

**United States Department of the Interior  
Bureau of Land Management**

Environmental Assessment DOI-BLM-0010-2011-0031-EA  
May 9, 2011

**Project Title:** Oil and Gas Lease Parcel Sale,  
October 18, 2011

**Location:** Billings Field Office (see attached Appendix A for list of lease  
parcels by number and legal description and Maps 1 - 8

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# United States Department of the Interior



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In Reply Refer To:

1600/3100 (MT0010)

May 9, 2011

Dear Reader:

The Bureau of Land Management (BLM) Billings Field Office has prepared an Environmental Assessment (EA) to analyze the potential effects from offering 7 nominated lease parcels for competitive oil and gas leasing in a sale tentatively scheduled to occur on October 18, 2011.

The EA with an unsigned Finding of No Significant Impact (FONSI) is available for a 30-day public comment period. Written comments must be postmarked by June 14, 2011 to be considered. Comments may be submitted using one of the following methods:

Email: MT\_BillingsFO\_Lease\_EA@blm.gov  
Mail: Billings Field Office  
Attn: Melissa Passes  
5001 Southgate Drive  
Billings, MT 59101

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

Upon review and consideration of public comments, the EA will be updated as needed. Based on our analysis, parcels recommended for leasing in our assessment would be included as part of a competitive oil and gas lease sale tentatively scheduled to occur on October 18, 2011.

Prior to issuance of any leases, the Decision Record and FONSI will be finalized and posted for public review on our BLM website. Please refer to the Montana/Dakotas BLM website at [www.blm.gov/mt](http://www.blm.gov/mt) for availability of the updated EA and the Lease Sale Notice. 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 EAs,

Lease Sale Notices and corresponding information can be found on the link titled "Oil and Gas Lease Sale Information." Once there, click on 2011, and search for the October 18, 2011 lease sale to review information and analysis.

If you have any questions, or would like more information about the updated EA or upcoming oil and gas lease sale, please contact us at (406) 896-5013.

Sincerely,

A handwritten signature in black ink, appearing to read "James M. Sparks", with a long horizontal flourish extending to the right.

James M. Sparks  
Field Manager

**Billings Field Office Oil and Gas Lease Sale EA  
DOI-BLM-0010-2011-0031-EA**

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# **Billings Field Office Oil and Gas Lease Sale EA**

## **DOI-BLM-0010-2011-0031-EA**

### **1.0 PURPOSE AND NEED**

#### **1.1 Introduction**

It is the policy of the Bureau of Land Management (BLM) to make mineral resources available for use and to encourage development of mineral resources to meet national, regional, and local needs. This policy is based on various laws, including the Mineral Leasing Act of 1920 and the Federal Land Policy and Management Act of 1976. The Federal Onshore Oil and Gas Leasing Reform Act of 1987 Sec. 5102(a)(b)(1)(A) directs the BLM to conduct quarterly oil and gas lease sales in each state whenever eligible lands are available for leasing. The Montana State Office conducts mineral estate lease auctions for lands managed by the federal government, whether the surface is managed by the Department of the Interior (BLM or Bureau of Reclamation), United States Forest Service, or other departments and agencies. In some cases the BLM holds subsurface mineral rights on split estate lands where the surface estate is owned by another party, other than the federal government. Federal mineral leases can be sold on such lands as well. The Montana State Office has historically conducted five lease sales per year.

Members of the public file Expressions of Interest (EOI) to nominate parcels for leasing by the BLM. From these EOIs, the Montana State Office provides draft parcel lists to the appropriate field offices for review. BLM field offices then review legal descriptions of nominated parcels to determine: 1) if they are in areas open to leasing; 2) if new information has come to light which might change previous analyses conducted during the land use planning process; 3) if there are special resource conditions of which potential bidders should be made aware; and 4) which stipulations should be identified and included as part of a lease. Ultimately, all of the lands in proposed lease sales are nominated by private individuals, companies, or the BLM, and therefore represent areas of high interest.

This environmental assessment (EA) has been prepared to disclose and analyze the potential environmental consequences from leasing parcels located in the Billings Field Office (Billings FO), to be included as part of a competitive oil and gas lease sale tentatively scheduled to occur in October 2011. The Billings Field Office received 44 parcel nominations from the public, of the 44 nominations 37 were located within, or immediately adjacent to, high priority Sage Grouse habitat. These areas were recently designated as Sage Grouse core areas by Montana Fish, Wildlife and Parks. Land management decisions, including leasing for oil and gas development are currently under consideration within the ongoing Billings Field Office Resource Management Plan revision. Further consideration of these 37 nominations is contained within section 2.4 of this document.

The analysis area includes the 44 nominated parcels in Golden Valley, Musselshell, Stillwater, and Sweet Grass counties (Map 1).

## **1.2 Purpose and Need for the Proposed Action**

The purpose of offering parcels for competitive oil and gas leasing is to provide opportunities for private individuals or companies to explore for and develop federal oil and gas resources after receipt of necessary approvals and to sell the oil and gas in public markets.

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

The decision to be made is whether to sell and issue oil and gas leases on the lease parcels identified, and, if so, identify stipulations that would be included with specific lease parcels at the time of lease sale.

## **1.3 Conformance with Land Use Plan(s)**

This EA is tiered to the decisions and conforms with information and analysis contained in the Billings Resource Management Plan (RMP) (September 1984) and its associated environmental impact statement. The Billings RMP is the governing land use plan for the Billings Field Office. The Oil and Gas portion of the 1984 Billings RMP was amended by the 1992 Oil and Gas Amendment of the Billings, Powder River, and South Dakota Resource Management Plans and Final Environmental Impact Statement and the 1994 Record of Decision. The 2008 Final Supplement to the Montana Statewide Oil and Gas Environmental Impact Statement and Proposed Amendment of the Powder River and Billings Resource Management Plans (FSEIS) amended the 1984 Billings RMP/EIS with a development alternative for coal bed natural gas production. A more complete description of activities and impacts related to oil and gas leasing, development, production, etc. can be found in Chapter Four – Environmental Consequences (pages 55-77) of the 1992 Oil and Gas RMP/EIS Amendment.

Analysis of the 44 parcels is documented in this EA, and was conducted by Billings Field Office resource specialists who relied on professional knowledge of the areas involved, review of current databases and file information, and site visits to ensure that appropriate stipulations were recommended for a specific parcel. Analysis may have also identified the need to defer entire or partial parcels from leasing pending further environmental review.

At the time of this review it is unknown whether a particular parcel will be sold and a lease issued. It is unknown when, where, or if future well sites, roads, and facilities might be proposed. Assessment of potential activities and impacts was based on potential well densities discerned from the Reasonably Foreseeable Development (RFD) Scenario developed for the Billings Field Office. Detailed site-specific analysis and mitigation of activities associated with any particular lease would occur when a lease holder submits an application for permit to drill (APD). In this scenario, the BLM would require the use of best management practices (BMPs) documented in “Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development-The Gold Book (USDI and USDA 2007) and online at [http://www.blm.gov/wo/st/en/prog/energy/oil\\_and\\_gas/best\\_management\\_practices.html](http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/best_management_practices.html).

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

#### **1.4 Public Scoping and Identification of Issues**

Public scoping for this project was conducted through a 15-day scoping period advertised on the BLM Montana State Office website and posted on the Billings Field Office website National Environmental Policy Act (NEPA) notification log. While the scoping was initiated March 28, 2011; comments were received through April 21, 2011.

The BLM coordinates with Montana Fish, Wildlife and Parks (MFWP), and the United States Fish and Wildlife Service (USFWS) to manage wildlife habitat because BLM management decisions can affect wildlife populations which depend on the habitat. The BLM manages habitat on BLM lands, while MFWP is responsible for managing wildlife species populations. The USFWS also manages some wildlife populations but only those federal trust species managed under mandates such as the Endangered Species Act, Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act. Managing wildlife is factored into project planning at multiple scales and is to be implemented early in the planning process.

Coordination with MFWP and USFWS was conducted for the 7 lease parcels being reviewed. BLM has coordinated with MFWP and USFWS in the completion of this EA in order to prepare analysis, identify protective measures, and apply stipulations associated with these parcels being analyzed. The BLM consults with Native Americans under Section 106 of the National Historic Preservation Act. BLM sent letters to Tribal Presidents and THPO or other cultural contacts for the Crow Tribe and Northern Cheyenne Tribe in Montana at the beginning of the 15 day scoping period informing them of the potential for the 7 parcels to be leased and inviting them to submit issues and concerns BLM should consider in the environmental analysis.

BLM will send a second letter to the tribes informing them about the 30 day public comment period for the EA and solicit any information BLM should consider before making a decision whether to offer any or all of the 7 parcels for sale.

## **2.0 DESCRIPTION OF ALTERNATIVES, INCLUDING PROPOSED ACTION**

### **2.1 Alternative A - No Action**

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

The No Action Alternative would exclude all 7 parcels within the Billings Field Office from the lease sale. Surface management would remain the same and ongoing oil and gas development would continue on surrounding federal, private, and state leases.

### **2.2 Alternative B – Proposed Action**

The Proposed Action Alternative would be to offer 7 parcels of federal minerals for oil and gas leasing, covering 784.61 acres administered by the Billings Field Office, in conformance with the existing land use planning decisions. The seven parcels would be offered with RMP lease stipulations and/or lease notices as necessary (Appendix A) for competitive oil and gas lease sale and lease issuance. The parcels are located in four counties in south-central Montana (Golden Valley, Musselshell, Stillwater and Sweet Grass Counties). Parcel number, size, and detailed locations and associated stipulations are listed in Appendix A. Map 3 indicates the general location of each parcel and Maps 4 through 8 indicates locations of parcels by county.

Of the 784.61 acres of federal mineral estate considered in this EA, approximately 424.61 acres (5 parcels) are managed by the BLM. The remaining 2 parcels are split estate (private surface with federal mineral estate).

#### **2.2.1 Additional Considerations for Alternatives B**

In the instance of the parcels which are split estate, the BLM provided courtesy notification to private landowners that their lands are considered in this NEPA analysis and would be considered for inclusion in an upcoming lease sale. If any activity were to occur on such split estate parcels, the lessee and/or operator would be responsible for adhering to BLM requirements as well as reaching an agreement with the private surface landowners regarding access, surface disturbance and reclamation. Standard lease terms, stipulations, conditions, and operating procedures would apply to these parcels.

Standard operating procedures, best management practices and required conditions of approval 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 specified at 43 CFR 3162.

### **2.3 Alternatives Considered, but Eliminated from further Analysis**

An alternative that included leasing all 37 nominations that are located within or immediately adjacent to the State of Montana sage grouse core areas was considered. There are several issues surrounding this potential alternative that complicate leasing (or offering to lease) these parcels at this time. Four key factors, as described below, were considered to reach this conclusion: 1) Quality of the affected habitat, 2) Recent research, funded in part by this Agency, 3) Ongoing conservation efforts by other Federal Agencies, and 4) Impending release of an updated Resource Management Plan with specific measures to address all of the above. These 37 nominations will be reconsidered once the Billings Field Office RMP is complete.

#### **1) Quality of the Affected Habitat**

The 37 parcels are within, or immediately adjacent to, two separate Sage Grouse Core Areas as designated by the State of Montana's Fish, Wildlife and Parks. As defined by the State of Montana Sage Grouse Core Areas are:

Definition: Sage-grouse core areas are habitats associated with 1) Montana's highest densities of sage-grouse (25% quartile), based on male counts and/or 2) sage-grouse lek complexes and associated habitat important to sage-grouse distribution.

As such, these areas represent some the most important habitat areas for future conservation of Sage Grouse within the State of Montana.

#### **2) Recent Research**

Oil and gas development may, or may not be compatible with Sage Grouse habitat depending upon the type and level of development proposed and the specific characteristics of the habitat to be affected. It has been shown that oil and gas development has negatively impacted sage grouse in the past. Based on recent research, the current oil and gas stipulations for sage grouse are considered ineffective to ensure that sage grouse can persist within fully developed areas. With regard to existing restrictive stipulations applied by the BLM, (Walker et al. 2007a) research has demonstrated that the 0.4-km (0.25 miles) NSO lease stipulation is insufficient to conserve breeding sage-grouse populations in fully developed gas fields because this buffer distance leaves 98 percent of the landscape within 3.2 km (2 miles) open to full-scale development. Full-field development of 98 percent of the landscape within 3.2 km (2 miles) of leks in a typical landscape in the Powder River Basin reduced the average probability of lek persistence from 87 percent to 5 percent (Walker et al. 2007a).

Other studies also have assessed the efficacy of existing BLM stipulations for sage grouse. Impacts to leks from energy development are most severe near the lek, and remained discernable out to distances more than 6 km (3.6 miles) (Holloran 2005, Walker et al. 2007a), and have resulted in the extirpation of leks within gas fields (Holloran 2005, Walker et al. 2007a). Holloran (2005) shows that lek counts decreased with distance to the nearest active drilling rig, producing well, or main haul road, and that development influence counts of displaying males to a distance of between 4.7 and 6.2 km (2.9 and 3.9 miles). All well-supported models in Walker et al. (2007a) indicate a strong effect of energy development, estimated as proportion of development within either 0.8 km (0.5 miles) or 3.2 km (2 miles), on lek persistence. Buffer sizes of 0.25 mi., 0.5 mi., 0.6 mi. and 1.0 mi. result in an estimated lek persistence of 5 percent, 11 percent, 14 percent, and 30 percent. Lek persistence in the absence of CBNG development averages approximately 85 percent. Models with development at 6.4 km (4 miles) had considerably less support, but the regression coefficient indicated that impacts were still apparent out to 6.4 km (4 miles) (Walker et al. 2007a). Tack (2010) found impacts of energy development on lek abundances (numbers of males per lek) out to 7.6 miles.

The previously used 2 mile timing stipulation only applies between March 1 to June 15, and development can occur within the 2 miles of the lek outside of those dates. Not all lease parcels would be expected to see full field development as noted in the range of RFD, although effects would most likely mirror these studies to some degree proportionate to the amount of development that occurs outside of the stipulated timeframe.

Noise has been shown to affect sage-grouse and associated sagebrush obligates. Sage-grouse are known to select highly visible leks with good acoustic properties. Effects to sage-grouse would be a decrease in numbers of males on leks and activity levels and lower nest initiation near oil and gas development. Sage-grouse numbers on leks within 1.6 km (1 mile) of coal bed natural gas compressor stations in Campbell County, Wyoming were shown to be consistently lower than on leks not affected by this disturbance (Braun et al. 2002). Holloran (2005), Holloran et al. (2005a, 2005b), Holloran and Anderson (2005) reported that lek activity by sage-grouse decreased downwind of drilling activities, suggesting that noise had measurable “negative” impacts on sage-grouse. The actual level of noise (measured in decibels) that would not affect greater sage-grouse breeding and nesting activities is presently unknown.

### **3) Ongoing Conservation Efforts by other Agencies**

The Natural Resources Conservation Service (NRCS) has recently undertaken a large cooperative project within the State of Montana to provide assistance to agricultural producers to initiate conservation practices beneficial to Sage Grouse. Core Area 4 (Golden Valley County), where 15 of the 37 nominations are located, was selected as the pilot Core Area for this effort. To date (fiscal years 2010 and 2011) the NRCS has invested \$3,623,000 to support Sage Grouse conservation, to protect 128,000 acres. Also in fiscal year 2011, the NRCS has invested, or is planning to invest another \$1,606,000 to protect 52,000 acres in Core Area 3 (Petroleum County) and Core Area 4 (Musselshell County, where the remaining 22 nominations are located). Effectiveness monitoring of the conservation practices is an integral part of the NRCS program. Leasing and subsequent oil and gas development at this time could jeopardize the substantial investment that the federal government has made, and at the least, would cloud any results of the effectiveness monitoring.

#### **4) Impending Revision of the Billings Field Office Resource Management Plan**

The BiFO is in the process of completing a Resource Management Plan. The process began in 2008, and the draft RMP is expected to be released for public review during the 4<sup>th</sup> quarter of 2011. Oil and gas development and sage grouse are two of the key issues identified by public comment in the Scoping Summary Report, available for review at:

[http://www.blm.gov/style/medialib/blm/mt/field\\_offices/billings/rmp.Par.24693.File.dat/ScopingReport.pdf](http://www.blm.gov/style/medialib/blm/mt/field_offices/billings/rmp.Par.24693.File.dat/ScopingReport.pdf)

The current BiFO RMP is dated 1984, as amended (most notably in 1992, where oil and gas leasing stipulations were updated). Since that time there have been substantial improvements in oil and gas development technology, as well as our understanding of Sage Grouse life history requirements and development related disturbance impacts (see item 2 above). The updated RMP (in progress) will provide stipulations relative to oil and gas development and Sage Grouse habitat based upon our current understanding, including those areas where no development may be the appropriate management response.

#### **Conclusion**

Giving consideration to all of the factors above, it would be premature to make leasing decisions, with respect to oil and gas development, at this time. Therefore, leasing decisions associated with these 37 parcels will be eliminated from this analysis and deferred to a later date once the BiFO RMP is complete.

## **3.0 AFFECTED ENVIRONMENT**

### **3.1 Introduction**

This chapter describes the affected existing environment (i.e., the physical, biological, social, and economic values and resources) within the analysis area, which includes the 7 nominated parcels in Golden Valley (Map 5), Musselshell (Map 7), Stillwater (Map 8) and Sweet Grass (Map 6) counties that could be affected by implementation of the alternatives described in Chapter 2.

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

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

The Billings FO has surface management responsibility for approximately 434,158 acres of BLM-administered public land (herein referred to as public land) and about 1,825,043 acres of federal mineral estate (subsurface) within eight counties in south-central Montana (Big Horn, Carbon, Golden Valley, Musselshell, Stillwater, Sweet Grass, Wheatland, and Yellowstone). The Billings Field Office also administers 6,340 acres of public land in Big Horn County, Wyoming (Pryor Mountain Wild Horse Range).

Except for several contiguous blocks of land in Carbon County, most of the public land consists of scattered tracts, intermingled with private and state-owned tracts.

The general climate in south-central Montana is Middle Latitude Steppe. This is a semi-arid region characterized by low rainfall, low humidity, clear skies, and wide ranges in annual and diurnal temperatures. Average annual precipitation is about 14 inches with about one third of that falling in May and June. The driest period is from November to February. Heavy snows are not unusual during the winter. Strong downslope winds known as Chinooks have a thawing and drying effect, and snow seldom accumulates to great depths.

The Billings FO management area is situated within the area called the Northwestern Plains, though portions of the management area also include the eastern slope of the Rocky Mountains (Beartooth Range) and several island mountain ranges, including the Pryor Mountains and Bull Mountains. Other mountain ranges within the Billings Field Office management area include the Little Snowy, Snowy, Belt, Crazy, and Absaroka mountains. Several rivers bisect the Billings FO management area: the Bighorn, Yellowstone, Musselshell, Clarks Fork of the Yellowstone, Stillwater, and Boulder.

The topography in south-central Montana ranges from moderately steep to steep mountains and canyons to rolling plains and tablelands of moderate relief. Elevations generally range from about 3,000 to 7,000 feet above mean sea level, with mountain peaks rising to over 10,000 feet.

Only those aspects of the affected environment that are potentially impacted by this project are described in detail (Table 1). Resources and resource uses that were determined to be not present or not potentially impacted will not be discussed further in this EA. The Critical Elements table (Table 1) is a summary of Resources and resource uses with a rationale for determination.

**Table 1. Summary of Critical Elements of the Human Environment and Other Resources/Concerns**

<b>CRITICAL ELEMENTS</b>		
<b>Determination*</b>	<b>Resource</b>	<b>Rationale for Determination</b>
PI	Air Quality <i>(The Clean Air Act of 1955, as amended)</i>	See discussion in section 3.2.1
NI	Areas of Critical Environmental Concern <i>(Federal Land Policy and Management Act of 1976)</i>	There are nine ACECs within the Billings Field Office planning area. None of the proposed lease sale parcels occur within an ACEC, See Section 3.17.2
PI	Cultural Resources <i>(National Historic Preservation Act of 1966, as amended)</i>	See discussion in section 3.8
PI	Environmental Justice <i>(Executive Order 12898)</i>	See discussion in section 3.18.1
NP	Farmlands (Prime & Unique) <i>(Surface Mining Control and Reclamation Act of 1977)</i>	There are no prime or unique farmlands located in the parcels being analyzed. See discussion in section 3.3
NP	Floodplains <i>(Executive Order 11988)</i>	There are 0.07 acres of 100 year floodplains in parcel MTM 97300-N6. See discussion in section 3.4
PI	Invasive, Non-native weed species <i>(Federal Noxious Weed Act of 1974, as amended)</i>	See discussion in sections 3.5.3 and 3.5.4
NP	Native American Religious Concerns <i>(Executive Order 13007)</i>	See discussion in section 3.9
PI	Threatened, Endangered, or Candidate Plant Species <i>(Endangered Species Act of 1973, as amended)</i>	See discussion in section 3.6.3
NP	Threatened, Endangered, or Candidate Animal Species	See discussion in sections 3.6.2

	<i>(Endangered Species Act of 1973, as amended)</i>	
NP	Wastes (hazardous or solid)  <i>(Resource Conservation and Recovery Act of 1976, and Comprehensive Environmental Response, Compensation, and Liability Act of 1980)</i>	There are no known wastes (hazardous or solid) located in the proposed lease sale parcels.
PI	Water Quality (drinking/ground)  <i>(Safe Drinking Water Act of 1974, as amended and Clean Water Act of 1977)</i>	See discussion in section 3.4
PI	Wetlands / Riparian Zones  <i>(Executive Order 11990)</i>	Field visits and NAIP image analysis have determined small riparian zones in parcels LA, LB and N6 with at least one wetland obligate plant species. See section 3.5.2 below for discussion and analysis.
NP	Wild and Scenic Rivers  <i>(Wild and Scenic Rivers Act of 1968, as amended)</i>	There are no designated Wild and Scenic Rivers within the Billings Field Office planning area. There are river segments which have been inventoried by BLM and found to be eligible for potential designation as W&SRs. The new draft Billings RMP has made preliminary suitability determinations on these eligible river segments. The proposed lease sale parcels are not close to any of the river/creek segments evaluated as WSR eligible or suitable in the Billings/Pompeys Pillar RMP/EIS revision
NP	Wilderness  <i>(Federal Land Policy and Management Act of 1976 and Wilderness Act of 1964)</i>	There are no designated Wilderness Areas within the Billings Field Office planning area. There are four Wilderness Study Areas (WSA) within the Billings Field Office planning area and each of these WSAs is closed to oil and gas leasing.
<b>OTHER RESOURCES / CONCERNS</b>		
<b>Determination*</b>	<b>Resource</b>	<b>Rationale for Determination</b>
NP	Fish and Wildlife including Special Status Species other than FWS candidate or listed species  e.g. Migratory birds ( <i>E.O. 13186</i> )	Because there are no aquatic habitats within the lease parcels, no aquatic wildlife species occur in the lease parcels. Species that are in aquatic habitats near parcels are northern leopard frog, Northern redbelly X Finescale Dace, spiny softshell turtle, and sauger. – Data from Montana Natural Heritage Tracker. See discussion on wildlife in section 3.6
NI	Geology / Mineral Resources/Energy Production	See discussion in section 3.16
PI	Lands / Access	See discussion in section 3.15
PI	Livestock Grazing  <i>(Taylor Grazing Act of 1934, National Environmental Policy Act of 1969 Endangered Species Act of 1973, Federal Land Policy and Management Act of 1976, and the Public</i>	See discussion in section 3.13

	<i>Rangelands Improvement Act of 1978)</i>	
PI	Paleontology <i>(Paleontological Resources Protection Act P.L. 111-011, HR 146)</i>	See discussion in section 3.10
PI	Rangeland Health Standards and Guidelines <i>(43 CFR 4180)</i>	See discussion in section 3.13
NI	Recreation	See discussion in section 3.14
PI	Socioeconomics	See discussion in section 3.18.1
PI	Soils	See discussion in section 3.3
PI	Vegetation including Special Status Plant Species other than FWS candidate or listed species	See discussion in section 3.6.2
PI	Visual Resource Management <i>(FLPMA 1976, NEPA 1969)</i>	The public lands are managed as VRM Class III. Management objectives for this class are consistent with this type of proposal. If the lands are leased and an APD is received, visual impacts would be addressed with Class III guidelines. BLM has no authority to address visual impacts on federal non-surface lands and there is no visual inventory for those parcels.
NP	Wild Horses and Burros <i>(Wild and Free Roaming Horses and Burros Act of 1971, as amended)</i>	Not present within the proposed lease sale parcels.
NP	Wilderness Characteristics	Following FLPMA section 201 and Secretarial Order 3310 (December 23, 2010), the BLM conducted an interdisciplinary team inventory of Wilderness characteristics lands. A total of 15 areas were found to meet the criteria in BLM Manual 6301 in the BiFO. None of these lands are included in the parcels covered in this proposal.
PI	Woodland / Forestry	See discussion in section 3.12
* NP = not present in the area impacted by the proposed or alternative actions NI = present, but not affected to a degree that detailed analysis is required PI = present and may be impacted to some degree. Will be analyzed in affected environment and environmental impacts. (NOTE: PI does not mean impacts are likely to be significant in any way).		

### 3.2 Air Resources

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

The Environmental Protection Agency (EPA) has the primary responsibility for regulating air quality, including seven nationally regulated ambient air pollutants. Regulation of air quality is also delegated to 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.

### 3.2.1 Air Quality

Analysis area air quality is very good. The EPA air quality index (AQI) is an index used for reporting daily air quality (<http://www.epa.gov/oar/data/geosel.html>). It tells how clean or polluted an area's air is and whether associated health effects might be a concern. The AQI focuses on the potential health effects a person may experience within a few hours or days after breathing polluted air. The EPA calculates the AQI for the five major criteria air pollutants regulated by the Clean Air Act (CAA): ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each of these pollutants, EPA has established national air quality standards to protect public health. An AQI value of 100 generally corresponds to the national air quality standard for the pollutant, which is the level the EPA has set to protect public health. The following terms help interpret the AQI information:

- **Good** - The AQI value is between 0 and 50. Air quality is considered satisfactory and air pollution poses little or no risk.
- **Moderate** - The AQI is between 51 and 100. Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people. For example, people who are unusually sensitive to ozone may experience respiratory symptoms.
- **Unhealthy for Sensitive Groups** - When AQI values are between 101 and 150, members of "sensitive groups" may experience health effects. These groups are likely to be affected at lower levels than the general public. For example, people with lung disease are at greater risk from exposure to ozone, while people with either lung disease or heart disease are at greater risk from exposure to particle pollution. The general public is not likely to be affected when the AQI is in this range.

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

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

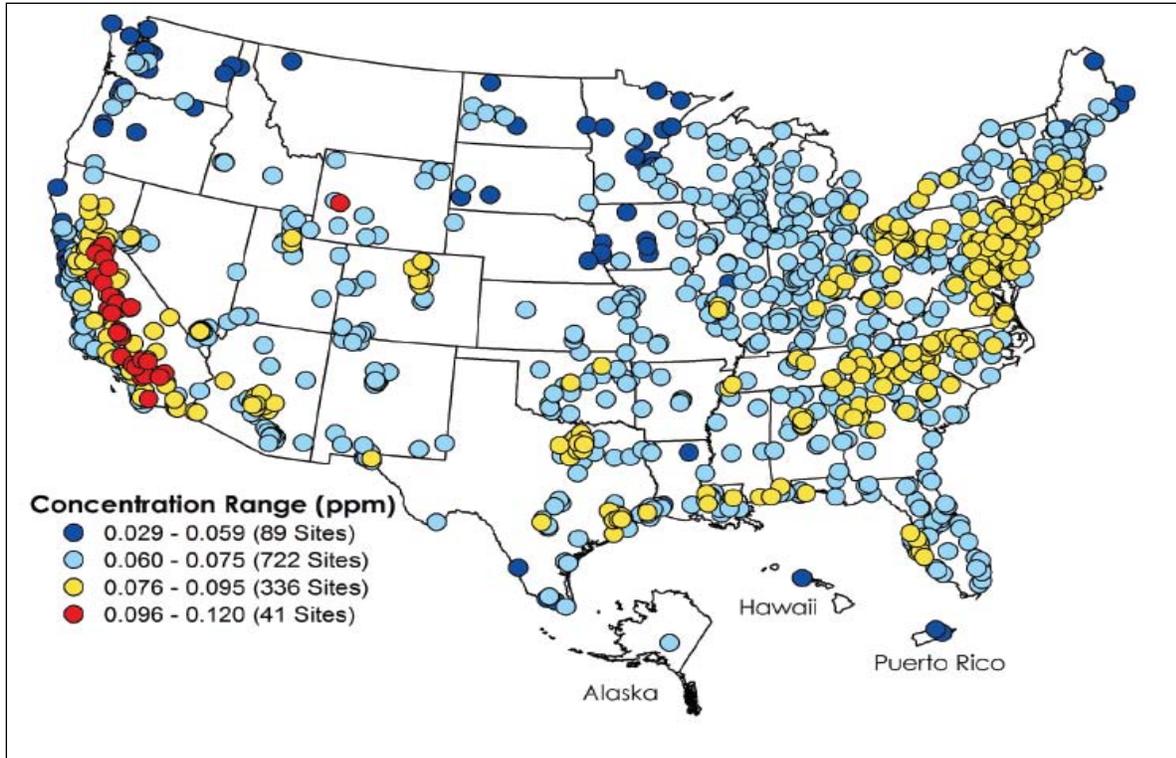


Figure A. Ozone concentrations in ppm, 2008 (fourth highest daily maximum 8-hour concentration).

