among the North American countries.

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 is.

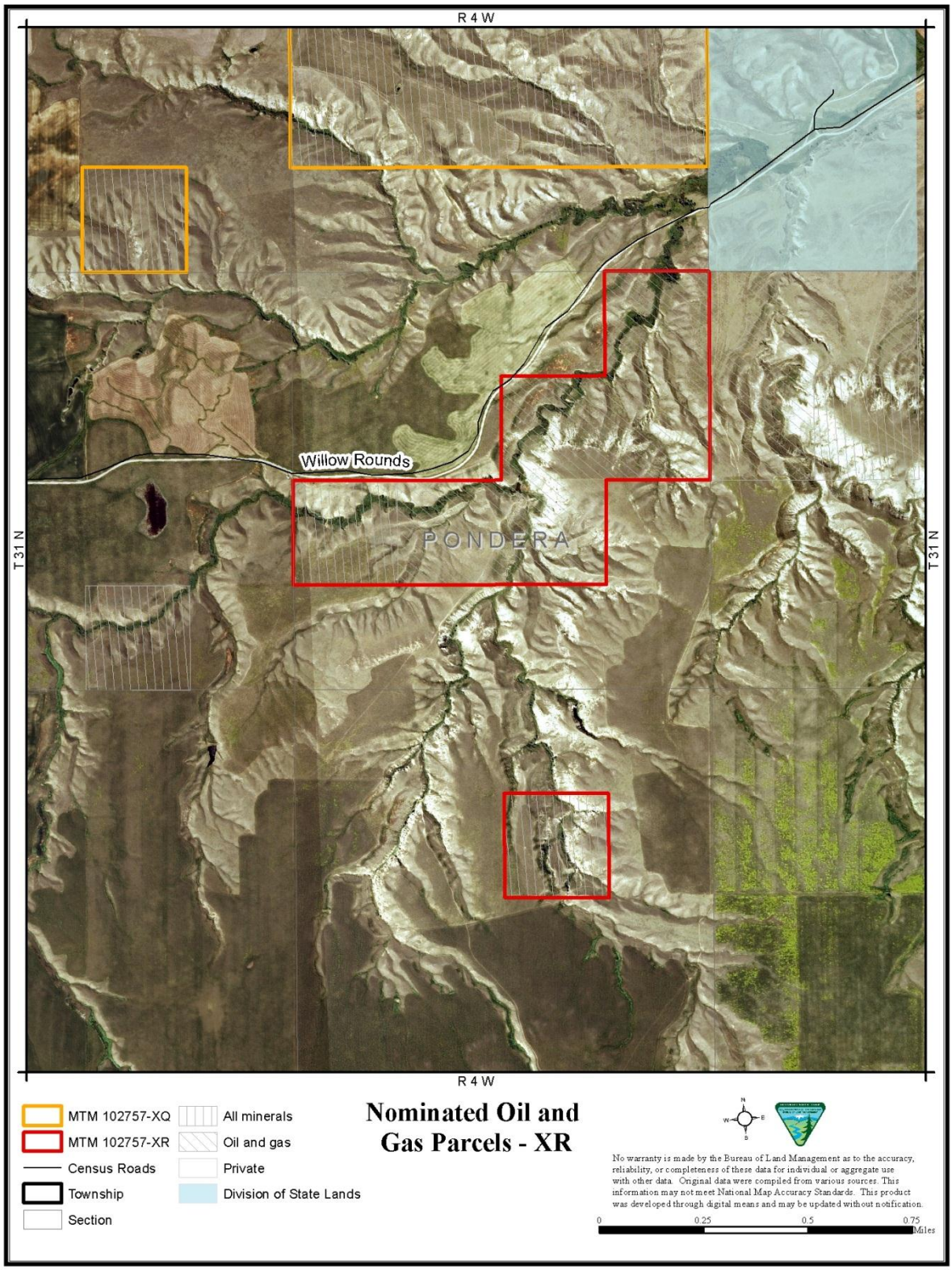
Appendix A-1. Lease Parcel Summary Table

PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED STIPULATIONS FOR ENTIRE PARCEL IF LEASED	PROPOSED FOR DEFERRAL-NO LEASING
MTM 102757-XQ	T. 31 N, R. 4 W, PMM, MT SEC. 17 NE,S2NW,N2S2; SEC. 18 SWSE; PONDERA COUNTY 440.00 AC PD	**CR 16-1** (ALL LANDS) **LN 14-12** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS)	
MTM 102757-XR	T. 31 N, R. 4 W, PMM, MT SEC. 20 NENE,S2NE,N2SW,NWSE; SEC. 29 SWNE; PONDERA COUNTY 280.00 AC PD	**CR 16-1** (ALL LANDS) **LN 14-12** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS)	
MTM 102757-XW	T. 31 N, R. 5 W, PMM, MT SEC. 27 SWNE,NENW; PONDERA COUNTY 80.00 AC PD	**CR 16-1** (ALL LANDS) **LN 14-12** (ALL LANDS) **STANDARD 16-3** (ALL LANDS) **TES 16-2** (ALL LANDS)	

Appendix A-2. Lease Parcel MTM 102757-XQ



Appendix A-3. Lease Parcel MTM 102757-XR



Appendix A-4. Lease Parcel MTM 102757-XW

Appendix B. Standard Stipulations

Stipulation Number	Stipulation Name/Brief Description
Bureau of Land Management	
Cultural Resources 16-1	**CULTURAL 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."
LN 14-12	**LEASE NOTICE PALEONTOLOGICAL RESOURCE INVENTORY REQUIREMENT** 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 meet the criteria for Class 3, 4 and/or 5 as set forth in the Potential Fossil Yield Classification System, WO 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 WO IM 2008-009 dated October 15, 2007, and WO IM 2009-011 dated October 10, 2008. 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, the lessee or project proponent will complete the inventory subject to the following: • the project proponent must engage the services of a qualified paleontologist, acceptable to the BLM, to conduct the inventory. • 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. Paleontological inventory may identify resources that may require mitigation to the satisfaction of the BLM as directed by WO IM 2009-011.
Standard 16-3	**STANDARD LEASE STIPULATION** **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 onground 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

Stipulation Number	Stipulation Name/Brief Description
	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 erodible or slumping soils. **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: • Contact the appropriate SMA to determine if a site-specific cultural resource inventory is required. If an inventory is required, then: • 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

Stipulation Number	Stipulation Name/Brief Description
	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. • 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.
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.

Appendix C. Special Status Species

Threatened, endangered, candidate/proposed, and BLM sensitive wildlife and fish species with the potential to occur within the Analysis Area on the Lewistown Field Office (FO).
***NOTE**: The U.S. Fish and Wildlife Service species list (US Fish and Wildlife Service 2013), Montana and Dakotas sensitive species list (BLM 2009) were reviewed.*
[1]**Status Codes**: **E**=federally listed endangered; **T**=federally listed threatened; **C**=federally proposed/candidate for listing; and **S**=BLM sensitive
[2]**Exclusion Rationale Codes**: **ODR**=outside known distributional range of the species; **HAB**=no habitat present in Analysis Area; and **SEA**=species not present/affected during season.

