United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Billings Field Office
5001 Southgate Drive
Billings, Montana 59101
www.blm.gov/mt

In Reply Refer To:

July 24, 2013

Dear Reader:

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

Based on our analysis and review of comments received, the EA has been updated (refer to Chapter 5 of the EA for a summary of public comments). A competitive oil and gas lease sale is tentatively scheduled to be held on October 22, 2013. It will be my recommendation to offer both lease parcels in whole, 147 federal mineral acres, along with stipulations identified in the BLM preferred alternative in the updated EA, see Appendix A. I will also recommend deferring 7 lease parcels in whole, 3,244.55 federal mineral acres pending additional study and analysis, see Appendix A.

We anticipate preparing and finalizing our Decision Record after the October oil and gas lease sale, but prior to lease issuance. Upon finalization, the Decision Record and accompanying finding of no significant impact (FONSI) will be posted on the website listed below.

Please refer to the Montana/Dakotas BLM website at http://blm.gov/57jd. Current and updated information about our EAs, Lease Sale Notices, and corresponding information pertaining to this sale can be found at the link referenced above. Once there, locate the October 22, 2013 lease sale to review the BiFO EA and the parcel list with recommended stipulations.

If you have any questions or would like more information about lease sale notices or the issuance of the EA, Decision Record and FONSI, please contact me at 406-896-5241.

Sincerely,

James M. Sparks
Field Office Manager

United States Department of the Interior
Bureau of Land Management

Environmental Assessment DOI-BLM-MT-0010-2013-0022-EA
July 24, 2013

Project Title: Oil and Gas Lease Parcel Sale,
October 22, 2013

Location: Billings Field Office (see attached Appendix A for list of lease parcels by number and legal description and Maps 1-5).

U.S. Department of the Interior
Bureau of Land Management
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Billings Field Office Oil and Gas Lease Sale EA
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1.0 PURPOSE AND NEED

1.1 Introduction

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

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

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

The analysis area includes the 9 nominated parcels in Carbon and Yellowstone counties (Map 3).

1.2 Purpose and Need for the Proposed Action

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

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

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

1.3 Conformance with Land Use Plan(s)

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

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

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

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

1.4 Public Scoping and Identification of Issues

Public scoping for this project was conducted through a 15-day scoping period advertised on the BLM Montana State Office website, posted on the Billings Field Office website National Environmental Policy Act (NEPA) notification log, and individual agency consultation as noted below. Scoping was initiated March 22, 2013; comments were received through April 09, 2013.

Unfortunately, numerous errors occurred with the internet notifications, resulting in the Billings Field Office accepting scoping comments throughout the process.

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

Coordination with MT FWP and USFWS was conducted for the 9 lease parcels being reviewed. BLM has coordinated with MT FWP and USFWS in the completion of this EA in order to prepare analysis, identify protective measures, and apply stipulations associated with these parcels being analyzed. The BLM consults with the State Historic Preservation Office (SHPO) and Native Americans under Section 106 of the National Historic Preservation Act (NHPA). BLM sent letters to the SHPO, Tribal Presidents, and Tribal Historical Preservation Officers (THPOs) or other cultural contacts for the Crow Tribe and Northern Cheyenne Tribe in Montana at the beginning of the 15 day scoping period informing them of the potential for the 9 parcels to be leased and inviting them to submit issues and concerns BLM should consider in the environmental analysis. The BLM also sent letters to USDA Forest Service, Nez Perce Trail Foundation, Nez Perce Tribal representatives, Confederated Tribes of the Colville Reservation, Confederated Tribes of the Umatilla Indian Reservation and Lewis and Clark National Historic Trail administration through the National Park Service, in order to identify issues that may arise from the proposed action with regard to the Nez Perce National Historic Trail and the Lewis and Clark National Historic Trail.

Identified Issues from Internal and External Scoping:

Internal Scoping Issues:

- Conservation of Greater Sage-Grouse Habitat
- Conservation of riparian, aquatic wildlife and water resources
- Conservation of wildlife resources along the Yellowstone and Clark's Fork Yellowstone Rivers
- Potential conflicts with preserving Cultural Resources and Special Designations, such as National Historic Trails

External Scoping Issues:

- MT FWP, USFS, and NPS responded to scoping letters, primarily to express interest in remaining informed during the leasing process.

BLM will send a second letter to the tribes informing them about the 30 day public comment period for the EA and solicit any information BLM should consider before making a decision whether to offer any or all of the 9 parcels for sale.

2.0 DESCRIPTION OF ALTERNATIVES, INCLUDING PROPOSED ACTION

2.1 Alternatives Considered, but Eliminated from Further Analysis

An alternative that included leasing the entire nine nominations, including those (7) located within the BLM Greater Sage-Grouse PPH areas (BLM WO-IM-2012-043), was considered. There are several issues surrounding this potential alternative that complicate leasing (or offering to lease) these parcels at this time. Four key factors, as described below, were considered to reach this conclusion: **1**) Quality of the affected habitat, **2**) Recent research, funded in part by this Agency, **3**) Ongoing conservation efforts by other Federal Agencies, and **4**) Impending release of an updated Resource Management Plan with specific measures to address all of the above. These seven parcel nominations would be reconsidered once the Billings Field Office RMP Revision is complete.

1) Quality of the Affected Habitat

Seven parcels are within BLM GSG PPH as designated by the BLM (Map 1). As defined by the BLM, PPH areas are: "Areas that have been identified as having the highest conservation value to maintaining sustainable Greater Sage-Grouse populations. These areas would include breeding, late brood-rearing, and winter concentration areas." (PPH in Montana was developed closely with MT FWP GSG Core Area maps)

As such, these areas represent some the most important habitat areas for future conservation of sage-grouse within the State of Montana.

2) Recent Research

Oil and gas development may, or may not be compatible with sage-grouse habitat depending upon the type and level of development proposed and the specific characteristics of the habitat to be affected. It has been shown that oil and gas development has negatively impacted sage-grouse in the past. Based on recent research, the current oil and gas stipulations for sage-grouse are considered ineffective to ensure that sage-grouse can persist within fully developed areas. With regard to existing restrictive stipulations applied by the BLM, (Walker et al. 2007a) research has demonstrated that the 0.4-km (0.25 miles) no surface occupancy (NSO) lease stipulation is insufficient to conserve breeding sage-grouse populations in fully developed gas fields because this buffer distance leaves 98 percent of the landscape within 3.2 km (two miles) open to full-scale development. Full-field development of 98 percent of the landscape within 3.2 km (two miles) of leks in a typical landscape in the Powder River Basin reduced the average probability of lek persistence from 87 percent to five percent (Walker et al. 2007a).

Other studies also have assessed the efficacy of existing BLM stipulations for sage-grouse. Impacts to leks from energy development are most severe near the lek, and remained discernible out to distances more than 6 km (3.6 miles) (Holloran 2005, Walker et al. 2007a), and have resulted in the extirpation of leks within gas fields (Holloran 2005, Walker et al. 2007a). Holloran (2005) shows that lek counts decreased with distance to the nearest active drilling rig,

producing well, or main haul road, and that development influenced counts of displaying males to a distance of between 4.7 and 6.2 km (2.9 and 3.9 miles). All well-supported models in Walker et al. (2007a) indicate a strong effect of energy development, estimated as proportion of development within either 0.8 km (0.5 miles) or 3.2 km (two miles), on lek persistence. Buffer sizes of 0.25 mi., 0.5 mi., 0.6 mi. and 1.0 mi. result in an estimated lek persistence of five percent, 11 percent, 14 percent, and 30 percent. Lek persistence in the absence of coal bed natural gas (CBNG) development averages approximately 85 percent. Models with development at 6.4 km (four miles) had considerably less support, but the regression coefficient indicated that impacts were still apparent out to 6.4 km (four miles) (Walker et al. 2007a). Tack (2010) found impacts of energy development on lek abundances (numbers of males per lek) out to 7.6 miles.

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

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

3) Ongoing Conservation Efforts by other Agencies
Montana Fish, Wildlife and Parks monitors sage-grouse populations and coordinates with BLM and other agencies and private owners to manage sage-grouse habitat.

4) Impending Revision of the Billings Field Office Resource Management Plan
The Billings Field Office is in the process of completing a Resource Management Plan Revision. The process began in 2008 and the draft RMP/EIS was released for public review in March 2013. Oil and gas development and sage-grouse management are key issues identified by public comment in the Scoping Summary Report, available for review at:
http://www.blm.gov/style/medialib/blm/mt/field_offices/billings/rmp.Par.24693.File.dat/ScopingReport.pdf

The current Billings Field Office RMP is dated 1984, as amended (most notably in 1992, where oil and gas leasing stipulations were updated). Since that time there have been substantial improvements in oil and gas development technology, as well as our understanding of Greater Sage-grouse life history requirements and development related disturbance impacts (see item 2 above). The Draft Billings and Pompey's Pillar National Monument RMP/EIS (in progress)

would provide stipulations relative to oil and gas development and sage-grouse based upon our current understanding, including those areas where no development may be the appropriate management response.

Conclusion
Giving consideration to all of the factors above, it is determined that addressing an alternative to lease in whole or parts-there-of seven parcels is eliminated from detailed analysis and deferred to a later date once the Draft Billings and Pompey's Pillar National Monument RMP/EIS is complete**.**

2.2 Alternative A - No Action

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

The No Action Alternative would exclude all parcels (2 @ 147 acres) within the Billings Field Office from the lease sale. Surface management would remain the same and ongoing oil and gas development would continue on surrounding federal, private, and state leases.

2.3 Alternative B – Proposed Action

The Proposed Action Alternative would be to offer two parcel's federal minerals for oil and gas lease, covering 147 acres administered by the Billings Field Office, in conformance with the existing land use planning decisions. The two parcels would be offered with RMP lease stipulations and/or lease notices as necessary (Appendix A) for competitive oil and gas lease sale and lease issuance. The parcels are located in Yellowstone County in south-central Montana. Parcel number, size, and detailed locations, and associated stipulations are listed in Appendix A. Map 3 indicates the general location of each parcel and Maps 4 and 5 depict the parcels through lower scale aerial imagery.

Of the 147 acres of federal mineral estate considered in this EA, approximately 132 surface acres in 1 parcel is managed by the BLM. One parcel (15 acres) is split-estate (private surface with federal mineral estate).

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

Standard operating procedures, best management practices, and required conditions of approval (COAs), and the application of lease stipulations change over time to meet overall RMP objectives. The COAs would be attached to permits for oil and gas lease operations to address site-specific concerns or new information not previously identified in the land use planning

process. In some cases new lease stipulations may need to be developed and these types of changes may require an RMP amendment. There is no relief from meeting RMP objectives if local conditions were to become drier and hotter during the life of the RMP. In this situation, management practices might need to be modified to continue meeting overall RMP management objectives. An example of a climate related modification is the imposition of additional conditions of approval to reduce surface disturbance and implement more aggressive dust treatment measures. Both actions reduce fugitive dust, which would otherwise be exacerbated by the increasingly arid conditions that could be associated with climate change.

Oil and gas leases would be issued for a 10-year period and would continue for as long thereafter as oil or gas is produced in paying quantities. If a lessee fails to produce oil and gas, does not make annual rental payments, does not comply with the terms and conditions of the lease, or relinquishes the lease, ownership of the minerals leased would revert back to the federal government, and the lease could be resold.

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

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

This chapter describes the affected existing environment (i.e., the physical, biological, social, and economic values and resources) within the analysis area, which includes the 2 nominated parcels in Yellowstone county (Maps 4&5) and immediately surrounding area that could be affected by implementation of the alternatives described in Chapter 2.

The existing environment is described by the different resources found throughout the analysis area. Within each resource description, lease parcels containing the resource will be listed and analyzed further in Chapter 4.

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

Only those aspects of the affected environment that are potentially impacted by this project are described in detail. Table 1, "Critical Elements" indicates which resources and resource uses are likely to be impacted by the project and which will be described and analyzed in detail in chapters 3 and 4.

The Billings Field Office has surface management responsibility for approximately 434,154 acres of BLM-administered public land (herein referred to as public land) and about 690,000 acres of federal mineral estate (oil and gas) 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 Field Office 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, Belts, Crazy, and Absaroka mountains. Several rivers bisect the Billings Field Office management area: the Bighorn, Yellowstone, Musselshell, Clark's Fork of the Yellowstone, Stillwater, and Boulder.

The topography in south-central Montana ranges from moderately steep to steep mountains and canyons to rolling plains and tablelands of moderate relief. Elevations generally range from about 3,000 to 7,000 feet above mean sea level, with mountain peaks rising to over 10,000 feet. Only those aspects of the affected environment that are potentially impacted by this project are described in detail (Table 1). Resources and resource uses that were determined to be not present or not potentially impacted will not be discussed further in this EA. The Critical Elements table (Table 1) is a summary of resources and resource uses with a rationale for determination.

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

CRITICAL ELEMENTS		
Determination*	**Resource**	**Rationale for Determination**
PI	Air Quality *(The Clean Air Act of 1955, as amended)*	See discussion in section 3.2.
NP	Areas of Critical Environmental Concern *(Federal Land Policy and Management Act of 1976)*	The parcels do not lie within or close to ACEC resources.
PI	Cultural Resources *(National Historic Preservation Act of 1966, as amended)*	See discussion in section 3.8.
PI	Environmental Justice *(Executive Order 12898)*	See discussion in section 3.18.1.
NP	Farmlands (Prime & Unique) *(Surface Mining Control and Reclamation Act of 1977)*	There are no prime or unique farmlands located in the parcels being analyzed.
PI	Floodplains *(Executive Order 11988)*	See discussion in 3.4 for discussion and analysis.
PI	Invasive, Non-native weed species *(Federal Noxious Weed Act of 1974, as amended)*	See discussion in sections 3.5.3 and 3.5.4.
PI	Native American Religious Concerns *(Executive Order 13007)*	See discussion in section 3.9.
NP	Threatened, Endangered, or Candidate Plant Species *(Endangered Species Act of 1973, as amended)*	Though not identified within the project area, T,E&C species are discussed further in section 3.6.
NP	Threatened, Endangered, or Candidate Animal Species *(Endangered Species Act of 1973, as amended)*	Though not identified within the project area, T,E&C species are discussed further in section 3.6.
NP	Wastes (hazardous or solid) *(Resource Conservation and Recovery Act of 1976, and Comprehensive Environmental Response, Compensation, and Liability Act of 1980)*	There are no known wastes (hazardous or solid) located in the proposed lease sale parcels.
PI	Water Quality (drinking/ground) *(Safe Drinking Water Act of 1974, as amended and Clean Water Act of 1977)*	See discussion in section 3.4.
PI	Wetlands / Riparian Zones *(Executive Order 11990)*	See section 3.5.2 below for discussion and analysis.
NP	Wild and Scenic Rivers *(Wild and Scenic Rivers Act of 1968, as amended)*	There are no designated Wild and Scenic Rivers within the Billings Field Office planning area. There are river segments which have been inventoried by BLM and found to be eligible for potential designation as W&SRs. The Draft Billings and Pompeys Pillar National Monument RMP/EIS has made preliminary suitability determinations on these eligible river segments. The proposed lease sale parcels are not close to any

		of the river/creek segments evaluated as WSR eligible or suitable in the Billings and Pompeys Pillar National Monument RMP/EIS revision
NP	Wilderness *(Federal Land Policy and Management Act of 1976 and Wilderness Act of 1964)*	There are no designated Wilderness Areas within the Billings Field Office planning area. There are four Wilderness Study Areas (WSA) within the Billings Field Office planning area and each of these WSAs are closed to oil and gas leasing. None of the WSAs are located near the lands under discussion.
PI	Other: National Historic Trails	See discussion in section 3.12.1.
OTHER RESOURCES / CONCERNS		
Determination*	**Resource**	**Rationale for Determination**
PI	Fish and Wildlife including Special Status Species other than USFWS candidate or listed species e.g. Migratory birds (E.O. 13186)	See discussion on wildlife in section 3.6 and 3.7.
NI	Geology / Mineral Resources/Energy Production	See discussion in 3.17.
NI	Lands / Access	See discussion in section 3.16.
NI	Livestock Grazing *(Taylor Grazing Act of 1934, National Environmental Policy Act of 1969 Endangered Species Act of 1973, Federal Land Policy and Management Act of 1976, and the Public Rangelands Improvement Act of 1978)*	See discussion in section 3.14.
NI	Paleontology *(Paleontological Resources Protection Act P.L. 111-011, HR 146)*	See discussion in section 3.10.
NI	Rangeland Health Standards and Guidelines *(43 CFR 41`80)*	See discussion in section 3.14 and 3.5.2.
NI	Recreation	See discussion in section 3.15.
PI	Socioeconomics	See discussion in section 3.18.
NI	Soils	See discussion in section 3.3.
NI	Vegetation including Special Status Plant Species other than USFWS candidate or listed species	See discussion in section 3.5 and 3.6.
NI	Visual Resource Management *(FLPMA 1976, NEPA 1969)*	The public lands are managed as VRM Class III. Management objectives for this class are consistent with this type of proposal. If the lands are leased and an APD is received, visual impacts would be addressed with Class III guidelines. BLM has no authority to address visual impacts on federal non-surface lands and there is no visual inventory for those parcels. See discussion in 3.11.
NP	Wild Horses and Burros *(Wild and Free Roaming Horses and Burros Act of 1971, as amended)*	Not present within the proposed lease sale parcels.
NI	Wilderness Characteristics	Following the mandates prescribed in FLPMA section 201, the BLM conducted an interdisciplinary team inventory of Wilderness characteristics lands. These lands are included in a parcel covered in this proposal. See discussion in 3.12.2.
NI	Woodland / Forestry	See discussion in section 3.13.
*		
NP = not present in the area impacted by the proposed or alternative actions		

NI = present, but not affected to a degree that detailed analysis is required
PI = present and may be impacted to some degree. Will be analyzed in affected environment and environmental impacts. (NOTE: PI does not mean impacts are likely to be significant in any way).