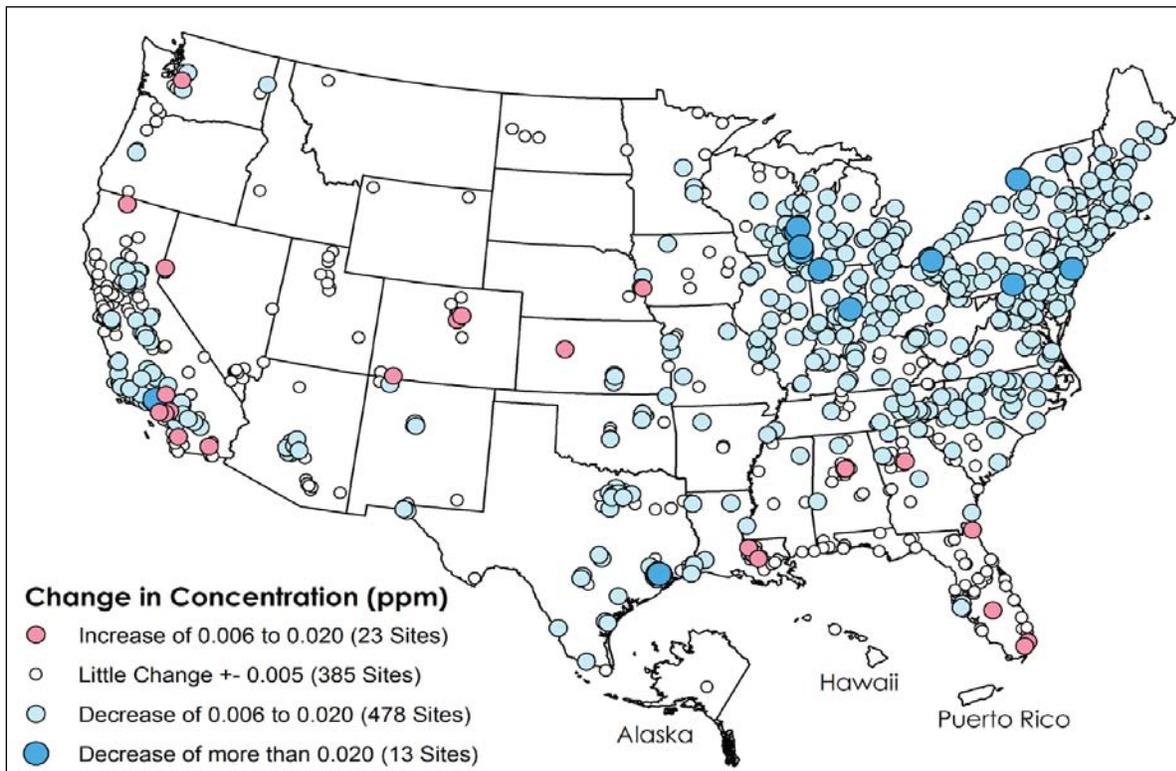


Figure B. Change in ozone concentrations in ppm, 2001-2003 vs. 2006-2008 (three-year average of the annual fourth highest daily maximum 8-hour concentrations).

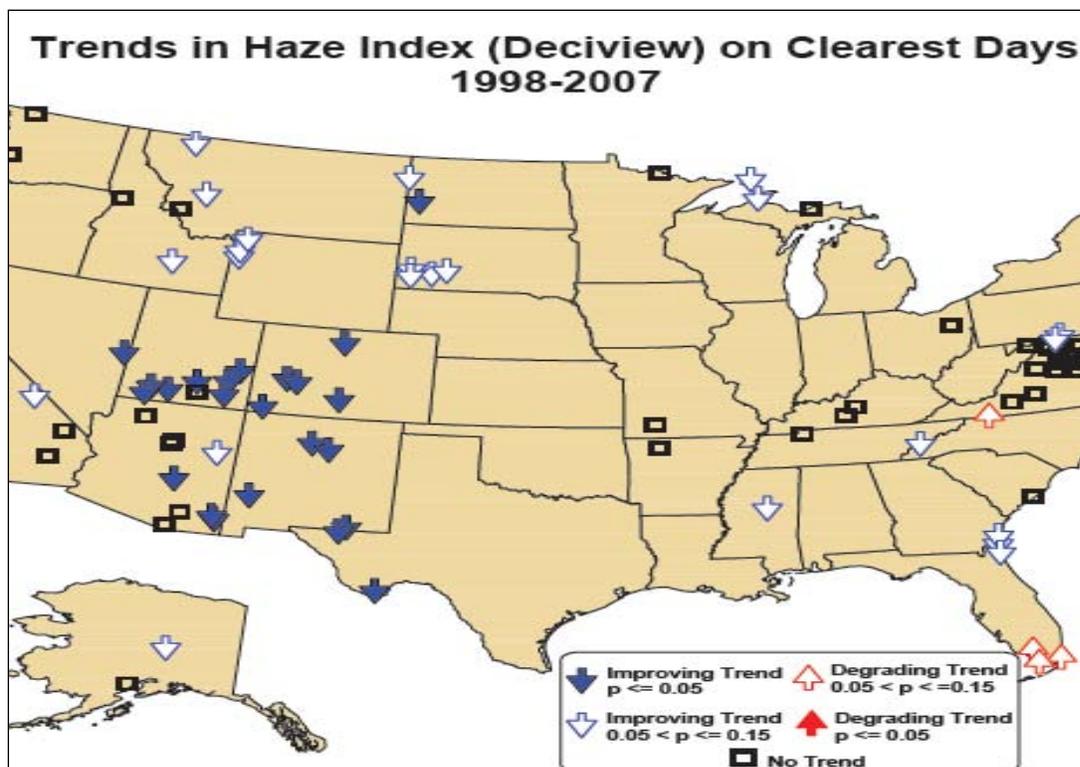


Figure C. Trends in haze index (deciview) on clearest days, 1998-2007.

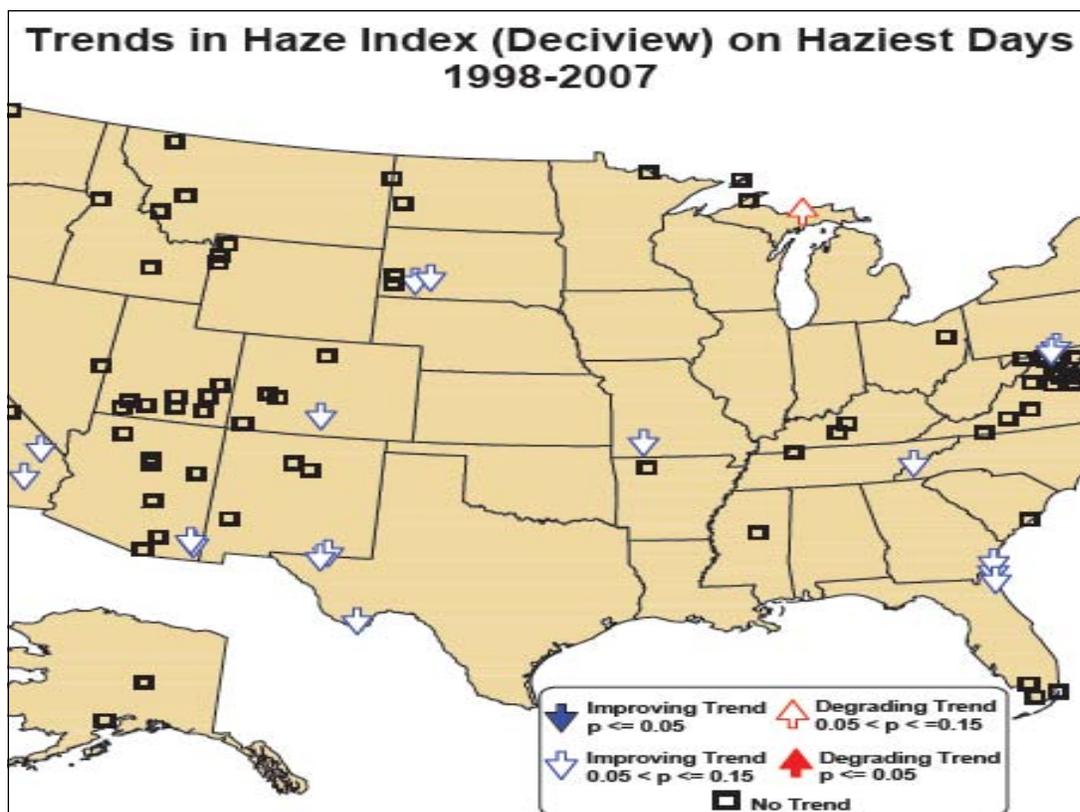


Figure D. Trends in haze index (deciview) on haziest days, 1998-2007.

**Billings:** The AQI data (Table 2) for the Billings FO shows that there is little risk to the general public from air quality in the Billings FO. Between 1998 and 2008, 97 percent of the days were rated “good” with 3 percent being “moderate.” While there have been days that posed a health risk in both Yellowstone and Big Horn Counties, the occurrence is very rare (<.01 percent of all records) and short-term (<1 day/year). The pollutants causing the elevated risks have been PM<sub>10</sub> in Big Horn County and PM<sub>2.5</sub> in Yellowstone County. The primary air quality pollutants in the Billings FO are ozone, carbon monoxide, sulfur dioxide, and particulate matter.

**Table 2. US EPA - AirData Air Quality Index Report – Billings FO Summary (1998-2008).**

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
Big Horn	MT	640	597	93	41	1	1
Yellowstone	MT	3975	3843	97	126	0	3
Sweet Grass	MT	521	512	98	9	0	0
Musselshell	MT	414	414	100	0	0	0
Stillwater	MT	40	39	98	1	0	0
Total		5590	5404	97	177	0	4
Field Office Percentages				97 percent	3 percent	0 percent	<0.01 percent

In 2008 the area managed by the Billings Field Office was in compliance with all air quality standards. Sulfur dioxide reached 18.6 percent of the standard (24 hour); carbon monoxide reached 25.6 percent (8 hour), ozone reached 78.7 percent, and PM<sub>2.5</sub> reached 44.9 percent of the standard (24 hour). This indicates that current air quality is very good, falling well below applicable standards.

The primary pollutants identified for the project area are carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), and particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>). A review of emissions from Musselshell, Yellowstone, and Carbon counties (where most BLM lands are located) show that highway vehicles are the primary source of CO (64 percent) with off-highway vehicles making up another 21 percent. Sulfur dioxide emissions are primarily from industrial sources located in the Billings and Laurel areas. Particulate matter sources vary by the size of the particles. PM<sub>2.5</sub> is primarily from fugitive dust (49 percent), agriculture and forestry (12 percent), and residential wood burning (9 percent), while PM<sub>10</sub> is primarily from fugitive dust (76 percent) and agriculture and forestry (13 percent). It is important to note that the presence of a source does not automatically mean that air quality is impaired. As shown above, these emissions do not necessarily lead to impaired air quality. The section is simply intended to identify those sectors which have the greatest likelihood to influence current and future air quality for this project area.

Class 1 Areas: None, although the Northern Cheyenne Reservation is located just outside Billings Field Office planning area.

Nearby Non-Attainment Areas:

Billings and Laurel – State sulfur dioxide

### 3.2.2 Climate Change

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

The Intergovernmental Panel on Climate Change (Climate Change SIR 2010) states, “Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.” Global average temperature has increased approximately 1.4°F since the early 20<sup>th</sup> century (NOAA (National Oceanic and Atmospheric Administration) 2010a as cited by the 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 (2010), earth has a natural greenhouse effect wherein naturally occurring gases such as water vapor, CO<sub>2</sub>, methane, and N<sub>2</sub>O absorb and retain heat. Without the natural greenhouse effect, earth would be approximately 60°F cooler (USGCRP, 2009, cited in the Climate Change SIR 2010). Current ongoing global climate change is believed by scientists to be linked to the atmospheric buildup of GHGs, which may persist for decades or even centuries. Each GHG has a global warming potential that accounts for the intensity of each GHG’s heat trapping effect and its longevity in the atmosphere (Climate Change SIR 2010). The buildup of GHGs such as CO<sub>2</sub>, methane, N<sub>2</sub>O, 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, activities using combustion engines, changes to the natural carbon cycle, and changes to radiative forces and reflectivity (albedo). It is important to note that GHGs will have a sustained

climatic impact over different temporal scales due to their differences in global warming potential (described above) and lifespans in the atmosphere. For example, CO<sub>2</sub> proper may last 50 to 200 years in the atmosphere while methane has an average atmospheric life time of 12 years (USEPA 2010a, as cited in the 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](http://assets.opencrs.com/rpts/RL34272_20071205.pdf), Ramseur 2007). Montana, North Dakota, and South Dakota combine for 1.8 percent of the U.S.'s GHG emissions.

Some information and projections of impacts beyond the project scale are becoming increasingly available. Chapter 3 of the Climate Change SIR describes impacts of climate change in detail at various scales, including the state scale when appropriate. The following bullet points summarize potential changes identified by the EPA (EPA 2008) that are expected to occur at the regional scale, where the Proposed Action and its alternatives are to take place. The EPA identifies this area as part of the Mountain West and Great Plains region (<http://www.epa.gov/Region8/climatechange/pdf/ClimateChange101FINAL.pdf>):

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

Other impacts could include:

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

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

- Large-scale shifts have already occurred in the ranges of species and the timing of the seasons and animal migrations. These shifts are likely to continue (USGCRP 2009, as cited by 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-21<sup>st</sup> century and between 5 to 9°F at the end of the 21<sup>st</sup> century. As the mean temperature rises, more heat waves are predicted to occur. In the late 21<sup>st</sup> 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 analysis area, it is impossible to predict precisely when they could occur. The following example summarizing climate data for the West North Central Region (MT, ND, SD, and WY) illustrates this point at the regional scale. A potential regional effect of climate change is earlier snowmelt and associated runoff. This is directly related to spring-time temperatures. Over a 112-year record, overall warming is clearly evident with temperatures increasing 0.21 degrees per decade (Figure E). 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 F). This example is not an anomaly, as several other

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.

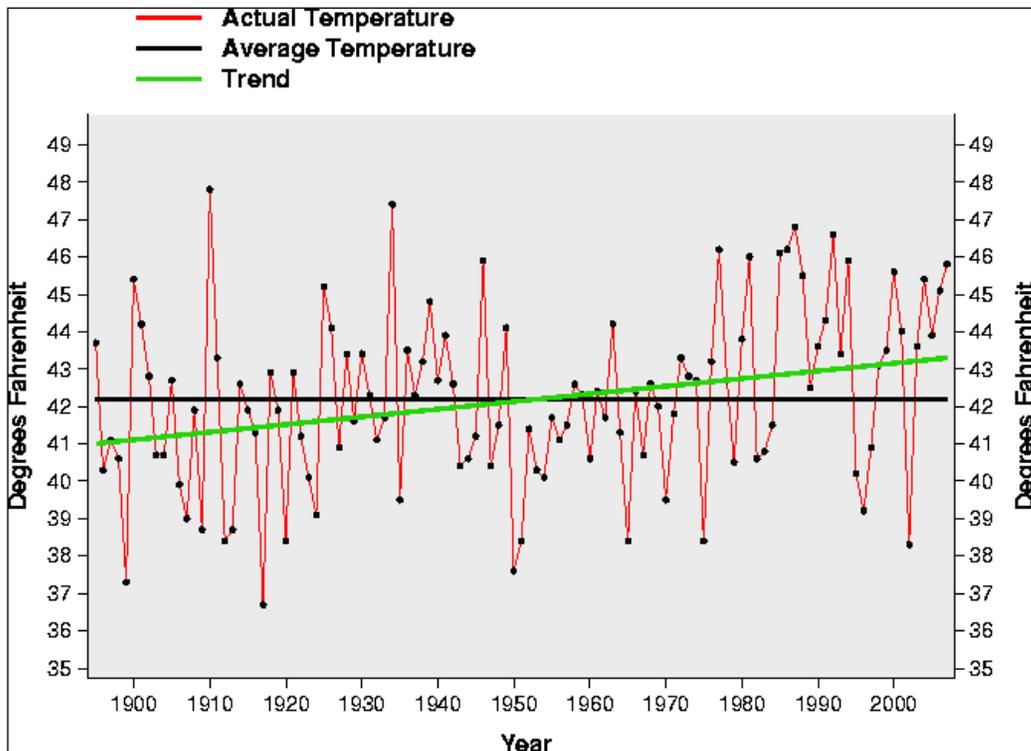


Figure E. Regional climate summary of spring temperatures (March-May) for the West North Central Region (MT, ND, SD, WY), from 1895-2007. (Source: NOAA website – <http://www.ncdc.noaa.gov/oa/climate/research/cag3/wn.html>)

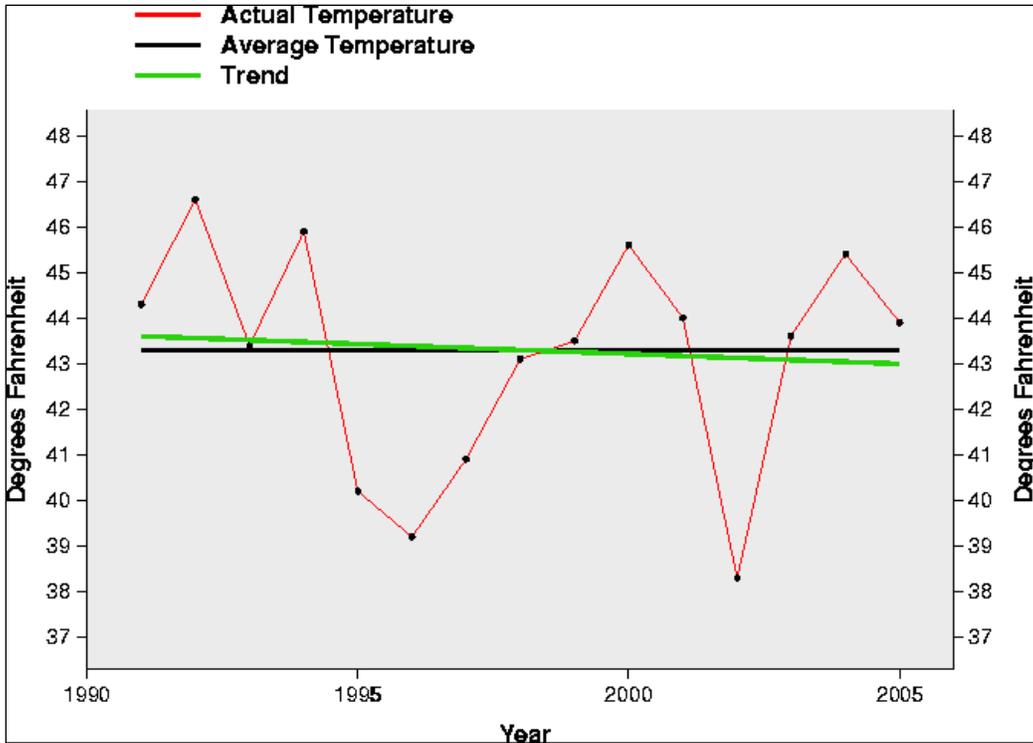


Figure F. Regional climate summary of spring temperatures (March-May) for the West North Central Region (MT, ND, SD, WY), from 1991-2005. (Source: NOAA website – <http://www.ncdc.noaa.gov/oa/climate/research/cag3/wn.html>)

### 3.3 Soil Resources

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

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

The Proposed Action is located within three watersheds [HUC 8 (Hydrological Unit Code); subbasins]: Middle Musselshell River (10040202), Upper Musselshell River (HUC 10040201), and Upper Yellowstone River-Big Lake Basin (HUC 10070004). The acreage of the lease parcels comprises approximately 0.01 percent, 0.03 percent, and 0.03 percent of each watershed, respectively (USGS 2009). The following describes the common soil properties of lease parcels within each watershed:

The Middle Musselshell River watershed contains proposed parcels MTM 97300 L3, L9, N6, and NT. Parcel soils generally developed from residuum weathered from sedimentary rock of the Fort Union Formation. Surface textures are typically loams. Terrain within the parcels is hilly, with slopes ranging around 15 percent; however slopes reach about 65 percent. Elevation is approximately 2,900 feet. Approximately 51 percent (158 acres) of the parcels are considered poorly suited to reclamation.

The Upper Musselshell River watershed contains proposed parcels MTM 97300 LA and LB. Parcel soils generally developed from loamy residuum weathered from sandstone and shale from the Hell Creek and Judith River Formations. Ecological sites are typically shallow (Sw, RRU 58AC, 11-14). Surface textures are typically loams. Terrain within the parcels is gentle, with slopes ranging around 15 percent; however slopes reach about 70 percent. Elevation is approximately 4,100 feet. Approximately 57 percent (90 acres) of the parcels are considered poorly suited to reclamation.

The Upper Yellowstone River-Big Lake Basin watershed contains proposed parcel MTM 97300 MS. Parcel soils generally developed from alluvium derived from siltstone from the Judith River and Claggett Formations. Ecological sites are typically shallow clay (Swc, RRU 58AC, 11-14). Surface textures are typically clay loams. Terrain within the parcel is gentle, with slopes ranging around 10 percent; however slopes reach about 60 percent. Elevation is approximately 3,700 feet. Approximately 69 percent (222 acres) of the parcel is considered poorly suited to reclamation. Approximately 2 percent (6 acres) of the parcel is considered prime farmland if irrigated.

### **3.4 Water Resources**

#### **3.4.1 Surface Hydrology**

The Proposed Action is located within 3 watersheds [HUC 8 (Hydrological Unit Code); subbasins]: Middle Musselshell River (10040202), Upper Musselshell River (HUC 10040201), and Upper Yellowstone River-Big Lake Basin (HUC 10070004). The acreage of the lease parcels comprises approximately 0.01%, 0.03%, and 0.03% of each watershed, respectively (USGS 2009).

Surface water resources across Billings FO are present as lakes, reservoirs, rivers, ponds, streams, wetlands, and springs. Water resources are essential to the residents to support agriculture, public water supplies, industry, and recreation beneficial uses. Water resources and riparian areas are crucial to the survival of many BLM-sensitive fish, reptiles, birds, and amphibians. The lease parcels cumulatively contain no known springs, lakes, reservoirs, and ponds (NHD 2009).

Stream morphology is influenced by a number of factors including: stream flow regime, geology, soils, vegetation type, climate, and land use history. Stream conditions reflect a number of historic and current impacts, ranging from agriculture to mining. Perennial streams retain water year-round and have variable flow regimes. Intermittent streams flow during part of the year when they receive sufficient water from springs, groundwater, or surface sources such as snowmelt or storm events. Ephemeral streams flow only in direct response to precipitation.

Intermittent and ephemeral streams play an important role in the hydrologic function of the ecosystems within the lease parcels by transporting water, sediment, nutrients, and debris and providing connectivity within a watershed. They filter sediment, dissipate energy from snowmelt and storm water runoff, facilitate infiltration, and recharge groundwater (Levick et al. 2008). The pools of intermittent streams retain water in the summer months, supporting riparian vegetation and providing water resources for wildlife and livestock.

There are no perennial streams and approximately 4 miles of intermittent and ephemeral streams located within the parcels (Table 3). The Lease Parcels do not contain any streams identified as impaired on the 2010 303 (d)/305(b) Integrated Report (Impaired Streams List) by the Montana Department of Environmental Quality (MDEQ). These streams are intermittent, with the nearest connectivity to perennial water from 1.2 to 9.5 miles down stream (Table 3).

**Table 3. Streams Located within Lease Parcels**

Lease Parcel	Name	Stream Type	Total Miles	Approx. Distance to Perennial Water
MTM 97300-L9	Unnamed	Intermittent/ephemeral	0.01	6.5 miles
MTM 97300-LA	Unnamed	Intermittent/ephemeral	0.79	9.5 miles
MTM 97300-LB	Unnamed	Intermittent/ephemeral	0.36	5.4 miles
MTM 97300-MS	Unnamed	Intermittent/ephemeral	1.70	6.5 miles
MTM 97300-N6	Unnamed	Intermittent/ephemeral	0.27	7.5 miles
MTM 97300-NT	Unnamed	Intermittent/ephemeral	0.91	1.2 miles

(Source: NHD, 2009)

Floodplain function is essential to watershed function; water quality; soil development; stream morphology; and wetland and riparian community composition (Scott et al. 1997). Floodplains reduce flood peaks and velocities thereby reducing erosion; enhance nutrient cycling; reduce frequency and duration of low flows; and increase infiltration, water storage, and aquifer recharge. Floodplains enhance water quality by facilitating sedimentation and filtering overland flow. Floodplains support high plant productivity, high biodiversity, and habitat for wildlife. Periodic flooding is essential to riparian communities of active floodplains (Eubanks 2004). The lease parcel MTM 97300-N6 contains 0.07 acres of 100-year floodplains.

Any beneficial use of produced water requires water rights to be issued by Montana Department of Natural Resources and Conservation (MDNRC) as established by law. This water has been used for watering stock, irrigation, drilling operations, and industrial applications. The majority of the CBNG-produced water is pumped into temporary ponds, where the water evaporates or could potentially infiltrate the soil or shallow aquifers.

### 3.4.2 Groundwater

The quality and availability of ground water varies greatly across the three state region (Montana, North Dakota, and South Dakota). Aquifers in western Montana are typically in unconsolidated, alluvial valley-fill materials within intermontane valleys. The intermontane valley aquifers often yield relatively large quantities of high-quality water to relatively shallow water wells. Because many wells are being constructed in these aquifers as development encroaches, fractured bedrock aquifers surrounding the intermontane valleys are becoming

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

When CBNG is developed, the methane must be desorbed from the coal so that it can flow to production wells. This is typically achieved by pumping groundwater from the coal bed aquifer to reduce the hydrostatic pressure within the coal, creating a pressure gradient within the aquifer which enables methane to flow towards the well. The amount of water produced varies from well to well and annually for each well. As wells operate over time, hydrostatic pressure drawdown occurs within the coal aquifer. For example, in the Canyon coal bed, the hydrostatic pressure has been lowered more than 600 feet, and in the Dietz and Canyon beds, a 20-foot groundwater drawdown extended about 1.0 to 1.5 miles beyond the boundary of the CX field. The quality of CBNG-produced water varies, but is generally characterized by elevated levels of salinity, SAR (36.8 to 66.3), and TDS (up to 2,029 mg/L) (Wheaton et al. 2007).

Any beneficial use of produced water requires water rights to be issued by Montana Department of Natural Resources and Conservation (MDNRC), as established by law. This water has been used for watering stock, irrigation, drilling operations, and industrial applications. Most of the CBNG-produced water is pumped into temporary ponds, where the water evaporates or could potentially infiltrate the soil or shallow aquifers.

### 3.5 Vegetation Resources

#### 3.5.1 Vegetation Communities: Upland

Vegetative resources vary greatly throughout the field office. These variations are a result of soil, geomorphology, precipitation, topography, aspect, and other influences. Table 4 shows the lease parcels, the counties in which they occur, the closest co-op weather station to the lease, and the average annual precipitation for that site.

**Table 4. Average Precipitation Based on the Closest Co-op Weather Station**

Lease Parcel	Lease Parcel County	Co-op Weather Station <sup>1</sup>	Average Annual Precipitation (Inches)	Period of Record
MTM 97300-LA	Sweet Grass	Rapelje 4S	14.31	1908-2010
MTM 97300-LB	Golden Valley	Rapelje 4S	14.31	1908-2010
MTM 97300-MS	Stillwater	Rapelje 4S	14.31	1908-2010
MTM 97300-NT	Musselshell	Melstone	13.81	1909-2010
MTM 97300-L3	Musselshell	Melstone	13.81	1909-2010
MTM 97300-L9	Musselshell	Melstone	13.81	1909-2010
MTM 97300-N6	Musselshell	Melstone	13.81	1909-2010

1. Co-op weather station data was gathered from <http://www.wrcc.dri.edu/summary/Climsmemt.html>

All seven lease parcels are located in precipitation zones which allow for productive vegetative communities. As described above in section 3.3 the soil and geomorphology throughout the lease parcels varies. These variations have resulted in different vegetative communities. Vegetative communities on the western lease parcels (MTM 97300-LA, MTM 97300-LB, MTM 97300-MS) are dominated by short to mid grass species, while lease parcels in Musselshell county have a mixed community of short to mid grass species, as well as a ponderosa pine (*Pinus ponderosa*) overstory.

All lease parcels have been visited by BLM personnel with the exception of MTM 97300-LB. For this analysis it is assumed that vegetation communities on this parcel are similar to vegetation communities on lease parcels MTM 97300-LA and MTM 97300-MS.

