

United States Department of the Interior
Bureau of Land Management

Environmental Assessment MT-M010-2010-0042-EA

August 12, 2010

Updated October 22, 2010

Project Title: Oil and Gas Leasing of Two Small Parcels in Northern and East-Central Phillips County, Malta Field Office, Montana

Location: Malta Field Office

MTM 79010 DF

T. 37 N, R. 29 E, PMM, MT

Sec. 11 POR OF W2E2 NOT

INCLUDED IN MTM 40067;

Phillips County (071)

PD

44.35 acres

MTM 79010 GG

T. 32 N, R. 34 E, PMM, MT

Sec. 20 BED OF MILK RVR RIPAR

TO LOTS 1,2,3,4,7,8

DESC BY M&B

(24.94 AC);

21 BED OF MILK RVR RIPAR

TO LOTS 6,7 DESC BY

M&B (2.80 AC);

Phillips County (071)

PD

27.74 acres





In Reply Refer To:

1600/3100 (MTM010)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Malta Field Office
501 South 2nd Street East
Malta, Montana 59538-0047
www.blm.gov/mt



December 9, 2010

Dear Reader:

The Bureau of Land Management (BLM) Malta Field Office has prepared an Environmental Assessment (EA) to revisit our decisions concerning oil and gas leases that were issued in 2008, and subsequently suspended under the terms of a settlement agreement in March 2010. The analysis addresses two lease parcels issued in 2008.

The EA was posted for a 30-day public comment period on August 12, 2010. Based on our analysis and review of comments received, the EA has been finalized and a Decision Record (DR) and Finding of No Significant Impact (FONSI) has also been prepared and finalized.

Please refer to the Montana/Dakotas BLM website at www.blm.gov/mt for availability of the EA and corresponding DR and FONSI, as well as other updated information and current lease sale notices. 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 are listed under the "Oil and Gas Lease Sale Information" link.

If you have any questions, or would like more information about the issuance of the updated EA, Decision Record and FONSI, please contact us at 406-654-5100.

Sincerely,

Richard E. Adams
Field Manager

U.S. Department of the Interior
Bureau of Land Management
Malta Field Office
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**Oil and Gas Leasing of Two Small Parcels in Northern and
Central Phillips County, Malta Field Office, Montana**

MT- M010-2010-0042-EA

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1.0 PURPOSE & NEED

1.1 Introduction

It is the policy of the Bureau of Land Management (BLM) to make mineral resources available for use and to encourage development of mineral resources to meet national, regional, and local needs. This policy is based in 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. Mineral leases can be sold on such lands as well. The Montana State Office has historically conducted five lease sales per year.

Oil and gas companies 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. The BLM field offices then review legal descriptions of nominated parcels to determine: if they are in areas open to leasing; if new information has come to light which might change previous analyses conducted during the land use planning process; if there are special resource conditions of which potential bidders should be made aware; and which stipulations should be identified and included as part of a lease. Ultimately, all of the lands in proposed lease sales (including those covered by this EA) are nominated by the oil and gas industry and, therefore, represent areas of interest.

This environmental assessment (EA) has been prepared to disclose and analyze the environmental consequences of leasing two parcels located in the Malta Field Office (FO) that are currently leased, but under suspension. The Malta Field Office is part of the HiLine District. The Malta FO is wholly within Phillips County minus portions of the Fort Belknap Reservation, the Charles M. Russell, Hewitt Lake, and Bowdoin National Wildlife Refuges (NWR), and the Upper Missouri River Breaks National Monument. Approximately one-third of Phillips County is public land managed by the Malta FO, and resource values and issues are diverse. Natural gas production is a major component of the economy of the area and the two parcels being considered are either within or near the edge of an active gas field.

1.2 Purpose and Need for the Proposed Action

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

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

Because the parcels addressed in this EA are already leased but are currently under suspension, the decision to be made is whether the conditions under which they have been leased are still valid and in conformance with the land use plan and whether the lease suspensions should be lifted.

1.3 Conformance with Land Use Plan(s)

This EA is tiered to the decisions, information, and analysis contained in the Phillips Management Framework Plan (MFP) (1977), Little Rocky Mountains MFP (1977), and the UL Bend/Zortman MFP (1977). Although the Judith-Valley-Phillips (JVP) Resource Management Plan (RMP), as amended, was approved in 1994, to guide management of all resources within the planning area, it did not make specific decisions relative to leasing of fluid minerals due to a protest on the 1992 Final RMP. The leasing of nominated parcels not requiring special wildlife stipulations has continued in the planning area through reliance on the leasing decisions made in previous land use plans and programmatic analyses.

The parcels to be offered are within areas open to oil and gas leasing. Site-specific analysis was conducted by Malta and Glasgow Field Office resource specialists who relied on professional knowledge of the areas involved, review of existing databases and file information, and site visits to ensure that appropriate stipulations had been attached to specific parcels.

At the time of this review it is unknown whether a particular parcel would be subject to exploration and development activity. It is unknown when, where, or if future well sites, roads, and facilities might be proposed. Assessment of projected activities and impacts was based on potential well densities discerned from the Reasonably Foreseeable Development (RFD) Scenario developed and documented in conjunction with the JVP RMP. Detailed site-specific analysis of activities associated with any particular parcel would occur when a lease holder submits an Application for Permit to Drill (APD).

The proposed project 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 posting on the Field Office website NEPA notification log. Scoping was initiated May 25, 2010; however, comments were received through June 21, 2010. Several scoping comment letters pertained to overall issues/concerns from oil and gas leasing within the Montana/Dakotas BLM, while some comments pertained to this planning area. Refer to Section 5.2 of this EA for a more complete summary of the scoping comments received.

Planning issues identified through scoping related to oil and gas leasing include: green-house gas (GHG) emissions and impacts to climate change; protect wildlife and fisheries habitat and corridors; preserve wildlands/pristine landscapes; protect scenic quality/viewsheds; protect cultural areas; minimize surface (soil) disturbance; and identify mitigation measures to minimize impacts from operations. One comment specifically suggested considering a no leasing alternative.

2.0 DESCRIPTION OF ALTERNATIVES, INCLUDING PROPOSED ACTION

2.1 Alternative A - No Action

For EAs on externally initiated proposed actions, the No Action Alternative generally means that the proposed action would not take place. In this case, the No Action Alternative would maintain two parcels in the Malta FO in suspension, and would be subject to cancellation. 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 would be to lift oil and gas lease suspensions on two parcels of federal minerals covering 72.09 acres administered by the Malta FO. The parcels are located in northern and east-central Phillips County. Parcel number, size, and detailed locations and associated stipulations are listed in Appendix A. Map 1 shows the general location of each parcel within the planning area, and Maps 2 and 3 are maps of the lease parcels being addressed.

Of the approximately 72.09 acres of federal mineral estate that are considered in this EA, approximately 44.35 acres are public surface with federal mineral estate and approximately 27.74 are split-estate (private surface with federal mineral estate). All parcels would be subject to leasing stipulations as per the oil and gas leasing decisions in the JVP RMP that would protect identified resources or resource uses that otherwise might be jeopardized by the proposed action.

Approximately 27.74 acres in one parcel is private surface overlying federal mineral estate. In these instances the BLM would provide courtesy notification of private landowners that their lands would be included in this lease sale. In the event of activity on such split estate parcels, the lessee and/or operator would be responsible for adhering to BLM requirements as well as reaching an agreement with the private surface landowners regarding access, surface disturbance, and reclamation.

Standard lease terms, conditions, and operating procedures, as well as additional stipulations as listed in Appendix A, would apply to these parcels. Standard operating procedures in oil and gas fields include measures to protect the environment and resources such as groundwater, air, wildlife, historical and pre-historical concerns, and others as mentioned in the JVP RMP at pages 275 through 291.

Standard operating procedures, best management practices and required conditions of approval and the application of lease stipulations change over time to meet overall RMP objectives. In some cases new lease stipulations may need to be developed and these types of changes may require an RMP amendment. 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 as 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) that could be affected by implementation of the alternatives described in Chapter 2. The Malta FO is included within a larger geographic study area referred to as the HiLine District. Several resource sections and studies, including the reasonably foreseeable development scenario (RFD), refer to the HiLine District area, which includes the Malta, Glasgow and Havre Field Offices.

3.2 General Setting

Lease parcels occur in upland silty/silty steep and river bottom/riparian Ecological Sites in the Eastern Montana Glaciated Plains--10-14-inch Precipitation Zone. Elevations range from 2,170 feet on the Milk River (MTM79010-GG) to 2,620 feet near Morgan (MTM79010-DF) mean sea level. Temperatures can vary from near minus 50°F in winter to slightly over 100°F in summer. Winds are predominantly from the west, and most of the precipitation occurs as rainfall during April to early July. The growing season is generally from May 15 to September 15 or 123 days. The Morgan parcel is less than two miles from Canada; daily temperatures may be slightly cooler there than at the Milk River parcel. Both parcels were homesteaded, but only the Milk River parcel remains in private ownership. The Morgan parcel came back to the federal government as Bankhead-Jones Land Use land when the owner was unable to meet the tax liability. The land has always been grazed with no apparent cultivation (except for a tiny piece of crested wheatgrass along Whitewater Creek), whereas some of the Milk River parcel has hay land coming right up to the river's edge. Under terms of metes and bounds determinations along a meandering river, the bottom of the Milk River channel is technically owned by the State of Montana, and the water is owned by the U.S. Bureau of Reclamation. Actual land ownership boundaries are not easily found.

Specific components of the environment that may be affected by this project are discussed below. Only those aspects of the affected environment that are potentially impacted by this project are described in detail.

The following aspects of the affected environment were determined to not be present or not potentially impacted by this project: Farmlands, Hazardous or Solid Wastes, Water Quality, Wilderness, and Special Designations (including Wild and Scenic Rivers and Areas of Critical Environmental Concern). These resources and resource uses will not be discussed further in this EA.

3.3 Resource Issues Brought Forward for Analysis

3.3.1 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 some states. Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology and terrain, and also includes applications of noise, 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.

3.3.1.1 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. 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 the context of ozone, all areas throughout Montana and the Dakotas (including near Billings FO) are currently meeting federal standards in all locations. Light and dark blue circles in Figure 1 indicate standards being met in 2008. Open circles in Figure 2 indicate static trends.

For haze, trends appear to be improving for the clearest days (Figure 3), while there are no apparent trends for the haziest days (Figure 4).

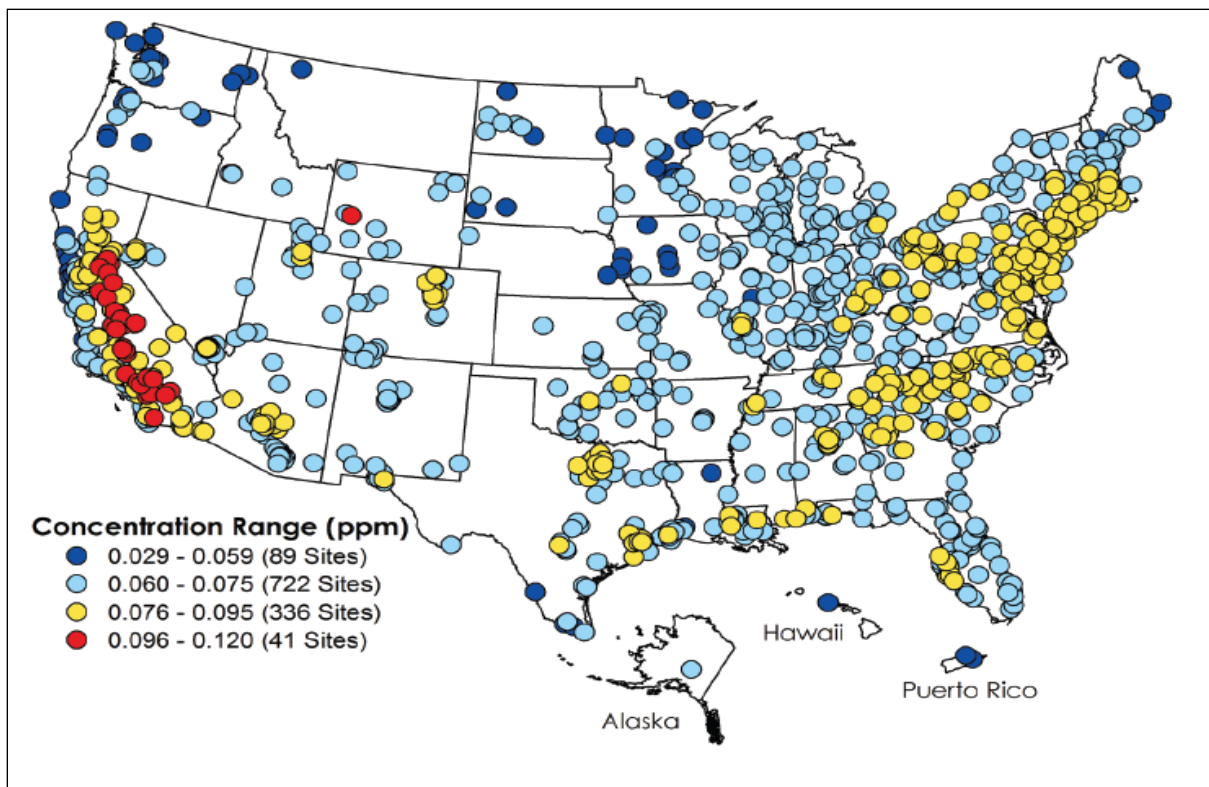


Figure 1. Ozone concentrations in ppm, 2008 (fourth highest daily maximum 8-hour concentration).

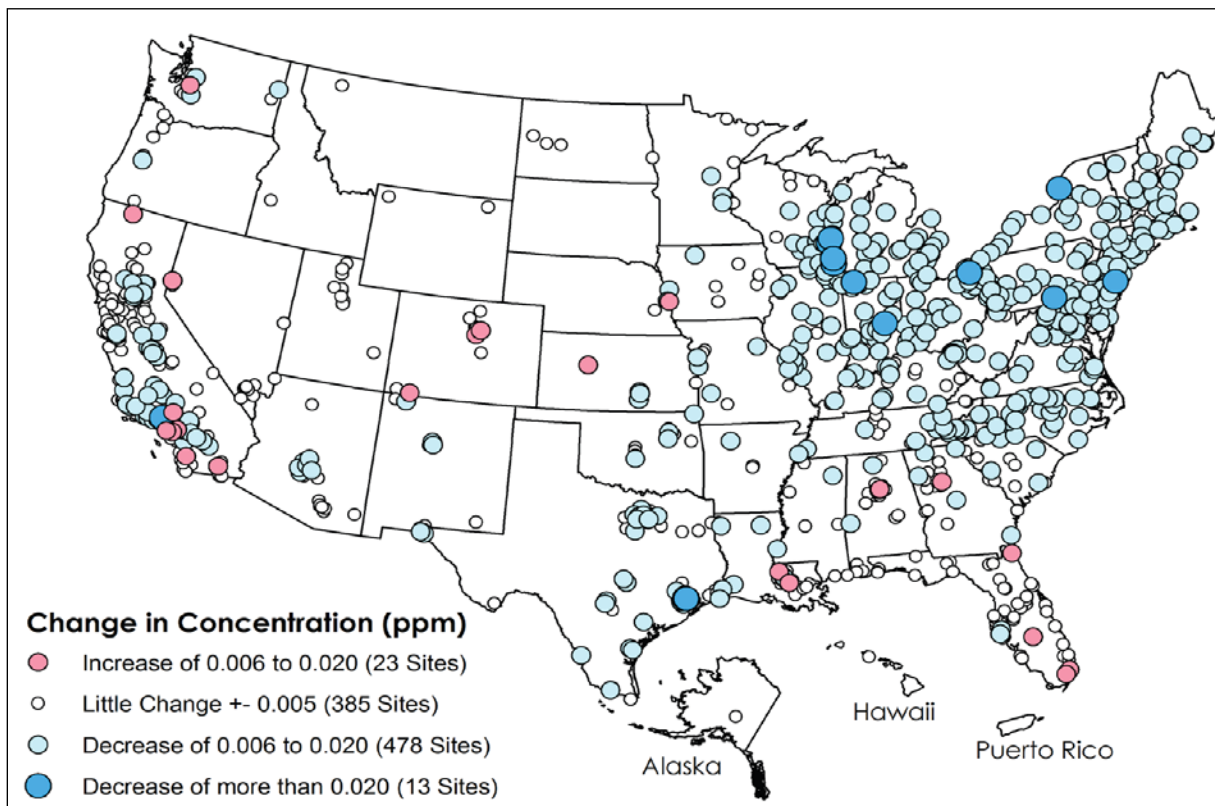


Figure 2. Change in ozone concentrations in ppm, 2001-2003 vs. 2006-2008 (three-year average of the annual fourth highest daily maximum 8-hour concentrations).