3.2 Air Resources

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

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

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

3.2.1 Air Quality

The EPA air quality index (AQI) is an index used for reporting daily air quality (http://www.epa.gov/oar/data/geosel.html) to the public. The index tells how clean or polluted an area's air is and whether associated health effects might be a concern. The EPA calculates the AQI for six criteria air pollutants regulated by the Clean Air Act (CAA): ground-level ozone, CO, PM_{10}, $PM_{2.5}$, SO_2, and NO_2. For each of these pollutants, EPA has established national air quality standards to protect public health. An AQI value of 100 generally corresponds to the national air quality standard for the pollutant, which is the level the EPA has set to protect public health. The following terms help interpret the AQI information:

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

- **Unhealthy** – The AQI is between 151 and 200. Everyone may begin to experience some adverse health effects, and members of the sensitive groups may experience more serious effects.
- **Very Unhealthy** – The AQI is between 201 and 300. This index level would trigger a health alert signifying that everyone may experience more serious health effects.

AQI data (Table 2) show that there is little risk to the general public from air quality in the Billings Field Office. Between 2009-2011, 82 percent of the days were rated "good." While there have been some days that posed a health risk for sensitive groups, the occurrence is rare (approximately 1 percent). The pollutants that cause the highest AQI values in Yellowstone County are SO_2 and $PM_{2.5}$.

Table 2. USEPA - AirData Air Quality Index Report – Billings Field Office Summary (2009-2011).

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 or Very Unhealthy
Yellowstone	MT	1,095	903	82	177	15	0

[1] Source: EPA Air Data website (http://www.epa.gov/airdata/ad_rep_aqi.html, accessed April 22, 2013).

An SO_2 nonattainment area has been designated by the USEPA near Laurel, Montana. The circular nonattainment area extends 2 kilometers from the center of a tank at an oil refinery located in the southern portion of Laurel. The two lease parcels are not located within the nonattainment area.

Ozone, PM_{10}, and NO_2 are not currently monitored in Yellowstone County or the BiFO. Based on data at the Birney monitor in Rosebud County located east of the BiFO, 2010-2012 monitored ozone, NO_2, and PM_{10} concentrations were 75 percent, 8 percent, and 13 percent of the NAAQS, respectively (MDEQ 2013). Although ozone concentrations above the NAAQS have been monitored in some rural areas in other states with oil and gas activity, moderate ozone concentrations have been monitored in Montana oil and gas areas. Based on 2010-2012 data from monitors located near Sidney and Broadus, Montana, ozone concentrations are approximately 75 percent of the ozone NAAQS (MDEQ 2013).

Air resources also include visibility, which can be degraded by regional haze due in part to sulfur, nitrogen, and particulate emissions. Based on trends identified during 2005-2009, visibility has improved at the nearest IMPROVE monitors located in and near Yellowstone National Park on the clearest and haziest days, as shown in Figure A and Figure B.

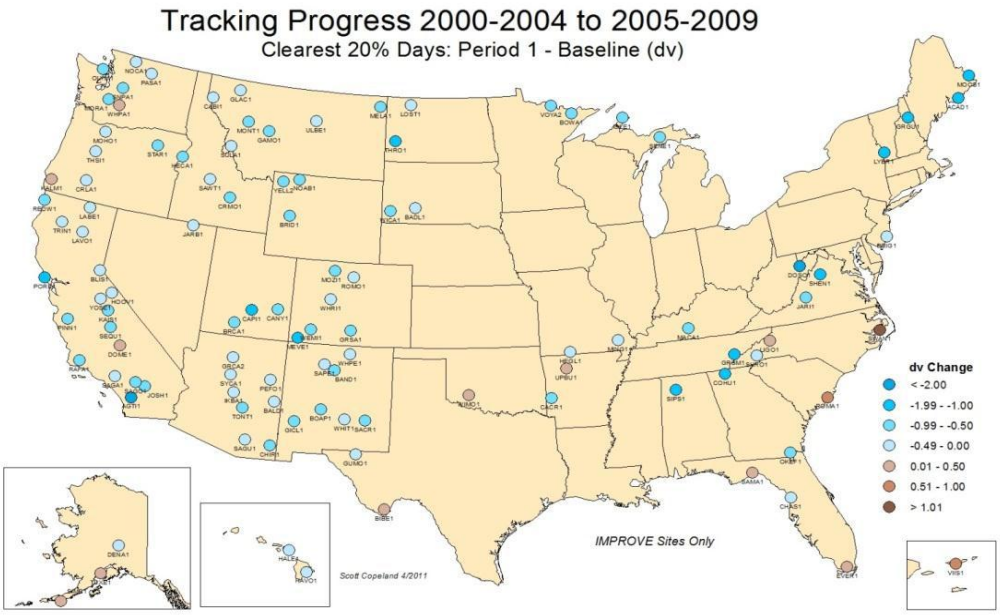

Figure A. Trends in haze index (deciview) on clearest days, 2005-2009. Source: IMPROVE 2011.

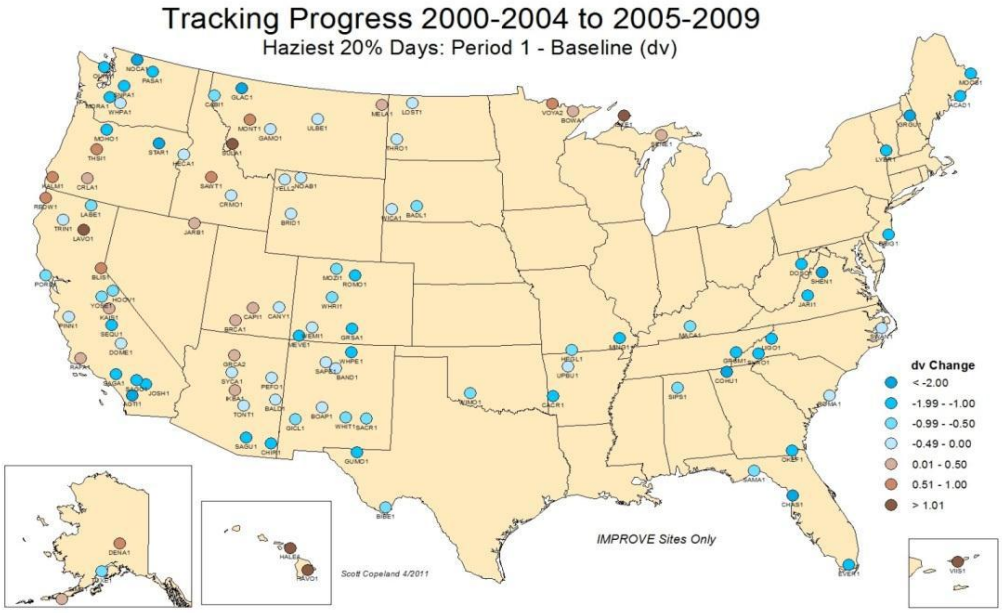

Figure B. Trends in haze index (deciview) on haziest days, 2005-2009. Source: IMPROVE 2011.

3.2.2 Climate Change

Climate change is defined by the Intergovernmental Panel on Climate Change (IPCC) as "a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and persist for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity" (IPCC 2007). Climate change and climate science are discussed

in detail in the Climate Change Supplementary Information Report for Montana, North Dakota, and South Dakota, Bureau of Land Management (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 (Climate Change SIR 2010). Warming has occurred on land surfaces, oceans and other water bodies, and in the troposphere (lowest layer of earth's atmosphere, up to 4-12 miles above the earth). Other indications of global climate change described by IPCC (Climate Change SIR 2010) include:

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

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

A number of activities contribute to the phenomenon of climate change, including emissions of GHGs (especially carbon dioxide and methane) from fossil fuel development, large wildfires, 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 would have a sustained climatic impact over different temporal scales due to their differences in global warming potential (described above) and lifespans in the atmosphere. For example, CO_2 proper may last 50 to 200 years in the atmosphere while methane has an average atmospheric life time of 12 years (Climate Change SIR 2010).

With regard to statewide GHG emissions, Montana ranks in the lowest decile when compared to all the states (http://assets.opencrs.com/rpts/RL34272_20071205.pdf, Ramseur 2007).

The estimate of Montana's 2005 GHG emissions of 37 million metric tons (MMt) of gross consumption-based carbon dioxide equivalent (CO_2e) account for approximately 0.6 percent of the U.S. GHG emissions (CCS 2007).

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 occur. The EPA identifies this area as part of the Mountain West and Great Plains region (http://www.epa.gov/Region8/climatechange/pdf/ClimateChange101FINAL.pdf):

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

Other impacts could include:

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

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

- Large-scale shifts have already occurred in the ranges of species and the timing of the seasons and animal migrations. These shifts are likely to continue (Climate Change SIR 2010). Climate changes include warming temperatures throughout the year and the arrival of spring an average of 10 days to two weeks earlier through much of the U.S. compared to 20 years ago. Multiple bird species now migrate north earlier in the year.
- Fires, insect epidemics, disease pathogens, and invasive weed species have increased and these trends are likely to continue. Changes in timing of precipitation and earlier runoff increase fire risks.
- Insect epidemics and the amount of damage that they may inflict have also been on the rise. The combination of higher temperatures and dry conditions have increases insect populations such as pine beetles, which have killed trees on millions of acres in western

U.S. and Canada. Warmer winters allow beetles to survive the cold season, which would normally limit populations; while concurrently, drought weakens trees, making them more susceptible to mortality due to insect attack.

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

- Temperature increases in Montana are predicted to be between 3 to 5°F at mid-21st century and between 5 to 9°F at the end of the 21st century. As the mean temperature rises, more heat waves are predicted to occur.
- 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.
- 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.
- Wind power production potential is predicted to decline in Montana based on modeling focused on the Great Falls area.
- Water temperatures are expected to increase in lakes, reservoirs, rivers, and streams. Fish populations are expected to decline due to warmer temperatures, which could also lead to more fishing closures.
- Wildland fire risk is predicted to continue to increase due to climate change effects on temperature, precipitation, and wind. One study predicted an increase in median annual area burned by wildland fires in Montana based on a 1°C global average temperature increase to be 241 to 515 percent.

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

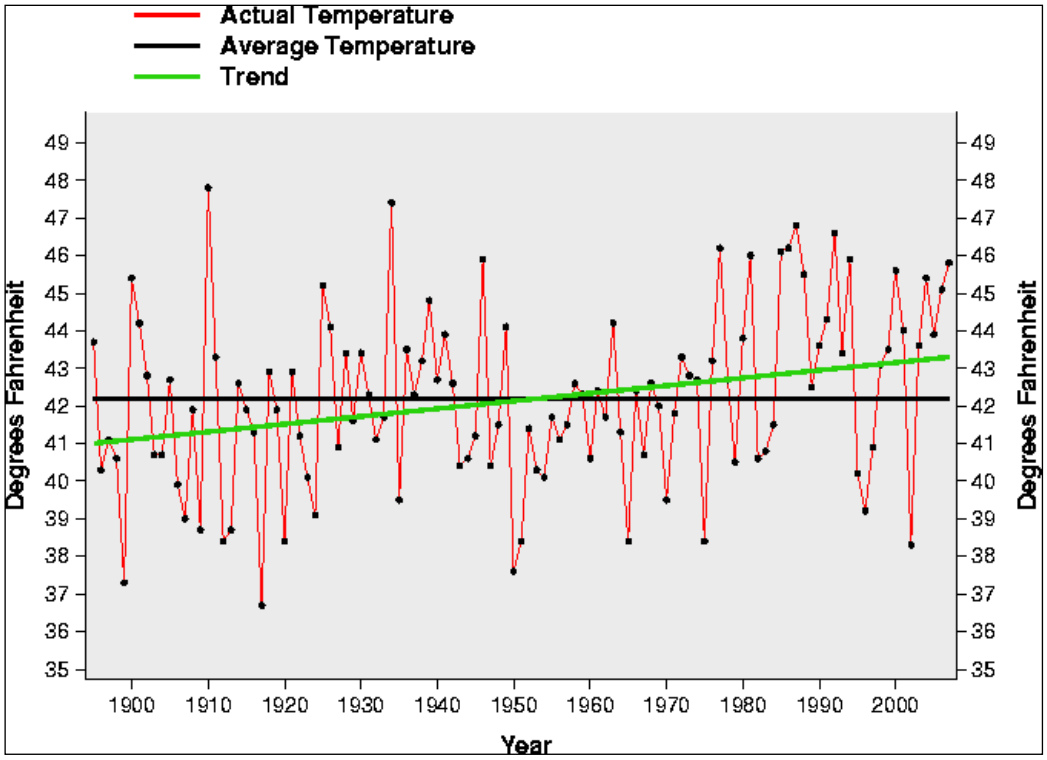

Figure C. Regional climate summary of spring temperatures (March-May) for the West North Central Region (MT, ND, SD, WY), from 1895-2007. (Source: NOAA website – http://www.ncdc.noaa.gov/oa/climate/research/cag3/wn.html**)**

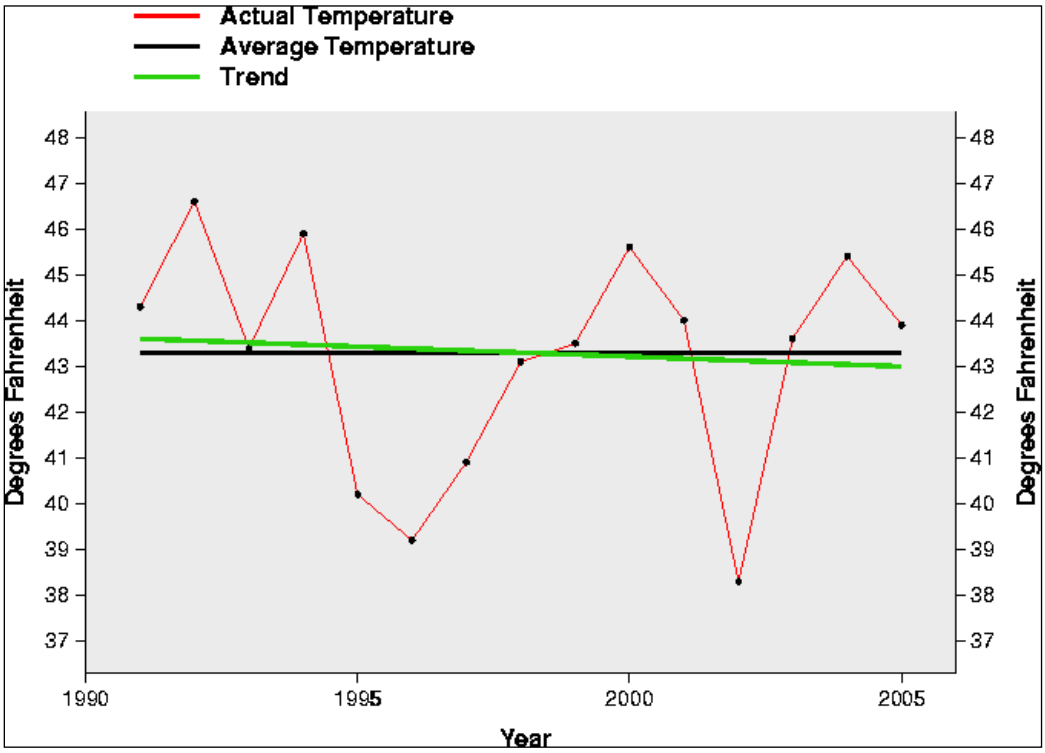

Figure D. Regional climate summary of spring temperatures (March-May) for the West North Central Region (MT, ND, SD, WY), from 1991-2005. (Source: NOAA website – http://www.ncdc.noaa.gov/oa/climate/research/cag3/wn.html**)**

3.3 Soil Resources

The lease parcels (MT 102757-XD and XE) are located almost entirely within the active river channels of the Yellowstone and Clark's Fork Yellowstone Rivers. Portions of each parcel are located on islands and/or terraces within the active floodway. These portions, outside of the active river channel, support unconsolidated, cobbly, alluvial soils.