The dominant vegetation on each lease parcel is listed in the section below:

MTM 97300-LA: This parcel is dominated by needle-and-thread (*Hesperostipa comata*), blue grama (*Bouteloua gracilis*), prairie junegrass (*Koeleria macrantha*) with decreasing amounts of bluebunch wheatgrass (*Agropyron spicatum*) and green needlegrass (*Nassella viridula*). Drainage bottoms in this lease parcel have increasing amounts of western wheatgrass (*Pascopyrum smithii*), Timothy (*Phleum pratense*). There are areas of snowberry (*Symphoricarpos albus*) and chokecherry (*Prunus virginiana*) in moist areas.

MTM 97300-LB: No site visits were conducted on this lease parcel. Vegetation is expected to be similar to vegetation found on lease parcels MTM 97300-LA and MTM 97300-MS.

MTM 97300-MS: This parcel is dominated by needle-and-thread, green needlegrass, and bluebunch wheatgrass, with decreasing amounts of blue grama, and threadleaf sedge (*Carex filifolia*). Wyoming big sagebrush (*Artemisia tridentata* ssp. *Wyomingensis*) and rabbit brush (*Chrysothamnus nauseosus*) are the dominant shrub components in this community. Drainage bottoms are heavily vegetated with western wheatgrass.

MTM 97300-NT/ MTM 97300-L3: These lease parcels are dominated by bluebunch wheatgrass, needle-and-thread, Japanese brome (*Bromus japonicus*), and western wheatgrass. This area was burned by wildland fire, which has resulted in areas of reduced ponderosa pine cover, and more meadows. Some areas in these lease parcels still are heavily covered with ponderosa pine. These lease parcels have contain a wide spread invasion of dalmatian toadflax (*Linaria dalmatica*), as well as a presence of spotted knapweed (*Centaurea maculosa*), and Canada thistle (*Cirsium arvense*).

MTM 97300-L9/ MTM 97300-N6: These lease parcels are dominated by bluebunch wheatgrass, threadleaf sedge, blue grama, needle-and-thread, and western wheatgrass. Both parcels have areas covered by ponderosa pine.

### **3.5.2 Vegetative Communities: Wetland/Riparian**

Riparian resources exist in two of the lease parcels.

MTM 97300-LA: This lease parcel contains approximately 1.0 acre of wetland/riparian communities. These areas are located in two portions of the parcel, the far SW portion has a 0.1 acre riparian community and the center of the parcel has a 0.8 acre riparian community. These

communities consist of one or two wetland obligates that are not identified due to the timing of the field visit. It is likely they are sedge and or rush species.

MTM 97300-LB: This lease parcel contains approximately 1.9 acres of “stream bottoms” that potentially contain wetland/riparian communities. A field visit was not authorized by the private land owner; 2009 National Agricultural Imagery Program (NAIP) images were used to determine the presence of a riparian community. From the images, it appears there could be a mix of wetland obligate woody and grass species; however this is not verifiable without a field visit.

### **3.5.3 Vegetative Communities: Invasive, Non-Native Species**

The BLM considers plants invasive if they have been introduced into an environment where they did not evolve (BLM national website: <http://www.blm.gov/wo/st/en/prog/more/weeds.html>). Their vigor, combined with a lack of natural enemies, often leads to outbreak populations. Competition from invasive, non-native plants constitutes a potential threat to native plant species and wildlife habitat within the project area. According to Rangeland Health Assessments conducted on grazing allotments within the nominated lease parcels only noted Japanese brome (*Bromus japonicus*) within MTM 97300-L3. Although the Rangeland Health Assessment does not mention the following invasive and non-native species, the following are common to the counties mentioned in this document: crested wheatgrass (*Agropyron cristatum*), cheatgrass (*Bromus tectorum*), foxtail barley (*Hordeum jubatum*), scotch thistle (*Onopordum acanthium*), and Russian olive (*Elaeagnus angustifolia*). Crested wheatgrass was planted as a reclamation planting to protect farmed areas from erosion after many Bankhead-Jones (LU) lands were not proved-up by homesteaders. Approximately 29,727 acres of crested wheatgrass stands exist on BLM lands, primarily in Musselshell and Yellowstone counties. Many of these crested wheatgrass stands remain monocultures of crested wheatgrass with very little vegetation diversity and little wildlife habitat value. As a result, crested wheatgrass has expanded beyond the planting and has become invasive in various wildlife habitats. Cheatgrass, Japanese brome, foxtail barley, scotch thistle, and Russian olive are all aggressive non-native invasive species that out-compete desirable vegetation for water and soil nutrients. These species could 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.

### **3.5.4 Vegetative Communities: Noxious Weeds**

Noxious weeds are any plant species designated by federal or state law or county government as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or non-native, new, or not common to the United States (DOI-BLM, 2007 17 Western State Vegetation Programmatic EIS). Various noxious weeds occur throughout the planning area, the most common of which are: leafy spurge (*Euphorbia esula*), spotted knapweed (*Centaurea maculosa*), Canada thistle (*Cirsium arvense*), field bindweed (*Convolvulus arvensis*), whitetop (*Cardaria draba*), dalmatian toadflax (*Linaria dalmatica*), houndstongue (*Cynoglossum officinale*), and saltcedar (*Tamarix ramosissima*). According to Rangeland Health Assessment conducted on the grazing allotments within the following nominated lease parcels: MTM 97300-NT and L3, both contained dalmatian toadflax which were found throughout the grazing allotment and isolated patches of Canada thistle and spotted knapweed were also noted on the assessment. According to the Rangeland

Health Assessment conducted on the nominated parcel MTM 97300-L9 indicated dalmatian toadflax on the grazing allotment. Noxious weed control is typically the responsibility of the surface owner or lease holder, in cooperation with the local weed boards or county weed departments, when surface disturbance occurs. Typically, Integrated Pest Management (IPM) is the common approach when treating noxious weeds. IPM is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks.

### 3.6 Special Status Species

#### 3.6.1 Special Status Animal Species

##### 3.6.1.1 Terrestrial Wildlife

**Table 5: Analysis Area Occurrence of BLM Terrestrial Sensitive Species and USFWS Threatened, Endangered, Candidate or Proposed Terrestrial Species**

Species	USFWS Status	BLM Status	In Current Range	Suitable Habitat Present
<b>Mammals</b>				
Gray Wolf*	Endangered/Experimental Nonessential (XN)	Special Status Species (SSS)	No	Not applicable (N/A)
Grizzly Bear**	Threatened	Sensitive	No	N/A
Black-footed ferret	Endangered	SSS	Unlikely	Yes
Black-tailed prairie dog	None	Sensitive	Yes	Yes
Swift fox	None	Sensitive	Yes	Yes
Fisher	None	Sensitive	No	NA
Meadow Jumping Mouse	None	Sensitive	Yes	Yes
Great Basin Pocket Mouse	None	Sensitive	No	N/A
North American Wolverine	Candidate	Sensitive	No	N/A
Long-legged Myotis	None	Sensitive	Yes	Yes
Long-eared Myotis	None	Sensitive	Yes	Yes
Fringe-tailed Myotis	None	Sensitive	No	N/A
Pallid bat	None	Sensitive	No	N/A
Townsend's big-eared bat	None	Sensitive	Yes	Yes
White-tailed prairie dog	None	Sensitive	No	N/A
<b>Birds</b>				
Whooping crane – Yellowstone Co. only	Endangered	SSS	Yes	Yes
Mountain plover	Proposed	Sensitive	Yes	Yes
Long-billed curlew	Bird of Conservation Concern (BCC)	Sensitive	Yes	Yes
Bobolink	None	Sensitive	Yes	Yes
Greater sage-grouse	Candidate	Sensitive	Yes	Yes
Burrowing owl	BCC	Sensitive	Yes	Yes
Bald eagle***	BCC	Sensitive	Yes	Yes
Golden eagle	None	Sensitive	Yes	Yes

Species	USFWS Status	BLM Status	In Current Range	Suitable Habitat Present
Ferruginous hawk	None	Sensitive	Yes	Yes
Swainson's hawk	None	Sensitive	Yes	Yes
Peregrine falcon	None	Sensitive	Yes	unlikely
Northern goshawk	None	Sensitive	Yes	possible
Sage thrasher	BCC	Sensitive	Yes	possible
Sprague's pipit	Candidate	Sensitive	Yes	Yes
Loggerhead shrike	BCC	Sensitive	Yes	Yes
Chestnut-collared longspur	BCC	Sensitive	Yes	Yes
McCown's longspur	BCC	Sensitive	Yes	Yes
Baird's sparrow	BCC	Sensitive	Yes	Yes
Brewer's sparrow	BCC	Sensitive	Yes	Yes
LeConte's sparrow	None	Sensitive	Yes	Yes
Nelson's Sharp-tailed sparrow	None	Sensitive	Yes	Yes
Prairie falcon	BCC	None	Yes	Yes
Sage sparrow	BCC	Sensitive	Yes	Yes
Grasshopper sparrow	BCC	None	Yes	Yes
Dickcissel	BCC	Sensitive	Yes	Yes
Blue-gray gnatcatcher	None	Sensitive	No	N/A
Harlequin duck	None	Sensitive	No	N/A
<b>Amphibians</b>				
Northern leopard frog	None	Sensitive	Yes	Yes
<b>Reptiles</b>				
Spiny softshell turtle	None	Sensitive	Yes	Yes
Greater short-horned lizard	None	Sensitive	Yes	Yes
Milk snake	None	Sensitive	Yes	Yes
Western hog-nosed snake	None	Sensitive	Yes	Yes

Table 5 sources: Skarr 2003; Werner, Maxell, Hendricks, and Flath. 2004; Foresman 2001; MTNHP, 2010; BLM, 2009; USDA – NRCS Plants Database, 2010

\*Gray wolf will be moved to the bureau sensitive list if delisted by the USFWS.

\*\*Grizzly bear has been delisted for the Greater Yellowstone ecosystem. In this area it is a Bureau sensitive species.

\*\*\*Bald eagle has been delisted so has been moved to the sensitive list.

### 3.6.2 Threatened, Endangered, Candidate, and Proposed Species

#### Mammals

Black-tailed and White-tailed Prairie Dogs and Black-footed Ferrets

There are no known occurrences of prairie dog towns or black-footed ferrets in or near the lease parcels.

#### Gray Wolf

The threatened gray wolf is present within the planning area and would be addressed because of the possible occasional presence of wolves on public lands. Wolves are considered a nonessential experimental population in this area.

#### Grizzly Bear

The planning area is not within the grizzly bear (*Ursus arctos*) Recovery Zone, but the perimeter of the grizzly bear range is adjacent to public lands along the Beartooth Mountain front or foothills. There have been no grizzly bear observations on public lands within the planning area.

## **Birds**

### **Bald Eagle**

There are no known bald eagle nests or habitat in or near the lease parcels.

### **Mountain Plover**

The mountain plover is associated with short-grass prairie/grasslands (especially those that are heavily grazed and are on level or gently sloping areas) and regularly occupies prairie dog towns. It has been documented that mountain plovers are nesting in the short-grass prairie in the foothills south of the Snowy Mountains. The other documented nesting attempts have been at two locations in southern Carbon County.

### **Sprague's Pipit**

Sprague's pipits were found warranted, but precluded by higher priority actions for listing as a Threatened or Endangered Species (9/15/2010). They are currently considered a Candidate species.

Sprague's pipits are strongly tied to native prairie (land which has never been plowed) throughout their life cycle (Owens and Myres 1973, pp. 705, 708; Davis 2004, pp. 1138-1139; Dechant et al. 1998, pp. 1-2; Dieni et al. 2003, p. 31; McMaster et al. 2005, p. 219 as cited in Federal Register: September 15, 2010 Volume 75, Number 178). They are rarely observed in cropland (Koper et al. 2009, p. 1987; Owens and Myres 1973, pp. 697, 707; Igl et al. 2008, pp. 280, 284 as cited in Federal Register: September 15, 2010 Volume 75, Number 178) or land in the Conservation Reserve Program (a program whereby marginal farmland is planted primarily with grasses) (Higgins et al. 2002, pp. 46-47 as cited in Federal Register: September 15, 2010 Volume 75, Number 178). Sprague's pipits will use nonnative planted grassland (Higgins et al. 2002, pp. 46-47; Dechant et al. 1998, p. 3; Dohms 2009, pp. 77-78, 88 as cited in Federal Register: September 15, 2010 Volume 75, Number 178). Vegetation structure may be a better predictor of occurrence than Species composition (Davis 2004, pp. 1135, 1137 as cited in Federal Register: September 15, 2010 Volume 75, Number 178). Native grassland is disturbance dependant. Without disturbance, the vegetative species mix changes, and grasslands are ultimately overgrown with woody vegetation (Grant et al. 2004, p. 808 as cited in Federal Register: September 15, 2010 Volume 75, Number 178) unsuitable for Sprague's pipits. Montana Natural Heritage Tracker has documented observations of Sprague's pipits in Musselshell, Golden Valley, Wheatland, Sweet Grass, Stillwater, and Yellowstone Counties within the Billings Field Office area. Lease parcels MTM-97300 LA, LB, and MS are in potential habitat. Lease Notice 14-15 will be applied to those parcels.

### **Greater Sage-grouse**

In a recent status review, the FWS (March 2010) determined that the greater sage-grouse was warranted but precluded for listing under the ESA. In 2009, Montana Fish, Wildlife, and Parks (MFWP), developed and designated sage grouse core habitat areas. MFWP Core Area maps were later updated in March, 2011. Greater sage-grouse use a variety of shrub-steppe habitats

throughout their life cycle and are considered obligate users of several sagebrush species (FWS 2005). Primary ongoing threats to greater sage-grouse include loss and deterioration of habitat from such factors as the spread of noxious weeds, infrastructure development, oil and gas development, wildfire, and conifer invasion (FWS 2005).

The planning area includes approximately 3.68 million acres (all ownerships) of greater sage-grouse habitat, which includes approximately 336,000 acres (9.1 percent) on BLM public lands. Parcels MTM 97300- LA and LB could occasionally have sage grouse, although current inventories indicate that there are very low to no sage grouse populations in or near these parcels.

### **BLM-Listed Sensitive Raptors**

BLM-listed sensitive raptors in the planning area include the peregrine falcon, burrowing owl, ferruginous hawk, and Swainson's hawk. Burrowing owls are widely distributed across eastern Montana where they occur in open grasslands and use abandoned mammal burrows (primarily prairie dog and badger) for nesting (MNHP 2005). Ferruginous hawks breed in central Montana but rarely occur in the area during winter. Habitat for these hawks includes grasslands, sagebrush, and other brush lands. The Swainson's hawk breeds throughout Montana, generally nesting in river bottom forests, brushy coulees, and shelterbelts. They hunt in grasslands and agricultural areas, especially along river bottoms (MNHP 2005). Peregrine falcons have five known nest sites within the planning area three of these known nest sites are on BLM public lands. The FWS delisted peregrines from the endangered species list in August 1999, and they remain in the population monitoring phase of delisting.

### **Migratory Birds**

As per EO13186, Responsibilities of Federal Agencies to Protect Migratory Birds, federal agencies are required to address migratory birds in their management activities. A wide variety of migratory birds occurs in the planning area, and species are generally associated with particular habitat types. Migratory birds of the greatest conservation concern are those with declining population trends and/or those associated with uncommon habitats. As identified by the FWS, there are 23 species of Birds of Conservation Concern in 2008 in Montana (FWS 2008). The mountain plover, Sprague's pipit, and burrowing owl are addressed in the earlier part of this section.

Montana Audubon has identified three Important Bird Areas (IBA) in the planning area. One is at Bear Canyon in the foothills of West Pryor Mountain, near the Wyoming border, and two are sagebrush steppe IBAs in North Musselshell County and southern Carbon County. These areas identified by Montana Audubon are primarily for greater sage-grouse and other sagebrush obligate species.

### **3.6.3 Special Status Plant Species**

Special status plant species are those species that require particular management attention due to population or habitat concerns. These include species that are federally listed as threatened and endangered (T&E) species or habitats designated as critical, federally proposed species, proposed critical habitats, federal candidate species, state-listed as T&E, and Montana BLM sensitive species. The BLM accomplishes its special status plant management through coordination with the FWS and the Montana Natural Heritage Program (MNHP).

Bureau sensitive species are those species designated by the state director, usually in cooperation with the state agency responsible for management of the species, and state natural heritage programs. BLM sensitive species are those species that:

- could become endangered in or extirpated from a state, or within a significant portion of its distribution,
- are under status review by the FWS and/or the National Marine Fisheries Service (NMFS),
- are undergoing significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution,
- are undergoing significant current or predicted downward trends in population or density such that federally listed, proposed, candidate, or state-listed status could become necessary,
- typically have small and widely dispersed populations,
- inhabit ecological refugia or other specialized or unique habitats, or
- are state listed but which could be better conserved through application of BLM sensitive species status.

No known sites of federally listed or proposed plant species are in the Billings Field Office planning area. Twenty-three BLM sensitive plant species are known to occur in the Billings Field Office planning area.

Montana natural heritage tracker was queried. No special status plant species populations are known to exist on or in the vicinity of any of the seven lease parcels. All lease parcels have been visited by BLM personnel with the exception of MTM 97300-LB. No special status species were documented on these site visits.

### **3.7 Wildlife**

#### **3.7.1 General Wildlife**

The distribution and abundance of wildlife in the planning area are primarily functions of habitat conditions. Wildlife habitat is best characterized by the various vegetation types found in the leasing area. The diversity of vegetation/habitat types in the leasing area is low (eight types) and ranges from moderate/high cover grasslands to Douglas fir forests. The most common vegetation community in the leasing parcels is grasslands.

Special emphasis areas or habitats include those vegetation types that are either rare, support threatened or otherwise sensitive or declining wildlife species or support a high diversity of native wildlife. The 1984 Billings RMP identified five special emphasis areas or habitats in the planning area, including: crucial habitats for big game, upland game birds and waterfowl; crucial habitats for non-game species of special interest and concern to state or other federal agencies; wetland and riparian habitats; existing or potential fisheries habitat; and habitat for state or federally listed threatened and/or endangered species. These habitats are generally distributed across the planning area.

## **Big Game**

Big game species in the project area include mule deer, white-tailed deer, pronghorn antelope, Rocky Mountain elk, bighorn sheep, and moose. These animals are considered priority species due to the public's interest in them for hunting and aesthetic enjoyment.

### **Mule Deer**

Mule deer are the most abundant big game species in the planning area and use the greatest variety of habitats. An important limiting factor for mule deer, as well as other big game in the area, is the availability of winter range.

### **White-tailed Deer**

Although less abundant than mule deer, white-tailed deer are common in the planning area. White-tailed deer prefer riparian drainage bottoms and conifer areas, but would also use a variety of other habitats.

### **Pronghorn Antelope**

Pronghorn antelope are the second most abundant big game species in the planning area. The animals are generally associated with grasslands and shrublands, but would also use agricultural fields. Public lands provide approximately 13 percent of the more than 1.4 million acres of winter range for the species in the planning area.

### **Rocky Mountain Elk**

Rocky Mountain elk are associated with grasslands, shrublands, woodlands/forests, and riparian/wetlands. The species is common in the Bull Mountains area near Parcels L3, L9, N6, and NT. There is no winter habitat designated within the parcels.

### **Game Birds**

Upland game birds common to the planning area include sharp-tailed grouse, greater sage-grouse, blue grouse, ruffed grouse, wild turkey, ring-necked pheasant, Hungarian partridge, and chukar. Greater sage-grouse is considered a BLM SSS. Similar to big game species, upland game birds are considered priority species due to the public's interest in them for hunting. The primary threats to upland game bird populations in the planning area include habitat loss, habitat fragmentation, possibly West Nile virus, and adverse weather conditions.

Waterfowl species common in the planning area include Canada and snow geese and 18 species of ducks. The presence of open water is the most important factor for waterfowl production. These areas are protected with riparian/wetland stipulations.

### **Non-game Animals**

Various non-game priority species occur in the planning area. Also occurring are an undetermined number of small mammals such as ground squirrels, mice, chipmunks, rabbits, skunks, and raccoons that provide the main prey for raptors and larger carnivores. Those species that are also federally listed or are considered BLM sensitive species are discussed in the Special Status Animal Species section above.

Other priority animals include amphibians, which are considered a priority group of species due to their association with rare habitats (wetlands and riparian areas), their sensitivity to

environmental conditions, global population declines for some species, and the limited knowledge regarding their occurrence and distribution in the planning area. Amphibians known or expected to occur in the planning area include the tiger salamander, plains spadefoot, Great Plains toad, Woodhouse's toad, boreal chorus frog, and northern leopard frog. These species and their habitat are protected with riparian/wetland stipulations.

### **3.8 Cultural Resources**

Cultural resources consist of the material remains of or the locations of past human activities, including traditional cultural properties (TCP) to both past and contemporary Native American communities. Cultural resources within the Billings FO management boundaries represent human occupation throughout two broad periods: the prehistoric and the historic. The prehistoric period began with the arrival of humans to the area around 12,000 years ago and is generally considered to have ended in 1805 when the Lewis and Clark Expedition passed through the area.

Cultural resources relating to the prehistoric period could consist of scatters of flaked and ground stone tools and debris, stone quarry locations, hearths, and other camp debris, stone circles, wooden lodges, and other evidence of domestic structures, occupied or utilized rock shelters and caves, game traps and kill sites, petroglyph and pictographs, stone cairns, and alignments and other features associated with past human activities. Some of these sites contain cultural resource features that are in buried deposits.

The historic period is characterized by the arrival of fur traders and explorers to the area and is the start of the period for which written records exist. Cultural resources within the Billings Field Office management area that are associated with the historic period consist of fur trading posts, homesteads, settlements, historic emigrant and stage trails, Indian war period battle sites, ranch development, railroad installations, mining operations, oil and gas fields, and Native American sites.

The existence of cultural resources within a specific location is determined through examination of existing records, on-the-ground surveys, and subsurface testing of areas that are proposed for disturbance on federal lands and on state and private lands if the proposed disturbance is a result of a federal undertaking. Cultural resources are evaluated on split estate if federal or state minerals are involved.

The Montana State Historic Preservation Office (SHPO) maintains a register of all identified cultural sites within each of Montana's counties, regardless of land ownership, which includes all sites that are listed or eligible for listing on the National Register of Historic Places (NRHP). The SHPO also maintains a database of all cultural resource inventory reports that occurred as a result of cultural inventories throughout the state. A literature and database review for cultural resources was performed to construct an overview of the known cultural resources present in the proposed lease parcels and the cultural resource inventories that have occurred in the proposed lease parcels.

The results of these two reviews are as follows:

### **Cultural Resource Inventory Report Overview:**

In the SHPO's Cultural Resources Annotated Bibliography System (CRABS) only two cultural resource inventories are reported that may have occurred within/partially within, or at least in the same section as the proposed lease parcels. A third report was located in the Billings FO files that include inventory work within two of the parcels. Of the seven proposed leases (MTM 97300- L3, L9, LA, LB, MS, and N6), only three (MTM 97300- L9, MS, and NT) have no record of previous examination for the presence of cultural resources. The total acreage inventoried is unknown because the BLM is only in possession of those reports that are a result of federal undertakings.

Only one of the three cultural resource reports is more than 10 years old. Due to the instability of soils in south-central Montana, a federal undertaking occurring in an area where a cultural inventory took place 10 or more years ago would require a new cultural inventory.

### **Cultural Resource Site Overview:**

A total of three previously recorded cultural sites are documented as occurring in or proximate to the seven proposed lease parcels. All are prehistoric with no evidence of historic activity. Given the small number of sites, it is not surprising that there is little variety in the types of sites represented. Two are stone circle sites. The other is an open camp with evidence of stone tool processing and general domestic activities in the form of a hearth. The only records for the three sites are the SHPO recording forms and require further documentation and possible subsurface testing to evaluate NRHP eligibility.

Historic records include original survey plats from the 1890s-early 1900s (General Land Office Records). While these records primarily document the homesteading process and patent assignment for the region, they also contain information about early transportation systems. Search of these records indicates that no significant transportation developed that are not now obscured by modern roadways.

Of the three previously recorded sites, two are located within the proposed lease sale parcel boundaries and one is about 350ft (106 m) from a lease boundary:

- 24ML0474 – three part open camp site with a hearth and lithic scatter in MTM 97300 N6
- 24SW0702 – several stone rings with no associated portable artifacts in MTM 97300 LA
- 24SW0703 – two tipi rings with no associated portable artifacts about 350 ft from the MTM 97300 LA western boundary

All of these sites are listed as “Unresolved” in the SHPO's Cultural Resources Information System (CRIS) and, therefore are regarded as eligible for nomination to the National Register of Historic Places (NRHP) until more information is provided about their contents, integrity, and potential for yielding important information on local, regional, or national history or prehistory.

The distribution of sites among the parcels is shown in Table 6.

**Table 6. Distribution of Recorded Cultural Sites among the Lease Parcels**

Parcel Number	Site Number	National Register Eligible	Land Status	Description of Site
MTM 97300 LA	24SW0702	Unresolved	BLM	Multiple stone circles
	24SW0703	Unresolved	BLM	Two circles
MTM 97300 N6	24ML0474	Unresolved	BLM	Open camp with hearth and lithic scatter

### **3.9 Native American Religious Concerns**

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

As part of Coordination and Consultation portion of the 2008 Final Supplement to the Montana Statewide Oil and Gas Environmental Impact Statement and Proposed Amendment of the Powder River and Billings Resource Management Plans, extensive government-to-government consultation occurred among the BLM Miles City/Billings Field Offices and the Crow, Northern Cheyenne, and Lower Brule Sioux tribes. This consultation occurred between 2005 and 2008. Readers should refer to that document for more detailed information. This document can be downloaded from the BLM web page at [http://www.blm.gov/eis/mt/milescity\\_seis/fseis/contents.htm](http://www.blm.gov/eis/mt/milescity_seis/fseis/contents.htm)

In preparation for this action notification letters covering this action were sent to the appropriate authorities of the Crow and Northern Cheyenne governments on March 28, 2011 and a second letter on April 21, 2011. Certifications of receipt have been returned for all of the mailings but no comments identifying sensitive traditional cultural properties have been provided as of this time (19 April 2011). Every attempt will be made to accommodate Native American concerns if possible within the tight scheduling of this process.

As a matter of at least getting a general understanding of the potential impacts of the leasing action, we bring attention to the following information. The perspective provided on Native American values is critical to implementation of appropriate protective measures should sensitive properties be found.

As a result of an ethnographic overview (Peterson and Deaver 2002), 12 sensitive site-types known to exist in the project area were defined. These site types are those mentioned by individuals interviewed and from previous investigations known to be the most likely to cause concern in the Indian communities. Most of these site types are also the easiest to document as having traditional cultural values under Criteria A, B, or C. Site types identified include battle and raiding sites, final resting places (burials), cairns, communal kill sites, fasting beds, homesteads, medicine lodges, rock art, settlements, stone rings, spirit homes, and environmental places (landscapes, water, plant gathering areas, fossils, and mineral collection areas/paint sources). Avoidance is the preferred option for all sites of cultural significance.

### **3.9.1 Northern Cheyenne**

Much of the information in this section was summarized from *The Northern Cheyenne Tribe and Its Reservation: A Report to the U.S. Bureau of Land Management and the state of Montana Department of Natural Resources and Conservation* (Northern Cheyenne Tribe 2002).

Through sacred ways and ceremony, the Cheyenne believe that they can harness the spiritual essence as a power to benefit physical existence. If they do not practice traditional culture and beliefs to maintain the balance and cycle, the spiritual essence would not be available to benefit them or maintain the earth system.

With these belief systems, natural resources become culturally and spiritually important, particularly water (with living spirits), plants (considered to be relatives), animals (also relatives), great birds (messengers to the spirits in Blue-Sky Space) and fossil and mineral sources (used in ceremony). Cultural resources such as burials, ceremonial sites (fasting locations, vision quest sites, sweet lodges, and memorials), homes (tipi rings, historic depressions, foundations, and cabins), community and commercial reservation-era sites, military and exploration-related sites and prehistoric sites (lithic scatters, cairns and petroglyphs) are considered sacred to the Northern Cheyenne (BLM 2008: pgs 3-78 and 3-79).

No TCPs were identified in the Billings FO although two were identified in the Miles City (Powder River) planning area (BLM 2008: pg 3-79).

### **3.9.2 Crow**

Much of the information in this section has been summarized from *The Crow Indian Reservation's Natural, Socio-Economic and Cultural Resources Assessment and Conditions Report* (Crow Tribe 2002).

The Crow historical perspective sees time as interlinked so that there is an intimate relationship between the individual and the past. The past (tradition or time) provides the template for the appropriate way to live. The Crow live in constant presence with the past that truly transcends the western concept of time. There are five qualities of time: sacred time, ancient Indian time, historic time, the present, and the future, which have some sequential qualities, but for the Crow, the spirituality of these times is most important.

In this world perception many landscapes and places are sacred. They are sacred because they represent why and how things are done. Sacred sites include cultural material scatters,

petroglyphs, tipi rings, homesteads, burial areas, cairns, communal kills, fasting beds, medicine lodges, rock art, stone rings and settlements. Sacred locations and places include water (springs and rivers), spirit homes (springs, rivers, hills and mountains), landscapes (mountains and topographic features), plant and animal procurement areas, fossil areas, and mineral locations (BLM 2008: pg 3-70).