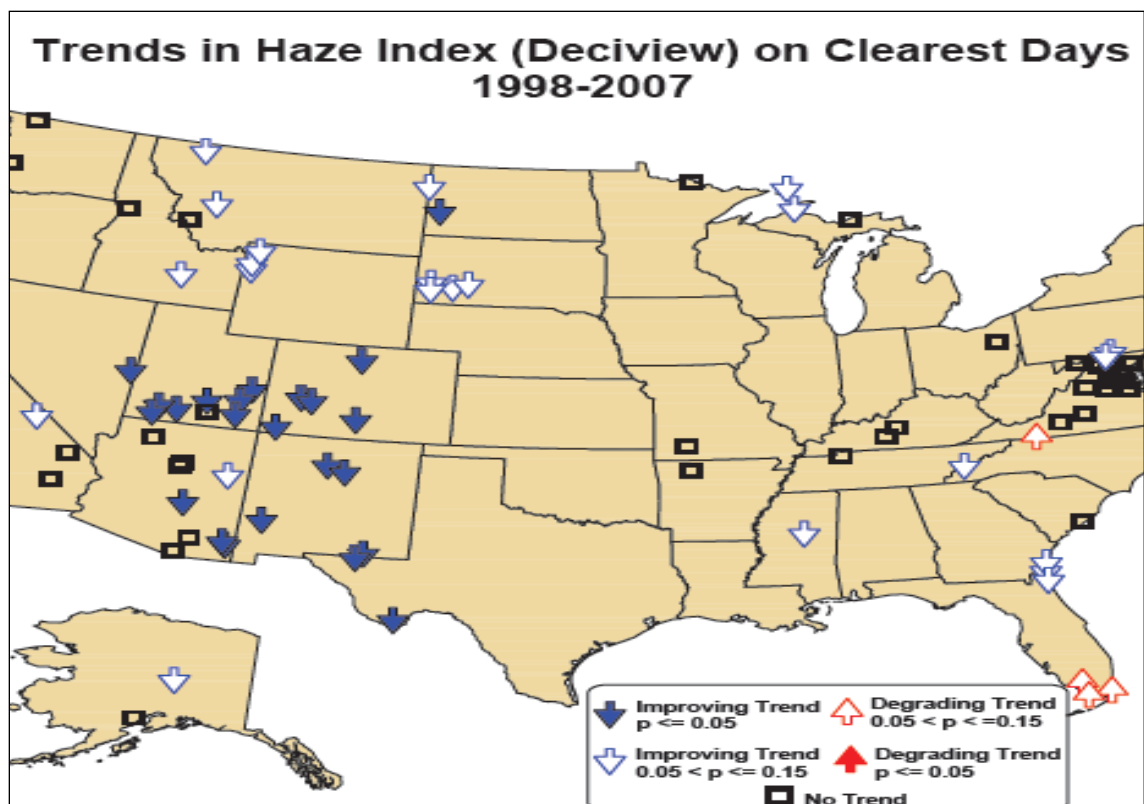


Figure 3. Trends in haze index (deciview) on clearest days, 1998-2007.

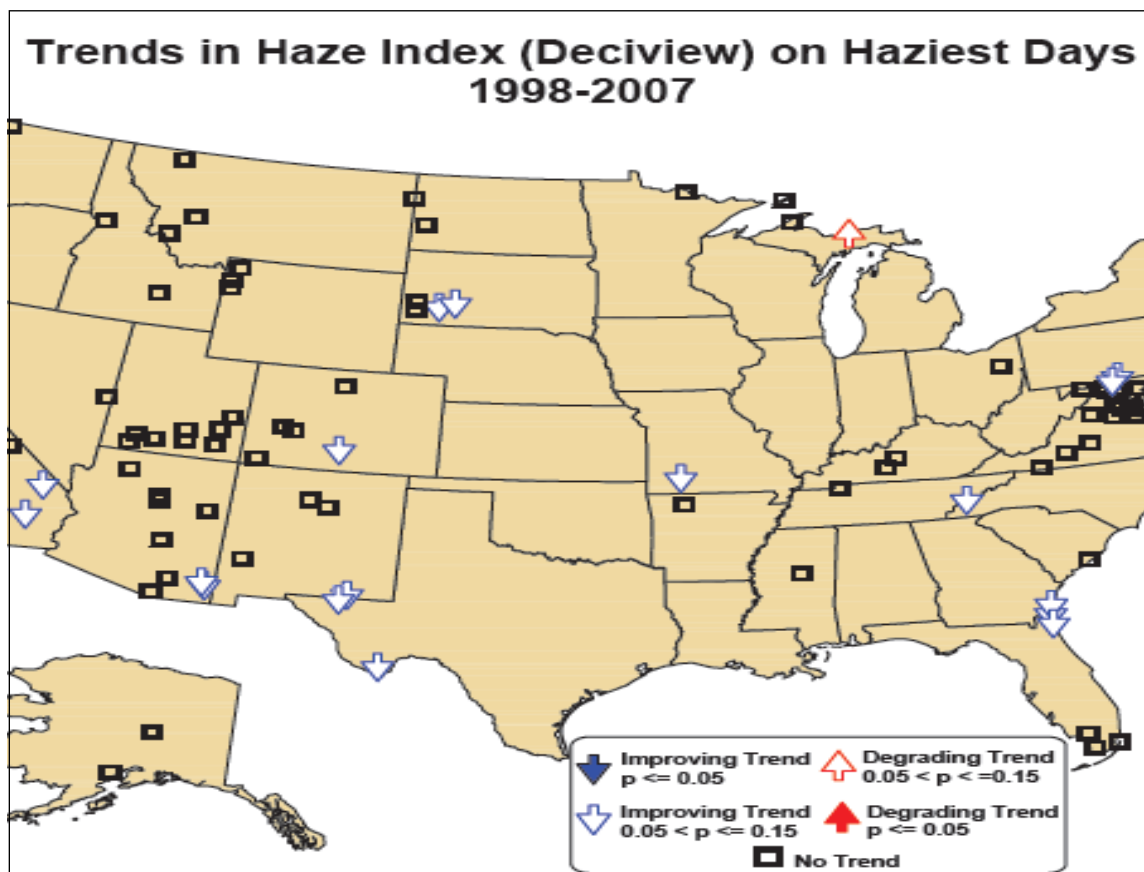


Figure 4. Trends in haze index (deciview) on haziest days, 1998-2007.

HiLine District

The AQI data shows that there's little risk to the general public from degraded air quality (Table 1). Between 1997 and 2007, 94 percent of the days monitored rated "good" with 6 percent being "moderate." While there was one day in 2003 that posed a health risk in Glacier County, this was a very rare and short-term occurrence that appears to have been related to large wildfires in Glacier National Park and to the south of the receptor (the Lincoln complex). Phillips County has not experienced any exceedences, and this station was discontinued in 1997.

Table 1. US EPA – Air Data Air Quality Index Report – Field Office Summary (1997-2007)							
County	State	# Days with Data	# Days Rated Good	Percent of Days Rated Good	# Days Rated Mod	# Days Rated Unhealthy for Sensitive Groups	# Days Rated Unhealthy
Phillips-1997	MT	92	92	100	0	0	0
Phillips-All	MT	92	92	100	0	0	0
Glacier-2007	MT	45	43	94	2	0	0
Glacier-2006	MT	61	60	98	1	0	0
Glacier-2005	MT	61	61	100	0	0	0
Glacier-2004	MT	66	66	100	0	0	0
Glacier-2003	MT	42	38	90	3	1	0
Glacier-2002	MT	59	52	88	7	0	0
Glacier-2001	MT	61	59	97	2	0	0
Glacier-2000	MT	59	55	93	4	0	0
Glacier-1999	MT	58	53	91	5	0	0
Glacier-1998	MT	52	44	85	8	0	0
Glacier-1997	MT	39	29	74	10	0	0
Glacier All	MT	603	560	93 percent	42	1	0
Field Office Values	MT	695	652	94 percent	42	1	0
Field Office Percentages	MT	-	-	94 percent	6 percent	< 1 percent	0 percent

In 2007 lands within the HiLine District were in compliance with all air quality standards. While the data is from Browning, it is the only station within the District Office Boundary. At that time, particulate matter (PM₁₀) reached 40 percent of the standard. This indicates that current air quality is very good, falling well below applicable standards.

The primary pollutant identified for the project area is PM₁₀. A review of tier-1 and tier-2 emissions for PM₁₀ shows that agriculture and forestry is the largest source of PM₁₀. This source produces 53 percent of all emissions with fugitive dust contributing another 43 percent.

The UL Bend National Wildlife Refuge (NWR), with its wilderness area, and Glacier National Park are Class 1 Areas within the HiLine District, but only UL Bend is in the Malta Field Office. It is located 66 miles south-southwest of Parcel MTM79010 GG and another 30 miles farther from Parcel MTM79010 DF. Glacier National Park is hundreds of miles west of the Malta Field Office. There are no known nonattainment areas for air quality.

3.3.2 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 Intergovernmental Panel on Climate Change (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;
- 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, earth has a natural greenhouse effect wherein naturally occurring gases such as water vapor, CO₂, methane, and N₂O 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 CO₂, methane, N₂O, 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, CO₂ 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 Supplementary Information Report for Montana, North Dakota, and South Dakota (Climate Change SIR 2010) 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 patters 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 (USGCRP 2009, as cited in the Climate Change SIR 2010). 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 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 (2010) 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, 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 5). 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 6

, 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.

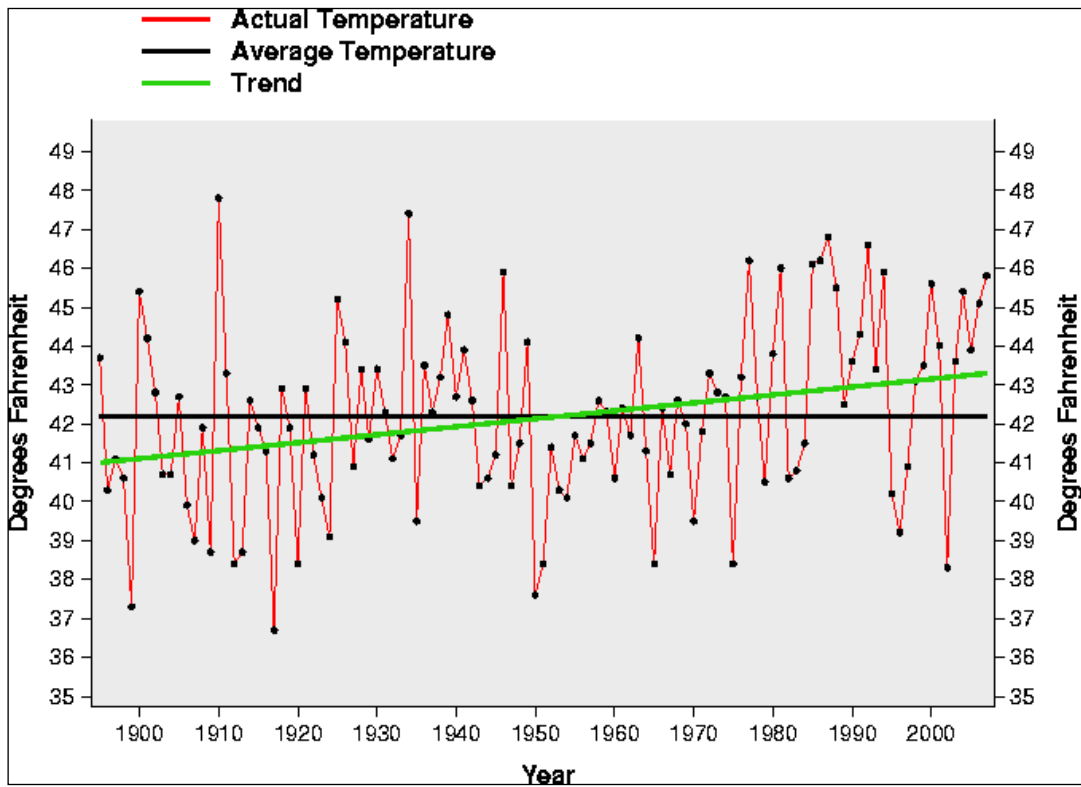


Figure 5. Regional climate summary of spring temperatures (March-May) for the West North Central Region (MT, ND, SD, WY), from 1895-2007. (Source: NOAA website – <http://www.ncdc.noaa.gov/oa/climate/research/cag3/wn.html>)

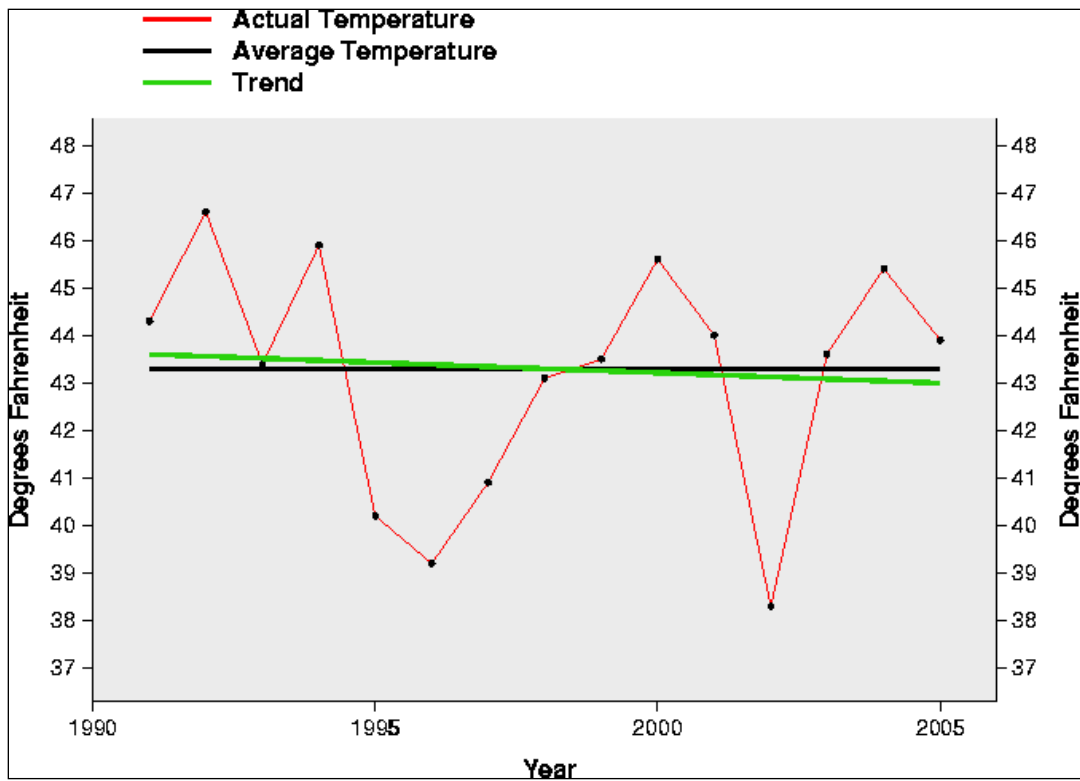


Figure 6. Regional climate summary of spring temperatures (March-May) for the West North Central Region (MT, ND, SD, WY), from 1991-2005. (Source: NOAA website – <http://www.ncdc.noaa.gov/oa/climate/research/cag3/wn.html>)

3.3.3 Soil Resources

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/>). The USDA-NRCS performed soil surveys according to National Cooperative Soil Survey (NCSS) standards. Pertinent information for review and analysis is from the SDM and the National Soils Information System (NASIS) database for the area.

Soils within the lease area parcels developed from glacial till and alluvium from mixed sources. The primary map units (MU) are the: Map unit: 220E - Hillon-Joplin cobbly loams, 8 to 35 percent slopes; Map unit: 811A - Glendive-Havre loams, 0 to 2 percent slopes; Map unit: 1221F - Hillon-Kevin association, 15 to 45 percent slopes; and, Map unit: 1441D - Kevin-Scobey-Phillips association, 2 to 15 percent slopes.

Appendix B provides a description of the major soils that occur in a MU. Descriptions of non-soil (miscellaneous areas) and minor MU components are not included. Table 2 breaks out the MU within a Lease Area Parcel and provides acres, soil ratings, and interpretations.

Table 2. Map units and associated acres, ratings, and interpretations for Lease Area Parcel MTM 79010 DF and MTM 79010 GG based on dominant condition of each MU. (Source: USDA-NRCS SSURGO dataset [USDA-NRCS, 2010])

Parcel #	Map Unit	Acres ¹	Water Erosion Hazard ²	Wind Erosion Hazard ³	BLM-Reclamation Suitability (MT) ⁴	
					Rating Class	Limiting Feature(s)
MTM79010-DF	1221F	30	Severe	Moderate	Poorly Suited	Water Erosion
	1441	14	Slight	Slight	Well Suited	-
MTM79010-GG	220E	3	Slight	Moderate	Moderately Suited	Water Erosion Wind Erosion
	811A	8	Slight	Slight	Well Suited	-
	W(Water)	17	-	-	-	-

1. Approximate acres of each MU within the lease area parcel. Approximate acres based on GIS calculations.
2. The water erosion hazard for bare, non-compacted, soil is estimated by using the formula: Water Erosion Hazard = Kw factor x Representative Value (RV) Slope. The soil erodibility factor (Kw) quantifies soil detachment by runoff and raindrop impact. This erodibility factor is an index used to predict the long-term average soil loss, from sheet and rill erosion. The Kw factor applies to the whole soil, which includes rock fragments. Kw is based primarily on percentage of silt, sand, and organic matter, soil structure, saturated hydraulic conductivity, and rock fragments (USDA-NRCS, 2010). Representative Value (RV) Slope indicates the expected slope value for a given MU (USDA-NRCS 2010).
3. The wind erosion hazard is estimated from the Wind erosion Index (WEI).The WEI is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. This index is divided into three rating classes: slight (0, 38, 48, 56), moderate (86), and severe (134, 160, 180, 220, 250, 310) (USDA-NRCS, 2010).
4. Vulnerability to degradation is a function of resistance to degradation. Resistance to degradation of a rangeland or woodland site is a measure of its ability to function without change throughout a disturbance. The magnitude of decline in the capacity to function determines the degree of resistance to change. Resistance to degradation thus could be described as an areas buffering capacity. This depends upon soil type, vegetation, climate, land use, disturbance regime, temporal and spatial scales. The disturbance regime determines the type of stresses placed upon the soil, vegetation, and wildlife components of the site. Thus, soil factors of vulnerability to degradation will vary based upon the disturbance regime for a particular site. The hazard to site degradation ratings represent the soil factors that dominate these processes. Factors for vulnerability to site degradation include relative risk of water and wind erosion, salinization, sodification, organic matter and nutrient depletion and/or redistribution, loss of adequate rooting depth to maintain desired plant communities. Dynamic soil properties which vary with time, e.g. microbial biomass/diversity and carbon/nitrogen ratio, are not used since they are not contained within STATSGO or SSURGO databases. This rating should be used with the objective to protect vulnerable sites from the type of degradation that would result in accelerated erosion, reduction in water and air quality, invasion by annual grasses or noxious weeds, and other large scale potential natural plant community conversions. When degradation of soil and natural plant community characteristics goes beyond the threshold for the ecological site, the ecological site characteristics cannot be restored without intensive inputs of energy (USDA-NRCS, 2010).

3.3.4 Water Resources

3.3.4.1 Hydrology – Surface Water Quality

Parcel MTM79010 GG includes approximately 1.6 miles of the Milk River while parcel MTM79010 DF borders a small bend of Whitewater Creek. The Montana Department of Environmental Quality has identified both the Milk River and Whitewater Creek as impaired. These bodies of water and their probable causes and sources of impairment are identified in Table 3.