The soils of each parcel are vulnerable to erosion due to the potential exposure to flowing water annually.

3.4 Water Resources

3.4.1 Surface Hydrology

Lease parcel MT 102757-XD is located in the Upper Yellowstone-Lake Basin sub-basin (HUC-10070004). The parcel, 131 acres, is approximately 1/100 of one percent of the sub-basin's area of one million acres. Lease parcel MT 102757-XE is located in the Clark's Fork Yellowstone sub-basin (HUC-10070006). The parcel, 15 acres, is approximately 1/1000 of one percent of the sub-basin's area of 1.8 million acres.

Surface water resources across Billings Field Office are present as lakes, reservoirs, rivers, ponds, streams, wetlands, and springs. Water resources are essential to the residents to support agriculture, public water supplies, industry, recreation and other beneficial uses. Water resources and riparian areas are crucial to the survival of many BLM-sensitive fish, reptiles, birds, and amphibians as well as other wildlife.

Both lease parcels in the analysis area contain surface water resources. Parcel MT 102757-XE is entirely within the active river channel or annual floodway of the Clark's Fork Yellowstone river. Surface water can comprise 100% of the parcels surface during spring run-off. During low flow periods, water comprises approximately 15 percent of the surface area of the parcel, with alluvial bars, islands and first terraces making up the rest of the surface area. Parcel MT 102757-XD is almost entirely within the active river channel or annual floodway of the Yellowstone River. In normal high water conditions, water can cover approximately 80% of the parcel's surface. During exceptional flood conditions, as seen in 2011, the entire parcel can be covered in water.

Both lease parcels are located on water bodies identified as impaired on the 2012 303 (d)/305(b) Integrated Report (Impaired Streams List) by the Montana Department of Environmental Quality (MDEQ). MDEQ has further identified each parcel as being within Surface Water Spill Response Region for both the Billings and Lockwood public water supply systems. Parcel MT-102757-XE is located on the Clark's Fork Yellowstone river, DEQ Waterbody ID# 43D001_011. Table 3 describes the impairments and probable causes.

Table 3. **MT DEQ Integrated Water Quality Report For Clark's Fork Yellowstone River @ Parcel XE.**

Beneficial Use Support Information

Use Name	Fully Supporting	Partially Supporting	Not Supporting	Threatened	Insufficient Information	Not Assessed
Agricultural		✓				
Aquatic Life		✓				
Drinking Water					✓	
Primary Contact Recreation		✓				

Impairment Information

Probable Causes	Probable Sources	Associated Uses	TMDL Completed
Ammonia (Total)	Irrigated Crop Production Streambank Modifications/destablization	Aquatic Life	NO
Chlorophyll-a	Irrigated Crop Production Streambank Modifications/destablization	Aquatic Life Primary Contact Recreation	NO
Copper	Source Unknown	Aquatic Life	NO
Iron	Source Unknown	Aquatic Life	NO
Lead	Source Unknown	Aquatic Life	NO
Low flow alterations	Impacts from Hydrostructure Flow Regulation/modification	Aquatic Life Primary Contact Recreation	NO
Mercury	Source Unknown	Aquatic Life	NO
Nitrate/Nitrite (Nitrite + Nitrate as N)	Irrigated Crop Production Streambank Modifications/destablization	Aquatic Life	NO
Nitrogen (Total)	Irrigated Crop Production Streambank Modifications/destablization	Aquatic Life	NO
Phosphorus (Total)	Irrigated Crop Production Streambank Modifications/destablization	Aquatic Life	NO
Physical substrate habitat alterations	Habitat Modification - other than Hydromodification Streambank Modifications/destablization	Aquatic Life	NO
Solids (Suspended/Bedload)	Habitat Modification - other than Hydromodification Impacts from Hydrostructure Flow Regulation/modification Irrigated Crop Production Streambank Modifications/destablization	Agricultural Aquatic Life	NO
Temperature, water	Habitat Modification - other than Hydromodification Impacts from Hydrostructure Flow Regulation/modification Irrigated Crop Production Source Unknown Streambank Modifications/destablization	Aquatic Life	NO

(source MT DEQ Clean Water Act Information Center; http://cwaic.mt.gov/query.aspx)

Parcel MT-102757-XD, is located on the Yellowstone River, DEQ Waterbody ID# MT43F001_011. Table 4 describes the impairments and probable causes.

Table 4. **MT DEQ Integrated Water Quality Report for Yellowstone River @ Parcel -XD.**

Beneficial Use Support Information

Use Name	Fully Supporting	Partially Supporting	Not Supporting	Threatened	Insufficient Information	Not Assessed
Agricultural	✓					
Aquatic Life			✓			
Drinking Water					✓	
Primary Contact Recreation			✓			

Impairment Information

Probable Causes	Probable Sources	Associated Uses	TMDL Completed
Cause Unknown	Channelization Crop Production (Crop Land or Dry Land) Municipal Point Source Discharges Streambank Modifications/destablization	Aquatic Life	NO
Chlorophyll-a	Crop Production (Crop Land or Dry Land) Municipal Point Source Discharges	Aquatic Life Primary Contact Recreation	NO
Nitrate/Nitrite (Nitrite + Nitrate as N)	Crop Production (Crop Land or Dry Land) Municipal Point Source Discharges	Aquatic Life	NO
Oil and Grease	Pipeline Breaks	Aquatic Life Primary Contact Recreation	NO
Other anthropogenic substrate alterations	Channelization Streambank Modifications/destablization	Aquatic Life	NO
Physical substrate habitat alterations	Channelization Streambank Modifications/destablization	Aquatic Life	NO

(source MT DEQ Clean Water Act Information Center; http://cwaic.mt.gov/query.aspx)

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

Any beneficial use of produced water requires water rights to be issued by Montana Department of Natural Resources and Conservation (MDNRC) as established by law. This water has been used for watering stock, irrigation, drilling operations, and industrial applications. The majority

of the produced water is pumped into temporary ponds, where the water evaporates or could potentially infiltrate the soil or shallow aquifers.

3.4.2 Groundwater

The quality and availability of ground water varies greatly across the three state region (Montana, North Dakota, and South Dakota). Aquifers in western Montana are typically in unconsolidated, alluvial valley-fill materials within intermontane valleys. The intermontane valley aquifers often yield relatively large quantities of high-quality water to relatively shallow water wells. Because many wells are being constructed in these aquifers as development encroaches, fractured bedrock aquifers surrounding the intermontane valleys are becoming important. Residents in eastern Montana and the Dakotas commonly get their ground water from aquifers consisting of unconsolidated, alluvial valley-fill materials, glacial outwash, or consolidated sedimentary rock formations (such as the Fort Union, Hell Creek, Fox Hills, Judith River, and Eagle consolidated formations). In some areas east of the Rocky Mountains, near-surface thick shale deposits such as those of the Colorado Group and Bearpaw (Pierre) Shale severely limit the economic availability of water to wells, or provide water of quality too poor for most uses. Eastern Montana aquifers typically yield less water and produce more salty, or mineralized, water compared to those in western Montana. The water in some eastern aquifers is suitable only for livestock consumption.

Local groundwater conditions within the vicinity of the lease parcels are highly variable and include many of the conditions described above.

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

3.5 Vegetation Resources

Vegetative resources vary greatly throughout the field office. These variations are a result of soil, geomorphology, precipitation, topography, aspect, and other influences. The lease parcels are in a 10-14” inch precipitation zone and are comprised entirely of riparian vegetative communities.

3.5.1 Vegetation Communities: Upland

There are no upland vegetative communities within the leasing parcels.

3.5.2 Vegetative Communities: Wetland/Riparian

Vegetative communities within the lease parcels are strictly riparian, dominated by willow (Salix spp.) and cottonwood (Populus spp.) overstory with smooth brome (Bromus inermis) understory. Additional species present include, but are not limited to: buffaloberry (Shepherdia argentea),wild rose (Rosa acicularis), snowberry (Symphiocarpus albus), juniper (Juniperus scopulorum), green ash (Fraxinus pennsylvanica), chokecherry (Prunus virginiana), prairie cordgrass (Spartina pectinata), canary reed grass (Phalaris arundinacea), sedges (Carex spp.), rushes (Juncus spp.), Russian olive (Elaeagnus angustifolia), and salt cedar (Tamarix spp.).

Parcel MT 102757-XE has private surface, therefore riparian conditions have not been surveyed. There are approximately 4 acres of riparian habitat in the parcel, with the remainder being surface water of the Clark's Fork Yellowstone River.

Parcel MT 102757-XD had a riparian assessment in 2011, and was identified as "Properly Functioning". The parcel contains approximately sixty acres of riparian habitat, with the remainder being surface water of the Yellowstone River.

3.5.3 Vegetative Communities: Invasive, Non-Native Species (INNS)

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. Smooth brome is the most prominent non-native invasive species in the lease parcels. Smooth brome is an aggressive non-native invasive species that out-competes desirable vegetation for water and soil nutrients. Russian olive *(Elaeagnus angustifolia)* occurs in both parcels. The BLM has implemented Russian olive control on nearby lands, but has not worked on parcel XD (where BLM administers surface management). Russian olive does not have an overwhelming presence in this parcel, as it has been found to have on nearby areas. These species could also affect upland health standards, wildlife habitat quality, and native species diversity.

3.5.4 Vegetative Communities: Noxious Weeds

Noxious weeds are any plant species designated by federal or state law or county government as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or non-native, new, or not common to the United States (DOI-BLM, 2007 17 Western State Vegetation Programmatic EIS). Various noxious weeds occur adjacent to and/or in the project area and lease parcels. The most common of which are: leafy spurge (*Euphorbia esula*), Canada thistle (*Cirsium arvense*), houndstongue (*Cynoglossum officicinale*), and saltcedar (*Tamarix ramosissima*). Noxious weed control is typically the responsibility of the surface owner or lease holder (federal and private), in cooperation with the local weed boards or county weed departments, when surface disturbance occurs. The BLM does not maintain inventory data for private surface. 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.

Lease parcel MT 102757-XD has not been inventoried since 2011, when an unusual amount of human activity took place during an oil spill clean-up effort. The Silvertip Incident-Exxon pipeline rupture and subsequent river spill, resulted in oil contamination across the entire lease parcel. Oil clean-up efforts were extensive with personnel and atv/utv traffic widespread across this lease parcel. The vegetative ground cover (primarily smooth brome) is dense, abundant, and very competitive, which likely reduced the spread of new weeds on the leasing parcel; however it is unknown at this time what effect the clean-up activities had on noxious weed populations.

3.6 Special Status Species
3.6.1 Special Status Animal Species
3.6.1.1 Terrestrial Wildlife

Table 5: Billings Field Office Occurrence of BLM Terrestrial Sensitive Species and USFWS Threatened, Endangered, Candidate or Proposed Terrestrial Species

Species	USFWS Status	BLM Status	In Current Range	Suitable Habitat Present
Mammals				
Gray Wolf	None	Special Status Species (SSS)	Yes	Yes
Grizzly Bear**	Threatened	Sensitive	Yes	Yes
Black-footed ferret	Endangered	SSS	Unlikely	Yes
Canada Lynx	Threatened	Sensitive	Possible	No
Black-tailed prairie dog	None	Sensitive	Yes	Yes
Swift fox	None	Sensitive	Possible	Yes
Fisher	None	Sensitive	No	NA
Meadow Jumping Mouse	None	Sensitive	Yes	Yes
Great Basin Pocket Mouse	None	Sensitive	No	N/A
North American Wolverine	Candidate	Sensitive	Possible	No
Long-legged Myotis	None	Sensitive	Yes	Yes
Long-eared Myotis	None	Sensitive	Yes	Yes
Fringe-tailed Myotis	None	Sensitive	No	N/A
Pallid bat	None	Sensitive	No	N/A
Townsend's big-eared bat	None	Sensitive	Yes	Yes
White-tailed prairie dog	None	Sensitive	Yes	Yes
Birds				
Whooping crane – Yellowstone Co. only	Endangered	SSS	Yes	Yes
Mountain plover	Proposed	Sensitive	Yes	Yes
Long-billed curlew	Bird of Conservation Concern (BCC)	Sensitive	Yes	Yes
Bobolink	None	Sensitive	Yes	Yes
Greater sage-grouse	Candidate	Sensitive	Yes	Yes
Burrowing owl	BCC	Sensitive	Yes	Yes
Bald eagle***	BCC	Sensitive	Yes	Yes
Golden eagle	None	Sensitive	Yes	Yes
Ferruginous hawk	None	Sensitive	Yes	Yes
Swainson's hawk	None	Sensitive	Yes	Yes
Peregrine falcon	None	Sensitive	Yes	Yes
Northern goshawk	None	Sensitive	Yes	possible
Sage thrasher	BCC	Sensitive	Yes	possible
Sprague's pipit	Candidate	Sensitive	Yes	No
Loggerhead shrike	BCC	Sensitive	Yes	Yes
Chestnut-collared	BCC	Sensitive	Yes	Yes

Species	USFWS Status	BLM Status	In Current Range	Suitable Habitat Present
longspur				
McCown's longspur	BCC	Sensitive	Yes	Yes
Baird's sparrow	BCC	Sensitive	Yes	Yes
Brewer's sparrow	BCC	Sensitive	Yes	Yes
LeConte's sparrow	None	Sensitive	Yes	Yes
Nelson's Sharp-tailed sparrow	None	Sensitive	Yes	Yes
Prairie falcon	BCC	None	Yes	Yes
Sage sparrow	BCC	Sensitive	Yes	Yes
Grasshopper sparrow	BCC	None	Yes	Yes
Dickcissel	BCC	Sensitive	Yes	Yes
Blue-gray gnatcatcher	None	Sensitive	Yes	Yes
Harlequin duck	None	Sensitive	Yes	Yes
Fish				
Yellowstone Cutthroat trout	None	Sensitive	Yes	Yes
Amphibians				
Northern leopard frog	None	Sensitive	Yes	Yes
Plains Spadefoot Toad	None	Sensitive	Yes	Yes
Reptiles				
Spiny softshell turtle	None	Sensitive	Yes	Yes
Greater short-horned lizard	None	Sensitive	Yes	Yes
Milk snake	None	Sensitive	Yes	Yes
Western hog-nosed snake	None	Sensitive	Yes	Yes

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

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

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

3.6.2 Threatened, Endangered, Candidate, and Proposed Species

Mammals

The lease parcels are not known to be habitat for any T&E or sensitive mammal species. The potential for many mammal species to be present exists with these parcels located in the riparian corridors.

