

United States Department of the Interior

Bureau of Land Management

Environmental Assessment DOI-BLM-MT-C010-2010-0046-EA
August 12, 2010

Review of Oil and Gas Lease Sale Parcels in the Billings Field Office Planning Area

Location: Billings Field Office

MTM 79010 A3

T. 1 N, R. 15 E, PMM, MT
Sec. 26 SWNE, NWNW, S2NW;
33 SESE;

T. 1 S, R. 15 E, PMM, MT

Sec. 1 S2SE, N2SE;
2 SENE, N2SE;
3 LOTS 1,2,3;
3 SENE;
4 SWNW;
5 LOTS 2,3;
5 E2SW;
6 LOT 7;
6 NESW;
9 SESW, SWSE;
11 NENE, S2NE,
SE, NWSE;
12 NWNW;
13 NE, NESE, S2SE;
14 SWSE;
17 SESE;
18 LOTS 1,3;
18 SENE, NENW;

Sweet Grass County (097)

MTM 79010 EM

T. 4 N, R. 19 E, PMM, MT
Sec. 24 N2N2, SENE, SWNW;
Stillwater County (095)

MTM 79010 2X

T. 4 N, R. 19 E, PMM, MT
Sec. 2 SESW;
6 LOTS 4,5;
8 NWNW;
10 NENE, NWSW,
S2SW, SE;
20 W2NW;
Stillwater County (095)

MTM 79010 2Z

T. 4 N, R. 19 E, PMM, MT
Sec. 26 ALL;
Stillwater County (095)

MTM 79010 VJ

T. 11 N, R. 24 E, PMM, MT
Sec. 5 SWSW;
8 NW, E2SW, SE;
23 E2SW, SWSE;
26 W2NE, E2NW, NWSE;

MTM 79010 QI

T. 10 N, R. 25 E, PMM, MT
Sec. 6 LOT 7;
6 SESW, S2SE;
7 LOTS 1,2,3,4;
7 E2, E2W2;
8 S2NW, SW;
Musselshell County (065)

MTM 79010 JL

T. 5 S, R. 18 E, PMM, MT
Sec. 30 LOT 1;
30 NESW;
31 LOT 3;
33 NWSW;
Stillwater County (095)
Carbon County (009)

MTM 79010 4W

T. 6 S, R. 23 E, PMM, MT
Sec. 11 W2NW, S2SE;
12 E2SW, SE;
13 NE, NWSW, NWSE;
14 NE, E2NW;
23 SWNE, E2W2, W2SE;
25 SW, S2SE;
26 E2NW;
Carbon County (009)

MTM 79010 3F

T. 9 S, 23 E, PMM, MT

Sec. 6 LOTS 1-7 INCL;
6 S2NE, SENW, E2SW,
SE;

7 LOTS 1,2,3,4;

7 E2, E2W2;

Carbon County (009)

MTM 79010 3O

T. 9 S, R. 23 E, PMM, MT
Sec. 18 LOTS 1,2,3,4;
18 E2, E2W2;
19 LOTS 1,2,3,4;
19 E2, E2W2;
30 LOTS 1,2;
30 NE, E2NW;
Carbon County (009)

MTM 79010 4T

T. 9 S, R. 23 E, PMM, MT
Sec. 31 LOTS 3-7 INCL;
31 NESW, N2SE;
32 LOTS 1,2,3,4;
32 NW, N2S2;
Carbon County (009)

MTM 79010 4U

T. 4 S, R. 24 E, PMM, MT
Sec. 1 LOT 1;
1 SENE;
Carbon County (009)



MTM 79010 3Q

T. 4 S, R. 24 E, PMM, MT

Sec. 1 E2SW;

11 NENE;

12 N2NW, SENW,SWSW;

13 NENE, NW, N2SW,

SWSW;

14 SESW,SE;

24 SESE;

25 SENW,SESE;

Carbon County (009)

MTM 79010 3X

T. 4 S, R. 24 E, PMM, MT

Sec. 23 N2NE,SWNE;

26 SESW;

Carbon County (009)

MTM 79010 4V

T. 5 S, R. 24 E, PMM, MT

Sec. 13 LOT 1;

Carbon County (009)

MTM 79010 3R

T. 5 S, R. 24 E, PMM, MT

Sec. 24 SWSE;

25 SWNW, NWSW,
S2SW;

26 SENE,NESE,S2SE;

35 N2NE,SENE,NENW,
NESW,SE;

Carbon County (009)

MTM 79010 4J

T. 6 S, R. 24 E, PMM, MT

Sec. 17 N2NE,SESW,NESE;

18 E2E2;

Carbon County (009)

MTM 79010 4H

T. 7 S, R. 24 E, PMM, MT

Sec. 10 S2NW,S2;

11 NENW,S2NW,SW;

15 NE,N2NW,SWNW,

N2SW,SESW,W2SE;

21 LOT 1;

21 NENW,S2NW,S2;

22 SWNE,SWNW,SW,
NWSE;

Carbon County (009)

MTM 79010 4R

T. 7 S, R. 24 E, PMM, MT

Sec. 17 LOTS 1,2,3,4;

18 LOTS 5,6,7;

18 SESW;

19 LOTS 3-8 INCL;

19 E2SW,NESE;

20 LOTS 1-5 INCL;

20 S2S2;

Carbon County (009)

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United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Billings Field Office
5001 Southgate Drive
Billings, Montana 59101-4669
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In Reply Refer To:

1600/3100 (MT0010)

August 12, 2010

Dear Reader:

The Bureau of Land Management (BLM) Billings Field Office has prepared an Environmental Assessment (EA) to revisit our decisions concerning oil and gas leases that were issued in 2008, and subsequently suspended under the terms of a settlement agreement in March 2010. This analysis addresses 19 lease parcels that were issued in 2008.

The EA, with an unsigned Finding of No Significant Impact (FONSI), is available for a 30-day public comment period. Written comments must be postmarked by September 13, 2010, to be considered. Comments may be submitted using one of the following methods:

Email: MT_BillingsFO_Lease_EA@blm.gov
Mail: Billings Field Office
Attention: Oil and Gas EA
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, Decision Record and FONSI will also be finalized and posted for public review on our BLM website. Based on our analysis, current suspensions on parcels would be lifted, or in some cases, our assessment would recommend keeping the suspensions in effect for portions of the parcels.

Please refer to the Montana/Dakotas BLM website at www.blm.gov/mt. From this home page, go to the heading titled “Frequently Requested,” where you will find a number of links to information about our oil and gas program. Current and updated information about our

environmental assessments can be found on the link titled “Oil and Gas Leasing EAs” and Lease Sale notices are listed under the “Current competitive oil and gas lease sale and results lists” link.

If you have any questions, or would like more information about lease sale notices or the issuance of the final EA, Decision Record and FONSI, 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

**U.S. Department of the Interior
Bureau of Land Management
Billings Field Office
5001 Southgate Drive
Billings, MT 59101**

**Finding of No Significant Impact
Environmental Assessment DOI-BLM-MT-C010-2010-0046-EA**

This unsigned Finding of No Significant Impact and the attached Environmental Assessment DOI-BLM-MT-C010-2010-0046-EA for the Billings Field Office are available for public review and comment for 30 days beginning on August 12, 2010.

Impact identification and analysis of approving the project proposal and/or alternatives(s) has been completed. Environmental analysis has been conducted based on available inventory and monitoring data files. The proposed action conforms with and is within the scope of the land use decisions described in the Billings Resource Management Plan (RMP) (September 1984) and its associated environmental impact statement (EIS), as amended by the 1992 Oil and Gas RMP Amendment and FEIS (1994 Record of Decision); and the 2008 Final Supplement to the Montana Statewide Oil and Gas EIS and Proposed Amendment of the Powder River and Billings RMPs (FSEIS). Based on my review of the EA and supporting documents, I have determined that the project, including the implementation of required stipulations/mitigating measures, is not a major federal action and will not significantly affect the quality of the human environment, individually or cumulatively with other actions in the general area. No potential environmental effects associated with the project meet the definition of significance in context or intensity as defined in 40 CFR 1508.27, nor do potential effects exceed those effects described in the Billings RMP/FEIS, as amended. An environmental impact statement (EIS) is not required. Where the suspension would be lifted on these parcels, resultant from this decision, any future proposed development on such parcels would be subject to additional site-specific NEPA analysis and documentation.

The decision to approve or deny the proposed action and preparation of a signed Finding of No Significant Impact with rationale, as appropriate, will be released after consideration of public comments and completion of the EA.

Recommended by _____ Date _____
James M. Sparks, Field Manager

Approved by _____ Date _____
Theresa M. Hanley, Deputy State Director Division of Resources

Review of Oil and Gas Lease Sale Parcels in the Billings Field Office Planning Area

DOI-BLM-MT-C010-MT-2010-0046-EA

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**Review of Oil and Gas Lease Sale Parcels
in the Billings Field Office Planning Area
DOI-BLM-MT-C010-2010-0046-EA**

1.0 PURPOSE & NEED

1.1 Introduction

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

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

This environmental assessment (EA) has been prepared to disclose and analyze the environmental consequences of leasing parcels located in the Billings Field Office that are currently under lease suspension (See Map 1).

1.2 Purpose and Need for the Proposed Action

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

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

Because the parcels being considered in this EA have already been leased but are currently under suspension, the decision to be made is whether the conditions under which they have been leased

are still valid and in conformance with the land use plan, whether the lease suspensions should be lifted, and if additional stipulations are required.

1.3 Conformance with Land Use Plan(s):

This EA is tiered to the decisions, 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.

The parcels to be offered are within areas open to oil and gas leasing. Billings Field Office resource specialists conducted site-specific analysis of the areas involved, reviewed existing databases and file information, and conducted site visits to ensure that appropriate stipulations had been attached to specific parcels.

At the time of this review it is unknown whether a particular parcel would be subject to exploration and development activity. It is unknown when, where, or if future well sites, roads, and facilities might be proposed. Assessment of projected activities and impacts discussed in this EA was based on potential well densities discerned from the revised Reasonably Foreseeable Development (RFD) Scenario developed and documented in conjunction with the Billings/Pompeys Pillar RMP/EIS revision. The Billings Field Office received the revised RFD scenario January 2010. Detailed site-specific analysis of activities associated with any particular parcel would occur when a lease holder submits an application for permit to drill (APD).

The proposed project would not be in conflict with any local, county, or state laws or plans.

The 1992 Oil and Gas RMP/EIS Amendment identifies all of these lands proposed for lease sale as open to oil and gas leasing, subject to certain environmental controls indicated in the Amendment and ROD page 3-4. Consequently, this action (Alternative B) is in conformance with the Amendment.

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 FO website NEPA notification log (http://www.blm.gov/style/medialib/blm/mt/blm_information/nepa_logs/2010.Par.9416.File.dat/BiFO.pdf).

Scoping was initiated May 25, 2010; however, comments were received through June 21, 2010. Several scoping comment letters pertained to overall issues/concerns from oil and gas leasing within the Montana/Dakotas BLM while other scoping comment letters were specific to this EA planning area. Refer to Section 5.2 of this EA for a more complete summary of the scoping comments received.

Issues identified through scoping related to oil and gas leasing include: greenhouse gas (GHG) emissions and impacts to climate change, protection of wildlife and fisheries habitat and corridors, preservation of wildlands/pristine landscapes, protection of scenic quality/viewsheds, protection of cultural areas, minimal surface (soil) disturbance, and identification of mitigation measures to minimize impacts from operations. One comment specifically suggested considering a no leasing alternative.

In addition to the issues identified above, several comments were specific to the Billings Field Office. Comments ranged from concern about livestock grazing operations, access issues, concerns regarding paleontological and cultural resources, and surface disturbance from potential development.

Comments received and potential issues identified through scoping include:

- Sections X [geographic description omitted – contains sensitive resource information/*confidential*] contain known dinosaur fossils--the actual areas containing fossils are probably much larger.
- Concerns about vandalism to paleontological resources on split estate land if area opened to oil and gas development.
- Most of the area is rugged and highly erodible which means it needs extra care and repair when damaged. Some of this surface is 110 million-year-old early Cretaceous material and doesn't grow grass very well.
- Access into the entire Cottonwood Creek area is poor. There is no electrical service within the entire area.
- Water/springs are critical. Some past drilling has netted a free-flowing artesian well--and drained the aquifer source.
- This area is proximate to the Bozeman Trail, several off-shoot, cut-off, and shortcut roads. Wagon ruts are still present.
- Lessee runs cattle and has range improvements (windmill, cisterns, water tank and spring) identified for avoidance.
- Lightly used road – unstable when wet.
- General questions/inquiries about process, surface owner agreements, split estate, mineral ownership, etc.
- Concerned with clean-up from past oil development.
- Inquired if stipulations apply to split estate parcels.
- Runs livestock on parcel.
- Fisheries concerns in general, and impacts to Yellowstone Cutthroat Trout habitat in particular.
- Inadequate stipulations to protect fisheries resources.

2.0 DESCRIPTION OF ALTERNATIVES, INCLUDING PROPOSED ACTION

2.1 Alternative A - No Action

For environmental assessments (EAs) on externally initiated proposed actions, the No Action alternative generally means that the Proposed Action would not take place. The No Action alternative would maintain suspensions on 19 lease parcels, covering 15,016 acres, in the Billings Field Office (Billings FO) and would be subject to cancellation. Surface management would remain the same and ongoing oil and gas development would continue on surrounding federal, private, and state leases.

2.2 Alternative B - Proposed Action

The Proposed Action would be to lift suspensions on portions of 19 already leased parcels covering 14,179 acres of federal minerals administered by the Billings FO and 837 acres (portions of 2 parcels) would continue to be held in suspension until the Billings/Pompeys Pillar RMP/EIS revision is completed. The parcels are located in Carbon, Musselshell, Stillwater, and Sweet Grass counties in south-central Montana. Refer to Map 1 for a general location of the planning area. Refer to Map 2 for general parcel location. Parcel number, size, and detailed locations and associated stipulations are listed in Appendix A. Appendix A also identifies those portions of parcels that would continue to be held in suspension.

Of the approximately 15,016 acres of federal mineral estate that are considered in this EA, approximately 9,635 acres are public surface with federal mineral estate and approximately 5,381 acres are split estate. All parcels would be subject to leasing stipulations, per the 1984 Billings RMP as amended, that would protect identified resources or resource uses that otherwise might be jeopardized by the Proposed Action. Because portions of 2 leased parcels (837 acres) would continue to be held in suspension, standard terms and conditions and additional lease stipulations would not be applied until such time that a final decision is rendered. Approximately 5,381 acres within 12 parcels contain private surface overlying federal mineral estate (split estate). In these instances, the BLM provided notification to private landowners that their lands would be included in this analysis. In the event of activity on such split estate parcels, the lessee and/or operator would be responsible for adhering to BLM requirements as well as reaching an agreement with the private surface landowners regarding access, surface disturbance, and reclamation.

Standard lease terms, conditions, and operating procedures, as well as additional stipulations as listed in Appendix A, would apply to these parcels. Standard operating procedures in oil and gas fields include measures to protect the environment and resources such as groundwater, air, wildlife, historic and archaeological concerns, and others as mentioned in the 1992 Oil and Gas RMP/EIS Amendment and the BLM Gold Book. Lease stipulations (as required by 43 CFR 3131.3) would be attached to the parcels to address site-specific concerns or new information not previously identified in the land use planning process. Once sold, the lessee would have the right to use as much of the leased lands as is reasonably necessary to explore and drill for all of the oil and gas within the lease boundaries, subject to the stipulations attached to the lease (43 CFR 3101.1-4).

Standard operating procedures, best management practices and required conditions of approval and the application of lease stipulations change over time to meet overall RMP objectives. In

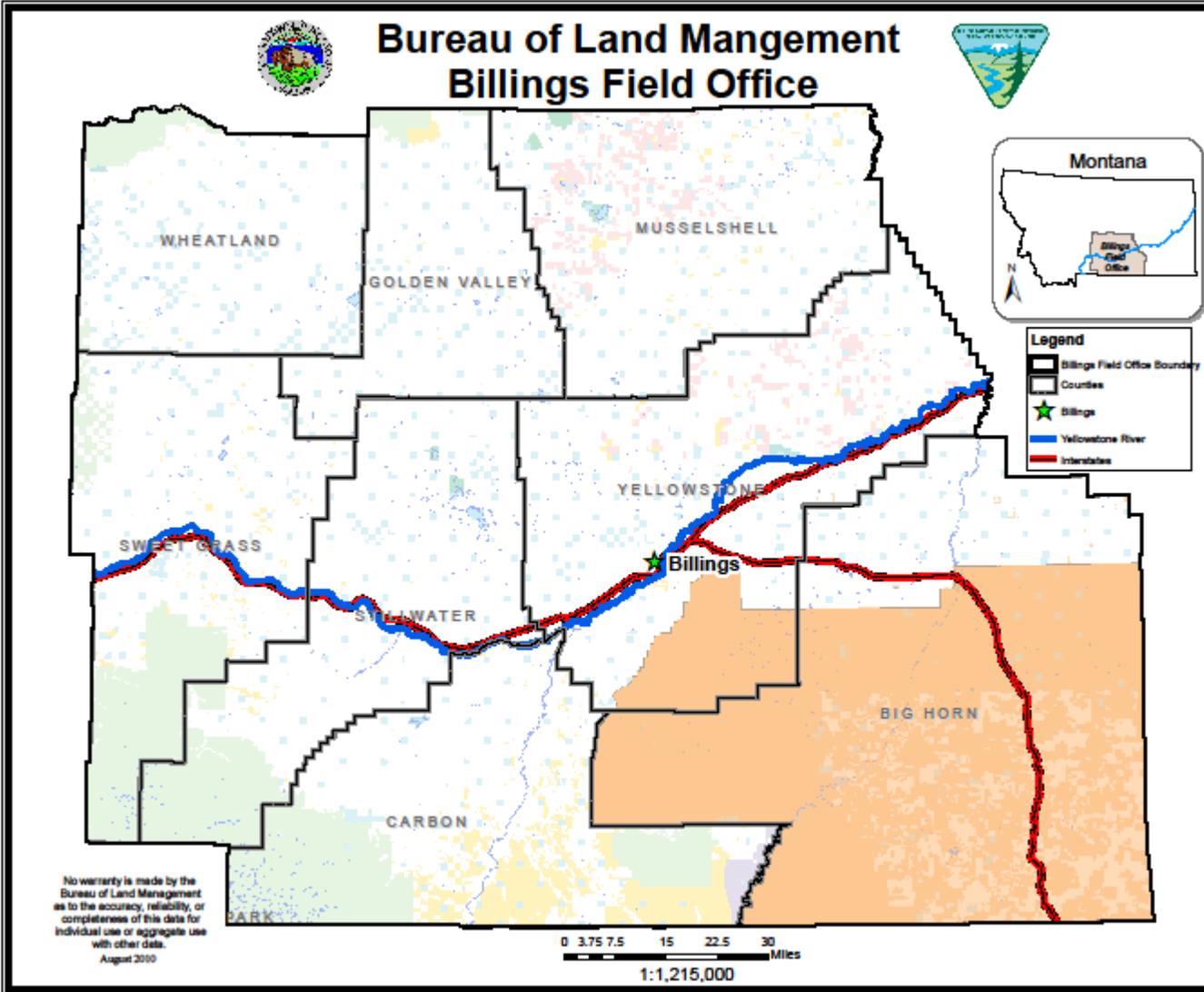
some cases new lease stipulations may need to be developed and these types of changes may require an RMP amendment. There is no relief from meeting RMP objectives if local conditions were to become drier and hotter during the life of the RMP. In this situation, management practices might need to be modified 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 within that time period, does not make annual rental payments, does not comply with the terms and conditions of the lease, or relinquishes the lease; ownership of the minerals leased would revert back to the federal government, and the lease could be resold.

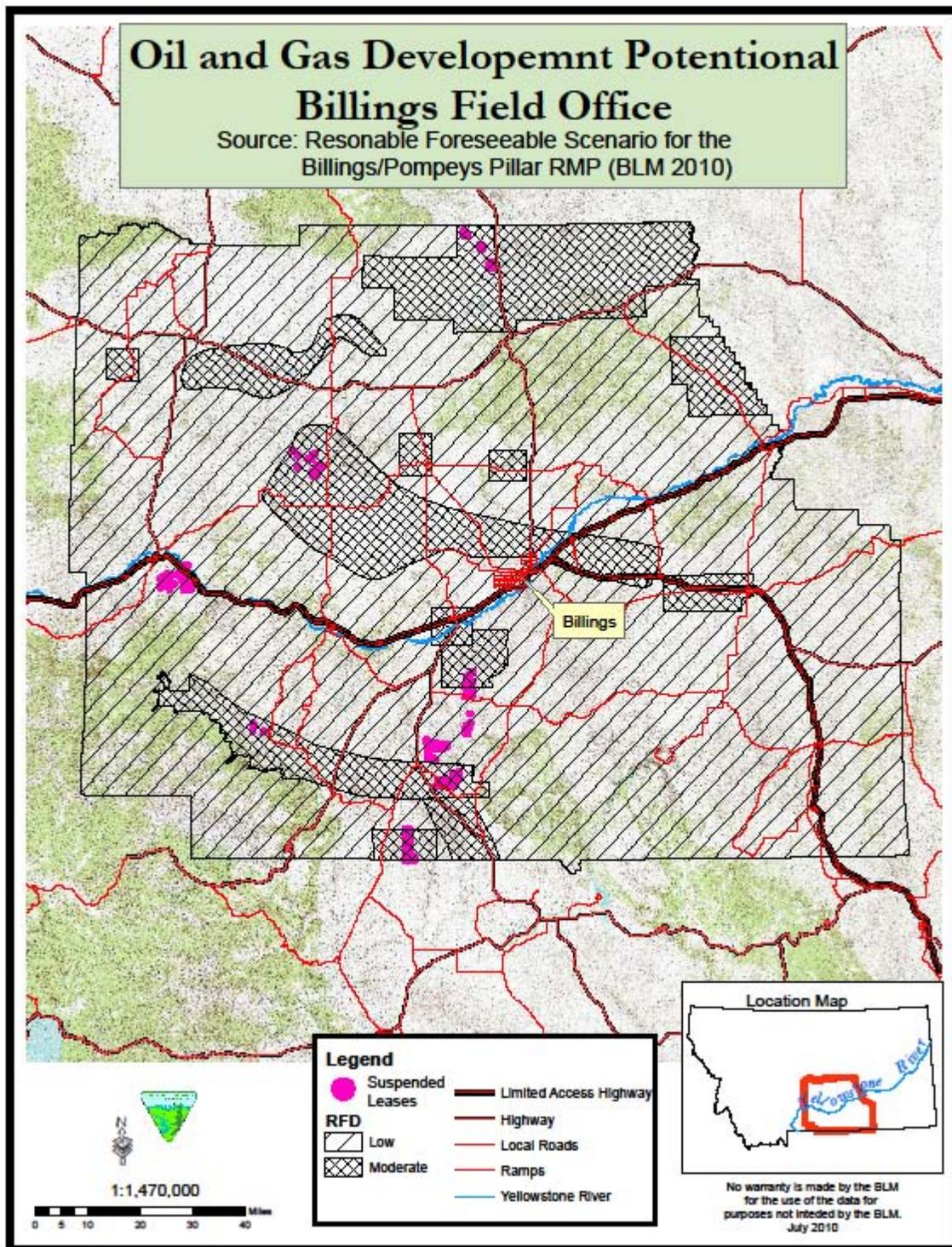
Drilling of wells on a lease would not be permitted until the lease owner or operator secures approval of a drilling permit and a surface use plan as specified at 43 CFR 3162.

2.3 Alternatives Considered but Dismissed from Detailed Analysis

An alternative to lift the suspension on 20 already leased parcels of federal minerals covering 15,139.6 acres administered by the Billings Field Office was considered but dismissed from detailed analysis. This alternative was dismissed due to additional resource information acquired as a result of updating the Billings/Pompeys Pillar RMP. In addition, one lease parcel was terminated, therefore, additional analysis is not necessary at this time.



Map 1 – Planning Area



Map 2- Billings Oil and Gas Development Potential

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

This chapter describes the affected existing environment (i.e., the physical, biological, social, and economic values and resources) that could be affected by implementation of the alternatives described in Chapter 2.

3.2 General Setting

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.

3.3 Resources Issues Brought Forward for Analysis

Certain resources are protected by specific laws, regulations, or policies (e.g., Executive Orders [EO]). BLM refers to these resources as “Critical Elements of the Human Environment” and addresses them in all EAs. Those Critical Elements that are identified below as being present and potentially affected will be analyzed further in this chapter.