Species Common and Scientific Name	Status[1]	Potential to Occur?	Rationale for Exclusion[2]	Brief Habitat Description and Range in Montana
INVERTEBRATES				
Dakota skipper *Hesperia dacotae*	S		ODR	Native tallgrass prairie in Eastern Dakotas
FISH				
Arctic grayling *Thymallus arcticus montananus*	S		ODR	small, cold, clear lakes with tributaries suitable for spawning. They do not coexist well with other fishes except cutthroat trout and others with which they evolved. Sun River along Rocky Mtn. Front.
Bull trout *Salvelinus confluentus*	T		ODR	Sub-adult and adult fluvial bull trout reside in larger streams and rivers and spawn in smaller tributary streams, whereas adfluvial bull trout reside in lakes and spawn in tributaries. They spawn in headwater streams with clear gravel or rubble bottom
Northern redbelly dace x Finescale dace *Phoxinus eos x Phoxinus neogaeus*	S		ODR	Northern redbelly dace prefer quiet waters from beaver ponds, bogs and clear streams. The finescale dace likes similar habitat but is also found in larger lakes. Known in Big Coulee Ck in Judith Basin Co.
Paddlefish *Polyodon spathula*	S		ODR	slow or quiet waters of large rivers or impoundments. They spawn on the gravel bars of large rivers during spring high water. Paddlefish tolerate, or perhaps seek, turbid water
Pallid Sturgeon *Scaphirhynchus albus*	E		ODR	large turbid streams including the Missouri and Yellowstone rivers. They use all channel types, primarily straight reaches with islands. They primarily use areas with substrates containing sand (especially bottom sand dune formations) and fines (93% of observations)
Pearl dace *Margariscus margarita*	S		ODR	small cool streams, either clear or turbid (Brown 1971). They spawn in clear water at depths of 1 to 2 feet over a gravel or sand bottom. N/E MT.
Sauger *Stizostedion canadense*	S		ODR	larger turbid rivers and the muddy shallows of lakes and reservoirs. They spawn in gravelly or rocky areas in shallow water and seem to prefer turbid water.
Sturgeon chub *Macrhybopsis gelida*	S		ODR	turbid water with moderate to strong current over bottoms ranging from rocks and gravel to coarse sand
Westslope cutthroat trout *Oncorhynchus clarki lewisi*	S		HAB	gravel substrate in riffles and pool crests for spawning habitat. Cutthroat trout have long been regarded as sensitive to fine sediment
Yellowstone cutthroat trout *Oncorhynchus clarki bouvieri*	S		ODR	relatively clear, cold streams, rivers, and lakes. Optimal temperatures have been reported to be from 4 to 15 degrees C., with occupied waters ranging from 0 to 27 degrees C.
AMPHIBIANS AND REPTILES				
Coeur d'Alene salamander *Plethodon idahoensis*	S		ODR	primary habitats are seepages and streamside talus; W. MT near Libby, MT
Great Plains toad *Bufo cognatus*	S	✓		sagebrush-grassland, rainwater pools in road ruts, in stream valleys, at small reservoirs and stock ponds, and around rural farms; breeding has been documented in small reservoirs and backwater sites along streams appears to prefer stock tanks and roadside ponds rather than floodplains. Eggs and larvae develop in shallow water, usually clear or slightly turbid, but not muddy.