Table 3. Impairment Information for the Milk River and Whitewater Creek

Stream Name	Miles	Probable Cause	Probable Source
Milk River	1.6	Alteration in stream-side or littoral vegetative covers	Crop Production (Crop Land or Dry Land), Irrigated Crop Production, Rangeland Grazing
		Iron	Natural
		Nitrates	Crop Production (Crop Land or Dry Land), Irrigated Crop Production, Rangeland Grazing
		Other flow regime alterations	Flow Alterations from Water Diversions
Whitewater Creek	<0.1	Mercury	Unknown

3.3.4.2 Hydrology – Ground Water

Groundwater below the lease area parcels resides in both shallow alluvial and deep bedrock aquifers that are currently or could eventually be used for agricultural, domestic, and/or industrial purposes. Alluvial deposits consist of valley-fill, stream floodplain, and stream terrace gravels, sands, and muds. Valley-fill and floodplain deposits are extensively developed in and proximal to the broad valley of the Milk River and the wider floodplains of Whitewater Creek. The Judith River formation is a widely used source of groundwater with total dissolved solids (TDS) levels generally ranging from 800 to 2,000 milligrams/liter. Wells in the Judith River formation near the Canadian border average 150-200 feet deep with an average yield of 3-4 gallons per minute (gpm) and a potential yield of 20 gpm. The Judith River formation consists of up to 450 feet of gray, brown, and yellow mudstone; thin brown sandstones; and thick multistory-multilateral channel deposits, all of fluvial origin. The Judith River formation lies comfortably on the Claggett Shale. The Claggett Shale, which resides atop the Eagle Formation and often acts as a confining layer, consists of up to 450 feet of dark gray, brown, and sandy shale. The crest of the Claggett Shale unit commonly exhibits flaggy sandstones and yellow and rusty concretionary zones.

3.3.5 Vegetation Resources

Vegetation composition of the lease parcels is characteristic of that expected to occur on an upland silty ecological site in the Northern Glaciated Plains. Major grasses consist primarily of increaser species including western wheatgrass (*Pascopyrum smithii* (Rydb.) A. Löve), needle and thread grass (*Hesperostipa comata* (Trin. & Rupr.) Barkworth), blue grama (*Bouteloua gracilis* (Willd. ex Kunth) Lag. ex Griffiths), prairie junegrass (*Koeleria macrantha* (Ledeb.) J.A. Schultes), and Sandberg bluegrass (*Poa secunda* J. Presl); major forbs consist primarily of scarlet globemallow (*Sphaeralcea coccinea* (Nutt.) Rydb.), and western yarrow (*Achillea millefolium* L. var. *occidentalis* DC.); major shrubs consist primarily of silver sagebrush (*Artemisia cana* Pursh), winterfat (*Krascheninnikovia lanata* (Pursh) A.D.J. Meeuse & Smit), broom snakeweed (*Gutierrezia sarothrae* (Pursh) Britt. & Rusby), and prairie sagewort (*Artemisia frigida* Willd.).

Most decreaser species are considered rare within these parcels but can be found. These include green needlegrass (*Nassella viridula* (Trin.) Barkworth), plains muhly (*Muhlenbergia cuspidata* (Torr. ex Hook.) Rydb.), purple prairieclover (*Dalea lasiathera* Gray), prairie coneflower (*Ratibida columnifera* (Nutt.) Woot. & Standl.), and dotted gayfeather (*Liatris punctata* Hook.).

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

3.3.5.1 Vegetation Communities

Three vegetation communities plus several disturbed areas were identified in the lease parcels: silver sagebrush-mixed grassland, mixed grassland, improved pasture or restored pasture, agriculture, and riparian areas.

3.3.5.2 Silver-sagebrush-mixed Grassland, Mixed Grassland

The silver-sagebrush-mixed grassland community occurs on lower valley slopes near drainages, especially where soils are deeper. This setting is absent or very limited in extent in the lease area. The sagebrush/grassland vegetation community has a perennial grass understory, but a shift in the understory species composition may have occurred due to historic use or fire impacts. Mixed grasslands are similar, only missing the silver sagebrush component.

3.3.5.3 Improved or Restored Pasture; Agriculture

Improved pastures consists of cultivated areas planted with introduced vegetation such as crested wheatgrass, smooth brome (*Bromus inermis*), or alfalfa (*Medicago sativa*). A small patch of crested wheatgrass is on the extreme eastern edge of Parcel MTM79010 DF along Whitewater Creek while grass/alfalfa hay land on private surface adjoins the Milk River in MTM79010 GG. Restored pastures may include sub-marginal farmlands that have been restored due to poor crop production and/or high erosion potential. These pastures are often dominated by a monoculture of crested wheatgrass.

3.3.5.4 Wetland-Riparian

Riparian and wetland areas are the green zones bordering lakes, rivers, reservoirs, estuaries, potholes, springs and seeps, and perennial, intermittent, or ephemeral streams where the water table is usually at or near the surface. The riparian zone is the interface or linkage between the upland (terrestrial) zone and the aquatic zone and is generally more productive in terms of total biomass than the remainder of the area. Characteristically, riparian and wetland areas display a greater diversity of plants, fish, and wildlife than adjoining ecosystems. Healthy riparian systems filter and purify water as it moves through the riparian-wetland zone, reduce sediment loads and enhance soil stability, provide micro-climate moderation when contrasted to temperature extremes in adjacent areas, and contribute to ground water recharge and base flow. Some of the more common vegetative species that occur in riparian-wetland areas along Whitewater Creek and the Milk River include prairie cordgrass (*Spartina pectinata*), switchgrass (*Panicum virgatum*), Canada wildrye (*Elymus canadensis*), western wheatgrass (*Pascopyrum smithii*), willow (*Salix* spp.), chokecherry (*Prunus virginiana*), buffaloberry (*Shepherdia*), water sedge (*Carex aquatilis*), plains cottonwood (*Populus deltoids occidentalis*), sedges (*Carex*

spp.), rushes (*Juncus spp.*), bulrush (*Schoenoplectus spp.*), cattail (*Typha spp.*), American licorice (*Glycyrrhiza lepidota*), smooth brome (*Bromus inermis*), wild rose (*Rosa spp.*), sloughgrass (*Beckmannia*), curlycup gumweed (*Grindelia squarrosa*), Kentucky bluegrass (*Poa pratensis*), and snowberry (*Symphoricarpos spp.*).

3.3.5.5 Other Disturbed Vegetation Communities

The only evidence of disturbed vegetation communities is a tiny area of crested wheatgrass in the Whitewater Creek bottom in Parcel MTM79010-DF remaining from the homesteading days. Parcel MTM79010-GG on the Milk River is primarily under the river channel and vegetation is dependent upon river dynamics rather than disturbances caused by man, grazing, or fire.

3.3.5.6 Invasive, Non-Native Species

Competition from invasive, non-native plants constitutes a potential threat to native plant species and wildlife habitat within the lease parcels. The primary invasive, non-native plant species occupying a tiny portion of the lease area (MTM79010-DF) is crested wheatgrass (*Agropyron cristatum*). Japanese brome (*Bromus japonicas*), cheatgrass (*Bromus tectorum*), intermediate wheatgrass (*Thinopyrum intermedium*), and foxtail barley (*Hordeum jubatum*) could become established in the area after disturbance from natural gas development. Crested wheatgrass and intermediate wheatgrass occur in areas as a result of being planted to increase forage production or to stabilize soils by reducing erosion. Cheatgrass, Japanese brome, and foxtail barley are all aggressive invasive species that out-compete desirable vegetation for water and soil nutrients. These species may also reduce cattle grazing performance, wildlife habitat quality, and native species diversity. Cheatgrass is an invasive species well known for completely replacing native vegetation and changing fire regimes.

3.3.5.7 Noxious Weeds

Noxious weeds occur in scattered isolated populations throughout the planning area. The most common species of noxious weeds are leafy spurge (*Euphorbia esula*), Russian knapweed (*Acroptilon repens*), spotted knapweed (*Centaurea stoebe*), and Canada thistle (*Cirsium arvense*). Noxious weed control is the responsibility of the surface management agency in cooperation with the local weed control board. Chemical and biological control methods are utilized, with chemical control being the more predominant.

Parcel MTM79010-DF is not known to contain any noxious weeds. Site visits by the wildlife biologist on July 9, 2010, the archeologist on July 14, 2010, and the rangeland management specialist on July 15, 2010, did not reveal any noxious weed infestations. The native range dominated by prairie junegrass, western wheatgrass, and blue grama does not appear to have been cultivated when homesteaded and noxious weeds have not had an opportunity to become established. A very small portion of the Whitewater Creek bottom has crested wheatgrass left after the homestead was abandoned, but other introduced plants or noxious weeds were not observed.

Parcel MTM79010-GG is predominantly underneath the Milk River channel. None of the common noxious weeds could grow there. The adjoining river bank is either in woody vegetation or is hayed. No leafy spurge was observed from a distance on July 9, 2010 (no access across private land), but leafy spurge is known to exist near natural gas well pads in the same general area along the Milk River.

3.3.6 Special Status Species

3.3.6.1 Special Status Animal Species

The decisions in this EA pertaining to special status animal species are tiered to the decisions, information, and analysis contained in the JVP RMP/EIS. The JVP RMP is the governing land use plan for the Malta FO. The discussion of special status animal species in the JVP RMP, however, is vastly out-of-date. The threatened and endangered species list has changed, and the BLM sensitive species list has increased in size after reviews in 2004 and 2009. For this reason, a more recent summary of special status animal species is included in this EA. Two formerly listed species are now on the sensitive species list with some protections still in place.

Five wildlife species occur or may occur in Phillips County that are protected under section 7c of the Endangered Species Act (ESA) as amended in 1973, including the interior least tern (*Sterna antillarum*), piping plover (*Charadrius melodus*), whooping crane (*Grus americana*), pallid sturgeon (*Scaphirhynchus albus*), and black-footed ferret (*Mustela nigripes*). The black-footed ferret has been reintroduced in south Phillips County as an experimental, nonessential population. Those introduced on BLM land are located near the Dry Fork Road in the Beauchamp Creek reintroduction area, but none have been observed there since September 2006. The only known remaining ferrets are on the Charles M. Russell NWR in the UL Bend Area. Ferrets, however, have also been introduced in Grasslands National Park in Saskatchewan just a few miles from the international border and Phillips County. The piping plover and least tern have been observed on Whitewater Lake in northern Phillips County, but no nesting has occurred there. Piping plover nesting does occur on Nelson Reservoir and Bowdoin NWR in central Phillips County. The least tern has also been observed on Nelson Reservoir. The pallid sturgeon occurs in the Missouri River. Since 1990, the whooping crane has been observed several times in spring on large reservoirs in the Whitewater area and to the southwest, between the two parcels.

The BLM listed sensitive species that could be in Phillips County include the Great Plains toad (*Bufo cognatus*), greater short-horned lizard (*Phrynosoma hernandesi*), milksnake (*Lampropeltis triangulum*), northern leopard frog (*Rana pipiens*), snapping turtle (*Chelydra serpentina*), western hog-nosed snake (*Heterodon nasicus*), black-tailed prairie dog (*Cynomys ludovicianus*), bald eagle (*Haliaeetus leucocephalus*) (formerly listed), black-crowned night-heron (*Nycticorax nycticorax*), black tern (*Chlidonias niger*), burrowing owl (*Athene/Speotyto cunicularia*), common loon (*Gavia immer*), dickcissel (*Spiza americana*), ferruginous hawk (*Buteo regalis*), Franklin's gull (*Larus pipixcan*), golden eagle (*Aquila chrysaetos*), greater sage-grouse (*Centrocercus urophasianus*), Harlequin duck (*Histrionicus histrionicus*), loggerhead shrike (*Lanius ludovicianus*), long-billed curlew (*Numenius americanus*), chestnut-collared longspur (*Calcarius ornatus*), McCown's longspur (*Calcarius mccownii*), marbled godwit (*Limosa fedoa*), mountain plover (*Charadrius montanus*), northern goshawk (*Accipiter gentiles*), peregrine falcon (*Falco peregrinus*) (formerly listed), sage thrasher (*Oreoscoptes montanus*), Baird's sparrow (*Ammodramus bairdii*), Brewer's sparrow (*Spizella breweri*), Sprague's pipit (*Anthus spragueii*), Swainson's hawk (*Buteo swainsoni*), white-faced ibis (*Plegadis chihi*), willet (*Cataptrophorus semipalmatus*), Wilson's phalarope (*Phalaropus tricolor*), red-headed woodpecker (*Melanerpes erythrocephalus*), and yellow rail (*Coturnicops noveboracensis*).

Many of these species are migratory birds that could be nesting between April 15 and July 15. Bald eagles can be present on the parcels or anywhere in Phillips County from November to early April each year, but no confirmed nesting occurs in Phillips County. Nesting, if it does occur, is most likely along the Milk River in the Wagner area. The bald eagle was delisted on

June 29, 2007, and is now treated as a special status (sensitive) species rather than as a threatened species. The Milk River corridor on Parcel MTM79101-GG is considered bald eagle winter roosting habitat. The long-legged myotis (*Myotis volans*) and the Townsend's big-eared bat (*Corynorhinus townsendii*) have been found in Azure Cave in the Little Rocky Mountains, and the long-eared myotis (*Myotis evotis*) has been found near ponds in the Little Rocky Mountains. Sensitive fish species include the sauger (*Stizostedion canadense*), pearl dace (*Margariscus margarita*) and northern redbelly X finescale dace hybrid (*Phoxinus eos* X *Phoxinus neogaeus*). The dace occur in intermittent streams such as Whitewater Creek, Garland Coulee, and Cottonwood Creek, while the sauger is found in the Milk River. Dace are also found in Frenchman Creek, especially in the perennial portions.

Parcel MTM79010-DF is BLM surface in native range dominated by western wheatgrass, prairie junegrass, and blue grama. None of the listed species are expected to occur there. The three bird species need larger bodies of water with sandbars or gravel shorelines, the black-footed ferret needs black-tailed prairie dog towns, and the pallid sturgeon is known only from the Missouri River. The candidate greater sage-grouse is also unlikely to be found on the parcel because there are no active or historic strutting grounds within five miles, and silver sage is found only in isolated patches on the lease and along Whitewater Creek which is adjacent to the parcel. The historic strutting ground located five miles south of the parcel has not had documented strutting activity for nearly 30 years, but greater sage-grouse do occur sporadically throughout Phillips County and occurrence in any prairie habitat cannot be eliminated from discussion. Any of the BLM sensitive grassland bird species could be expected to occur on the parcel during the migration and nesting seasons. A McCown's longspur (with hatched nest) and ferruginous hawk were observed on the day of the site visit (July 9, 2010). An additional eight sensitive sparrow, pipit, raptor, and shorebird species could use the area. There are no black-tailed prairie dog towns near the parcel. The closest dog towns would probably be in Saskatchewan in Grasslands National Park.

Parcel MTM79010-GG is an unusual parcel located on the bank and immediately beneath all or half of the Milk River channel. Adjacent land is private surface predominantly in hay production and farmsteads. The Milk River channel is a narrow strip of habitat and unlikely to have any of the listed species and few of the BLM sensitive species. The three bird species need larger bodies of water with sandbars or gravel shorelines, the black-footed ferret needs black-tailed prairie dog towns, and the pallid sturgeon is known only from the Missouri River. The Milk River is winter habitat for the bald eagle and yearlong habitat for the northern leopard frog, snapping turtle, and sauger although the sauger is uncommon, and there is only one record of the snapping turtle approximately 20 river miles upstream from the parcel. None of the grassland birds would occur on the parcel. The dace species could be present in the Milk River when migrating to the smaller prairie streams that are tributary to the Milk River.

Summary

Although listed threatened or endangered species are unlikely to occur on the lease parcels, the TES 16-2 stipulation for threatened or endangered species would be attached to the leases in the event that listed species are observed, or in case any future listed species are likely to occur on the lease parcels. Some of the standard stipulations and notice also could apply to special status species.

3.3.6.2 Special Status Plant Species

There are no known threatened or endangered plant species on the lease parcels. Both the U.S. Fish and Wildlife Service (FWS) and the Montana Natural Heritage Program (MNHP) lists show none for the Malta Field Office (Phillips County). The Montana/Dakotas BLM sensitive plant species list shows five species that occur in and around water and riparian areas in Phillips County, although not much is known of the status of these plants in the Malta Field Office. Three species have single records and two have two records each. The general trend and condition of riparian habitats could be used to estimate the specific conditions until the sites can be revisited and site-specific data are collected. Parcel MTM79010-DF has no developed riparian areas and none of these plants would be found in the upland range sites. Parcel MTM79010-GG has a narrow band of riparian vegetation in places, but with private surface ownership, BLM has little authority to do surveys for the plant. Development is not anticipated on that site due to 1,000-ft set-back regulations in the standard stipulations. The five sensitive plant species are chaffweed (*Anagallis minima*), long-sheath waterweed (*Elodea bifoliata*), dwarf woolyheads (*Psilocarphus brevissimus*), slender bulrush (*Schoenoplectus heterochaetus*), and slender-branched popcorn-flower (*Plagiobothrys leptocladus*).

3.3.7 Fish and Wildlife

The BLM coordinates with Montana Fish, Wildlife and Parks (MFWP) and the FWS to manage wildlife. While the BLM manages habitat on BLM lands, MFWP is responsible for managing all wildlife species populations. The FWS also manages some wildlife populations, but only those federal trust species managed under mandates such as the Endangered Species Act, Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act.

Managing wildlife is factored into project planning at multiple scales and should begin early in the planning process. Evaluating wildlife values at the landscape scale is the first step to understand potential impacts of a project. Wildlife values, including terrestrial conservation species, richness, and game quality, and aquatic conservation connectivity, conservation species, and game species have been mapped at the landscape level for Montana by MFWP through their Crucial Areas Planning System (CAPS: <http://fwp.mt.gov/gis/maps/caps/>). The oil and gas lease parcels were reviewed in the CAPS GIS website as an overlay to potential aquatic, terrestrial, and habitat values. This course-scale landscape analysis of wildlife resources provides one tool for understanding the context of the wildlife values at a large scale. Fine-scaled tools, data, and resource information based on inventory and monitoring data, as well as local knowledge from BLM and MFWP employees, are used to further examine resource issues at the site-specific level for the specific resources contained in the lease parcels considered in this EA.