CRITICAL ELEMENTS		
Determination*	Resource	Rationale for Determination*
PI	Air Quality	See discussion in section 3.3.1.1
NI	Areas of Critical Environmental Concern	There are nine ACECs within the Billings Field Office planning area. None of the proposed lease sale parcels occur within an ACEC, although one lease sale parcel occurs proximate to the Bridger Fossil Area ACEC. See Section 3.3.16
PI	Cultural Resources	See discussion in section 3.3.8
PI	Environmental Justice	See discussion in section 3.3.17.2
PI	Farmlands (Prime or Unique)	See discussion in section 3.3.3
PI	Floodplains	See discussion in 3.3.3
PI	Invasive, Non-native Species	See discussion in sections 3.3.5.11 and 3.3.5.12
NP	Native American Religious Concerns	See discussion in section 3.3.10
PI	Threatened, Endangered or Candidate Plant Species	See discussion in section 3.3.6.3
PI	Threatened, Endangered or Candidate Animal Species	See discussion in sections 3.3.6.1 and 3.3.6.2
NP	Wastes (hazardous or solid)	There are no known wastes (hazardous or solid) located in the proposed lease sale parcels.
PI	Water Quality (drinking/ground)	See discussion in section 3.3.4
PI	Wetlands/Riparian Zones	See discussion in section 3.3.5.10
NP	Wild and Scenic Rivers	There are no designated Wild and Scenic Rivers within the Billings Field Office planning area. The proposed lease sale parcels are not close to any of the river/creek segments evaluated for WSR suitability in the Billings/Pompeys Pillar RMP/EIS revision.
NP	Wilderness	There are no designated Wilderness Areas within the Billings Field Office planning area. There are four Wilderness Study Areas within the Billings Field Office planning area and each of these WSAs is closed to oil and gas leasing.
* 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).		

The following aspects of the affected environment were determined to not be present, or not potentially impacted by this project: Caves and Karsts, Lands with Wilderness Characteristics, Wastes (hazardous and solid), Wild and Scenic Rivers, and Wilderness. These resources and resource uses will not be discussed further in this EA.

3.3.1 Air Resources

Air quality and climate are components of air resources, which include applications, activities, and management of the air resource. Therefore, the BLM must consider and analyze the

potential effects of BLM and BLM-authorized activities on air resources as part of the planning and decision making process.

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

3.3.1.1 Air Quality

Project area air quality is very good. The EPA air quality index (AQI) is 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 could 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 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 could be a moderate health concern for a very small number of people. For example, people who are unusually sensitive to ozone could experience respiratory symptoms.
- **Unhealthy for Sensitive Groups** - When AQI values are between 101 and 150, members of "sensitive groups" could experience health effects. These groups are likely to be affected at lower levels than the general public. For example, people with lung disease are at greater risk from exposure to ozone, while people with either lung disease or heart disease are at greater risk from exposure to particle pollution. The general public is not likely to be affected when the AQI is in this range.

In the context of ozone, all areas throughout Montana and the Dakotas (including near Billings FO) are currently meeting federal standards in all locations. Light and dark blue circles in Figure 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).

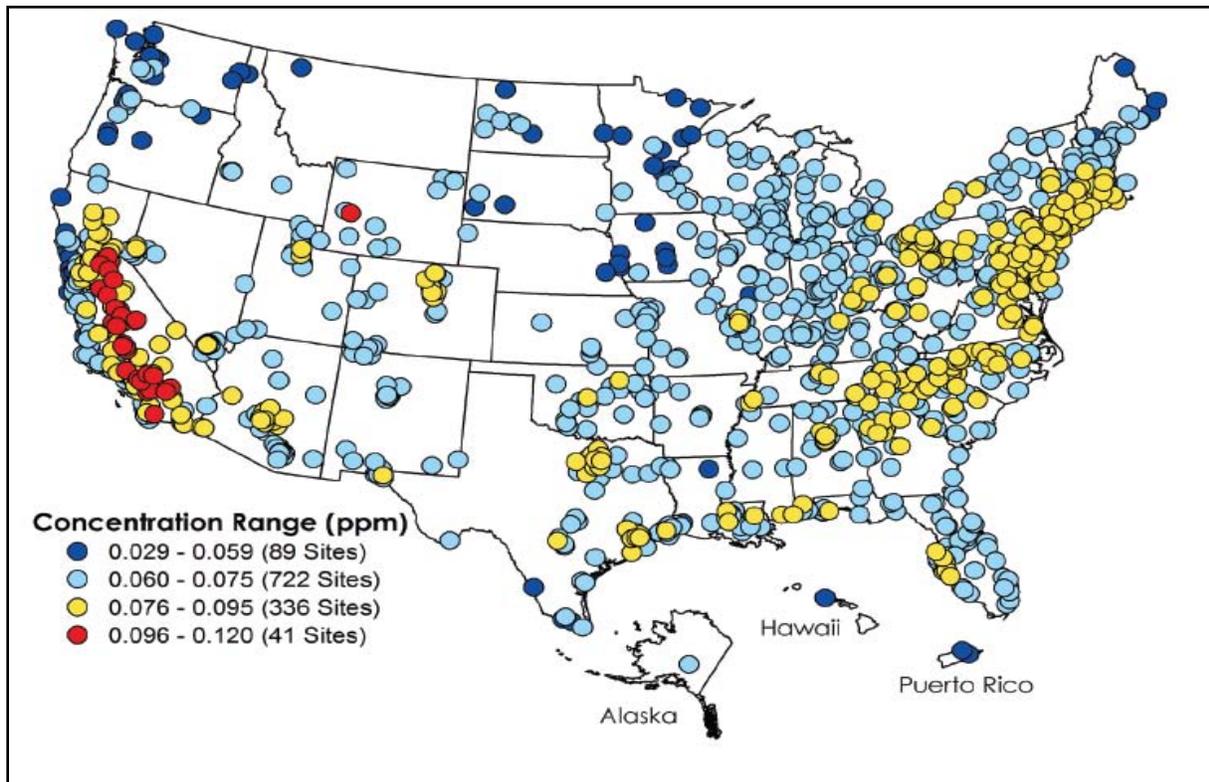


Figure A. Ozone concentrations in ppm, 2008 (fourth highest daily maximum 8-hour concentration).

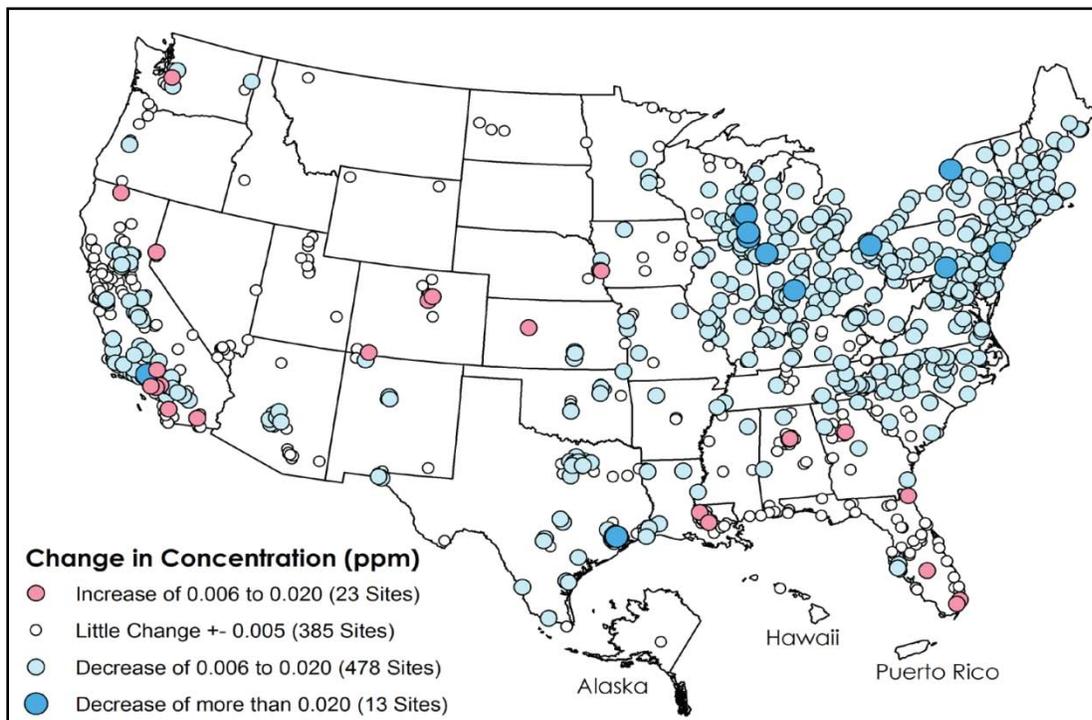


Figure B. Change in ozone concentrations in ppm, 2001-2003 vs. 2006-2008 (three-year average of the annual fourth highest daily maximum 8-hour concentrations).

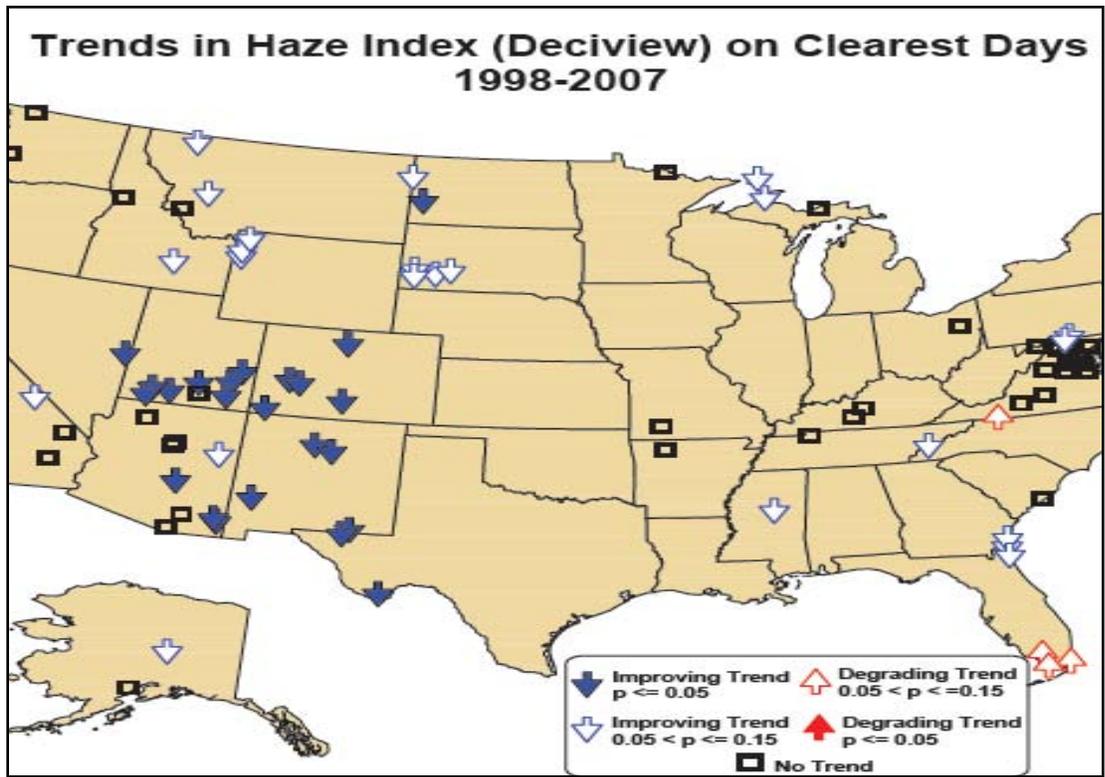


Figure C. Trends in haze index (deciview) on clearest days, 1998-2007.

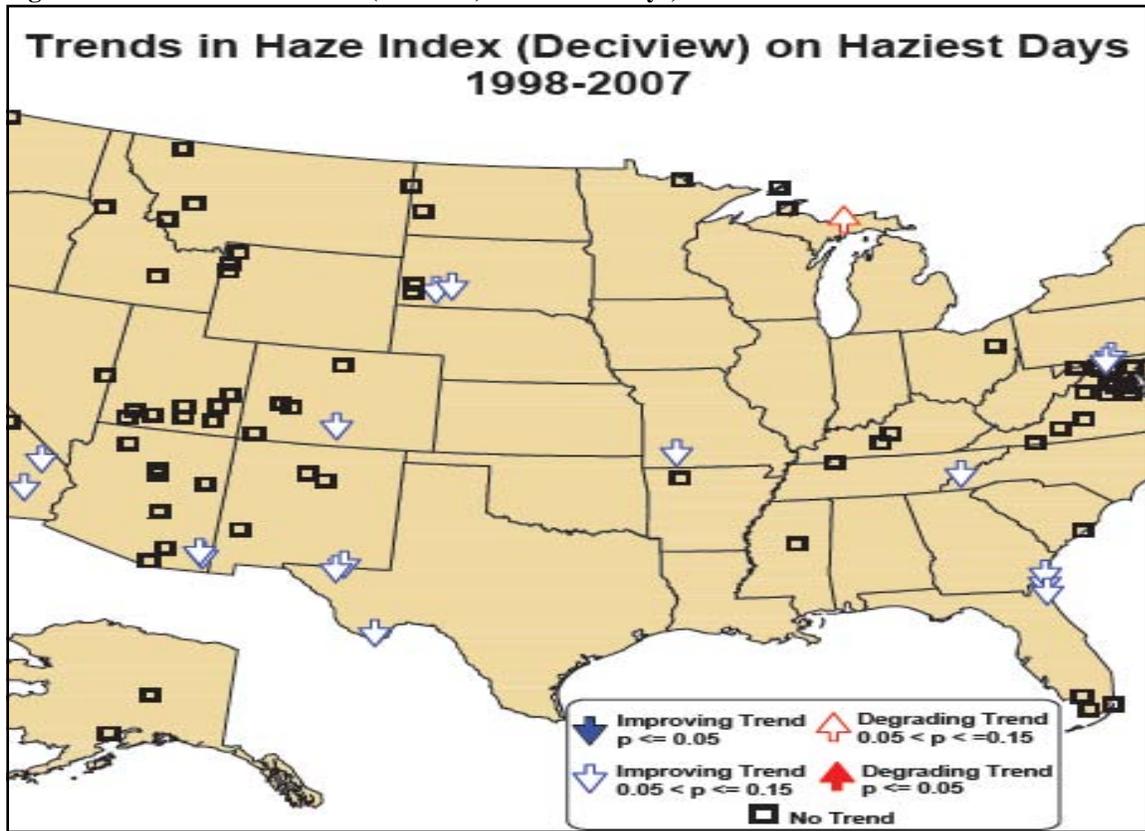


Figure D. Trends in haze index (deciview) on haziest days, 1998-2007.

Billings: The AQI data (Table 1) for the Billings FO shows that there is little risk to the general public from air quality in the Billings FO. Between 1998 and 2006, 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 PM₁₀ in Big Horn County and PM_{2.5} in Yellowstone County. The primary air quality pollutants in the Billings FO are ozone, carbon monoxide, sulfur dioxide, and particulate matter.

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	595	559	94	35	0	1
Yellowstone	MT	3289	3166	96	117	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		4859	4690	97	162	0	4
Field Office Percentages				97 percent	0.03 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_{2.5} 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 (SO₂), and particulate matter (PM_{2.5} and PM₁₀). 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_{2.5} is primarily from fugitive dust (49 percent), agriculture and forestry (12 percent), and residential wood burning (9 percent), while PM₁₀ 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

Lame Deer – Federal PM₁₀

3.3.2 Climate Change

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

The Intergovernmental Panel on Climate Change (Climate Change SIR, 2010) states, “Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.” Global average temperature has increased approximately 1.4°F since the early 20th century (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 (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, CO₂, methane, and N₂O 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 (summarized in the Climate Change SIR 2010). The buildup of GHGs such as CO₂, methane, N₂O, and halocarbons since the start of the industrial revolution has substantially increased atmospheric concentrations of these compounds compared to background levels. At such elevated concentrations, these compounds absorb more energy from the earth’s surface and re-emit a larger portion of the earth’s heat back to the earth rather than allowing the heat to escape

into space than would be the case under more natural conditions of background GHG concentrations.

A number of activities contribute to the phenomenon of climate change, including emissions of GHGs (especially carbon dioxide and methane) from fossil fuel development, large wildfires, and activities using combustion engines; changes to the natural carbon cycle; and changes to radiative forces and reflectivity (albedo). It is important to note that GHGs will have a sustained climatic impact over different temporal scales due to their differences in global warming potential (described above) and lifespans in the atmosphere. For example, CO₂ proper may last 50 to 200 years in the atmosphere while methane has an average atmospheric life time of 12 years (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, Ramseur 2007). Montana, North Dakota, and South Dakota combine for 1.8 percent of the United States' greenhouse gas emissions.

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

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

Other impacts could include:

- Increased particulate matter in the air as drier, less vegetated soils experience wind erosion.
- Shifts in vegetative communities which could threaten plant and wildlife species.

- Changes in the timing and quantity of snowmelt which could affect both aquatic species and agricultural needs.

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

- Large-scale shifts have already occurred in the ranges of species and the timing of the seasons and animal migrations. These shifts are likely to continue (USGCRP (United State Global Change Research Program) 2009, as cited in the Climate Change SIR 2010). Climate changes include warming temperatures throughout the year and the arrival of spring an average of 10 days to 2 weeks earlier through much of the U.S. compared to 20 years ago. Multiple bird species now migrate north earlier in the year.
- Fires, insect epidemics, disease pathogens, and invasive weed species have increased and these trends are likely to continue. Changes in timing of precipitation and earlier runoff increase fire risks.
- Insect epidemics and the amount of damage that they may inflict have also been on the rise. The combination of higher temperatures and dry conditions have increases insect populations such as pine beetles, which have killed trees on millions of acres in the western U.S. and Canada. Warmer winters allow beetles to survive the cold season, which would normally limit populations, while concurrently, drought weakens trees, making them more susceptible to mortality due to insect attack.

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

- Temperature increases in Montana are predicted to be between 3 to 5°F at mid-21st century and between 5 to 9°F at the end of the 21st century. As the mean temperature rises, more heat waves are predicted to occur. In the late 21st century, the number of days per year with temperatures above 100°F is predicted to be between 10 and 45, depending on the level of GHG emissions, with the largest increase in the number days over 100°F occurring in the eastern portion of the state.
- Precipitation increases in winter and spring in Montana may be up to 25 percent in some areas. Precipitation decreases of up to 20 percent may occur during summer, with potential increases or decreases in the fall. In the fall western Montana may see little change in precipitation, while the northwestern portion of the state may experience 5 to 10 percent increases.
- For most of Montana, annual median runoff is expected to decrease between 2 and 5 percent, but northwestern Montana may see little change in annual runoff. Mountain snowpack is expected to decline, reducing water availability in localities supplied by meltwater.
- Glaciers are already known to be melting, and all glaciers in Glacier National Park are expected to be completely melted by 2030 or sooner.
- Wind power production potential is predicted to decline in Montana based on modeling focused on the Great Falls area.
- Conditions in Montana wetlands across much of the northern part of the state are predicted to remain relatively stable, although some wetland habitat near Cutbank is predicted to degrade to less favorable conditions.

- Water temperatures are expected to increase in lakes, reservoirs, rivers, and streams. Fish populations are expected to decline due to warmer temperatures, which could also lead to more fishing closures.
- Wildland fire risk is predicted to continue to increase due to climate change effects on temperature, precipitation, and wind. One study predicted an increase in median annual area burned by wildland fires in Montana based on a 1°C global average temperature increase to be 241 to 515 percent.

While long-range regional changes might occur within this project area, it is impossible to predict precisely when they could occur. The following example summarizing climate data for the West North Central Region (MT, ND, SD, WY) illustrates this point at the regional scale. A potential regional effect of climate change is earlier snowmelt and associated runoff. This is directly related to spring-time temperatures. Over a 112-year record, overall warming is clearly evident with temperatures increasing 0.21 degrees per decade (Figure 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, since several other 15-year windows can be selected to show either warming or cooling trends. Some of these year-to-year fluctuations in temperature are due to natural processes, such as the effects of El Niño, and the eruption of large volcanoes (summarized in the 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.

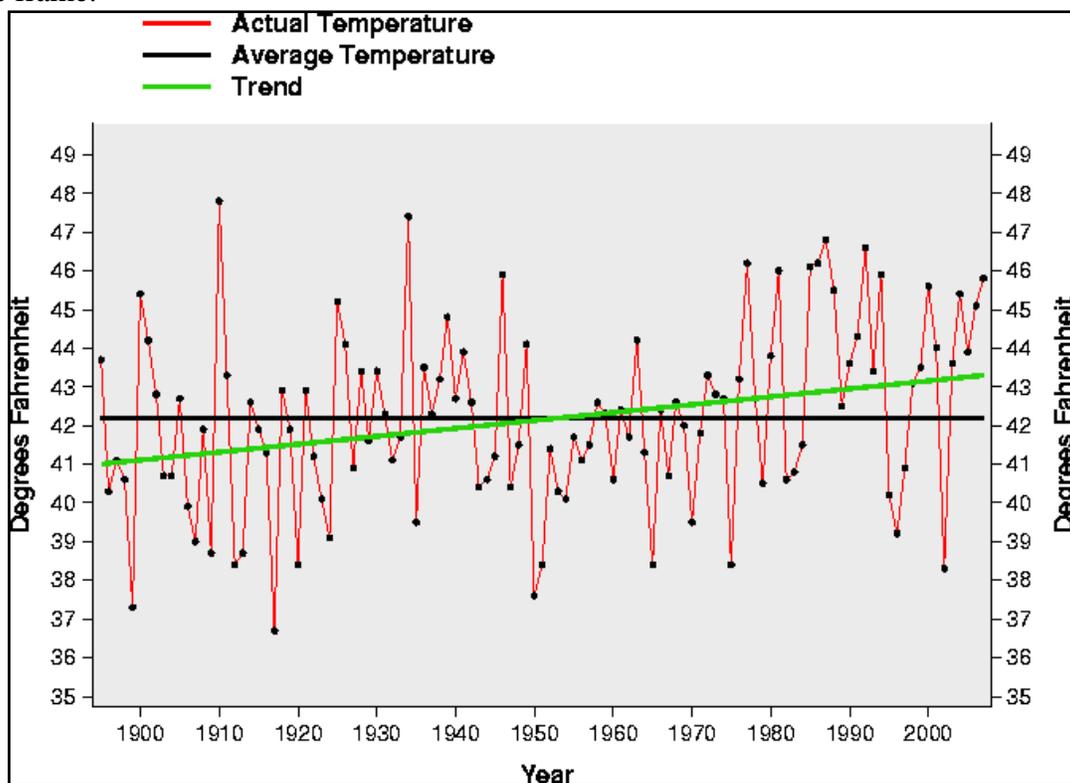


Figure E. Regional climate summary of spring temperatures (March-May) for the West North Central Region (MT, ND, SD, WY), from 1895-2007. (Source: NOAA website – <http://www.ncdc.noaa.gov/oa/climate/research/cag3/wn.html>)

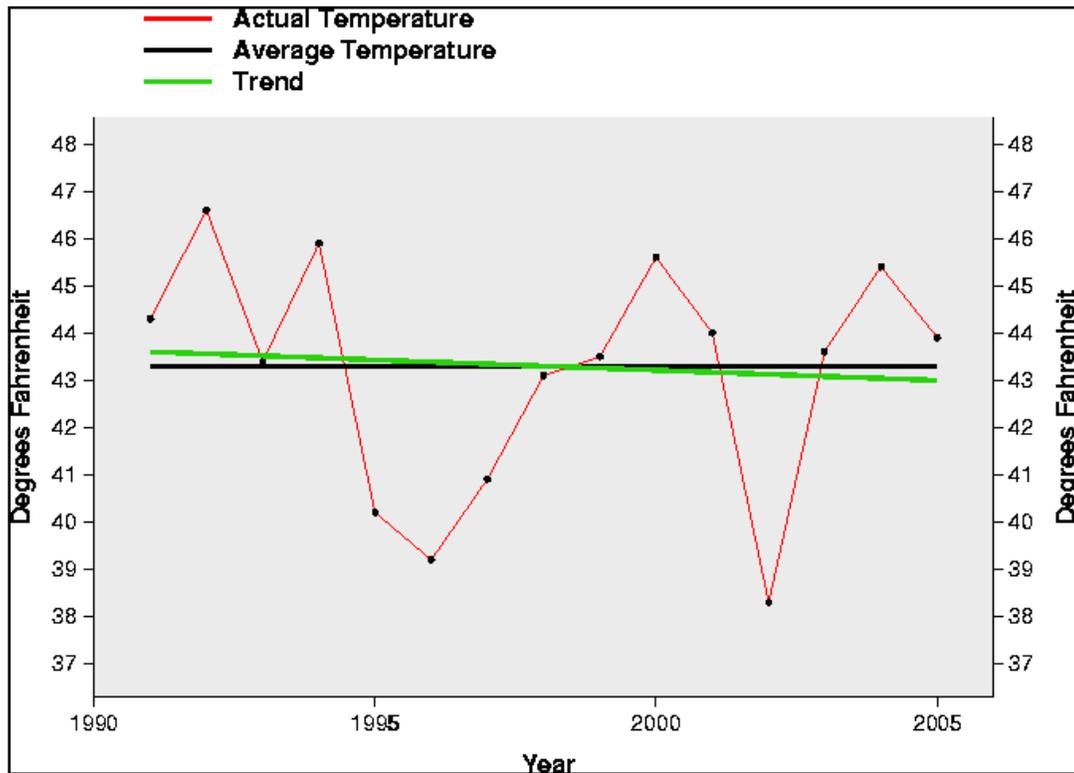


Figure F. Regional climate summary of spring temperatures (March-May) for the West North Central Region (MT, ND, SD, WY), from 1991-2005. (Source: NOAA website – <http://www.ncdc.noaa.gov/oa/climate/research/cag3/wn.html>)

3.3.3 Soil Resources

The soil-forming factors (climate, parent material, topography, biota, and age) are variable across the planning area and by geographical area, resulting in soils with diverse physical, chemical, and biological properties.