Species Common and Scientific Name	Status[1]	Potential to Occur?	Rationale for Exclusion[2]	Brief Habitat Description and Range in Montana
Northern leopard frog *Lithobates pipiens*	S	✓		wetland habitats of relatively fresh water with moderate salinity, including springs, slow streams, marshes, bogs, ponds, canals, flood plains, beaver ponds, reservoirs, and lakes, usually in permanent water with rooted aquatic vegetation.
Plains spadefoot *Spea bombifrons*	S	✓		soft sandy/gravelly soils near permanent or temporary bodies of water. lives largely inactive in burrows of its own construction or occupies rodent burrows, and enters water only to breed. Following heavy rains, adults have been reported in water up to 30 centimeters deep in flooded wagon wheel ruts, temporary rain pools formed in wide flat-bottom coulees, water tanks, and badland seep ponds, and tadpoles and toadlets have been observed in stock ponds and small ephemeral reservoirs, usually in sagebrush-grassland habitats
Western toad *Anaxyrus boreas boreas*	S		ODR	utilize a wide variety of habitats, including desert springs and streams, meadows and woodlands, mountain wetlands, beaver ponds, marshes, ditches, and backwater channels of rivers where they prefer shallow areas with mud bottoms
REPTILES				
Greater short-horned lizard *Phrynosoma hernandesi*	S	✓		ridge crests between coulees, and in sparse, short grass and sagebrush with sun-baked soil. limestone outcrops in canyon bottoms of sandy soil with an open canopy of limber pine-Utah juniper, and are also present on flats of relatively pebbly or stony soil with sparse grass and sagebrush cover
Milksnake *Lampropeltis triangulum*	S		ODR	open sagebrush-grassland habitat and ponderosa pine savannah with sandy soils, most often in or near areas of rocky outcrops and hillsides or badland scarps, sometimes within city limits.
Snapping turtle *Chelydra serpentine*	S		ODR	backwaters along major rivers, at smaller reservoirs, and in smaller streams and creeks with permanent flowing water and sandy or muddy bottoms
Spiny softshell *Apalone spinifera*	S		ODR	primarily a riverine species, occupying large rivers and river impoundments, but also occurs in lakes, ponds along rivers, pools along intermittent streams, bayous, irrigation canals, and oxbows. open sandy or mud banks, a soft bottom, and submerged brush and other debris. Spiny Softshells bask on shores or on partially submerged logs. They burrow into the bottoms of permanent water bodies, either shallow or relatively deep (0.5 to 7.0 meters), where they spend winter. Eggs are laid in nests dug in open areas in sand, gravel, or soft soil near water
Western hog-nosed snake *Heterodon nasicus*	S	✓		apparent preference for arid areas, farmlands, and floodplains, particularly those with gravelly or sandy soil, has been noted. They occupy burrows or dig into soil, and less often are found under rocks or debris, during periods of inactivity
BIRDS				
Baird's sparrow *Ammodramus bairdii*	S	✓		nest in native prairie, but structure may ultimately be more important than plant species composition. (nesting has been observed in crested wheat, while smooth brome is avoided) areas with little to no grazing activity are required.
Bald eagle *Haliaeetus leucocephalus*	S		HAB	near open water including rivers, streams & lakes, nesting & roosting in large ponderosa pine, Douglas-fir, or cottonwood trees in proximity to open water and rivers.
Black tern *Chilodonias niger*	S		HAB	wetlands, marshes, prairie potholes, and small ponds. 30%-50% of the wetland complex is emergent vegetation. Vegetation within known breeding colonies includes alkali bulrushes, canary reed-grass, cattail spp., sedge spp., rush spp., reed spp., grass spp., *Polygonum* spp., *Juncus* spp. and *Potamogeton* spp., indicating a wide variety of potential habitats are usable by Black Terns. Water levels range from about 0.5 m to greater than 2.0 m with most having depths between 0.5 m and 1.0 m (MTNHP 2003).

Species Common and Scientific Name	Status[1]	Potential to Occur?	Rationale for Exclusion[2]	Brief Habitat Description and Range in Montana
Black-backed woodpecker *Picoides arcticus*	S		ODR	early successional, burned forest of mixed conifer, lodgepole pine, Douglas-fir, and spruce-fir, although they are more numerous in lower elevation Douglas-fir and pine forest habitats than in higher elevation subalpine spruce forest habitats
Black-crowned night heron *Nycticorax nycticorax*	S		HAB	shallow bulrush or cattail marshes, most often within a grassland landscape. also nest in cottonwoods, willows, or other wetland vegetation that allows them to nest over water or on islands that may afford them protection from mammalian Most colonies are located in large wetland complexes, typically with a one-to-one ratio of open water and emergent vegetation
Blue-gray gnatcatcher *Polioptilia caerulea*	S		ODR	brush, scrub, or chaparral are intermixed with taller vegetation (e.g., forest edge, riparian corridors); nesting often occurs near water. Nests are built on branches or forks of trees or shrubs, usually 1 to 25 meters above ground—S. Central MT
Bobolink *Dolichonyx orysivorus*	S	✓		Nests built in tall grass and mixed-grass prairies. Prefers "old" hay fields with high grass-to-legume ratios.
Brewer's sparrow *Spizella breweri*	S		HAB	Sagebrush, mountain meadows, and mountain shrub habitats. nested in sagebrush averaging 16-inches high. The cover (concealment) for the nest provided by sagebrush is very important
Burrowing owl *Athene cunicularia*	S		HAB	open grasslands, where abandoned burrows dug by mammals such as ground squirrels, prairie dogs and badgers are available. Black-tailed Prairie Dog and Richardson's Ground Squirrel colonies provide the primary and secondary habitat for Burrowing Owls in the state
Chestnut-collared longspur *Calcarius ornatus*	S	✓		Species prefers short-to-medium grasses that have been recently grazed or mowed. Prefers native pastures.
Common loon *Gavia immer*	S		HAB	13+ acre lake <5000 feet in elevation. Small islands preferred for nesting, but herbaceous shoreline areas, also selected. Nursery areas are very often sheltered, shallow coves with abundant small fish and insects. relatively oligotrophic and have not experienced significant siltation or other hydrological changes.
Dickcissel *Spiza americana*	S		ODR	grasslands, meadows, savanna, cultivated lands, and brushy fields. nest on ground in grass or rank herbage, or raised a little above ground, in grass tufts or tall weeds, or in low shrubs or trees, up to about 2 meters above the ground but usually low. prefer habitat with dense, moderate to tall vegetation (particularly with some forbs) and moderately deep litter. moderately grazed and idle prairie. A high abundance of forbs provides perches, nesting cover, nest support, and possibly increased invertebrate abundance.
Ferruginous hawk *Buteo regalis*	S	✓		mixed-grass prairie, shrub-grasslands, grasslands, grass-sagebrush complex, and sagebrush steppe.
Flammulated owl *Otus flammeolus*	S		ODR	old-growth or mature ponderosa pine, ponderosa pine, & Douglas-fir forests, often mixed with mature aspen, nesting in cavities, feeding on insects.
Franklin's gull *Larus pipixcan*	S		HAB	Preferring large, relatively permanent prairie marsh complexes, the Franklin's Gull builds its nests over water on a supporting structure of emergent vegetation. Nesting is noted to occur in cattails and bulrushes
Golden eagle *Aquila chrysaetos*	S	✓		nest on cliffs and in large trees (occasionally on power poles), and hunt over prairie and open woodlands. Cliff nests selected for south or east aspect, less than 200 in. snowfall, low elevation, availability of sagebrush/grassland hunting areas