The decisions in this EA pertaining to fish and wildlife and fish and wildlife habitats are tiered to the decisions, information, and analysis contained in the JVP RMP/EIS. The JVP RMP is the governing land use plan for the Malta FO. The discussion of fish and wildlife resources in the JVP RMP, including greater sage-grouse and native fish in prairie streams, is out-of-date. For this reason, a more recent summary of fish and wildlife resources is included in this EA. The wildlife resource is diverse and widely distributed in Phillips County, with grassland species predominating. Big game animals include pronghorn antelope (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), elk (*Cervus elaphus*), and occasionally moose (*Alces alces*) and bighorn sheep (*Ovis canadensis*). Large blocks of native grasslands, sagebrush grasslands, and breaks topography are important habitats for big game species, and designated big game winter range areas are spread across much of Phillips County. Moose are becoming more abundant because transient animals may stay in certain

drainages throughout the summer. Bighorn sheep are more restricted to islands of habitat in the Little Rocky Mountains and the Larb Hills. Black bears (*Ursus americanus*) can occur in the Little Rocky Mountains, but they are extremely uncommon. Parcel MTM79010-DF has no designated big game winter range. Summer use by pronghorns and mule deer is expected, but thermal cover and dense sage are not present, and winter use is not expected. Parcel MTM79010-GG is partially in designated pronghorn winter range and also partially in designated mule deer winter range. Riparian cover on the streambank, however, is sparse, and big game use in winter would be marginal. Summer use would be more for watering than for forage consumption.

Smaller mammals include cougar (*Puma concolor*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), badger (*Taxidea taxus*), beaver (*Castor canadensis*), porcupine (*Erethizon dorsatum*), striped skunk (*Mephitis mephitis*), swift (*Vulpes velox*) and red (*Vulpes vulpes*) foxes, white-tailed jackrabbit (*Lepus townsendii*), mountain cottontail (*Sylvilagus nuttallii*), muskrat (*Ondatra zibethicus*), mink (*Mustela vison*), and up to three species of weasels (*Mustela* spp.). There are a few records for wolverine (*Gulo gulo*). A variety of shrews, rodents, and other small mammals can also be found, including periodic high populations of Richardson's ground squirrels (*Spermophilus richardsonii*). There are black-tailed prairie dog (*Cynomys ludovicianus*) colonies in the southern two-thirds of the county, but they are reduced in area periodically by outbreaks of sylvatic plague. There are no black-tailed prairie dog towns near either lease parcel.

Upland game birds include the native sharp-tailed grouse (*Tympanuchus phasianellus*), greater sage-grouse (*Centrocercus urophasianus*), and mourning dove (*Zenaida macroura*), and the introduced ring-necked pheasant (*Phasianus colchicus*) and gray partridge (*Perdix perdix*). There are active greater sage-grouse strutting grounds or leks in sagebrush habitat, with leks more abundant in Wyoming big sagebrush areas in the southern half of the county than in silver sagebrush areas in the northern part of the county. Sage-grouse nesting is probable in sagebrush grasslands within two or possibly more miles of active leks. Sharp-tailed grouse dancing grounds are more abundant, especially near breaks habitats north of the Milk River. Woody draws are especially important for sharp-tailed grouse, and some shrub species appear to be declining in portions of Phillips County. Many areas provide nesting habitat for female sharptails coming from multiple leks due to the high lek abundance. Pheasant, gray partridge, and mourning doves are most abundant near crop fields and Conservation Reserve Program (CRP) lands in the area. Gray partridge are often observed near the boundary with the Charles M. Russell NWR. There are no active or historic greater sage-grouse strutting grounds near the two lease parcels, but there are historic records of sharp-tailed grouse dancing grounds within two miles of both parcels. Nesting is possible on MTM79010-DF, but unlikely on MTM79010-GG due to a lack of adequate nesting cover on the edge of Milk River. Natural gas exploration/development would probably not affect sharp-tailed grouse on dancing grounds, and nesting effects would be mitigated by the migratory bird nesting timing limit and associated nest-searching.

Amphibians and reptiles of Phillips County include the Great Plains toad (*Bufo cognatus*), Woodhouse's toad (*Bufo woodhousii*), Boreal chorus frog (*Pseudacris triseriata*), northern leopard frog (*Rana pipiens*), tiger salamander (*Ambystoma tigrinum*), greater short-horned lizard (*Phrynosoma douglasi*), common sagebrush lizard (*Sceloporus graciosus*), painted turtle (*Chrysemys picta*), eastern racer (*Coluber constrictor*), western hog-nosed snake (*Heterodon nasicus*), plains garter snake (*Thamnophis radix*), gophersnake (bullsnake) (*Pituophis catenifer*), milksnake (*Lampropeltis triangulum*), and western rattlesnake (*Crotalus viridis*). The frogs, the

painted turtle, and the salamander are restricted to wetlands and stockponds during most of the year. Many species are widespread throughout Phillips County. Over 30 stock ponds are managed as either cold water or warm water fisheries depending on water depths and drought cycles. Native minnow species can be found in many of the streams and drainages, especially during spring runoff periods and in isolated pools later in summer. Riparian vegetation can be important for fish habitat because it shades the water surface and lowers water temperatures.

Migratory Birds

Stock ponds and wetlands throughout Phillips County, when wet, provide habitat for over 20 species of waterfowl. Common nesting species include gadwall (*Anas strepera*), northern shoveler (*Anas clypeata*), blue-winged teal (*Anas discors*), cinnamon teal (*Anas cyanoptera*), northern pintail (*Anas acuta*), mallard (*Anas platyrhynchos*), American wigeon (*Anas americana*), green-winged teal (*Anas crecca*), lesser scaup (*Aythya affinis*) and Canada goose (*Branta canadensis*). The nesting season for waterfowl usually extends from April 15 to July 15. Constructed as well as natural islands on stock ponds and reservoirs provide important nesting sites for Canada geese and most duck species. Wood ducks (*Aix sponsa*) and some diving duck species utilize natural cavities and nest boxes in trees along the Milk River and various irrigation canals.

Raptors found in Phillips County include the bald (*Haliaeetus leucocephalus*) and golden (*Aquila chrysaetos*) eagles, peregrine (*Falco peregrinus*) and prairie (*Falco mexicanus*) falcons, northern harrier (*Circus cyaneus*), Swainson's hawk (*Buteo swainsoni*), ferruginous hawk (*Buteo regalis*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), merlin (*Falco columbarius*), turkey vulture (*Cathartes aura*), northern goshawk (*Accipiter gentilis*), sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*Accipiter cooperii*), rough-legged hawk (*Buteo lagopus*), and numerous species of owls. Many raptor nests are found in lone cottonwood (*Populus deltoides*) trees along county roads. Ferruginous hawks are especially abundant in northwestern Phillips County, a long way from prairie dog towns.

Important grassland birds occurring in native prairie habitat in Phillips County include the Baird's (*Ammodramus bairdii*) and grasshopper (*Ammodramus savannarum*) sparrows, Sprague's pipit (*Anthus spragueii*), long-billed curlew (*Numenius americanus*), marbled godwit (*Limosa fedoa*), willet (*Cataptrophorus semipalmatus*), and McCown's (*Calcarius mccownii*) and chestnut-collared (*Calcarius ornatus*) longspurs. The Brewer's sparrow (*Spizella breweri*) is locally abundant in sagebrush habitat. Many of these species have experienced declines across much of their range in recent years, and large blocks of intact native grasslands remain important in maintaining healthy breeding populations of these birds. Areas with reduced or no livestock grazing are especially important. Wetlands also provide nesting areas for Wilson's phalaropes (*Phalaropus tricolor*), spotted sandpipers (*Actitis macularia*) and many other shorebirds. The nesting season for migratory birds other than ducks is generally from May 1 to August 1. Native grassland habitat in MTM79010-DF is probably the most important wildlife habitat on the parcels because so many BLM sensitive grassland species nest there.

3.3.8 Cultural Resources

The decisions in this EA pertaining to cultural resources are tiered to the decisions, information, and analysis contained in the JVP RMP/EIS. The JVP RMP is the governing land use plan for the Malta FO. A more complete description of oil and gas leasing as it is related to cultural resources can be found on page 40 of the RMP/EIS.

A records search was conducted of the State Historic Preservation Office database and BLM/GIS database. Records indicate that approximately 45 acres have been surveyed at a Class III level within section 11, T37N R29E and sections 20 and 21, T32N R34E. Of the 45 acres surveyed, only 15 acres within the boundary of one of the nominated parcels have been surveyed at a Class III level. No cultural resources were located within that 15 acre survey area. Within the remaining 35 acres surveyed, three cultural sites were recorded. All three sites are stone circle/stone feature sites. Site # 24PH3487 (located one-quarter mile from a nominated parcel) consists of one stone circle; 24PH4052 (located one-half mile from a nominated parcel) consists of three stone circles and 17 cairns; and 24PH4075 (located more than one-half mile from a nominated parcel) consists of 15 stone circles, 18 single cairns, and three linear stone alignments. These site types are predominant on the northern Great Plains. It is difficult to determine the age of stone circle site types, but it is generally assumed that they are prehistoric in nature.

A site visit was conducted at Parcel MTM 79010 DF parcel due to the high probability of cultural sites on the ridge tops above Whitewater Creek and the lack of inventory data for that section of the creek. Although the area is classified as LU (homesteaded) land, it was obvious that the ridge tops had not been previously farmed. A quick reconnaissance of the ridge top on the eastern side of Whitewater Creek yielded 10 stone circles; however, the features were not densely situated. It is assumed that additional features and sites could be located with a Class III inventory but that avoidance of sites and/or features would be possible.

3.3.9 Paleontology

The decisions in this EA pertaining to paleontological resources are tiered to the decisions, information, and analysis contained in the JVP RMP/EIS. The JVP RMP is the governing land use plan for the Malta FO. A more complete description of oil and gas leasing as it is related to paleontological resources can be found on page 40 of the RMP/EIS.

Paleontological resources are known mostly to occur in Hell Creek, Judith River, and Two Medicine formations and in some cases the Bearpaw Shale and Claggett formations within the HiLine district. There are no known paleontological sites within the nominated parcel areas. The nominated parcels are not located in Class IV or V High Probability areas for paleontological resources.

3.3.10 Native American Religious Concerns

“A traditional cultural property, can be defined generally as one that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community’s history, and (b) are important in maintaining the continuing cultural identity of the community” (NR Bulletin 38).

Through past consultation, the Sweet Grass Hills and Little Rocky Mountains have been identified as Traditional Cultural Properties (TCP). In addition, the Kevin Rim and Big Bend of the Milk River Areas of Critical Environmental Concern (ACECs) contain diverse cultural resources and historic sites of significance.

In 1994, BLM signed a Memorandum of Understanding with BIA and the Fort Belknap Community Council to designate the Little Rockies as a TCP. In 2005 the Sweet Grass Hills were designated a TCP. The JVP RMP/EIS designated the Big Bend of the Milk ACEC, the West HiLine RMP/EIS designated the Kevin Rim ACEC, and the Final Sweet Grass Hills EIS

(1996) designated the Sweet Grass Hills an ACEC. The parcels in question are not located on or near the Little Rockies and the Sweet Grass Hills.

During the preparation of the Bowdoin Field Development EA (2009), outreach to the tribes in the region resulted in one identification of a TCP in the Larb Hills (Saco Hills). This area was classified as an area of traditional plant gathering by Fort Peck tribes. However, the area has not been nominated as a TCP. The lease parcels in question are not located in the Larb Hills.

No other areas have been recommended as traditional cultural properties through consultation meetings for various projects such as the Bowdoin Field Development EA and the Valley County Wind Farm EA (2006).

3.3.11 Visual Resources

Both parcels are within visual resource management (VRM) Class IV which provides for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high, meaning these management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance and repeating the basic elements of form, line, color, and texture in the natural characteristic landscape. VRM is only applied to federally managed surface. As such, the affected environment for VRM only applies to parcel MTM79101-DF (44.35 acres).

3.3.12 Lands with Wilderness Characteristics

There is no designated wilderness or wilderness study area (WSA) within or near the proposed lease parcels.

3.3.13 Livestock Grazing

Parcel MTM79010-DF is within BLM grazing allotment Big Coulee #5012. This parcel is on BLM surface and is intermingled with unfenced BLM, private, and state lands within the BLM grazing allotment. It has one permittee, and his operation consists of cattle only. The allotment has a four-pasture deferred rotation grazing system. The season of use is May 1 to October 31. This allotment is classified as an Improve (I) category allotment. This grazing allotment has range improvement projects (RIPs) such as water developments and fences constructed to improve rangeland health, improve livestock distribution, provide rest, control timing and use, or totally exclude livestock from areas of interest. Parcel MTM79010-GG is on private surface and not within a BLM grazing allotment. BLM has no control over management of the surface resources.

3.3.14 Recreation and Travel Management

Recreational opportunities managed by the BLM are only available on BLM-administered surface. Therefore the affected environment consists of 44.35 acres (or 62 percent of the total acreage proposed for lease) entirely within parcel MTM79010-DF.

This parcel is not located within a special recreation management area (SRMA). The area is accessible via primitive roads mainly on public land, and motorized use by the public is limited to existing roads. Recreational use of this land is likely casual and dispersed and may include hunting, hiking, wildlife observation, and photography.

Recent efforts through the Theodore Roosevelt Conservation Partnership (TRCP) identified high quality hunting and fishing opportunities. More specifically, a geographic area was identified as the TRCP Sportsmen Area, which covers lands in Phillips, Valley, Fergus, Petroleum, Garfield and McCone counties. Based on a review of the information, none of the proposed oil and gas lease parcels are located within the TRCP Sportsmen Area.

3.3.15 Lands and Realty

The lands proposed for competitive leasing of the federal mineral estate are 62 percent under the jurisdiction of BLM and 38 percent private surface. There is one parcel (44.35 acres) with full fee estate (BLM surface and federal mineral estate) under the jurisdiction of BLM. There is one split estate parcels (27.74 acres). For split estate parcels, the United States owns the minerals in the land as well as any surface entry rights.

Parcel MTM79010-GG is a split estate parcel in east-central Phillips County. There is no legal access through private and State of Montana lands.

Parcel MTM79010-DF is a 44.35-acre federal surface and subsurface parcel located near the Canadian border in northern Phillips County. Access is across federal and private land from Highway 191 approximately two miles to the east within a BLM grazing allotment. There is also legal access across BLM land from the south. The parcel is part of a rather large block of Bankhead-Jones LU land.

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

Currently there are no biomass, geothermal, solar power, or wind projects in the area of the aforementioned parcels.

3.3.16 Minerals

3.3.16.1 Fluid Minerals

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

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

Currently there are 607 oil and gas leases covering approximately 490,207 acres, in the Malta Field Office. Existing production activity holds approximately 61 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 4.

Numbers of townships, leases acres within those townships, and development activity for all jurisdictions are summarized in Table 5.

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

Table 4. Existing Development Activity.

	FEDERAL WELLS	PRIVATE AND STATE WELLS
Drilling Well(s)	0	1
Producing Gas Well(s)	1035	576
Producing Oil Well(s)	0	0
Water Injection Well(s)	0	0
Shut-in Well(s)	63	59
Temporarily Abandoned Well(s)	0	2

Table 5. Oil and Gas Leasing and Existing Development within Townships Containing Lease Parcels.

	Phillips County
Number of Townships Containing Lease Parcels	2
Total Acres Within Applicable Township(s)	44,560
Federal Oil and Gas Minerals	20,345
Percent of Township(s)	45.6
Leased Federal Oil and Gas Minerals	17,912
Percent of Township(s)	40.2
Leased Federal Oil and Gas Minerals Suspended	251
Percent of Township(s)	0.6
Federal Wells	Producing Gas Well(s) 42 Shut-in Well(s) 1
Private and State Wells	Producing Gas Well(s) 69 Shut-in Well(s) 3

3.3.16.2 Solid Minerals

The decisions in this EA pertaining to solid minerals are tiered to the decisions, information, and analysis contained in the JVP RMP/EIS. The JVP RMP is the governing land use plan for the Malta FO. A more complete description of oil and gas leasing as it is related to Solid Minerals can be found on pages 40-41 of the RMP/EIS.

3.3.16.3 Salable Minerals

There are no open gravel pits on either of the lease parcels. Parcel MTM79010-DF is located in glacial till adjacent to a creek bottom. Those areas typically contain gravel deposits, and one developed deposit occurs within a few miles to the south of the parcel. The federal government owns all the minerals. Parcel MTM79010-GG is primarily under the Milk River and would not be subject to gravel sale. The federal government owns only the oil and gas and does not own or control the salable minerals.

3.3.17 Economic and Social Conditions

3.3.17.1 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 affected local economy is made up of eight counties in Montana within the HiLine District Office boundary (Blaine, Chouteau, Glacier, Hill, Liberty, Phillips, Toole, and Valley). While the leasing activity considered in this analysis occurs in only Phillips County, employment and income effects spread across other counties, especially Hill, Blaine, and Valley. The distribution of these economic effects is based on acres leased and levels of production as well as business patterns. The eight-county local economy had an estimated 2007 population of 59,541 people. The population within the HiLine District has been declining. For example, from 1970 to 2006, the population of Phillips County fell by 1,413 people, a 26 percent decline in population. Total employment was estimated to be 36,237 jobs; there were an estimated 23,239 households; there were 156 NAICS industrial sectors represented in the local economy; average income per household was \$72,898; and total personal income was \$1,694 million (IMPLAN, 2007). Havre, located in Hill County, is the largest population and business center in the local area. Within this local economy, there are 1.64 people per job.

In some areas, the decline in population has contributed to the erosion of the economic tax base to support public services. For example, as local population and corresponding number of students declined, state payments to school districts also declined. The taxable value also declines where population decreases which results in more vacant homes.

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

Leasing

In 2010, there were 1,069,348 acres of federal minerals leased for oil and gas within the HiLine District. Currently, annual lease rental is paid on 535,792 acres that are not held by production. Total minimum average annual lease and rental revenues to the federal government were an estimated \$1,151,505. Lease rents were not paid on 533,557 acres that were held by production. Instead, royalties are paid on oil and gas production from these leases.