Many of the parcels located within the moderate oil and gas potential areas (as identified in the Billings RFD) contain soils at risk of severe erosion by wind and/or water. Soils with high water erosion potential have a whole soil water erosion factor (Kw) value multiplied by relative percent slope value of seven or greater. Soils with high wind erosion potential have a Wind Erodibility Index (WEI) of 134 or greater. Some of the moderate RFD areas also contain soils considered highly susceptible to degradation. Susceptibility to degradation describes the ability of the soil resource to resist functional changes from surface-disturbing actions. Degradation resistance is dependent on soil type, vegetation, climate, land use, disturbance regime, and temporal and spatial scales. Soils considered highly susceptible to degradation have a high risk of: accelerated erosion by wind and water, salinization, sodification, organic matter and nutrient depletion, and/or inadequate rooting medium following disturbance. Soils with high degradation susceptibility have characteristics such as: steep slopes, high soluble salt content, limited organic matter and nutrients, poor water holding capacity, inadequate rooting depth, and/or are highly erosive. No matter the quality of reclamation, sites highly susceptible to accelerated erosion

and/or degradation would never recover from disturbance. Conversely, soils resilient to surface uses have the potential to maintain functionality following disturbance.

Data was not always available to determine the primary parent material, ecological site, and/or surface textures for the planning area. The following describes principal soil properties found within each lease parcel that falls in the moderate oil and gas potential RFD areas:

MTM 79010 2X--Lake Basin Fault Zone soils generally developed from siltstone alluvium, sandstone residuum, or shale residuum from either the Eagle or Telegraph Creek Formations. The primary ecological site is shallow clay with 11-14 inches of annual precipitation. Surface textures are predominantly clay loams. Slopes are commonly 15 percent or less, though they reach about 100 percent. Approximately 52 percent (280 acres) of this parcel is considered highly erodible.

MTM 79010 2Z--Lake Basin Fault Zone soils generally developed from sandstone or shale residuum from either Claggett shale or the Eagle Formation. The primary ecological site is clayey with 11-14 inches of annual precipitation. Surface textures are predominantly clay loams. Slopes are commonly less than 10 percent, though they reach about 50 percent. Approximately 32 percent (210 acres) of this parcel is considered highly erodible.

MTM 79010 3F--Elk Basin soils generally developed from the Tongue River Member of the Fort Union Formation. Slopes are various, reaching about 80 percent. Approximately 4 percent (60 acres) of this parcel is considered highly erodible and highly susceptible to site degradation.

MTM 79010 3O--Elk Basin soils are generally various, having developed from the Tullock Member of the Fort Union Formation. Slopes commonly range around 15 percent or less, though they reach about 70 percent. Approximately 20 percent (280 acres) of this parcel is considered highly erodible, 68 percent (190 acres) of which is considered highly susceptible to degradation.

MTM 79010 3Q--Soils generally developed from sandstone or shale residuum from the Kootenai Formation. Surface textures are predominantly channery clay loams. Slopes commonly range around 15 percent, though they reach about 65 percent.

MTM 79010 3X--Soils generally developed from clayey shale residuum from the Kootenai Formation. The primary ecological site is saline upland with 11-14 inches of annual precipitation. Surface textures are predominantly clays. Slopes are various, reaching about 65 percent.

MTM 79010 4H--Nye Bowler Lineament generally developed from residuum over calcareous sandstone, shale residuum, or calcareous sandstone residuum from either the Kootenai or Piper Formations. The primary ecological sites are shallow, with either 11-14 or 13-19 inches of annual precipitation. Surface textures are predominantly channery loams, clay loams, or silt loams. Slopes commonly range around 15 percent or less, though they reach about 80 percent. Approximately 24 percent (480 acres) of this parcel is considered highly erodible, 85 percent (410 acres) of which is considered highly susceptible to degradation.

MTM 79010 4R--Nye Bowler Lineament soils are generally various, having developed from the Kootenai or Chugwater Formations. Slopes are various, reaching about 80 percent. Approximately 22 percent (140 acres) of this parcel is considered highly erodible and highly susceptible to site degradation.

MTM 79010 4T, Elk Basin soils are generally various, having developed from either the Lance Formation or the Tullock Member of the Fort Union Formation. Slopes commonly range around 15 percent or less, though they reach about 70 percent. Approximately 27 percent (200 acres) of this parcel is considered highly erodible; 95 percent (190 acres) of which is considered highly susceptible to degradation.

MTM 79010 4U soils generally developed from the clayey residuum of Mowry shale. The primary ecological site is saline upland with 11-14 inches of annual precipitation. Surface textures are predominantly clays. Slopes are various reaching about 90 percent.

MTM 79010 EM--Lake Basin Fault Zone soils generally developed from sandstone or shale residuum from the Eagle Formation. The primary ecological site is clayey with 11-14 inches of annual precipitation. Surface textures are predominantly clay loams. Slopes are commonly less than 10 percent, though they reach about 110 percent. Approximately 41 percent (100 acres) of this parcel is considered highly erodible.

MTM 79010 JL--Nye Bowler Lineament soils generally developed from clayey shale residuum from either the Judith River or Hell Creek Formations. The primary ecological site is shallow clayey with 13-16 inches of annual precipitation. Surface textures are predominantly clay loams. Soils considered prime farmland occur within this parcel (0.1 acres). Slopes commonly range around 25 percent, though they reach about 55 percent. Approximately 81 percent (130 acres) of this parcel is considered highly erodible, 46 percent (60 acres) of which is considered highly susceptible to degradation.

MTM 79010 QI--Pole Creek Anticline soils generally developed from sedimentary rock alluvium or residuum from the Telegraph Creek through Greenhorn Formations, Bearpaw shale, or Claggett shale. The primary ecological site is silty with 11-14 inches of annual precipitation. Surface textures are predominantly loams. Slopes are commonly less than 10 percent, though they reach about 55 percent. Approximately 20 percent (210 acres) of this parcel is considered highly erodible.

MTM 79010 VJ--Pole Creek Anticline soils generally developed from sandstone or alluvium residuum from the Kootenai Formation. The primary ecological site is shallow with 11-14 inches of annual precipitation. Surface textures are predominantly fine sandy loams or loams. Soils considered prime farmland, if irrigated, occur within this parcel. However, dependable water is unavailable on these lands; therefore, they would not be considered prime farmland. Slopes are commonly less than 10 percent, though they reach about 40 percent. Approximately 37 percent (280 acres) of this parcel is considered highly erodible.

3.3.4 Water Resources

3.3.4.1 Hydrology – Surface Water Quality

The Proposed Action is located within the Upper Musselshell River (10040201), Middle Musselshell River (10040202), Upper Yellowstone River (10070002), Upper Yellowstone River-Big Lake Basin (10070004), Stillwater River (Yellowstone River, 10070005), Clarks Fork Yellowstone River (10070006), and Shoshone River (10080014) watersheds (subbasin; HUC (Hydrologic Unit Code) 8).

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

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. The lease parcels cumulatively include approximately seven miles of perennial and approximately 57 miles of intermittent and ephemeral streams (NHD (National Hydrologic Database) GIS). Of these, five lease parcels contain 5.72 miles of Silvertip, Cottonwood, South Fork Bridger, and North Fork Willow creeks which have been identified as impaired on the 2008 Impaired Streams List (303 (d) list) by the Montana Department of Environmental Quality (MDEQ) (GIS).

Silvertip Creek (SILVERTIP CREEK, state line to the mouth (Clarks Fork), MT43D002_100) is listed as is listed as category 5 (one or more uses are impaired and a TMDL is required) and 2B (available data and/or information indicate that a water quality standard is exceeded due to an apparent natural source in the absence of any identified anthropogenic sources) with primary contact recreation uses fully supporting, agricultural and industrial uses partially supporting, and drinking water and aquatic life uses not supporting. Cold water fishery use is listed as insufficient information to evaluate and does not support the use likely due to natural conditions. According to the MDEQ, “If not for oil production waste water, this stream may be ephemeral. The elevated flow and resulting sediment load and poor water quality does not fully support agriculture or industry beneficial uses. Overall the habitat is moderately impaired, and the biology is severely impaired for a B-1 (use class) stream. Due to the lack of information about the quality and source of water coming out of Wyoming, the lack of oil and grease samples, and the likelihood of continuing spills, it would be beneficial to establish a monitoring plan for this stream in the future” (http://cwaic.mt.gov/det_rep.aspx?segId=MT43D002_100&qryId=74018 accessed 6/24/2010).

Cottonwood Creek (COTTONWOOD CREEK, headwaters to the mouth (Clarks Fork), MT43D002_140) is listed as category 5 (one or more uses are impaired and a TMDL is required) and 2B (available data and/or information indicate that a water quality standard is exceeded due to an apparent natural source in the absence of any identified anthropogenic sources) with agricultural, drinking water, industrial, and primary contact recreation uses fully supporting and aquatic life use partially supporting. Cold water fishery use is listed as insufficient information to evaluate and does not support the use likely due to natural conditions (http://cwaic.mt.gov/det_rep.aspx?segId=MT43D002_140&qryId=74020 accessed 6/24/2010).

South Fork Bridger Creek (SOUTH FORK BRIDGER CREEK, tributary to Bridger Cr, MT43D002_180) is listed as category 5 (one or more uses are impaired and a TMDL is required) and 2B (available data and/or information indicate that a water quality standard is exceeded due to an apparent natural source in the absence of any identified anthropogenic sources) with agricultural, industrial, and primary contact recreation uses fully supporting and aquatic life and drinking water uses not supporting. Cold water fishery use is listed as insufficient information to evaluate and does not support the use likely due to natural conditions (http://cwaic.mt.gov/det_rep.aspx?segId=MT43D002_180&qryId=74021 accessed 6/24/2010).

North Willow Creek (NORTH WILLOW CREEK, headwaters to the mouth (Musselshell River, MT40C002_010) is listed as category 5 (one or more uses are impaired and a TMDL (Total Maximum Daily Load) is required) with primary contact recreation use fully supporting and aquatic life and warm water fishery uses not supporting. (http://cwaic.mt.gov/det_rep.aspx?segId=MT40C002_010&qryId=74022 accessed 6/24/2010).

The lease parcels cumulatively include approximately four acres of waterbodies (NHD GIS) (see Table 2). Of these, no parcels contain waterbodies that have been identified on the 2008 Impaired Streams List (303 (d) list) by the Montana Department of Environmental Quality (MDEQ) (GIS).

Table 2. Waterbodies by Lease Parcel

Lease Parcel	Name	Type	Acres	RFD Potential
MTM 79010 3O	Unnamed	Intermittent Lake/Pond	0.19	Moderate
MTM 79010 3O	Unnamed	Intermittent Lake/Pond	1.00	Moderate
MTM 79010 4W	Unnamed	Intermittent Lake/Pond	1.03	Low
MTM 79010 QI	Unnamed	Intermittent Lake/Pond	1.19	Moderate
MTM 79010 VJ	Unnamed	Intermittent Lake/Pond	0.15	Moderate

The lease parcels, MTM 79010 4R and MTM 79010 2Z contain one spring/seep each which are located in moderate RFD potential areas (NHD GIS).

3.3.4.2 Hydrology – Ground Water

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 coal bed natural gas (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, sodium adsorption rate (SAR) (36.8 to 66.3), and total dissolved solids (TDS) (up to 2,029 milligrams/liter) (Wheaton et al. 2008).

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 potentially infiltrates the soil or shallow aquifers.

3.3.5 Vegetation Resources

The proposed lease parcels occur throughout four counties within the field office. As a result, the vegetative communities vary greatly. These variations are a result of soil, geomorphology, precipitation, topography, aspect, and other influences. Table 3 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 3. Average precipitation based on the closest co-op weather station

Lease Parcel	Lease Parcel County	Co-op Weather Station ¹	Average Annual Precipitation (Inches)	Period of Record
MTM 79010 A3	Sweet Grass	Big Timber	15.35	1894-2009
MTM 79010 EM	Stillwater	Rapelje 4S	14.32	1908-2009
MTM 79010 2X	Stillwater	Rapelje 4S	14.32	1908-2009
MTM 79010 2Z	Stillwater	Rapelje 4S	14.32	1908-2009
MTM 79010 VJ	Musselshell	Roundup	12.47	1914-2009
MTM 79010 QI	Musselshell	Roundup	12.47	1914-2009
MTM 79010 JI	Stillwater	Nye 2	18.36	1905-2009
MTM 79010 JL	Carbon/ Stillwater	Nye 2	18.36	1905-2009
		Fishtail	17.97	1951-2009
MTM 79010 4W	Carbon	Bridger	11.49	1900-2009
MTM 79010 3F	Carbon	Belfry	6.84	1876-1974
MTM 79010 3O	Carbon	Belfry	6.84	1876-1974
MTM 79010 4T	Carbon	Belfry	6.84	1876-1974
MTM 79010 4E	Carbon	Prior	15.79	1950-2009
		Edgar	18.03	1950-1974
MTM 79010 3Q	Carbon	Prior	15.79	1950-2009
		Edgar	18.03	1950-1974
MTM 79010 3X	Carbon	Prior	15.79	1950-2009
		Edgar	18.03	1950-1974
MTM 79010 4V	Carbon	Bridger	11.49	1900-2009
MTM 79010 3R	Carbon	Bridger	11.49	1900-2009
MTM 79010 4J	Carbon	Bridger	11.49	1900-2009
MTM 79010 4H	Carbon	Bridger	11.49	1900-2009
MTM 79010 4R	Carbon	Bridger	11.49	1900-2009

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

The table above illustrates the large variance in precipitation from a high average of over 18 inches annually to a low average of below 7 inches annually. Due to the extreme variance in precipitation, vegetation also varies greatly. Table 4 lists the lease parcels, as well as the dominant vegetative communities expected within each lease parcel. This table gives the expected communities. Unique vegetative communities do exist within each lease parcel but may not be described in this document. The vegetative communities listed in Table 4 are defined below. The proposed lease parcels include both private and public surface. It is likely that agricultural land, as well as improved and restored pasture land, is present within the parcels proposed for lease. These areas are not specifically identified in Table 4 but could occur anywhere that topography allows for agricultural development in the past or present.

Table 4. Dominant Vegetative Communities within the Lease Parcels

Lease Parcel	Lease Parcel County	Likely Vegetation Communities
MTM 79010 A3	Sweet Grass	Mixed Grassland, Juniper Grassland, Overflow
MTM 79010 EM	Stillwater	Sagebrush Grassland, Overflow
MTM 79010 2X	Stillwater	Mixed Grass, Sagebrush Grassland, Ponderosa Pine Grassland, Juniper Grassland, Overflow
MTM 79010 2Z	Stillwater	Mixed Grass, Sagebrush Grassland, Ponderosa Pine Grassland, Juniper grassland, Overflow
MTM 79010 VJ	Musselshell	Sagebrush Grassland, Mixed Grass
MTM 79010 QI	Musselshell	Sagebrush Grassland,
MTM 79010 JI	Stillwater	Lodgepole, Douglas Fir Forest, Mixed Grass
MTM 79010 JL	Carbon/ Stillwater	Lodgepole, Douglas Fir Forest, Mixed Grass
MTM 79010 4W	Carbon	Sagebrush Grassland, Mixed Grass, Juniper Grassland, Saltbush/Greasewood Shrub Land
MTM 79010 3F	Carbon	Sagebrush Grassland, Saltbush/Greasewood Shrub Land
MTM 79010 3O	Carbon	Sagebrush Grassland, Saltbush/Greasewood Shrub Land
MTM 79010 4T	Carbon	Sagebrush Grassland, Saltbush/Greasewood Shrub Land
MTM 79010 4U	Carbon	Sagebrush Grassland, Agriculture, Juniper Grassland
MTM 79010 3Q	Carbon	Sagebrush Grassland, Mixed grass, Juniper Grassland, overflow
MTM 79010 3X	Carbon	Mixed Grass, Sagebrush Grassland, Juniper Grassland,
MTM 79010 4V	Carbon	Mixed Grass, Sagebrush Grassland
MTM 79010 3R	Carbon	Sagebrush Grassland, Mixed Grass
MTM 79010 4J	Carbon	Sagebrush Grassland, Mixed Grass
MTM 79010 4H	Carbon	Sagebrush Grassland, Mixed Grass, Overflow, Juniper Grassland
MTM 79010 4R	Carbon	Sagebrush Grassland, Mixed Grass, Overflow, Juniper Grassland

3.3.5.1 Vegetative Communities: Mixed Grassland

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

3.3.5.2 Vegetative Communities: Sagebrush Grassland

This community is typically dominated by cool season perennial grasses, with varying cover amounts of big sagebrush (*Artemisia tridentata*) intermixed. Big sagebrush is an important component of this community, providing a unique structure within the community. The big sagebrush structure creates microclimates within the community improving capture and retention of moisture, as well as reducing soil temperatures, providing a more hospitable environment for herbaceous species. This community is found on a variety of soils, slopes, and aspects throughout the field office. Precipitation and soil are the dominant factors which drive the sub-species of big sagebrush on a site. Typical understory vegetation in the 10-14 inch precipitation includes bluebunch wheatgrass, western wheatgrass, needle-and-thread, green needlegrass, Sandberg bluegrass (*Poa secunda*) along with desirable forbs such as coneflowers (*Ratibida spp.*) and prairie clovers (*Dalea spp.*).

3.3.5.3 Vegetative Communities: Saltbush (*Atriplex spp.*)/Greasewood (*Sarcobatus vermiculatus*) Shrubland

The saltbush/ greasewood community typically occurs on sites with saline, poorly developed, or clayey soils. These sites are often harsh and could limit or restrict other species from growing. Many times these areas are clay bottoms, clay pans, and washouts. Depending on soil conditions, greasewood could be a monoculture or grow in association with saltbush species. Other vegetation which commonly grows in this community includes inland saltgrass (*Distichlis spicata*), basin wild rye (*Elymus cinereus*), alkali sacaton (*Sporobolus airoides*), western wheatgrass, bluebunch wheatgrass, and bottlebrush squirrel tail (*Elymus elymoides*). Other shrubs which could occur include various saltbush species, winterfat (*Ceratoides lanata*), rubber rabbitbrush (*Chrysothamnus nauseosus*), and big sagebrush (*Artemisia tridentata*).

3.3.5.4 Vegetative Communities: Ponderosa Pine-mixed Grassland

The ponderosa pine-mixed grassland community generally occurs on moderate-to-steep upland slopes on shallow soils. Ponderosa pine is a minor component of the community canopy cover but is characteristic of the type. Dominant herbaceous material includes bluebunch wheatgrass, western wheatgrass, and prairie junegrass, with various species of forbs.

3.3.5.5 Vegetative Communities: Juniper Grassland

This community typically occurs near sagebrush grassland communities. While juniper often does occur within sagebrush grassland communities on gentle slopes, juniper becomes more dominant on steep slopes with shallower soils. These areas are typically on hillsides and coulee sides, on all aspects. Because these areas often limit livestock use, understories are typically dominated by decreaser cool season bunch grasses. This herbaceous layer is highly variable depending on the juniper canopy cover.

3.3.5.6 Vegetative Communities: Lodgepole Pine/ Douglas Fir Forest

These coniferous forest communities occur typically on shallow-soiled sites which receive higher amounts of precipitation. Understory vegetation could vary greatly from a bunchgrass-dominated understory with species such as Idaho fescue (*Festuca idahoensis*), rough fescue (*Festuca scabrella*), and bluebunch wheatgrass to a shrub understory dominated by huckleberry (*vaccinium spp.*), snowberry (*symphoricarpos albus*), beargrass (*Xerophyllum tenax*), elk sedge (*Carex geyeri*), and Kinnikinnick (*Arctostaphylos uva-ursi*). Sites may be dominated by either

lodgepole pine (*Pinus contorta*) or Douglas fir (*Pseudotsuga menziesii*) depending on seral stage and disturbance return interval.

3.3.5.7 Vegetative Communities: Overflow

These communities are often associated with low areas, drainage ways, and swales that receive additional moisture from other sites. Soils are typically moderately deep to very deep. Vegetation in these areas should be dominated by grasses and sedges with forbs and woody species being a minor component of this site. Vegetation includes basin wild rye (*Elymus cinereus*), green needlegrass, bluebunch wheatgrass, western wheatgrass, snowberry, silver sagebrush (*Artemisia cana*), and various forbs.

3.3.5.8 Vegetative Communities: Improved or Restored Pasture

Improved pastures consists of cultivated areas planted with introduced grasses crested wheatgrass (*Agropyron cristatum*), smooth brome (*Bromus inermis*), and intermediate wheatgrass (*Thinopyrum intermedium*) or alfalfa (*Medicago sativa*).

3.3.5.9 Vegetative Communities: Agriculture

The agriculture community is comprised of monocultures of crops which could include small grains, alfalfa, or other crops grown primarily as supplemental feed sources for livestock.

3.3.5.10 Vegetative Communities: Wetland-Riparian

The importance of the riparian zone and associated vegetative communities, regarding water quality, wildlife habitat and over all land health is widely recognized. Healthy riparian zones and associated plant communities help to: reduce streambank erosion; filter and deposit sediment from run-off to build rich floodplains; improve ground water reserves; support diverse and rich aquatic and terrestrial wildlife communities; generally maintain or improve water quality by filtering pollutants, slowing and dissipating flood waters, and reducing water temperature fluctuations.

The riparian zone is defined as “a form of wetland transition between permanently saturated wetlands and upland areas.” These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water. Lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels, are typical riparian areas, also known as “the Green Zone.” Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation dependent upon free water in the soil (BLM Manual 1737).

Most of the lease parcels are in a particularly dry zone, averaging 13.7 inches of precipitation annually, (low of 6.84, high of 18.36) with a correspondingly rare riparian presence (comprising less than 1/4 of one percent of the surface area of the proposed lease parcels). However, large rivers, perennial streams, springs, and intermittent streams in the lease areas do support riparian communities. These narrow bands of lush vegetation and free water are invaluable to the wildlife in the area. This elevates the value of the riparian area due to its rarity and importance for wildlife habitat and water quality.

Vegetative species common to riparian areas vary widely from parcel to parcel. Several lease parcels are located near or in riparian communities associated with foothill streams. These

communities are dominated by willow, water birch, red osier dogwood, cottonwood, and conifers such as Douglas fir and lodgepole pine, as well as the invasive species such as Russian olive and salt cedar. The understory often consists of woody plants such as buffalo berry, sumac, snowberry, golden current, Woods' rose, and grasses and forbs. In areas where woody vegetation has not developed, sedge and rush communities dominate the riparian zones. These habitat types are most common among the riparian communities found in or near the proposed lease parcels. Rush and/or sedge communities dominate the riparian areas in the great plains eco-types of Musselshell, Stillwater and Carbon counties, as well as in most of the intermittent streams and springs of the foothill areas in Stillwater and Sweet Grass counties.

Thirteen of the 19 lease parcels contain riparian habitat/vegetation. As mentioned above, this accounts for less than ½ of one percent of the total lease area. This emphasizes the importance of preserving riparian communities because their resource value far outweighs their limited surface area.

3.3.5.11 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. Several invasive, non-native plant species occupy the project area including: crested wheatgrass (*Agropyron cristatum*), Japanese brome (*Bromus japonicus*), 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.

3.3.5.12 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). 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.

3.3.6 Special Status Species

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

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

3.3.6.1 Special Status Animal Species

Threatened and endangered species and special status species (SSS) that occur in the lease parcel areas are listed below. In addition, migratory birds are considered BLM sensitive species and are a special status group. Two federally listed species historically occurred in the planning area but are no longer present (the black-footed ferret and grizzly bear). The grizzly bear recovery zone has been identified along the U.S. Forest Service (USFS)/BLM boundary in the Beartooth Mountain foothills. Lynx exist along the perimeter of the planning area on USFS lands; however, no Lynx Analysis Units are identified within the planning area. Lynx could be occasional migrants onto public lands. Whooping cranes could also be an occasional migrant into the planning area. Because black-footed ferrets and gray wolves could be considered for reintroduction into portions of the planning area, they are included in this section.