### **3.10 Paleontology**

Paleontological resources consist of fossil-bearing rock formations containing information that can be interpreted to provide a further understanding about Montana's past. Fossil-bearing rock units underlie the entire planning area. While fossils are relatively rare in most rock layers, there are three geologic formations within the planning area that do contain significant fossil material. Rock units that are known to contain substantial deposits of vertebrate and significant invertebrate fossils are the Fort Union Formation, the Judith River Formation, and the coeval Lance and Hell Creek Formations, herein after referred to as Hell Creek (Lance) Formation. The Judith River and Hell Creek (Lance) Formations are particularly rich in fossil material. Other geological units found in the lease parcels include the Clagett Shale, and the Eagle, Telegraph Creek, and Lennep formations as well as some areas of Quaternary alluvium. Of these, the Clagett Shale and Eagle Formation have some known fossil beds. The Telegraph Creek Formation has not been adequately investigated for paleontological resources to evaluate. The Lennep Formation has no significant paleontological elements.

The Judith River Formation preserves the fossil record from ancient environments including shallow oceans, deltas, rivers, freshwater swamps and lakes. The Judith River Formation contains the fossil remains of plants as well as many animal species including mollusks, fish, amphibians, lizards, small mammals, dinosaurs, and other reptiles.

The Cretaceous Period Hell Creek (Lance) Formation, noted for the occurrence of dinosaur fossils in its beds, preserves the fossil record of a subtropical to tropical environment that was characterized by low plains interrupted by broad swampy bottoms and deltaic areas. Fossil remains from the Hell Creek Formation include a wide variety of plants, mollusks, fish, amphibians, reptiles, birds, small mammals and dinosaurs. Fossil dinosaur remains include *triceratops*, *apatosaurus*, and *tyrannosaurus*. The fossil record of plant and animal communities found within the Hell Creek Formation varies between low moist areas and the drier, upland plains environments that were present in the past. The Castle Butte ACEC, located in Yellowstone County within the Billings RMP area, contains outcrops of the Hell Creek Formation, which are noted for their paleontological resources.

Overlying the Cretaceous Period Hell Creek Formation is the Paleocene Tullock Member of the Fort Union Formation marks an important event in time. The Hell Creek (Lance)-Tullock contact represents a time of worldwide extinction for many animals, most notably the dinosaurs, and the beginning of the rapid evolution of mammals. The fossil record from the Fort Union Formation contains evidence of ancient environments that include streamside swamps, bottomlands, and well-established river courses. Fill within ancient river channels contains fossils of fresh water clams and snails. The Tullock and Tongue River Members are both fossil-bearing units of the Fort Union Formation and contain fossils of turtles, fish, reptiles and mammals.

### Potential Fossil Yield Classification System

The Potential Fossil Yield Classification (PFYC) system (WO-IM-2008-009) is used to classify paleontological resource potential on public lands in order to assess possible resource impacts and mitigation needs for federal actions involving surface disturbance, land tenure adjustments, and land-use planning. This classification system is based on the potential for the occurrence of significant paleontological resources in a geologic unit and the associated risk for impacts to the resource based on federal management actions. It uses geologic units as base data.

Using the PFYC system, geologic units are classified based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher potential (Table 7). Areas with a PFYC rating of three or higher would be inventoried for paleontological resources.

**Table 7. Potential Fossil Yield Classification (PFYC) Description**

PFYC Class	Potential
Class 1	Very Low Potential for Paleontological Resources
Class 2	Low Potential for Paleontological Resources
Class 3	Moderate or Unknown Potential for Paleontological Resources
Class 4	High Potential for Paleontological Resources
Class 5	Very High Potential for Paleontological Resources

Table 8 provides the PFYC class acreage totals for each unit and for the combined lease nominations. The total acreage for PFYC classes 1 and 2 is 14.3 acres, or about 1.8% of the total lease acreages. The remaining 98.2% or 773.3 acres is divided among PFYC classes 3a, 3b, and 5. There are no parcels with Class 4 lands. All of the lease parcels contain geologic units classified as PFYC Class 3a, 3b, 4, and/or 5. In fact, MTM 97300 MS, at 48%, has the lowest percentage of Class 5 land (Table 9). All of the other have in excess of 90 % of their area underlain by units of high fossil yield potential. Any lessee will be required to obtain a professional inventory of the paleontological resources on these leases.

**Table 8. Potential Fossil Yield Classification Acres**

Nominated Lease	Lease (acres)	All PFYC (acres)					
		1	2	3a	3b	4	5
MTM 97300 L3	39.9						39.9
MTM 97300 L9	41.3						41.3
MTM 97300 LA	120.0				9.7		109.2
MTM 97300 LB	40.0		0.8				39.6
MTM 97300 MS	319.9		0.4	143.0	21.9		154.6
MTM 97300 N6	64.4						64.4
MTM 97300 NT	162.8		13.1				149.7
<b>Totals</b>	<b>787.6</b>	<b>0.0</b>	<b>14.3</b>	<b>143.0</b>	<b>31.6</b>	<b>0.0</b>	<b>598.7</b>

**Table 9. Potential Fossil Yield Classification Percentages**

Lease	All PFYC Percentages				
		3a	3b	5	Total
MTM 97300 L3				100%	100%
MTM 97300 L9				100%	100%
MTM 97300 LA			8%	92%	100%
MTM 97300 LB	2%			98%	100%
MTM 97300 MS	1 %	45%	7%	48%	100%
MTM 97300 N6				100%	100%
MTM 97300 NT	8%			92%	100%

There are no known or recorded paleontological locations are in or adjacent to the lease parcels (Hanna 2009).

### 3.11 Visual Resources

Visual Resource Management (VRM) is BLM’s systematic approach to inventorying and managing visual resource values, as mandated by Federal legislation (FLPMA, 1976 and NEPA, 1969). It includes the evaluation of public lands for assignment of inventory classes during Resource Management Plan (RMP) development, as well as the determination of management of Visual Resource Management (VRM) classes and the routine operational management of those classes. The VRM enables the BLM to have a system for managing the human concern for scenery and public acceptance for visible changes to the natural landscape setting. Through this system the BLM is able to objectively measure proposed landscape altering projects for compliance to visual performance standards and apply the use of good design principles to satisfy management objectives.

BLM manages landscapes according to the Visual Resource Management Manual (H-8431-1) VRM Classes establish specific objectives on the management of visual resource values. The VRM objectives set the standards for the planning, design, and evaluation of proposed projects. The VRM classes consider the compatibility between land use decisions and visual values. Management Objectives range from preserving the natural landscape (VRM Class I) to providing for activities which require major modification of the existing landscapes (VRM Class IV).

A Class I VRM area means that the objective is to preserve the existing landscape. This class provides for natural ecological changes, however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract any attention of a casual observer.

The management objective for a Class II VRM is that the existing character of the landscape should be retained. Activities or modifications of the environment should not be evident or attract the attention of the casual observer. Changes caused by management activities must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

The management objective for a Class III VRM area means the level of change to the character of the landscape should be moderate. Changes caused by management activities should not

dominate the view of the casual observer and should not detract from the existing landscape features. Any changes made should repeat the basic elements found in the natural landscape such as form, line, color and texture.

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

Assessing scenic values and determining visual impacts can be a somewhat subjective process. Objectivity and consistency can be greatly increased by using the basic design elements of form, line, color, and texture, which have often been used to describe and evaluate landscapes, to also describe proposed projects. Projects that repeat these design elements are usually in harmony with their surroundings; those that don't create contrast. By adjusting project designs so the elements are repeated, visual impacts can be minimized.

All of the public land parcels in the proposal are currently managed as VRM Class III. Management objectives for this class are consistent with this type of proposal. Should a parcel be leased and an application permit to drill be received, visual management prescriptions would be developed. For non-federal surface lands, BLM does not have the authority to manage for VRM and there is no visual resource inventory of VRM class.

### **3.12 Forest and Woodland Resources**

Evergreen forest habitat types occurring in MTM 97300- NT, L3, L9 and N6 (approximately 304.61 acres) include ponderosa pine (*Pinus ponderosa*). The Lease parcels are located in the Bull Mountains. Ponderosa pine forest types are sparse within the lease parcels in coulees. Moisture (along with soil type, nutrient availability, plant density, topography, and climate) is one of the most important factors affecting plant growth; lack of moisture can have a pronounced influence on overall productivity (Hansen et al. 2008).

Historically, many forests in the analysis area consisted of open and park-like stands of ponderosa pine. Mature stands were dominated by large ponderosa pine trees with an understory of native bunchgrasses and low shrubs. Prior to European settlement, fires ignited by lightning and Native Americans frequently burned throughout the analysis area, with fire return intervals of 35 to 40 years (Arno and Gruell 1983). High-frequency low-intensity fires kept forests open and removed understory vegetation, down material, and tree regeneration; results in irregularly shaped patches and groups of trees varying in size and density across the landscape.

In the early 1900s, implementation of aggressive fire suppression tactics dramatically interrupted the historic role of fire in ponderosa pine ecosystems; resulting in species composition and structural changes and increased stand density levels. Subsequently, vegetative communities shifted towards late successional stage forests and woodlands. Forests and woodlands have declined in overall health and productivity and are less resilient to disturbances. Overstocked forests and woodlands experience increased stress due to competition for growing space (e.g., water, sunlight, and nutrients). Consequently, these conditions have increased the susceptibility of forested areas to insect attacks, disease, and the risk of stand-replacing fires.

Since the late 1800s, intensive grazing in eastern Montana has removed fine grass fuels that historically carried low-intensity fires over large areas each year (Clark and Sampson 1995). As a result of both fire suppression and livestock grazing, juniper became established on sites that were previously grass-covered and maintained by periodic wildfires (Smeins and Fuhlendorf 1997). Trees are now growing on sites where natural disturbance historically limited their presence.

Forest and woodland health within the analysis area will continue to deteriorate without implementation of management treatments to reduce fuel accumulations and restore existing stands to desired conditions by improving the overall vigor, productivity, and resiliency of forested vegetation. Selective thinning and removal of vegetative resources through hand and mechanical methods, or low intensity prescribed burns, would be important management tools for ponderosa pine stands forests.

### 3.13 Livestock Grazing

Currently all seven lease parcels are located on areas used for livestock grazing. Lease parcels MTM 97300-LB and MTM 97300-MS are split estate parcels. These lands are not included in federal grazing allotments, but they are used as private livestock pastures. The table 10, below shows the remaining five lease parcels, and the grazing allotment information associated with the lease parcel.

**Table 10. Grazing Allotments within Nominated Lease Parcels**

Lease Parcel	Allotment #	Kind of Livestock	Number of Livestock	Season of Use	AUM's	Management Category
MTM 97300-LA	5444	Cattle	3	5/1-2/28	30	Custodial
MTM 97300-NT	9712	Cattle	14	10/15-2/26	62	Custodial
MTM 97300-L3	9712	Cattle	14	10/15-2/26	62	Custodial
MTM 97300-L9	9648	Cattle	1	3/1-2/28	7	Custodial
MTM 97300-N6	9740	Cattle	1	3/1-2/28	12	Custodial

On the four grazing allotments there is one range improvement project, spring development on allotment 5444. This improvement was installed in 1953.

### 3.14 Recreation and Travel Management

#### 3.14.1 Recreation

The BLM has an important niche in recreation in Montana, providing opportunities for Off-highway vehicle use, camping, hiking, driving for pleasure, picnicking, hunting, whitewater rafting, wildlife viewing, and a wide variety of other pursuits. This role in outdoor recreation is under stress from changing populations, new technologies, and access issues. Population increases, particularly in the metropolitan area such as Billings, are placing additional demands on recreational use of BLM lands. Current and new forms of recreational activities such as extreme Mountain Biking and traditional uses such as photography, hunting and OHV use, are increasing in popularity. There is also a growing concern for preserving the character and resources upon which this recreation depends.

The BLM Recreational Strategy is to improve access to appropriate recreational opportunities and experiences; ensure a quality experience and enjoyment of natural and cultural resources, and; provide for and receive fair value in recreation.

For the BLM, there has been a shift from activity based to a recreation outcome focused management (OFM) approach, The shift to OFM has required the setting of setting conditions to produce the desired outcome essential to produce the targeted outcome desired by both managers and the public. For the Billings FO these settings are generally more primitive and rugged, require more individual responsibility, and have an overall lower density and demand than lands managed by other agencies. For the lands covered in the proposal, this is the case, with the exception that parcel MTM 97300-MS is located adjacent to the US Fish and Wildlife Hailstone Refuge – a popular local point destination for recreation. These lands are essentially an extension of this refuge however the BLM does not have surface management authority on this parcel.

For the surface lands which BLM does manage, recreational use is extremely low due to access issues. None of the lands serve as core areas for wildlife or as main destinations for recreational use. What use there is, is apparently is mostly related to hunting by adjacent landowners. There are no commercial, competitive, or organized operators conducting recreational activities on any of these parcels. The action of leasing these parcels would not by itself change any recreational opportunity or experience.

### **3.14.2 Travel Management**

Comprehensive travel management is integral to the character of recreational settings. Travel management decisions support planning decisions such as protecting and/or enhancing landscape character. In general BLM policy, travel is permitted on designated or seasonally limited routes, except in established OHV areas open for motorized use. In the Billings FO, travel management takes the existing transportation system created by past resource uses and public access patterns and has created a system to meet the current and future needs for motorized and non-motorized travel based on management objectives. Recreational management objectives and recreation setting prescriptions, including the recreational opportunity spectrum (ROS) and visual resource management (VRM) as well as other resource programs, constrain and guide the kinds and locations of travel routes.

The action of leasing these parcels would not by itself change any recreational opportunity or experience.

### **3.15 Lands and Realty**

Parcels MTM 97300-LB and MTM 97300-MS are split estate (private surface and federal minerals) with no BLM authorized rights-of-way or development. Because of the private surface, Lease Notice 14-1 is not applicable.

Parcels MTM 97300-LA, MTM 97300-NT, MTM 97300-L3, and MTM 97300-L9 are federal surface and minerals with no BLM authorized rights-of-way or development. Lease Notice 14-1 would not be required.

Parcel MTM 97300-N6 involves federal surface and minerals encumbered by multiple BLM authorized rights-of-way, including: NorthWestern Energy, 7.2 kV overhead powerline; Mid-Rivers Telecommunications, buried communications line; Musselshell County, road right-of-way; and the Town of Melstone, two municipal water wells, a water control vault, and associated pipelines.

The above-referenced water wells and facilities provide the sole drinking water supply for the Town of Melstone and were authorized under BLM right-of-way grant MTM 92414 approved on March 27, 2003. The wells were drilled as result of an emergency water situation resulting during the drought years when the Musselshell River stopped flowing and the Town of Melstone was reduced to pumping water out of holes in the river (August 2002).

Primary funding for the Melstone Water System was provided by the U.S. Army Corps of Engineers and a Community Development Block Grant. In 2005, the investment in the Melstone Water System was at \$1,454,000.

Water quality and quantity for the Melstone Water System is closely monitored by the Town of Melstone, U.S. Army Corps of Engineers, and the Montana Department of Environmental Quality. The ability to provide a reliable, continuous supply of water that meets state and federal standards is of paramount concern for the Town of Melstone.

Discussions between the Town of Melstone and the BLM with respect to a Recreation and Public Purposes Act conveyance to the Town have taken place. If this parcel is carried forward, Lease Notice 14-1 would be required.

### **3.16 Minerals**

#### **3.16.1 Fluid Minerals**

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

Currently there are 234 federal oil and gas leases covering approximately 149,829 acres in the Billings FO. The number of acres leased and the number of leases can vary on daily basis as leases are relinquished, expired, or are terminated. 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 11. Numbers of townships, leases acres within those townships, and development activity for all jurisdictions are summarized in Table 12.

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

**Table 11. Existing Development Activity**

	Federal Wells	Private and State Wells
Drilling Well(s)	0	5
Producing Gas Well(s)	11	107
Producing Oil Well(s)	54	134
Water Injection Well(s)	5	44
Shut-in Well(s)	17	186
Temporarily Abandoned Well(s)	1	6

**Table 12. Oil and Gas Leasing and Existing Development within Townships Containing Lease Parcels**

	Golden Valley County	Stillwater County	Sweet Grass County	Musselshell County
Number of Townships Containing Lease Parcels	1	1	1	3
Total Acres Within Applicable Township(s)	23,232	22,520	22,501	61,787
Federal Oil and Gas Minerals	283	2,498	484	5,630
Percent of Township(s)				
Leased Federal Oil and Gas Minerals	0	643	0	0
Percent of Township(s)				
Leased Federal Oil and Gas Minerals Suspended	0	0	0	0
Percent of Township(s)				
Federal Wells	Producing Gas Well(s) 0 Producing Oil Well(s) 0 Water Injection Well(s) 0 Shut-in Well(s) 0 Temporarily Abandoned Well(s) 0	Producing Gas Well(s) 0 Producing Oil Well(s) 0 Water Injection Well(s) 0 Shut-in Well(s) 0 Temporarily Abandoned Well(s) 0	Producing Gas Well(s) 0 Producing Oil Well(s) 0 Water Injection Well(s) 0 Shut-in Well(s) 0 Temporarily Abandoned Well(s) 0	Producing Gas Well(s) 0 Producing Oil Well(s) 0 Water Injection Well(s) 0 Shut-in Well(s) 0 Temporarily Abandoned Well(s) 0
Private and State Wells	Producing Gas Well(s) 0 Producing Oil Well(s) 0 Water Injection Well(s) 0 Shut-in Well(s) 0 Temporarily Abandoned Well(s) 0	Producing Gas Well(s) 0 Producing Oil Well(s) 0 Water Injection Well(s) 0 Shut-in Well(s) 2 Temporarily Abandoned Well(s) 0	Producing Gas Well(s) 5 Producing Oil Well(s) 0 Water Injection Well(s) 0 Shut-in Well(s) 4 Temporarily Abandoned Well(s) 0	Producing Gas Well(s) 0 Producing Oil Well(s) 0 Water Injection Well(s) 0 Shut-in Well(s) 0 Temporarily Abandoned Well(s) 0

### **3.16.2. Solid Minerals**

#### **3.16.2.1. Coal**

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

#### **3.16.2.2. Locatable Minerals**

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

#### **3.16.2.3. Salable Minerals**

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

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

### **3.17 Special Designations** As should be listed as not discussed – currently they are all NL areas

#### **3.17.1 National Historic/Scenic Trails**

There are portions of two National Historic and Scenic Trails which pass through the lands managed by the Billings FO. They are the Lewis and Clark National Historic Trail and the Nez Perce National Historic Trail. Neither of these trails pass through any of the parcels covered in this proposal. There would be no affect.

#### **3.17.2 Areas of Critical Environmental Concern (ACECs)**

The Federal Land Policy and Management Act (FLPMA) requires that priority shall be given to the designation and protection of ACECs. Areas of Critical Environmental Concern are defined in the FLPMA Sec. 103[43 U.S.C 1702] (a) and in 43 C.F.R. 1601.0-5(a) as “areas within the public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards.”

There are no lands which have been nominated in the new RMP for possible designation as an ACEC and there are no lands being currently managed as an ACEC present. There are no affects.

#### **3.17.3 Lands with Wilderness Characteristics**

Principal authorities affecting the consideration of LWCs in the NEPA process are:

- A. The Federal Land Policy and Management Act of 1976, 43 U.S.C. 1701 *et seq.* (FLPMA), exclusive of 43 U.S.C. 1782. FLPMA specifically states that preserving and protecting certain public lands in their natural condition is part of the BLM's mission. *See* 43 U.S.C. 1701(a)(8). FLPMA provides direction for inventories in Sections 102(a)(2), 201(a), and 202(c)(4) and (9).
- B. The Wilderness Act of 1964, 16 U.S.C. 1131 *et seq.*
- C. National Environmental Policy Act of 1969, 42 U.S.C. 4321 *et seq.* (NEPA)
- F. Council on Environmental Quality (CEQ) Regulations, 40 CFR 1500-1508
- G. BLM Regulations, 43 CFR 1601-1610, 43 CFR 2360.0-1 *et seq.*
- H. Secretary's Order 3310, December 23, 2010. Secretary's Order 3310 affirms that the protection of the wilderness characteristics of public lands is a high priority for the BLM, and is an integral component of its multiple use mission.
- I. Department of the Interior (DOI) NEPA Regulations, 43 CFR Part 46

The criteria for inventorying Lands with Wilderness Characteristics are any public lands that are at least 5,000 acres in size, without roads, or adjacent to other federal lands either designated as wilderness or recommended for potential designation as wilderness; where the imprint of man must be substantially unnoticeable; and an opportunity for solitude or primitive and unconfined recreation exists. An important note is that these lands are not managed as designated wilderness, only Congress has that authority, and they are not managed as WSAs, either, since BLMs authority to do so has expired. Management prescriptions for individual parcels of LWC lands are developed in the RMP planning process.

In this proposal, there are no lands which have been found to possess wilderness characteristics present.

### **3.18 Social and Economic Conditions**

#### **3.18.1 Social and Environmental Justice**

The social section focuses on the areas in the immediate vicinity of the leases being examined, which are located in four counties in south central Montana. These counties include: Golden Valley, Musselshell, Stillwater and Sweet Grass. The county seats in the counties where leasing could occur include Ryegate in Golden Valley County (2010 population 245), Roundup in Musselshell County (1,788), Columbus in Stillwater County (1,893), and Big Timber in Sweet Grass County (1,641). In addition, there are other smaller communities in the vicinity of the leases. The county populations range from 884 in Golden Valley County to 3,651 in Sweet Grass County, 4,538 in Musselshell County and 9,117 in Stillwater County. Changes in county population between 2000 and 2010 ranged between a loss of 15% in Golden Valley to an increase of 11% in Stillwater county. Both Musselshell and Sweet Grass Counties gained about 1% during that time period. Population density (persons per square mile) is generally low ranging between 0.8 in Golden Valley County and 5.1 in Stillwater County. These numbers compare to a statewide figure of 6.8. The areas in the vicinity of the leases are home mostly to large cattle ranches. There is an underground coal mine in Musselshell County near Roundup and palladium and platinum mines in Stillwater County. Approximately 46 % of the land being considered is split estate (private or state surface with federal mineral estate).

Oil and gas leasing and/or production are already occurring in all of the counties included in this analysis. However, most current area production occurs in Carbon County, which is located south of Stillwater and to the east of Sweet Grass Counties. The oil and gas industry support services for oil and gas activities in these counties come from Billings and Miles City to the east, and Park County, Wyoming, to the south.

In 2010, the percent American Indian was less than 1.5 percent in the four counties where leasing may occur. The percent of the population living below the poverty level in 2008 ranged from 9.5% in Stillwater County to 18.1% in Musselshell County. The comparison statewide figure for 2008 was 14.1. No Indian Reservations are located in these Counties but the Crow and Northern Cheyenne Reservations are located nearby to the east and southeast of these counties.

The social environment of these counties is described in detail in the Final Supplement to the Montana Statewide Oil and Gas EIS and Proposed Amendment for the Powder River and Billings RMPs, Volume 1 (2008), and the Analysis of the Management Situation (AMS) for the Billings RMP, (2009).

### **3.18.2 Economics**

Certain existing demographic and economic features influence and define the nature of local economic and social activity. Among these features are the local population, the presence and proximity of cities or regional business centers, longstanding industries, infrastructure, predominant land and water features, and unique area amenities. The local economic impact area extends beyond the Field Office boundaries because of economic linkages to areas outside the Field Office boundaries. The affected local economy is made up of eight counties in Montana within the BLM Billings Field Office boundaries (Big Horn, Carbon, Golden Valley, Musselshell, Stillwater, Sweet Grass, Yellowstone, and Wheatland) as well as Park County, WY. Park County, Wyoming is included because of the oil and gas related businesses that are based in Cody and Powell, Wyoming that work in Elk Basin and other oil and gas fields within the Billings Field Office boundaries. While public revenues from oil and gas leasing, rent, and production in Montana are only distributed to those counties in Montana, employment and income effects are spread across the nine counties. The distribution of these economic effects is based on acres leased and levels of production as well as business patterns.

#### **Affected Environment**

The nine-county local economy had an estimated 2009 population of 215,698 people. Total employment was estimated to be 145,362 jobs; there were an estimated 86,230 households; and there were 240 NAICS industrial sectors represented in the local economy (IMPLAN, 2009). The local economy includes Billings (the largest population and business center in Montana) and Cody and Powell, WY (regional oil and gas business and service centers). There were 1.48 people per job within the local economy and 0.59 households per job.

#### **Nature of the Oil and Gas Industry in the Billings Field Office**

In March 2011, BLM had leases in effect covering 149,829 acres within the Billings Field Office boundaries. Annual lease rent is paid on 133,885 acres that are not held by production on leases

with oil/gas being produced from one or more wells. Estimated annual average (2005-2010) lease bonus and rental revenue to the Federal government was about \$600,000 (ONRR, 2011). Lease rent was not paid on 15,955 acres that were held by production. Instead, royalties are paid on oil and gas production from these leases. More Federal leases and more acres were leased in Carbon County than any other county in the Billings Field Office boundary.

Leasing and production of Federal minerals occurs in every county within the planning area except Big Horn and Wheatland. Most Federal oil production occurs in Carbon County; with much smaller amounts in Musselshell, Stillwater, and Yellowstone Counties. The only reported natural gas production from Federal minerals within the Billings Field Office boundary also occurs in Carbon County. While some gas production from Federal minerals does occur in Big Horn County, Montana, this comes from the mineral estate managed by the Miles City BLM office and is not addressed in this analysis.

Local oil and gas exploration, development, and production as well as gas pipeline transmission industry all support jobs and income in the local economy. Local contractors, as well as regional firms from Miles City and Park County, Wyoming, provide most of the contract services to local oil and gas fields. Between 1990 and 2008, there has been an average of one producing well and one dry hole drilled annually on Federal minerals within the Billings Field Office boundary. Currently there are 9 producing gas wells and 60 producing oil wells.

A portion of the oil and gas-related revenues collected by the Federal government is distributed to the state and counties. The amount that is distributed is determined by the Federal authority under which the Federal minerals are being managed. The leased acres changes daily as leases expire and other parcels are leased. Generally, within the field office boundary, public domain Federal minerals account for about 58 percent of the acres leased; acquired lands/minerals known as Bankhead-Jones lands account for about 41 percent of acres leased; and the other authorities for acquired minerals account for less than 1% of Federal leased acres. The leased acres changes daily as leases expire and other parcels are leased.

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

### **Leasing**

Federal oil and gas leases generate a one-time lease bonus bid as well as annual rents. The minimum lease bid is \$2.00 per acre. If parcels do not receive the minimum bids they may be leased later as noncompetitive leases that don't generate bonus bids. Within the Billings Field Office area, bonus bids averaged \$12.54 per acre on Federal leases issued between 2005 and 2010. Average bonus per leased acre ranged from \$0.94 in Yellowstone County to \$19.77 per acre in Carbon County.

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.

Currently, the Federal government collects an estimated annual average of about \$400,000 in lease bids and rent; of which an estimated \$157,000 is distributed to the state/local governments.

### **Production**

Federal oil and gas production in Montana is subject to production taxes or royalties. These Federal oil and gas royalties generally equal 12.5 percent of the value of production (43 CFR 3103.3.1). Forty-nine percent of the royalties from public domain Federal minerals are distributed to the state, of which 25 percent is distributed back to the county of production (Title 17-3-240, MCA).

Between 2005 and 2010, an annual average of 277,662 barrels of oil and 143,099 MCF of natural gas was produced from BLM-administered Federal minerals in the Billings Field Office area. The vast majority of Federal oil production occurred in Carbon County (269,375 bbls) with lesser amounts produced in Musselshell County (8,184 bbls), Stillwater County (63 bbls), and Yellowstone County (40 bbls). All of the gas production (143,099 MCF) from BLM-administered Federal minerals occurred in Carbon County. The average annual royalty value less allowances was \$1.837 million for Federal oil production and \$253,603 for gas Federal gas production. Between 2005 and 2010, average annual Federal royalty revenues were \$2.09 million; and about \$1.08 million of this was disbursed to the state and counties.

### **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 (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 2,362 total jobs and \$187.5 million in total employee compensation and proprietor income in the local economy (IMPLAN, 2009).

Total Federal revenues from Federal oil and gas leasing, rents, and royalty payments within the Billings Field Office boundary are an estimated \$3.2 million. Federal revenues distributed to the state of Montana amount to an estimated \$1.2 million per year. The state redistributes an estimated \$551,000 to the local Montana counties with Federal leases and production within the Billings Field Office boundaries per year. These revenues help fund traditional county functions such as enforcing laws, administering justice, collecting and disbursing tax funds, providing for orderly elections, maintaining roads and highways, providing fire protection, and/or keeping records. Other county functions that may be funded include administering primary and secondary education and operating clinics/hospitals, county libraries, county airports, local landfills, and county health systems.

The estimated annual local economic contribution associated with Federal leases, rents, drilling, production, and royalty payments combined to support about 230 total local jobs and \$13.0 million in local labor income, respectively. This equals about two-tenth of one percent of the local employment and about two-tenths of one 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, professional scientific and technical services, and health care and social assistance. Table 13 shows the current contributions of leasing Federal oil and gas minerals and the associated exploration, development, and production of Federal oil and gas minerals to the local economy.