Federal oil and gas leases generate a one-time lease bid as well as annual rents. The minimum lease bid is \$2.00 per acre; lease rental is \$1.50 per acre per year for the first five years and \$2.00

per acre per year thereafter. Typically, oil and gas leases expire after 10 years unless held by production. Annual lease rentals continue until one or more wells are drilled that result in production and associated royalties. Forty-nine percent of these federal leasing revenues are distributed to the state and the state distributes a portion back to the counties. An estimated \$564,237 is distributed to the state; 25 percent of this amount is distributed to the counties of production (Title 17-3-240, MCA).

Nature of the Oil and Gas Industry in the HiLine District

In the nine-year period between 2000 and 2008, oil and gas drilling and production occurred in all eight of the nine counties within the HiLine District. During this period, an annual average of 10.34 oil wells, 215.44 gas wells, and 38 dry holes were drilled (MT DNRM, Oil and Gas Conservation Commission, 2010). Based on 2007 federal production levels provided by the Minerals Management Service (2008), it is assumed that about 12 percent of the oil wells, 31 percent of the gas wells, and 31 percent of dry holes were associated with federal minerals. In 2007, about 168,000 barrels (bbl) of oil and 18,255,000 thousand cubic feet (MCF) of natural gas were produced from federal minerals. Statewide average wellhead prices were \$64.64 per bbl for crude oil and \$5.72 per MCF for natural gas (Independent Petroleum Association of American [IPAA], 2008). Statewide average output per producing well was 7,144 bbl of crude oil and 14,314 MCF for natural gas (IPAA, 2008). The statewide average cost of drilling and equipping each well was \$4,507,413 for oil wells, \$552,867 for gas wells, and \$1,311,719 for dry holes (IPAA, 2008).

Production

In 2007, production from federal minerals equaled 167,687 bbl of oil and 18,254,938 MCF of natural gas (MMS, 2008). Average production from the federal mineral estate within the HiLine District Office boundaries in 2007 was 0.16 barrels of oil per leased acre and 17.07 MCF of natural gas per leased acre.

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

The amounts of federal minerals and the contributions of that production to local economies vary among the counties. Table 6 displays the amount of 2007 oil and gas production for each county. Glacier and Toole Counties produce the most oil, and Toole County produces the most oil from federal minerals. Across the eight-county area, federal minerals account for about 12 percent of total oil production. Phillips County produces the most natural gas and the most natural gas from federal minerals. Almost one-third of the natural gas produced in the eight-county area comes from federal minerals.

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 these royalties are distributed to the state. In Montana, 25 percent of the royalty revenues that the state receives are redistributed to the counties of production (Title 17-3-240, MCA). In 2007, estimated annual federal royalty revenues were about \$14.4 million of which about \$7.1 million were distributed to the state and counties.

Table 6. 2007 County Oil and Gas Leasing and Production HiLine District

County/Area	Federal Oil Produced: (Barrels)*	Total Oil Produced (Barrels)**	Federal Oil Produced (% of Total Oil Produced)	Federal Natural Gas Produced: (MCF)*	Total Gas Produced (MCF) **	Federal Gas Produced(% of Total Gas Produce)
Blaine	47,599	228,270	0.21	3,796,012	13,062,106	0.29
Chouteau				310,577	1,619,986	0.19
Glacier	4,399	454,270	0.01	28,401	1,697,997	0.02
Hill		2,151	0.00	503,446	14,684,022	0.03
Liberty	4,140	78,325	0.05	151,056	1,948,477	0.08
Phillips				12,647,147	19,986,323	0.63
Toole	111,549	456,536	0.24	318,073	4,001,343	0.08
Valley		122,077	0.00	500,226	1,132,069	0.44
Hi Line FO	167,687	1,341,629	0.12	18,254,938	58,132,323	0.31

*Stacey Browne, MMS, 2/23/2008
**Montana DNRC, Oil and Gas Conservation Division, Annual Review, 2007 County Drilling and Production Statistics

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 (North American Industry Classification System [NAICS] sector 20), drilling oil and gas wells (NAICS sector 28), and support activities for oil and gas operations (NAICS sector 29) supported an estimated 894 total jobs and \$61.5 million in total employee compensation and proprietor income in the local economy (IMPLAN, 2007). In addition, other state and local government sector (NAICS sector 432) supports 375 full and part-time jobs and \$14.6 million in employee compensation.

Based on 2007 federal mineral production levels, total federal revenues from federal oil and gas leasing, rents, and royalty payments are an estimated \$15.6 million annually. Average federal revenues distributed to the state of Montana amount to an estimated \$7.6 million per year. The state redistributes an estimated \$1.9 million to the local Montana counties with federal leases and production within the HiLine District Office boundaries per year. These revenues help fund traditional county functions such as law enforcement, justice administration, tax collection and disbursement, provision of orderly elections, road and highway maintenance, fire protection, and/or record keeping. Other county functions that may be funded include primary and secondary education administration and the operation of clinics/hospitals, county libraries, county airports, local landfills, and county health systems.

The estimated average annual local economic contribution associated with federal leases, rents, drilling, production, and royalty payments combined to support about 820 total local jobs (full and part-time) and \$48.4 million in local labor income, respectively. This amounts to about two percent of the local employment and about four percent of the local income. The NAICS aggregated sectors that experience the most influence from oil and gas related leasing, exploration, development, and production are mining, retail trade, construction, health care and

social assistance, professional scientific and technical services, and accommodations and food services. 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. The bonus and rental revenue received for each suspended parcel and totals for each Field Office are displayed in Table 7a. Because operator's lease rights have been suspended without any monetary compensation to the operators, the end result of this 'involuntary' suspension is stranded capital incurred by the operator. If lease stipulations are changed as a result of this analysis and the lessee chooses to relinquish the lease, the lessee would be entitled to a full refund of bonus bids and rent.

Table 7. Current Average Annual Contributions of Federal Oil and Gas Leasing, Exploration, Development, and Production to the Local Economy

Industry	Employment (full and part-time jobs)		Labor Income (Thousands of 2009 dollars)	
	Area Totals	Federal O&G -Related	Area Totals	Federal O&G-Related
Agriculture	7,484	4	\$59,150.1	\$77
Mining	894	449	\$63,497.3	\$36,760
Utilities	226	5	\$29,920.0	\$734
Construction	1,611	46	\$51,843.3	\$1,787
Manufacturing	402	2	\$14,605.7	\$90
Wholesale Trade	804	21	\$33,250.3	\$873
Transportation & Warehousing	3,285	12	\$78,809.1	\$636
Retail Trade	1,137	55	\$80,937.1	\$1,283
Information	448	5	\$19,688.9	\$225
Finance & Insurance	1,068	22	\$33,116.4	\$668
Real Estate & Rental & Leasing	662	14	\$16,621.0	\$344
Prof. Scientific, & Tech Services	761	35	\$28,514.1	\$1,451
Mngt of Companies	16	3	\$926.0	\$156
Admin, Waste Mngt & Rem Serv	952	13	\$14,490.0	\$159
Educational Services	311	3	\$4,580.5	\$45
Health Care & Social Assistance	2,488	40	\$79,892.2	\$1,280
Arts, Entertainment, and Rec	679	6	\$10,049.4	\$70
Accommodation & Food Services	2,344	37	\$35,154.8	\$524
Other Services	2,239	30	\$30,815.9	\$397
Government	8,426	18	\$413,587.8	\$812
Total	36,237	820	1,099,450	48,370
Federal O&G as Percent of Total	---	2.26%	---	4.40%

IMPLAN, 2007 database IMPLAN is an economic model used in the Input-Output analysis that allows the assessment of change in overall economic activity as a result of some corresponding change in one or several activities.

Table 7a - Bonus and Rents Paid and Revenue Distribution Related to Suspended Leases

Field Office	Bonus Paid	Rent Paid	Total Revenue	Federal Revenue	Revenue to State	Revenue to Counties
Totals						
Billings	\$361,422	\$22,175	\$383,597	\$195,634	\$187,962	\$46,991
Butte	\$5,761	\$3,590	\$9,351	\$4,769	\$4,582	\$1,145
Dillon	\$13,996	\$10,497	\$24,493	\$12,491	\$12,002	\$3,000
Lewistown	\$3,840	\$480	\$4,320	\$3,240	\$0	\$1,080
Malta	\$2,500	\$110	\$2,610	\$1,331	\$1,279	\$320
Miles City	\$693,319	\$17,441	\$710,760	\$362,487	\$348,272	\$87,068
ND / SD	No suspended lease parcels					
Source: USDOJ, Bureau of Land Management, Montana State Office, LR 2000. 2010						

In addition to the local economic contributions from the oil and gas industry, the industry contributions to the state of Montana are further documented in a recent article (Scott Rickard, Ph.D.). Dr. Rickard's oil and gas industry analysis is based on private as well as federal oil and gas activity. He wrote that the 28 million barrels of oil and 105 million MCF of gas produced from Montana wells in 2009 were worth an estimated \$1.9 billion. He notes that although total annual production of both has been declining since 2006, the 2009 output levels were valued at \$1.9 billion and provided an estimated \$308 million in state and local production taxes. The 4,600 jobs directly related to the oil and gas industry also support several thousand additional indirect and induced jobs. (Rickard, 2010). He notes that in 2009, the industry paid an estimated \$44 million in property taxes on pipelines and flow lines to state and local government in Montana (Rickard, 2010).

3.3.17.2 Social and Environmental Justice

The social section focuses on the area in the immediate vicinity of the leases being examined. The two leases being examined are located in northern and east-central Phillips County in the vicinity of the incorporated community of Loring and the incorporated community of Saco (2009 population 191). Malta, the county seat of Phillips County, with a 2009 population of 1,816, is located about 35 miles south of Loring. Population density (persons per square mile) is less than one person for Phillips County, compared to a statewide figure of 6.7 and a national figure of 90. The area in the vicinity of the leases is home to large cattle ranches.

Oil and gas production is currently occurring in the immediate vicinity of the lease in the east-central part of Phillips County. This lease (27 acres) is also split-estate (private surface with federal mineral estate).

In 2008, the percent of American Indians or Alaska Natives in Phillips County was nine percent. The figure for population living below the poverty level was 16.1 percent. The Fort Belknap Reservation is located in and adjacent to southwestern Phillips County. The social environment of Phillips County is described in detail in the HiLine Resource Management Plan Analysis of the Management Situation (2008).

4.0 ENVIRONMENTAL IMPACTS

4.1 Assumptions and Reasonably Foreseeable Development Scenario Summary

At this stage of the leasing process, the act of lifting suspensions on lease parcels would not result in any activity that might affect various resources. Even if parcels are leased, it remains unknown whether development would actually occur, and if so, where specific facilities would be placed. This would not be determined until the BLM receives an application for permit to drill (APD) in which more detailed information about proposed activities and facilities would be clarified for particular lease parcels. Therefore, this EA discusses potential effects that could occur in the event of development.

Upon receipt of an APD, the BLM would initiate a more site-specific NEPA analysis to more fully analyze and disclose site-specific effects of specifically identified activities. In all potential exploration and development scenarios, the BLM would require the use of best management practices 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 project, or require other reasonable measures to minimize adverse impacts (43 CFR 3101.1-2 Surface use rights; Lease Form 3100-11, Section 6) to protect sensitive resources, and to ensure compliance with laws, regulations, and land use plans.

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

The following assumptions are from the RFD developed for the HiLine Planning Area (for the HiLine RMP revision; the HiLine planning area includes the Malta, Glasgow and Havre Field Offices). The BLM administers approximately 3,483,000 acres of federal minerals (for fluid minerals) available for leasing within the HiLine planning area. The RFD forecasts the following level of development in the HiLine planning area.

The reasonably foreseeable development (RFD) scenario for the HiLine RMP forecasts up to 6,866 wells in the planning area between 2007 and 2026. Up to 150 of these wells could be coalbed natural gas (CBNG) wells. Of the 6,716 conventional wells, 1,351 wells are located within the boundaries of the Bowdoin Dome area (see RFD Map 4). In the HiLine planning area, high development potential indicates an average drilling density would exceed 100 wells per township from 2007 to 2026. Moderate potential indicates 20 to 100 wells per township. Low development potential indicates two to 20 wells per township. Very low development potential indicates two wells or less per township. Average well depths should remain typical of the planning area, less than 6,000 feet except for along the Rocky Mountain Front.

Potential surface disturbance for typical wells by area can be found in the draft RFD scenario (Table 13, draft RFD). Baseline projected new producing well numbers and existing producing wells for the period from 2007 through 2026 is in the draft RFD scenario (Table 13, draft RFD). This information follows:

Table 8. Total RFD Projected Disturbance Associated with New Drilled Wells and Existing Active Wells (Short-Term Disturbance – Two Years).

Wells			Acres of Surface Disturbance			
Type	Total	BLM Managed	Access Roads and Flow Lines	Well Pad	Total	BLM Managed
New Exploratory and Development Wells CBNG	150	24	1.85	1	428	68
New Exploratory and Development Wells Bowdoin Dome Area	1,351	776	1.85	1	3,850	2,212
New Exploratory and Development Wells Rest of Planning Area	5,365	1,447	3.1	2.1	27,898	7,527
Existing Wells Bowdoin Dome Area	1,706	988	0.25	0.5	1,280	741
Existing Wells Rest of Planning Area	7,176	571	0.78	0.14	6,602	525
Total Wells/Disturbance	15,748	3,806			40,057	11,073

Table 9. Total RFD Projected Disturbance Associated with All New Producing Wells and Existing Active Wells Less Abandonments (Long-Term Disturbance).

Wells			Acres of Surface Disturbance			
Type	Total	BLM Managed	Access Roads and Flow Lines	Well Pad	Total	BLM Managed
New Exploratory and Development Wells CBNG	135	22	0.25	0.5	101	16
New Exploratory and Development Wells Bowdoin Dome Area	1,310	753	0.25	0.5	983	565
New Exploratory and Development Wells Rest of Planning Area	4,118	1,111	0.78	0.14	3,788	1,022
Existing Wells Bowdoin Dome Area	1,573	911	0.25	0.5	1,180	683
Existing Wells Rest of Planning Area	5,533	440	0.78	0.14	5,090	405
Total Wells/Disturbance	12,669	3,236			11,142	2,691

Alternative A (No Action Alternative)

Under the No Action Alternative, the lease parcels would remain in suspension and would be subject to cancellation. 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.

Alternative B (Proposed Action) Assumptions

The act of lifting the suspensions on the leased parcels would, by itself, have no impact on any natural resources in the area administered by the Malta Field Office. 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), and long-term impacts are those that would substantially remain for more than five years.

Parcel MTM 79010 DF consists of 44.35 acres in Section 11, T. 37 N., R. 29 E., in Phillips County. This township is in an area of low development potential for conventional oil and gas near the Bowdoin area. The RFD does not identify any potential for CBNG. The RFD projects a possibility of two to 20 wells per township in areas of low potential. Individual disturbance

factors for that area are 1.85 acres for access roads/flow lines per well and one acre well pad per well for short-term disturbance (two years). Long-term disturbance would be 0.25 acres per well for access roads/flow lines and 0.5 acres per well pad. Outside of unit areas, the typical spacing is one well per quarter section.

Parcel MTM 79010 GG consists of 27.74 acres in Section 20 and 21 of T. 32 N., R. 34 E., in Phillips County. This parcel is committed to the Bowdoin Unit Area receiving allocated production. The lands are in the bed of the Milk River. There is no potential for impacts from issuing this lease.

The two parcels under consideration are located in two different townships. Active (not currently suspended) federal oil and gas leases occur on approximately 39 percent of these two townships. The parcels total about 72.09 acres, approximately 0.2 percent of the two township's total area.

4.2 Air Resources

4.2.1 Direct and Indirect Effects

Air Quality

Lifting lease suspensions on two parcels under Alternative B would have no direct impacts on air quality. Any potential effects on air quality from activities on these lease parcels would occur at such time that the leases were developed.

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 (section 4.2.2.2.) is expected to maintain this level of air quality by limiting emissions. In addition to the limited level of development, 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

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 Application for Permit to Drill.

Greenhouse Gas Emissions at the Malta FO and Project Scales

Sources of greenhouse gases 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 lift the suspension on the leased parcels. 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 Application for Permit to Drill 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, CO, based on methods described in the Climate Change SIR. Based on the assumptions summarized above for the HiLine District RFD, Table 10 discloses projected annual greenhouse gas source emissions from BLM-permitted activities associated with the RFD (note: the source year selected to disclosed the estimated GHG emissions was the year with the highest expected combined construction and production emissions for oil and gas sources in the planning area).

Table 10. BLM projected annual emissions of greenhouse gases associated with oil and gas exploration and development activity in the HiLine District RFD.

Source	BLM Projected Greenhouse Gas Emissions in tons/year from HiLine District RFD			Emissions (metric tons/yr)
	CO ₂	CH ₄	N ₂ O	CO ₂ e
Conventional Natural Gas	120,755.6	1,041.1	0.9	129,664.2
Coal Bed Natural Gas	883.9	48.4	0.0	1,725.3
Oil	2,380.4	15.9	0.7	2,655.4
Total	124,019.9	1,105.4	1.6	134,044.9

Under Alternative A, there would be no greenhouse gas emissions resultant from this project because under this alternative the suspended lease parcels would remain under suspension and would be subject to cancellation.

To estimate potential GHG emissions associated with the action alternative, 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 (and/or lifting of lease suspensions), 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 highest year emission output used) to estimate GHG emissions for that particular alternative.

Under Alternative B, approximately 72 acres of lease parcels with federal minerals would have lease suspensions lifted. These acres constitute 0.0021 percent of the total federal mineral estate of approximately 3,483,000 acres identified in the HiLine RFD. Therefore, based on the approach described above to estimate GHG emissions, 0.0021 percent of the HiLine RFD total estimated BLM emissions of 134,044.9 metric tons/year would be approximately 2.8 metric tons/year of CO₂e if the parcels within Alternative B were to be developed.

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 greenhouse gas 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.

4.2.2 Mitigation

The BLM encourages industry to incorporate and implement Best Management Practices (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 conditions of approval 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 combustion engines for compressors;
- nitrogen oxides (NO_x) 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.
- collocate 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 NO_x and ozone (O₃).