Table 5. Special Status Wildlife Species that Occur in the Lease Parcel Areas

Species	USFWS Status	BLM Status
<u>Mammals</u>		
White-tailed prairie dog	None	Sensitive
Black-tailed prairie dog	None	Sensitive
Black-footed ferret*	Endangered	
Gray wolf	Threatened (experimental pop.)	
Townsend’s big-eared bat		Sensitive
Spotted bat		Sensitive
Fringe-tailed myotis		Sensitive
Long-legged myotis		Sensitive
Long-eared myotis		Sensitive
Pallid bat		Sensitive
		Sensitive
<u>Birds</u>		
Bald eagle		Sensitive
Whooping crane	Endangered	
Mountain plover	None	Sensitive
Greater sage-grouse	None	Sensitive
BLM sensitive raptors (peregrine falcon, burrowing owl, ferruginous hawk, Swainson’s hawk)	None	Sensitive
Migratory birds	None	Sensitive
<u>Reptiles/ Amphibians</u>		
Greater short-horned lizard		Sensitive
Milk snake		Sensitive
Northern leopard frog		Sensitive
Spiny softshell turtle		Sensitive
Western hog-nosed snake		Sensitive
<u>Fish</u>		
Yellowstone Cutthroat Trout		Sensitive

*Not currently present in the Billings Planning Area

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. Two identified wolf packs could occasionally range onto public lands along the Beartooth Mountain front. Leases JL and A3 are on the fringe of the wolf recovery 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.

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. 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.

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*. The mountain plover 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.

3.3.6.2 Special Status Fish Species

Within its historical range, Yellowstone cutthroat trout (YCT) are considered a “species of special concern” or a “sensitive species” by many state and federal agencies and organizations. In 1998, it was petitioned for listing as a threatened species under the ESA, but this petition was rejected in February 2001.

Yellowstone cutthroat trout numbers have declined in distribution and abundance throughout its range. Yellowstone cutthroat trout currently occupy 31 percent of their historical range in Montana (May, 2007). Most remaining indigenous populations in Montana inhabit headwater streams and the upper Yellowstone River.

Non-native fish species are generally considered the greatest threat to YCT persistence. Displacement of native fish species by brown trout, brook trout, and hybridization with rainbow trout have been thoroughly documented in the region. Habitat fragmentation from irrigation diversion, culvert barriers, and other manmade obstacles has also contributed to the decrease in YCT numbers. Preserving habitat quality in the suitable restoration habitats is a crucial step in maintaining the viability of YCT populations and restoration efforts. In *Range-Wide Status Assessment for Yellowstone Cutthroat Trout (*Oncorhynchus clarkii bouvieri*): 2006*, resource managers designated potentially suitable restoration habitats for YCT. These habitats are located in or near parcels MTM 79010 A3 and MTM 79010 JL, as described in the Fisheries section (Upper and Lower Deer Creek, Ingersoll Creek and Stopher Gulch). A portion of MTM 79010 A3 (northernmost tract) is also within one-half mile of an YCT conservation population habitat in the Yellowstone River.

3.3.6.3 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. The Montana Natural Heritage Program website (MNHP 2010) was queried. Of the 23 sensitive plant species which occur in the resource area, only one is known to occur within the proposed lease parcels. Dwarf mentzelia (*Mentzelia pumila*) is listed by the Montana Natural Heritage Tracker Database to occur within section 20 of lease parcel MTM 79010 4R. On June 18, 2010, BLM personnel conducted a site visit on this parcel and confirmed the occurrence of dwarf mentzelia. Dwarf mentzelia prefers open habitat, typically on sandy soils, often in the Chugwater sandstones, in the desert shrubland and woodland valley and foothill zones (Lesica and Achuff 1992). Threats have not been assessed, and trends are unknown. This population is one of 19 occurrences in Carbon and Bighorn counties (Montana Field Guides 2010 Page 2).

3.3.7 Fish and Wildlife

3.3.7.1 Terrestrial Wildlife Resources

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 Beartooth foothills (Parcels A3, JI, and JL). Crucial winter habitat is also concentrated on the Beartooth Mountain foothills.

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.

3.3.7.2 Fisheries Resources

Fisheries resources, in or adjacent to proposed lease parcels, are limited to a few small streams with sparse populations of cold water fish. The one exception is parcel MTM 79010 A3, which is located approximately one-half mile from the Yellowstone River. This reach of the Yellowstone River is a blue ribbon fishery and is habitat to a conservation population of Yellowstone cutthroat trout. Many other non-sensitive fish species also use this reach of the river.

Parcels MTM 79010 A3 and MTM 79010 JL have perennial streams and cold water fish habitat within their boundaries or less than one-half mile away. These streams are Ingersoll Creek, Upper and Lower Deer Creeks, and Stopher Gulch, which are home to several fish species, including but not limited to, rainbow trout, brook trout, brown trout, mountain whitefish, and mountain suckers. They are also designated Yellowstone cutthroat trout suitable restoration habitat (Range-Wide Status Assessment for Yellowstone Cutthroat Trout (*Oncorhynchus clarkii bouvieri*): 2006, May et al.). Portions of parcel MTM 79010 4J lie within one-half mile of Bluewater Creek, which is home to a state fish hatchery. Topographical features would prevent impacts from oil and gas development on this lease parcel (the tracts within one-half mile of Bluewater Creek are over a ridge).

The remaining lease parcels do not have fish bearing waters in them or within several miles of their boundaries.

3.3.8 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. The SHPO also maintains a database of all cultural resource inventory reports that occurred as a result of cultural inventories throughout the state. (2008 BLM 3-11)

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: A total of 64 cultural resource inventories have occurred within/partially within the proposed lease parcels. The total acreage inventoried is unknown because the BLM is only in possession of those reports that are a result of federal undertakings (33 reports). Cultural resource inventories have been conducted in portions of lease sale parcels (MTM 79010) A3, EM, 2X, VJ, QI, JI, JL, 4W, 3F, 3O, 4T, 3R, 4J, 4H, and 4R. No cultural resource inventories have been conducted in lease parcels (MTM 79010) 2Z, 4U, 3Q, 3X, and 4V.

Forty-seven of the 64 cultural resource reports are 10 years old or older. 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 twenty-six previously recorded cultural sites are documented as occurring in or proximate to the 20 proposed lease parcels. Prehistoric localities comprise 12 of these sites (46 percent) with the remaining 14 sites (54 percent) containing historic components. A wide range of prehistoric site types occur, including petroglyphs/pictographs, lithic scatters, fire hearths, buffalo processing areas, rock shelters, tipi rings, cairns, and other rock structures. The majority of these sites have been minimally

recorded and require further documentation and possible subsurface testing to evaluate NRHP eligibility. The historic sites consist of homesteads and other structures, railroad routes, trails/roads, bridges, sheepherder monuments, mining evidence, and irrigation systems. A fair amount of document research and history was included in initial recordation of these sites, providing a substantial basis for suitable recommendations.

Historic records include original survey plats from the 1890s-early 1900s (General Land Office Records) along with separate homestead patent searches conducted for individual tracts. Since the late 1800s, all of the lease sale parcels have experienced varying levels of exploitation from gold mining, logging, agriculture, ranching, westward transportation expansion, and coal and oil exploration (Noyes 1915). Historic properties documented within the affected counties and within the lease parcels themselves include structures and evidence of many of these operations.

Of the 26 previously recorded sites, 11 (four historic and seven prehistoric) sites are located within the proposed lease sale parcel boundaries. The four historic localities are:

- 24ML339 – a possible sheepherder’s camp;
- 24CB1234 – two large sheepherder’s monuments;
- 24CB1242 – portions of the Bridger Trail that occur in three separate sections of T7S R24E; and
- 24CB 2107 – portions of the Silver Tip Road that occur in four separate sections of T9S R23E.

The 24ML339 and 24ML1234 sites were recommended as not eligible for the NRHP by the initial recorders, while more information on the Silver Tip Road site (24CB2107) is needed to determine eligibility. The entire Bridger Trail (24CB1242) is recommended as eligible as an important alternative to the more famous Bozeman Trail because it provided safer travel around hostile native tribes.

The seven prehistoric localities are:

- 24ML388 – buffalo jump and processing area;
- 24ML505 – fire hearth with associated lithic scatter;
- 24CB1966 – fire hearth with associated lithic scatter;
- 24CB1967 – fire hearth with associated lithic scatter;
- 24CB14 – rock wall structure with associated lithic scatter;
- 24CB191 – rock shelter with associated bone and lithic scatter; and
- 24CB1276 – tipi rings, cairns, and lithic scatters with a reported possible medicine wheel.

Only one site, 24CB1966, was determined ineligible for listing in the NRHP. Two sites, 24ML388 and 24CB1967, were recommended as eligible. The remaining four sites, 24ML505, 24CB14, 24CB191, and 24CB1276, were all recommended as needing more information to determine NRHP status.

Four of the 20 proposed lease sale parcels (parcels QI, 3F, 3O, and 4H) contain recorded cultural sites (see Table 6).

Table 6. Recorded cultural sites in four lease parcels

Parcel Number	Site Number	National Register Eligible	Land Status	Description of Site
MTM 79010 QI	24ML0339	Not eligible	BLM	Historic campsite and trash dump
	24ML0388	Eligible	BLM	Buffalo jump and processing area
	24ML 0505	Unevaluated	BLM	Lithic scatter and hearth
MTM 79010 3F	24CB1234	Not eligible	BLM	Historic sheep camp
	24CB2107	Unevaluated	BLM	Historic road (Silver Tip road)
MTM 79010 3O	24CB1966	Not eligible	BLM	Lithic scatter and hearth
	24CB1967	Eligible	BLM	Lithic scatter and hearth
	24CB2107	Unevaluated	BLM	Historic road (Silver Tip road)
MTM 79010 4H	24CB0014	Unevaluated	BLM	Rock structure and lithic scatter
	24CB0191	Unevaluated	BLM	Lithic scatter and rock shelter
	24CB1242	Eligible	BLM / Private	Historic road (Bridger Trail)
	24CB1276	Unevaluated	BLM	Lithic scatter and tipi ring

3.3.9 Paleontology Resources

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 seven geologic rock units within the planning area that do contain significant fossil material. Rock units that are known to contain fossils are the Tullock and Ludlow Members of the Fort Union Formation, the Judith River, Hell Creek, Morrison and Cloverly Formations, the Lakota Sandstone Formation, and the White River Group.

The Morrison, Hell Creek, Cloverly, and Lakota Sandstone formations are noted for the occurrence of dinosaur fossils. The Bridger Fossil Area Area of Critical Environmental Concern (ACEC), a 575-acre site located in Carbon County on public land, contains outcrops of both the Cretaceous Period Cloverly Formation and the Jurassic Period Morrison Formation. Outcrops of the Morrison Formation within the Bridger Fossil Area ACEC have yielded the fossil remains of numerous juvenile and sub-adult sauropods. The Bridger Fossil Area ACEC is one of two listed National Natural Landmarks within the Billings Field Office area.

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 Formation 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.

The contact between the Cretaceous Period Hell Creek Formation and the Paleocene Tullock/Ludlow Member of the Fort Union Formation marks an important event in time. This 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/Ludlow Member is the primary fossil-bearing unit of the Fort Union Formation and contains fossils of turtles, fish, reptiles and mammals.

The Tertiary Period White River Group is considered an important source of fossil mammals. Although the White River Group outcrops in the planning area, the majority of the fossil-bearing areas are in the Dakotas.

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 area 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 (see Table 7). Areas with a PFYC rating of three or higher would be inventoried for paleontological resources.

Table 7. PFYC Classes

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

A total of 2,452.6344 acres in the proposed lease parcels contain geologic units classified as PFYC Class 2. A total of 3,748.488 acres in the proposed lease parcels contain geologic units classified as PFYC Class 3a. A total of 737.8074 acres in the proposed lease sale parcels contain geologic units classified as PFYC Class 3b. A total of 3,341.0071 acres in the proposed lease sale parcels contain geologic units classified as PFYC Class 4. A total of 5,141.8726 acres in the

proposed lease sale parcels contain geologic units classified as PFYC Class 5 (see Table 8). For those lease parcels containing geologic units classified as PFYC Class 3a, 3b, 4, and 5, an inventory for paleontological resources would occur.

Table 8. Acres of PFYC Class 5

Lease Parcel	PFYC Class	Acres
MTM 79010 3X	Class 3a	39.7089
	Class 4	116.3602
MTM 79010 3Q	Class 2	40.5717
	Class 3a	359.8623
	Class 4	510.721
MTM 79010 3R	Class 2	76.0252
	Class 3a	414.6559
	Class 3b	23.3671
	Class 4	197.3332
MTM 79010 VJ	Class 2	14.3042
	Class 3a	55.3439
	Class 4	691.3265
MTM 79010 QI	Class 2	52.8284
	Class 3a	372.1507
	Class 3b	297.8777
	Class 5	314.5094
MTM 79010 JL	Class 2	10.6046
	Class 3a	0.6237
	Class 5	148.5598
MTM 79010 EM	Class 3a	211.6623
	Class 3b	30.3829
MTM 79010 A3	Class 2	310.7257
	Class 5	1351.5456
MTM 79010 4W	Class 2	748.8985
	Class 3a	730.6956
MTM 79010 4V	Class 2	0.0003
	Class 3a	1.4982
	Class 4	40.8532
MTM 79010 4U	Class 3a	77.6288
MTM 79010 4R	Class 2	227.2851
	Class 3a	66.8908
	Class 3b	43.0069
	Class 4	378.2972
MTM 79010 4J	Class 2	14.7191
	Class 3a	2.3467
	Class 4	304.5098
MTM 79010 4H	Class 2	601.3032
	Class 3b	213.4292
	Class 4	1101.606
MTM 79010 2X	Class 2	35.1351
	Class 3a	326.9579
	Class 3b	129.7436
	Class 5	49.5798
MTM 79010 4T	Class 3a	8.535
	Class 5	803.1447

MTM 79010 3O	Class 2	170.1801
	Class 5	1380.319
MTM 79010 2Z	Class 3a	1079.9281
MTM 79010 3F	Class 2	150.0532
	Class 5	1094.2143

Thirty-one paleontological sites are located in or near the proposed lease sale parcels (2009 Hanna). These sites are located within four proposed lease sale parcels: MTM 79010-3Q, MTM 79010-3X, MTM 79010-4H, and MTM 79010-4R (see Table 9).

Table 9. Paleo sites in or near the lease parcels

Parcel Number	Site Number	Land Status	Description of Site
MTM 79010 3Q	CL-185 (RMP0149)	Private	Vertebrate
	CL-395 (RMP0152)	Private	Vertebrate
	CL-427 (RMP0154)	Private	Vertebrate
	HU-75(19)/75M (RMP0176)	Private	Vertebrate
	HU-36/83M (RMP0177)	Private	Vertebrate
MTM 79010 3X	CL-184 (RMP0148)	Private	Vertebrate
	CL-183 (RMP0147)	Private	Vertebrate
	CL-182 (RMP0146)	Private	Vertebrate
	CL-181 (RMP0145)	Private	Vertebrate
MTM 79010 4H	CL-185 (RMP0149)	Private	Vertebrate
MTM 79010 4R	M-166 (RMP0013)	BLM	Vertebrate
	PR 2419 (RMP0055)	BLM	Vertebrate
	WC90-20 (RMP0058)	BLM	Vertebrate
	WC10-19 (RMP0059)	BLM	Vertebrate
	WC90-21 (RMP0060)	BLM	Vertebrate
	WC90-22 (RMP0061)	BLM	Vertebrate
	HU-5 (RMP0073)	BLM	Vertebrate
	MT-025-CB-92-1 (RMP0092)	BLM / Private	Vertebrate
	YPM 64-75 (RMP0136)	BLM/ State	Vertebrate

		/Private	
	CL-163 (RMP0137)	BLM	Vertebrate
	Locality 6 (RMP0172)	BLM / Private	Invertebrate
	HU-11 2/74M (RMP0174)	BLM	Vertebrate
	HU-5/75M (RMP 0175)	BLM	Vertebrate
	Loc Js-XVI (RMP0233)	BLM / Private	Invertebrate
	AM 33-8 (RMP0407)	BLM/ State /Private	Vertebrate
	YPM 64-53 (RMP0422)	BLM / Private	Vertebrate
	YPM 64-54 (RMP0423)	BLM / Private	Vertebrate
	YPM 64-56 (RMP0424)	BLM	Vertebrate
	YPM 64-57 (RMP0425)	BLM	Vertebrate
	YPM 64-58 (RMP0426)	BLM	Vertebrate
	YPM 64-59 (RMP0427)	BLM	Vertebrate
	YPM 64-74 (RMP0436)	BLM	Vertebrate
	JSS #1 (RMP0438)	BLM / Private	Invertebrate

3.3.10 Native American Religious Concerns

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

As a result of an ethnographic overview (Peterson 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.

3.3.10.1 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).

3.3.10.2 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 spiritualness 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).

3.3.11 Visual Resources

Visual resource management (VRM) classes have not been formally established in the project area. However, an existing visual resource inventory (VRI) has been conducted in the area as part of an ongoing RMP revision and can be used to describe the existing environment (as directed in BLM Manual 8400 - Visual Resource Management).

Visual resource management classifications would only be applied to federally managed surface. The proposed lease parcels located on BLM-administered public lands (approximately 9,614 acres) are within VRI Class III areas. This classification means that the characteristic of the landscape has modifications, but the level of change to the character of the landscape should be moderate. Changes caused by management activities should not detract from the existing landscape features.

3.3.12 Livestock Grazing

The proposed parcels are scattered throughout four counties in the Billings FO planning area. The proposed oil and gas leases occur on both fee (BLM surface and federal sub-surface) and split estate lands inside and outside of BLM grazing allotments. The parcels proposed for oil and gas lease occur on 27 allotments. Table 10 shows the grazing allotment information associated with each oil and gas lease parcel.

Table 10. Grazing allotment information for each lease parcel.

Allotment #	Livestock Kind	Livestock Number	Season Of Use	AUM's	Management Category
MTM 79010 A3					
5440	Cattle	2	3/1-2/28	10	C
5533	Cattle	3	3/1-2/28	28	C
5532	Cattle	14	5/1-2/28	42	C
5534	Horse	22	7/1-9/1	46	C
5508	Cattle	22	5/1-2/28	7	C
5435	Cattle	11	3/1-2/15	15	C
MTM 79010 EM					
No Grazing Allotment within this lease parcel					
MTM 79010 2X					
5559	Cattle	3	3/1-2/28	19	C
MTM 79010 2Z					
No Grazing Allotment within this lease parcel					
MTM 79010 VJ					
4972	Cattle	468	3/1-2/27	1624	M
	Cattle	2	3/1-5/30	2	M
MTM 79010 QI					
4972	Cattle	468	3/1-2/27	1624	M
	Cattle	2	3/1-5/30	2	M
4910	Currently there is no permit for this allotment.				
MTM 79010 JI					
No Grazing Allotment within this lease parcel					

MTM 79010 JL					
No Grazing Allotment within this lease parcel					
MTM 79010 4W					
4911	16	Cattle	3/1-2/28	192	C
4912	10	Cattle	3/1-2/28	6	C
5215	5	Cattle	3/1-2/28	60	C
4119	175	Cattle	5/1-11/1	309	M
MTM 79010 3F					
5210	71	Cattle	5/15-10/15	359	I
	33	Cattle	5/15-10/15	167	
	40	Cattle	5/15-10/15	190	
5202	190	Cattle	5/1-12/15	1430	I
MTM 79010 3O					
5210	71	Cattle	5/15-10/15	359	I
	33	Cattle	5/15-10/15	167	
	40	Cattle	5/15-10/15	190	
1003	450	Cattle	4/15-8/15 8/15-12/1	1642	M
MTM 79010 4T					
1003	450	Cattle	4/15-8/15 8/15-12/1	1642	M
MTM 79010 4U					
5569	2	Cattle	3/1-2/28	24	C
MTM 79010 3Q					
5569	2	Cattle	3/1-2/28	24	C
MTM 79010 3X					
5569	2	Cattle	3/1-2/28	24	C
5566	3	Horse	3/1-2/28	8	C
MTM 79010 4V					
4108	1	Cattle	5/16-10/29	5	C
MTM 79010 3R					
5201	49	Cattle	5/1-11/13	7	C
4122	67	Cattle	5/15-10/15	132	C
MTM 79010 4J					
4911	16	Cattle	3/1-2/28	192	C
MTM 79010 4H					
1555	50	Cattle	6/1-10/19	72	C
4119	175	Cattle	5/1-11/1	309	M
4113	58	Cattle	3/1-2/28	216	I
4114	68	Cattle	6/1-10/31	161	M
MTM 79010 4R					

4129	102	Cattle	3/1-2/27	146	M
4113	58	Cattle	3/1-2/28	216	I
4150	3	Cattle	5/1-2/28	94	C

Over 80 range improvement projects (RIPs) have been constructed (e.g., water developments, pipelines, troughs, and fences) on the allotments which occur within the proposed oil and gas lease areas. The purpose of the RIPs is to improve rangeland health, improve livestock distribution, provide rest, control timing and use, or totally exclude livestock from areas of interest.

3.3.13 Recreation and Travel Management

Recreational opportunities and experiences managed for by the BLM are only available on BLM-administered surface. None of the lease parcels are within special recreation management areas (SRMAs). Portions of the project area consist of small, isolated, and scattered tracts with limited legal public access. The lack of public access limits use of the BLM parcels for recreational use by the general public. Recreational use by the public in the remainder of the project area can be characterized as casual dispersed recreational activities that include hiking, hunting, and motorized recreational opportunities.

3.3.14 Lands and Realty

The lands proposed for competitive leasing of the federal mineral estate are under the jurisdiction of BLM. Seven parcels (4,502.18 acres) are full fee estate (BLM surface and federal mineral estate). Four are split estate parcels (1,959.8 acres). Eight parcels (8,557.62 acres) have a combination of fee and split estate ownership.

Information on land and mineral ownership, access, rights-of-way, etc. was obtained from the BLM lands and realty case files, Master Title Plats, Oil and Gas Plats, and the Montana Cadastral Mapping Program website (<http://gis.mt.gov/>).

Parcel MTM 79010 A3 is both federal full fee estate (479.37 acres) and split estate (1,182.61 acres). The land ownership is comingled and scattered with minimal physical and no legal access. The private surface in section 3, Lots 1 and 2, is encumbered by a residence, two large outbuildings, and a reservoir.

Parcel MTM 79010 EM is entirely split estate covering 240 acres. The mineral ownership pattern is scattered and would require access over adjoining private lands.

Parcel MTM 79010 2X is both federal full fee estate (140.64 acres) and split estate (400 acres). Land ownership is comingled. In particular, the full fee federal tracts are isolated and without physical or legal access.

Parcel MTM 79010 2Z is split estate (640 acres). There are no other federal surface lands in the vicinity of the parcel, and legal access would need to be secured over the adjoining private land. There is the potential to utilize a county road in the vicinity of the parcel.

Parcel MTM 79010 VJ is federal full fee estate (760 acres). Portions of the parcel adjoin other BLM lands with the potential for an off-lease right-of-way grant. Access over adjoining private lands would need to be secured. The parcel is encumbered by an existing right-of-way grant held by Fergus Electric Cooperative. The right-of-way is for a 7.2 kV overhead powerline along the east boundary of section 8, SE.

Parcel MTM 79010 QI is federal full fee estate (1,038.71 acres). The parcel adjoins other BLM-administered lands that could be utilized for access purposes with an off-lease right-of-way grant. There is potential access by either a county road or state Highway 87. A portion of the parcel (section 7, Lot 4 and SESW) is encumbered by a road right-of-way for the Snowy Mountain Road held by Musselshell County.

Parcel MTM 79010 JL is entirely split estate (159.8 acres) split between Stillwater and Carbon counties. There is partial access to the vicinity of the parcel by a county road, but full legal access would require an easement over the private lands adjoining the parcel. This lease is partially encumbered by a conservation easement on the following tracts: section 30, Lot 1, and NESW, totaling 79.82 acres.

Parcel MTM 79010 4W is both federal full fee estate (1,080 acres) and split estate (400 acres). All of the lands are scattered, and the split estate lands do not have legal access. The federal full fee lands have county road access in section 13. The parcel is encumbered by an existing right-of-way grant held by NorthWestern Energy. The right-of-way is for a 12 kV overhead powerline in section 12, S2SE.

Parcel MTM 79010 3F is both federal full fee estate (491.39 acres) and split estate (753.94 acres). The parcel is surrounded on all sides by BLM-administered public lands. Access to the parcel is provided by Carbon County's Silver Tip Road.

Parcel MTM 79010 3O is entirely federal full fee estate (1,549.67 acres). Access to the parcel is provided by Carbon County's Silver Tip Road. The parcel is encumbered by multiple oil and gas transmission line rights-of-way held by NorthWestern Energy, Colorado Interstate Gas, Williston Basin Pipeline Company, and ExxonMobil Corporation.

Parcel MTM 79010 4T is both federal full fee estate (555.93 acres) and split estate (280 acres). The federal full fee lands are blocked-up. There is potential access to the parcel across public lands from the Wyoming state line, along an existing road right-of-way, to Silver Tip road in Montana. The parcel is encumbered by two rights-of-way held by Voyager Exploration; these uses are for an access road and a surface oil and gas pipeline.

Parcel MTM 79010 4U is entirely federal full fee estate (80 acres). The parcel adjoins other BLM-administered lands to the southeast, and there is existing county road access.

Parcel MTM 79010 3Q is entirely split estate (920 acres). The lands are widely scattered, and access easements would need to be secured from the private surface owner.