Birds

Bald Eagle

Bald eagle nests are documented near the parcels (within one to three miles) on the Yellowstone river (Map 6). The potential for many bird species to be present exists with these parcels located in the riparian corridors.

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, but none are in close proximity to the lease parcels. The USFWS delisted peregrines from the endangered species list in August 1999, and they remain in the population monitoring phase of delisting.

Migratory Birds

As per Executive Order (EO) 13186, 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 USFWS, there are 23 species of Birds of Conservation Concern in 2008 in Montana (USFWS 2008). The lease parcels and surrounding area do not contain any populations of these species, however, the nature of the riparian habitat in and around the parcels makes it possible for any number of species to be present during migration.

Reptiles

The Spiny Softshell Turtle (Apalone spinifera) inhabits both lease parcels. Generally, the Spiny Softshell is primarily a riverine species, occupying large rivers and river impoundments, but also occurs in lakes, ponds along rivers, pools along intermittent streams, bayous, irrigation canals, and oxbows. It usually is found in areas with open sandy or mud banks, a soft bottom, and submerged brush and other debris. Montana populations of the Spiny Softshell are poorly understood, making management of them more difficult (per MT FWP; http://fieldguide.mt.gov/detail_ARAAG01030.aspx).

Fish

Sauger (Sander canadensis) inhabit the Yellowstone River, well downstream of the leasing parcels in reaches near Pompey's Pillar and downstream. Densities in the Yellowstone river are very low. The statewide stronghold for Sauger is in the middle Missouri river. MT FWP reports that the Yellowstone population relies on the Tongue and Powder rivers as important spawning/reproduction areas.

Yellowstone Cutthroat Trout (YCT) (Oncorhynchus clarkii bouvieri) are not common in the leasing parcel area, however are known to inhabit the Yellowstone river near the parcels, but primarily are found well upstream of the parcels. YCT are a BLM sensitive species that have experienced an extreme decline in range from historic conditions. In the Billings Field Office, YCT are primarily limited to small, mountain streams in the southern portion of the field office. Competition from non-native fishes as well as reduced water quality in some streams has caused the decline in population and range. The rivers, near the leasing parcels, are not considered suitable habitat for YCT.

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 USFWS 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 USFWS 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.

There are no special status plant species listed in the analysis area.

3.7 Wildlife

3.7.1 General Wildlife

The distribution and abundance of wildlife in the planning area are primarily functions of habitat conditions. Wildlife habitat is best characterized by the various vegetation types found in the leasing area. The diversity of vegetation/habitat types in the leasing area is low (eight types) and ranges from moderate/high cover grasslands to Douglas fir forests. The most common vegetation communities in the leasing parcels are riparian, with cottonwood overstory, a variety of shrub understory with and herbaceous component dominated primarily by smooth brome.

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 and white-tailed deer with rare occurrences of moose, black bear and mountain lion. These animals are considered priority species due to the public's interest in them for hunting and aesthetic enjoyment. Both parcels are considered white-tailed deer winter range. It is important to minimize human disturbance during the winter and habitat alteration in big game crucial winter range due to the added stresses animals face during winter months in Montana.

Fish
The Yellowstone river is a destination fishery and the area near parcel XD is considered a Red Ribbon trout fishery. The portion of river near and around the leasing parcels is not as desirable a destination as reaches up-stream where Blue Ribbon trout fisheries exist. However, this reach of river is important to local anglers targeting rainbow and brown trout, small-mouth bass, burbot and catfish, among others. There are also a number of non-game fish species supported throughout this reach of river.

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. 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.

The most common game birds in and around these lease parcels are wild turkey, pheasant, ruffed grouse and waterfowl. Sage-grouse are not found in or around these parcels, with the nearest active lek approximately ten miles to the south of the parcels.

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, larger carnivores, and reptiles. Those species that are also federally listed or are considered BLM sensitive species are discussed in the Special Status Animal Species section above.

Other priority animals include amphibians, which are considered a priority group of species due to their association with rare habitats (wetlands and riparian areas), their sensitivity to environmental conditions, global population declines for some species, and the limited knowledge regarding their occurrence and distribution in the planning area. Amphibians known or expected to occur in the planning area include the tiger salamander, plains spadefoot, Great

Plains toad, Woodhouse's toad, boreal chorus frog, and northern leopard frog. These species and their habitat are protected with riparian/wetland stipulations.

3.8 Cultural Resources

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

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

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

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

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

The results of these two reviews are as follows:

Cultural Resource Inventory Report Overview:
The two parcels identified for leasing were reviewed by Billings Field Office archaeologists to determine if known or recorded cultural resources were located. In reviewing the SHPO's

Cultural Resources Annotated Bibliography System (CRABS) it was determined that there has been no prior Class III cultural resources inventory conducted within the two parcels.

Cultural Resource Site Overview:
No previously recorded cultural properties have been identified in either parcel.

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

Both parcels are located at, or in close proximity to, the confluence of the Clarks Fork and Yellowstone Rivers and include the BLM's Sundance Lodge Recreation Area, an area that had been a working ranch prior to the BLM's acquisition of the parcel in 1997. This river confluence is a prominent location in the Yellowstone Valley and was used as a landmark over the centuries by various American Indian tribes. In addition, the parcels are located along, or in close proximity to, segments of both the Lewis and Clark National Historic Trail (LCNHT) and the Nez Perce National Historic Trail (NPNHT). Both trails are historic resources yet do not show up on the Montana site database since they have not been recorded as historic properties and assigned Smithsonian trinomial identifiers. That process is separate from the National Historic Trail identification process. Both parcels MTM102757-XD and MTM 102757-XE are within the proposed trail corridor (one-half mile either side of the trail) of the NPNHT at the point where the Nez Perce crossed the Clarks Fork River, on about September 12, 1877. Parcel MTM102757-XD is within the LCNHT corridor, where Clark and his party passed down the Yellowstone River on July 24, 1806.

> Clark and his contingent arrived here early in the morning of July 24, an estimated twenty-nine miles downstream from the Canoe Camp, and indicated in his courses and distances for that date that he believed it was the Bighorn River.[1]
>
> *This...River is 150 yards wide at it's Mouth and 100 a Short destance up. The water of a light Muddy Colour, and much Colder than that of the Rochejhone. A Small island is Situated imediately in its mouth.*
>
> Apparently he reviewed his Yellowstone River journey when he visited with the Mandans and Hidatsas again in mid-August 1806, and was told this was the river they called "The Lodge Where All Dance"--perhaps actually a reference to the "old Indian fort of logs and bark" some six miles farther downriver, that Shannon had noticed as they passed by.
>
> *This Lodge, a council lodge. It is of a Conocil form 60 feet [in] diamuter at its base built of 20 poles, each pole 2-1/2 feet in Secumpheranc and 45t feet Long,...& covered with bushes. In this Lodge I observed a Cedar bush Sticking up on the opposit side of the lodge fronting the dore. On one side was a Buffalow head, and on the other Several Sticks bent and Stuck in the ground. A Stuffed Buffalow skin was Suspended from the*

Center with the back down. On the top of those poles were deckerated with feathers of the Eagle & Calumet Eagle, also Several Curious pieces of wood bent in Circleler form with sticks across them in form of a Griddle hung on tops of the lodge poles, others in form of a large Sturrip.
---Joseph Mussulman, rev. 02/06

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1. Gary Moulton, ed., *TheJournals of the Lewis & Clark Expedition* (13 vols., Lincoln, University of Nebraska Press, 1983-2001), 8:221n.

http://www.lewis-clark.org/content/content-article.asp?ArticleID=1565

3.9 Native American Religious Concerns

BLM's management of Native American religious concerns is guided through its 8120 Manual: Tribal Consultation Under Cultural Resources Authorities and 8120 Handbook: Guidelines for Conducting Tribal Consultation. Further guidance for consideration of fluid minerals leasing is contained in BLM Washington Office Instruction Memorandum 2005-003: Cultural Resources, Tribal Consultation, and Fluid Mineral Leasing. The 2005 memo notes leasing is considered an undertaking as defined in the National Historic Preservation Act. Generally areas of concern to Native Americans are referred to as "Traditional Cultural Properties" (TCPs) which are defined as cultural properties eligible for the National Register because of their association with cultural practices or beliefs that (a) are rooted in that community's history and (b) are important in maintaining the continuing cultural identity of the community (see National Register Bulletin 38). No Traditional Cultural Properties (TCPs) have been formally identified on the Billings Field Office administered public lands.

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

In preparation for this action notification letters covering this action were sent to the appropriate authorities of the Crow, Northern Cheyenne (March 27, 2013), Nez Perce, Colville and Umatilla tribal governments and/or representatives on April 23, 2013. Certifications of receipt have been returned for all of the Crow and Northern Cheyenne mailings, but no comments identifying sensitive traditional cultural properties have been provided as of this time (April 29, 2013)(Comments/concerns from Nez Perce, Colville and Umatilla tribes will be addressed before the EA is finalized). Every attempt would be made to accommodate Native American concerns if possible within the tight scheduling of this process. As a matter of at least getting a general understanding of the potential impacts of the leasing action, we bring attention to the following information. The perspective provided on Native American values is critical to implementation of appropriate protective measures should sensitive properties be found. Avoidance is the preferred option for all sites of cultural significance.

3.9.1 Northern Cheyenne

Much of the information in this section was summarized from The Northern Cheyenne Tribe and Its Reservation: A Report to the U.S. Bureau of Land Management and the state of Montana Department of Natural Resources and Conservation (Northern Cheyenne Tribe 2002). Through sacred ways and ceremony, the Cheyenne believe that they can harness the spiritual essence as a power to benefit physical existence. If they do not practice traditional culture and beliefs to maintain the balance and cycle, the spiritual essence would not be available to benefit them or maintain the earth system. With these belief systems, natural resources become culturally and spiritually important, particularly water (with living spirits), plants (considered to be relatives), animals (also relatives), great birds (messengers to the spirits in Blue-Sky Space) and fossil and mineral sources (used in ceremony). Cultural resources such as burials, ceremonial sites (fasting locations, vision quest sites, sweat 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: pp. 3-78 and 3-79). No TCPs were identified in the Billings Field Office (BLM 2008: p. 3-79).

3.9.2 Crow

Much of the information in this section has been summarized from The Crow Indian Reservation's Natural, Socio-Economic and Cultural Resources Assessment and Conditions Report (Crow Tribe 2002). The Crow historical perspective sees time as interlinked so that there is an intimate relationship between the individual and the past. The past (tradition or time) provides the template for the appropriate way to live. The Crow live in constant presence with the past that truly transcends the western concept of time. There are five qualities of time: sacred time, ancient Indian time, historic time, the present, and the future, which have some sequential qualities, but for the Crow, the spirituality of these times is most important.

In this world perception many landscapes and places are sacred. They are sacred because they represent why and how things are done. Sacred sites include cultural material scatters, petroglyphs, tipi rings, homesteads, burial areas, cairns, communal kills, fasting beds, medicine lodges, rock art, stone rings and settlements. Sacred locations and places include water (springs and rivers), spirit homes (springs, rivers, hills and mountains), landscapes (mountains and topographic features), plant and animal procurement areas, fossil areas, and mineral locations (BLM 2008: p. 3-70).

3.9.3 Nez Perce

The Billings Field Office is currently collecting information to help understand and protect Nez Perce cultural and religious concerns that may be identified along the Nez Perce National Historical Trail, which passes in or near the leasing parcels. A Nez Perce representative has voiced (telephone conversation) concern that the Nez Perce be involved in any action that is proposed with relative proximity to the Nez Perce National Historic Trail.

3.10 Paleontology

According to Section 6301 of the Paleontological Resource Protection Act of 2009 Omnibus Public Lands Bill, Subtitle D, SEC. 6301, paleontological resources are defined as "any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are

of paleontological interest and that provide information about the history of life on earth" (Paleontological Resource Protection Act of 2009 Omnibus Lands Bill, Subtitle D, SEC. 6301-3612 (P.L. 59-209; 34 Stat. 225; 16 U.S.C. 431-433). All vertebrate fossils, be they fossilized remains, traces, or imprints of vertebrate organisms, are considered significant. Paleontological resources do not include archaeological and cultural (typically human graves) resources.

The BLM utilizes the Potential Fossil Yield Classification (PFYC) as a planning tool for identifying areas with high potential to yield significant fossils. The system consists of numbers ranging from 1-5 (low to high) assigned to geological units, with 1 being low potential and 5 being high potential to have significant fossil resources. It should be pointed out that the potential to yield significant fossil resources is never 0. Rock units not typically fossiliferous can in fact contain fossils in unique circumstances.

BLM classified geologic formations that have a high Potential Fossil Yield Classification (PFYC) of 3 or higher should be specifically reviewed for paleontological resources prior to surface disturbing activities, and rankings of 4 and 5 may require on-site monitoring during surface disturbing activities. The Billings Field Office has the following classification on the relevant geologic units:

Formation	Rank
Recent river alluvium (Qal)	2

Neither of the 2 lease parcels (MTM 102757-XD and XE) include geologic units rated as PFYC 3-5, so no prior assessment for paleontological resources is required. However, prior to surface disturbance there should be an approved Unanticipated Resource Recovery plan for fossils.

3.11 Visual Resources

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

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

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

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

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

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

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

All of the public land parcels in the proposal have been inventoried and have been assigned a Class "B/"C"" rating. They are currently managed as interim VRM Class III until final designation can be established in the new Billings RMP. Management objectives for this class are consistent with this type of proposal. Should a parcel be leased and an application permit to drill be received, visual management prescriptions would be developed. For non-federal surface lands, BLM does not have the authority to manage for VRM and there is no visual resource inventory of VRM class.

3.12 Special Designations

3.12.1 National Historic Trails

National Historic Trails commemorate historic or pre-historic travel routes that are of significance to the entire nation. A designated trail should generally follow the route of the historic trail but may deviate if necessary. To qualify for designation as a national historic trail, a trail must meet the following criteria:

- have been established by a historic use and have historical significance as a result of that use,
- have historic use of the trail that has had a far and reaching effect on broad patterns of American culture, and
- has significant potential for public recreational or historical interest.

The BiFO manages several segments of National Historic Trails. These include segments along the Lewis and Clark National Historic Trail (L&CNHT) and the Nez Perce National Historic Trail (NPNHT) (Map 7 – National Historic Trails).

The BiFO manages approximately 12 miles of the Nez Perce (Nimíipuu or Nee-Me-Poo) National Historic Trail. The BiFO also manages the portion of trail on public land along the Clarks Fork of the Yellowstone River and north toward the Bear's Paw Mountains. The trail stretches from Wallowa Lake, Oregon, to the Bear's Paw Battlefield near Chinook, Montana. It was designated as a National Historic Trail in 1986. This route was used in its entirety only once; however, components of the route were used for generations prior to and after the 1877 flight of the Nez Perce.

The BiFO manages approximately seven miles of the L&CNHT that primarily follows the Yellowstone River through the planning area.

Both Trails intersect at the Sundance Lodge Recreation Area.

3.12.2 Lands with Wilderness Characteristics

Lands with wilderness characteristics are lands which have been inventoried under FLPMA Section 201 and found to be at least 5,000 contiguous acres of BLM land without roads (or as in this case, islands of any size), where the imprint of people's work must be substantially unnoticeable, and where an outstanding opportunity for solitude or primitive and unconfined type of recreation exists.

There are lands identified as possibly having Wilderness Characteristics present. Parcel MTM102757-XD is an island in the Yellowstone River adjacent to the Sundance Lodge Recreation Area and this land is identified as LWC Unit MT-0100-210.

Although possessing wilderness characteristics these lands are still managed under the existing LUP management prescriptions until a new management direction decision is made in the new RMP, which is under development. The inventory process makes no determination about how the lands should be managed; it simply documents the current state of the lands.

3.13 Forest and Woodland Resources

The only forest type in the analysis area is cottonwood gallery (*Populus spp.*) There are no coniferous forest types in the analysis area. Parcel MT 102757-XE contains no woodlands, while parcel MT 102757-XD contains approximately 43 acres of cottonwood gallery. The cottonwood galleries are located on islands and first terraces of the river bank. These woodlands are in healthy condition, with a diverse age structure. River meandering, flooding, and beaver activity

constantly change the density and abundance of cottonwoods, maintaining conditions that promote healthy riparian forest communities.