Species Common and Scientific Name	Status[1]	Potential to Occur?	Rationale for Exclusion[2]	Brief Habitat Description and Range in Montana
Great gray owl *Strix nebulosa*	S		ODR	dense coniferous and hardwood forest, especially pine, spruce, paper birch, poplar, and second-growth, especially near water. forage in wet meadows, boreal forests and spruce-tamarack bogs in the far north, and coniferous forest and meadows in mountainous areas. nest in the tops of large broken-off tree trunks in old nests of other large birds, or in debris platforms from dwarf mistletoe, frequently near bogs or clearings. Nests are frequently reused and the same pair often nests in the same area in successive years.
Greater sage-grouse *Centrocercus urophasianus*	S/C		ODR	tall dense stands of sagebrush; 6 to 18 inch high sagebrush covered benches in June to July (average 213 acres); move to alfalfa fields (144 acres) or greasewood bottoms (91 acres) when forbs on the benches dry out; and move back to sagebrush (average 128 acres) in late August to early September (Peterson 1969).
Harlequin duck *Histrionicus histrionicus*	S		ODR	fast moving, low gradient, clear mountain streams. birds in streams on the Rocky Mountain Front were seen in pole-sized timber.
Least tern *Sternula antillarum*	E		ODR	nest on unvegetated sand-pebble beaches and islands of large reservoirs and rivers in northeastern and southeastern Montana, specifically the Yellowstone and Missouri river systems.
LeConte's sparrow *Ammodramus leconteii*	S		ODR	wet meadows within peatlands, often with a strong sedge (*Carex*) component
Loggerhead shrike *Lanius ludovicianus*	S	✓		open riparian areas, montane meadows, agricultural areas, grasslands, shrublands, & piñon/juniper woodlands
Long-billed curlew *Numenius americanus*	S	✓		Nests primarily in short-grass or mixed-prairie habitat with flat to rolling topography Habitats with trees, high density of shrubs (e.g., sagebrush [*Artemisia* spp.]), and tall, dense grass generally. Taller, denser grass used during brood-rearing when shade and camouflage from predators are presumably more important for chicks, but may also reflect decline in availability of shorter habitats with season.
Marbled godwit *Limosa fedoa*	S	✓		Breeds in short, sparsely to moderately vegetated landscapes that include native grassland and wetlands. ephemeral ponds, as well as temporary ponds and alkali wetland. Semi permanent ponds used as well. Upland habitat during breeding season primarily idle grassland and pastures
McCown's longspur *Calcarius mccownii*	S	✓		breeding habitat is a matrix of perennial shortgrass species (e.g., *Bouteloua gracilis, Buchloe dactyloides*) interspersed with cactus, and limited cover of midgrasses (e.g., *Aristida longiseta, Agropyron smithii, Stipa comata*) and shrubs (e.g., *Gutierrezia sarothrae, Chrysothamnus nauseosus, Artemesia frigida*).
Mountain plover *Charadrius montanus*	S		HAB	prairie dog colonies and other shortgrass prairie sites are confirmed as preferred breeding habitat. Strong preference was also given to sites with slopes less than 5% and grass height of less than 6 cm (3 inches)
Nelson's sharp-tailed sparrow *Ammodramus nelson*	S		ODR	freshwater wetlands with dense, emergent vegetation or damp areas with dense grasses
Northern goshawk *Accipiter gentilis*	S		HAB	primarily forest habitat, especially in mountains, nesting in lower portions of mature Douglas-fir, ponderosa pine, lodgepole pine, or aspen canopies; prefers mature or old-growth forest structure.
Peregrine falcon *Falco peregrinus anatum*	S	✓		wide variety of habitats, selects cliff ledges or rock outcroppings for nesting, preferring high, open cliff faces that dominate the surrounding area.
Piping Plover *Charadrius melodus*	T		HAB	Nests on sand or pebble beaches on freshwater and saline wetlands, lakes, reservoirs and rivers. Only nests in areas with sparse to no vegetation. Summer range primarily in northeastern Montana with isolated population in Pondera County.