Parcel MTM 79010 3X is both federal full fee estate (40 acres) and split estate (120 acres). The tracts in section 23 would require access from the private surface owner. In section 26, there is legal access from Carbon County's Bozeman Trail Road.

Parcel MTM 79010 4V is entirely federal full estate (42.29 acres). The parcel is isolated and would require an access easement from the private surface owner.

Parcel MTM 79010 3R is both federal full fee estate (440 acres) and split estate (280 acres). The tracts are widely scattered and require either a BLM right-of-way or an easement from the private surface owner.

Parcel MTM 79010 4J is entirely federal full fee estate (320 acres). The tracts are scattered and isolated. There is access potential by utilizing Carbon County's Bluewater Road and a BLM right-of-way or an easement from the adjoining private landowner.

Parcel MTM 79010 4H is both federal full fee estate (1,593.74 acres) and split estate (320 acres). All of the tracts are moderately blocked-up. There is potential access to the parcel from Carbon County's Pryor Mountain Road and either a BLM right-of-way or an easement from the private surface owner. This parcel is located in an area of interest for renewable energy (wind) development. Until recently, all of the federal surface was encumbered by a Wind Energy Site Testing and Monitoring right-of-way. On December 31, 2009, the subject right-of-way expired.

Parcel MTM 79010 4R is entirely federal full fee estate (711.51 acres). The tracts are moderately blocked-up and there is direct access from Carbon County's Pryor Mountain Road. As with Parcel MTM 79010 4H, this parcel is located in an area of interest for renewable energy (wind) development. The Wind Energy Site Testing and Monitoring right-of-way for this parcel expired on December 31, 2009. The parcel is also encumbered by a water pipeline right-of-way grant located in section 18, Lot 5; section 19, Lots 6 and 7; and section 20, S2SW.

Renewable energy includes biomass, geothermal, solar power, and wind. As demand has increased for clean and viable energy, the opportunity for renewable energy sources available on BLM public lands is considered as part of the bureau's multiple use objectives. Developing renewable energy projects depends on market trends and market value. The primary limiting factors in site selection include access to power transmission interconnects, acquisition of permits, and power purchase agreements between the producer and owner of the power lines. Currently, there is no biomass, geothermal, solar power, or wind projects in the area of the aforementioned parcels. Please see Parcels MTM 79010 4H and 4R above. Currently there are no active wind energy development projects on the subject BLM lands.

3.3.15 Minerals

3.3.15.1 Fluid Minerals

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

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

Currently there are 255 oil and gas leases covering approximately 168,744 acres in the Billings Field Office. Information on numbers, status, and jurisdiction of wells on these leases is displayed in Table 11. Numbers of townships, leased acres within those townships, and development activity for all jurisdictions are summarized in Table 12. Existing production activity holds approximately 9.5 percent of this lease acreage.

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

Table 11. Existing Development Activity

	FEDERAL WELLS	PRIVATE AND STATE WELLS
Drilling Well(s)	0	6
Producing Gas Well(s)	8	101
Producing Oil Well(s)	55	181
Water Injection Well(s)	7	55
Shut-in Well(s)	6	196
Temporarily Abandoned Well(s)	6	4

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

	Carbon County	Stillwater County	Sweet Grass County	Musselshell County
Number of Townships Containing Lease Parcels	7	3	2	2
Total Acres Within Applicable Township(s)	150,553	56,425	45,934	46,027
Federal Oil and Gas Minerals (acres)	47,343	17,424	6,210	9,869
Percent of Township(s)	31	31	14	21
Leased Federal Oil and Gas Minerals (acres)	6,058	2,123	0	6,827
Percent of Township(s)	4	3.8	0.0	14.8
Leased Federal Oil and Gas Minerals Suspended (acres)	10,090	1,633	1,662	1,798
Percent of Township(s)	6.7	2.9	3.6	3.9
Federal Wells	Producing Gas Well(s) 1 Producing Oil Well(s) 47 Water Injection Well(s) 5 Shut-in Well(s) 6 Temporarily Abandoned Well(s) 1			Shut-in Well(s) 1
Private and State Wells	Producing Oil Well(s) 17 Water Injection Well(s) 8 Shut-in Well(s) 10	Producing Gas Well(s) 1 Shut-in Well(s) 3		Drilling Well(s) 1 Water Injection Well(s) 2 Shut-in Well(s) 16 Temporarily Abandoned Well(s) 1

3.3.15.2 Solid Minerals

Leasable Minerals

Leasable minerals are those leased to individuals for exploration and development. They are acquired by applying to the federal government for a lease to explore and develop the minerals. Leasable minerals are subdivided into two classes, fluid and solid. Fluid minerals include oil and gas, geothermal resources, and associated by-products, oil shale, native asphalt, oil-impregnated sands, and any other material where oil is recoverable by special treatment after the deposit is mined or quarried. Solid leasable minerals are specific minerals such as coal and phosphates. These minerals are associated with the following laws: Mineral Leasing Act of 1920, as amended and supplemented, Mineral Leasing Act for Acquired Lands of 1947, as amended, and the Geothermal Steam Act of 1970, as amended (AGI, 1997). Coal is the only solid, leasable mineral known to occur within the Billings planning area.

Coal

It is unlikely that coal resources with development potential are present under the oil and gas lease parcels. Coal with development potential is confined to the Bull Mountains coal mining area in Musselshell County. There are no lease parcels located in that area.

Sub-economic, unrecoverable coal deposits could occur because widespread occurrences of thin coal beds in a small number of parcels in Carbon County. The mere presence of coal seams does not indicate a resource concern unless a conflict between oil and gas development and coal mining is possible. All of the subject oil and gas lease parcels have been reviewed, and none fall within the boundaries of existing coal mines (Bull Mountains). Thus, there are no conflicts between the oil and gas lease parcels and sale parcels and existing coal mines and coal leases, and the special stipulation pertaining to surface coal mines does not need to be applied (if parcels were located on existing leases, the coal lease NSO stipulations would be applied).

3.3.15.3 Locatable Minerals

All federal minerals within the Billings planning area are available for exploration and development unless withdrawn. The surface management program for hardrock mineral exploration and development is administered under federal regulations (CFR 3809) and a memorandum of understanding between the Montana Department of State Lands and the BLM. Hardrock mineral activities in wilderness study areas (WSAs) are administered under the 43 CFR 3820 regulations.

Locatable minerals within the Billings planning area consist of two active bentonite mines, located in southern Carbon County. Two bentonite mining companies have both patented and un-patented claims for bentonite located on the west and southwest flanks of the Pryor Mountains in southern Carbon County. American Colloid and Wyo-Ben have 151 un-patented placer claims covering over 3,000 acres.

It is likely that locatable minerals (bentonite) are present within the following oil and gas lease parcels:

- MTM79010 3F
- MTM 79010 3O
- MTM 79010 4T
- MTM 79010 4J
- MTM 79010 4H
- MTM 79010 4R

The parcels have been reviewed for mining claims; the following claims, held by American Colloid Co., are located on parcel MTM 79010 4R, section 19, SW ¼ only:

- MMC216195
- MMC216196
- MMC216197
- MMC216198
- MMC216199

The claims are active and were located on November 28, 2006.

3.3.15.4 Saleable Minerals

Saleable minerals or mineral materials are common-variety minerals that may be obtained through a free use permit by federal, state, and local governments and qualified nonprofit groups. Sales for common variety minerals must be obtained by commercial and private entities. Examples of typical saleable mineral resources include sand, gravel, pumice, petrified wood, and common dimension stone. Saleable minerals are regulated by the Federal Materials Act of 1947 and the Multiple Surface Act of 1955.

Most of the sand and gravel mining operations within the Billings planning area are on private lands containing alluvial gravel deposits. Some higher terrace gravel deposits exist on federal lands; however, these are not as easily accessible as the alluvial valley deposits. Average annual production of sand and gravel from federal lands within the planning area is from of 5,000 to 10,000 cubic yards.

3.3.16 Special Designations

Areas of Critical Environmental Concern (ACECs)

The Bridger Fossil Area ACEC is proximate to a lease parcel in Carbon County. The Bridger Fossil Area ACEC (575 acres) was designated in 1998 (BLM 1999) to protect paleontological relevant and important values (page 73). The Bridger Fossil Area National Natural Landmark (161 acres) is located entirely within the 575-acre Bridger Fossil Area ACEC.

3.3.17 Social and Economic Conditions

3.3.17.1 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 Billings Field Office boundaries (Big Horn, Carbon, Golden Valley, Musselshell, Stillwater, Sweet Grass, Yellowstone, and Wheatland) as well as Park County, Wyoming. Park County, Wyoming, is included because of the oil and gas-related businesses that are based in Cody and Powell, Wyoming, and 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 2007 population of 209,600 people. Total employment was estimated to be 145,000 full and part-time jobs; there were an estimated 83,000 households; there were 249 NAICS (North American Industry Classification System) industrial sectors represented in the local economy; average income per household was \$82,488; and total personal income was \$6,840 million (IMPLAN, 2007). The local economy includes Billings (the

largest population and business center in Montana) and Cody and Powell, Wyoming (regional oil and gas business and service centers). There were 1.44 people per job within the local economy.

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

In the nine-year period between 2000 and 2008, oil and gas drilling and production occurred in eight of the nine counties within the Billings Field Office. (Also, oil and gas leasing and production in Big Horn County was not included in this analysis because federal oil and gas-related management decisions are based out of the Miles City District and will be covered in that analysis.) During this nine-year period, an annual average of 4.0 oil wells, 1.32 gas wells, and 6.23 dry holes were drilled (MT DNRM, Oil and Gas Conservation Commission, 2010). Based on 2007 federal production levels provided by the Minerals Management Service (2008), it is assumed that about 44 percent of the oil wells, 5 percent of the gas wells, and 34 percent of dry holes were associated with federal minerals. In 2007, about 278,000 barrels (bbl) of oil and 147,000 thousand cubic feet (MCF) of natural gas were produced from federal minerals. Statewide average wellhead prices were \$64.64 per bbl for crude oil and \$5.72 per MCF for natural gas (Independent Petroleum Association of America [IPAA], 2008). Statewide average output per producing well was 7,144 bbls of crude oil and 14,314 MCF for natural gas (IPAA, 2008). The statewide average cost of drilling and equipping each well was \$4,507,413 for oil wells, \$552,867 for gas wells, and \$1,311,719 for dry holes (IPAA, 2008).

Local economic effects of leasing federal minerals for oil and gas exploration, development, and production are influenced by the number of acres leased and estimated levels of production. The acres leased, number of wells drilled, and level of production all influence local employment, income, and public revenues (indicators of economic impacts).

Leasing

In 2010, 168,744 acres of federal minerals were leased for oil and gas in the Billings Field Office. Currently, annual lease rental is paid on 152,631 acres that are not held by production. Total annual average lease and rental revenues to the federal government were an estimated \$301,000. Lease rents were not paid on 16,113 acres that were held by production. Instead, royalties are paid on oil and gas production from these leases.

Federal oil and gas leases generate a one-time lease bid as well as annual rents. The minimum lease bid is \$2.00 per acre; lease rental is \$1.50 per acre per year for the first five years and \$2.00 per acre per year thereafter. Typically, oil and gas leases expire after 10 years unless held by production. Annual lease rentals continue until one or more wells are drilled that result in production and associated royalties. Within the Billings Field Office, about 20 percent of the leases and about 10 percent of the leased acres are held by production. Forty-nine percent of these federal leasing revenues are distributed to the state, and the state distributes a portion back to the counties. The federal government collects an estimated annual average of about \$301,000 in lease bids and rent, of which an estimated \$147,000 is distributed to the state/local governments.

Production

In 2007, production from federal minerals in the Billings Field Office equaled 277,523 barrels of oil and 147,325 MCF of natural gas. Average production from federal mineral estate within the

Billings Field Office boundaries in 2007 was 1.64 barrels of oil per leased acre and 0.87 MCF of natural gas per leased acre.

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

The amounts of federal minerals and the contributions of that production to local economies vary among the counties. Table 13 displays the amount of 2007 oil and gas production for each county. Carbon County has the only federal gas production and the largest amount of federal oil production. About 44 percent of the oil and 5 percent of the natural gas produced in the planning area comes from federal minerals. The largest share of total production occurs in Carbon County where about 60 percent of all the county oil production and 8 percent of the county natural gas production comes from federal minerals.

Federal oil and gas production in Montana is subject to production taxes or royalties. These federal oil and gas royalties generally equal 12.5 percent of the value of production (43 CFR 3103.3.1). Forty-nine percent of these royalties are distributed to the state, of which 25 percent is distributed back to the county of production (Title 17-3-240, MCA). In 2007, estimated annual federal royalty revenues were about \$2.3 million, of which about \$1.2 million were distributed to the state and counties.

Table 13. 2007 County Oil and Gas Leasing and Production

County/Area	Federal Oil Produced (Barrels)*	Total Oil Produced (Barrels)**	Federal Oil Produced (% of Total Oil Produced)	Federal Natural Gas Produced: (MCF)*	Total Gas Produced (MCF) **	Federal Gas Produced(% of Total Gas Produce)
Big Horn	NA	NA	NA	NA	NA	NA
Carbon	271,696	457,110	60	147,325	1,952,657	8
Golden Valley		0	0		94,673	0
Musselshell	4,995	144,731	3		6,601	0
Stillwater		0	0		583,553	0
Sweet Grass		0	0		69,189	0
Wheatland		0	0		0	0
Yellowstone	832	22,821	4		0	0
Billings FO Planning Area	277,523	624,662	44	147,325	2,706,673	5

*Stacey Browne, MMS, 2/23/2008

**Montana DNRC, Oil and Gas Conservation Division, Annual Review, 2007 County Drilling and Production Statistics

NA: Not Applicable because federal oil and gas minerals in Big Horn County, Montana are administered by the Miles City Field Office of the BLM.

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 1,996 total full and part-time jobs and \$218.5 million in total employee compensation and proprietor income in the local economy (IMPLAN, 2007).

Total federal revenues from federal oil and gas leasing, rents, and royalty payments were an estimated \$2.6 million in 2007. Federal revenues distributed to the state of Montana amount to an estimated \$1.3 million per year. The state redistributes an estimated \$324,000 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 law enforcement, justice administration, tax collection and disbursement, provision of orderly elections, road and highway maintenance, fire protection, and/or record keeping. Other county functions that may be funded include primary and secondary education administration and the operation of clinics/hospitals, county libraries, county airports, local landfills, and county health systems.

The estimated annual local economic contribution associated with federal leases, rents, drilling, production, and royalty payments combined to support about 140 total local jobs (full and part-time) and \$9.6 million in local labor income, respectively. This amounts to about one-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, construction, retail trade, professional scientific and technical services, and health care and social assistance. Table 14 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 14. Current Annual Average Contributions of Federal Oil and Gas Leasing, Exploration, Development, and Production to the Local Economy

Industry	Employment (full and part-time jobs)		Labor Income (Thousands of 2009 dollars)	
	Area Totals	Federal O&G -Related	Area Totals	Federal O&G-Related
Agriculture	6,635	1	\$71,219.8	\$15
Mining	4,003	49	\$429,374.3	\$5,998
Utilities	532	1	\$63,794.9	\$100
Construction	11,700	16	\$515,546.0	\$669
Manufacturing	5,925	2	\$468,215.1	\$122
Wholesale Trade	6,392	3	\$374,081.9	\$179
Transportation & Warehousing	16,902	4	\$448,205.5	\$180
Retail Trade	4,625	12	\$225,074.1	\$293
Information	2,040	1	\$83,693.4	\$50
Finance & Insurance	4,730	4	\$260,815.7	\$238
Real Estate & Rental & Leasing	5,055	4	\$145,055.7	\$147
Prof, Scientific, & Tech Services	8,463	12	\$386,140.8	\$619
Mngt of Companies	130	0	\$8,629.3	\$33
Admin, Waste Mngt & Rem Serv	8,588	4	\$180,307.7	\$88
Educational Services	1,113	1	\$19,143.7	\$16
Health Care & Social Assistance	15,422	10	\$742,379.5	\$453
Arts, Entertainment, and Rec	4,203	2	\$62,607.7	\$28
Accommodation & Food Services	11,532	7	\$196,088.4	\$115
Other Services	8,821	6	\$164,786.5	\$111
Government	18,356	3	\$1,020,901.2	\$170
Total	145,166	142	5,866,061	9,624
Federal O&G as Percent of Total	---	0.10%	---	0.16%

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

3.3.17.2 Social and Environmental Justice

The social section focuses on the area in the immediate vicinity of the leases being examined.

The leases being examined in this EA are located throughout the western part of the Billings Field Office in Sweet Grass, Stillwater, Carbon, and Musselshell Counties. The incorporated communities closest to the various leases are Laurel (with a 2009 population of 6,750), Roundup (1,966), Big Timber (1,740), Bridger (736), Joliet (639), Fromberg (473), and Ryegate (273). The 2009 population density (persons per square mile) in the four counties with the leases ranges from 2.0 in Sweet Grass County to 4.9 in Stillwater County. These figures are compared to a statewide figure of 6.7 and a national figure of approximately 100. The areas in the vicinity of the leases are home to small communities and farms and ranches, and in some cases, national forest service and Crow Reservation land.

Oil and gas production is already occurring in some areas, and in other cases there are existing leases but no current production. Approximately one-third of the acreage being considered is split estate.

In 2008, American Indians consisted of 0.6 percent of the population of Sweet Grass County and 1.5 percent of the population of Musselshell County. The percent of the population living below the poverty level ranged from 10.2 percent in Sweet Grass County to 18.1 percent in Musselshell County. Two Indian reservations, the Crow and the Northern Cheyenne, are located south and

east of the Billings Field Office. The social environment of the Billings Field Office is described in detail in the Billings RMP Analysis of the Management Situation (2008).

4.0 ENVIRONMENTAL IMPACTS

4.1 Assumptions and Reasonably Foreseeable Development Scenario Summary

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

Upon receipt of an APD, the BLM would initiate a more site-specific 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, 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.

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

In some cases, resource-specific impact analyses may be conservative because the analyses may not have taken into account stipulations being applied from other resource program areas. For example, Parcel MTM 79010 4R has a timing limitation to protect greater sage-grouse nesting habitat, and the analysis discussed in that resource section is based upon that specific stipulation. However, as proposed, Parcel MTM 79010 4R also has a stipulation not allowing surface occupancy across the entire parcel therefore minimizing the net impact to greater sage-grouse.

Yellowstone cutthroat trout (YCT) habitat and suitable habitat are currently being considered in the ongoing Billings/Pompeys Pillar RMP revision, therefore, portions of two lease parcels (837 acres) (as identified in the Proposed Action and in Appendix A) would continue to be held in suspension pending further review and analysis as part of the RMP revision process.

The following assumptions are from the RFD developed for the Billings FO. The BLM administers approximately 690,000 acres of federal minerals (for fluid minerals) within the Billings Field Office. The RFD forecasts the following level of development in the entire Billings FO planning area.

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

the table below. 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 15. 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

The RFD scenario identified these areas and contains more information about them (refer to 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.

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

Alternative A (No Action Alternative)

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

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

Alternative B Assumptions

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

If the lease parcels are developed, short-term impacts would be stabilized or mitigated rapidly (within 2 to 5 years) and long-term impacts are those that would substantially remain for more than 5 years.

Nineteen suspended leases are considered in this EA. Fourteen of the leases are located in Carbon County, one in Carbon and Stillwater counties, four in Stillwater County, one in Sweet Grass County, and two in Musselshell County.

Both parcels in Musselshell County are in townships marked as moderate potential. As areas of moderate development potential, the RFD forecasts one to five wells per township per year. The parcels are located within the Central Montana Uplift. Devil's Basin Field lies within parts of both townships. The Billings RFD assumes that oil would be the target for activity in this area with disturbance factors of two acres per drill site and 1.5 acre of disturbance for ancillary facilities and access roads. The two parcels under consideration in moderate development potential areas are located in two different townships. Active (not currently suspended) federal oil and gas leases occur on approximately 14.8 percent of these two townships. The parcels total about 1,799 acres, approximately 4 percent of the two-township area.

One lease lies within Sweet Grass County. The lease is in an area of low potential. The RFD scenario states that no more than one well per year per township would be drilled in these areas. The parcel lies within the Crazy Mountains Basin, an area only sparsely explored to date. Recent exploration has been for natural gas. 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 spans two different townships. No active federal oil and gas leases occur on these two townships. The parcels total about 1,662 acres, approximately 3.6 percent of these two townships.

Two parcels are located in Stillwater County in the vicinity of Big Coulee Field which produces natural gas. These leases are located in T. 4 N., R. 19 E. in an area of moderate development potential. As such, 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 two parcels in Stillwater County under consideration are located in a single township. No active federal oil and gas leases occur on this township. The parcels total about 781 acres, approximately 3.4 percent of this township.

Two parcels are located in Stillwater and Carbon Counties in T. 5 S., R. 16 E. and T. 5 S., R. 18 E. Both parcels are located in an area of moderate development potential. As such, the RFD scenario forecasts one to five wells per township per year. The parcel in T. 5 S., R. 16 E. is located in the vicinity of Dean Dome which is a gas field. Assumed disturbance factors are four acres per drill site and 1.5 acres for ancillary facilities and access roads. The parcel in T. 5 S., R. 18 E. is in the vicinity of Roscoe Dome Field which is an oil field. The RFD assumes that oil would be the target for activity in this area with disturbance factors of two acres per drill site and 1.5 acre of disturbance for ancillary facilities and access roads. These two parcels are located in two different townships. Active federal oil and gas leases occur on approximately 4.6 percent of these townships. The parcels total about 280 acres, approximately 1.2 percent of the two township area.

Three parcels are located in T. 9 S., R. 23 E., which is located in the area of Elk Basin Field which is an oil field. Both parcels are located in an area of moderate development potential. As such, the RFD scenario forecasts one to five wells per township per year. The RFD assumes that

oil would be the target for activity in this area with disturbance factors of three acres per drill site and 1.5 acre of disturbance for ancillary facilities and access roads. These parcels are located in a single township. Active federal oil and gas leases occur on approximately 23.5 percent of this township. The parcels total about 3,631 acres, approximately 15.8 percent of this township.

Two parcels are located in T. 7 S., R. 24 E., which is classified as moderate development potential. As such, the RFD scenario forecasts one to five wells per township per year. The parcels are in the vicinity of Red Dome oil field, which is abandoned. These parcels are located in a single township. No active federal oil and gas leases occur on this township. The parcels total about 2,625 acres, approximately 11.4 percent of this township.

Five other parcels are located in Carbon County in an area of low development potential. The RFD scenario states that no more than one well per year per township would be drilled in these areas. The RFD assumes that a low level of exploration could occur on these leases. It also assumes that oil would be the target for activity in this area with disturbance factors of three acres per drill site and 1.5 acre of disturbance for ancillary facilities and access roads. These parcels are located in four different townships. Active federal oil and gas leases occur on approximately 0.7 percent of these townships. The parcels total about 2,722 acres, approximately 3 percent of the four-township area.

The remaining parcels are located in northern Carbon County in an area of moderate development potential. As such, the RFD scenario forecasts one to five wells per township per year. The RFD assumes that oil would be the target for activity on this lease with disturbance factors of three acres per drill site and 1.5 acre of disturbance for ancillary facilities and access roads. These parcels are located in a single township. Active federal oil and gas leases occur on approximately 0.3 percent of this township. The parcels total about 1,000 acres, approximately 4.3 percent of the township.

4.2 Air Quality

4.2.1 Direct and Indirect Effects

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

Current monitoring data show that the criteria pollutants fall well below applicable air quality standards, indicating very good air quality. The potential level of development and mitigation (section 4.4.3.) is expected to maintain this level of air quality by limiting emissions. In addition to the limited level of development, pollutants would be regulated through the use of state-issued air quality permits or air quality registration processes developed to maintain air quality below applicable standards.

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

drilled, the types of equipment needed if a well were to be completed successfully (e.g., compressor, separator, dehydrator), or what technologies could 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 APD permitting trends are consistent with assumptions in the current RFD. This level of exploration and production would contribute an incremental increase in overall hydrocarbon emissions, including GHGs, released into the planet’s atmosphere. When compared to total national or global emissions (see Cumulative Impacts section), the amount released as a result of potential production from the proposed lease tracts would not have a measurable effect on climate change.

Greenhouse Gas Emissions at the Billings FO and Project Scales

Sources of greenhouse gases associated with development of lease parcels may include construction activities, operations, and facility maintenance in the course of oil and gas exploration, development, and production. Estimated GHG emissions are discussed for these specific aspects of oil and gas activity because the BLM has direct involvement in these steps. However, the current proposed activity is to maintain the lease parcels in suspension. 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. 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. Based on the RFD assumptions summarized above for the Billings Field Office RFD, Table 16 discloses projected annual greenhouse gas source emissions from BLM-permitted activities associated with the RFD.

Table 16. BLM projected annual emissions of greenhouse gases associated with oil and gas exploration and development activity in the Billings Field Office.