**Table 13. Current Contributions of Federal Oil and Gas Leasing, Exploration, Development, and Production to the Local Economy**

Industry	Employment (jobs)		Labor Income (Thousands of 2009 dollars)	
	Area Totals	Federal O&G -Related	Area Totals	Federal O&G-Related
Agriculture	7,064	0	\$88,112	\$2
Mining	4,775	108	\$379,399	\$8,620
Utilities	531	1	\$56,150	\$67
Construction	10,830	5	\$435,746	\$206
Manufacturing	4,957	1	\$345,213	\$34
Wholesale Trade	6,016	7	\$358,175	\$395
Transportation & Warehousing	4,438	5	\$219,976	\$241
Retail Trade	16,631	16	\$467,070	\$440
Information	1,978	2	\$86,053	\$91
Finance & Insurance	4,731	5	\$253,628	\$294
Real Estate & Rental & Leasing	5,808	8	\$76,009	\$159
Prof, Scientific, & Tech Services	8,683	18	\$371,315	\$832
Mngt of Companies	434	1	\$25,901	\$79
Admin, Waste Mngt & Rem Serv	7,754	7	\$181,401	\$151
Educational Services	1,302	1	\$23,789	\$23
Health Care & Social Assistance	16,060	14	\$872,812	\$726
Arts, Entertainment, and Rec	4,140	3	\$64,946	\$50
Accommodation & Food Services	11,725	10	\$228,408	\$191
Other Services	9,322	10	\$226,509	\$209
Government	18,184	6	\$1,004,087	\$214
Total	145,362	229	5,764,698	13,026
Federal O&G as Percent of Total	---	0.16%	---	0.23%

IMPLAN, 2009 database

## 4.0 ENVIRONMENTAL IMPACTS

### 4.1 Assumptions and Reasonably Foreseeable Development Scenario Summary

At this stage of the leasing process, the act of leasing parcels would not result in any activity that might affect various resources. Even if lease parcels are leased, it remains unknown whether development would actually occur, and if so, where specific wells would be drilled and where facilities would be placed. This would not be determined until the BLM receives an application for permit to drill (APD) in which detailed information about proposed wells and facilities would

be provided for particular leases. Therefore, this EA discusses potential effects that could occur in the event of development.

Upon receipt of an APD, the BLM would initiate a more site-specific National Environmental Policy Act (NEPA) analysis to more fully analyze and disclose site-specific effects of specifically identified activities. In all potential exploration and development scenarios, the BLM would require the use of best management practices (BMPs) documented in “Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development” (USDI and USDA 2007), also known as the “Gold Book.” The BLM could also identify APD Conditions of Approval (COAs), based on site-specific analysis which could include moving the well location, restrict timing of the project, or require other reasonable measures to minimize adverse impacts (43 CFR 3101.1-2 Surface use rights; Lease Form 3100-11, Section 6) to protect sensitive resources, and to ensure compliance with laws, regulations, and land use plans.

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

This chapter presents the potential environmental, social, and economic effects from the actions described in each alternative in Chapter 2, as well as potential effects from lease exploration and development activities. 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 are identified by resource below. The duration of the possible effects is analyzed and described as either short-term or long-term. Short-term effects generally last less than five years and long-term effects generally last more than five years.

#### **4.1.1 Reasonably Foreseeable Development Scenario Summary**

The RFD scenario (Appendix B) is based on information contained in the February 2010 Billings FO RFD; it is an unpublished report that is available by contacting the Billings FO. The RFD scenario (Appendix B) contains projections of the number of possible oil and gas wells that could be drilled and produced in the Billings FO area and used to analyze projected wells for the 7 nominated lease parcels. Four lease parcels are identified within moderate and three lease parcels are identified within low potential development for coal bed methane. These well numbers are only an estimate based on historical drilling and mineral resources present, and may change in the future if new technology is developed or new fields and formations are discovered. For the RFD scenario (Appendix B), the 7 lease parcels have been analyzed under the following development areas; the Lake Basin Fault Zone, Pole Creek Anticline, Bull Mountain Basin. These areas are identified on Map 2. A detailed description of the RFD forecast in the analysis area is found in Appendix B.

#### **4.1.2 Assumptions for Alternative A (No Action)**

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

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

#### **4.1.3 Analysis Assumptions for Alternative B (Proposed Action)**

By itself, the act of leasing the parcels would have no impact on any natural resources in the area administered by the Billings FO. No surface disturbance would occur as a result of issuing leases. The potential number of acres disturbed by exploration and development activities is shown in Table 24 in Appendix B. The potential acres of disturbance reflect acres typically disturbed by construction, drilling, and production activities, including infrastructure installation through the Billings FO. Typically exploration and development activities and associated acres of disturbance were used as assumptions for analysis purposes in this EA. Standard terms and conditions as well as special stipulations would apply to the lease parcels. All impacts would link to as yet undetermined future levels of lease development.

If the lease parcels are developed, short-term impacts would be stabilized or mitigated rapidly (within two to five years). Long-term impacts are those that would substantially remain for more than five years.

### **4.2 Alternative A (No Action)**

#### **4.2.1 Direct Effects Common to All Resources (not including Economics)**

Under Alternative A, the 7 parcels, 784.61 acres of federal mineral acres (424.61 acres of federal surface and 360 acres of private acres), would not be offered for competitive oil and gas lease sale. Under this alternative, the state and private minerals could still be leased in surrounding areas.

There would be no new impacts from oil and gas exploration or production activities on the federal lease parcel lands. No additional natural gas or crude oil would enter the public markets, and no royalties would accrue to the federal or state treasuries from the parcel lands. The No Action Alternative would result in the continuation of the current land and resource uses on the lease parcels.

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

#### **4.2.2 Economics**

##### **4.2.2.1 Direct and Indirect Effects:**

Economic effects are summarized and displayed in comparative form in Tables 17, 18, 20 and 21. Under Alternative A, none of the nominated parcels would be leased. Consequently, no

federal, state, or local revenues would be generated from leasing, rents, or royalties associated with production. No additional employment or income would be generated from the nominated parcels if none of the parcels are leased.

### **4.3 Alternative B (Proposed Action)**

Under Alternative B, 7 parcels, 784.61 federal mineral acres (424.61 acres of federal surface and 360 acres of private), would be offered for competitive oil and gas lease sale.

#### **4.3.1 Direct Effects Common to All Resources**

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

#### **4.3.2 Indirect Effects Common to All Resources**

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

Typical impacts to resources from oil and gas exploration and development activities such as well sites, roads, facilities, and associated infrastructure are described in the Billings RMP (1984) and its associated environmental impact statement. The Oil & Gas portion of the 1984 Billings RMP was amended by the 1992 Oil & Gas Amendment of the Billings, Powder River, and South Dakota RMPs and Final EIS and the 1994 Record of Decision. The Final Supplement to the Montana Statewide Oil & Gas EIS (2008) and Proposed Amendment of the Powder River and Billings RMPs (FSEIS) amended the 1984 Billings RMP/EIS.

Land Use Plan

### **4.3.3 Air Resources**

#### **4.3.3.1 Direct and Indirect Effects**

##### **4.3.3.1.1 Air Quality**

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

Potential impacts of development could include increased airborne soil particles blown from new well pads or roads; exhaust emissions from drilling equipment, compressors, vehicles, and dehydration and separation facilities, as well as potential releases of GHGs and volatile organic compounds during drilling or production activities. The amount of increased emissions cannot be precisely quantified at this time since it is not known for certain how many wells might be

drilled, the types of equipment needed if a well were to be completed successfully (e.g., compressor, separator, dehydrator), or what technologies may be employed by a given company for drilling any new wells. The degree of impact would also vary according to the characteristics of the geologic formations from which production occurs, as well as the scope of specific activities proposed in an APD.

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

#### 4.3.3.1.2 Greenhouse Gas Emissions at the Billings Field Office and Project Scales

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

Anticipated GHG emissions presented in this section are taken from the Climate Change SIR, 2010. Data are derived from emissions calculators developed by air quality specialists at the BLM National Operations Center in Denver, Colorado, based on methods described in the Climate Change SIR (2010). Based on the assumptions summarized above for the Billings FO RFD, Table 14 discloses projected annual GHG source emissions from BLM-permitted activities associated with the RFD (note: the source year selected to disclose 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 14. BLM Projected Annual Emissions of Greenhouse Gases Associated with Oil and Gas Exploration and Development Activity in the Billings Field Office.**

Source	BLM Long-Term Greenhouse Gas Emissions in tons/year			Emissions (metric tons/yr)
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
Conventional Natural Gas	354.6	5.2	0.0	421.9
*Coal Bed Natural Gas (none forecasted in RFD)	0.0	0.0	0.0	0.0
Oil	8,352.9	53.9	2.3	9,251.1
<b>Total</b>	<b>8,707.5</b>	<b>59.1</b>	<b>2.3</b>	<b>9,673.0</b>

\*Currently there is no CBNG production within the Billings FO (RFD, February 2010 p-17)

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

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

Under Alternative B, approximately 784.61 acres of lease parcels with federal minerals would be leased. These acres constitute approximately 0.11 percent of the total federal mineral estate of approximately 690,000 acres identified in the Billings FO RFD. Therefore, based on the approach described above to estimate GHG emissions, 0.11 percent of the RFD for this EA total estimated BLM emissions of approximately 9,673 metric tons/year would be approximately 11 metric tons/year of CO<sub>2e</sub> if the parcels within Alternative B were to be developed.

#### **4.3.3.1.3 Climate Change**

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

It is currently not possible to know with certainty the net impacts from developing lease parcels on climate. The inconsistency in results of scientific models used to predict climate change at the global scale coupled with the lack of scientific models designed to predict climate change on regional or local scales, limits the ability to quantify potential future impacts of decisions made at this level. It is therefore beyond the scope of existing science to relate a specific source of greenhouse gas emission or sequestration with the creation or mitigation of any specific climate-related environmental effects. Although the effects of greenhouse gas emissions in the global aggregate are well-documented, it is currently impossible to determine what specific effect GHG emissions resulting from a particular activity might have on the environment. For additional information on environmental effects typically attributed to climate change, please refer to the cumulative effects discussion below.

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

#### 4.3.3.2 Mitigation

The BLM encourages industry to incorporate and implement BMPs to reduce impacts to air quality by reducing emissions, surface disturbances, and dust from field production and operations. Measures may also be required as COAs on permits by either the BLM or the applicable state air quality regulatory agency. The BLM also manages venting and flaring of gas from federal wells as described in the provisions of Notice to Lessees (NTL) 4A, Royalty or Compensation for Oil and Gas Lost.

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

- flare or incinerate hydrocarbon gases at high temperatures to reduce emissions of incomplete combustion;
- install emission control equipment of a minimum 95 percent efficiency on all condensate storage batteries;
- install emission control equipment of a minimum 95 percent efficiency on dehydration units, pneumatic pumps, produced water tanks;
- vapor recovery systems where petroleum liquids are stored;
- tier II or greater, natural gas or electric drill rig engines;
- secondary controls on drill rig engines;
- no-bleed pneumatic controllers (most effective and cost effective technologies available for reducing volatile organic compounds (VOCs));
- gas or electric turbines rather than internal combustion engines for compressors;
- nitrogen oxides (NO<sub>x</sub>) emission controls for all new and replaced internal combustion oil and gas field engines;
- water dirt and gravel roads during periods of high use and control speed limits to reduce fugitive dust emissions;
- interim reclamation to re-vegetate areas of the pad not required for production facilities and to reduce the amount of dust from the pads.
- co-locate wells and production facilities to reduce new surface disturbance;
- directional drilling and horizontal completion technologies whereby one well provides access to petroleum resources that would normally require the drilling of several vertical wellbores;
- gas-fired or electrified pump jack engines;
- install velocity tubing strings;
- cleaner technologies on completion activities (i.e. green completions), and other ancillary sources;
- centralized tank batteries and multi-phase gathering systems to reduce truck traffic;
- forward looking infrared (FLIR) technology to detect fugitive emissions; and
- air monitoring for NO<sub>x</sub> and ozone (O<sub>3</sub>).

More specific to reducing GHG emissions, Section 6 of the Climate Change SIR identifies and describes in detail commonly used technologies to reduce methane emissions from natural gas, coal bed natural gas, and oil production operations. Technologies discussed in the Climate Change SIR and as summarized below in Table 15 (reproduced from Table 6-2 in Climate Change SIR 2010), display common methane emission technologies reported under the USEPA

Natural Gas STAR Program and associated emission reduction, cost, maintenance and payback data.

**Table 15. Selected Methane Emission Reductions Reported Under the USEPA Natural Gas STAR Program <sup>1</sup>**

Source Type / Technology	Annual Methane Emission Reduction <sup>1</sup> (Mcf/yr)	Capital Cost Including Installation (\$)	Annual Operating and Maintenance Cost (\$)	Payback (Years or Months)	Payback Gas Price Basis (\$/Mcf)
<b>Wells</b>					
Reduced emission (green) completion	7,000 <sup>2</sup>	\$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
<b>Tanks</b>					
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
<b>Glycol Dehydrators</b>					
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
<b>Pneumatic Devices and Controls</b>					
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
<b>Valves</b>					
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

**Table 15. Selected Methane Emission Reductions Reported Under the USEPA Natural Gas STAR Program <sup>1</sup>**

Source Type / Technology	Annual Methane Emission Reduction <sup>1</sup> (Mcf/yr)	Capital Cost Including Installation (\$)	Annual Operating and Maintenance Cost (\$)	Payback (Years or Months)	Payback Gas Price Basis (\$/Mcf)
<b>Compressors</b>					
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
<b>Flare Installation</b>					
	2,000	>\$10K	>\$1K	None	NR

Source: Multiple USEPA Natural Gas STAR Program documents. Individual documents are referenced in Climate Change SIR (2010).

<sup>1</sup> Unless otherwise noted, emission reductions are given on a per-device basis (e.g., per well, per dehydrator, per valve, etc).

<sup>2</sup> Emission reduction is per completion, rather than per year.

K = 1,000

mo = months

Mcf = thousand cubic feet of methane

NR = not reported

yr = year

In the context of the oil sector, additional mitigation measures to reduce GHG emissions include methane reinjection and CO<sub>2</sub> injection. These measures are discussed in more detail in Section 6.0 of the Climate Change SIR (2010).

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

#### 4.3.4 Soil Resources

##### 4.3.4.1 Direct and Indirect Effects

Leasing the parcels would have no direct impacts on soil resources. Any potential effects from the sale of lease parcels would occur at the time that the leases are developed. Land uses associated with oil and gas exploration and development could cause surface disturbances. Such acts result in reduced ground cover, soil mixing, compaction, or removal, exposing soils to accelerated erosion by wind and water, resulting in the irretrievable loss of topsoil and nutrients and potentially resulting in mass movement or sedimentation. Surface disturbances also change soil structure, heterogeneity (variable characteristics), temperature regimes, nutrient cycling, biotic richness, and diversity. Along with this, mixed soils have decreased bulk density, and altered porosity, infiltration, air-water relationships, salt content, and pH (Perrow and Davy,

2003; Bainbridge 2007). Soil compaction results in increased bulk density, and reduced porosity, infiltration, moisture, air, nutrient cycling, productivity, and biotic activity (Logan 2001; 2003; 2007). Altering such characteristics reduces the soil system's ability to withstand future disturbances (e.g., wildfire, drought, high precipitation events, etc.).

The probability and magnitude of these effects are dependent upon local site characteristics, climatic events, and the specific mitigation applied to the project. Within 2-5 years following reclamation, vegetative cover and rates of erosion would return to pre-disturbance conditions (FSEIS 2008). Exceptions would be sites poorly suited to reclamation (approximately 470 acres, 60 percent of the parcels), which would require unconventional and/or site-specific reclamation measures. Prime farmland if irrigated (approximately 6 acres, 0.8 percent of the parcels) would be avoided or require site-specific reclamation as well.

#### **4.3.4.2 Mitigation**

Measures would be taken to reduce, avoid, or minimize potential impacts to soil resources from exploration and development activities. Prior to authorization, proposed actions would be evaluated on a case-by-case basis and would be subject to mitigation measures in order to maintain the soil system. Mitigation could include avoiding areas poorly suited to reclamation, limiting the total area of disturbance, rapid reclamation, erosion/sediment control, soil salvage, decompaction, revegetation, weed control, slope stabilization, surface roughening, and fencing.

Conducting oil and gas development with the following BMPs would enhance soil resilience and reduce soil system fragmentation, accelerated wind and water erosion, and the total area of surface disturbance with the following:

- utilizing plans of development,
- removing vegetation in the smallest area possible,
- co-locating infrastructure,
- using a single trench for utilities and piping,
- employing multiple completions per well bore and directional drilling,
- closed-loop drilling or other pit-less methods,
- ensuring reclamation of all new roads at the end of the life of the well,
- preventing degradation of the watershed from produced water,
- designing impoundments or water disposal methods to minimize impacts to soil; and initiating interim reclamation within 25 days of drilling the well.

#### **4.3.5 Water Resources**

##### **4.3.5.1 Direct and Indirect Effects**

Leasing the parcels would have no direct impacts on water resources. Any potential effects to water resources would occur from subsequent exploration/development of the 7 lease parcels over the entire project area as described in Chapter 3. Stipulations applied to steep slopes, waterbodies, streams, 100-year floodplains of major rivers, riparian areas, and wetlands would minimize potential impacts (refer to Appendix A). The magnitude of the impacts to water resources would be dependent on the specific activity, season, proximity to waterbodies, location in the watershed, upland and riparian vegetation condition, effectiveness of mitigation, and the time until reclamation success. Surface disturbance effects typically are localized, short-term,

and occur from implementation through vegetation reestablishment. As acres of surface-disturbance increase within a watershed, so could the effects on water resources.

Oil and gas exploration/development of a lease parcel could cause the removal of vegetation, soil compaction, and soil disturbance in uplands within the watershed, 100-year floodplains of non-major streams, and non-riparian, ephemeral waterbodies. The potential effects from these activities could be accelerated erosion, increased overland flow, decreased infiltration, increased water temperature, channelization, and water quality degradation associated with increased sedimentation, turbidity, nutrients, metals, and other pollutants. Erosion potential can be further increased in the long term by soil compaction and low permeability surfacing (e.g. roads and well pads) which increases the energy and amount of overland flow and decreases infiltration, which in turn changes flow characteristics, reduces groundwater recharge, and increases sedimentation and erosion (DEQ 2007).

Spills or produced fluids could potentially impact surface and ground water resources in the long term. Oil and gas exploration/development could contaminate aquifers with salts, drilling fluids, fluids and gases from other formations, detergents, solvents, hydrocarbons, metals, and nutrients; change vertical and horizontal aquifer permeability; and increase hydrologic communication with adjacent aquifers (EPA 2004). Potential groundwater impacts could also result from post development casing failures. These situations are normally mitigated by downhole engineering requirements and inspection at the time of construction, however unforeseen material flaws or pressure conditions may be encountered. Groundwater abstraction would result in a depletion of flow in nearby streams and springs if the aquifer is hydraulically connected to such features. Typically produced water from conventional oil and gas wells is from a depth below useable aquifers or coal seams (FSEIS 2008).

#### **4.3.5.2 Mitigation**

In the event of exploration or development, measures would be taken to reduce, avoid, or minimize potential impacts to water resources including application of appropriate mitigation. Mitigation measures that minimize the total area of disturbance, control wind and water erosion, reduce soil compaction, maintain vegetative cover, control nonnative species, and expedite rapid reclamation (including interim reclamation) would maintain water resources. Methods to reduce erosion and sedimentation could include: reducing surface disturbance acres; installing and maintaining adequate erosion control; proper road design, road surfacing, and culvert design; road/infrastructure maintenance; use of low water crossings; and use of isolated or bore crossing (HDD) methods for waterbodies and floodplains. In addition, applying mitigation to maintain adequate, undisturbed, vegetated buffer zones around waterbodies and floodplains could reduce sedimentation and maintain water quality. Appropriate well completion, the use of Spill Prevention Plans, and Underground Injection Control (UIC) regulations would mitigate groundwater impacts. Site-specific mitigation and reclamation measures would be described in the COAs.

#### **4.3.6 Vegetation Resources**

##### **4.3.6.1 Direct and Indirect Effects**

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

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

Other direct impacts, such as invasive species and noxious weed invasion could result in loss of desirable vegetation. Invasive species and noxious weeds may also reduce livestock grazing forage, wildlife habitat quality, and native species diversity. Cheatgrass is an invasive species well known for completely replacing native vegetation and changing fire regimes.

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

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

Oil and gas development activity would reduce BLM's ability to manage livestock grazing while meeting or progressing towards meeting the Standards of Rangeland Health. Development and associated disturbances would reduce available forage or alter livestock distribution leading to overgrazing or other localized excess grazing impacts. Construction of roads, especially in areas of rough topography can cause significant changes in livestock movement and fragment suitable habitat for some plant communities. Where grazing activity contributes to not meeting the Standards for Rangeland Health, the authorized officer must adjust grazing practices or levels of use prior to the next grazing season.

If development activity is reducing vegetative resources for livestock grazing and the grazing activity is resulting in the allotment not meeting the standards for rangeland health, then the authorized officer would have to take action prior to the next grazing season to ensure the BLM lands are progressing towards meeting the standards. This would result in the change of livestock grazing activities in order to improve vegetative conditions.

#### **4.3.6.1.1 Invasive, Non-Native Species**

At the lease sale stage 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.

Direct impacts would occur during oil and gas development. Impacts associated with oil and gas development to non-native and invasive weeds would include ground disturbance and creating vectors for dispersal. Ground disturbance from drill site development could create invasive, non-native species habitat. Vectors create invasive weed seed movement from vehicles and equipment to sites which were not previously infested.

Indirect impacts associated with oil and gas development would include ecological changes as a result from the spread of invasive non-native weeds. If proper management does not occur and these invasive species becomes established, they could alter a plant community, which would then affect wildlife habitat. Dense infestations of weed species can lead to increased fire frequency and intensity of Wildland fire.

#### **4.3.6.1.2 Noxious Weeds**

At the lease sale stage 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.

Direct impacts would occur during oil and gas development. Noxious weed species are highly competitive and could invade plant communities very rapidly. The spread of noxious weeds would have a negative impact on vegetative composition. This negative impact could be both short and long term depending upon the effectiveness and timing of control measures.

The construction of access roads and well pad could unintentionally contribute to the establishment and spread of noxious weeds. Noxious weed seed could be carried to and from the project areas by construction equipment, drilling rigs, and transport vehicles.

The main mechanism for invasive weed seed dispersion on roads and well pads is by equipment and vehicles that were previously used and/or driven across or through noxious weed infested areas. The potential for the dissemination of invasive and noxious weed seed may be elevated by the use of construction equipment typically contracted out to companies that may be from other geographic areas in the region. Washing and decontaminating equipments prior to transporting from site to site would minimize this impact.

#### **4.3.6.2 Mitigation**

Mitigation would be addressed at the site specific APD stage of exploration and development. If needed, COAs would potentially include revegetation with desirable plant species, soil enhancement practices, direct live haul of soil material for seed bank revegetation, reduction of livestock grazing, fencing of reclaimed areas, and the use of seeding strategies consisting of native grasses, forbs, and shrubs, would be identified and addressed at the APD stage. During development, all equipment would be cleaned and free of unwanted plant species, and sites would be monitored for the presence of noxious and invasive species. Small populations of noxious weeds should be eradicated as they appear.

### **4.3.7 Riparian-Wetland Habitats**

#### **4.3.7.1 Direct and Indirect Effects**

Leasing the parcels would have no direct impacts on riparian-wetland habitats. Any potential effects on riparian-wetland habitats from sale of lease parcels would occur at the time the leases are developed. The total acreage of riparian areas within the proposed lease parcels is 2.9 acres. Leasing stipulation 11-2 will be applied to parcels MTM 97300-LA and MTM 97300-LB, restricting surface disturbing activities from riparian areas, wetlands, streams and waterbodies in those parcels.

The exploration and development of oil and gas within uplands or adjacent to riparian-wetland areas could reduce riparian/wetland functionality by changing native plant productivity, composition, richness, and diversity; accelerating erosion; increasing sedimentation; and changing hydrologic characteristics. Impacts that reduce the functioning condition of riparian and wetland areas would impair the ability of riparian/wetland areas to reduce nonpoint source pollution (MDEQ 2007) and provide other ecosystem benefits. The magnitude of these effects would be dependent on the specific activity, season, proximity to riparian-wetland areas, location in the watershed, upland and riparian-wetland vegetation condition, mitigation applied, and the time until reclamation success. Erosion increases typically are localized, short term, and occur from implementation through vegetation reestablishment. As acres of surface-disturbance increase within a watershed, so would the effects on riparian-wetland resources. Project planning, design and mitigation measures would ensure riparian functionality would be maintained at current levels. Impacts that reduce the PFC rating of a riparian area would not be allowed.

#### **4.3.7.2 Mitigation**

Stipulations addressing steep slopes, waterbodies, streams, 100-year floodplains of major rivers, riparian areas, and wetlands would minimize potential impacts to maintain riparian functional ratings and would be included with the lease when necessary (refer to Appendix A). In the event of exploration or development, site-specific mitigation measures would be identified which would avoid or minimize potential impacts to riparian-wetland areas at the APD stage. Mitigation measures that minimize the total area of disturbance, control wind and water erosion, reduce soil compaction, maintain vegetative cover, control nonnative species, maintain biodiversity, maintain vegetated buffer zones, and expedite rapid reclamation (including interim reclamation) would maintain riparian/wetland resources.

### **4.3.8 Wildlife**

#### **4.3.8.1 Direct and Indirect Effects**

Leasing the 7 parcels would have no direct impacts on wildlife. Any potential effects on wildlife from sale of lease parcels would occur at the time the leases are developed.

The use of standard lease terms and stipulations on these lands (refer to Appendix A) would minimize, but not preclude impacts to wildlife. Oil and gas development which results in surface disturbance could directly and indirectly impact aquatic and terrestrial wildlife species. These impacts could include loss or reduction in suitability of habitat, improved habitat for undesirable (non-native) competitors, species or community shift to species or communities more tolerant of disturbances, nest abandonment, mortalities resulting from collisions with vehicles and power

lines, electrocutions from power lines, barriers to species migration, habitat fragmentation, increased predation, habitat avoidance, and displacement of wildlife species resulting from human presence. The scale, location, and pace of development, combined with implementation of mitigation measures and the specific tolerance of the species to human disturbance all influence the severity of impacts to wildlife species and habitats, including Threatened, Endangered, Candidate, Proposed, and other special status species.

Suitable habitat within various lease parcels exists to support USFWS Threatened, Endangered, Proposed, or Candidate species including the mountain plover, Sprague’s pipit, and a remote possibility for sage grouse.

**4.3.8.1.1 Threatened, Endangered Proposed, and Candidate Species  
Threatened and Endangered Species Consultation**

The Biological Opinion from the Billings RMP/EIS ROD -4/23/1984, pg. 100-102; Biological Assessment / Opinion from Miles City District, Oil and Gas RMP/ EIS Amendment -12/1992, pg. 237-243; and Backlog Consultation of 5/8/2008, pg. 1-33 and Biological Opinion 5/20/2008 with US Fish and Wildlife Service address possible effects to T&E Species including grizzly bear, gray wolf, lynx, black-footed ferret, peregrine falcon, and bald eagle within Billings Field Office. Refer to the “Affected Environment, Chapter 3” for the current status of these species.

**Summary of determinations for the Billing FO RMP- (5/8/2008-Backlog Consultation)**

The following is a summary of the effects determinations on T & E species, developed for each of the Billings RMP management actions (Table 16). Determinations apply to all T&E Species listed in the Billings Field Office unless indicated otherwise.

**Table 16. Threatened and Endangered, Proposed and Candidate Wildlife Species Summary of Determinations for the Billings FO RMP**

<b>T &amp; E Species</b>	<b>Determination</b>
Black-footed ferret	May Affect, Not Likely to Adversely Affect
Gray Wolf	May Affect, Not Likely to Adversely Affect
Grizzly Bear	May Affect, Not Likely to Adversely Affect
Lynx	May Affect, Not Likely to Adversely Affect
Whooping Crane	No Affect

<b>Resource &amp; Species</b>	<b>Determination</b>
Geology & Minerals	
Whooping Crane	No Affect
Grizzly Bears, Grey Wolf, Lynx	May Affect, Not Likely to Adversely Affect
Black-footed ferret	May Affect, Not Likely to Adversely Affect

These determinations would remain valid for these species given the stipulations applied, inventories required, and mitigation implemented at the APD stage of development through Conditions of Approval.

**Whooping Crane:**

Whooping crane is only listed in Yellowstone County within the Billings Field Office area. There are no lease parcels in Yellowstone County, although whooping cranes may be occasional migrants through the project area, any affects are discountable as there is no suitable habitat

available (in the proposed parcels). BLM has determined that the act of issuing leases within the whooping crane migration corridor will not affect the whooping crane. However, impacts to whooping cranes are possible from subsequent oil and gas development activities that would be permitted at the APD stage. At this time, stipulations do not currently exist to protect any known whooping crane migration staging areas. Line strikes, collisions with vehicles, habitat fragmentation, and other anthropogenic activities can disturb, displace, or cause direct mortality of whooping cranes.