SPECIES COMMON AND SCIENTIFIC NAME	STATUS[1]	POTENTIAL TO OCCUR?	RATIONALE FOR EXCLUSION[2]	BRIEF HABITAT DESCRIPTION AND RANGE IN MONTANA
Red-headed woodpecker *Melanerpes erythrocephalus*	S		ODR	along major rivers having riparian forest. open savannah country w/ ground cover, snags and canopy cover. Large burns also utilized. nest in holes excavated 2 to 25 meters above ground by both sexes in live trees, dead stubs, utility poles, or fence posts. Individuals nest in the same cavity in successive years.
Sage sparrow *Amphispiza belli*	S		ODR	Prefers semiopen habitats with evenly spaced shrubs 1–2 m high. Vertical structure, habitat patchiness, and vegetation density may be more important in habitat selection than specific shrub species, but this sparrow is closely associated with big sagebrush throughout most of its range. Historical records w/i FO 20+ years old. Extreme S. Central MT
Sage thrasher *Oreoscoptes montanus*	S		ODR	sagebrush obligate in Montana. abundance is generally positively correlated with the amount of sage cover and negatively correlated with grass cover.
Sedge wren *Cistorthorus platensis*	S		ODR	areas that are highly susceptible to flooding and drying caused by annual and seasonal variation in rainfall.
Sprague's pipit *Anthus spragueii*	S	✓		native, medium to intermediate height prairie and in a short grass prairie landscape, can often be found in areas with taller grasses. more abundant in native prairie than in exotic vegetation; area sensitive, requiring relatively large areas of appropriate habitat; the minimum area requirement in a Saskatchewan study was 470 acres. known to utilize and breed in alkaline meadows and around the edges of alkaline lakes
Swainson's hawk *Buteo swainsoni*	S	✓		nest in river bottom forests, brushy coulees, and shelterbelts. hunt in grasslands and agricultural land, especially along river bottoms.
Three-toed woodpecker *Picoides dorsalis*	S		HAB	mature or old-growth spruce-fir forest, but also occurs in ponderosa pine, Douglas-fir, & lodgepole pine forests with abundant snags and insect populations are present due to outbreaks from disease or fire.
Trumpeter swan *Cygnus buccinators*	S		HAB	Along the Rocky Mountain Front the breeding habitat is small pothole lakes, generally with sufficient water to maintain emergent vegetation through the breeding season. Habitat requirements for breeding include room to take off (~100 m), shallow, unpolluted water with sufficient emergent vegetation and invertebrates, appropriate nest sites (i.e. Muskrat lodges), and areas with little human disturbance
White-faced ibis *Plegadis chihi*	S		HAB	freshwater wetlands, including ponds, swamps and marshes with pockets of emergent vegetation. also use flooded hay meadows and agricultural fields as feeding locations. nest in areas where water surrounds emergent vegetation, bushes, shrubs, or low trees. use old stems in cattails (*Typha* spp.), hardstem bulrush (*Scirpus acutus*) or alkali bulrush (*S. paludosus*) over shallow water as their nesting habitat
Yellow rail *Coturnicops noveboracensis*	S		ODR	Breeding habitat consists of wet sedge meadows and other wetlands containing grasses, rushes and bulrushes. Presence of the Yellow Rail is most commonly dictated by water depth, specifically one that fluctuates throughout the breeding season, i.e. wet in the early part of the breeding season and relatively dry (no standing water) by July or September. NE MT and Flathead Valley.
Yellow-billed cuckoo *Coccyzus americanus*	S		ODR	tall cottonwood and willow riparian woodlands. Nests are found in trees, shrubs or vines, an average of 1 to 3 meters above ground. Western subspecies require patches of at least 10 hectares (25 acres) of dense, riparian forest with a canopy cover of at least 50 percent in both the understory and overstory. Nests are typically found in mature willows