Source	BLM Projected Greenhouse Gas Emissions in tons/year from Billings FO RFD			Emissions (metric tons/yr)
	CO ₂	CH ₄	N ₂ O	CO ₂ 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
Total	8,707.5	59.1	2.3	9,673.0

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

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

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

Under Alternative B, approximately 14,179 acres of lease parcels with federal minerals would have the lease suspensions lifted. These acres constitute 2.1 percent of the total federal mineral estate of approximately 690,000 acres identified in the Billings RFD. Therefore, based on the approach described above to estimate GHG emissions, 2.1 percent of the Billings RFD total estimated BLM emissions of 9,673 metric tons/year would be approximately 198.8 metric tons/year of CO₂e if the parcels within Alternative B were to be developed.

Climate Change

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

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

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

4.2.2 Mitigation

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

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

- flare or incinerate hydrocarbon gases at high temperatures to reduce emissions of incomplete combustion;
- install emission control equipment of a minimum 95 percent efficiency on all condensate storage batteries;
- install emission control equipment of a minimum 95 percent efficiency on dehydration units, pneumatic pumps, produced water tanks;
- vapor recovery systems where petroleum liquids are stored;
- tier II or greater, natural gas or electric drill rig engines;
- secondary controls on drill rig engines;
- no-bleed pneumatic controllers (most effective and cost effective technologies available for reducing volatile organic compounds (VOCs));
- gas or electric turbines rather than internal combustion engines for compressors;
- nitrogen oxides (NO_x) emission controls for all new and replaced internal combustion oil and gas field engines;
- water dirt and gravel roads during periods of high use and control speed limits to reduce fugitive dust emissions;
- interim reclamation to re-vegetate areas of the pad not required for production facilities and to reduce the amount of dust from the pads.
- 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_x and ozone (O₃).

More specific to reducing greenhouse gas 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 (CBNG), and oil production operations. Technologies discussed in the Climate Change SIR and as summarized below in Table 17 (reproduced from Table 6-2 Climate Change SIR, 2010), displays common methane emission technologies reported under the

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

Table 17. Selected Methane Emission Reductions Reported Under the USEPA Natural Gas STAR Program ¹

Source Type / Technology	Annual Methane Emission Reduction ¹ (Mcf/yr)	Capital Cost Including Installation (\$)	Annual Operating and Maintenance Cost (\$)	Payback (Years or Months)	Payback Gas Price Basis (\$/Mcf)
Wells					
Reduced emission (green) completion	7,000 ²	\$1K – \$10K	>\$1,000	1 – 3 yr	\$3
Plunger lift systems	630	\$2.6K – \$10K	NR	2 – 14 mo	\$7
Gas well smart automation system	1,000	\$1.2K	\$0.1K – \$1K	1 – 3 yr	\$3
Gas well foaming	2,520	>\$10K	\$0.1K – \$1K	3 – 10 yr	NR
Tanks					
Vapor recovery units on crude oil tanks	4,900 – 96,000	\$35K – \$104K	\$7K – \$17K	3 – 19 mo	\$7
Consolidate crude oil production and water storage tanks	4,200	>\$10K	<\$0.1K	1 – 3 yr	NR
Glycol Dehydrators					
Flash tank separators	237 – 10,643	\$5K – \$9.8K	Negligible	4 – 51 mo	\$7
Reducing glycol circulation rate	394 – 39,420	Negligible	Negligible	Immediate	\$7
Zero-emission dehydrators	31,400	>\$10K	>\$1K	0 – 1 yr	NR
Pneumatic Devices and Controls					
Replace high-bleed devices with low-bleed devices					
End-of-life replacement	50 – 200	\$0.2K – \$0.3K	Negligible	3 – 8 mo	\$7
Early replacement	260	\$1.9K	Negligible	13 mo	\$7
Retrofit	230	\$0.7K	Negligible	6 mo	\$7
Maintenance	45 – 260	Negl. to \$0.5K	Negligible	0 – 4 mo	\$7
Convert to instrument air	20,000 (per facility)	\$60K	Negligible	6 mo	\$7
Convert to mechanical control systems	500	<\$1K	<\$0.1K	0 – 1 yr	NR
Valves					
Test and repair pressure safety valves	170	NR	\$0.1K – \$1K	3 – 10 yr	NR
Inspect and repair compressor station blowdown valves	2,000	<\$1K	\$0.1K – \$1K	0 – 1 yr	NR
Compressors					
Install electric compressors	40 – 16,000	>\$10K	>\$1K	>10 yr	NR
Replace centrifugal compressor wet seals with dry seals	45,120	\$324K	Negligible	10 mo	\$7
Flare Installation	2,000	>\$10K	>\$1K	None	NR

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

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

² Emission reduction is per completion, rather than per year.

K = 1,000

mo = months

Mcf = thousand cubic feet of methane

NR = not reported

yr = year

In the context of the oil sector, additional mitigation measures to reduce GHG emissions include methane reinjection and CO₂ injection. These measures are discussed in more detail in Section 6.0 of the Climate Change SIR.

4.3 Soil Resources

4.3.1 Alternative A (No Action Alternative)

There would be no impacts to Soil Resources as a result of the No Action Alternative.

4.3.2 Alternative B (Proposed Action Alternative)

Leasing the subject parcels would have no direct impacts on soil resources. Any potential effects from sale of lease parcels would occur at such time that the leases were developed. Land uses associated with oil and gas development could cause surface disturbances. Such acts reduce ground cover (e.g., biological soil crust, vegetation, litter, and rock), alter soil structure, heterogeneity (variable characteristics), temperature regimes, nutrient cycling, biotic richness, and diversity. This could result in mixed soils which have decreased bulk density, and altered porosity, infiltration, air-water relationships, salt content, and pH (Perrow and Davy, 2003; Bainbridge 2007). Soil compaction could also occur and result in increased bulk density, and reduced porosity, infiltration rate, moisture, air, nutrient cycling, productivity, and biotic activity (Logan 2001; Perrow and Davy, 2003; Bainbridge 2007). Altering such characteristics diminishes the soil system's ability to withstand future disturbances (e.g. wildland fire, 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.

4.3.3 Mitigation

Additional mitigation measures and/or best management practices, based on analysis once a site-specific plan of development is proposed, 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. Mitigations could include rapid revegetation, surface roughening, geotextiles, silt fences, and mulch.

4.4 Water Resources

4.4.1 Alternative A (No Action Alternative)

There would be no impacts to Water Resources as a result of the No Action Alternative.

4.4.2 Alternative B (Proposed Action Alternative)

The action of leasing the parcel itself would not have any impact on water resources. The subsequent exploration and development of the leases would result in reasonably foreseeable impacts to hydrologic resources. 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 potential impacts would be analyzed on a site-specific basis prior to the approval of exploration or development at the APD stage of development.

One hundred-year floodplains are protected from surface disturbance by Executive Order No. 11988. If 100-year floodplains would be impacted, they must be avoided unless there is no other practical alternative, and then mitigation measures must be developed.

The exploration and development of the lease (e.g., construction and operation of well pads, reserve pits, water disposal pits, and other facilities), vehicle use, and infrastructure development (e.g., roads, pipelines, ancillary facilities, and powerlines) would 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 effects from these activities could potentially be accelerated erosion, increased overland flow, decreased infiltration, increased water temperature, channelization, and water quality degradation associated with increased sedimentation, turbidity, nutrients, eutrophication, metals, and other pollutants. Once vegetation is re-established, erosion rates would return to near natural levels. Erosion potential can be increased further and 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, which in turn changes flow characteristics and increases sedimentation and erosion. Vehicle use would introduce pollutants such as oil, grease, dust, and metals to water systems (Montana Department of Environmental Quality (DEQ) 2007). Permanent fills from placing bridge columns in waterbodies and the placement of culverts could have long-term impacts along with any short-term impacts from construction.

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 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 nonmajor streams, and non-riparian, ephemeral waterbodies. The potential effects from these activities could be increased overland flow, decreased infiltration, increased water temperature, channelization, and water quality degradation associated with increased sedimentation, turbidity, nutrients, metals, and other pollutants

The Proposed Action would not contribute to the impairment of impaired streams (303 (d)-list) within the Proposed Action areas (see Section 3.3) according to Sections 313(a) and 319 of the Clean Water Act, 2010 MOU between the MDEQ and the BLM (BLM-MOU-MT923-1030), and Executive Order 12088. Additional mitigation and/or reclamation would be required in these areas to ensure that water quality standards and developed total maximum daily loads (TMDLs) would be achieved.

4.4.3 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 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. Site-specific mitigation and reclamation measures would be described in the Conditions of Approval.

4.5 Vegetation Resources

4.5.1 Alternative A (No Action Alternative)

There would be no impacts to vegetation resources as a result of the No Action Alternative.

4.5.2 Alternative B (Proposed Action Alternative)

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

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

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

Potential impacts to plants include direct mortality from earth excavation or crushing by vehicles. Adverse impacts could also result from soil erosion resulting in loss of the supporting substrate for plants or from soil compaction resulting in reduced germination rates. Impacts to plants occurring after seed germination but prior to seed set could be particularly harmful because both current and future generations would be adversely affected. Weeds which are introduced and/or promoted by soil-disturbing activities compete against and displace native vegetation.

Development associated with oil and gas activities has the potential to affect rare plants. Soil-disturbing activities directly affect species by destroying habitat, churning soils, impacting

biological crusts, disrupting seedbanks, burying individual plants, and generating sites for undesirable weedy species. Weeds could be introduced during construction and operation of the lease. Roads generate weedy habitat along their edges, as well as avenues for weed invasion into unoccupied territory. Dust generated by construction activities and travel along dirt roads can affect nearby plants by depressing photosynthesis, disrupting pollination, and reducing reproductive success. Oil or other chemical spills could contaminate soils as to render them temporarily unsuitable for plant growth until cleanup measures were fully implemented. If cleanup measures were less successful, longer term impacts could be expected.

4.5.3 Mitigation

Habitat restoration takes longer in shrublands and woodlands as opposed to grasslands. Grassland habitats could resemble their pre-project conditions in two to five years. Shrublands could require five to 15 years and woodlands even longer because trees must be reestablished on the site. The parcels in this Proposed Action are generally grassland and shrubland habitats that return to their pre-project composition and structure relatively easily and quickly. Mitigation would be addressed at the site-specific APD stage of development. Needed stipulations and COAs would be identified and addressed during planning at the APD stage.

4.6 Invasive, Non-Native Species

4.6.1 Alternative A (No Action Alternative)

There would be no impacts to Invasive, Non-Native Species as a result of the No Action Alternative.

4.6.2 Alternative B (Proposed Action Alternative)

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 the creation of 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.

4.6.3 Mitigation

The potential for these impacts can be minimized by using native species seed mixes during restoration efforts and treat invasive species throughout development to prevent establishment. During development, all equipment must be cleaned and free of unwanted plant species, and quarantine and monitoring programs to reduce the transport of non-native species should be

implemented. Although invasive species may occur within the proposed parcels, BMPs would help to mitigate the spread.

Mitigation would be addressed at the site-specific APD stage of development. Stipulations and COAs would be identified and addressed during planning at the APD stage.

4.7 Noxious Weeds

4.7.1 Alternative A (No Action Alternative)

There would be no impacts to Noxious Weeds as a result of the No Action Alternative.

4.7.2 Alternative B (Proposed Action Alternative)

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.

4.7.3 Mitigation

The potential for these impacts could be minimized by using native species seed mixes during restoration efforts and the treatment of noxious weeds throughout development to prevent establishment. During development, all equipment would be cleaned and free of unwanted plant species, and quarantine and monitoring programs to reduce the transport of noxious weeds should be implemented. Small populations of noxious weeds should be eradicated as they appear because it becomes increasingly expensive to manage as the population increases.

Although some parcels do contain noxious weed species, BMPs would help to mitigate the spread and introduction to new areas. Mitigation would be addressed at the site-specific APD stage of development. Stipulations and COAs would be identified and addressed during planning at the APD stage.

4.8 Riparian Vegetation

4.8.1 Alternative A (No Action Alternative)

There would be no impacts to Riparian Vegetation under this alternative.

4.8.2 Alternative B (Proposed Action Alternative)

Riparian stipulations (NSO 11-2: Surface occupancy and use is prohibited within riparian areas, 100-year floodplains of major rivers, and on water bodies and streams) would protect riparian resources from disturbance during exploration and development activities that could take place. No surface occupancy stipulations have been specified for approximately 3,724 acres (portions of 12 lease parcels). Riparian communities were delineated by 40-acre tracts; however, actual riparian habitat is normally a fraction of the 40 acres specified.

Since riparian resources are rare, occupying less than one-half of one percent of the surface area of the lease parcels, any project implementation would be located and designed to minimize impacts to riparian resources. Conditions of approval would be identified and addressed during planning at the APD stage.

4.9 Special Status Species

4.9.1 Special Status Species (SSS)/ Threatened and Endangered (T&E) Wildlife

4.9.1.1 Alternative A (No Action Alternative)

This alternative would have no impact to SSS and T&E wildlife resources. Resources would remain undisturbed.

4.9.1.2 Alternative B (Proposed Action)

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. Also, refer to the Miles City District, Oil and Gas RMP/ EIS Amendment -12/1992, pg. 69-71, for analysis of wildlife impacts from oil and gas leasing and development.

According to BLM geographic information systems (GIS) mapping records, the only SSS that could be impacted by these lease parcels are greater sage-grouse, ferruginous hawk, and white-tailed prairie dogs. Protective stipulations would include NSO and 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 controlled surface use (CSU) stipulations. Refer to Appendix A for a list of stipulations applied to lease parcels.

The potential impacts of development to animals, including listed and special status species, include direct mortality or injury, loss of dens or burrows, displacement, and human disturbance. Direct mortality or injury could result from vehicle strikes or from collapsed dens and burrows resulting in animals being crushed or entombed. Burrows and dens could be destroyed or damaged by vehicle traffic, particularly heavy equipment. Animals could be displaced during project activities. Such displacement of animals into unfamiliar areas could increase the risk of predation and increase the difficulty of finding required resources such as food and shelter. Human disturbance could result in displacement of animals, even though dens and burrows may not be directly impacted. Human disturbance also might alter the behavior of animals (e.g.,

activity periods, space use) resulting in increased predation risk, reduced access to resources, reduced breeding success, and increased stress during critical life stages could decrease survival rates. Project activities during the spring breeding season could increase the potential for adverse impacts. Animals could also become entrapped in oil spills, leaks, sumps, or improperly maintained well cellars or other facilities.

Roads and large areas of disturbance can be barriers to movement for some animal species. This exposes these animals to vehicle strikes, especially on paved roads with higher vehicle speeds. The impact of roads, large areas of disturbance, barriers, and vehicle strikes is within the range analyzed in the Miles City District (Billings) Oil and Gas RMP Amendment 1992, EIS Ch. 4, and the Miles City (Billings) Oil and Gas RMP/EIS Biological Opinion. Also, wildlife impacts are discussed thoroughly in the Final Supplement to the Montana Statewide Oil and Gas EIS and Proposed Amendment of the Powder River and Billings RMP, 10/2008, Chapter 4, Wildlife Impacts, pgs. 4/250-4/280.

Structures such as utility poles, buildings, and pumping units could provide perches for raptors. Addition of such structures in flat terrain could increase predation rates on small mammals and other prey species. The types of structures typically found in oilfields, however, do not tend to provide nesting structures for raptors, including ravens. Introducing nesting structures can have a greater impact on prey species since much more prey is taken by raptors that are rearing young, and the nest site is continuously occupied for the season, increasing the duration and frequency of the predation effect. The introduction of structures that would only serve as perches may occasionally increase predation. These perches are sporadically used for hunting.

Forecasts based upon the RFD indicate only 13.5-27 acres in the short term and 5.5-15.5 acres in the long term would be disturbed as a result of the Proposed Action. These relatively minor disturbances coupled with best management practices, avoidance measures, and lease stipulations would result in impacts that are likely to trigger an avoidance response at the individual level and would result in no impacts at the landscape level.

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.

Greater sage-grouse

There are 6,084 acres of greater sage-grouse core (FWP) area habitat affected by these lease parcels. The parcels in the core areas are include 3F, 3Q, 4H, 4J, 4R, 4T, 4W, and QI. Impacts to breeding greater sage-grouse would be minimal because all of the lease parcels are greater than 0.6 miles from the known lek sites. Portions of nine lease parcels would have a timing stipulation for the protection of nesting greater sage-grouse with a two- mile buffer (5,730 acres in lease parcels 3F, 3O, 3Q, 3X, 4H, 4J, 4R, 4T, 4W, A3, and QI). 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 and disturbance. (FWS, 2005).

Local research in northern Mussellshell County indicate that 96 percent of the greater sage-grouse nest sites occur within three miles of a lek site and 74 percent of the nest sites occurred within two miles of a lek site. This research suggests approximately 2 percent of nest sites would be impacted by disturbance, if development occurs (Sage Grouse Studies Analysis, Synopsis of 3 Studies, MSU, MTFWP, Jenny Sika, 8/2007).

Mountain Plover

Breeding and brood rearing mountain plovers have the potential to make use of open lands in the foothills south of the Snowy Mountains and a few areas in southern Carbon County. 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.

Migratory Birds

The leases are in sagebrush/grassland or grassland habitat types. The majority of the migratory birds of conservation concern occur in other habitat types. Some examples of the sagebrush/grassland or grassland species that could be affected by development or disturbance are the Baird's, grasshopper, and sage sparrows, sage thrasher, McCown's and chestnut-collared longspurs, loggerhead shrike, Sprague's pipit, and long-billed curlew.

The minimal short and long-term disturbance acreage from the Proposed Action, including the application of identified stipulations and avoidance measures, would result in negligible to minor impacts to migratory birds at the site-specific scale and negligible at the population and landscape scales.

Raptors (Sensitive)

Bald and golden eagles, ferruginous hawks, peregrine falcons, burrowing owls, and Swainson's hawks are considered BLM SSS. Opportunities exist throughout the field office area for disturbance, abandonment of nests, or nest destruction from oil development activities. Nest sites are protected from disturbance or destruction through a NSO stipulation and timing stipulations. The timing stipulation (13-4: one-half mile buffer) for raptor nest protection would be applied to lease parcel 2X (13 acres). Impacts to raptors from leasing would be negligible, with only one nest site documented within or near the lease areas.

Structures such as utility poles, buildings, and pumping units could provide perches and nest sites for raptors. Addition of such structures in flat terrain could increase predation rates on small mammals and other prey species. Introducing nesting structures can have a greater impact on prey species since much more prey is taken by raptors that are rearing young, and the nest site is continuously occupied for the season increasing the duration and frequency of the predation effect. The effect of introducing structures that would only serve as perches is not expected to be significant because such perches are likely to only occasionally be used for hunting.

Burrowing Owl

The burrowing owl has the potential to occur in some units. Potential impacts to burrowing owls include loss of burrows, entrapment in burrows, and collision with vehicles. Burrowing owl burrows and dens would be monitored for use before destruction or plugging, allowing detection of burrowing owl use. If owl use is detected and the burrow cannot be avoided, burrow destruction or plugging would occur only after the owl has vacated the site. The one-acre of habitat disturbance that could result from leasing these parcels combined with the avoidance measures would result in negligible to minor impacts to burrowing owls at the site-specific scale and negligible at the population and landscape scales.

White-tailed and Black-tailed Prairie Dogs

Prairie dogs have the potential to occur on Lease Parcel 4R. Burrows of small mammals would be avoided to the extent practicable, but some impacts to these two species would likely occur. Considering the small amount of habitat expected to be disturbed during the construction of one well, the site-specific impacts would be minor, and the impacts to populations would be negligible.

Black-footed Ferret

There are no known sitings of ferrets in the Billings Field Office. Prior to surface disturbance, prairie dog colonies and complexes 80 acres or more in size would be examined to determine the presence or absence of ferrets.

Bat Species (Townsend's big-eared, Spotted, Fringe-tailed myotis, Long-legged myotis, Long-eared myotis, and Pallid bats)

Bats have the potential to occur in all units. Impacts to bats from development activities would not be expected because roost sites (rocky grottos, buildings, mines) would not be impacted and very little foraging habitat would be altered. Thus, the impacts would be negligible.

4.9.2 Special Status Species: Fish

4.9.2.1 Alternative A (No Action Alternative)

There would be no impacts to Special Status fish resources as a result of this alternative.

4.9.2.2 Alternative B (Proposed Action Alternative)

There would be no known impacts to Yellowstone cutthroat trout or its habitat because the Proposed Action maintains the current suspension on portions of parcels A3 and JL. There are no other known populations of Yellowstone cutthroat trout that are hydrologically connected to any of the lease parcels

4.9.2.3 Mitigation

Specific mitigation measures addressing Yellowstone cutthroat trout and other fisheries habitat would be developed in the ongoing Billings RMP revision. The parcels that are continuing to be held in suspension could be reconsidered once the RMP is complete.

4.9.3 BLM Sensitive Plant Species

One BLM sensitive plant species is known to exist within the proposed lease parcels. This species, the dwarf mentzelia, occupies habitat in the MTM 79010-4R proposed lease parcel,

specifically in portions of T. 7 S., R. 24 E. sections 19 and 20. On June 18, 2010, BLM personnel conducted a site visit of this parcel, and confirmed the presence of dwarf mentzelia. Little is known about the population and trend of this species. This species prefers open sandy desert woodlands and shrublands (Montana Natural Heritage Database 2010). A 1992 report completed by BLM found that this species preferred Chugwater Sandstone formations (Lesica and Achuff 1992).

4.9.3.1 Alternative A (No Action Alternative)

There would be no impacts to BLM Sensitive Plant Species as a result of the No Action Alternative.

4.9.3.2 Alternative B (Proposed Action Alternative)

There are no direct impacts associated with the act of leasing this parcel. Indirect impacts associated with leasing this parcel would include increased use of public lands during exploration of the proposed parcels. Increased use would inherently increase the likelihood of disturbance to vegetative communities including, but not limited to, vegetation trampling, weed transport, and soil compaction. The likelihood of increased use in concentrations large enough to cause negative impacts on a scale inhibiting the vegetative communities is low at the lease stage of this process.

Other indirect impacts associated with the leasing of these parcels include future development of well sites and ancillary facilities. Impacts would be dependent on the location of the disturbance relative to populations of the species in question. The construction of roads, well pads, and similar development could destroy plants or disrupt continuity between populations. New weedy species could be introduced, and weeds would benefit from the additional moisture generated by run-off from roads and pads.

4.9.3.3 Mitigation

If the Billings Field Office receives an APD for lands in MTM 79010-4R, an onsite vegetative clearance survey would need to be conducted to ensure that dwarf mentzelia does not exist within a quarter of a mile of areas which would be developed. If dwarf mentzelia is present within a quarter of a mile, COAs would be required prior to development.

If the white-tailed prairie dog town in MTM 79010-4R is greater than 80 acres in size, this lease would also be subject to a CSU stipulation requiring a black-footed ferret survey to determine the presence or absence of black-footed ferrets.

Mitigation would also be addressed at the site-specific APD stage of development. Needed stipulations and COAs would be identified and addressed during planning at the APD stage. Also, refer to the FSEIS, Chapter 4, Wildlife Impacts, pgs. 4/250- 4/280, and Wildlife Appendix, Wildlife Monitoring and Protection Plan, pgs. WMPP -1-20.

4.10 Fish and Wildlife Resources

4.10.1 Wildlife

4.10.1.1 Alternative A (No Action)

This alternative would have no impact to wildlife resources. Resources would remain undisturbed.

4.10.1.2 Alternative B (Proposed Action Alternative)

According to BLM GIS mapping records, the identified wildlife species affected by these lease parcels are sharp-tailed grouse, mule deer, elk, and antelope. Protective stipulations would include 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. A total of 159.8 acres would be protected with timing stipulations for elk calving and 40 acres for elk crucial winter range (CWR); 1,305 acres for mule deer CWR; and 811 acres for antelope CWR. Sharp-tailed grouse would be protected with a timing stipulation (13-3) for nesting applied to a two-mile buffer from sharp-tailed grouse lek sites. This stipulation would affect 1,697 acres in three parcels--A3, QI, and VJ.

The timing stipulations would protect these species in their critical life cycles during subsequent development of the oil and gas, but do not provide protection during the production phases of successful wells. If a well is successfully developed, COAs could be applied to provide protection of resources and habitat and decrease disturbance during the production phase of development. There would be negligible impacts during the development stage due to timing stipulation protection. Although these species could be impacted during the production phase of successful wells, COAs would be applied during production. There would be avoidance related impacts to species from maintenance equipment, human disturbance, and increased vehicle traffic during production and the loss of habitat over the life of the well. The degree of impact would coincide with the overall level of development.

Refer to the Special Status Species Impacts narrative for discussion of the potential impacts of development to wildlife species.

4.10.2 Fish Resources

4.10.2.1 Alternative A (No Action Alternative)

There would be no impact to fish resources as a result of the No Action Alternative.

4.10.2.2 Alternative B (Proposed Action Alternative)

Lease parcels MTM 79101 A3 and JL are the only parcels with fish populations and habitat. These lease parcels have general fish habitat that is also YCT core population habitat and YCT suitable recovery habitat (refer to analysis in SSS Fisheries section).