3.14 Livestock Grazing

Lease parcel MT 102757-XE does not contain BLM surface managed lands, therefore there is no public grazing allotment associated with this parcel. Parcel MT 102757-XD, which is BLM public surface, does not have an allotment associated with it. Grazing can be authorized on this parcel to manage/manipulate vegetation resources; however this has not occurred nor is it a foreseeable action. Livestock used to treat noxious weed infestations would be the most likely use of grazing in this parcel, if and when the issue surfaced.

3.15 Recreation and Travel Management

3.15.1 Recreation

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

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

For the BLM, there has been a shift from activity based to a recreation outcome focused management (OFM) approach. The shift to OFM has essentially required developing and setting sustainable conditions to produce the desired outcome desired by both managers and the public while providing for activities . For the Billings Field Office these settings are generally more primitive and rugged, require more individual responsibility, and have an overall lower density and demand than lands managed by other agencies.

Lease parcel MT 102757-XE does not have public surface management; therefore the BLM does not manage recreation on it. The BLM manages a popular area, the Sundance Lodge Recreation Area, which abuts this lease parcel. Use of this recreation area is heavy, consisting primarily of hikers, dog walkers, runners and hunters. Public sentiment shows this recreation area to be of great value to the local communities of Laurel and Billings, as well as other small towns around the area.

Parcel MT 102757-XD is a portion of two islands in the Yellowstone River and some floodplain along the north bank of the river adjacent to the islands. There is no available recreational use data for these parcels. Staff knowledge of general use around the parcels indicates the primary use being fisherman floating or motoring the river and fishing. Some limited hunting for deer, turkey and pheasant on the island and flood plain is also expected.

3.15.2 Travel Management

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

Lease parcel MT 102757-XE does not have public surface management; therefore the BLM does not manage travel on it.

Parcel MT 102757-XD does not have access for motorized vehicles and does not contain any "travel routes".

3.16 Lands and Realty

None of the lease sale parcels have BLM authorized rights-of-way subject to Lease Notice 14-1. This is due either to rights-of-way simply not being present on federally administered surface or in the case of privately owned surface where the BLM has no authority to grant rights-of-way.

3.17 Minerals

3.17.1 Fluid Minerals

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

Currently there are 237 federal oil and gas leases covering approximately 146,538 acres in the Billings Field Office. The number of acres leased and the number of leases can vary on a daily basis as leases are relinquished, expired, or are terminated. Information on numbers and status of wells on these leases and well status and numbers of private and state wells within the external boundary of the field office is displayed in Table 6. Numbers of townships, lease acres within those townships, and development activity for all jurisdictions are summarized in Table 7.

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

Table 6. Existing Development Activity

	Federal Wells	Non-Federal Wells
Drilling Well(s)	2	19

Producing Gas Well(s)	4	20
Producing Oil Well(s)	8	122
Water Injection Well(s)	56	134
Shut-in Well(s)	6	44
Temporarily Abandoned Well(s)	5	5
Gas Storage Wells	0	16

Table 7. Oil and Gas Leasing and Existing Development within Townships Containing Lease Parcels

	Yellowstone County
Number of Townships Containing Lease Parcels	1
Total Acres Within Applicable Township(s)	147
Federal Oil and Gas Minerals	147
Percent of Township(s)	0.6%
Leased Federal Oil and Gas Minerals	0
Percent of Township(s)	0
Leased Federal Oil and Gas Minerals Suspended	0
Percent of Township(s)	0
Federal Wells	Producing Gas Well(s) 0 Producing Oil Well(s) 0 Water Injection Well(s) 0 Shut-in Well(s) 0 Temporarily Abandoned Well(s) 0
Private and State Wells	Producing Gas Well(s) 0 Producing Oil Well(s) 0 Water Injection Well(s) 0 Shut-in Well(s) 1 Temporarily Abandoned Well(s) 0

3.17.2. Solid Minerals

3.17.2.1. Coal

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

3.17.2.2. Locatable Minerals

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

3.17.2.3. Salable Minerals

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

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

3.18 Social and Economic Conditions

3.18.1 Social and Environmental Justice

Introduction

Certain existing demographic and economic features influence and define the nature of local economic and social activity. Long-held customs, social cohesion, and history of an area provide valuable insight into how events or changes to the area may affect the livelihood and quality of life of the residents. While linkages exist across various social environments, the affected social environment consists of Yellowstone County, Montana.

Affected Environment

Yellowstone County is located in south-central portion of Montana and in 2010 had a population of 147,972, which made it the county with the largest population in the State (US Census, 2010a). The county seat of Yellowstone County is Billings which had a population of 104,170 in 2010 (US Census, 2010b). Billings plays an important role as a commercial, transportation, education, and medical services center for a large portion of this part of the state. Yellowstone County also supports considerable agriculture-it had 1,615,769 acres of land in farms and 1,407 farms in 2007 (NASS, 2007). In 2011, the County ranked number 7 for barley production, nine for winter wheat production, and eleven for alfalfa production for Montana counties (NASS, 2012). Additionally, in 2012 Yellowstone County ranked number 4 in cattle and calves (NASS, 2012). This information helps highlight the importance of agriculture in the County.

Environmental Justice

Executive Order 12898, Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations, requires the identification and addressing of disproportionately high and adverse human health and environmental impacts of federal programs, policies, and activities on minority and low-income populations. We used the following criteria to determine if there was an environmental justice population:
At least one-half of the population is of minority or low-income status, and
The percentage of the population that is of minority or low-income status is at least 10 percent higher than for the entire State of Montana.

The population's race and ethnicity for the study area and the State of Montana, respectively, in 2010 is presented in the below table (Table 8). Table 8 indicates that Yellowstone County does not have an environmental justice minority population. The poverty level for all individuals in Yellowstone County in 2010 was 11.2%, and for the State of Montana it was 14.5%. (US Census, 2010d; US Census, 2010e). Neither the minority nor low-income status in the study area meets the above criteria. However, it should be noted that the poverty level for American Indian and Alaska Native (alone) all individuals was 42.8% (US Census, 2010f), meeting the second criteria above. This indicates that there may be an environmental justice concern for low-income American Indians and Alaska Natives in Yellowstone County. Further outreach, analysis, and potential mitigation would be addressed at the site specific APD stage of exploration and development.

Table 8. Race and Ethnicity for the State of Montana and Yellowstone County.

	White Alone	Black or African American Alone	American Indian and Alaska Native Alone	Asian Alone	Native Hawaiian and Other Pacific Islander Alone	Some other race	Two or more races	Hispanic
Montana	89.4%	0.4%	6.3%	0.6%	0.1%	0.6%	2.5%	2.9%
Yellowstone County	90.7%	0.6%	4.0%	0.6%	0.1%	1.2%	2.8%	4.7%

Sources: US Census, 2010a. US Census, 2010c.
Note: The percentages will not add up to 100% because Hispanic can be of any race.

3.18.2 Economics

Introduction

The BLM is tasked with maintaining the health, diversity, and productivity of more than 6 million surface acres of public land and another 24.1 million of subsurface mineral estates in Montana. The Billings Field Office (BFO) manages approximately 434,000 acres of public surface lands and 690,000 acres of federal mineral estate (oil and gas) in eight counties in south central Montana and in Big Horn County, Wyoming. The relationship between these BLM-administered lands and nearby communities is generally defined by local characteristics which

may include the demographic make-up of populations, the presence and proximity of cities or regional business centers, longstanding industries, infrastructure, predominant land and water features, and amenities unique to the area. These characteristics define the types and level of social and economic activity which occurs in communities surrounding lands administered by the BLM.

In order to accurately portray the relationship between BLM management and the local economy, and examine the economic effects of leasing two additional parcels for fluid minerals exploration and development in Yellowstone County, Montana, the geographic scope of the analysis has been expanded to encompass a four county impact area which includes three counties in Southern Montana (Big Horn, Carbon and Yellowstone) as well as Park County, Wyoming. Though Park, Wyoming is located across state lines, many of the oil and gas related companies which service the Elk Basin are based out of Cody and Powell, Wyoming. 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 four counties. The distribution of these economic effects is based on acres leased and levels of production as well the degree of economic linkages created by the flow of goods, services and people in the region.

Affected Environment

The four-county local economy had an estimated 2010 population of 197,932 people. Total employment was estimated to be 133,793 jobs; there were an estimated 78,498 households; and there were 238 NAICS industrial sectors represented in the local economy (IMPLAN, 2010). This study area includes Billings, MT; the largest business center in the state, and the regional oil and gas business and service centers of Cody (9,520) and Powell (6,314), WY. In 2010 Billings, MT was reported to be the most populated city in the region with 104,170 residents. The county seats of Big Horn (Hardin) and Carbon (Red Lodge) were reported to have populations of 3,505 and 2,125 respectively, while Cody and Powell were reported to have 9,520 and 6,314 residents respectively (U.S. Census Bureau 2010). The local economy which includes these four counties was estimated to have0.68 people per job and 1.7 households per job in 2010.

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

The following discussion applies to Federal minerals for which BLM makes leasing decisions—it does not apply to Forest Service leases. As of March 11, 2013, BLM leased 140,393 acres of land within the Billings Field Office boundaries. The federal government collects annual rent on land leased through the BLM. Rent is paid on leased parcels until one or more oil/gas producing well is drilled, then the leased parcel is considered to be held by production. Instead of paying rent on land held by production, producers pay royalties as share of revenue generated from the extracted minerals. As of March 11, only 11 percent (15,955 acres) of leased minerals in the Billings FO were held by production. Annual lease rent is paid on the remaining 124,438 acres that are not held by production. The majority of federal minerals leased from the Billings Field Office are located in Carbon County which accounts for 28 percent of BLM administered leases. Leasing in Yellowstone County, (where the two nominated parcels are located) only accounts for 2 percent (3,406 acres) of leasing in the field office.

While leasing and production of federal minerals occurs in nearly every county within the field office, leasing and development of federal minerals in the BFO remains low relative to levels in the neighboring Miles City Field Office. A large majority of BFO's federal oil production occurs in Carbon County; with much smaller amounts in Musselshell, Stillwater, and Yellowstone Counties. The only reported natural gas production from federal minerals within the Billings Field Office boundary also occurs in Carbon County. While some gas production from federal minerals does occur in Big Horn County, Montana, this comes from the mineral estate managed by the Miles City BLM office and is not addressed in this analysis.

Local oil and gas exploration, development, and production as well as gas pipeline transmission industry all support jobs and income in the local economy. Local contractors, as well as regional firms from Miles City and Park County, Wyoming, provide most of the contract services to local oil and gas fields. Between 2007 and 2011 the average number of producing and dry wells drilled a year on BLM land within the BFO was less than one. During this time period, Yellowstone County which contains the two nominated parcels averaged 0.001 dry wells and <0.001 producing wells a year on BLM leased land (Montana Board of Oil & Gas Conservation, 2013). Statewide average wellhead prices in 2010 were $70.24 per bbl. for crude oil and $3.64 per MCF for natural gas (IPAA, 2012).

All oil and gas related revenue is collected by the federal government which then distributes a share of this revenue back to the states and counties in which it was generated. The amount of federally collected revenue which is distributed back to state and local governments is determined by the federal authority under which the minerals are being managed, i.e. public domain or acquired. Forty-nine percent of revenue generated from leasing public domain minerals is distributed back to the state of Montana who then gives 25% back to the counties where the revenue was generated (Title 17-3-240, Montana Code Annotated). If the government acquired mineral rights from private owners through the Bankhead Jones Act, then twenty-five percent of the federally collected leasing revenue is returned directly back to the counties leasing acquired minerals. Although the number of acres leased fluctuates daily, federally leased minerals within the BFO have generally been split 75% public domain, 25% acquired. All 147 acres being considered for leasing in the upcoming October 2013 lease sale are public domain minerals.

Leasing

Federal oil and gas leases generate a one-time lease bonus bid as well as annual rents. The minimum lease bid is $2.00 per acre. If parcels do not receive the minimum bids they may be leased later as noncompetitive leases that don't generate bonus bids. Within the Billings Field Office area, bonus bids averaged $12.54 per acre on Federal leases issued between 2005 and 2010. Minerals in Yellowstone County, where both nominated parcels are located, have been leased for $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.

Currently, the Federal government collects an estimated annual average of about $5,611 in lease bids and rent from leasing BLM administered minerals in Yellowstone County. Of the $5,611 federally collected revenue, approximately $2,062 is distributed back to the state of Montana and the redistribution of state and federal revenue from public domain and acquired minerals in Yellowstone generates $866 for the county.

Production

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

Between 2005 and 2010, an annual average of 277,662 barrels of oil and 143,099 MCF of natural gas was produced from BLM-administered Federal minerals in the Billings Field Office area, with the vast majority of BFO production occurring in Carbon County. In 2011 BLM administered minerals in Yellowstone County were estimated to have produced 97 bbls and no MCFs of natural gas. The federal government collected $848 in royalties from production of federal mineral in Yellowstone County and distributed $395 back to the state of Montana. Royalties earned from public domain and acquired mineral production generated $109 for the county.

Local Economic Contribution

The economic contribution to a local economy is measured by estimating the employment and labor income generated by 1) payments to counties associated with the leasing, rent, and production of Federal minerals, 2) local royalty payments associated with production of Federal oil and gas, and 3) economic activity generated from drilling and associated activities. Activities related to oil and gas leasing, exploration, development, and production form a basic industry that brings money into the state and region and creates jobs in other sectors. Extraction of oil and natural gas (IMPLAN sector 20), drilling oil and gas wells (IMPLAN sector 28), and support activities for oil and gas operations (IMPLAN sector 29) supported an estimated 2,389 jobs and $249 million in local wages and proprietor income in the four counties which make up the local economy (IMPLAN, 2010). The vast majority of income and employment in oil and gas related sectors is supported by leasing, exploration and development in Carbon County.

Total federally collected revenue from oil and gas leasing, rents, and royalty payments on BLM administered minerals within Yellowstone County averages $6,459 annually. . Federal revenues distributed to the state of Montana amount to an estimated $2,457 per year. Between redistribution of federal revenue from acquired minerals and state revenue from public domain minerals Yellowstone County receives approximately $975 annually from oil and gas activity on BLM administered minerals. Revenue earned from mineral development helps fund traditional county functions such as enforcing laws, administering justice, collecting and disbursing tax funds, providing for orderly elections, maintaining roads and highways, providing fire

protection, and/or keeping records. Other county functions that may be funded include administering primary and secondary education and operating clinics/hospitals, county libraries, county airports, local landfills, and county health systems.

While exploration and development of BLM administered minerals occurs in Yellowstone County, the economic contributions from current leasing, exploration and development are minimal. The estimated annual local economic contribution associated with Federal leases, rents, drilling, production, and royalty payments in Yellowstone County combined to support a fraction of one local job and $1,000 in local labor income (table 9).

Table 9. Current Contributions of Federal Oil and Gas Leasing, Exploration, Development, and Production in Yellowstone County to the Local Economy

	Employment (jobs)		Labor Income (Thousands of 2010 dollars)	
Industry	Area Totals	BLM-Related	Area Totals	BLM-Related
Agriculture	4,762	0	$44,200	$0
Mining	3,146	0	$317,997	$0
Utilities	547	0	$59,126	$0
Construction	8,700	0	$401,942	$0
Manufacturing	4,015	0	$346,015	$0
Wholesale Trade	5,856	0	$343,104	$0
Transportation &Warehousing	4,415	0	$222,977	$0
Retail Trade	16,040	0	$444,623	$0
Information	1,851	0	$89,351	$0
Finance & Insurance	6,931	0	$334,456	$0
Real Estate & Rental & Leasing	5,623	0	$83,968	$0
Prof, Scientific, & Tech Services	7,532	0	$384,192	$0
Mngt of Companies	502	0	$35,560	$0
Admin, Waste Mngt & Rem Serv	6,921	0	$174,663	$0
Educational Services	1,383	0	$28,449	$0
Health Care & Social Assistance	16,182	0	$888,462	$0
Arts, Entertainment, and Rec	3,575	0	$56,941	$0
Accommodation & Food Services	11,346	0	$198,973	$0
Other Services	8,008	0	$207,633	$0
Government	16,458	0	$962,210	$1
Total	133,793	0	5,624,843	1
Percent of Total	---	0.00%	---	0.00%

IMPLAN, 2010 database

4.0 ENVIRONMENTAL IMPACTS

4.1 Assumptions and Reasonably Foreseeable Development Scenario Summary

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

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

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

This chapter presents the potential environmental, social, and economic effects from the actions described in each alternative in Chapter 2, as well as potential effects from lease exploration and development activities. Environmental consequences are discussed below by alternative to the extent possible at this time for the resources described in Chapter 3. As per NEPA regulations at 40 CFR 1502.14(f), 40 CFR 1502.16(h), and 40 CFR 1508.20, mitigation measures to reduce, avoid, or minimize potential impacts are identified by resource below. The duration of the possible effects is analyzed and described as either short-term or long-term. Short-term effects generally last less than five years and long-term effects generally last more than five years.