More specific to reducing greenhouse gas emissions, Section 6 of the Climate Change SIR 2010 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 11 (reproduced from Table 6-2 in Climate Change SIR) displays common methane emission technologies reported under the USEPA Natural Gas STAR Program and associated emission reduction, cost, maintenance and payback data.

Table 11. Selected Methane Emission Reductions Reported Under the USEPA Natural Gas STAR Program¹

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

Table 11. Selected Methane Emission Reductions Reported Under the USEPA Natural Gas STAR Program ¹

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

Source: Multiple USEPA Natural Gas STAR Program documents. Individual documents are referenced in Climate Change SIR 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 CO₂ injection. These measures are discussed in more detail in Section 6.0 of the Climate Change SIR.

In an effort to disclose potential future GHG emissions reductions that might be feasible, the BLM estimated GHG emissions reductions based on the RFD for the Miles City FO. For emissions sources subject to BLM (federal) jurisdiction, the estimated emissions reduction represent approximately 51 percent reduction ¹ in total GHG emissions compared to the estimated Miles City FO 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).

4.2.3 Soil Resources

4.2.3.1 Direct and Indirect Effects

Alternative B - Proposed Action

While the act of leasing a parcel would produce no effects, the development of the leases would result in reasonably foreseeable disturbances to soils. Construction and operation of well pads, access roads, pipelines, power lines, reserve pits, and other facilities would result in the exposure of mineral soil, soil compaction, 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. Production water, when spilled, could contaminate soils and vegetation (depending on properties of the water). This would affect reclamation by altering chemical characteristic of the soils (high electrical conductivity (EC), exchangeable sodium percentage (ESP), sodium adsorption ratio (SAR), pH, etc.). Potential site-specific effects would be addressed in more detail at the APD stage.

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. Table 12 below shows the approximate acres of soils on slopes over 30 percent and erodible soils on slopes over 20 percent for each lease area parcel.

Table 12. Approximate acres of soils on slopes over 30 percent and erodible soils on slopes >20 percent for each lease area parcel. (Source: USDA-NRCS SSURGO dataset (USDA-NRCS, 2010))

Parcel #	>30% slope ¹	Erodible soils on slopes >20% ²
	Acres	Acres
MTM79010DF	0	30
MTM79010GG	0	0

1. Approximate acres calculated from MU RV slope where RV slope is >30%. Approximate acres based on GIS calculations.
2. Approximate acres calculated from MU RV slope and Water Erosion Hazard where RV slope > 20% and Water Erosion Hazard is severe. Approximate acres based on GIS calculations.

4.2.3.2 Mitigation

Any surface use or occupancy on slopes over 30 percent, or 20 percent on extremely erodible or slumping soils, would be strictly controlled, or if absolutely necessary, excluded. Use or occupancy would be restricted only when the BLM demonstrates the restriction necessary for the protection of slopes over 30 percent, or 20 percent on extremely erodible or slumping soils.

Surface-disturbing activities may be prohibited during muddy and/or wet soil periods. This limitation does not apply to operations and maintenance of producing wells using authorized roads.

In the event of exploration/development, a number of measures would be taken to prevent, minimize, or mitigate effects to soil resources. Measures included in the Bowdoin Natural Gas Project Environmental Assessment 2008 (BNGPEA) (see pages 2-21 to 2-22, 4-64, Appendix A

– Master APD, and Appendix D – Reclamation Plan of the BNGPEA) and the Gold Book would be applied.

Additional mitigation measures and/or best management practices, if necessary, would be applied once a site-specific plan of development is proposed.

4.2.4 Water Resources

4.2.4.1 Direct and Indirect Effects

Alternative B - Proposed Action

The action of leasing the parcel itself would have no impact on water resources. The subsequent development of the leases could result in reasonably foreseeable disturbances to hydrologic resources. The development of the lease (construction and operation of well pads, access roads, pipelines, power lines, reserve pits, and other facilities) would create surface disturbances that could consequently lead to surface and ground water degradation through non-point source pollution. The likelihood and magnitude of these occurrences is dependent upon local site characteristics, climatic events, and the success of specific mitigation measures applied.

Stipulations regarding steep slopes, erosive soils, and activities on floodplains and in wetlands would minimize potential impacts and would be addressed in more detail at the APD stage.

4.2.4.2 Mitigation

In the event of exploration/development, a number of measures would be taken to prevent, minimize, or mitigate effects to water resources. Measures included in the Bowdoin Natural Gas Project Environmental Assessment 2008 (BNGPEA) (see pages 2-22 to 2-24, 4-64, Appendix A – Master APD, and Appendix D – Reclamation Plan of the BNGPEA) and the Gold Book would be applied.

Additional mitigation measures and/or best management practices would be assigned once a site-specific plan of development is proposed.

4.2.5 Vegetation Resources

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

4.2.5.1 Direct and Indirect Effects

Alternative B – Proposed Action

Impacts to native vegetation would depend on the native vegetation type and the topography of the lease parcels. The lease parcels contain a combination of grassland, shrubland, and riparian vegetation communities. Habitat disturbance in grasslands generally has less of an impact than disturbance in shrublands and riparian areas because shrubs and trees take longer to become re-established. Shrublands and riparian areas also support a greater diversity and number of wildlife species as shrubs provide a high variety of food and cover. As the diversity of habitat structure increases from grassland to shrubland to riparian/woodland, so does the wildlife species richness. Thus, there is more potential for impacts to wildlife in shrubland and riparian/woodland communities than in grassland communities. The impacts associated with well pads and roads, however, would be very site-specific and are not expected to significantly affect these habitats at the community scale. The footprint of the disturbance is also expected to be a small proportion of the habitat area.

Topography can play a role in the amount of surface disturbance that results from well and road construction. Flat areas would require little or no cut and fill, and road routes are not constrained by topography. In hilly areas, cut and fill may be required which disturbs additional land. Road routes may be longer to meet engineering requirements and may also require cut and fill. Areas lacking roads near potential drilling sites would have more disturbance, because the entire access route would need to be constructed rather than just a short spur route from an existing road.

Potential impacts to plants include direct mortality from earth excavation or crushing by vehicles. Adverse impacts could also result from soil erosion resulting 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 because both current and future generations would be adversely affected. Weeds which are introduced and/or promoted by soil-disturbing activities compete against and displace native vegetation.

Development associated with oil and gas activities has the potential to affect those plants in low abundance or occurring only in isolated locations. Soil-disturbing activities directly affect species by destroying habitat, churning soils, impacting biological crusts, disrupting seed banks, burying individual plants, and generating sites for undesirable weedy species. Weeds may be introduced during construction and operation of the lease. Roads generate weedy habitat along their edges as well as avenues for weed invasion into unoccupied territory. Dust generated by construction activities and travel along dirt roads can affect nearby plants by depressing photosynthesis, disrupting pollination, and reducing reproductive success. Oil 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 impacts could be expected.

4.2.5.2 Mitigation

Habitat restoration also takes longer in shrublands and riparian/woodlands as opposed to grasslands. Grassland habitats may resemble their pre-project conditions in two to five years. Shrublands may require five to 15 years and woodlands even longer as trees must be reestablished on the site. The two parcels have generally grassland and shrubland habitats that return to their pre-project composition and structure relatively easily and quickly.

Mitigation would be addressed at the site-specific APD stage of development. Needed stipulations and conditions of approval would be identified and addressed during planning at the APD stage.

4.2.6 Special Status Species

The act of leasing the parcels would, by itself, have no impact on special status species in the area administered by the Malta Field Office. 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.

4.2.6.1 Direct and Indirect Effects

Alternative B – Proposed Action

No listed threatened or endangered species would be affected by leasing the parcels. None are known to occur on the two parcels. Any possible subsequent development on Parcel MTM79010-DF could affect BLM sensitive species nesting grassland birds (including migratory

species as well as prairie grouse) unless mitigated. Standard stipulations address concerns about nesting habitat and apply timing limits. Several sensitive species are associated with black-tailed prairie dog towns, but none are present on or near the lease parcels.

Development is unlikely to occur on MTM79010-GG after leasing due to the requirement for 1,000-ft set-backs from major rivers in the standard stipulations. BLM sensitive grassland bird species do not nest at this location.

4.2.6.2 Mitigation

Standard stipulations call for special care to avoid nesting areas during the period from March 1 to June 30. The TES 16-2 stipulations protect current and future listed species and their habitats.

Mitigation would also be addressed at the site-specific APD stage of development. Needed mitigation and conditions of approval would be identified and addressed during planning at the APD stage. A survey could be required to determine presence of nest sites for migratory birds. Nest presence would require adherence to a timing limit unless the nest can be avoided, protected, or otherwise mitigated.

4.2.7 Fish and Wildlife; Migratory Birds

The act of leasing the parcels would, by itself, have no impact on fish and wildlife resources (including migratory birds) in the area administered by the Malta Field Office. 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.

4.2.7.1 Direct and Indirect Effects

Alternative B – Proposed Action

Potential impacts to animals, including listed species, if subsequent development occurs after leasing, include direct mortality or injury, loss of dens or burrows, displacement, and human disturbance. Direct mortality or injury could result from vehicle strikes or from collapsed dens and burrows resulting in animals being crushed or entombed. Burrows and dens could be destroyed or damaged by vehicle traffic, particularly heavy equipment. Animals could be displaced during project activities. Such displacement of animals into unfamiliar areas could increase the risk of predation and increase the difficulty of finding required resources such as food and shelter. Human disturbance could result in displacement of animals, even though dens and burrows may not be directly impacted. Human disturbance also might alter the behavior of animals (e.g., activity periods, space use) resulting in increased predation risk, reduced access to resources, and reduced breeding success. Project activities during the spring breeding season could increase the potential for adverse impacts. Animals could also become entrapped in oil spills, leaks, sumps or improperly maintained well cellars or other facilities. Roads and large areas of disturbance can be a barrier to movement for some animal species. Structures such as utility poles, buildings, and pumping units may provide perches for raptors. Addition of such structures in flat terrain may increase predation rates on small mammals and other prey species.

There would be no affect to big game winter range on Parcel MTM79010-DF, and minimal or no effect to big game on Parcel MTM79010-GG. Development probably would not occur on MTM79010-GG due to mandatory set-backs from rivers in the standard stipulations so there would be no effects. Effects on nesting grouse also are unlikely due to the distance to active or historic leks.

A timing limit from April 15 to July 15 to protect nesting migratory birds would mitigate disturbance at a key time of the year. Riparian habitat in MTM79010-GG is very limited and on private surface where BLM has very little or no control. Standard stipulations, however, have a 1,000-ft set-back from major rivers which would provide protection from development. The small size of these lease parcels (72.09 acres) would indicate that any disruption or disturbance on them by natural gas exploration/development would be insignificant on the large scale. The same mitigation planned for these parcels is being used on existing developments with good success. Several species of migratory birds have nested successfully on well pads due to protections in place.

4.2.7.2 Mitigation

Standard Stipulations would provide protections for nesting grouse as well as for riparian areas near large rivers. Nesting migratory birds would receive additional protection at the APD stage with a timing limit of April 15 to July 15. Mitigation would be addressed at the site-specific APD stage of development. Other needed mitigation measures and conditions of approval would be identified and addressed during planning at the APD stage.

4.2.8 Cultural Resources

4.2.8.1 Direct and Indirect Effects

Alternative B - Proposed Action

Leasing a nominated parcel gives a basic right to the operator to develop the lease. Leasing would not, however, result in effects to cultural resources. It is only when the lease is developed that there is a potential for cultural resources to be affected by the proposed action. That is when the drilling location is known and cultural resource investigations can be centered on that location and other related developments such as roads, transmission lines, and pipelines.

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 impacts to cultural resources at the APD stage include damage to archaeological sites through construction activities and the possibility of removal of, or damage to, archaeological materials by increased human activity in the area. Conversely, cultural resource investigations associated with development potentially adds to our understanding of the prehistory and history of the area under investigation.

Direct and indirect effects to cultural resources in T32N R34E section 20 and 21 (MTM79010-GG) should be minimal because the nominated parcels are located under the Milk River. This lease could not be developed based on standard lease terms.

Effects to cultural resources on T37N R29E section 11 (MTM79010-DF) most likely would not be adverse due to Class III inventory and the potential for avoidance of sites. A site visit to the area resulted in some site features, but they were not located densely throughout the ridge tops; therefore, a well could be maneuvered to avoid sites.

Based on current data, inventory can be deferred until a specific development is proposed. In all cases, the standard lease notice and the following stipulation identified in IM-2005-003 should be attached to the lease:

“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.”

4.2.8.2 Mitigation

Specific mitigation measures, including, but not limited to possible site avoidance or excavation and data recovery would have to be determined when site-specific development proposals are received.

Based on existing information, there are an unknown number of cultural resources located on the nominated parcels and if developed, these properties could be potentially impacted by a site-specific proposal.

4.2.9 Paleontology

4.2.9.1 Direct and Indirect Effects

Alternative B - Proposed Action

The act of leasing a nominated parcel would not impact paleontological resources; however, subsequent development could have impacts on those resources. The nominated parcels are not located in Class III, IV or V areas.

4.2.9.2 Mitigation

Specific mitigation measures could include, but are not limited to, site avoidance or excavation if inadvertent discoveries are found. This is not, however, anticipated to occur based on locality of the nominated parcels.

4.2.10 Native American Religious Concerns

4.2.10.1 Direct and Indirect Effects

Alternative B - Proposed Action

Leasing of nominated parcels 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 Executive Order 13007. It would not prevent tribes from visiting sacred sites or prevent possession of sacred objects. A specific development authorized through the APD process may, however, have an impact on Native American religious practices and TCPs.

4.2.10.2 Mitigation

The stipulation contained in IM-2005-003 should be attached to all nominated lease parcels. Consultation with tribes may be necessary to determine whether nominated parcels can be recommended for sale. Additional consultation may also be necessary at the APD stage. Refer to Appendix A of this document for pertinent parcel-specific lease stipulations as needed.

4.2.11 Visual Resources

4.2.11.1 Direct and Indirect Effects

Alternative B - Proposed Action

Only VRM Class IV is represented in the parcels proposed for leasing. Class IV VRM provides for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high, meaning these management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance and repeating the basic elements of form, line, color, and texture in the natural characteristic landscape.

While the act of leasing federal minerals produces no visual impacts, subsequent development of a lease would result in modifications to the existing landscape. Through the use of best management practices and mitigation guidelines for visual resources, impacts to visual resources would be minimized by ensuring that new development/modifications will blend favorably with the form, line, color and texture of the existing landscape. The authorized officer will determine the color of the well facilities and ensure that site developments blend favorably with the existing landscape during the APD stage.

4.2.11.2 Mitigation

All new development would implement, as appropriate for the site, BMPs for VRM in oil and gas development. This includes (but would not be limited to) proper site selection, minimizing disturbance, selecting color(s)/color schemes that blend with the background, and reclaiming areas that are not in active use. Wherever practical, no new development would be allowed on ridges or hill tops. Further evaluation of mitigation measures for effects on visual resources can be deferred to site-specific requirements determined at the APD stage. Overall, the goal is to not reduce the visual qualities that currently exist.

4.2.12 Livestock Grazing

4.2.12.1 Direct and Indirect Effects

At this stage (lease sale) there would be no impacts to livestock grazing. Impacts (both direct and indirect) would occur if a lease is developed in the future. The potential impacts would be analyzed on a site-specific basis prior to oil and gas development and during the APD stage of development.

Alternative B - Proposed Action

Impacts possible at the APD stage of development would include a loss of forage as a result of drill-site development which includes pad, reserve pit, earthen pit, roads, surface facilities, pipelines, power lines, and herbicide use. In some cases, there could be a temporary loss of animal unit months (AUMs).

4.2.12.2 Mitigation

Mitigation would be addressed at the site-specific APD stage of development. BMPs would be incorporated into conditions of approval. Fencing of facilities would be considered as needed to minimize conflicts between oil and gas exploration/development and livestock grazing. Distribution patterns of livestock and use levels changes created by development would have to be considered if utilization levels exceed allotment objectives.

4.2.13 Recreation and Travel Management

4.2.13.1 Direct and Indirect Effects

Alternative B - Proposed Action

Recreational opportunities managed by the BLM are only available on BLM-administered surface. Therefore the affected environment consists of 44.35 acres (or 62 percent of the total acreage proposed for lease) entirely within parcel MTM79010-DF.

This parcel is not located within a SRMA. The area is accessible via primitive roads mainly on public land, and motorized use by the public is limited to existing roads. Recreational use of this land is likely casual and dispersed and may include hunting, wildlife viewing, photography, and hiking.

While the act of leasing federal minerals produces no impacts to recreation, subsequent development of a lease would generate impacts to recreation activities. User conflicts may occur between motorized recreationists (OHV activities), hunting, target shooting, wildlife viewing, or hiking and the oil and gas/industrial activities. The intensity of these impacts is expected to be low to moderate and exist in both the short-term (exploration and construction phases of oil and gas development) and in the long-term (producing wells, maintenance of facilities, etc.).

As oil and gas development occurs, new routes are created which often attract more recreationists seeking additional or new areas to explore for motorized recreational opportunities. Motorized recreational opportunities could be enhanced through the additional opportunities to explore; however, user conflicts and public safety issues could result from the use of the new travel routes. The creation of routes from oil and gas activities could lead to a proliferation of user-created motorized routes, resulting in adverse impacts to the scenic qualities of the area and increased level of surface disturbance. These impacts would be isolated to BLM-administered public lands and could be minimized and avoided through mitigation and reclamation of industrial routes when no longer needed. Other potential effects of development on recreational opportunities in the lease parcel include increased disturbance of wildlife by industry trucks and facilities.

4.2.13.2 Mitigation

These impacts would be isolated to BLM-administered public lands and could be minimized and avoided through mitigation and reclamation of industrial routes when no longer needed. Noise disturbance should be controlled to reduce sound levels by placing production facilities behind hills. Wherever practical, no new development would be allowed on ridges or hill tops. Further evaluation of mitigation measures for effects on recreation resources can be deferred to site-specific requirements determined at the APD stage.