4.10.2.3 Mitigation

Mitigation would be addressed at the site-specific APD stage of development. Needed stipulations and COAs would be identified and addressed during planning at the APD stage. Also, refer to the FSEIS, Chapter 4, Wildlife Impacts , pgs. 4/250- 4/280, and Wildlife Appendix, Wildlife Monitoring and Protection Plan, pgs. WMPP -1-20.

4.11 Cultural Resources

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

Direct and indirect impacts are not anticipated from leasing nominated parcels. It is at the APD stage of development that specific impacts can be correctly assessed. Potential impacts to cultural resources at the APD stage include damage to archaeological sites through construction activities and the possibility of removal of, or damage to, archaeological materials by increased human activity in the area. Conversely, cultural resource inventories associated with development potentially adds to our understanding of the prehistory and history of the area under investigation.

4.11.1 Alternative A (No Action Alternative)

There would be no impact to cultural resources as a result of the No Action Alternative

4.11.2 Alternative B (Proposed Action Alternative)

Approval of the lease parcels would have no direct effect on any known cultural resources, although any subsequent development of the lease could impact known archaeological sites and unrecorded archaeological sites. The prior analysis pertains only to the action of leasing and does not consider ground-disturbing activities.

Preceding any future possible land-disturbing development within the lease parcels, a Class III cultural inventory would be required for all areas not previously examined within the past 10 years. Further archaeological assessment for recorded sites/areas documented as needing additional information and updating/monitoring of significant sites would be conducted as well. All recorded archaeological sites listed as unevaluated or needing more information would be treated as eligible to the National Register of Historic Places until determination of eligibility is completed.

As further developments are proposed, any areas of potential effect (APE) would be established, and any cultural resources would be identified, evaluated, and an appropriate mitigation strategy would be determined. Mitigation primarily focuses on site avoidance, but could include data recovery through subsurface testing and/or excavation. If mitigation is necessary, BLM would manage mitigation plans and stipulations, along with any avoidance possibilities for the project. While the lessee retains the right to develop a lease, BLM could require avoidance measures up to 200 meters in any direction, which would provide a high likelihood of site avoidance. Cultural resources that cannot be avoided would be documented and evaluated for eligibility for listing on the National Register of Historic Places. If a site is found to be eligible, a mitigation plan would be developed and carried out before any project activities can be initiated. Archaeological sites discovered during any lessee actions would warrant stoppage of all work until the site can be evaluated as described above.

Two lease notices are attached to all proposed lease parcels. These lease notices inform the lessee that a cultural inventory is required prior to any development/exploration (MT-14-2) and that cultural resources could be located on the lease parcel, the BLM must meet its obligation under the National Historic Preservation Act, and that modifications of the exploration/development proposal could be required to protect cultural resources (MT-16-1). Lease Notice MT-14-9 has been attached to portions of lease sale parcels MTM 79010 QI, 3F, 3O, and 4H. Lease Notice MT-14-9 states that there are known historic properties on the lease sale parcel, and it notifies the lessee that archaeological inventory and mitigation costs could be higher.

4.11.3 Mitigation

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

Based on existing information, there are 11 recorded cultural sites located on four of the 19 proposed lease parcels. If developed, these properties could be potentially impacted by a site-specific proposal.

4.12 Paleontology

The act of leasing a nominated parcel would not impact paleontological resources; however, subsequent development could have impacts on those resources.

4.12.1 Alternative A (No Action Alternative)

There would be no impact to paleontological resources as a result of the No Action Alternative.

4.12.2 Alternative B (Proposed Action Alternative):

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), lease notice MT-14-12 has been attached stating that a survey for paleontological resources by a qualified paleontologist would need to occur prior to exploration or development and as a result of the paleontological survey, those identified resources would be avoided. For those parcels containing known/recorded paleontological resources, NSO stipulation has been attached (MT-11-12) in order to protect those resources from damage and/or vandalism.

Thirty-one recorded paleontological sites are located in four lease sale parcels.

4.12.3 Mitigation

Specific mitigation measures could include, but are not limited to, inventory, site avoidance, or excavation. These measures would be determined when site-specific development proposals are received.

4.13 Native American Religious Concerns

Leasing of nominated parcels would not have an impact on TCPs and/or areas of religious or cultural importance to tribes. A lease sale would not interfere with the performance of traditional ceremonies and rituals pursuant to the American Indian Religious Freedom Act (AIRFA) or EO 13007. It would not prevent tribes from visiting sacred sites or prevent possession of sacred objects.

4.13.1 Alternative A (No Action Alternative)

There would be no impacts to Native American Religious Concerns as a result of the No Action Alternative.

4.13.2 Alternative B (Proposed Action Alternative)

There are no known TCPs or properties of religious and/or cultural importance located on any of the proposed lease parcels. Should site types identified by the Crow and Northern Cheyenne as being of traditional or religious concern be located as a result of the cultural inventory at the APD phase, Native American consultation would occur on specific lease parcels. Thus there would be no impacts to Native American Religious Concerns as a result of the Proposed Action.

Lease Notice MT-16-1 has been attached to all proposed lease parcels.

4.14 Visual Resources

4.14.1 Alternative A (No Action Alternative)

There would be no impacts to visual resources as a result of the No Action Alternative;

4.14.2 Alternative B (Proposed Action Alternative)

The parcels proposed for lease fall into VRI Class III. While the act of leasing federal minerals produces no visual impacts, subsequent development of a lease could result in some new development and modifications to the existing landscape. Through the use of best management practices and mitigation guidelines for visual resources, impacts to visual resources would be minimal because the potential new development/modifications are expected to favorably blend with the form, line, color, and texture of the existing landscape.

4.15 Livestock Grazing

4.15.1 Alternative A (No Action Alternative)

There would be no impacts to livestock grazing as a result of the No Action Alternative.

4.15.2 Alternative B (Proposed Action Alternative)

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

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

4.15.3 Mitigation

Mitigation would be addressed at the site-specific APD stage of development. Best management practices would be incorporated into COAs.

Fencing of facilities would be considered as needed to minimize conflicts between oil and gas exploration/development and livestock grazing.

4.16 Recreation and Travel Management

4.16.1 Alternative A (No Action Alternative)

There would be no impacts to recreation and travel management resources as a result of the No Action Alternative.

4.16.2 Alternative B (Proposed Action Alternative)

While the act of leasing federal minerals itself produces no impacts to recreation and travel management, subsequent development of a lease could result in localized, short-term impacts to some recreation activities on approximately 9,614 acres. For those lease parcels that occur on isolated tracts of BLM-administered public lands, recreation opportunities and experiences in these areas are limited to non-existent; therefore, oil and gas activities would have little or no impact on recreational experiences in this area. For those lease parcels that are located on contiguous BLM public lands with good access, mainly in the southern portion of the project area, recreation impacts could exist where oil and gas development and recreational user conflicts might occur. The intensity of these impacts would be low to and exist in both the short-term (exploration and construction phases of oil and gas development) and in the long-term (producing wells, maintenance of facilities, etc.) should development actually occur. Conversely, if oil and gas development would occur in those areas of contiguous BLM-administered lands, new routes could be created which would enhance motorized recreational opportunities.

4.17 Lands and Realty

4.17.1 Alternative A (No Action Alternative)

There would be no impacts to federal or split-estate surface as a result of the No Action Alternative.

4.17.2 Alternative B (Proposed Action Alternative)

During the leasing process, there would be no impacts to federal or split-estate surface because it remains unknown if actual development would occur and where specific facilities may be placed. Both direct and indirect impacts could occur if a lease is developed in the future. Potential impacts include construction of access roads, well pads, and reserve pits. If the well is completed as commercially viable, there would likely be additional impacts from the need for powerlines, pipelines, and other facilities. These potential impacts would be analyzed on a site-specific basis prior to approval of the APD.

Leasing can sometimes cause conflicts with other surface uses that occur on the lands. This is especially possible if the leased lands are split estate.

The surface landowners for this lease sale have already been notified that the federal mineral estate underneath their surface would be addressed in this analysis (see Section 5.2). Surface owners have the right to comment on lease sales and the proposed lease stipulations, including the right to protest the inclusion of a specific parcel in a lease sale. Surface owners would be invited to participate in the BLM's onsite inspections during the notice of staking and APD process.

Along with the ownership of the minerals, the federal government retains the right to use the surface for exploration or development. The surface entry right and mitigation measures would be determined by the BLM in careful consideration of the private surface owner's views and the effects on the private surface owner's land uses. However, the surface entry right is not absolute. The BLM works to encourage coordination and cooperation among all parties that have rights and responsibilities in split estate situations. For a concise summary of split estate, as applicable to BLM, the lessee/operator, and the private surface owner, refer to the BLM brochure "Split Estate: Rights, Responsibilities, and Opportunities." By working together cooperatively, many of the direct and indirect impacts associated with oil and gas development can be avoided or mitigated.

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

4.17.3 Mitigation

Mitigation measures would be addressed in the APD and the COAs. The BLM would encourage the use of BMPs documented in "Surface Operating Practices and Guidelines for Oil and Gas Exploration and Development" (USDI and USDA 2007), also known as "The Gold Book." Specific mitigation would be deferred until the APD stage of development.

4.18 Minerals

4.18.1 Fluid Minerals

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

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

4.18.1.1 Alternative B (Proposed Action)

Under Alternative B, approximately 40 percent of the areas would be subject to major constraints (no surface occupancy). Portions of all parcels would be subject to moderate constraints. None of the parcels would be subject to standard terms and conditions only.

4.18.2 Solid Minerals

Coal

If conflicts between oil producers and coal mines were to occur the following guidance would be observed:

It is the policy of the BLM to encourage oil and gas and coal companies to resolve conflicts between themselves; and when requested, the BLM will assist in facilitating agreements between the companies. The BLM will also exercise authority provided in the leases, applicable statutes, and regulations to manage federal mineral development in the public's best interest (USDI, BLM IM 2003-253).

4.18.3 Locatable Minerals

If potential mineral development conflicts arise in the future, issues would be addressed during the APD review process and/or the conflict would be resolved between the private parties through customary corporate and legal procedures.

4.18.4 Salable Minerals

Salable minerals are scattered throughout the planning area and could occur within most of the oil and gas lease parcels. However, disposal of salable minerals is a discretionary decision of the authorized officer and thus future potential resource development conflicts would be avoided either by not issuing sales contracts in oil and gas development locations or conditioning the APD or sand and gravel contract to avoid conflicts between operations.

4.19 Special Designations

Areas of Critical Environmental Concern (ACECs)

4.19.1 Alternative A (No Action Alternative):

There would be no impact to the Bridger Fossil Area ACEC as a result of the No Action Alternative.

4.19.2 Alternative B (Proposed Action)

The Bridger Fossil Area ACEC is located proximate to a lease sale parcel in Carbon County. Because that lease parcel also contains paleontological resources similar to this ACEC, an NSO stipulation has been attached to portions of the lease sale parcel (11-12). This NSO stipulation would protect the relevant and important values of the Bridger Fossil Area ACEC as well as protect the paleontological values in the lease sale parcels. Lease Notice 14-12 has also been attached to the lease sale parcels proximate to the Bridger Fossil area.

4.20 Social and Economic Conditions

4.20.1 Economics

4.20.1.1 Alternative A (No Action Alternative)

Economic impacts associated with Alternative A would be similar to the existing conditions described in the economic section of the Affected Environment, and summarized in Tables 18 and 19.

4.20.1.2 Alternative B (Proposed Action)

Public Revenues

Leasing an additional 14,179 acres of federal minerals would increase annual oil and gas leasing and rent revenues to the federal government by an estimated \$28,000 (Table 18). Annual leasing and rent revenues that would be distributed to state/local governments would increase by an estimated \$14,000. Annual federal oil and gas royalties would increase by an estimated \$197,000. Royalties distributed to the state/counties would increase by an estimated \$97,000 annually.

Total annual federal revenues related to leasing an additional 14,179 acres of federal minerals and associated annual rent and royalty revenues related to annual production of federal minerals would amount to an estimated \$2.873 million. This would be an estimated annual increase of \$225,000 compared to Alternative A. Total annual revenues distributed to the state and counties would be an estimated \$1.4 million, an estimated \$110,000 more than with Alternative A. Total revenues distributed to the counties would be about \$352,000. This would be an estimated increase of about \$28,000 over Alternative A.

Table 18. Summary of Annual Average Economic Impacts by Alternative

Activity	Alternative		
	A	B	Alt. B-Alt. A
Existing Acres leased*	168,744	168,744	0
<i>Acres that would be leased based on this EA **</i>	0	14,179	
Total acres leased	168,744	182,923	14,179
Acres held by production*	16,113	16,113	0
Total acres leased for which lease rents would be paid	152,631	166,810	14,179
Lease rental first 5 years (\$1.50/acre)	114,473	125,108	10,634
Lease rental second 5 years (\$2.00/acre)	152,631	166,810	14,179
Minimum lease bid (\$2.00/ac.)	33,749	36,585	2,836
Total annual federal lease and rental revenue	300,853	328,502	27,649
Distribution to State/local government	147,418	160,966	13,548
Annual oil production (bbl)***	277,523	300,842	23,319
Annual gas production (MCF)	147,325	159,704	12,379
Federal Oil Royalty (bblx\$64.64x0.125)	2,242,386	2,430,806	188,420
Federal gas Royalty (bblx\$5.72x0.125)	105,337	114,189	8,851
Total Annual Federal O&G royalties	2,347,723	2,544,995	197,271
Distribution to State/local government	1,150,384	1,247,047	96,663
Total Annual Federal Revenues	2,648,576	2,873,497	224,920
Total Annual State/Local Revenues	1,297,802	1,408,013	110,211
Total annual revenue distributed to counties	324,451	352,003	27,553
*LR2000, BLM, May 21, 2010			
**RFD, May 28, 2010			
***Estimated 2007 federal production level			

Local Economic Contribution

The estimated combined total annual average employment and income supported by federal oil and gas leasing, distributions of royalties to local governments, drilling wells, and production would amount to about 150 total full and part-time jobs and \$10.4 million within the local economy (IMPLAN, 2007). Table 19 shows that this would be an annual average increase of about 10 total full and part-time jobs and \$0.8 million in labor income over levels anticipated with Alternative A. There would also be a corresponding increase in local population of about 10-15 people.

Conclusion

Total federal contribution of Alternative B (leasing an additional 14,179 acres of federal minerals and anticipated related exploration, development, and production of oil and gas) would have negligible effects on local population, total local employment, number of households, average income per household, and total personal income, e.g., the effects would be less than one-tenth of one percent of current levels. The economic effects would continue to be spread unevenly among the counties. Leasing the additional 14,179 acres and anticipated exploration, development, and production under alternative B would provide an average of about \$28,000 per

year of additional funds for county functions such as law enforcement, justice administration, tax collection and disbursement, provision of orderly elections, road and highway maintenance, fire protection, and/or record keeping. Other county functions that may be funded include primary and secondary education administration and the operation of clinics/hospitals, county libraries, county airports, local landfills, and county health systems. Demand for these services would also increase as total local employment and population increase. Leasing the additional 14,179 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).

Table 19. Average Annual Employment and Income by Major Industry by Alternative

Industry	Total Jobs Contributed		Total Income Contributed (\$1000)	
	Alt. A	Alt. B	Alt. A	Alt. B
Agriculture	1	1	\$14.6	\$15.8
Mining	49	53	\$5,998.3	\$6,500.4
Utilities	1	1	\$100.4	\$108.8
Construction	16	17	\$668.6	\$724.8
Manufacturing	2	2	\$122.3	\$132.5
Wholesale Trade	3	3	\$179.1	\$194.0
Transportation & Warehousing	4	4	\$180.2	\$195.1
Retail Trade	12	13	\$293.2	\$317.8
Information	1	1	\$49.8	\$54.0
Finance & Insurance	4	4	\$238.1	\$257.9
Real Estate & Rental & Leasing	4	5	\$147.1	\$159.4
Prof, Scientific, & Tech Services	12	13	\$618.5	\$670.1
Mngt of Companies	0	1	\$32.6	\$35.3
Admin, Waste Mngt & Rem Serv	4	4	\$88.2	\$95.6
Educational Services	1	1	\$15.9	\$17.2
Health Care & Social Assistance	10	11	\$453.0	\$490.9
Arts, Entertainment, and Rec	2	2	\$27.8	\$30.1
Accommodation & Food Services	7	7	\$115.4	\$125.1
Other Services	6	7	\$110.5	\$119.7
Government	3	3	\$170.0	\$184.3
Total Federal Contribution	142	154	\$9,623.7	\$10,428.9
Percent Change from Current	---	8.4%	---	8.4%

4.20.2 Social and Environmental Justice

4.20.2.2 Alternative B (Proposed Action Alternative)

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

estate is federally owned, surface owner agreements, standard lease stipulations, and best management practices could address many of the concerns of private surface owners.

There would be no disproportionate effects to low income or American Indian populations. There are low income people in the county but they do not appear to be associated with any specific BLM resources or activities. The known American Indian-related cultural resources in the area are currently protected.

4.21 Cumulative Impacts

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

Cumulative effects associated with oil and gas exploration and development in the Billings Field Office, including implementation of the RFD Scenario described above, 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 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 activity 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 all resources and programs other than Air Resources as presented for this Proposed Action, and is incorporated by reference.

4.21.1 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, wildland fires, 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.

4.21.2 Greenhouse Gas Emissions and Cumulative Impacts on 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. These impacts would be discussed at multiple scales including the planning area, state, national, and global scales. The analysis addresses of the potential contributions to GHG emissions in the event that Alternative B lease parcels are ever developed, followed by a general discussion of potential impacts to climate. Potential emissions relate to those derived from potential exploration and development of fluid minerals. Additional emissions beyond the control of the

BLM, 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 to provide a context for the potential contributions of GHGs associated with this project.

As discussed in the Chapter 4 Air Quality section, total projected BLM GHG emissions from the RFD are 9,673 metric tons/year CO₂e. Potential emissions under Alternative B would be approximately 2.1 percent of this total. Table 20 displays projected GHG emissions from non-BLM activities included in the Billings FO RFD. Total projected emissions of non-BLM activities in the RFD are 13,696.8 metric tons/year of CO₂e. When combined with projected annual BLM emissions, this totals 23,369.8 metric tons/year CO₂e.

Potential GHG emissions under Alternative B would be 0.85 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 Field Office.

Table 20. 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 ₂	CH ₄	N ₂ O	CO ₂ 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
Total	12,299.5	99.1	2.3	13,696.8

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 CO₂e (Center for Climate Strategies (CCS) 2007). Potential emissions from development of lease parcels in Alternative B of this project represent approximately 0.00054 percent of the state-wide total of GHG emissions based on the 2005 state-wide inventory (CCS 2007).

The EPA (Climate Change SIR, 2010) published an inventory of U.S. GHG emissions, indicating gross U.S. emissions of 6,957 million metric tons, and net emissions of 6,016 million metric tons (when CO₂ sinks were considered) of CO₂e in 2008. Potential annual emissions under Alternative B of this project would amount to approximately 0.0000029 percent of gross U.S. total emissions. Global GHG emissions for 2004 (Climate Change SIR, 2010) indicated approximately 49 gigatonnes (10⁹ metric tons) of CO₂e emitted. Potential annual emissions under Alternative B would amount to approximately 0.00000041 percent of this global total.

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

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

4.21.3 Cumulative Impacts of Climate Change

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

4.21.4 Cumulative Impacts on Other Resources

4.21.4.1 Soil Resources

Historic and ongoing activities adjacent to, or within, the planning area include minerals exploration and development, livestock grazing, vehicle use on and off-road, recreation, infrastructure, fire suppression, altered fire regimes, forestry, urbanization, noxious weed infestation, pollution, and agriculture. The cumulative effects of such activities have contributed

to compaction, increased surface runoff, mass failure, and accelerated erosion by wind and water, resulting in sedimentation, dust formation, and the irretrievable loss of topsoil and nutrients. Long-term impacts include altered pH and reduced soil stability, organic matter content, microbial mass, biotic richness and diversity, and phosphorus and nitrogen content (Perrow and Davy, 2003). Permanent impacts include altered calcium carbonate and clay translocation, texture class, rock fragment content, structure, and depth to bedrock.

Land uses associated with leasing, in conjunction with other resource uses, would have a collective effect on the soil resource, augmenting impacts to the soil system within those areas. Surface-disturbing actions in areas of weed infestations would compound the degradation of the soil resource, which has been altered by the infestation. Land application and seepage ponds used to dispose of produced water have the potential to form saline seeps. Extraction and infrastructure development would cause soil system fragmentation leading to altered soil heterogeneity (variable characteristics), microclimate, hydrology, nutrient cycling, biotic richness, and diversity (Perrow and Davy, 2003). From the edge of the fragmented patch, localized impacts would include microclimatic changes tens of meters into the patch, while altered biota and nutrient cycling would extend even further into the patch (Perrow and Davy, 2003). On a landscape-scale, pre-existing disturbance regimes (e.g., fire) would be altered, changing natural rates of soil formation (Perrow and Davy, 2003). Potential cumulative impacts and mitigation would be addressed site-specifically at the exploration and APD stages.

4.21.4.2 Water Resources

Water is affected by past and present land use, dams, natural events, changes in local and global climatic patterns, and management actions. As human populations increase and expand, so would the effects on water resources. Water is connected throughout a watershed and operates in four scales: longitudinal from headwaters downstream; lateral through interactions with floodplains, riparian areas, and uplands; vertical through interactions with the substrate and subsurface; and temporal. These interactions compound the effects of land management and land use throughout an entire watershed (Eubanks, 2004).

The construction of numerous impoundments and spring developments, construction of stream crossings, overgrazing in riparian areas, and historic impacts to stream morphology and groundwater all contribute to disconnectivity within the watershed. Connectivity is essential for the cycling of water, nutrients, and sediment throughout the watershed. Continued degradation of stream channels and riparian areas would result in accelerated loss of water resources and hydrologic function. The cumulative effects of surface-disturbing activities within uplands, riparian areas, and stream channels, grazing, local geology and soils, and agricultural practices have contributed to accelerated erosion and increased sedimentation. Sedimentation from activities in the upper watershed is compounded as these drainages combine and flow into larger streams and rivers.

Erosive soils and arid climate across the area form hydrologic systems that are sensitive to erosion, channel degradation, excessive lateral cutting, and sedimentation. The BLM's ability to influence future conditions in watersheds is limited by scattered and minority land ownership and mineral administration in many watersheds. Activity that occurs adjacent to or on BLM-administered lands, including livestock grazing, agriculture, urbanization, fire suppression,

mineral exploration and development, weed infestation, OHV use, and pollution decreases watershed health and water quality. These activities cause accelerated erosion, increased overland flow, decreased infiltration, channel degradation, atmospheric deposition of pollutants, and water quality degradation associated with increased sedimentation, turbidity, nutrients, eutrophication, metals, and other pollutants in waterbodies. Fire suppression has increased fire severity and intensity, leading to increased overland flow, erosion, and sedimentation. Crop and livestock production comprises the largest percentage of non-point source pollution in Montana (MDEQ 2007) and is the most common anthropogenic contributor to stream impairment in the area (MDEQ 2009).

Produced water from oil, gas, CBNG, and coal development in Wyoming and Montana impacts the quality and quantity of surface and groundwater through impoundments, injection, and discharge; effects of these activities would be mitigated by permits. These activities, in combination, increase the potential for water quality degradation. Discharge of sodic and saline water from CBNG development as well as the use of seepage ponds to dispose of this water has cumulative effects on water quality (FSEIS 2008).

Site-specific impacts and mitigation would be addressed at the exploration and APD stages.

4.21.4.3 Cumulative Economic Impacts

The cumulative effects of federal mineral leasing within the local economy as well as the specific effects of leasing 14,179 acres under Alternative B are presented in the description of the affected environment and environmental consequences described previously. These effects are summarized in Tables 18 and 19. The total demographic and economic characteristics of the local economy would change very little with the economic activity associated with leasing an additional 14,179 acres of federal minerals.

5.0 CONSULTATION AND COORDINATION

5.1 Persons, Agencies, and Organizations Consulted

Table 21 lists persons, agencies, and organizations who were consulted during development of this EA along with the findings and conclusions associated with consultations.

Table 21. 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 (MTFWP), Region 5	I.M. #MT-2008-008, 2/26/2007; MTFWP and BLM Guidance on Coordination During Oil and Gas Lease Parcel Reviews	Additional stipulations were added to some of the leases due to updated inventory data from MTFWP.
USFWS	Coordination letter I.M. # MT-2009-039, 2009 Montana/Dakotas special Status Species List.	Pending.
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.
Switchback Ranch, LLC	Montana Land Reliance Conservation Easement	Copy of easement obtained from Carbon County. Updated information in EA to reflect a conservation easement on a portion lease MTM 79010 JL

5.2 Summary of Public Participation

Public scoping for this project was conducted through a 15-day scoping period advertised on the BLM Montana State Office website and posting on the field office website NEPA notification log. Scoping was initiated May 25, 2010; however, scoping comments were received through June 21, 2010. Surface owner notification letters were also distributed briefly explaining the oil and gas leasing process and planning process. The surface owner notification letter requested written comments regarding any issues or concerns that should be addressed in the environmental analysis. A total of 325 surface owner notification letters were distributed for the oil and gas leasing analysis process in the entire Montana/Dakotas BLM, with 22 of those surface owner letters (about 7 percent) geographically specific to the Billings Field Office.