4.1.1 Reasonably Foreseeable Development Scenario Summary

The RFD scenario (Appendix B) is based on information contained in the February 2010 Billings Field Office RFD; it is an unpublished report that is available by contacting the Billings Field Office. The RFD scenario contains projections of the number of possible oil and gas wells that could be drilled and produced in the Billings Field Office area and used to analyze projected wells for the two nominated lease parcels. Both lease parcels are identified within areas of moderate development potential. These well numbers are only an estimate based on historical drilling and mineral resources present, and may change in the future if new technology is

developed or new fields and formations are discovered. For the RFD scenario (Appendix B), the lease parcels have been analyzed under the Bull Mountain Basin area. This area is identified on Map 2. A detailed description of the RFD forecast in the analysis area is found in Appendix B.

4.1.2 Assumptions for Alternative A (No Action)

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

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

4.1.3 Analysis Assumptions for Alternative B (Proposed Action)

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

If the lease parcels are developed, short-term impacts would be stabilized or mitigated rapidly (within two to five years). Long-term impacts are those that would substantially remain for more than five years. Long-term impacts would include surface disturbance in areas with low reclamation potential as well as disturbance to wildlife resources by increased traffic and human presence on existing or new travel routes.

Given the RFD scenario and recent activity in the Billings Field Office, it is assumed that a maximum of one well pad and associated infrastructure and activities would occur with regard to the parcels being leased. This would result in approximately 3.5 acres of disturbance, including well pad and associated ancillary facilities for an oil well with associated natural gas extraction.

With “No Surface Occupancy” stipulations applied, any surface disturbance is expected to be on private surface ownership within a 2 mile radius of the parcels.

Given the sensitivity of cultural and environmental resources, Waivers, Exemptions and Modifications would not be granted to allow surface occupancy on these parcels.

Given the NSO stipulations, any development would likely occur within a two mile radius of the parcels (a reasonable and feasible distance directional drilling is used to access fluid minerals). This would encompass approximately 8,000 acres around the parcels, dominated by river bottom

and farm lands, with a small proportion of upland grassland and shrublands. Any predicted disturbance will be measured against this 8,000 acre analysis area.

Much of the lands surface in the area around the lease parcels has experienced surface disturbance from residential, commercial and agricultural development; therefore it is likely any well development would take place on previously disturbed ground.

With the exception of Social and Economics, impacts discussed in chapter 4 will pertain to potential development on lands outside of the lease parcels. The BLM cannot predict where or when this development would occur, therefore a general discussion of potential impacts will be developed. Specific impacts to resources will be analyzed through NEPA during the APD stage of development.

4.2 Alternative A (No Action)

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

Under Alternative A, two parcels, 147 acres of federal mineral acres, would not be offered for competitive oil and gas lease sale. Under this alternative, the state and private minerals could still be leased in surrounding areas.

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

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

4.2.2 Economics

4.2.2.1 Direct and Indirect Effects:

Economic effects are summarized and displayed in comparative form in Tables 12 and 13. Under Alternative A, none of the nominated parcels would be leased. Consequently, no federal, state, or local revenues would be generated from leasing, rents, or royalties associated with production. No additional employment or income would be generated from the nominated parcels if none of the parcels are leased.

4.3 Alternative B (Proposed Action)

Under Alternative B, two parcels with 147 federal mineral acres would be offered for competitive oil and gas lease sale.

4.3.1 Direct Effects Common to All Resources

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

4.3.2 Indirect Effects Common to All Resources

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

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

4.3.3 Air Resources

4.3.3.1 Direct and Indirect Effects

4.3.3.1.1 Air Quality

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

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

Current monitoring data show that criteria pollutant concentrations are well below applicable air quality standards, with the exception of intermittent high localized SO_2 concentrations within 2 kilometers of a refinery in Laurel. The potential level of development and mitigation described below is expected to maintain good air quality in the lease area. Pollutant emissions would be regulated under Montana's oil and gas registration permitting system. SO_2 emissions would be low due to requirements for vehicles and non-road engines to use ultra-low sulfur diesel fuel.

Hazardous air pollutants (HAPs) would also be emitted from oil and gas operations, including well drilling, well completion, and gas and oil production. Recent air quality modeling

performed for the BiFO indicates that concentrations of benzene, ethylbenzene, formaldehyde, n-hexane, toluene, and xylene would be less than 11 percent of applicable health-based standards and that the additional risk of cancer would be less than 0.23 in one million (BLM 2013).

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

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

Anticipated GHG emissions presented in this section are taken from the Climate Change SIR, 2010. Data are derived from emissions calculators developed by air quality specialists at the BLM National Operations Center in Denver, Colorado, based on methods described in the Climate Change SIR (2010). Based on the assumptions summarized above for the Billings Field Office RFD, Table 10 discloses projected annual GHG source emissions from BLM-permitted activities associated with the RFD.

Table 10. BLM Projected Annual Emissions of Greenhouse Gases Associated with Oil and Gas Exploration and Development Activity in the Billings Field Office.

Source	BLM Long-Term Greenhouse Gas Emissions in tons/year			Emissions (metric tons/yr)
	CO_2	CH_4	N_2O	CO_2e
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**

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

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

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

Under Alternative B, approximately 147 acres of lease parcels with federal minerals would be leased. These acres constitute approximately 0.02 percent of the total federal mineral estate of approximately 690,000 acres identified in the Billings Field Office RFD scenario. Therefore, based on the approach described above to estimate GHG emissions,0.02 percent of the total estimated BLM RFD emissions of approximately 9,673 metric tons/year would be approximately 2.0 metric tons/year of CO_2e if the parcels within Alternative B were to be developed.

4.3.3.1.3 Climate Change

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

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

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

4.3.3.2 Mitigation

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

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

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

- install emission control equipment of a minimum 95 percent efficiency on all condensate storage batteries;
- install emission control equipment of a minimum 95 percent efficiency on dehydration units, pneumatic pumps, produced water tanks;
- operate vapor recovery systems where petroleum liquids are stored;
- use tier II or greater, natural gas or electric drill rig engines;
- operate secondary controls on drill rig engines;
- use no-bleed pneumatic controllers (most effective and cost effective technologies available for reducing VOCs);
- use gas or electric turbines rather than internal combustions engines for compressors;
- operate nitrogen oxides (NO_x) emission controls on 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;
- implement 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;
- use directional drilling and horizontal completion technologies whereby one well provides access to petroleum resources that would normally require the drilling of several vertical wellbores;
- operate gas-fired or electrified pump jack engines;
- install velocity tubing strings;
- capture gas during completion activities (i.e. green completions), and other ancillary sources;
- use centralized tank batteries and multi-phase gathering systems to reduce truck traffic;
- use forward looking infrared (FLIR) technology to detect fugitive emissions; and
- monitor ambient air concentrations of NO_x and ozone (O_3).

More specific to reducing GHG emissions, Section 6 of the Climate Change SIR identifies and describes in detail commonly used technologies to reduce methane emissions from natural gas, coal bed natural gas, and oil production operations. Technologies discussed in the Climate Change SIR and as summarized below in Table 11 (reproduced from Table 6-2 in Climate Change SIR 2010), display common methane emission technologies reported under the USEPA Natural Gas STAR Program and associated emission reduction, cost, maintenance and payback data.

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

Source Type / Technology	Annual Methane Emission Reduction [1] (Mcf/yr)	Capital Cost Including Installation ($)	Annual Operating and Maintenance Cost ($)	Payback (Years or Months)	Payback Gas Price Basis ($/Mcf)
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

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

Source Type / Technology	Annual Methane Emission Reduction [1] (Mcf/yr)	Capital Cost Including Installation ($)	Annual Operating and Maintenance Cost ($)	Payback (Years or Months)	Payback Gas Price Basis ($/Mcf)
Compressors					
Install electric compressors	40 – 16,000	>$10K	>$1K	>10 yr	NR
Replace centrifugal compressor wet seals with dry seals	45,120	$324K	Negligible	10 mo	$7
Flare Installation	2,000	>$10K	>$1K	None	NR

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

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

In an effort to disclose potential future GHG emissions reductions that might be feasible in individual field offices, the BLM estimated GHG emissions reductions based on the RFD for the Miles City Field Office (MCFO). For analysis purposes, the MCFO RFD was selected based on the high potential development scenario. Similar emissions reductions may be possible in the planning area. For emissions sources subject to BLM (federal) jurisdiction, the estimated emissions reduction represent approximately 51 percent reduction in total GHG emissions compared to the estimated MCFO federal GHG emissions inventory (Climate Change SIR, as updated October 2010, Section 6.5 and Table 6-3). The emission reduction technologies and practices are identified as mitigation measures that could be imposed during development. Furthermore, the EPA is expected to promulgate new federal air quality regulations that would require GHG emission reductions from many oil and gas sources.

4.3.4 Soil Resources

4.3.4.1 Direct and Indirect Effects

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

Furthermore, the lease parcels would have NSO stipulations attached to them, preventing any surface disturbance in the lease parcels. Soil resources in the lease parcels would not be directly or indirectly impacted by leasing or developing the leases.

The potential exists for a well pad to be constructed on private surface adjacent to the lease parcels. Soil resources may be impacted in this case. The BLM cannot predict where or if this

will occur. Much of the surrounding area is impacted by surface disturbance from residential, commercial and agricultural development. If the well site fell on undisturbed lands, the development of one well pad would disturb approximately 3.5 acres, including the pad and associated ancillary facilities. Considering a radius of two miles, a common distance from which directional drilling is used to access fluid minerals, this acreage disturbed is approximately five one-thousandths of one percent of the area.

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

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

4.3.4.2 Mitigation

Measures would be taken to reduce, avoid, or minimize potential impacts to soil resources from exploration and development activities. Prior to authorization, APDs would be evaluated on a case-by-case basis through NEPA and would be subject to mitigation measures in order to maintain the soil system. Mitigation could include avoiding areas poorly suited to reclamation, limiting the total area of disturbance, rapid reclamation, erosion/sediment control, soil salvage, decompaction, revegetation, weed control, slope stabilization, surface roughening, and fencing. Conducting oil and gas development with the following BMPs would enhance soil resilience and reduce soil system fragmentation, accelerated wind and water erosion, and the total area of surface disturbance with the following:

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

4.3.5 Water Resources

4.3.5.1 Direct and Indirect Effects

Leasing the parcels would have no direct impacts on water resources. Any potential effects to water resources would occur from subsequent exploration/development of the two lease parcels. NSO stipulations assure there would be no impacts to water resources from surface disturbance on the lease parcels. However, if a well is developed on private land adjacent to the parcels, the potential for impacts to water resources would exist.

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

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

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

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

and drilling practices determine the probability of this occurrence and determine the groundwater resources that could be impacted. In addition to changing the producing formations' physical properties by increasing the flow of water, gas, and/or oil around the well bore; hydraulic fracturing can also introduce chemical additives into the producing formations. Types of chemical additives used in drilling activities may include acids, hydrocarbons, thickening agents, lubricants, and other additives that are operator and location specific. These additives are not always used in these drilling activities and some are likely to be benign such as bentonite clay and sand. Concentrations of these additives also vary considerably since different mixtures can be used for different purposes in oil and gas development and even in the same well bore. If contamination of aquifers from any source occurs, changes in groundwater quality could impact springs and residential wells that are sourced from the affected aquifers. Onshore Order #2 requires that the proposed casing and cementing programs shall be conducted as approved to protect and/or isolate all usable water zones.

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

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

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

4.3.5.2 Mitigation

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

4.3.6 Vegetation Resources

4.3.6.1 Direct and Indirect Effects

Leasing the parcels would have no direct impacts on vegetation resources. Any potential effects on vegetation resources from sale of lease parcels would occur at the time the leases are developed. Furthermore, NSO stipulations attached to all lease parcels would prevent impacts to vegetation resources in the lease parcels. Any impacts to vegetation resources would result from the leases being developed on surface adjacent to the parcels, most likely private surface, as public lands are rare around the project area.

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

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

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

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

4.3.6.1.1 Invasive, Non-Native Species (INNS)

At the lease sale stage there are no impacts. Impacts (both direct and indirect) would occur when the lease is developed. The potential impacts would be analyzed on a site-specific basis prior to oil and gas development and during the APD stage of development. Furthermore, the NSO stipulations attached to the lease parcels would prevent any threat of INNS impacts to the lands within the parcels.

Direct impacts would occur during oil and gas development, which would occur on lands adjacent to the parcels due to the NSO stipulation. Impacts associated with oil and gas development to INNS would include surface disturbance and creating vectors for dispersal. Surface disturbance from drill site development could create suitable site conditions for the introduction of INNS. 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 site alterations as a result from the spread of INNS. If appropriate management techniques do not occur and these invasive species becomes established, they could alter the plant community, which would then affect wildlife habitat and upland health.

4.3.6.1.2 Noxious Weeds

At the lease sale stage there are no impacts. Impacts (both direct and indirect) would occur when the lease is developed in the future. The potential impacts would be analyzed on a site-specific basis prior to oil and gas development and during the APD stage of development. Furthermore, due to NSO stipulations applied to the lease parcels, any impacts associated with noxious weeds would occur on lands adjacent to the parcels, as there will be no surface disturbance allowed on the parcels.

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 pads 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 other 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 equipment prior to transporting from site to site would minimize this impact.

4.3.6.2 Mitigation

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

4.3.7 Riparian-Wetland Habitats

4.3.7.1 Direct and Indirect Effects

Leasing the parcels would have no direct impacts on riparian-wetland habitats. Any potential effects on riparian-wetland habitats from sale of lease parcels would occur at the time the leases are developed. Furthermore, due to NSO stipulations applied to the lease parcels, there would be no impacts to riparian resources within the lease parcels. Any development that occurs would be

on lands adjacent to the parcels; therefore any impacts to riparian resources would be on lands outside the lease parcels.

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

4.3.7.2 Mitigation

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

4.3.8 Wildlife and Special Status Species

4.3.8.1 Direct and Indirect Effects

Leasing the two parcels would have no direct impacts on wildlife. Any potential effects on wildlife resources from sale of lease parcels would occur at the time the leases are developed. In addition, impacts to wildlife resources on the lease parcels would be minimal due to NSO stipulations that prevent any surface activity on the lease parcels. In order to develop the lease (drill for oil), the well pad would have to be placed outside of the lease parcel, presumably on lands within a two mile radius of the parcels.

Development of the leases would result in approximately 3.5 acres of surface disturbance (somewhere outside the parcel boundaries), which would have minimal impacts on wildlife resources in the analysis area, including a two mile radius around the lease parcels (an area where directional drilling would be feasibly developed to access the lease minerals). Overall, this would only result in less than five one-thousandths of one percent of the surrounding area being disturbed by development (direct habitat alteration/loss). Disturbance to wildlife from development and maintenance activities associated with lease activities would have minimal impacts on wildlife resources, as the wildlife in the surrounding area are accustomed to

disturbance and disruptive activities from the abundance of human activity (residential, recreational, commercial) in the area.