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

### **Mountain Plover**

Mountain plover are a "Proposed" species to be listed in the Federal Register under Section 4 of the Endangered Species Act. Breeding and brood-rearing mountain plovers have the potential to make use of open lands in the foothills south of the Snowy Mountains. Potential impacts to mountain plover would include temporary displacement by human activities associated with oilfield construction. Plovers are opportunistic in their foraging and would likely make use of some other foraging area. Any development would have a negligible impact on mountain plovers. Proposed leases are not located in known mountain plover areas.

### **Sprague's pipit**

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

The MS parcel is sagebrush/ grass habitat that would not be preferred habitat for Sprague's pipit due to the shrub cover, but there are large grassland openings that could be considered suitable habitat. Portions of MTM 97300 LA and LB parcels would be considered potential Sprague's pipit habitat due to the presence of short grass prairie habitat. The parcels MTM 97300- LA, LB, and MS parcels will have Lease Notice 14-15 issued with the lease.

Wildlife inventories would be conducted in suitable habitat at APD stage of development to determine the presence or absence of pipits. If pipits are found in the area, informal consultation with USFWS would be initiated, and Conditions of Approval would be applied for the protection of habitat. With the protections described above, development would have a May

Affect, Not Likely to Adversely Affect (MLAA) on Sprague's pipits. Other than these 3 parcels mentioned previously, development would have a negligible impact on Sprague's pipit.

#### **4.3.8.1.2 Other Special Status Species**

As noted, up to 46 wildlife species that BLM has designated as "sensitive" have the potential to occur within the parcel areas. Stipulations are not provided for all BLM sensitive species in the current Resource Management Plans. Stipulations are provided for 10 out of the 46 "non-TE&P" sensitive species. For those species afforded some protections through existing stipulations, impacts would be minimized, but not eliminated. Impacts to BLM sensitive species would be similar to those described above, unless they are afforded protective measures from other regulations such as the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703.) or the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668c). BLM does not consult with the USFWS on "sensitive" species and likewise would not receive terms and conditions from USFWS requiring additional protections of those species.

Numerous species of birds were identified as inhabitants across the analysis area. With the impacts associated with development, it is reasonable to assume there would be impacts to nesting and migrating bird species. The primary impacts to these species would include disturbance of preferred nesting habitats, improved habitat for undesirable competitors and/or a species shift to disturbance associated species, and increased vehicle collisions.

Research in Sublette County, Wyoming on the effects of natural gas development on sagebrush steppe passerines documented negative impacts to sagebrush obligates such as Brewer's sparrows, sage sparrows, and sage thrashers. (Ingelfinger, 2001) The impacts were reported greatest along roads where traffic volumes are high and within 100 meters of these roads. Sagebrush obligates were reduced within these areas by as much as 60%. Sagebrush obligate density was reduced by 50% within 100 meters of a road even when traffic volumes were less than 12 vehicles /day. It would be expected that similar population declines would occur to this guild of species from similar development proposals within sagebrush habitats.

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

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

through the “Waivers, Exceptions, and Modifications” (WEM) process. BLM would coordinate WEMs with USFWS to assure MBTA compliance.

**Raptors:**

All raptor species known to exist within the analysis area are considered migratory under MBTA. No known raptor nest data exists for the lease parcels from BLM, Montana Natural Heritage, or onsite inventories. Nest surveys would be completed at proposed development sites for activities planned between May 1 and August 30. The timbered habitats in parcels L3, N6, NT, or L9, provide potential nesting habitat for raptors. If nest sites are found, mitigation measures would be assigned at the development stage (as Conditions of Approval) to ensure there would be no negative effects to nesting raptors.

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

**Greater sage-grouse:**

Sage grouse is the only other special status species that is offered species specific protections through a stipulation. Under Alternative B, review of habitat from aerial photography, site visits, and inventory records from BLM and Montana Natural Heritage have indicated that there are no sage grouse within the 7 parcels. Only parcel MTM 97300-MS, has potential sagebrush habitat that would be suitable for sage grouse, although no lek sites or observations have been recorded in the vicinity.

**4.3.8.1.3 Other Wildlife**

Onsite visits to the lease parcels identified the presence of antelope, mule deer, elk, coyote, Hungarian partridge, and badger. According to BLM GIS mapping records, there were no crucial or critical habitats identified such as winter range or elk calving, therefore, no protective stipulations would be applied. Possible stipulations would have included timing stipulations that restrict activities during wildlife critical life cycle stages such as breeding, nesting, or crucial winter seasons, and other management guidelines included in CSU stipulations. Refer to Appendix A for a list of stipulations applied to lease parcels.

Although no crucial or critical habitats were identified, some species inhabit the parcel areas occasionally. The types and extent of impacts to wildlife species and habitats from development are similar to those described above for other species. Impacts include loss of habitat from development infrastructure, mortalities resulting from collisions with vehicles and power lines, electrocution on power lines, and displacement of wildlife species from initial disturbance caused by human presence. Indirect impacts would include habitat fragmentation and subsequent vehicle traffic, human presence, and other continual development activities.

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

It is anticipated that some development may occur adjacent to existing disturbances of some type. Depending on proximity and species tolerance, wildlife species within these areas would either have acclimated to the surrounding conditions, previously been displaced by construction activities, or may be caused to be displaced to other areas with or without preferred habitat.

Mule deer would be impacted by this project from habitat fragmentation and disturbance. Development would affect mule deer use of habitat in those areas. Studies conducted in the Pinedale anticline of Wyoming found that mule deer avoided areas in close proximity to well pads with no evidence of well-pad acclimation during 3 out of 4 years. During year 4 of development habitat selection patterns were influenced more by road density, and not proximity of well pads. The authors attributed this to an unusually severe winter, where movement options and available habitat was limited. Densities of mule deer decreased by an estimated 46% within the developed area over the four years, and indirect impacts were observed out to 2.7-3.7 km of well sites. Mule deer distribution shifted toward less preferred and presumably less suitable habitat. (Sawyer et al, 2005) Similar impacts would be expected from development with this proposal.

Elk are present in parcels MTM 97300-L3, L9, N6, and NT that are forest habitat with Ponderosa pine. Elk would be impacted by oil and gas development that fragments undeveloped landscapes. Developments can block natural migration patterns and encroach on wildlife habitat. The results from one study on elk-habitat effectiveness found that when road densities are two miles per square mile, elk are displaced from up to 50% of their habitat. When road densities exceed five to six miles per square mile, elk are unable to use more than 75% of the habitat and may not use any of the potentially available habitat (Lyon 1983). Another study concluded that more than 640 acres of elk habitat can be affected by one mile of road (Perry and Overly 1976).

Pronghorn would be impacted by this project from habitat fragmentation and disturbance. Pronghorn winter range habitat has been identified over 2,922 acres across all lease parcels combined. Preliminary studies in the upper green river basin in Wyoming report that some pronghorn exhibit movement patterns that suggest almost complete avoidance of gas field areas of intensive development in the Jonah field during the winter, whereas pronghorn in the PAPA (Pinedale Anticline Project Area) apparently have not been avoiding human activities. It is speculated that the difference may exist due to different levels in well densities, as the Jonah field was reported as 1 well/57 acres, and the PAPA at 1 well/124 acres. (Berger et al. 2007)

Effects to winter range within existing and future oil and gas development and exploration would be similar to those referenced above and would depend on rate and location of development.

#### **4.3.8.2 Mitigation**

Measures would be taken to prevent, minimize, or mitigate impacts to fish and wildlife animal species from exploration and development activities. Prior to authorization, activities would be evaluated, and the project would be subject to mitigation measures. Mitigation could include rapid revegetation, project relocation, or pre-disturbance wildlife species surveying. If oil and gas development is proposed in suitable habitat for threatened or endangered species, consultation with the USFWS would occur to determine if additional terms and conditions would need to be applied.

#### **4.3.9 Special Status Plant Species**

##### **4.3.9.1 Direct and Indirect Effects**

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

##### **4.3.9.2 Mitigation**

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

#### **4.3.10 Cultural Resources**

##### **4.3.10.1 Direct and Indirect Effects**

Leasing a nominated parcel gives a basic right to the operator to develop the lease. 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.

Indirect effects from surface disturbances associated with exploration and development activities after leasing have the potential to alter the characteristics of a significant cultural or historic property by diminishing the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Other effects to cultural resources from proposed surface disturbance activities include the destruction, damage, or alteration to all or part of the cultural resource and diminishing the property's significant historic features as a result of the introduction of visual, atmospheric, or audible elements. This could include altering or diminishing the elements of a National Register eligible property and diminish an eligible property's eligibility status. Cultural resource investigations associated with development potentially adds to our understanding of the prehistory/history of the area under investigation and discovery of sites that would otherwise remain undiscovered due to burial or omission during

review inventories. Indirect effects to cultural resources within the analysis area by county are as follows:

Lease parcels MTM 97300 L3, L9, N6 and NT are located in Musselshell County and include 304.61 acres. Parcels LA with 120.00 acres, LB with 40.00 acres and MS with 320 acres are located in Sweet Grass, Golden Valley and Stillwater counties respectively. The RFD for this analysis (Appendix B) projects a low rate of development for region of Musselshell County in which parcels MTM 97300 L3, L9 and N6 are located. For parcels LA, LB and MS in the Lake Basin Fault Zone and NT to the east in Musselshell County, a moderate rate of conventional oil and gas well development is anticipated for the immediate future. Consequently, it is unlikely that impacts on cultural or paleontological resources will develop at anything but relatively slow rates allowing the present permitting system to accommodate appropriate protective measures as APDs are submitted.

The foregoing speculations notwithstanding, it must be recognized that 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 inventories associated with development potentially adds to our understanding of the prehistory and history of the area under investigation.

#### **4.3.10.2 Mitigation**

Under Alternative B it is recommended that lease parcels MTM 97300- L3, L9, LA, LB, MS, N6, NT be leased with cultural resource Lease Notice 14-2 and Standard Lease Notice 16-1 both stipulations would reduce the potential impacts. It is further recommended that lease parcels MTM 97300-LA and N6 have attached Lease Notice 14-9 in recognition of the presence of prehistoric archaeological sites eligible for the NRHP in or within 200 meters of the parcel boundaries. See Appendix A for specific legal location description.

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

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

### **4.3.11 Native American Religious Concerns**

#### **4.3.11.1 Direct and Indirect Effects**

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

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

A review of the lease parcels in Appendix A indicates that no previously reported TCPs would be directly or indirectly impacted. For those parcels where no inventory data is available or where no information is available for TCPs, BLM is proposing to apply Standard Lease Notice 16-1 and continuing to seek information from tribal authorities on the presence of TCPs that have not been previously reported.

### **4.3.12 Paleontology**

#### **4.3.12.1 Direct and Indirect Effects**

There would be no impact to paleontological resources as a result of leasing these parcels. It is only when the lease is developed that there is a potential for paleontological resources to be impacted.

For areas known to contain or have the potential to contain paleontological resources (rated at a PFYC 3-5), Once a parcel is leased, the application of standard lease terms (movement of activities by 200 meters or delay of up to 60 days) would protect vulnerable significant paleontological resource values on these lease parcels. In most instances this may be sufficient to provide the necessary protection to paleontological values. However, the application of standard lease terms may not always adequately protect paleontological values. In order to protect paleontological values, paleontological resources management relies on the application of Lease Notice MT-14-12, applied at the leasing phase to provide protection to paleontological resources or at least notification to the lessee that potentially significant paleontological resources are or are likely to be present on the lease parcels should the lease parcel fall within one of the designated PFYC Class 4 or 5 significant geologic formations which have a record of producing significant fossils.

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

#### **4.3.12.2 Mitigation**

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

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

Based on the above analysis, in order to protect potential paleontological values the following Leases are recommended to have the Paleontological Lease Notice, (MT-14-12) applied per guidance identified in Instructional Memorandums 2009-011 and 2008-009. Leases recommended for paleontological lease notice are listed by county: Musselshell County MTM 97300-L3, L9, N6 and NT; Sweet Grass County MTM 97300-LA; Golden Valley County MTM 97300- LB; and Stillwater County MTM 97300 MS . See Appendix A for specific legal description.

#### **4.3.13 Visual Resources**

##### **4.3.13.1 Direct and Indirect Effects**

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

The 5 lease parcels managed by BLM fall into VRM classes III, the remaining 2 lease parcels are split estate (private surface with federal minerals) . BLM has no authority to address visual impacts on federal non-surface lands and there is no visual inventory for those parcels. While the act of leasing federal minerals produces no visual impacts, subsequent development (indirect effects) of a lease parcel would result in some level of modification to the existing landscape.

##### **4.3.13.2 Mitigation**

All new oil and gas development would implement, as appropriate for the site, BLM Best Management Practices for VRM, regardless of the VRM class. This includes, but would not be limited to, proper site selection, reduction of visibility, minimizing disturbance, selecting color(s)/color schemes that blend with the background and reclaiming areas that are not in active use. Repetition of form, line, color and texture when designing projects would reduce contrasts between landscape and development. Wherever practical, no new development would be allowed on ridges or mountain tops. Overall, the goal would be to not reduce the visual qualities or scenic value that currently exists.

Measure would be taken to mitigate the visual impacts within a Class III area to protect the scenic value.

#### **4.3.14 Forest and Woodland Resources**

##### **4.3.14.1 Direct and Indirect Effects**

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

Potential impacts from oil and gas development could include the cutting and subsequent removal of forest and woodland vegetation from drill-site development areas, including roads, pads, reserve and earthen pits, surface facilities, pipelines, and powerlines. The degree of impact would vary according to the precise location of development activities in the parcel area and is directly related to topography, miles of road construction (including right-of-way), standing timber volume per acre, and total acres of surface facilities development. Greater numbers of miles/acres of surface disturbance and steeper slopes with larger cuts and fills within forested areas signify that a greater volume of forest and woodland vegetation would be removed. A total of 304.61 acres of forest and woodland could potentially be impacted by Alternative B.

##### **4.3.14.2 Mitigation**

Measures would be taken to prevent, minimize, or mitigate impacts to forest and woodland resources from exploration and development activities. Prior to authorization, activities would be evaluated on a case-by-case basis, and the project would be subject to mitigation measures. The road construction and maintenance BMPs outlined in the Gold Book are consistent with the Water Quality BMPs for Montana Forests (Logan 2001) which are designed to protect water quality and forest soils. Other mitigation measures could include the artificial planting of bareroot or containerized nursery stock seedlings.

All severed forest and woodland vegetative material would need to be removed or reduced to acceptable standards meeting Montana's Control of Timber Slash and Debris Law (Title 76, Chapter 13, Part 4), commonly referred to as the "Slash" Law; therefore requiring burning, grinding, chipping, burying, or hauling residual debris off-site to a designated landfill or other location for disposal.

#### **4.3.15 Livestock Grazing**

##### **4.3.15.1 Direct and Indirect Effects**

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

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

exploration or development, the success of reclamation, and the type of vegetation removed for the oil and gas activities.

#### **4.3.15.2 Mitigation**

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

#### **4.3.16 Recreation and Travel Management**

##### **4.3.16.1 Direct and Indirect Effects**

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

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

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

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

For those areas with isolated tracks of BLM public lands that generally do not have existing public access, recreation opportunities that occur in these areas are limited to use with adjacent land owner permission or hunting by an outfitter; therefore, oil and gas activities would have little or no impact on recreational experiences in this area.

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

#### **4.3.17 Lands and Realty**

##### **4.3.17.1 Direct and Indirect Effects**

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

Facilities associated with oil and gas development and potential direct and indirect effects on existing surface development were not analyzed on split estate private surface parcels MTM 97300-LB and MTM 97300MS because the BLM has no authority to regulate private property. Lease Notice 14-1 would not be applicable

On parcels MTM 97300-LA, MTM 97300-NT, MTM 97300-L3, and MTM 97300-L9 with federal surface and minerals there would be no direct or indirect effects from oil and gas development to BLM authorized rights-of-way because they are not present. Lease Notice 14-1 would not be required.

Parcel MTM 97300-N6 is encumbered by multiple BLM authorized rights-of-way, including the Melstone Water System. Potential oil and gas development of this parcel could cause disturbance to these existing rights-of-way on federal surface and in particular the subsurface water aquifers (Fox Hills and Lance). Additional rights-of-way could be required across federal surface for “off-lease” or third party facilities required for potential development of the parcel. If this parcel is carried forward, Lease Notice 14-1 would be required.

##### **4.3.17.2 Mitigation**

Measures would need to be taken to avoid disturbance to or impacting the existing rights-of-way on federal surface on parcels MTM 97300-N6 in the event of any exploration and development activities on the leased parcels. Any new “off-lease” or third party rights-of-way required across federal surface for future exploration and/or development of the parcel would be subject to stipulations to protect other resources as determined by environmental analyses which would be completed on a case-by-case basis.

#### **4.3.18 Minerals**

##### **4.3.18.1 Fluid Minerals**

###### **4.3.18.1.1 Direct and Indirect Effects**

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

Issuing a lease provides opportunities to explore for and develop oil and gas. Additional natural gas or crude oil produced from any or all of the 7 parcels would enter the public markets. The production of oil and gas results in the irreversible and irretrievable loss of these resources. Royalties and taxes would accrue to the federal and state treasuries from the lease parcel lands.

There would be a reduction in the known amount of oil and gas resources.

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

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

#### **4.3.18.2 Solid Minerals**

##### **4.3.18.2.1 Direct and Indirect Effects**

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

#### **4.3.20 Social and Economic Conditions**

##### **4.3.20.1 Social**

##### **4.3.20.1.1 Direct and Indirect Effects**

While the act of leasing Federal minerals itself would result in no social impact, subsequent exploration and development may generate impacts to people living near or using the area in the vicinity of the lease. Exploration, drilling or production could create an inconvenience to people living adjacent to leases due to increased traffic and traffic delays, and light, noise and visual impacts. This could be especially noticeable in rural areas where oil and gas development has not occurred previously. The amount of inconvenience would depend of the activity affected, traffic patterns within the area, noise and light levels, length of time and season these activities occur, etc.

Residents living in areas that have been experiencing ongoing population losses may support any increase in revenues and employment to counties associated with oil and gas leasing and development.

There would be no disproportionate effects to low income or minority populations from oil and gas leasing. Coordination with potentially affected Tribes is ongoing and would also occur at the APD stage.

As noted in the Lands and Realty section, parcel MTM 93700 N6 is located on the same parcel of land as BLM right of Way MTM 92414. This right of way is held by the town of Melstone and is the sole source for their municipal water supply. Current infrastructure associated with this right of way includes two wells, pumping facilities, and a water pipeline. Although remote (given advanced drilling technology and engineering), any potential groundwater degradation

associated with oil and gas development that rendered groundwater unfit for human consumption would be considered a significant impact.

#### 4.3.20.2 Economics

The basis for economic impacts is the number of acres leased, rents paid, and level of production by alternative. This is displayed in Table 17. The economic contribution to a local economy is measured by estimating the employment and labor income generated by 1) payments to counties associated with the leasing and rent of federal minerals, 2) royalty payments associated with production of federal oil and gas, and 3) economic activity generated from drilling and associated activities. Activities related to oil and gas leasing, exploration, development, and production form a basic industry that brings money into the state and region and creates jobs in other sectors. Table 18 is a summary of local revenues, employment, income, population, and household impacts of each alternative.

**Table 17. Summary of Anticipated Average Annual Oil and Gas Activity by Alternative**

Activity	Alternative	
	A	B
Acres that would be leased based on this EA	0	785
Lease rental first 5 years (\$1.50/acre)	0	\$589
Lease rental second 5 years (\$2.00/acre)	0	\$785
Bonus bids (avg. \$12.54/acre)	0	\$984
Total annual federal lease and rental revenue	0	\$2,358
Distribution to State/local government	0	\$923
Average annual oil production (bbl)	0	1,455
Average annual gas production (MCF)	0	750
Average annual Federal Oil Royalty (bblx\$91.76x0.125)	0	\$16,692
Average annual Federal gas Royalty (MCFx\$7.65x0.125)	0	\$717
Total average annual Federal O&G royalties	0	\$17,408
Average annual distribution to state/local government	0	\$6,817
Total average annual federal revenues	0	\$19,767
Total average annual state/local revenues	0	\$7,741
Total average annual revenue distributed to counties	0	\$3,455
Average annual total local employment (jobs)	0	2
Average annual total local income (\$1,000)	0	70

**Table 18. Summary Comparison of Estimated Average Annual Economic Impacts**

Alternative	Acres Recommended for Lease	Local Revenue to Counties (\$)	Total Employment (full and part-time jobs)	Total Labor Income (\$1,000)	Change in Population	Change in Number of Households
<b>A</b>	0	0	0	0	0	0
<b>B</b>	785	\$3,455	2	70	3	1

**4.20.1.1 Alternative A (No Action)**

Economic effects are summarized and displayed in comparative form in Table 18, Table 20 and Table 21. With Alternative A none of the parcels considered would be leased. Consequently, no federal, state, or local revenues would be generated from leasing, rents, or royalties associated with production. No employment or income would be generated if none of the parcels are leased.

**Alternative B (Proposed Action)**

**Public Revenues**

Leasing an additional 785 acres of federal minerals (Alternative B) would increase average annual oil and gas leasing and rent revenues to the federal government by an estimated \$ 2,000 (Table 17). Average annual leasing and rent revenues that would be distributed to state/local governments would increase by about \$1,000. Average annual federal oil and gas royalties would increase by an estimated \$17,000 with Alternative B compared to current levels. Average annual royalties distributed to the state/counties would increase by about \$7,000 compared to current levels.

Total average annual federal revenues related to leasing an additional 785 acres of federal minerals and associated annual rent and royalty revenues related to average annual production of federal minerals would amount to about \$20,000. Total average annual revenues from leasing, rent, and royalties distributed to the state and counties would be about \$8,000. Total estimated revenues distributed to the counties would be about \$3,000.

**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 two total jobs (full and part-time) and \$70,000 within the local economy (IMPLAN 2009). There would also be a corresponding increase in local population of less than five people and households.

**Conclusion**

Total federal contribution of Alternative B (leasing an additional 785 acres of federal minerals) and anticipated related exploration, development, and production of oil and gas would have little effect on local population, total local employment, number of households, average income per household, and total personal income. The economic effects would be spread unevenly among

the counties. Leasing the additional 785 acres and anticipated exploration, development, and production under alternative B would provide very little additional funds for county functions such as enforcing laws, administering justice, collecting and disbursing tax funds, providing for orderly elections, maintaining roads and highways, providing fire protection, and keeping records. Other county functions that may get a very small amount of funding include administering primary and secondary education and operating clinics/hospitals, county libraries, county airports, local landfills, and county health systems. Demand for these services would also increase by a very small amount along with the small increase in total local employment and population. Leasing the additional 785 acres and anticipated exploration, development, and production would not change local economic diversity (as indicated by the number of economic sectors), economic dependency (where one or a few industries dominate the economy), or economic stability (as indicated by seasonal unemployment, sporadic population changes and fluctuating income rates) across the entire 16-county area.

#### **4.3.20.2.1 Direct and Indirect Effects**

#### **4.3.21 Cumulative Impacts- Alternative B**

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

#### **4.3.21.1 Past, Present and Reasonably Foreseeable Future Actions**

Past, present, or reasonably foreseeable future actions that affect the same components of the environment as the Proposed Action are: grazing, roads, wildfire and prescribed fire, range improvement projects, utility right-of-ways and other items as presented in the Oil and Gas Amendment (1994) of the Billings RMP, as amended. There are no other major foreseeable future actions, and it is anticipated that the current use of the land would remain the same.

#### **4.3.21.2 Cumulative Impacts by Resource**

Cumulative effects for all resources in the Billings Field Office are described in the 1992 Oil and Gas Amendment of the Billings, Powder River and South Dakota Resource Management Plans and Final Environmental Impact Statement and the 1994 Record of Decision and the 2008 Final Supplement to the Montana Statewide Oil and Gas Environmental Impact with a development alternative for coal bed natural gas production. Anticipated exploration and development activities associated with the lease parcels considered in this EA are within the range of assumptions used and effects described in this cumulative effects analysis for resources other than air, climate, and socio-economics resources. This previous analysis is hereby incorporated by reference for resources other than for air, climate, and socio-economics resources.

#### 4.3.21.2.1 Greenhouse Gas Emissions and Cumulative Impacts on Climate Change

The cumulative effects analysis area is the Billings Field Office, with additional discussion at state-wide, national, and global scales for GHG emissions and climate change.

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

Projected GHG emissions for this project and the Billings FO RFD are compared below with recent, available inventory data at the state, national, and global scales. Greenhouse gas 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 for the sake of providing 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 9,673 metric tons/year CO<sub>2</sub>e. Potential emissions under Alternative B would be approximately 0.11 percent of this total. Table 19 displays projected GHG emissions from non-BLM activities included in the Billings Field Office RFD. Total projected emissions of non-BLM activities in the RFD in Appendix B are 13,696.8 metric tons/year of CO<sub>2</sub>e. When combined with projected annual BLM emissions, this totals 23,369.8 metric tons/year CO<sub>2</sub>e. Potential GHG emissions under Alternative B would be 0.047 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 Billings FO.

**Table 19. Projected non-BLM GHG Emissions Associated with the Billings FO Reasonably Foreseeable Development Scenario for Fluid Mineral Exploration and Development.**

Source	Non-BLM Projected Greenhouse Gas Emissions in tons/year for Billings FO RFD			Emissions (metric tons/yr)
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
Conventional Natural Gas	3,946.6	45.2	0.0	4,445.7
Coal Bed Natural Gas (none forecasted in RFD)	0.0	0.0	0.0	0.0
Oil	8,352.9	53.9	2.30	9,251.1
<b>Total</b>	<b>12,299.5</b>	<b>99.1</b>	<b>2.3</b>	<b>13,696.8</b>

#### 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 (based on 2004 global GHG emission data from the IPCC, summarized in the 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).

Greenhouse gas emissions from all major sectors in Montana in 2005 added up to a total of approximately 36.8 million metric tons of CO<sub>2</sub>e (CCS 2007). Potential emissions from development of lease parcels in Alternative B of this project represent approximately 0.00003 percent of the state-wide total of GHG emissions based on the 2005 state-wide inventory (CCS 2007).

The EPA (USEPA 2010, as summarized by the 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 CO<sub>2</sub> sinks were considered) of CO<sub>2</sub>e in 2008. Potential annual emissions under Alternative B of this project would amount to approximately 0.00000018 percent of gross U.S. total emissions. Global GHG emissions for 2004 (IPCC 2007, summarized by the Climate Change SIR 2010) indicated approximately 49 gigatonnes (10<sup>9</sup> metric tons) of CO<sub>2</sub>e emitted. Potential annual emissions under Alternative B would amount to approximately 0.000000022 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 GHG emissions resulting from a particular activity might have on climate or the environment. If exploration and development occur on the lease parcels considered under Alternative B, potential GHG emissions described above would incrementally contribute to the total volume of GHGs emitted to the atmosphere, and ultimately to climate change.

Mitigation measures identified in the Chapter 4 Air Quality section above may be in place at the APD stage to reduce GHG emissions from potential oil and gas development on lease parcels under 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).

#### **4.3.21.2.2 Cumulative Impacts of Climate Change**

As previously discussed in the Air Quality section of Chapter 4, it is difficult to impossible to identify specific impacts of climate change on specific resources within the analysis area. As summarized in the Climate Change SIR (2010), climate change impacts can be predicted with much more certainty over global or continental scales. Existing models have difficulty reliably simulating and attributing observed temperature changes at small scales. On smaller scales, natural climate variability is relatively larger, making it harder to distinguish changes expected due to external forcings (such as contributions from local activities to GHGs). Uncertainties in local forcings and feedbacks also make it difficult to estimate the contribution of GHG increases to observed small-scale temperature changes (IPCC 2007b, as cited by the Climate Change SIR 2010). Effects of climate change on resources are described in Chapter 3 of this EA and in the Climate Change SIR (2010).

**4.3.21.3 Cumulative Impacts to Wildlife**

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

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

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

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

**4.3.21.4 Cumulative Impacts to Economic Conditions Cumulative Effects for Alternative A (No Action)**

Cumulative economic impacts associated with Alternative A would be similar to those described in the economic section of the Affected Environment. The cumulative effects of federal mineral leasing, exploration, development and production within the local economy are summarized in Table 20 and Table 21. The cumulative demographic and economic characteristics of the local economy would not change if the parcels being considered are not leased.