A total of 14 written comment letters were received and 23 phone/verbal comments were provided. The written and verbal communication resulted in a total of 108 individual scoping comments received pertaining to oil and gas leasing in the Montana/Dakotas. Of the 108 scoping comments, 13 comments (about 12 percent) were specific to the Billings Field Office.

Of the 108 comments, about 20 were comments/requests for additional information (e.g., split estate brochure) regarding the general process of oil and gas leasing, split estate, questions about

the planning process, and questions regarding the verification of mineral ownership. Other comments ranged from the need to address GHG emissions and cumulative impacts to climate change; concerns about impacts to wildlife and fisheries habitat and fragmenting wildlife corridors; concerns related to wilderness, pristine landscapes, and scenic viewsheds/quality. Other comments provided specific information pertaining to cultural areas, suggestions for mitigation measures from surface disturbance and compliance with the NEPA process, including allowing for public comment, addressing a no leasing alternative, and addressing direct, indirect and cumulative impacts.

Of the 13 comments specific to the Billings Field Office, three comments were general in nature and requested information about the process. The remaining comments pertained to concerns about protecting paleontological and cultural areas, livestock grazing operations, poor access to the proposed lease parcels, concern about impacts to water sources, and concern regarding past oil and gas drilling impacts and the issues with past clean-up efforts.

5.3 List of Preparers:

Name	Title	Responsible for the Following Section(s) of this Document
Sheila Cain	GIS Specialist	GIS
Tom Carroll	Realty Specialist	Lands and Realty
Dustin Crowe	Rangeland Management Specialist	Livestock Grazing, Vegetation
Julie Cymore	Hydrologist	Water, Hydrology
Craig Drake	AFM	Overall review
Jayne Green	Archaeological Technician	Cultural, Paleontological, Native American Religious Concerns
Kelly McGill	Outdoor Recreation Planner SCEP	Recreation, Visual Resource Management
Ernie McKenzie	Fisheries Biologist	Fisheries, Riparian
Melissa Passes	Natural Resource Specialist	Noxious and Invasive Weeds
Jay Parks	Wildlife Biologist	Wildlife, Special Status Animals
Melissa Schroeder	Soil Scientist	Soils
Carolyn Sherve-Bybee	RMP Team Lead	Cultural, Paleontological, Native American Religious Concerns, NEPA
Joan Trent	Sociologist	Social Analysis
John Thompson	Economist	Economic Analysis

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APPENDIX A
Descriptions of Parcels and Lease Stipulations by Parcel

Parcel Number	Acres	Legal Description	Proposed Stipulations
MTM 79010 A3	944.77	T. 1 N, R. 15 E, PMM, MT Sec. 26 SWNE,NWNW; 33 SESE; T. 1 S, R. 15 E, PMM, MT Sec. 1 S2SENW; 4 SWNW; 3 LOTS 2,3; 5 E2SW; 6 LOT 7; 6 NESW; 9 SESW; 11 SENW; 13 NE,NESE,S2SE; 18 LOTS 1,3; 18 NENW,SENE; Sweet Grass County (097) PD	CSU 12-1 T. 1 N, R. 15 E, PMM, MT Sec. 26 SWNE,NWNW; Sec. 33 SESE; T. 1 S, R 15 E, PMM, MT Sec. 1 S2SENW; 3 LOTS 2,3; 4 SWNW; 5 E2SW; 6 NESW; 11 SENW; 12 NWNW; 13 E2NE,NWNE,NESE,SESE,SWNE,SWSE; 18 LOT 3; 18 SENE; Cultural Resources 16-1 (All Lands) Lease Notice 14-2 (All Lands) Lease Notice 14-11 (All lands) Lease Notice 14-12 (All Lands) NSO 11-2 T. 1 S, R. 15 E, PMM, MT Sec. 3 LOTS 2,3; 5 E2SW; 18 LOT 3; TES 16-2 (All Lands) TL 13-1 T. 1 N, R. 15 E, PMM, MT Sec. 26 SWNE,NWNW;* 33 SESE; T. 1 S, R. 15 E, PMM, MT Sec. 4 SWNW;* 6 LOT 7; 6 NESW; 11 SENW; 13 NE,NESE,S2SE;* 18 SENE;* TL 13-3 T. 1 S, R. 15 E, PMM, MT Sec. 18 LOT 3;
	717.21	Continue to suspend portion of lease for following described lands until completion of the RMP: T. 1 N, R 15 E, PMM, MT Sec. 26 S2NW; T. 1 S, R. 15 E, PMM, MT Sec. 2 SENE,N2SE; 3 LOT 1; 3 SENE; 5 LOTS 2,3; 9 SWSE; 11 NENE,S2NE,NWSE; 12 NWNW, 14 SWSE;	Maintain suspension for Yellowstone Cutthroat Trout concerns, until RMP is complete.

Parcel Number	Acres	Legal Description	Proposed Stipulations
		17 SESE; Sweet Grass County (097) PD	
MTM 79010 EM	240.00	T. 4 N, R. 19 E, PMM, MT Sec. 24 N2N2,SENE,SWNW; Stillwater County (095) PD	CSU 12-1 Sec. 24 E2NE,NWNE,NENW; Cultural Resources 16-1 (All Lands) Lease Notice 14-2 (All Lands) Lease Notice 14-12 (All Lands) TES 16-2 (All Lands)
MTM 79010 2X	540.64	T. 4 N, R. 19 E, PMM, MT Sec. 2 SESW; 6 LOTS 4,5; 8 NWNW; 10 NENE,NWSW,S2SW,SE; 20 W2NW; Stillwater County (095) PD	CSU 12-1 Sec. 2 SESW; 6 LOTS 4,5; 8 NWNW; 10 NENE,NWSW,S2SW,SE; 20 W2NW; Cultural Resources 16-1 (All Lands) Lease Notice 14-2 (All Lands) Lease Notice 14-12 (All Lands) NSO 11-2 Sec. 20 NWNW; TES 16-2 (All Lands) TL 13-1 Sec. 2 SESW;* 6 LOTS 4,5;* 8 NWNW;* 10 NENE,NWSW,S2SW,SE; 20 W2NW;* TL 13-4 Sec. 20 W2NW;
MTM 79010 2Z	640.00	T. 4 N, R. 19 E, PMM, MT Sec. 26 ALL; Stillwater County (095) PD	CSU 12-1 Sec. 26 NENW,NWNW,SWNW; Cultural Resources 16-1 (All Lands) Lease Notice 14-2 (All Lands) Lease Notice 14-12 (All Lands) NSO 11-2 Sec. 26 S2SE,SWNW; TES 16-2 (All Lands)
MTM 79010 VJ	760.00	T. 11 N, R. 24 E, PMM, MT Sec. 5 SWSW; 8 NW,E2SW,SE; 23 E2SW,SWSE; 26 W2NE,E2NW,NWSE; Musselshell County (065) ACQ	CSU 12-1 Sec. 23 NESW,SESW,SWSE; 26 NENW,NWNE,NWSE,SENE,SWNE; Cultural Resources 16-1 (All Lands) Lease Notice 14-1 Sec. 8 SE; Lease Notice 14-2 (All Lands) Lease Notice 14-12 (All Lands) NSO 11-2 Sec. 23 E2SW,SWSE; 26 W2NE,E2NW,NWSE; NSO 11-4 Sec. 8 SE; TES 16-2 (All Lands) TL 13-1 Sec. 5 SWSW; 8 NW,E2SW,SE; TL 13-3 Sec. 5 SWSW; 8 NW,E2SW,SE;
MTM 79010 QI	1038.71	T. 10 N, R. 25 E, PMM, MT	CSU 12-1

Parcel Number	Acres	Legal Description	Proposed Stipulations
		Sec. 6 LOT 7; 6 SESW,S2SE; 7 LOTS 1,2,3,4; 7 E2,E2W2; 8 S2NW,SW; Musselshell County (065) ACQ	Sec. 7 LOTS 3,4; 7 SESW,NESW; Cultural Resources 16-1 (All Lands) Lease Notice 14-2 (All Lands) Lease Notice 14-9 Sec. 7 E2; 8 SW; Lease Notice 14-11 (All lands) Lease Notice 14-12 (All Lands) TES 16-2 (All Lands) TL 13-3 Sec. 6 LOT 7; 6 SESW,S2SE; 7 LOTS 1,2,3; 7 NE,E2NW,NESW,N2SE; 8 S2NW,N2SW;
MTM 79010 JL	40.00	T. 5 S, R. 18 E, PMM, MT Sec. 33 NWSW; Carbon County (009) PD	Cultural Resources 16-1 (All Lands) Lease Notice 14-2 (All Lands) Lease Notice 14-12 (All Lands) TES 16-2 (All Lands) TL 13-1(All Lands) TL 13-2 (All Lands)* CSU 12-1 (All Lands)
	119.80	Continue to suspend portion of lease for following described lands until completion of the RMP: T. 5 S, R. 18 E, PMM, MT Sec. 30 LOT 1; 30 NESW; 31 LOT 3; Carbon County (009) Stillwater County (095) PD	Maintain suspension for Yellowstone Cutthroat Trout concerns, until RMP is complete.
MTM 79010 4W	1480.00	T. 6 S, R. 23 E, PMM, MT Sec. 11 W2NW,S2SE; 12 E2SW,SE; 13 NE,NWSW,NWSE; 14 NE,E2NW; 23 SWNE,E2W2,W2SE; 25 SW,S2SE; 26 E2NW; Carbon County (009) PD	CSU 12-1 Sec. 11 W2NW,S2SE; 12 E2SW,SE; 13 NE,NWSW,NWSE; 14 E2NE,SWNE,NENW; 23 SWNE,E2W2,W2SE; 25 SW,SESE,SWSE; 26 E2NW; Cultural Resources 16-1 (All Lands) Lease Notice 14-1 Sec. 12 S2SE; Lease Notice 14-2 (All Lands) Lease Notice 14-11 (All lands) Lease Notice 14-12 (All Lands) TES 16-2 (All Lands) TL 13-3 Sec. 11 SESE; 12 SESW,SE; 13 NE,NWSW,NWSE; 14 NE,SENW; 23 SWNE,E2W2,W2SE; 25 SWSE;

Parcel Number	Acres	Legal Description	Proposed Stipulations
			26 E2NW; NSO 11-2 Sec. 12 SESW;
MTM 79010 3F	1245.33	T. 9 S, R. 23 E, PMM, MT Sec. 6 LOTS 1-7 INCL; 6 S2NE,SE,SE, 7 LOTS 1,2,3,4; 7 E2,E2W2; Carbon County (009) PD	CSU 12-1 Sec. 6 LOTS 1-7 INCL; 6 E2SW,SE,SE, 7 LOTS 1,2,4; 7 E2,E2W2; Cultural Resources 16-1 (All Lands) Lease Notice 14-2 (All Lands) Lease Notice 14-9 Sec. 7 LOTS 1,2,3,4; 7 E2,E2W2; Lease Notice 14-11 (All lands) Lease Notice 14-12 (All Lands) NSO 11-2 Sec. 6 LOTS 1-7 INCL; 7 LOTS 1,2,3,4; 7 SESW; TES 16-2 (All Lands) TL 13-3 Sec. 6 LOTS 4-7 INCL; 6 SENW; 7 LOTS 1,2,3,4; 7 E2,E2W2;
MTM 79010 3O	1549.67	T. 9 S, R. 23 E, PMM, MT Sec. 18 LOTS 1,2,3,4; 18 E2,E2W2; 19 LOTS 1,2,3,4; 19 E2,E2W2; 30 LOTS 1,2; 30 NE,E2NW; Carbon County (009)	CSU 12-1 Sec. 18 LOTS 1,2,3,4; 18 E2E2,W2NE,NWSE,NENW,SE, SWSE; 19 LOTS 1,2,3,4; 19 N2NE,SE,SE,SE, 30 LOTS 1,2; 30 NWNE,S2NE,E2NW; Cultural Resources 16-1 (All Lands) Lease Notice 14-1 Sec. 18 LOTS 1,2,3; 18 E2W2; 19 E2,E2NW; 30 NE; Lease Notice 14-2 (All Lands) Lease Notice 14-9 Sec. 18 E2,E2W2; 19 E2; Lease Notice 14-11 (All lands) Lease Notice 14-12 (All Lands) NSO 11-2 Sec. 18 LOT 1; 18 E2W2,NENW,NWSE,SWSE; 19 W2NE,E2SE,NWSE,NENW; TES 16-2 (All Lands) TL 13-1 Sec. 18 LOTS 3,4; 19 LOTS 1,2,3,4; 19 E2,E2W2; 30 LOTS 1,2; TL 13-3 Sec. 18 LOTS 1,2,3,4; 18 NE,E2W2,N2SE,SWSE; 19 LOTS 1,2; 19 E2NW;

Parcel Number	Acres	Legal Description	Proposed Stipulations
MTM 79010 4T	835.93	T. 9 S, R. 23 E, PMM, MT Sec. 31 LOTS 3-7 INCL; 31 NESW,N2SE; 32 LOTS 1,2,3,4; 32 NW,N2S2; Carbon County (009) PD	CSU 12-1 Sec. 31 LOTS 3-7 INCL; 31 NESW,NWSE; 32 LOTS 1,2,3,4; 32 NESE,NWNW,NWSE,SESW,SWNW; Cultural Resources 16-1(All Lands) Lease Notice 14-1 Sec. 31 LOT 7; Lease Notice 14-2 (All Lands) Lease Notice 14-11 (All lands) Lease Notice 14-12 (All Lands) TES 16-2 (All Lands) TL 13-1 Sec. 31 LOTS 3,4; TL 13-3 Sec. 31 LOTS 3-7 INCL; 31 NESW,N2SE;
MTM 79010 4U	80.00	T. 4 S, R. 24 E, PMM, MT Sec. 1 LOT 1; 1 SENE; Carbon County (009) PD	CSU 12-1 Sec. 1 LOT 1; 1 SENE; Cultural Resources 16-1(All Lands) Lease Notice 14-2 (All Lands) Lease Notice 14-12 (All Lands) NSO 11-2 Sec. 1 LOT 1, 1 SENE; TES 16-2 (All Lands)
MTM 79010 3Q	920.00	T. 4 S, R. 24 E, PMM, MT Sec. 1 E2SW; 11 NENE; 12 N2NW,SESW,SWSW; 13 NENE,NW,N2SW,SWSW; 14 SESW,SE; 24 SESE; 25 SENW,SESE; Carbon County (009) PD	CSU 12-1 Sec. 1 SESW,NESW; 11 NENE; 12 N2NW,SESW,SWSW; 13 NENE,NW,N2SW,SWSW; 14 E2SE,SWSE,SESW,NWSE; 25 SENW,SESE; Cultural Resources 16-1(All Lands) Lease Notice 14-2 (All Lands) Lease Notice 14-11 (All lands) Lease Notice 14-12 (All Lands) NSO 11-2 Sec. 1 E2SW; 11 NENE; 12 N2NW,SESW,SWSW; 13 NW,N2SW,SWSW; 14 SESW,SE; 24 SESE; 25 SENW; 25 SESE; NSO 11-12 Sec. 11 NENE; 12 N2NW,SESW,SWSW; 13 NENE,NW,N2SW,SWSW; 14 SESW,SE; TES 16-2 (All Lands) TL 13-3 Sec. 11 NENE; 12 N2NW,SESW,SWSW; 13 NW,N2SW,SWSW; 14 SESW,SE;
MTM 79010 3X	160.00	T. 4 S, R. 24 E, PMM, MT Sec. 23 N2NE,SWNE;	CSU 12-1 Sec. 23 N2NE,SWNE;

Parcel Number	Acres	Legal Description	Proposed Stipulations
		26 SESW; Carbon County (009) PD	26 SESW; Cultural Resources 16-1(All Lands) Lease Notice 14-2 (All Lands) Lease Notice 14-11 (All lands) Lease Notice 14-12 (All Lands) NSO 11-2 Sec. 23 N2NE,SWNE; NSO 11-12 Sec 23 N2NE,SWNE; TES 16-2 (All Lands) TL 13-3 Sec. 23 N2NE,SWNE;
MTM 79010 4V	42.29	T. 5 S, R. 24 E, PMM, MT Sec. 13 LOT 1; Carbon County (009) PD	CSU 12-1 Sec. 13 LOT 1; Cultural Resources 16-1(All Lands) Lease Notice 14-2 (All Lands) Lease Notice 14-12 (All Lands) TES 16-2 (All Lands)
MTM 79010 3R	720.00	T. 5 S, R. 24 E, PMM, MT Sec. 24 SWSE; 25 SWNW,NWSW,S2SW; 26 SENE,NESE,S2SE; 35 N2NE,SENE,NENW,NESW,SE; Carbon County (009) PD	CSU 12-1 Sec. 24 SWSE; 25 SWNW,NWSW,S2SW; 26 SWSE,SENE,NESE,SENE,SESE; 35 SE,NESW,E2NE,NWNE,NENW; Cultural Resources 16-1(All Lands) Lease Notice 14-2 (All Lands) Lease Notice 14-12 (All Lands) NSO 11-2 Sec. 24 SWSE; 25 SWNW,NWSW,S2SW; 26 NESE,S2SE,SENE; 35 N2NE,SENE,NENW; 35 NESW; TES 16-2 (All Lands) TL 13-1 Sec. 24 SWSE; 25 SWNW,NWSW,S2SW; 26 E2SE,SWSE; 35 N2NE,SENE,SE;
MTM 79010 4J	320.00	T. 6 S, R. 24 E, PMM, MT Sec. 17 N2NE,SESW,NESE; 18 E2E2; Carbon County (009) PD	CSU 12-1 Sec. 17 NENE,SESW; 18 E2NE,NESE,SESE; Cultural Resources 16-1(All Lands) Lease Notice 14-2 (All Lands) Lease Notice 14-11 (All lands) Lease Notice 14-12 (All Lands) TES 16-2 (All Lands) TL 13-1 Sec. 17 N2NE,SESW,NESE; 18 E2NE; TL 13-3 Sec. 17 N2NE,SESW,NESE; 18 E2E2;
MTM 79010 4H	1913.74	T. 7 S, R. 24 E, PMM, MT Sec. 10 S2NW,S2; 11 NENW,S2NW,SW; 15 NE,N2NW,SWNW,N2SW,SESW,W2SE; 21 LOT 1; 21 NENW,S2NW,S2; 22 SWNE,SWNW,SW,NWSE;	CSU 12-1 Sec. 10 S2NW,SW,NWSE,S2SE,NESE; 11 NENW,S2NW,SW; 15 NE,N2NW,SWNW,N2SW,SESW,W2SE; 21 LOT 1; 21 NENW,S2NW,SW,SESE; 22 SWNE,SWNW,SW,NWSE; Cultural Resources 16-1(All Lands)

Parcel Number	Acres	Legal Description	Proposed Stipulations
		Carbon County (009) PD	Lease Notice 14-1 Sec. 15 SWSE; Lease Notice 14-2 (All Lands) Lease Notice 14-9 Sec. 10 S2; 11 SW; 15 NE,SWNW,N2SW,W2SE; Lease Notice 14-11 (All lands) Lease Notice 14-12 (All Lands) NSO 11-12 Sec 11 NENW,S2NW,SW; TES 16-2 (All Lands) TL 13-3 Sec. 10 SENW,S2; 11 NENW,S2NW,SW; 15 NE,N2NW,SWNW,N2SW,SESW,W2SE; 21 NENW,S2NW,S2;* 22 SWNE,SWNW,SW,NWSE;*
MTM 79010 4R	711.51	T. 7 S, R. 24 E, PMM, MT Sec. 17 LOTS 1,2,3,4; 18 LOTS 5,6,7; 18 SESW; 19 LOTS 3-8 INCL; 19 E2SW,NESE; 20 LOTS 1-5 INCL; 20 S2S2; Carbon County (009) PD	CSU 12-1 Sec. 17 LOTS 1,2,3,4; 18 LOTS 5,6,7; 18 SESW; 19 LOTS 3-8 INCL; 19 SESW,NESW,NESE; 20 LOTS 1,4,5; 20 SESW,S2SE,SWSW; Cultural Resources 16-1 (All Lands) Lease Notice 14-1 Sec. 18 LOT 5; 19 LOTS 6,7; 20 S2SW; Lease Notice 14-2 (All Lands) Lease Notice 14-11 (All lands) Lease Notice 14-12 (All Lands) NSO 11-2 Sec. 17 LOTS 1,2; 19 LOTS 3-8 INCL; 19 E2SW,NESE 20 LOTS 1-5 INCL; 20 S2SW; NSO 11-12 (All Lands) Sec. 17 LOTS 1,2,3,4; 18 LOTS 5,6,7; 18 SESW; 19 LOTS 3-8 INCL; 19 E2SW,NESE; 20 LOTS 1-5 INCL; 20 S2S2; TES 16-2 (All Lands) TL 13-3 Sec. 19 LOTS 1-4 INCL; 19 E2SW,SENW;
*Indicates that stipulation was added through consultation with Montana Fish, Wildlife and Parks			

Stipulation No.	Stipulation Name/Brief Description
CSU 12-1	CONTROLLED SURFACE USE STIPULATION Prior to surface disturbance on slopes over 30 percent, an engineering/reclamation plan

Stipulation No.	Stipulation Name/Brief Description
	must be approved by the authorized officer.
CSU 12-4	CONTROLLED SURFACE USE STIPULATION 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).
Cultural Resources 16-1 (All Lands)	CULTURAL RESOURCES LEASE STIPULATION This lease may be found to contain historic properties and/or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O. 13007, or other statutes and executive orders. The BLM will not approve any ground disturbing activities that may affect any such properties or resources until it completes its obligations under applicable requirements of the NHPA and other authorities. The BLM may require modification to exploration or development proposals to protect such properties, or to disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized, or mitigated.
Lease Notice 14-1	LAND USE AUTHORIZATIONS 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. The rights acquired, reserved, or withdrawn by BLM for specified purposes include non-oil and gas leases, conservation easements, archeological easements, road easements, fence easements, and administrative site withdrawals. The existence of such land use authorizations shall not preclude the leasing of the oil and gas. The specifically authorized acreage for land use should be avoided by oil and gas exploration and development activities. All authorized surface land uses are valid claims to prior existing rights unless the authorization states otherwise.
Lease Notice 14-2 (All Lands)	LEASE NOTICE CULTURAL RESOURCES 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.
Lease Notice 14-9	LEASE NOTICE CULTURAL RESOURCES 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 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.
Lease Notice 14-11	LEASE NOTICE GREATER SAGE-GROUSE HABITAT The lease may in part, or in total contain important Greater Sage-Grouse habitats as identified by the BLM, either currently or prospectively. The operator may be required to implement specific measures to reduce impacts of oil and gas operations on the Greater Sage-Grouse populations and habitat quality. Such measures shall be developed during the application for permit to drill on-site and environmental review process and will be consistent with the lease rights granted.
Lease Notice 14-12	LEASE NOTICE PALEONTOLOGICAL RESOURCES The lessee/operator is given notice that this lease has been identified as being located within geologic units rated as being moderate to very high potential for containing significant paleontological resources. The locations identified meet the conditions 1 and/or 2 as set forth in the Potential Fossil Yield Classification System, IM 2008-009, Attachment 2-2. The BLM is responsible for assuring that the leased lands are

Stipulation No.	Stipulation Name/Brief Description
	examined to determine if paleontological resources are present and to specify mitigation measures. The project proponent may be required to conduct a paleontological inventory prior to any surface disturbance.
NSO 11-2	NO SURFACE OCCUPANCY STIPULATION Surface occupancy and use is prohibited within riparian areas, 100-year flood plains of major rivers, and on water bodies and streams.
NSO 11-4	NO SURFACE OCCUPANCY STIPULATION Surface occupancy and use is prohibited within one-quarter mile of grouse leks.
NSO 11-12	NO SURFACE OCCUPANCY STIPULATION Surface occupancy and use is prohibited within designated or recorded paleontological sites.
TES 16-2 (All Lands)	ENDANGERED SPECIES ACT SECTION 7 CONSULTATION STIPULATION The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development, and require modifications to or disapprove proposed activity that is likely to result in jeopardy to proposed or listed threatened or endangered species or designated or proposed critical habitat.
TL 13-1	TIMING LIMITATION STIPULATION 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.
TL 13-2	TIMING LIMITATION STIPULATION 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.
TL 13-3	TIMING LIMITATION STIPULATION Surface use is prohibited from March 1 to June 15 in grouse nesting habitat within 2 miles of a lek, for the protection of sharp-tailed and sage grouse nesting habitat.
TL 13-4	TIMING LIMITATION STIPULATION Surface use is prohibited from March 1 to August 1, within ½ miles of raptor nest sites which have been active within the past 2 years, for the protection of raptor nest sites or raptors identified as Species of Concern.