SPECIES COMMON AND SCIENTIFIC NAME	STATUS[1]	POTENTIAL TO OCCUR?	RATIONALE FOR EXCLUSION[2]	BRIEF HABITAT DESCRIPTION AND RANGE IN MONTANA
MAMMALS				
Black-footed ferret *Mustela nigripes*	E		ODR	intimately tied to prairie dogs and only found in association with prairie dogs. limited to habitat used by prairie dogs: grasslands, steppe, and shrub steppe. rely on abandoned prairie dog burrows for shelter. Only large complexes (several thousand acres of closely spaced colonies) can support and sustain a breeding population. estimated that 40 to 60 hectares of prairie dog colony is needed to support one Black-footed Ferret, and females with litters have never been found on colonies less than 49 hectares
Black-tailed prairie dog *Cynomys ludovicianus*	S		HAB	colonies are found on flat, open grasslands and shrub/grasslands with low, relatively sparse vegetation. The most frequently occupied habitat in Montana is dominated by western wheatgrass, blue grama and big sagebrush. Colonies are associated with silty clay loams, sandy clay loams, and loams and fine to medium textured soils are preferred, presumably because burrows and other structures tend to retain their shape and strength better than in coarse, loose soils.
Canada lynx *Lynx canadensis*	T		ODR	dense spruce-fir, Douglas-fir, early seral lodgepole pine, mature lodgepole pine with developing understory of spruce-fir & aspen in subalpine zone & timberline, using caves, rock crevices, banks, logs for denning, closely associated with snowshoe hare.
Fisher *Martes pennanti*	S		ODR	When inactive, they occupy dens in tree hollows, under logs, or in ground or rocky crevices, or they rest in branches of conifers (in the warmer months). Fishers occur primarily in dense coniferous or mixed forests, including early successional forests with dense overhead cover. Optimal conditions for Fishers are forest tracts of 245 acres or more, interconnected with other large areas of suitable habitat.
Fringed myotis *Myotis thysanodes*	S	✓	ODR	rocky outcroppings in mid-elevation ponderosa pine, piñon/juniper, oak, & mixed conifer woodlands, grasslands, deserts, & shrublands;
Fringe-tailed myotis *Myotis thysanodes pahasapensis*	S		ODR	occurs primarily in caves in the Black Hills and Badlands. occurs only in certain montane (mountainous) areas of South Dakota and Wyoming
Gray wolf *Canis lupis*	S		ODR	no particular habitat preference except for the presence of native ungulates within its territory on a year-round basis. Gray Wolves establishing new packs in Montana have demonstrated greater tolerance of human presence and disturbance than previously thought characteristic of this species.
Great Basin pocket mouse *Perognathus parvus*	S		ODR	arid and sometimes sparsely vegetated. They include grassland-shrubland with less than 40% cover, stabilized sandhills, and landscapes with sandy soils, more than 28% sagebrush cover, and 0.3 to 2.0 meters shrub height. Extreme SW MT.
Grizzly bear *Ursus arctos horribilis*	T	✓		primarily use meadows, seeps, riparian zones, mixed shrub fields, closed timber, open timber, sidehill parks, snow chutes, and alpine slabrock habitats. Habitat use is highly variable between areas, seasons, local populations, and individuals. Historically, the Grizzly Bear was primarily a plains species occurring in higher densities throughout most of eastern Montana.
Long-eared myotis *Myotis evotis*	S	✓		found in wooded and rocky areas. It has been located hibernating in a mine in riverbreaks habitat in northeastern Montana
Long-legged myotis *Myotis volans*	S	✓		typically occupy mountainous or relatively rugged areas. They often live in coniferous forest, although they are sometimes found in oak or streamside woodlands, and even deserts. They feed mostly on moths, but are opportunistic, eating whatever soft-bodied insects are most abundant.