**Table 20. Summary Comparison of Cumulative Annual Economic Impacts by Alternative**

Activity	Alternative	
	A	B
Existing Acres leased*	149829	149829
<i>Acres that would be leased based on this EA **</i>	0	785

Total acres leased	149829	150614
Acres held by production*	15955	15955
Total acres leased for which lease rents would be paid	133874	134659
Lease rental first 5 years (\$1.50/acre)	\$100,406	\$100,994
Lease rental second 5 years (\$2.00/acre)	\$133,874	\$134,659
Bonus bids (average \$15.43/acre)	\$167,878	\$168,862
Total average annual federal lease and rental revenue	\$402,157	\$404,516
Average annual distribution to State/local government	\$157,485	\$158,408
Average annual oil production (bbl)***	277,662	279,117
Average annual gas production (MCF)***	143,099	143,849
Federal Oil Royalty (bblx\$91.79x0.125)	\$3,185,824	\$3,202,516
Federal gas Royalty (MCFx\$7.65x0.125)	\$136,838	\$137,555
Total Average annual Federal O&G royalties	\$3,322,663	\$3,340,071
Average annual distribution to State/local government	\$1,301,155	\$1,307,972
Total average annual Federal Revenues	\$3,724,820	\$3,744,587
Total average annual State/Local Revenues	\$1,458,640	\$1,466,380
Total average annual revenue distributed to counties	\$651,005	\$654,460

\*LR2000, BLM, April 4, 2011

\*\*RFD, BLM, March 29, 2011

\*\*\*Based on average annual production 2005-2010, Office of Natural Resource Revenue, 2011

**Table 21. Summary Comparison of Cumulative Employment and Income by Major Industry by Alternative**

Industry	Total Jobs Contributed		Total Income Contributed (\$1000)	
	Alt. A	Alt. B	Alt. A	Alt. B
Total Federal Contribution	229	231	13,026	13,096
Percent Change from Current	0.0%	0.5%	0.0%	0.5%

IMPLAN, 2009 database

**Cumulative Effects for Alternative B (Proposed Action)**

The cumulative effects of federal mineral leasing within the local economy as well as the specific effects of leasing an additional 785 acres under Alternative B are summarized in Tables 20 and 21. These tables also display in comparative form the cumulative effects of alternatives A. The total demographic and economic impacts of Alternative B on the local economy would change a relatively small amount with the economic activity associated with leasing an additional 785 acres of federal minerals. Estimated local employment and income associated with federal mineral leasing would increase by less than 0.01 percent.

## 5.0 CONSULTATION AND COORDINATION:

### 5.1 Persons, Agencies, and Organizations Consulted

Coordination with MFWP and USFWS was conducted for the 7 lease parcels being reviewed. BLM has coordinated with MFWP and USFWS in the completion of this EA in order to prepare analysis, identify protective measures, and apply stipulations associated with these parcels being analyzed.

The BLM consults with Native Americans under Section 106 of the National Historic Preservation Act. BLM sent letters to Tribal Chairman/Presidents and THPO or other cultural contacts for the Crow Tribe and Northern Cheyenne Tribe in Montana at the beginning of the 15 day scoping period informing them of the potential for the 7 parcels to be leased and inviting them to submit issues and concerns BLM should consider in the environmental analysis. BLM will send a second letter to the tribes informing them about the 30 day public comment period for the EA and soliciting any information BLM should consider before making a decision whether to offer any or all of the 7 parcels for sale.

Table 22 lists persons, agencies, and organizations who were consulted during development of this EA along with the findings and conclusions associated with consultations.

**Table 22. List of all Persons, Agencies and Organizations Consulted for Purposes of this EA**

Name	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
Montana Fish, Wildlife, and Parks (MFWP), Region 5	I.M. #MT-2008-008, 2/26/2007; MFWP and BLM Guidance on Coordination During Oil and Gas Lease Parcel Reviews	
USFWS	Coordination letter I.M. # MT-2009-039, 2009 Montana/Dakotas special Status Species List.	
Montana State Historic Preservation Office	Repository for cultural inventory reports and cultural site forms for the State of Montana	Consulted SHPO CRIS and CRABS databases for information on cultural inventories and cultural sites within the proposed lease sale parcels.

### 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 March 28, 2011 through April 12, 2011. 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 40 surface owner notification letters were distributed for the oil and gas leasing analysis process in the Billings FO. The written and verbal communication resulted in a total of 2 individual scoping comments pertaining to this EA.

Of the 2 comments, one comment informed BLM of a change in private land ownership from the new surface owner. The second comment was a telephone conversation from a private land owner concerning BLM field visits.

**Table 23. List of Preparers**

Name	Title	Responsible for the Following Section(s) of this Document
Tom Carroll	Realty Specialist	Lands & Realty
Craig Drake	AFM	Overall review
Calvin Jennings	Archaeologist	Cultural, Paleontological, Native American Religious Concerns
Tim Finger	Outdoor Recreation Planner	Recreation, VRM, Wilderness, & Special Designations
Jay Parks	Wildlife Biologist	Wildlife, T&E, BLM & State Sensitive Species
Melissa Passes	Natural Resource Specialist	EA Lead
Ernie McKenzie	Fisheries Biologist	Fisheries and Riparian
Sheila Cain	GIS Specialist	GIS
Dustin Crowe	Rangeland Management Specialist	Livestock Grazing/ Vegetation
Julie Cymore	Hydrologist	Water
Mel Schroeder	Soil Scientist	Soils
Carolyn Sherve-Bybee	RMP Team Lead	Cultural, Paleontological, Native American Religious Concerns, NEPA
Jared Bybee	Planning & Environmental Coordinator	NEPA
Joan Trent	Social Scientist	Social Analysis
John Thompson	Planning & Environmental Specialist	Economic Analysis

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

Jim Sparks      Field Manager, Billings Field Office

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## 7.0 DEFINITIONS

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

IMPLAN: The IMPLAN Model is the most flexible, detailed and widely used input-output impact model system in the U.S. It provides users with the ability to define industries, economic relationships and projects to be analyzed. It can be customized for any county, region or state, and used to assess "multiplier effects" caused by increasing or decreasing spending in various parts of the economy. This can be used to assess the economic impacts of resource management decisions, facilities, industries, or changes in their level of activity in a given area. The current IMPLAN input-output database and model is maintained and sold by MIG, Inc. (Minnesota IMPLAN Group). The 2007 data set was used in this analysis.

Traditional Cultural Property (TCP) is a property that derives significance from traditional values associated with it by a social or cultural group, such as an Indian tribe or local community. A traditional cultural property may qualify for the National Register of Historic Places if it meets the criteria and criteria exceptions at 36 CFR 60.4. See National Register Bulletin 38.

APPENDIX A

Changes made to this appendix are noted with bold for additions and strikeout for deletions.

PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	ALTERNATIVE CONSIDERED, BUT ELIMINATED FROM FURTHER ANALYSIS
MTM 97300-LA	T. 3 N, R. 18 E, PMM, MT SEC. 4 NESE,S2SE; SWEET GRASS COUNTY 120.00 AC PD	CR 16-1 (ALL LANDS) LN 14-2 (ALL LANDS) LN 14-12 (ALL LANDS) LN 14-9 (ALL LANDS) NSO 11-2 (ALL LANDS) LN 14-15 (ALL LANDS) <b>TES 16-2 (ALL LANDS)</b>	
MTM 97300-LB	T. 4 N, R. 18 E, PMM, MT SEC. 24 SWSW; GOLDEN VALLEY COUNTY 40.00 AC PD	CSU 12-1 (ALL LANDS) CR 16-1 (ALL LANDS) LN 14-2 (ALL LANDS) LN 14-12 (ALL LANDS) NSO 11-2 (ALL LANDS) LN 14-15 (ALL LANDS) <b>TES 16-2 (ALL LANDS)</b>	
MTM 97300-MS	T. 3 N, R. 20 E, PMM, MT SEC. 14 S2; STILLWATER COUNTY 320.00 AC PD	CSU 12-1 SEC. 14 N2SW, SESW, SE; CR 16-1 (ALL LANDS) LN 14-2 (ALL LANDS) LN 14-12 (ALL LANDS) LN 14-15 (ALL LANDS) <b>TES 16-2 (ALL LANDS)</b>	

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PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	ALTERNATIVE CONSIDERED, BUT ELIMINATED FROM FURTHER ANALYSIS
MTM 97300-LG	T. 8 N, R. 20 E, PMM, MT SEC. 12 N2,E2SE; SEC. 24 NE; GOLDEN VALLEY COUNTY 560.00 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-LH	T. 9 N, R. 20 E, PMM, MT SEC. 28 E2SW; SEC. 32 NE,N2S2; GOLDEN VALLEY COUNTY 400.00 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-LI	T. 8 N, R. 21 E, PMM, MT SEC. 6 LOTS 14,15; SEC. 6 NESW,NWSE; SEC. 18 LOTS 1,2,3,4; SEC. 18 E2,E2W2; GOLDEN VALLEY COUNTY 675.64 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT

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PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	ALTERNATIVE CONSIDERED, BUT ELIMINATED FROM FURTHER ANALYSIS
MTM 97300-LJ	T. 8 N, R. 21 E, PMM, MT SEC. 10 SW; SEC. 14 N2,SE; GOLDEN VALLEY COUNTY 640.00 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-LK	T. 8 N, R. 21 E, PMM, MT SEC. 20 E2; SEC. 22 SWNE,NW; GOLDEN VALLEY COUNTY 520.00 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-LU	T. 8 N, R. 21 E, PMM, MT SEC. 24 S2; GOLDEN VALLEY COUNTY 320.00 AC PD		SAGE GROUSE CORE AREA - SUITABLE HABITAT (ALL LANDS)
MTM 97300-LL	T. 8 N, R. 21 E, PMM, MT SEC. 26 NESW; SEC. 28 ALL; GOLDEN VALLEY COUNTY 680.00 AC PD		SAGE GROUSE CORE AREA - SUITABLE HABITAT (ALL LANDS)

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PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	ALTERNATIVE CONSIDERED, BUT ELIMINATED FROM FURTHER ANALYSIS
MTM 97300-LM	T. 8 N, R. 21 E, PMM, MT SEC. 30 LOTS 1,2,3,4; SEC. 30 E2,E2W2; SEC. 32 N2; GOLDEN VALLEY COUNTY 847.88 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-LN	T. 8 N, R. 21 E, PMM, MT SEC. 34 ALL; GOLDEN VALLEY COUNTY 640.00 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-LO	T. 9 N, R. 21 E, PMM, MT SEC. 34 E2E2; GOLDEN VALLEY COUNTY 160.00 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT

APPENDIX A

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PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	ALTERNATIVE CONSIDERED, BUT ELIMINATED FROM FURTHER ANALYSIS
MTM 97300-LP	T. 7 N, R. 22 E, PMM, MT SEC. 2 E2SE; SEC. 4 LOTS 1,2; SEC. 4 S2NE,S2; SEC. 8 N2NE,SENE,SWNW, NWSW,S2SW,NESE; SEC. 10 NW; GOLDEN VALLEY COUNTY 1040.78 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-LQ	T. 7 N, R. 22 E, PMM, MT SEC. 14 NWSW,S2SW; SEC. 22 ALL; SEC. 26 SE; SEC. 34 NW; GOLDEN VALLEY COUNTY 1080.00 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT

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MTM 97300-LR	T. 7 N, R. 22 E, PMM, MT SEC. 18 LOTS 1,2,3,4; SEC. 18 E2SW,SE; SEC. 20 N2N2,SENE,NESW, S2SW,SE; SEC. 28 W2; SEC. 30 NE; GOLDEN VALLEY COUNTY 1353.56 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-LS	T. 8 N, R. 22 E, PMM, MT SEC. 18 LOTS 3,4; SEC. 18 SENW,E2SW,W2SE; SEC. 20 SWNW,SW,SWSE; GOLDEN VALLEY COUNTY 540.84 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT

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MTM 97300-LT	T. 8 N, R. 22 E, PMM, MT SEC. 30 LOTS 1,2,3,4; SEC. 30 E2,E2W2; SEC. 32 LOTS 1,2,3,4; SEC. 32 N2NE,NW,N2SW,NWSE; GOLDEN VALLEY COUNTY 1210.69 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-LC	T. 10 N, R. 25 E, PMM, MT SEC. 2 LOTS 3,4; SEC. 2 S2NW,SW; SEC. 3 S2; SEC. 10 N2; SEC. 11 ALL; MUSSELSHELL COUNTY 1600.15 AC ACQ		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-ZA	T. 10 N, R. 28 E, PMM, MT SEC. 12 NE,E2SE; MUSSELSHELL COUNTY 240.00 AC ACQ		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT

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MTM 97300-ZB	T. 10 N, R. 28 E, PMM, MT SEC. 14 S2SE; MUSSELSHELL COUNTY 80.00 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-ZC	T. 10 N, R. 28 E, PMM, MT SEC. 34 SWSW; MUSSELSHELL COUNTY 40.00 AC ACQ		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-PA	T. 11 N, R. 28 E, PMM, MT SEC. 22 N2N2; MUSSELSHELL COUNTY 160.00 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT

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MTM 97300-PB	T. 11 N, R. 28 E, PMM, MT SEC. 32 NWNE,NENW; MUSSELSHELL COUNTY 80.00 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-PC	T. 11 N, R. 28 E, PMM, MT SEC. 34 NENW; MUSSELSHELL COUNTY 40.00 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-M0	T. 9 N, R. 29 E, PMM, MT SEC. 4 E2SWSW,W2SESW; MUSSELSHELL COUNTY 40.00 AC ACQ		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT

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MTM 97300-NS	T. 9 N, R. 29 E, PMM, MT SEC. 12 N2NW; MUSSELSHELL COUNTY 80.00 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-NT	T. 9 N, R. 29 E, PMM, MT SEC. 24 NE; MUSSELSHELL COUNTY 160.00 AC PD	CSU 12-1 SEC. 24 N2NE, SWNE; CR 16-1 (ALL LANDS) LN 14-2 (ALL LANDS) LN 14-12 (ALL LANDS) <del>NSO 11-2</del> <del>SEC. 24 NENE</del> <b>TES 16-2 (ALL LANDS)</b>	
MTM 97300-M6	T. 11 N, R. 29 E, PMM, MT SEC. 20 NE,SW,N2SE; MUSSELSHELL COUNTY 400.00 AC PD		DEFER (ALL LANDS) IMMEDIATELY ADJACENT TO SAGE GROUSE CORE AREA AND POTENTIALLY PRIORITY HABITAT PENDING RMP COMPLETION

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MTM 97300-M7	T. 11 N, R. 29 E, PMM, MT SEC. 22 S2S2; MUSSELSHELL COUNTY 160.00 AC PD		DEFER (ALL LANDS) IMMEDIATELY ADJACENT TO SAGE GROUSE CORE AREA AND POTENTIALLY PRIORITY HABITAT PENDING RMP COMPLETION
MTM 97300-M8	T. 11 N, R. 29 E, PMM, MT SEC. 24 W2NW,SW; MUSSELSHELL COUNTY 240.00 AC PD		DEFER (ALL LANDS) IMMEDIATELY ADJACENT TO SAGE GROUSE CORE AREA AND POTENTIALLY PRIORITY HABITAT PENDING RMP COMPLETION
MTM 97300-M9	T. 11 N, R. 29 E, PMM, MT SEC. 32 LOTS 1,4; SEC. 32 E2NE,W2NW, NWSW,NESE; MUSSELSHELL COUNTY 317.16 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT

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MTM 97300-L3	T. 9 N, R. 30 E, PMM, MT SEC. 30 SENW MUSSELSHELL COUNTY 40.00 AC PD	CSU 12-1 (ALL LANDS) CR 16-1 (ALL LANDS) LN 14-2 (ALL LANDS) LN 14-12 (ALL LANDS) <b>TES 16-2 (ALL LANDS)</b>	
MTM 97300-N2	T. 10 N, R. 30 E, PMM, MT SEC. 4 LOTS 1,2; SEC. 4 S2NE,SE; MUSSELSHELL COUNTY 320.58 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-N3	T. 10 N, R. 30 E, PMM, MT SEC. 26 S2SENE,N2NESE; MUSSELSHELL COUNTY 40.00 AC ACQ		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT

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MTM 97300-N4	T. 10 N, R. 30 E, PMM, MT SEC. 34 N2S2; MUSSELSHELL COUNTY 160.00 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-N1	T. 11 N, R. 30 E, PMM, MT SEC. 34 ALL; MUSSELSHELL COUNTY 640.00 AC PD		SAGE GROUSE CORE AREA - SUITABLE HABITAT (ALL LANDS)
MTM 97300-L9	T. 9 N, R. 31 E, PMM, MT SEC. 10 SENW; MUSSELSHELL COUNTY 40.00 AC PD	CR 16-1 (ALL LANDS) LN 14-2 (ALL LANDS) LN 14-12 (ALL LANDS) <b>TES 16-2 (ALL LANDS)</b>	

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MTM 97300-N6	T. 9 N, R. 31 E, PMM, MT SEC. 20 LOT 1; SEC. 20 SENE; MUSSELSHELL COUNTY 64.61 AC PD	CSU 12-1 SEC. 20 LOT 1; CR 16-1 (ALL LANDS) LN 14-2 (ALL LANDS) LN 14-12 (ALL LANDS) LN 14-9 (ALL LANDS) <del>NSO 11-2</del> <del>SEC. 20 SENE</del> LN 14-1 SEC. 20 SENE <b>TES 16-2 (ALL LANDS)</b>	
MTM 97300-N5	T. 10 N, R. 31 E, PMM, MT SEC. 6 LOT 3; MUSSELSHELL COUNTY 40.15 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-L7	T. 10 N, R. 31 E, PMM, MT SEC. 8 E2; MUSSELSHELL COUNTY 320.00 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT

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MTM 97300-L8	T. 10 N, R. 31 E, PMM, MT SEC. 20 W2NE,NWSE; MUSSELSHELL COUNTY 120.00 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-L5	T. 11 N, R. 31 E, PMM, MT SEC. 20 ALL; SEC. 30 NE,SE,SW; MUSSELSHELL COUNTY 840.00 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT
MTM 97300-L6	T. 11 N, R. 31 E, PMM, MT SEC. 34 W2NW; MUSSELSHELL COUNTY 80.00 AC PD		DEFER (ALL LANDS) PENDING RMP COMPLETION; SAGE GROUSE CORE AREA - SUITABLE HABITAT

**Appendix A: Lease Stipulation Key**

Stipulation Number	Stipulation Name/Brief Description
<b>Bureau of Land Management</b>	
<b>CSU 12-1</b>	<b>CONTROLLED SURFACE USE STIPULATION</b> Prior to surface disturbance on slopes over 30 percent, an engineering/reclamation plan must be approved by the authorized officer.
<b>CSU 12-2</b>	<b>CONTROLLED SURFACE USE STIPULATION</b> Prior to surface disturbance, a surface use plan of operations (SUPO) for oil and gas activities must be approved for black-footed ferret reintroduction areas by the authorized officer in consultation with the U.S. Fish and Wildlife Service (USFWS).
<b>CSU 12-3</b>	<b>CONTROLLED SURFACE USE STIPULATION</b> Prior to surface disturbance, prairie dog colonies and complexes 80 acres or more in size will be examined to determine the absence or presence of black-footed ferrets. the findings of this examination may result in some restrictions to the operator's plans or may even preclude use and occupancy that would be in violation of the endangered species act (ESA) of 1973.
<b>CSU 12-4</b>	<b>CONTROLLED SURFACE USE STIPULATION</b> Prior to surface disturbance, a surface use plan of operations (SUPO) for oil and gas activities must be approved for black-footed ferret reintroduction areas by the authorized officer in consultation with the U.S. Fish and Wildlife Service (USFWS).
<b>Cultural Resources 16-1</b>	<b>CULTURAL RESOURCES LEASE STIPULATION</b> 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.
<b>LN 14-1</b>	<b>LEASE NOTICE</b> Land Use Authorizations incorporate specific surface land uses allowed on Bureau of Land Management (BLM) administered lands by authorized officers and those surface uses acquired by BLM on lands administered by other entities. These BLM authorizations include rights-of-way, leases, permits, conservation easements, and Recreation and Public Purpose leases and patents.
<b>LN 14-2</b>	<b>LEASE NOTICE CULTURAL RESOURCES</b> The Surface Management Agency is responsible for assuring that the leased Lands are examined to determine if cultural resources are present and to specify mitigation measures.
<b>LN 14-8</b>	<b>LEASE NOTICE</b> Cultural sites are located in the _____, Sec. __ T. ., R. . This parcel is located adjacent to the Lake Mason National Wildlife Refuge. In accordance with 43 CFR 3101.1-2, additional mitigation may be required in regard to exploration and development.
<b>LN 14-9</b>	<b>LEASE NOTICE CULTURAL RESOURCES</b> Lease is located adjacent to known sacred sites and historic properties, and contains high potential for National Register eligible historic and cultural properties. Lessees are notified that archaeological resource inventory and mitigation costs may be high within this area. A cultural plan of operations will be developed in

Stipulation Number	Stipulation Name/Brief Description
	consultation with the Billings Field Office and must be approved before field development takes place. All surface use plans will be presented to the Billings Field Office archaeologist for approval.
<b>LN 14-12</b>	<p><b>LEASE NOTICE PALEONTOLOGICAL RESOURCE INVENTORY REQUIREMENT</b></p> <p>This lease has been identified as being located within geologic units rated as being moderate to very high potential for containing significant paleontological resources. The locations meet the criteria for class 3, 4 and/or 5 as set forth in the Potential Fossil Yield Classification System, WO IM 2008-009, Attachment 2-2. The BLM is responsible for assuring that the leased lands are examined to determine if paleontological resources are present and to specify mitigation measures. Guidance for application of this requirement can be found in WO IM 2008-009 dated October 15, 2007, and WO IM 2009-011 dated October 10, 2008. Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee or project proponent shall contact the BLM to determine if a paleontological resource inventory is required. If an inventory is required, the lessee or project proponent will complete the inventory subject to the following:</p> <ul style="list-style-type: none"> <li>● the project proponent must engage the services of a qualified paleontologist, acceptable to the BLM, to conduct the inventory.</li> <li>● the project proponent will, at a minimum, inventory a 10-acre area or larger to incorporate possible project relocation which may result from environmental or other resource considerations.</li> <li>● paleontological inventory may identify resources that may require mitigation to the satisfaction of the BLM as directed by WO IM 2009-011.</li> </ul>
<b>LN 14-15</b>	<p><b>LEASE NOTICE SPRAGUE'S PIPIT</b></p> <p>The lease area may contain habitat for the federal candidate Sprague's pipit. The operator may be required to implement specific measures to reduce impacts of oil and gas operations on Sprague's pipits, their habitat, and overall population. Such measures would be developed during the application for permit to drill and environmental review processes, consistent with lease rights. If the USFWS lists the Sprague's pipit as threatened or endangered under ESA, BLM would enter into formal consultation on proposed permits that may affect the Sprague's pipit and its habitat. Restrictions, modifications, or denial of permits could result from the consultation process.</p>
<b>NSO 11-1</b>	<p><b>NO SURFACE OCCUPANCY STIPULATION</b></p> <p>Surface occupancy and directional drilling are prohibited within the boundaries of existing coal leases.</p>
<b>NSO 11-2</b>	<p><b>NO SURFACE OCCUPANCY STIPULATION</b></p> <p>Surface occupancy and use is prohibited within riparian areas, 100-year flood plains of major rivers, and on water bodies and streams.</p>
<b>NSO 11-4</b>	<p><b>NO SURFACE OCCUPANCY STIPULATION</b></p> <p>Surface occupancy and use is prohibited within one-quarter mile of grouse leks.</p>
<b>NSO 11-5</b>	<p><b>NO SURFACE OCCUPANCY STIPULATION</b></p> <p>Surface occupancy and use is prohibited within 1/4 mile of designated reservoirs with fisheries.</p>
<b>NSO 11-6</b>	<p><b>NO SURFACE OCCUPANCY STIPULATION</b></p> <p>Surface occupancy and use is prohibited within one-half mile of known bald eagle nest sites which have been active within the past 7 years and within bald eagle nesting habitat in riparian areas.</p>
<b>NSO 11-7</b>	<p><b>NO SURFACE OCCUPANCY STIPULATION</b></p> <p>Surface occupancy and use is prohibited within 1 mile of identified peregrine falcon nesting sites.</p>
<b>NSO 11-8</b>	<p><b>NO SURFACE OCCUPANCY STIPULATION</b></p>

Stipulation Number	Stipulation Name/Brief Description
	Surface occupancy and use is prohibited within one-half mile of known ferruginous hawk nest sites which have been active within the past 2 years.
<b>NSO 11-9</b>	<b>NO SURFACE OCCUPANCY STIPULATION</b> Surface occupancy and use is prohibited within one-quarter mile of wetlands identified as piping plover habitat.
<b>NSO 11-10</b>	<b>NO SURFACE OCCUPANCY STIPULATION</b> Surface occupancy and use is prohibited within one-quarter mile of wetlands identified as interior least tern habitat.
<b>NSO 11-11</b>	<b>NO SURFACE OCCUPANCY STIPULATION</b> Surface occupancy and use is prohibited within sites or areas designated for conservation use, public use, or sociocultural use.
<b>NSO 11-12</b>	<b>NO SURFACE OCCUPANCY STIPULATION</b> Surface occupancy and use is prohibited within designated or known paleontological sites.
<b>NSO 11-13</b>	<b>NO SURFACE OCCUPANCY STIPULATION</b> Surface occupancy and use is prohibited within developed recreation areas and undeveloped recreation areas receiving concentrated public use.
<b>NSO 11-17</b>	<b>NO SURFACE OCCUPANCY STIPULATION</b> Surface occupancy and use is prohibited within one-half mile of Ferruginous Hawk nest sites.
<b>TES 16-2</b>	<b>ENDANGERED SPECIES ACT SECTION 7 CONSULTATION STIPULATION</b> 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.
<b>TL 13-1</b>	<b>TIMING LIMITATION STIPULATION</b> Surface use is prohibited within crucial winter range for wildlife for the time period December 1 to March 31 to protect crucial White-Tailed Deer, Mule Deer, Elk, Antelope, Moose, Bighorn Sheep, and Sage Grouse winter range from disturbance during the winter use season, and to facilitate long-term maintenance of wildlife populations.
<b>TL 13-2</b>	<b>TIMING LIMITATION STIPULATION</b> Surface use is prohibited within established spring calving range for Elk for the following time period April 1 to June 15 to protect Elk spring calving range from disturbance during the spring use season, and to facilitate long-term maintenance of wildlife populations.
<b>TL 13-3</b>	<b>TIMING LIMITATION STIPULATION</b> Surface use is prohibited within established spring calving range for Elk for the time period April 1 to June 15 to protect Elk spring calving range from disturbance during the spring use season, and to facilitate long-term maintenance of wildlife populations.
<b>TL 13-4</b>	<b>TIMING LIMITATION STIPULATION</b> Surface use is prohibited within one-half mile of Raptor nest sites which have been active within the past 2 years during the time period March 1 - August 1 to protect nest sites of Raptors which have been identified as species of special concern.

## **Appendix B - RFD Scenario Forecast for Area of Analysis**

The RFD is based on information contained in the February 2010 Billings FO RFD; it is an unpublished report that is available by contacting the Billings FO. The RFD contains projections of the number of possible oil and gas wells that could be drilled and produced in the Billings FO area and used to analyze projected wells for the 7 nominated lease parcels. The 7 lease parcels are indentified within low to moderate potential development for coal bed methane. These well numbers are only an estimate based on historical drilling and mineral resources present, and may change in the future if new technology is developed or new fields and formations are discovered. For the RFD scenario, the 7 lease parcels have been analyzed under the following development areas; the Lake Basin Fault Zone, Pole Creek Anticline, Bull Mountain Basin. These areas are on Map 2.

Three of the lease parcels are located in the Lake Basin Fault Zone in Sweet Grass, Golden Valley and Stillwater counties. One of the lease parcels is located in the Pole Creek Anticline in Musselshell County. Three of the lease parcels are located in the Bull Mountain Basin in Musselshell County.

One parcel lies within Sweet Grass County in T. 3 N., R. 18 E. The parcel is in an area of moderate development potential. The RFD scenario forecasts one to five wells per township per year. Assumed disturbance factors are four acres per drill site and 1.5 acres for ancillary facilities and access roads. The single parcel in Sweet Grass County under consideration is located in a single township. The parcel totals about 120 acres, approximately 0.5 percent of this township.

One parcel lies within Golden Valley County in T. 4 N., R. 18 E. The parcel is in an area of moderate development potential. The RFD scenario forecasts one to five wells per township per year. Assumed disturbance factors are two acres per drill site and 1.5 acres for ancillary facilities and access roads. The single parcel in Golden Valley County under consideration is located in a single township. The parcel totals about 40 acres, approximately 0.2 percent of this township.

One parcel lies within Stillwater County in T. 3 N., R. 20 E. The parcel is in an area of moderate development potential. The RFD scenario forecasts one to five wells per township per year. Assumed disturbance factors are two acres per drill site and 1.5 acres for ancillary facilities and access roads. The single parcel in Stillwater County under consideration is located in a single township. The parcel totals about 320 acres, approximately 1.4 percent of this township.