Oil and gas development which results in surface disturbance could directly and indirectly impact aquatic and terrestrial wildlife species. These impacts could include loss or reduction in suitability of habitat, improved habitat for undesirable (non-native) competitors, species or community shift to species or communities more tolerant of disturbances, nest abandonment, mortalities resulting from collisions with vehicles and power lines, electrocutions from power lines, barriers to species migration, habitat fragmentation, increased predation, habitat avoidance, and displacement of wildlife species resulting from human presence. The scale, location, and pace of development, combined with implementation of mitigation measures and the specific tolerance of the species to human disturbance all influence the severity of impacts to wildlife species and habitats. Furthermore, with the abundance of developed land around the lease parcels, there is high potential for the well pad to be constructed on previously disturbed ground, which would have less impact to wildlife resources than if it was constructed on undeveloped lands.

4.3.8.1.1 Threatened, Endangered Proposed, and Candidate Species

Threatened and Endangered Species Consultation

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

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

The following is a summary of the effects determinations on T & E species, developed for each of the Billings RMP management actions (Table 12). Determinations apply to all T&E Species listed in the Billings Field Office unless indicated otherwise.

Table 12. Threatened and Endangered, Proposed and Candidate Wildlife Species Summary of Determinations for the Billings Field Office RMP

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

These determinations would remain valid for these species given the stipulations applied, inventories required, and mitigation implemented at the APD stage of development through Conditions of Approval. The project area is not known habitat for any of the listed species.

Whooping Crane:
Whooping crane is listed in Yellowstone County within the Billings Field Office area. BLM has determined that the act of issuing leases within the whooping crane migration corridor would not affect the whooping crane. However, impacts to whooping cranes are possible from subsequent oil and gas development activities that would be permitted at the APD stage. At this time, stipulations do not currently exist to protect any known whooping crane migration staging areas. Line strikes, collisions with vehicles, habitat fragmentation, and other anthropogenic activities can disturb, displace, or cause direct mortality of whooping cranes.

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

4.3.8.1.2 Other Special Status Species
As noted, any number of the 46 wildlife species that BLM has designated as "Special Status Species" (SSS) have the potential to occur within the parcel areas. Stipulations are not provided for all BLM SSS in the current Resource Management Plans. Stipulations are provided for 10 out of the 46 SSS species. For those species afforded some protections through existing stipulations, impacts would be minimized, but not eliminated. Impacts to BLM sensitive species would be similar to those described above, unless they are afforded protective measures from other regulations such as the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703.) or the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668c). BLM does not consult with the USFWS on "SSS" species and likewise would not receive terms and conditions from USFWS requiring additional protections of those species. As mentioned above, any impacts to wildlife resources will be limited to areas outside of the leasing parcels, as NSO stipulations will restrict any surface disturbance or disruptive activities on the parcels. The degree of impact will depend on location and timing of development activities, which will not be disclosed unless an APD is submitted.

Numerous species of birds were identified as inhabitants across the analysis area. With the impacts associated with development, it is reasonable to assume there would be impacts to nesting and migrating bird species. The primary impacts to these species would include disturbance of preferred nesting habitats, improved habitat for undesirable competitors and/or a species shift to disturbance associated species, and increased vehicle collisions.
Research in Sublette County, Wyoming on the effects of natural gas development on sagebrush steppe passerines documented negative impacts to sagebrush obligates such as Brewer's sparrows, sage sparrows, and sage thrashers. (Ingelfinger, 2001) The impacts were reported greatest along roads where traffic volumes are high and within 100 meters of these roads. Sagebrush obligates were reduced within these areas by as much as 60%. Sagebrush obligate

density was reduced by 50% within 100 meters of a road even when traffic volumes were less than 12 vehicles /day. It would be expected that similar population declines would occur to this guild of species from similar development proposals within sagebrush habitats.

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

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

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

Take of bald and golden eagles and any other migratory raptors is not anticipated through this action; however, take may occur indirectly as a result of vehicle collisions and other related actions associated with development. Field surveys for raptors at proposed development sites would be conducted for activities planned between April 15 and August 30. Mitigation measures would be assigned at the APD stage to ensure there would be negligible effect on raptor populations, including bald and golden eagles. These mitigation measures would be required as Conditions of Approval. The application of stipulations and COAs at the project level is expected to comply with MBTA and BGEPA.

Greater Sage-Grouse:
In a recent status review, the USFWS (March 2010) determined that the greater sage-grouse was warranted, but precluded for listing under the ESA and is considered a Candidate species. Therefore, the species has specific protections through a stipulation. Review of habitat from aerial photography, and inventory records from BLM and Montana Natural Heritage have indicated that there are no lease parcels in sage-grouse PPH or Core Areas, all nominated parcels in PPH or Core Areas were considered but eliminated from further analysis. Furthermore, the lease parcels are not located within suitable sage-grouse habitat. The nearest sage-grouse leks are approximately 10 miles south of the parcels. There would be no impacts to greater sage-grouse from the development associated with the leasing of these parcels.

Yellowstone Cutthroat Trout (YCT)
The Yellowstone river, near the lease parcels, may support a sparse population of YCT, however it is not classified as suitable YCT habitat. The development of these lease parcels would have minimal impacts on YCT due to the stipulations applied at the leasing state and BMPs and COAs applied during developmental stages. Much effort is applied to ensure water quality and riparian habitat is not degraded during development of oil and gas projects, resulting in protections to fish and other aquatic life.

4.3.8.2 Mitigation
Stipulations applied to wildlife resources are designed to provide protections for wildlife species and their habitat, particularly during critical life cycles. Refer to Appendix A for a summary of stipulations that apply to wildlife and habitat. Measures would be taken to prevent, minimize, or mitigate impacts to fish and wildlife animal species from exploration and development activities. Prior to authorization, activities would be evaluated, and the project would be subject to mitigation measures. Mitigation could include rapid re-vegetation, project relocation, or pre-disturbance wildlife species surveying. If oil and gas development is proposed in suitable habitat for threatened or endangered species, consultation with the USFWS would occur to determine if additional terms and conditions would need to be applied.

4.3.9 Special Status Plant Species
4.3.9.1 Direct and Indirect Effects
There are no special status plant species identified in the project area or within a two mile radius (the distance it would be feasible to develop a well and directionally drill to the lease's minerals). There will be no direct or indirect effects to this resource. In the event that special status plant species are discovered in the parcels or the development sites, NEPA analysis at the APD stage and mitigation described below would minimize adverse effects.

4.3.9.2 Mitigation
Stipulations applied to wildlife resources, steep slopes, waterbodies, streams, 100-year floodplains of major rivers, riparian areas, and wetlands would likely also provide protections for special status plant species. Additionally stipulation 16-2 applies to all lease parcels. Proposed development would be analyzed on a site-specific basis prior to approval of oil and gas exploration or development activities at the APD stage**.** Mitigation would also be addressed at

the site-specific APD stage. Surveys to determine the existence of federally listed species could occur on BLM-administered surface or minerals prior to approval of exploration and development activities at the APD stage.

4.3.10 Cultural Resources

4.3.10.1 Direct and Indirect Effects

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

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

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

4.3.10.2 Mitigation

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

Lease Notice 14-2 (which informs the lessee that a cultural resource inventory is required prior to any surface disturbing activity within the lease parcel) and CR 16-1(which informs the lessee that the lease could contain resources important/sacred to Native Americans and should these resources be present, exploration and development proposals could be modified to protect the resources) would be attached to all proposed lease sale parcels.

Lease sale parcels MTM 102757-XD and XE do not contain recorded cultural resources that appear on the site database, but they do contain the Nez Perce and Lewis & Clark National Historic Trails, which are nationally significant cultural and historic resources. As there are known cultural resources within these lease sale parcels, a No Surface Occupancy (NSO) stipulation (NSO 11-11) would be attached to these lease sale parcels, which would inform the lessee that surface occupancy would be prohibited within a portion of the lease sale parcel. Lease Notice (LN 14-9) would also be attached to the same lease sale parcels. This informs the lessee that cultural resources are present within the lease and as a result cultural inventory and mitigation costs may be higher.

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

4.3.11 Native American Religious Concerns

4.3.11.1 Direct and Indirect Effects

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

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

A review of the lease parcels in Appendix A indicates that no previously reported TCPs would be directly or indirectly impacted, however additional tribal consultation would be required at the APD stage for those parcels containing site types identified by the Crow or Northern Cheyenne as being important to the tribes. For those parcels where no inventory data is available or where no information is available for TCPs, BLM is proposing to apply Standard Lease Notice 16-1 and continuing to seek information from tribal authorities on the presence of TCPs that have not been previously reported.

4.3.12 Paleontology

4.3.12.1 Direct and Indirect Effects

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

Indirect impacts from the sale of leases would be from the surface disturbances associated with oil and gas exploration and development activities. It is anticipated that most significant fossil resources are located in those geologic units with a Potential Fossil Yield Classification (PFYC) of 3 or higher. However, significant fossil resources could be discovered anywhere. Surface-disturbing activities could potentially alter the characteristics of paleontological resources through damage, fossil destruction, or disturbance of the stratigraphic context in which paleontological resources are located, resulting in the loss of important scientific data. Identified paleontological resources could be avoided by project redesign or relocation before project approval which would negate the need for the implementation of mitigation measures.

Conversely, surface-disturbing activities could potentially lead to the discovery of paleontological localities that would otherwise remain undiscovered due to burial or omission during review inventories. The scientific retrieval and study of these newly discovered resources would expand our understanding of past life and environments of Montana.

4.3.12.2 Mitigation

The application of lease terms, the paleontological no surface occupancy stipulation (NSO 11-12), and the paleontological lease notice (LN 14-12) at leasing, provides protection to paleontological resources during development. The paleontological lease notice is applied to those lease parcels that fall within the PFYC 3 or higher geologic units, requiring a field survey prior to surface disturbance. These inventory requirements could result in the identification of paleontological resources. Avoidance of significant paleontological resources or implementation of mitigation prior to surface disturbance would protect paleontological resources. However, the application of lease terms only allows the relocation of activities up to 200 meters, unless documented in the NEPA document, and cannot result in moving the activity off lease.

Specific mitigation measures could include, but are not limited to, site avoidance or excavation. Avoidance of paleontological properties would be a best management practice. However, should a paleontological locality be unavoidable, significant fossil resources must be mitigated prior to implementation of a project. Also, significant fossil resources could be discovered in areas that had not been surveyed (PFYC of less than 3) during surface disturbance. Those resources must also be professionally mitigated. These mitigation measures and contingencies would be determined when site specific development proposals are received.

In order to protect paleontological resources, 2 of the parcels are recommended to have the Paleontological lease notice 14-3 applied per guidance identified in IM 2009-011 and 2008-009. No parcels are recommended for the no surface occupancy lease stipulation (NSO 11-12) based upon paleontological resources. See section 3.10 Paleontology for list of parcels.

4.3.13 Visual Resources

4.3.13.1 Direct and Indirect Effects

Leasing the parcels would have no direct impacts on visual resources. Any potential effects from the sale of leases would occur at the time the leases are developed. Furthermore, due to the NSO stipulations, these effects would not be on the lease parcels, but in the analysis area surrounding the lease parcels.

There is no VRM inventory for the lease parcels or the analysis area immediately surrounding the parcels. While the act of leasing federal minerals produces no visual impacts, subsequent development (indirect effects) of a lease parcel would result in some level of modification to the existing landscape. This modification would be addressed through site specific planning and mitigation during the APD phase of development.

4.3.13.2 Mitigation

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

4.3.14 Special Designations

4.3.14.1 National Historic Trails

Lease sale parcels MTM 102757-XD and XE are on the Nez Perce and Lewis & Clark National Historic Trails, which are nationally significant cultural and historic resources. As there are known cultural resources within these lease sale parcels, a No Surface Occupancy (NSO) stipulation (NSO 11-11) would be attached to these lease sale parcels, which would inform the lessee that surface occupancy would be prohibited within a portion of the lease sale parcel. Lease Notice (LN 14-9) would also be attached to the same lease sale parcels. This informs the lessee that cultural resources are present within the lease and as a result cultural inventory and mitigation costs may be higher. These stipulations would ensure impacts to NHTs would be minimal.

4.3.14.1.1 Mitigation

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

4.3.14.2 Lands with Wilderness Characteristics

There are lands identified as possibly having Wilderness Characteristics present. Parcel XD is partially located on an island that has potential to be managed for its wilderness resources (defined as naturalness, opportunity for primitive recreation and solitude). Leasing the parcels would have no direct impacts on LWC resources. Due to NSO stipulations, which restrict any surface disturbance associated with oil and gas development on the parcel, there will also be no indirect impacts to LWC.

4.3.15 Forest and Woodland Resources

4.3.15.1 Direct and Indirect Effects

Leasing the parcels would have no direct impacts on forest and woodland resources. Any potential effects from the sale of leases would occur at the time the leases are developed. Furthermore, these effects would not occur on the lease parcels due to the NSO stipulation. Impacts to woodlands would be on private or other surface, most likely within a two mile radius of the lease parcels.

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

4.3.15.2 Mitigation

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

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

4.3.16 Livestock Grazing

4.3.16.1 Direct and Indirect Effects

Leasing the parcels would have no direct impacts on livestock grazing. Any potential effects from the sale of leases would occur at the time the leases are developed. Due to NSO stipulations and the absence of grazing allotments within the leasing area, impacts to livestock grazing will be minimal.

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

4.3.16.2 Mitigation

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

4.3.17 Recreation and Travel Management

4.3.17.1 Direct and Indirect Effects

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

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

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

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

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

Foreseeable changes in recreation use levels include demand for recreational use of public land to increase. Increases could be expected in, but not limited to: hunting, fishing, hiking, camping,

wildlife viewing, and dispersed recreational uses. This could increase the incidence of conflict between recreationists involved in motorized activities and non-motorized activities.

In this case, with NSO stipulations applied to the leases, impacts to recreation resources would be limited to areas outside the lease parcels. The degree of these impacts can only be determined at the APD stage, due to the unknown location of potential development.

4.3.18 Lands and Realty

4.3.17.1 Direct and Indirect Effects

Leasing any of the proposed parcels for this lease sale would have no direct impacts on lands and realty. Any potential effects from the sale of these leases would occur at the time the leases are potentially developed.

4.3.18.2 Mitigation

Measures would need to be taken to avoid disturbance to or impacting existing rights-of-way on federally administered surface in the event that the leased parcels are developed. Any new or "off-lease" rights-of-way required across federal surface for future exploration and/or development of the parcel would be subject to a separate review and be subject to stipulations to protect other resources as determined by environmental analysis which would be completed on a case-by-case basis.

4.3.19 Minerals

4.3.19.1 Fluid Minerals

4.3.19.1.1 Direct and Indirect Effects

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

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

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

Under Alternative B, both lease parcels would be offered for lease subject to major (NSO) constraints.

Fracking on BLM Montana Well Sites

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

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

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

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

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

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

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

4.3.19.2 Solid Minerals

4.3.19.2.1 Direct and Indirect Effects

Leasing the parcels would have no direct impacts on federal solid minerals. As described in Chapter 3, none of the parcels proposed to be leased for oil and gas in the analysis area conflict with currently active or existing claims, patents, permits or leases for all solid materials issued on federal lands within the analysis area. Due to NSO stipulations, any development of the leases would not have an effect on solid mineral resources.

4.3.20 Social and Economic Conditions

4.3.20.1 Social

Impacts Common to All Alternatives:

Impacts to the social environment of Yellowstone County from this BLM action would be associated with a change in the workforce/employment. Based upon the economics analysis, there would be very little impact to the social qualities, community infrastructure, and community services of Yellowstone County.

4.3.20.1.1 Direct and Indirect Effects

Alt A (No Action)

The No Action alternative would result in the continuation of the current land and resource uses and would cause no social impacts. There would be no disproportionate effects to low income or minority populations under this alternative.

Alternative B (Proposed Action)

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

There would be no disproportionate effects to low income or minority populations. Consultation with potentially affected Tribes would occur at the APD stage.

4.3.20.2 Economics

The basis for economic impacts is the number of acres leased, rents paid, and level of production by alternative. The economic contribution to a local economy is measured by estimating the employment and labor income generated by 1) payments to counties associated with the leasing and rent of federal minerals, 2) royalty payments associated with production of federal oil and gas, and 3) economic activity generated from drilling and associated activities. Activities related to oil and gas leasing, exploration, development, and production form a basic industry that brings money into the state and region and creates jobs in other sectors. Table 13 is a summary of local revenues, employment, income, population, and household impacts of each alternative.