4.2.14 Lands and Realty

4.2.14.1 Direct and Indirect Effects

Alternative B - Proposed Action

For areas with low to very low potential (MTM79010-DF), leasing BLM lands for oil and gas exploration and production does not typically impact land uses because the potential of a successful new find is low.

In the cases where potential is moderate to high (MTM79010-GG), leasing can sometimes cause conflicts with other surface uses. This is especially possible if the leased lands are split estate. Surface owners are often not aware of the federal ownership of the mineral estate or are not aware of the implications of the federal ownership.

Along with the ownership of the minerals, the federal government retains the right to use any part of the surface for exploration or development. These “surface entry rights” could cause distress for private surface owners who do not wish to see new roads and well pads on their land. Adjacent private lands could also be impacted due to leasing in that new road access to the leased areas is sometimes necessary. Although the responsibility for obtaining access to leased areas is the lessee’s and not BLM’s, leasing can sometimes cause an indirect impact to adjacent lands due to the need for road access.

Any surface-disturbing activity requires BLM approval. For those parcels that are split estate (private surface overlying federal minerals), the BLM requires the lessee/operator to make a good faith effort to obtain an agreement with the private surface owner prior to accessing the leased land issued through competitive bid.

4.2.14.2 Mitigation

The BLM would notify the surface landowner of any development proposal and ask for comments as well as invite the land owner on the staking tour. BLM would also suggest appropriate surface mitigation agreeable to the surface owner and highly recommend that the developer cooperate with the surface owner if at all possible. BLM would also require copies of any agreements with the surface owner so that any conditions in that agreement are followed when development occurs.

4.2.15 Minerals

Fluid Minerals

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

4.2.15.1 Direct and Indirect Effects

4.2.15.1.1 Fluid Minerals

Both parcels in their entirety would be offered for lease subject to standard terms and conditions and stipulations only, as identified in Appendix A.

4.2.15.1.2 Solid Minerals

Salables

Salable minerals may be located within portions of lease parcel MTM79010-DF. However, disposal of salable minerals is a discretionary decision of the authorized officer and thus future potential resource development conflicts would be avoided either by not issuing sales contracts in oil and gas development locations or conditioning the APD or sand and gravel contract to avoid conflicts between operations.

4.2.16 Economic and Social Conditions

4.2.16.1 Economic Conditions

Alternative A – No Action

Economic impacts associated with Alternative A would be similar to those described in the economic section of the Affected Environment. These effects are summarized in the tables below.

Alternative B – Proposed Action

Public Revenues related to leasing, rent, and production:

Leasing an additional 72.09 acres of federal minerals (Alternative B) would increase average annual oil and gas leasing and rent revenues to the federal government by a minimum of an estimated \$100 (Table 13). Annual average leasing and rent revenues that would be distributed to state/local governments would increase by an estimated \$100. Annual average federal oil and gas royalties would increase by an estimated \$1,000 with Alternative B. Royalties distributed to the state/counties would increase by an estimated average \$500 annually.

Total average annual federal revenues related to leasing an additional 72.09 acres of federal minerals and associated annual rent and royalty revenues related to annual production of federal minerals would increase by an estimated \$1,100 compared to Alternative A. Average total annual revenues distributed to the state and counties would be an estimated \$7.6 million, an estimated \$500 more than with Alternative A.

Table 13. Summary of Estimated Annual Economic Impacts by Alternative

Activity	Alternative		
	A	B	Alt. B-Alt. A
Existing Acres leased*	1,069,348	1,069,348	0
Acres that would be leased based on this EA **		72	72
Total acres leased	1,069,348	1,069,420	72
Acres held by production*	533,557	533,557	0
Total acres leased for which lease rents would be paid	535,792	535,864	72
Lease rental first 5 years (\$1.50/acre)	401,844	401,898	54
Lease rental second 5 years (\$2.00/acre)	535,792	535,864	72
Minimum lease bid (\$2.00/ac.)	213,870	213,884	14
Total annual federal lease and rental revenue	1,151,505	1,151,645	140
Distribution to State/local government	564,237	564,306	69
Annual oil production (bbl)***	167,687	167,698	11
Annual gas production (MCF)	18,254,938	18,256,167	1,229
Federal oil royalty (bblx\$64.64x0.125)	1,354,911	1,355,002	91
Federal gas royalty (MCFx\$5.72x0.125)	13,052,281	13,053,159	879
Total annual Federal O&G royalties	14,407,192	14,408,162	970
Distribution to State/local government	7,059,524	7,059,999	475
Total annual Federal revenues	15,558,696	15,559,807	1,110
Total annual State/local revenues	7,623,761	7,624,305	544

Total annual revenue distributed to counties	1,905,940	1,906,076	136
*LR2000, BLM, May 21, 2010			
**RFD, May 28, 2010			
***Estimated 2007 federal production level			

Local Economic Contribution

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 amount to about 820 total full and part-time jobs and \$48.4 million within the local economy (IMPLAN, 2007). Table 13 shows that this would be about the same as with Alternative A. There would not be a corresponding change in local population.

Conclusion

Total federal contribution of Alternative B (leasing an additional 72.09 acres of federal minerals and anticipated related exploration, development, and production of oil and gas) would have negligible effects on local population, total local employment, numbers of household, average income per household, and total personal income. The economic effects would continue to be spread unevenly among the counties. Most of the effects would occur in Phillips County. Leasing the additional 72.09 acres and anticipated exploration, development, and production under alternative B 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).

Cumulative Effects

The cumulative effects of federal mineral leasing within the local economy as well as the specific effects of leasing an additional 72.09 acres under Alternative B are presented in the previous analysis. These effects are summarized in Tables 13 and 14. The total demographic and economic characteristics of the local economy would change very little with the economic activity associated with leasing an additional 72.09 acres of federal minerals.

Table 14. Average Annual Employment and Income by Major Industry by Alternative

Industry	Total Full and Part-time Jobs Contributed		Total Income Contributed (\$1000)	
	Alt. A	Alt. B	Alt. A	Alt. B
Agriculture	4	4	\$77.0	\$77.0
Mining	449	449	\$36,759.8	\$36,762.5
Utilities	5	5	\$734.2	\$734.2
Construction	46	46	\$1,787.0	\$1,787.1
Manufacturing	2	2	\$89.6	\$89.6
Wholesale Trade	21	21	\$873.0	\$873.1
Transportation & Warehousing	12	12	\$636.1	\$636.2
Retail Trade	55	55	\$1,282.7	\$1,282.8
Information	5	5	\$225.2	\$225.2
Finance & Insurance	22	22	\$667.8	\$667.9
Real Estate & Rental & Leasing	14	14	\$343.9	\$344.0
Prof, Scientific, & Tech Services	35	35	\$1,451.1	\$1,451.3
Mngt of Companies	3	3	\$156.1	\$156.1
Admin, Waste Mngt & Rem Serv	13	13	\$159.1	\$159.1
Educational Services	3	3	\$44.6	\$44.6
Health Care & Social Assistance	40	40	\$1,279.9	\$1,280.0
Arts, Entertainment, and Rec	6	6	\$70.2	\$70.2
Accommodation & Food Services	37	37	\$524.2	\$524.2

Other Services	30	30	\$397.1	\$397.1
Government	18	18	\$811.7	\$811.7
Total Federal Contribution	820	820	\$48,370.3	\$48,373.9
Percent Change from Current	---	0.0%	---	0.0%

IMPLAN, 2007

4.2.16.2 Social Conditions

4.2.16.3 Direct and Indirect Effects

Alternative B – Proposed Action

While the act of leasing federal minerals would result in no social impacts, subsequent development of a lease may generate impacts to people living near or using the area in the vicinity of the lease. Oil and gas exploration, drilling, or production could create an inconvenience to these people due to increased traffic and traffic delays, noise, and visual impacts. This could be especially noticeable in these rural areas where oil and gas production has not occurred previously. The amount of inconvenience would depend on the activity affected, traffic patterns within the area, noise levels, length of time and season these activities occurred, etc. Creation of new access roads into an area could allow increased public access and exposure of private property to vandalism. For leases where the surface is privately owned and the mineral estate is federally owned, surface owner agreements, standard lease stipulations, and best management practices could address many of the concerns of private surface owners.

This alternative would have a beneficial effect on mineral exploration and development, since the land would be offered for competitive auction. The practical utilization of the lands would have a positive local effect in the generation of long-term jobs and revenues to the state and county. The royalties and rentals from competitive auctions are also a dependable source of long-term income for the federal government. The impacts from this particular auction may be small, including an unknown (but probably relatively small) amount of new reserves, due to the small amount of acreage offered. However, the positive action of the auction would provide the industry with increased opportunity for exploration, potentially resulting in increased stability and profitability of domestic companies.

There would be no disproportionate effects to low income or American Indian populations. There are low income people in the county, but they do not appear to be associated with any specific BLM resources or activities. (Census data source: <http://quickfacts.census.gov/qfd/index.html>).

4.3 Cumulative Impacts

Cumulative impacts are those impacts resulting from the incremental impact of an action when added to other past, present, and reasonably foreseeable actions regardless of what agency or person undertakes such other actions. 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.

The timeframe associated with potential cumulative effects is 25 years. Cumulative impacts from oil and gas development in the Bowdoin Field are found in the Bowdoin Natural Gas Project

Environmental Assessment (MT-92234-07-59) (BNGPEA page 4-63). This document is hereby incorporated by reference into this EA. Past, present, and future actions that have affected and would affect the various resources include mineral exploration and development, improper livestock grazing, recreation, vehicle travel, and wildfire and prescribed fire

4.3.1 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 wildfire and prescribed fire, livestock grazing, utility right-of-ways, and range improvement projects. It is anticipated that the current use of the land would remain the same.

4.3.2 Cumulative Impacts by Resource

4.3.3 Greenhouse Gas Emissions and Cumulative Impacts on Climate Change

The cumulative effects analysis area is the HiLine Planning Area, with additional discussion at state-wide, national, and global scales for greenhouse gas emissions and climate change.

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

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

As discussed in the Air Quality section of Chapter 4, total projected BLM GHG emissions from the RFD are 134,044.9 metric tons/year CO₂e. Potential emissions under Alternative B would be approximately 0.0021 percent of this total. Table 15 displays projected GHG emissions from non-BLM activities included in the HiLine RFD. Total projected emissions of non-BLM activities in the RFD are 278,199.5 metric tons/year of CO₂e. When combined with projected annual BLM emissions, this totals 412,244.4 metric tons/year CO₂e. Potential GHG emissions under Alternative B would be 0.00068 percent of the estimated emissions for the entire RFD. Potential incremental emissions of GHGs from exploration and development of fluid minerals on parcels within Alternative B would be minor in the context of projected GHG contributions from the entire RFD for the HiLine District.

Table 15. Projected non-BLM GHG emissions associated with the HiLine District Reasonably Foreseeable Development Scenario for fluid mineral exploration and development.

Source	Non-BLM Projected Greenhouse Gas Emissions in tons/year for HiLine District RFD			Emissions (metric tons/yr)
	CO ₂	CH ₄	N ₂ O	CO ₂ e
Conventional Natural Gas	230,463.7	1,988.7	1.2	247,353.9

Coal Bed Natural Gas	4,736.3	261.3	0.0	9,282.1
Oil	19,559.6	123.6	5.2	21,563.5
Total	47,339.6	2,373.6	6.4	278,199.5

Montana’s Contribution to U.S. and Global Greenhouse Gases (GHGs) Montana’s GHG inventory (<http://www.eia.doe.gov/oiaf/1605/archive/gg04rpt/emission.html>, Center for Climate Strategies 2007) shows that activities within the state contribute 0.6 percent of U.S and 0.076 percent of global GHG emissions (Climate Change SIR 2010). Based on 2005 data in the state-wide inventory, the most pronounced source of Montana’s emissions is combustion of fossil fuels to generate electricity, which accounts for about 27 percent of Montana’s emissions. The next largest contributors are the agriculture and transportation sectors (each at approximately 22 percent) and fossil fuel production (13.6 percent).

GHG emissions from all major sectors in Montana in 2005 added up to a total of approximately 36.8 million metric tons of CO₂e (Center for Climate Strategies (CCS) 2007). Potential emissions from development of lease parcels in Alternative B of this project represent approximately 0.0000076 percent of the state-wide total of GHG emissions based on the 2005 state-wide inventory (CCS 2007).

The EPA (Climate Change SIR 2010) published an inventory of U.S. GHG emissions, indicating gross U.S. emissions of 6,957 million metric tons, and net emissions of 6,016 million metric tons (when CO₂ sinks were considered) of CO₂e in 2008. Potential annual emissions under Alternative B of this project would amount to approximately 0.00000004 percent of gross U.S. total emissions. Global GHG emissions for 2004 (Climate Change SIR 2010) indicated approximately 49 gigatonnes (10⁹ metric tons) of CO₂e emitted. Potential annual emissions under Alternative B would amount to approximately 0.000000006 percent of this global total.

As indicated above, although the effects of greenhouse gas emissions in the global aggregate are well-documented, it is currently not credibly possible to determine what specific effect greenhouse gas emissions resulting from a particular activity might have on climate or the environment. If exploration and development occur on the lease parcels considered under Alternative B, potential GHG emissions described above would incrementally contribute to the total volume of GHGs emitted to the atmosphere, and ultimately to climate change.

Mitigation measures identified in the Chapter 4 Air Quality section above may be in place at the APD stage to reduce greenhouse gas emissions from potential oil and gas development on lease parcels within Alternative B. This is likely because many operators working in Montana, South Dakota and North Dakota are currently USEPA Natural Gas STAR Program Partners and future regulations may require GHG emission controls for a variety of industries, including the oil and gas industry (Climate Change SIR 2010).

4.3.3.1 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 project area. 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). Effects of climate change on resources are described in Chapter 3 of this EA and in the Climate Change SIR.

4.3.4 Cumulative Impacts on Other Resources

4.3.4.1 Soil Resources

Cumulative impacts from oil and gas development in the Bowdoin Field are found in the BNGPEA page 4-63. Past, present, future actions that have affected and would affect soil resources include mineral exploration and development, improper livestock grazing, recreation, vehicle travel, and wildfire and prescribed fire. In general, these actions have cumulative impacts on soil resources by causing surface disturbance contributing to soil compaction, erosion, and subsequent sedimentation. Some of these impacts can be mitigated or avoided through proper design, construction, maintenance, and implementation of best management practices.

4.3.4.2 Water Resources

Where facilities cross or are close to waterways, the likelihood of project impacts would increase. These impacts could include increased sedimentation; increased salt loading; contamination by petroleum products, chemicals, or produced waters; and flow alterations. Similarly, possible leaks from reserve and evaporation pits could degrade surface and ground water quality. Impacts can be reduced or avoided through proper project design, construction, maintenance activities, and implementation of best management practices.

Specific locations, development techniques, and mitigation procedures are undeveloped as of yet; therefore, specific descriptions of potential effects are unattainable at this time. Authorization of proposed projects would require full compliance with BLM directives and stipulations that relate to surface and groundwater protection.

4.3.4.3 Fish and Wildlife, Migratory Birds, Special Status Species

Cumulative impacts from oil and gas development in the Bowdoin Field are found in the BNGPEA page 4-63. Leasing of new land for oil and gas development has less effect than changing well spacing from 640 acres to 160 acres or less. Cumulative effects increase rapidly when more wells are drilled and accompanying infrastructure begins to blanket the landscape. On the other hand, the leasing of small parcels which may never be developed due to set-backs and other restraints (MTM79010-GG) would not contribute to cumulative effects.

Should development occur on Parcel MTM79010-DF, a small acreage of native grassland could be lost and made unavailable to nesting migratory birds. This in itself is insignificant, but many other similar developments in native grass have already occurred and at some point the sum total could become as significant as new cultivation of native prairie on private surface. Northern Montana is one of the last best places for grassland birds as well as other prairie wildlife species, and any fragmentation of habitats that occurs ultimately effects range-wide populations for many BLM Sensitive Species.

5.0 CONSULTATION AND COORDINATION:

5.1 Persons, Agencies, and Organizations Consulted

Table 16 lists persons, agencies, and organizations in which coordination or were consulted with during development of this EA, along with the findings and conclusions associated with consultations. A summary of scoping comments, including notification to surface owners is discussed below.

Table 16. List of Persons, Agencies and Organizations Consulted for Purposes of this EA

Name	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
Mark Sullivan, MFWP, Wildlife Biologist	State Wildlife Agency	Mark called at 0915 on April 4, 2008, to agree with the use of standard stipulations to protect wildlife and wildlife habitat on MTM79010-DF.
Mark Sullivan, MFWP, Wildlife Biologist	State Wildlife Agency	Mark commented on January 17, 2008, that his only concern was bald eagle winter roosting habitat. He was satisfied with the winter timing limit for MTM79010-GG.

5.2 Summary of Public Participation

Scoping

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 May 25, 2010; however, scoping comments were received through June 21, 2010. Surface owner notification letters were also distributed briefly explaining the oil and gas leasing process and planning process. The surface owner notification letter requested written comments regarding any issues or concerns that should be addressed in the environmental analysis. A total of 325 surface owner notification letters were distributed for the oil and gas leasing analysis process in the entire Montana/Dakotas BLM, with 2 of those surface owner letters (less than 1 percent) geographically specific to the Malta Field Office.

A total of 14 written comment letters were received and 23 phone/verbal comments were provided. The written and verbal communication resulted in a total of 108 individual scoping comments received pertaining to oil and gas leasing in the Montana/Dakotas. Of the 108 scoping comments that addressed issues/concerns related to the entire Montana/Dakotas BLM, no comments were submitted by surface owners from the Malta Field Office.

Of the 108 comments, about 20 were comments/requests for additional information (e.g., split estate brochure) regarding the general process of oil and gas leasing, split estate, questions about the planning process; and questions regarding verifying mineral ownership. Other comments ranged from the need to address green-house gas (GHG) emissions and cumulative impacts to climate change; concerns about impacts to wildlife and fisheries habitat and fragmenting wildlife corridors; concerns related to wilderness, pristine landscapes and scenic viewsheds/quality. Other comments provided specific information pertaining to cultural areas, suggestions for mitigation measures from surface disturbance and compliance with the NEPA process, including allowing for public comment, addressing a no leasing alternative and addressing direct, indirect and cumulative impacts.