Four parcels lies within Musselshell County. One of the parcels is in an area of moderate development potential which is located in T. 9 N., R. 29 E. The RFD scenario forecasts one to five wells per township per year. Assumed disturbance factors are two acres per drill site and 1.5 acres for ancillary facilities and access roads. This parcel under consideration is located in a single township. The parcel total about 160 acres, approximately 0.7 percent of this township. The remaining three parcels are in an area of low development potential. The RFD assumes that a low level of exploration could occur on these parcels. The RFD scenario states that no more than one well per year per township would be drilled in these areas. Assumed disturbance factors are two acres per drill site and 1.5 acres for ancillary facilities and access roads. One

parcel under consideration (T. 9 N., R. 30 E.) is located in a single township. This parcel totals about 40 acres, approximately 0.2 percent of this township. Two parcels under consideration share a single township (T. 9 N., R. 31 E.). These parcels total about 105 acres, approximately 0.5 percent of this township

The potential number of acres disturbed by exploration and development activities is shown in Table 24. The potential acres of disturbance reflect acres typically disturbed by construction, drilling, and production activities, including infrastructure installation throughout the Billings FO. Typical exploration and development activities and associated acres of disturbance were used as assumptions for analysis purposes in this EA. The assumptions were not applied to Alternative A because the lease parcel would not be recommended for lease; therefore, no wells would be drilled or produced on the lease parcel and no surface disturbance would occur on those lands from exploration and development activities.

The expected Billings FO total wells drilled per year equals 20 per year with three to four federal wells per year over a 20-year span. These wells could be in one of the three areas identified in table 24. The RFD scenario classified moderate potential lands as having the potential for one to five wells drilled per township per year. Low potential lands have the potential for less than one well per year per township.

**Table 24. RFD Projected Forecast Drilling Depths, and Forecast Surface Disturbance by Basin**

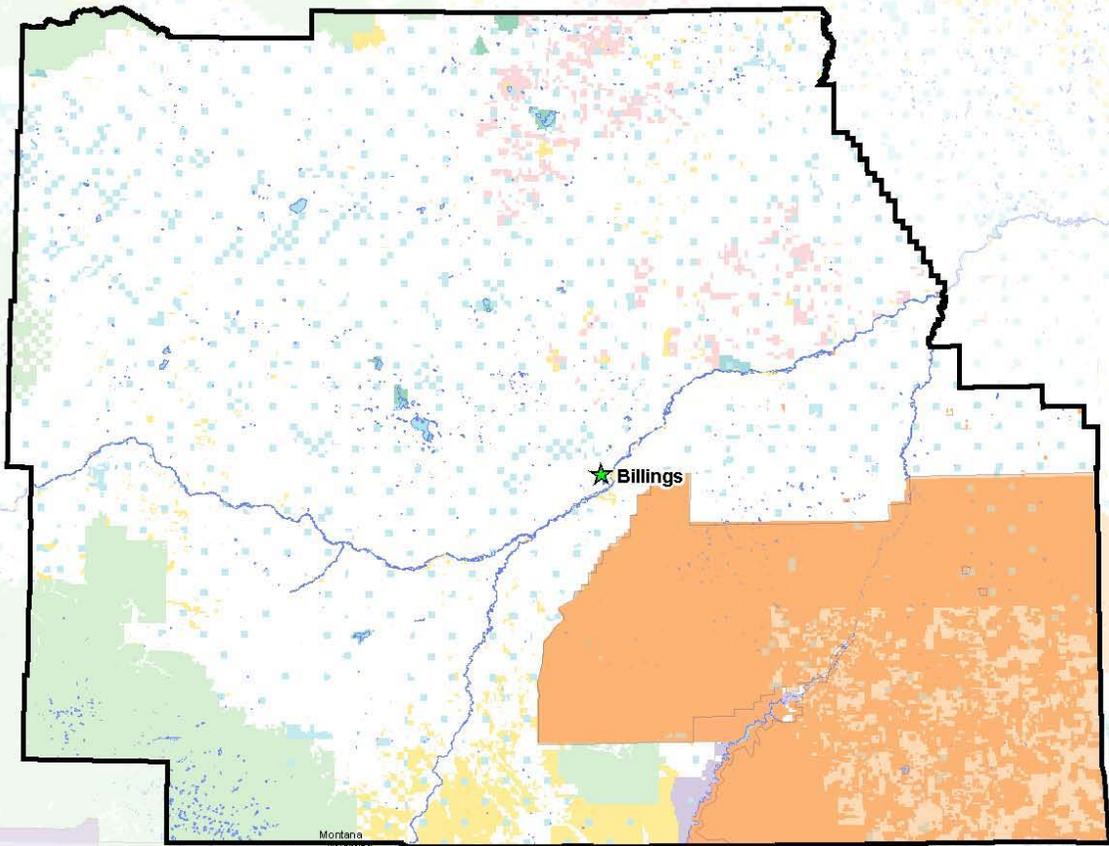
Location	Common Drilling Depth in Feet	Likely Product	Size of Drill Site in Acres	Access and Ancillary Facilities in Acres
Central Montana Uplift and Bull Mountain Basin	5,000	Oil with associated gas; CBNG*	2	1.5
Big Horn Basin	7,000	Oil with associated gas; Gas; CBNG*	3	1.5
Crazy Mountain Basin	8,000 – 10,000	Gas	4	1.5

\*Currently there is no CBNG production within the Billings FO (RFD, February 2010 p-17)

The RFD scenario identified these areas and contains more information about them (Map 2). Total annual disturbance for federal wells is approximately 13.5 acres to 27 acres of short-term disturbance (several years) and 5.5 to 15.5 acres of long-term disturbance for federal wells drilled in the Billings FO.



# Map 1 - Planning Area Billings Field Office Bureau of Land Management



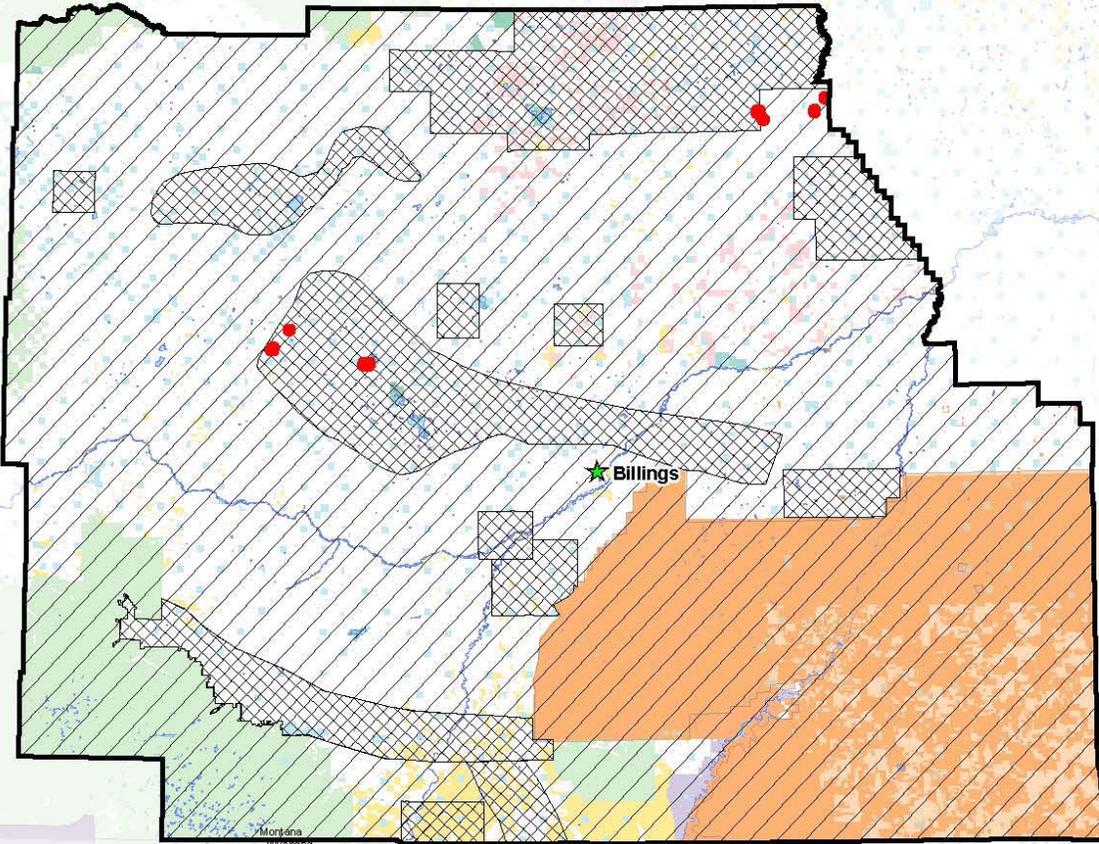
- Billings Field Office Boundary
- Bureau of Land Management
- Forest Service
- National Park Service
- State
- Water
- Private
- Billings



No warranty is made by the Bureau of Land Management for the use of the data for purposes not intended by the BLM.



# Map 2 - Oil and Gas Development Potential Billings Field Office Bureau of Land Management



- |                                |                           |
|--------------------------------|---------------------------|
| Billings Field Office Boundary | Bureau of Land Management |
| Parcel Nominations             | Forest Service            |
| <b>RFD</b>                     | National Park Service     |
| <b>Label</b>                   | State                     |
| Low                            | Water                     |
| Moderate                       | Private                   |

Source: Reasonable Foreseeable Development Scenario for the Billings / Pompeys Pillar RMP (BLM 2010)



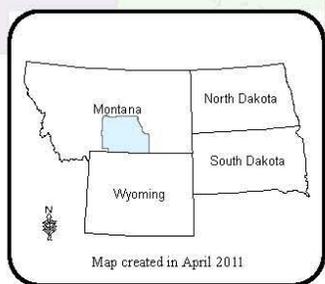
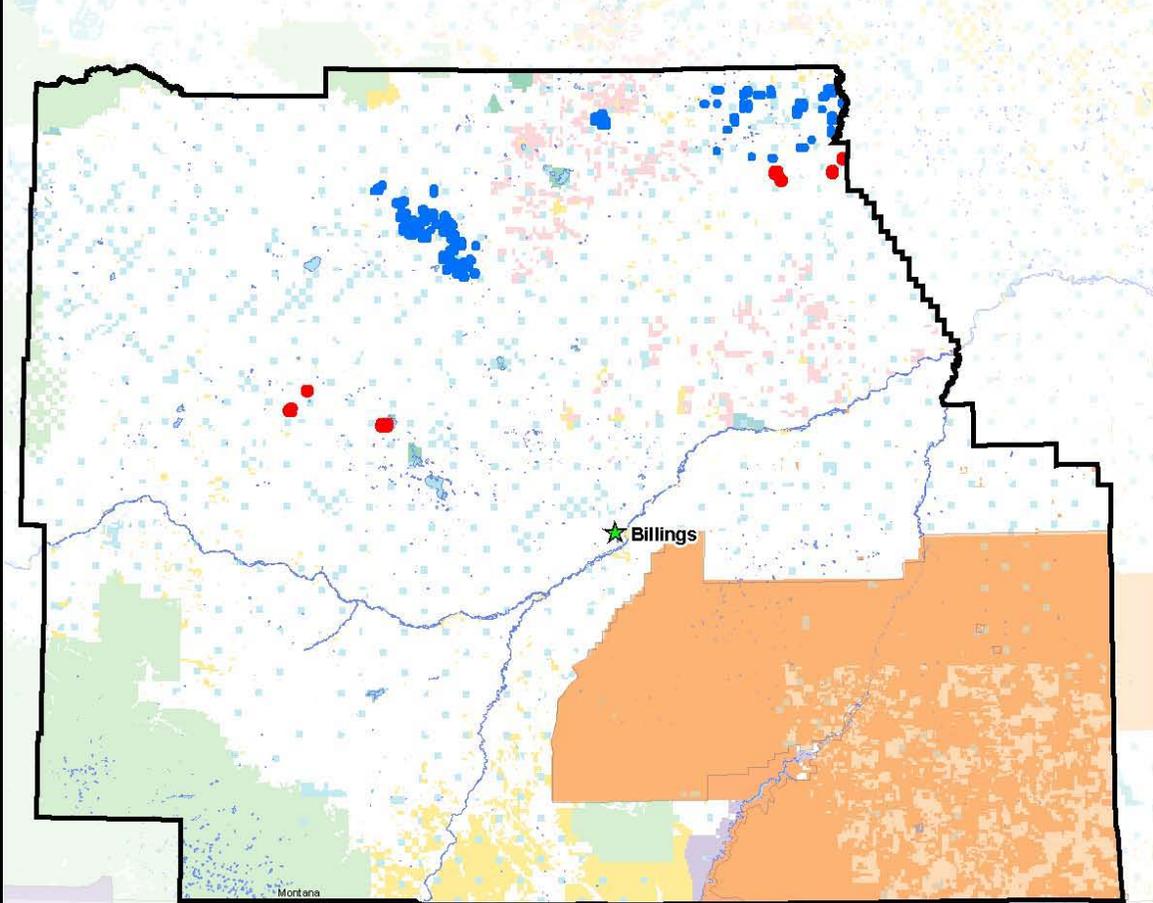
No warranty is made by the Bureau of Land Management for the use of the data for purposes not intended by the BLM.



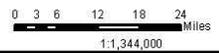
# Map 3 - Parcel Nominations & Deferred Parcels

## Billings Field Office

### Bureau of Land Management



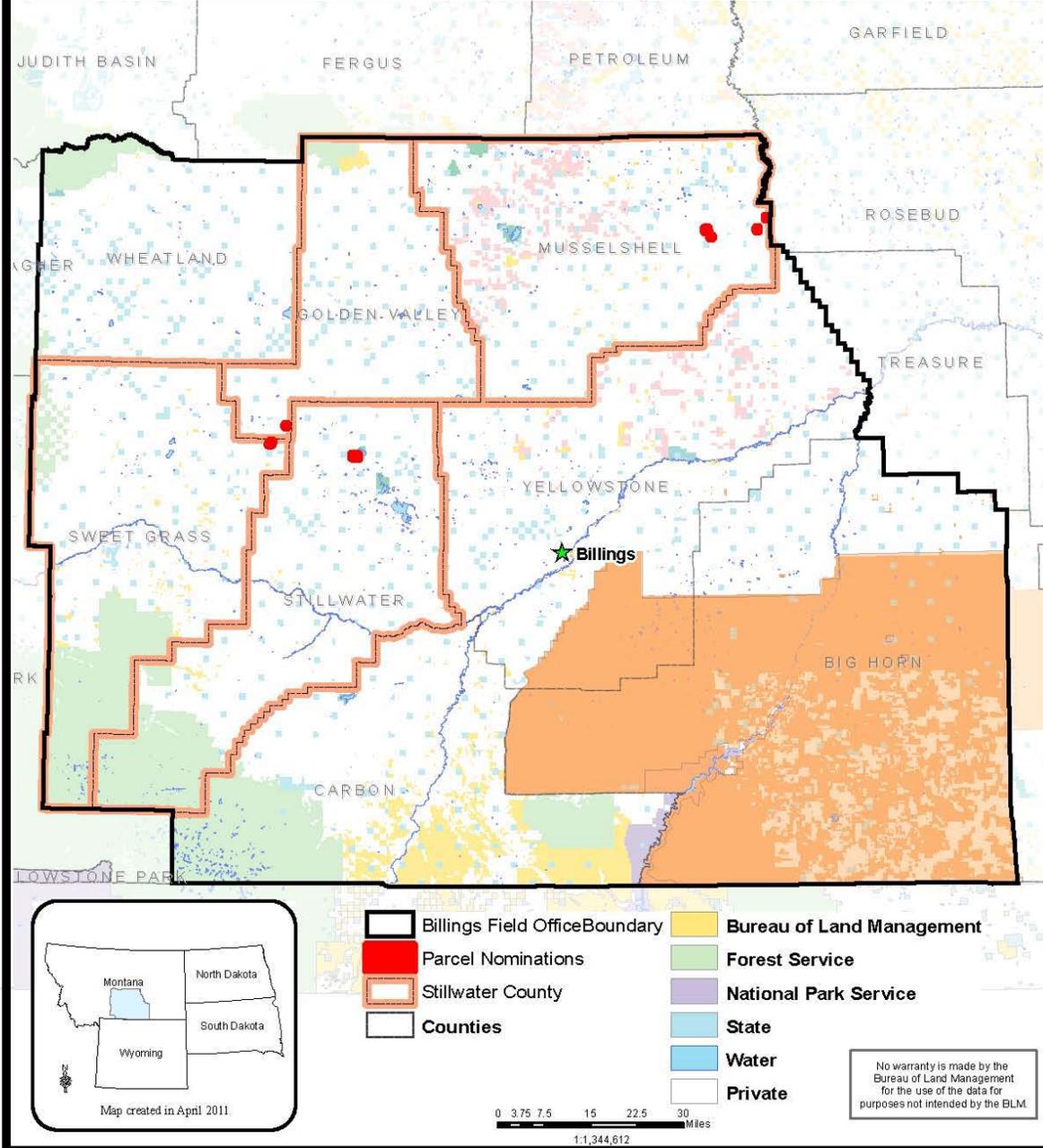
- Billings Field Office Boundary
- Not Deferred
- Deferred
- Bureau of Land Management
- Forest Service
- National Park Service
- State
- Water
- Private



No warranty is made by the Bureau of Land Management for the use of the data for purposes not intended by the BLM.

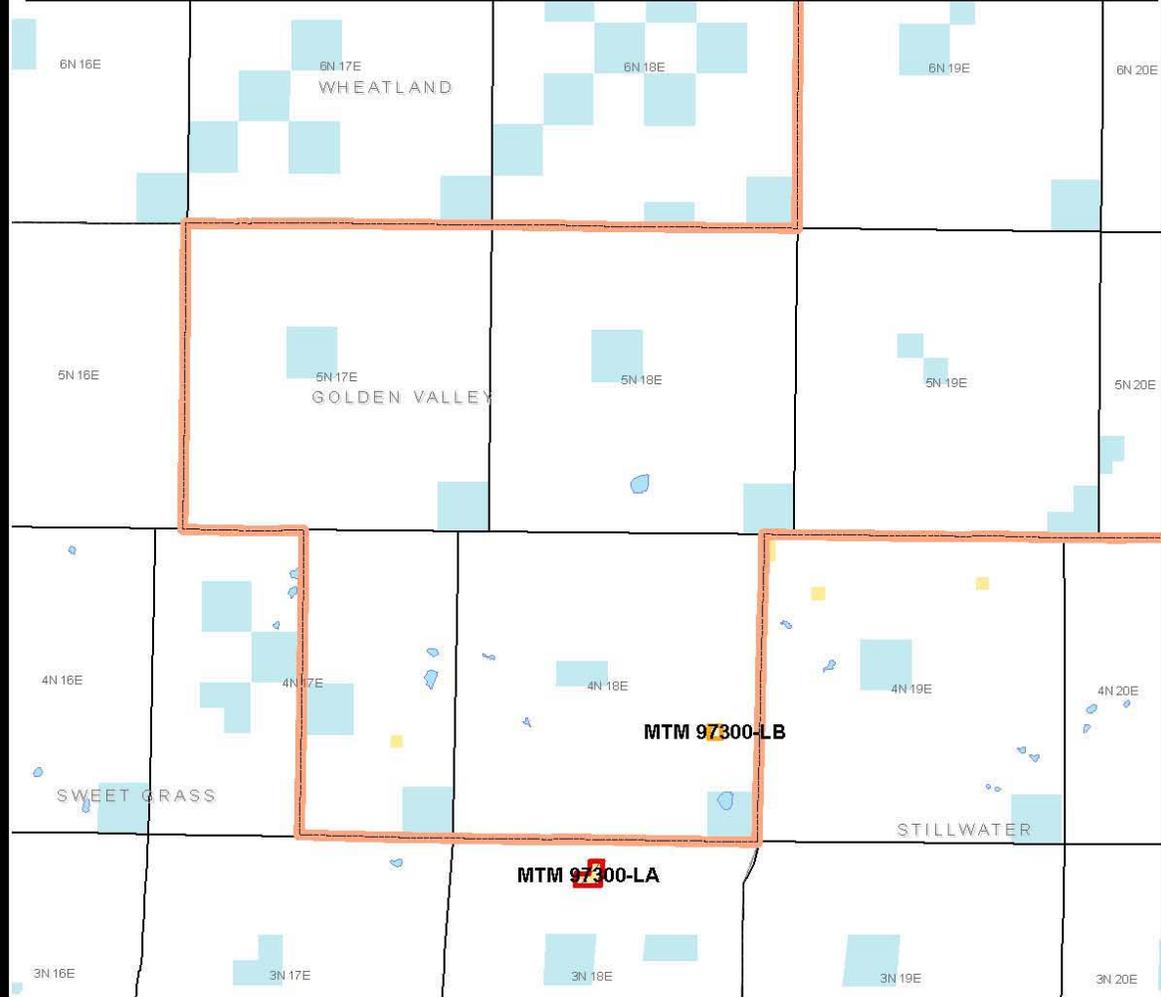


# Map 4 - Parcel Nominations by County Billings Field Office Bureau of Land Management

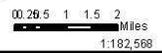




# Map 5 Golden Valley County Billings Field Office Bureau of Land Management



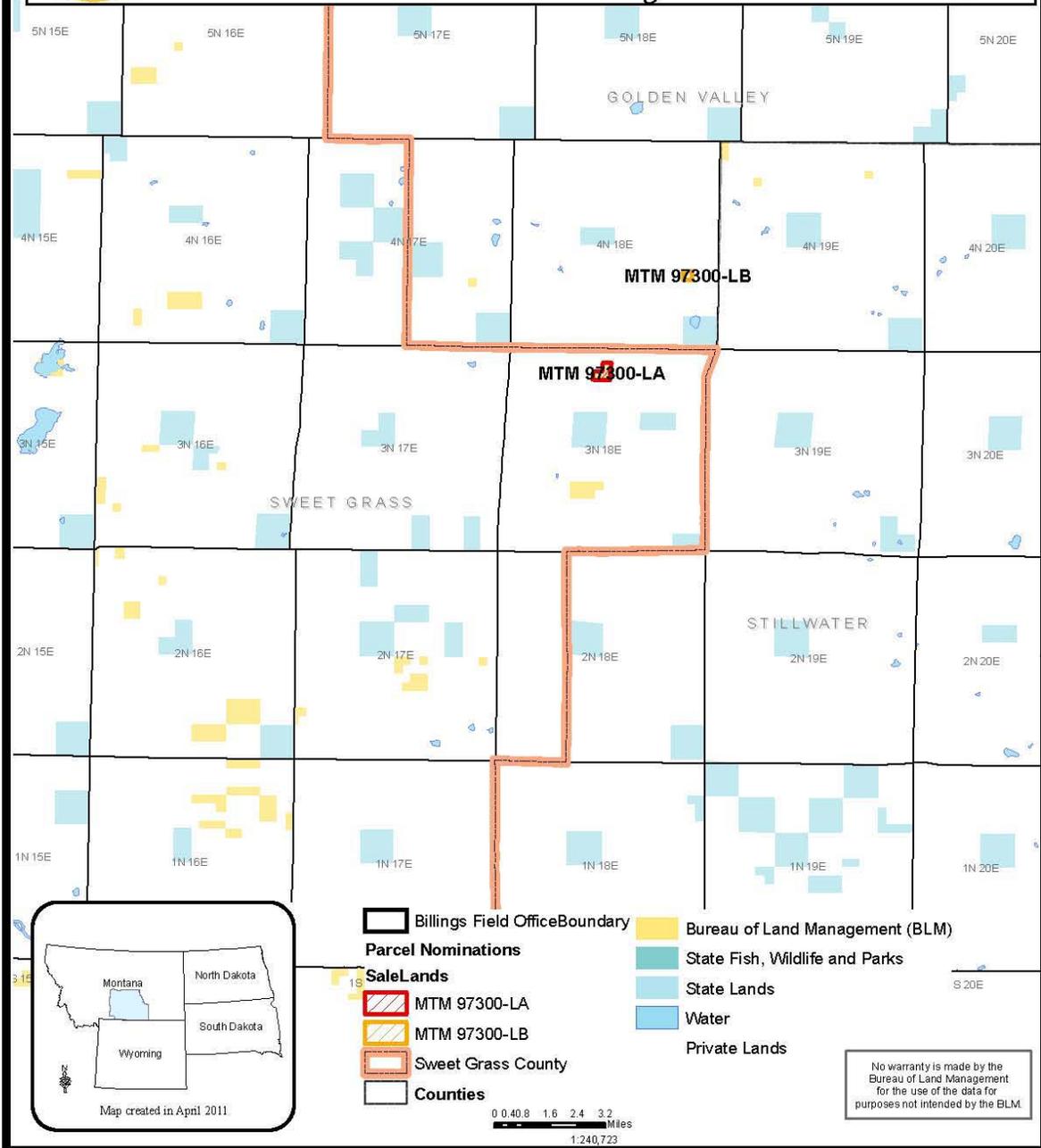
- Billings Field Office Boundary
- Parcel Nominations**
- Sale Lands**
- MTM 97300-LA
- MTM 97300-LB
- Golden Valley County
- Counties
- Bureau of Land Management (BLM)
- State Lands
- Water
- Private Lands



No warranty is made by the Bureau of Land Management for the use of the data for purposes not intended by the BLM.



# Map 6 - Sweet Grass County Billings Field Office Bureau of Land Management



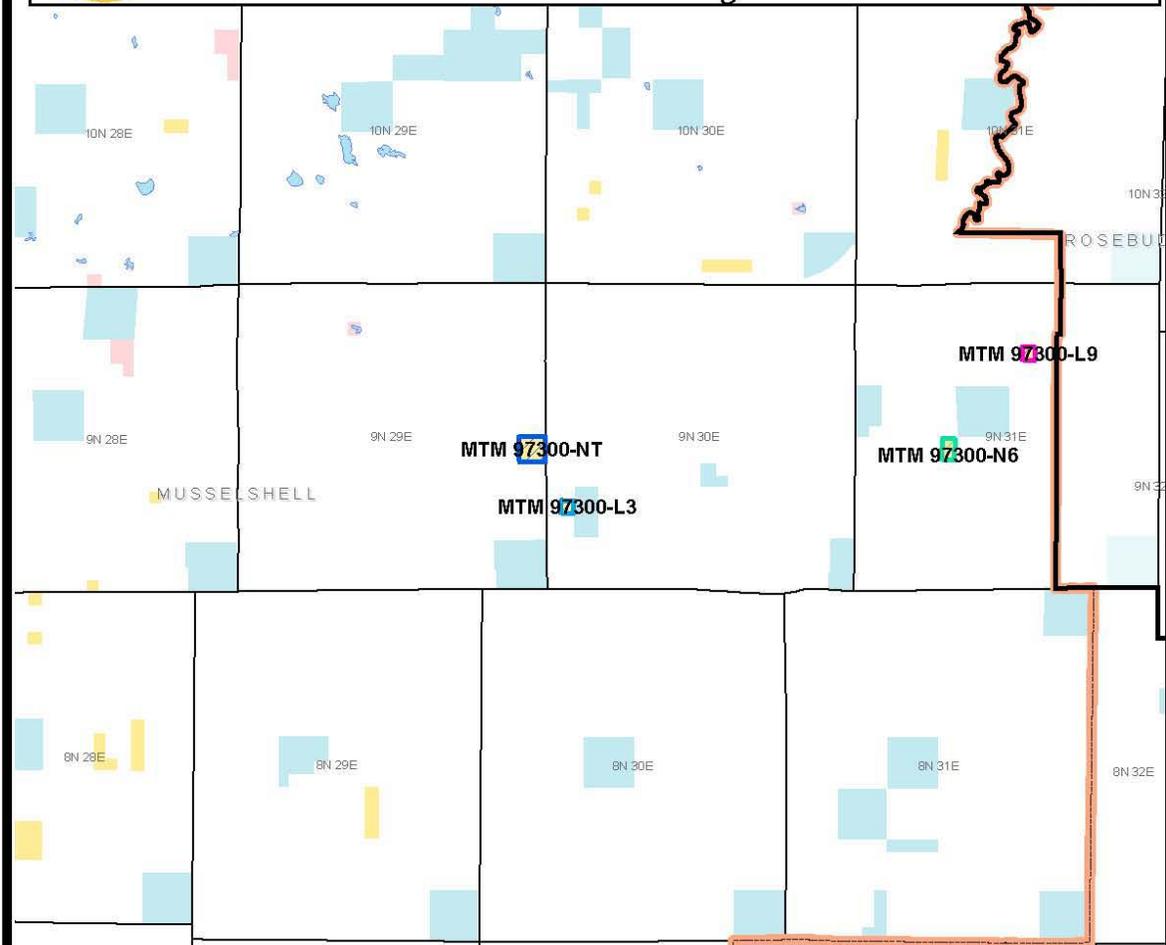
- Billings Field Office Boundary
- Bureau of Land Management (BLM)
- State Fish, Wildlife and Parks
- State Lands
- Water
- Private Lands
- Parcel Nominations**
- Sale Lands**
- MTM 97300-LA
- MTM 97300-LB
- Sweet Grass County
- Counties



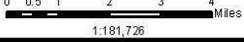
No warranty is made by the Bureau of Land Management for the use of the data for purposes not intended by the BLM.



# Map 7 - Musselshell County Billings Field Office Bureau of Land Management



- Billings Field Office Boundary
- Bureau of Land Management (BLM)
- Bankhead-Jones Land Use Lands (BLM)
- State Lands
- Private Lands
- MTM 97300-L3
- MTM 97300-L9
- MTM 97300-N6
- MTM 97300-NT
- Musselshell
- Counties



No warranty is made by the Bureau of Land Management for the use of the data for purposes not intended by the BLM.



# Map 8 - Stillwater County Billings Field Office Bureau of Land Management