Species Common and Scientific Name	Status[1]	Potential to Occur?	Rationale for Exclusion[2]	Brief Habitat Description and Range in Montana
Meadow jumping mouse *Zapus hudsonius*	S		ODR	dense, tall and lush grass and forbs in marshy areas (sometimes with standing water), riparian areas, woody draws, and grassy upland slopes, sometimes within or near forested sites of ponderosa pine. E/SE MT.
Northern myotis *Myotis septentrionalis*	S		ODR	located hibernating in an abandoned mine in riverbreaks habitat in Richland County. prefers cooler hibernacula than *Myotis lucifugus* and selects narrow crevices in which to hibernate. NE MT.
Pallid bat *Antrozous pallidus*	S		ODR	arid deserts, juniper woodlands, sagebrush shrub-steppe, and grasslands, often with rocky outcrops and water nearby. arid and semi-arid regions throughout northern Mexico and the western United States. Pallid bats eat beetles, grasshoppers, and moths, and they forage for slow-moving prey, such as scorpions, flightless arthropods, and sometimes lizards, at and near ground level. visit flowers in their hunt for insects, and are natural pollinators of several species of cactus. S. Central MT.
Pygmy rabbit *Brachylagus idahoensis*	S		ODR	shrub-grasslands on alluvial fans, floodplains, plateaus, high mountain valleys, and mountain slopes, where suitable sagebrush cover and soils for burrowing are available. Some occupied sites may support a relatively sparse cover of sagebrush and shallow soils, but these usually support patches of dense sagebrush and deeper soils. Big sagebrush was the dominant shrub at all occupied sites, averaging 21.3 to 22.6% coverage; bare ground averaged 33% and forbs 5.8%. SW MT.
Swift fox *Vulpes velox*	S	✓		open prairie and arid plains, including areas intermixed with winter wheat fields in north-central Montana. They use burrows when they are inactive; either dug by themselves or made by other mammals (marmot, prairie dog, badger). The burrows are usually located in sandy soil on high ground such as hill tops in open prairies, along fencerows, or occasionally in a plowed field. Suitable habitat generally extensive in size (preferably over 100,000 acres), with relatively level topography, and with greater than 50% of the area undisturbed by agriculture. A total of 8,000,000 suitable acres were identified in Montana
Townsend's big-eared bat *Plecotus townsendii*	S		HAB	associated with caves & abandoned mines for day roosts & hibernacula, will also use abandoned buildings in western shrubland, piñon/juniper woodlands, & open montane forests in elevations up to 9,500 ft.
White-tailed prairie dog *Cynomys leucurus*	S		ODR	xeric sites with mixed stands of shrubs and grasses. habitats dominated by two types of vegetation: areas with Nuttall saltbrush with lesser amounts of big sage, and areas with poverty sumpweed and winter fat. Extreme S. Central MT
Wolverine *Gulo gulo*	S		HAB	alpine & subalpine mature/intermediate timbered areas around natural openings, including cliffs, slides, basins, & meadows, dependant on ungulates, range extending the length of the Rocky Mts.

Bureau of Land Management (BLM). 2009. 2009 Montana/Dakotas Special Status Species List. Instruction Memorandum No. MT-2009-039 (April 24, 2009). http://www.blm.gov/mt/st/en/res/public_room/efoia/2009/IMs/09mtm039.html

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