30-day Public Comment Period

On August 12, 2010, eight EAs along with an unsigned finding of no significant impact, were made available for a 30-day public comment period. A total of 131 written submissions were received after the 30-day comment period, which resulted in 79 individually-coded substantive comments. With the exception of some parcel-specific and/or EA-specific comments and issues, most of the comments applied to all eight EAs. After review and consideration of the comments, some modifications have been made to the EAs. 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 changes that were made to the EAs as a result of the 30-day public comment period:

- Some stipulations identified for the proposed action were changed based on updated information submitted by individual commentors;
- Updates to the economic analysis;
- A table was added in the Appendix to summarize the proposed stipulation changes;
- Updates to the Climate Change SIR, including an analysis of the effectiveness of some mitigation practices and techniques;
- In some EAs, clarifications to the affected environment chapter (Chapter 3) and environmental impacts section (Chapter 4) were made to include habitat and/or species-specific comments. In some cases, these updates resulted in changes to proposed stipulations.
- Information was added to Chapter 4 – GHG emissions (direct and indirect impacts) section to clarify that the source year selected to disclose estimated GHG emissions was the year with the highest expected combined construction and production emissions for oil and gas sources in the planning area.

Table 17. List of Preparers

Name	Title	Responsible for the Following Section(s) of this Document
Fritz Prellwitz, CWB	Wildlife Biologist	EA Team Lead, Fish and Wildlife, Migratory Birds, Special Status Species
Josh Sorlie	Soil Scientist	Soils
Thomas G. Probert	Hydrologist	Water Resources, Vegetation Communities: Wetland-Riparian
Jody L. Miller	Archaeologist	Cultural Resources, Paleontology, Native American Religious Concerns
Kathy Tribby	Outdoor Recreation Planner	Visual Resources, Lands with Wilderness Characteristics, Recreation and Travel Management, Special Designations
Roy E. Taylor	Rangeland Management Specialist	Vegetation Resources and Livestock Grazing.
John Thompson	Planning/Environmental Specialist	Economic Analysis
Joan Trent	Sociologist	Social Analysis, Environmental Justice

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APPENDIX A
Description of Lease Parcels and Proposed Stipulations

Parcel Number	Acres	Legal Description	Proposed Stipulations
MTM 79010 DF	44.35	T. 37 N, R. 29 E, PMM, MT Sec. 11 POR OF W2E2 NOT INCLUDED IN MTM 40067; Phillips County (071) PD This parcel is described as a part of Tract No. 28 of the Martin Lake Unit. These lands were committed to the unit by the Authorized Officer at the time of unit approval. Joinder to the unit will not be required.	Cultural Resources 16-1 (All Lands) Standard 16-3 (All Lands) TES 16-2 (All Lands)
MTM 79010 GG	27.74	T. 32 N, R. 34 E, PMM, MT Sec. 20 BED OF MILK RVR RIPAR TO LOTS 1,2,3,4,7,8 DESC BY M&B (24.94 AC); 21 BED OF MILK RVR RIPAR TO LOTS 6,7 DESC BY M&B (2.80 AC); Phillips County (071) PD	Cultural Resources 16-1 (All Lands) Standard 16-3 (All Lands) TES 16-2 (All Lands) BOR 17-1 (All BOR Lands) BOR 17-2 (All BOR Lands)

Description of Stipulations

Stipulation Number	Stipulation Name/Brief Description
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.
Standard 16-3	STANDARD LEASE STIPULATION – see description below
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.
BOR 17-1	BUREAU OF RECLAMATION - Agency lease stipulations.
BOR 17-2	BUREAU OF RECLAMATION - Agency special stipulations.

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

OIL AND GAS LEASE STIPULATIONS

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

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

CONTROLLED OR LIMITED SURFACE USE STIPULATION --This stipulation may be modified, consistent with land use documents, when specifically approved in writing by the Bureau of Land Management (BLM) with concurrence of the SMA. Distances and/or time periods may be made less restrictive depending on the actual 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 special areas and that such areas may contain special values, may be needed for special purposes, or may require special attention to prevent damage to surface and/or other resources. Possible special areas are identified below. Any surface use or occupancy within such special areas will be strictly controlled, or **if absolutely necessary**, excluded. Use or occupancy will be restricted only when the BLM and/or the SMA demonstrates the restriction necessary for the protection of such special areas and existing or planned uses. Appropriate modifications to imposed restrictions will be made for the maintenance and operations of producing oil and gas wells.

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

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

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

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

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

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

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

See Notice on Back

NOTICE

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

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

1. Contact the appropriate SMA to determine if a site-specific cultural resource inventory is required. If an inventory is required, then:
2. Engage the services of a cultural resource specialist acceptable to the SMA to conduct a cultural resource inventory of the area of proposed surface disturbance. The operator may elect to inventory an area larger than the area of proposed disturbance to cover possible site relocation which may result from environmental or other considerations. An acceptable inventory report is to be submitted to the SMA for review and approval no later than that time when an otherwise complete application for approval of drilling or subsequent surface-disturbing operation is submitted.
3. Implement mitigation measures required by the SMA. Mitigation may include the relocation of proposed lease-related activities or other protective measures such as testing salvage and recordation. Where impacts to cultural resources cannot be mitigated to the satisfaction of the SMA, surface occupancy on that area must be prohibited.

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

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

Standard 16-3

APPENDIX B Soils¹

Map unit: 220E - Hillon-Joplin cobbly loams, 8 to 35 percent slopes

The Hillon component makes up 50 percent of the map unit. Slopes are 8 to 35 percent. This component is on hills. The parent material consists of till. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R052XC223MT Silty-Steep (sistp) 10-14" P.z. ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent.

The Joplin component makes up 35 percent of the map unit. Slopes are 8 to 25 percent. This component is on hills. The parent material consists of till. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R052XC223MT Silty-Steep (sistp) 10-14" P.z. ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent.

Map unit: 811A - Glendive-Havre loams, 0 to 2 percent slopes

The Glendive component makes up 60 percent of the map unit. Slopes are 0 to 2 percent. This component is on flood plains. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is rarely flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 3e. Irrigated land capability classification is 2e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 6 percent.

The Havre component makes up 30 percent of the map unit. Slopes are 0 to 2 percent. This component is on flood plains. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is rarely flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 3e. Irrigated land capability classification is 2e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 6 percent. The soil has a slightly sodic horizon within 30 inches of the soil surface.

Farmland classification for this map unit is a Farmland of statewide importance.

Map unit: 1221F - Hillon-Kevin association, 15 to 45 percent slopes

The Hillon component makes up 55 percent of the map unit. Slopes are 15 to 45 percent. This component is on hills. The parent material consists of till. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R052XC223MT Silty-Steep (sistp) 10-14" P.z. ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent.

The Kevin component makes up 20 percent of the map unit. Slopes are 15 to 25 percent. This component is on hills. The parent material consists of till. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R052XC223MT Silty-Steep (sistp) 10-14" P.z. ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 13 percent.

Map unit: 1441D - Kevin-Scobey-Phillips association, 2 to 15 percent slopes

The Kevin component makes up 35 percent of the map unit. Slopes are 2 to 15 percent. This component is on hills. The parent material consists of till. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R052XC217MT Silty (si) 10-14" P.z. ecological site. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 13 percent.

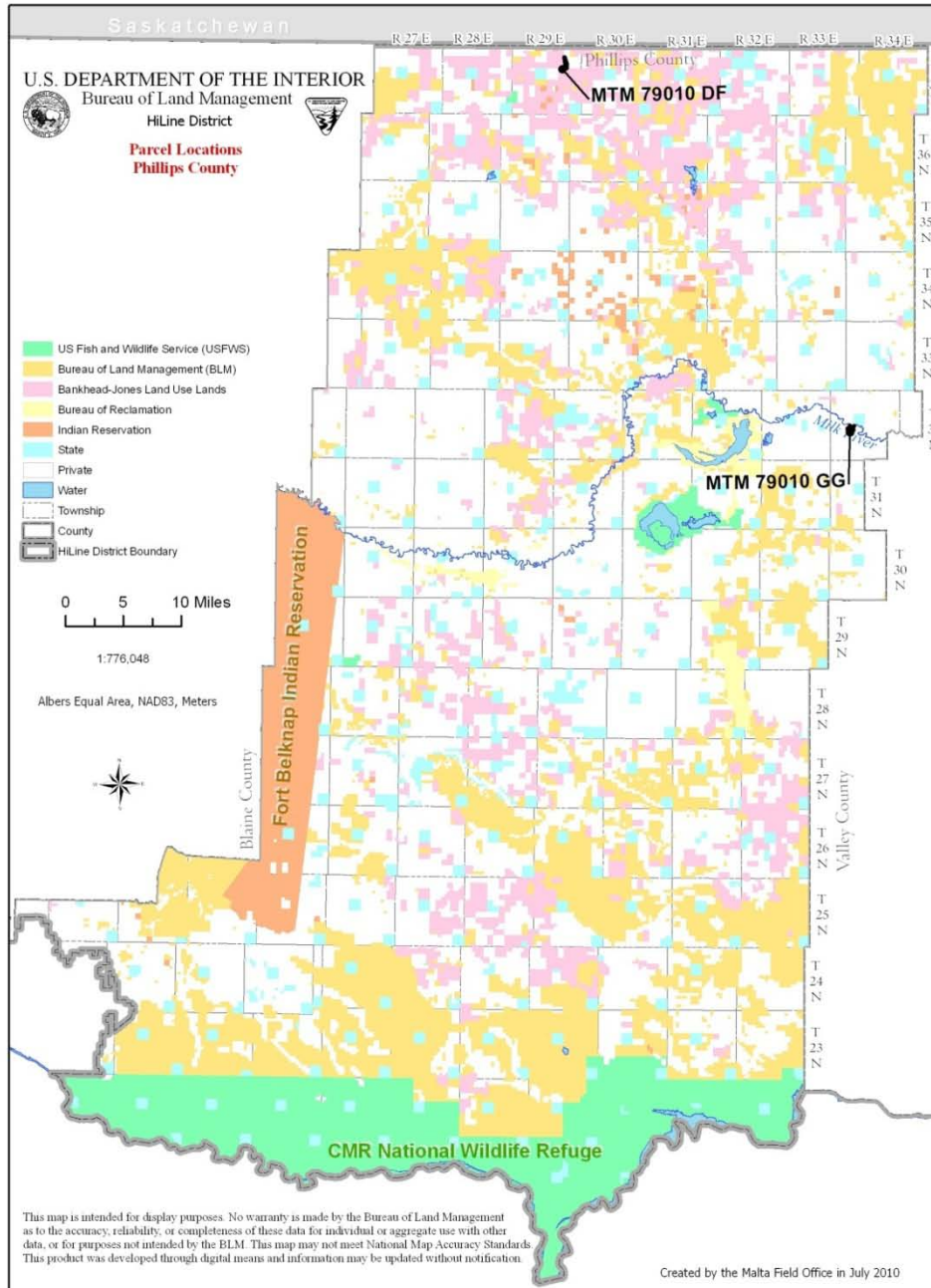
The Scobey component makes up 25 percent of the map unit. Slopes are 2 to 15 percent. This component is on till plains. The parent material consists of till. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R052XC217MT Silty (si) 10-14" P.z. ecological site. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent.

The Phillips component makes up 20 percent of the map unit. Slopes are 2 to 8 percent. This component is on till plains. The parent material consists of till. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R052XC217MT Silty (si) 10-14" P.z. ecological site.

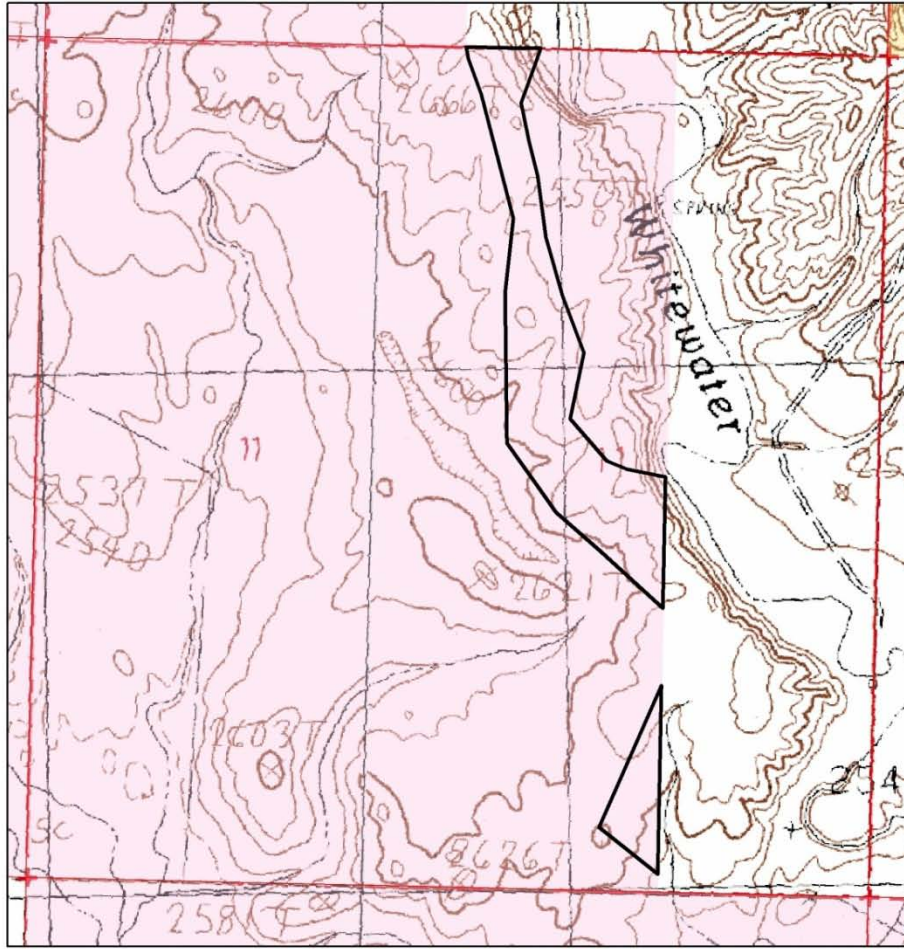
Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent. The soil has a slightly saline horizon within 30 inches of the soil surface. The soil has a slightly sodic horizon within 30 inches of the soil surface.

1. Map Unit Descriptions taken from USDA-NRCS Soil Data Mart Map Unit Description (Brief, Generated) Report (USDA-NRCS, 2010).

Map 1 – General Location of Lease Parcels








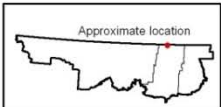
Map 3 – Lease Parcel MTM79010DF



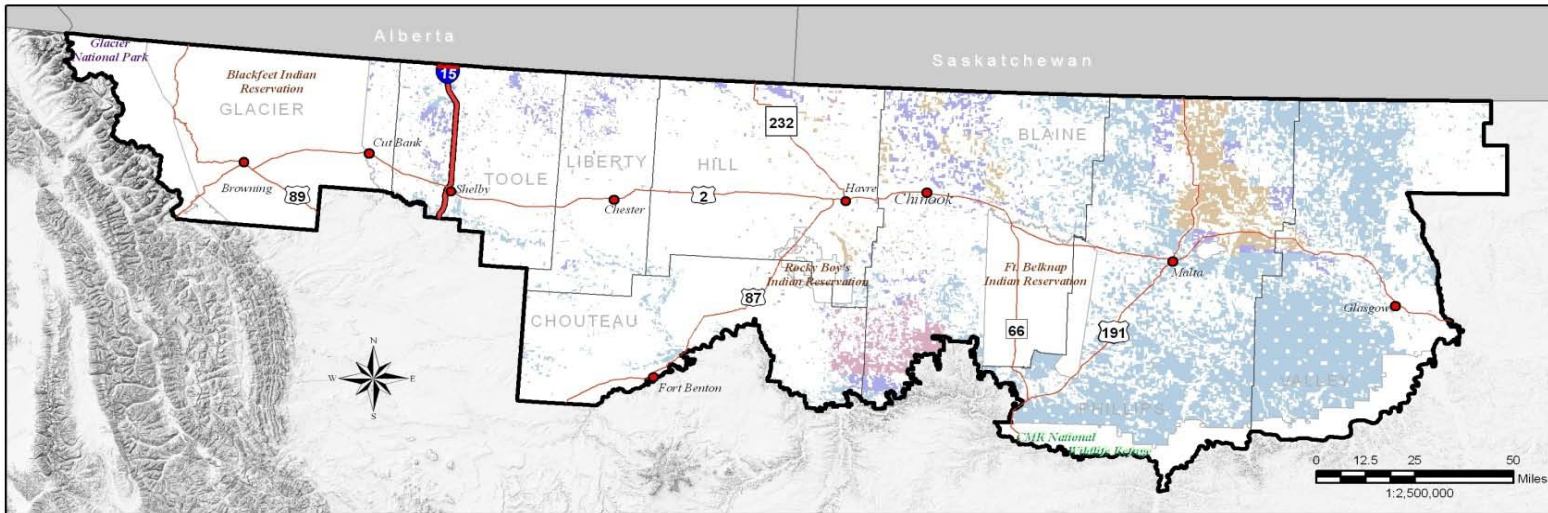
Created by the Malta Field Office in July 2010





Albers Equal Area, NAD83, Meters

<p>U.S. DEPARTMENT OF THE INTERIOR Bureau of Land Management HiLine District</p>   <p>MTM 79010 DF</p>	<p>T37N R29E Sec 11</p> <p>  Section  MTM79010DF </p>
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Map 4 – RFD potential for HiLine Planning Area



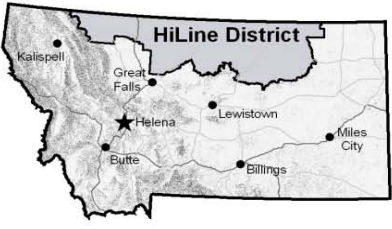
U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management
HiLine District Office

Albers Equal Area, NAD83, Meters
Created by the Malta Field Office in July 2010

Map shows the Development Potential for Oil and Gas on BLM administered subsurface.

<p>Development Potential</p> <ul style="list-style-type: none"> High Moderate Low Very Low Authorized Leases 	<ul style="list-style-type: none"> RMP boundary County Line Not Analyzed Interstate Highway or State Route Towns
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