Table 13. Summary Comparison of Estimated Average Annual Economic Impacts Related to BLM Oil and Gas Leasing, Development, and Production

Alternative	Acres Recommended for Lease	Change in Local Revenue to Counties ($)	Change in Total Employment (full and part-time jobs)	Change in Total Labor Income ($1,000)	Change in Population	Change in Number of Households
A	0	0	0	0	0	0
B	147	$90	0	0	0	0

4.20.1.1 Alternative A (No Action)

Economic effects are summarized and displayed in comparative form in Table 13 and Table 14. Under Alternative A none of the nominated parcels would be leased. Consequently, no federal, state, or local revenues would be generated from leasing, rents, or royalties associated with production. No employment or income would be generated if none of the parcels are leased.

Alternative B (Proposed Action)

Public Revenues

Total average annual federal revenues related to leasing an additional 147 acres of federal minerals and associated annual rent and royalty revenues related to average annual production of federal minerals would amount to about $7,074. Total average annual revenues from leasing, rent, and royalties distributed to the state and counties would be about $2,677. Total estimated revenues distributed back to the county would be $1,065.

Local Economic Contribution

The estimated combined total average annual employment and income supported by the additional federal oil and gas leasing, distributions of royalties to local governments, drilling wells, and production would amount to about 0 total jobs (full and part-time) and less than $

1,000 in local wages and income (IMPLAN 2010). Leasing these additional 147 acres is not anticipated to have an effect on the population growth within Yellowstone County.

Conclusion

Total federal contribution of Alternative B (leasing an additional 147 acres of federal minerals) and anticipated related exploration, development, and production of oil and gas would have little effect on local population, total local employment, number of households, average income per household, and total personal income. The economic effects would be spread unevenly among the counties. Leasing the additional acres and anticipated exploration, development, and production under alternative B would provide about $90 per year of additional funds for county functions. These funds would go to Yellowstone County to fund functions such as enforcing laws, administering justice, collecting and disbursing tax funds, providing for orderly elections, maintaining roads and highways, providing fire protection, and keeping records. Other county functions that may get a small amount of funding include administering primary and secondary education and operating clinics/hospitals, county libraries, county airports, local landfills, and county health systems. Demand for these services for these services is anticipated to remain the same. Leasing the additional acres and anticipated exploration, development, and production would not change local economic diversity (as indicated by the number of economic sectors), economic dependency (where one or a few industries dominate the economy), or economic stability (as indicated by seasonal unemployment, sporadic population changes and fluctuating income rates) across the local economy.

Disclosure of the direct, indirect, and cumulative effects of GHG emissions provides information on the potential economic effects of climate change including effects that could be termed the "social cost of carbon" (SCC). The EPA and other federal agencies developed a method for estimating the SCC and a range of estimated values (EPA 2013b). The SCC estimates economic damages associated with climate change impacts to net agricultural productivity, human health, property damage, and ecosystems. Using a 3 percent average discount rate and year 2020 values, the incremental SCC is estimated to be $46 per metric ton of annual CO_2e increase. Based on the GHG emission estimate provided in Section 4.3.3.1.2, the annual SCC associated with potential development on lease sale parcels is $92 (in 2011 dollars). Estimated SCC is not directly comparable to economic contributions reported above, which recognize certain economic contributions to the local area and governmental agencies but do not include all contributions to private entities at the regional and national scale. Direct comparison of SCC to the economic contributions reported above is also not appropriate because costs associated with climate change are borne by many different entities.

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

Cumulative economic impacts associated with Alternative A would be similar to those described in the economic section of the Affected Environment. The cumulative effects of federal mineral leasing, exploration, development and production within the local economy are summarized in Table 14. The cumulative demographic and economic characteristics of the local economy would not change if the parcels being considered are not leased.

Table 14. Basis for and Summary Comparison of Cumulative Annual Economic Impacts by Alternative

Activity	Alternative	
	A	B
Existing Acres leased*	3,406	3,406
***Acres that would be leased based on this EA ** **	0	147
Total acres leased	3,406	3,553
Acres held by production*	200	200
Total acres leased for which lease rents would be paid	3,206	3,353
Total average annual federal lease and rental revenue	$5,611	$6,163
Average annual distribution to State government	$2,062	$2,265
Average annual revenue distributed to Yellowstone	$866	$951
Average annual oil production (bbl)***	97	101
Average annual gas production (MCF)***	0	0
Total Average annual Federal O&G royalties	$848	$885
Average annual distribution to State/local government	$395	$412
Average annual revenue distributed to Yellowstone	$109	$114
Total average annual Federal Revenues	$6,459	$7,047
Total average annual State/Local Revenues	$2,457	$2,677
Total average annual revenue distributed to counties	$975	$1,065

*LR2000, BLM, April 11, 2013
**RFD, BLM, April 30,2012

Cumulative Impacts to Economic Conditions Cumulative Effects for Alternative B (Proposed Action)

The cumulative effects of federal mineral leasing within the local economy as well as the specific effects of leasing an additional 147 acres under Alternative B are summarized in Table 20. These tables also display in comparative form the cumulative effects of alternatives A. The total demographic and economic impacts of Alternative B on the local economy would change a relatively small amount with the economic activity associated with leasing an additional acres of federal minerals. Estimated local employment and income associated with federal mineral leasing would increase by an estimated 6 percent compared to current contributions.

The annual SCC associated with oil and gas development within Yellowstone County is $2,224 (in 2011 dollars) based on 3,553 cumulative acres. As noted earlier, the estimated SCC is not directly comparable to economic contributions.

4.3.21 Cumulative Impacts- Alternative B

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

4.3.21.1 Past, Present and Reasonably Foreseeable Future Actions

In Yellowstone County, past, present, or reasonably foreseeable future actions that affect the same components of the environment as the Proposed Action are: grazing, dryland and irrigated farming, timber harvest, roads, wildfire and prescribed fire, historical mining, range improvement projects, utility right-of-ways and other items as presented in the Oil and Gas Amendment (1994) of the Billings RMP, as amended. These actions have contributed to habitat loss, habitat fragmentation, impaired water quality, increased erosion, and noxious weed infestations.

Future Actions:

The Bureau of Land Management is not aware of any currently pending applications or proposals for new or different land uses. Currently the Billings Field Office is in the process of writing a new resource management plan (RMP).

Currently there are no BLM proposals for future actions at this time for lands in Yellowstone County.

4.3.21.2 Cumulative Impacts by Resource

Cumulative effects for all resources in the Billings Field Office are described in the 1992 Oil and Gas Amendment of the Billings, Powder River and South Dakota Resource Management Plans and Final Environmental Impact Statement and the 1994 Record of Decision and the 2008 Final Supplement to the Montana Statewide Oil and Gas Environmental Impact with a development alternative for coal bed natural gas production. Anticipated exploration and development

activities associated with the lease parcels considered in this EA are within the range of assumptions used and effects described in this cumulative effects analysis for resources other than air, climate, and socio-economics resources. This previous analysis is hereby incorporated by reference for resources other than for air, climate, and socio-economics resources.

4.3.21.2.1 Greenhouse Gas Emissions and Cumulative Impacts on Climate Change

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

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

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

As discussed in the Air Quality section of Chapter 4, total projected BLM GHG emissions from the RFD are 9,673 metric tons/year CO_2e. Potential emissions under Alternative B would be approximately 0.02 percent of this total. Table 15 displays projected GHG emissions from non-BLM activities included in the Billings Field Office RFD. Total projected emissions of non-BLM activities in the RFD are 13,696.8 metric tons/year of CO_2e. When combined with projected annual BLM emissions, this totals 23,369.8 metric tons/year CO_2e. Potential GHG emissions under Alternative B would be 0.01 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 15. Projected non-BLM GHG Emissions Associated with the Billings Field Office Reasonably Foreseeable Development Scenario for Fluid Mineral Exploration and Development.

Source	Non-BLM Projected Greenhouse Gas Emissions in tons/year for Billings Field Office RFD			Emissions (metric tons/yr)
	CO_2	CH_4	N_2O	CO_2e
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, CCS 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).

GHG emissions from all major sectors in Montana in 2005 added up to a total of approximately 36.8 million metric tons of CO_2e (CCS 2007). Potential emissions from development of lease parcels in Alternative B of this project represent approximately 5.43×10^{-6} percent of the state-wide total of GHG emissions based on the 2005 state-wide inventory (CCS 2007).

The EPA published an inventory of U.S. GHG emissions, indicating gross U.S. emissions of 6,822 million metric tons, and net emissions of 5,747 million metric tons (when CO_2 sinks were considered) of CO_2e in 2010 (EPA 2012). Potential annual emissions under Alternative B of this project would amount to approximately 2.93×10^{-8} percent of gross U.S. total emissions. Global GHG emissions for 2004 (Climate Change SIR 2010) indicated approximately 49 gigatonnes (10^9 metric tons) of CO_2e emitted. Potential annual emissions under Alternative B would amount to approximately 4.08×10^{-9} 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 Chapter 4 Air Quality section above may be in place at the APD stage to reduce GHG emissions from potential oil and gas development on lease parcels under Alternative B. This is likely because many operators working in Montana are currently USEPA Natural Gas STAR Program Partners and future regulations may require GHG emission controls for a variety of industries, including the oil and gas industry (Climate Change SIR 2010).

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

to observed small-scale temperature changes (Climate Change SIR 2010). Effects of climate change on resources are described in Chapter 3 of this EA and in the Climate Change SIR (2010).

4.3.21.3 Cumulative Impacts to Wildlife

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

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

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

Conservation Reserve Program (CRP) acreage trends have been reversed since 2007, when enrollment acreage began to decline. This reversal in enrollment trends would have a long-term direct negative impact on species dependent on intact vegetation cover. Source: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=rns-css

In 2008, the State of Montana designated core sage-grouse habitat areas. These areas were designated to target conservation management practices. Core area 11 is located in Carbon County (Greater Sage-grouse Habitat Conservation Strategy, May, 2009). Core area 11 consists of approximately 284,431 acres, of which 106,503 acres are located on BLM. Currently, there has been limited work in this core area to improve conservation practices. In 2010, the Natural Resource Conservation Service (NRCS) began working with grazing operators to improve grazing management in core area 4 in Musselshell and Golden Valley Counties under the Sage-Grouse Initiative. BLM recently approved applications to construct fences in accordance with ongoing projects with the Sage-Grouse Initiative. As a result of this initiative grazing management would be improved on over 100,000 acres in core area 4.

With the addition of various forms of stipulations, mitigation, and terms and conditions applied during the development stage, the assessed resources of concern are not expected to approach

conditions where additional stresses associated with the proposed action and, past, present and future foreseeable actions would have consequential cumulative effects.

As described in the section on impacts to wildlife, given the current RFD, impacts to wildlife species would be negligible or minimal at most. If significantly higher levels of development occur, further NEPA analysis would be required to determine impacts to wildlife resources. Additionally, analysis during the APD phase of development would identify specific impacts that cannot be identified or quantified at this time.

4.3.21.4 Cumulative Impacts to Cultural and Native American Religious Concerns

No significant impacts to the cultural resources or Native American Religious Concerns on Federal lands are likely to occur as a result of oil and gas leasing and development under any of the alternatives. For a more detailed discussion on cumulative impacts to cultural resources and Native American Religious Concerns, see Miles City District Final Oil and Gas RMP/EIS Amendment (1992) page 73.

4.3.21.5 Cumulative Impacts to Paleontological Resources

Since NSO stipulations for paleontological resources would be applied under all alternatives and paleontological inventories would be required in PFYC 3 or higher areas under all alternatives, there are no significant impacts to paleontological resources. For a more detailed discussion on cumulative impacts to paleontological resources, see Miles City District Final Oil and Gas RMP/EIS Amendment (1992) page 73.

4.3.21.6 Cumulative Impacts to Economic Conditions Cumulative Effects for Alternative A (Alternative A)

Cumulative economic impacts associated with Alternative A would be similar to those described in the economic section of the Affected Environment. The cumulative effects of federal mineral leasing, exploration, development and production within the local economy are summarized in Table 14. The cumulative demographic and economic characteristics of the local economy would not change if the parcels being considered are not leased.

Table 14. Basis for and Summary Comparison of Cumulative Annual Economic Impacts by Alternative

Activity	Alternative	
	A	B
Existing Acres leased*	3,406	3,406
Acres that would be leased based on this EA **	0	147
Total acres leased	3,406	3,553
Acres held by production*	200	200
Total acres leased for which lease rents would be paid	3,206	3,353

Total average annual federal lease and rental revenue	$5,611	$6,163
Average annual distribution to State government	$2,062	$2,265
Average annual revenue distributed to Yellowstone	$866	$951
Average annual oil production (bbl)***	97	101
Average annual gas production (MCF)***	0	0
Total Average annual Federal O&G royalties	$848	$885
Average annual distribution to State/local government	$395	$412
Average annual revenue distributed to Yellowstone	$109	$114
Total average annual Federal Revenues	$6,459	$7,047
Total average annual State/Local Revenues	$2,457	$2,677
Total average annual revenue distributed to counties	$975	$1,065

*LR2000, BLM, April 11, 2013
**RFD, BLM, April 30,2012

4.3.21.6.1 Cumulative Impacts to Economic Conditions Cumulative Effects for Alternative B (Proposed Action)

The cumulative effects of federal mineral leasing within the local economy as well as the specific effects of leasing an additional 147 acres under Alternative B are summarized in Table 14. These tables also display in comparative form the cumulative effects of alternatives A. The total demographic and economic impacts of Alternative B on the local economy would change a relatively small amount with the economic activity associated with leasing an additional acres of federal minerals. Estimated local employment and income associated with federal mineral leasing would increase by an estimated 6 percent compared to current contributions.

Economic contributions from oil and gas activity may be offset by costs associated with climate change impacts, which are estimated in terms of the social cost of carbon (SCC). The EPA and other federal agencies developed a method for estimating the SCC and a range of estimated values (EPA 2013b). The SCC estimates damages associated with climate change impacts to net agricultural productivity, human health, property damage, and ecosystems. Using a 3 percent average discount rate and year 2020 values, the incremental SCC is estimated to be $46

per metric ton of annual CO_2e increase. Based on the GHG emission estimate provided in Section XX, the annual SCC associated with potential development on lease sale parcels is $92 (in 2011 dollars). The estimated SCC is not directly comparable to economic contributions reported above because costs associated with climate change are borne by many different entities.

5.0 CONSULTATION AND COORDINATION:

5.1 Persons, Agencies, and Organizations Consulted

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

The BLM consults with the State Historic Preservation Office (SHPO) and Native Americans under Section 106 of the National Historic Preservation Act. BLM sent letters to the SHPO, Tribal Chairman/Presidents, and Tribal Historic Perservation Officer (THPO) or other cultural contacts for the Crow Tribe and Northern Cheyenne Tribe in Montana at the beginning of the 15 day scoping period informing them of the potential for the two parcels to be available for lease and inviting them to submit issues and concerns BLM should consider in the environmental analysis. BLM will send a second letter to the SHPO and tribes informing them about the 30 day public comment period for the EA and soliciting any information BLM should consider before making a decision whether to offer any or all of the two parcels for sale. The BLM also sent letters to USDA Forest Service, Nez Perce Trail Foundation, Nez Perce Tribal representatives and Lewis and Clark National Historic Trail administration through the National Park Service, in order to identify issues that may arise from the proposed action with regard to the Nez Perce National Historic Trail and the Lewis and Clark National Historic Trail.

Table 16 lists persons, agencies, and organizations that were consulted during development of this EA along with the findings and conclusions associated with consultations.

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

Name	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
Montana Fish, Wildlife, and Parks (MFWP), Region 5	I.M. #MT-2008-008, 2/26/2007; MFWP and BLM Guidance on Coordination During Oil and Gas Lease Parcel Reviews	Consulted with MFWP, recommend removing important sage-grouse areas from oil and gas lease sale.
USFWS	Coordination letter I.M. # MT-2009-039, 2009 Montana/Dakotas special Status Species List.	Consulted with USFWS, no comments were received.
Montana State Historic Preservation Office	Repository for cultural inventory reports and cultural site forms for the State of Montana	Consulted the State Historic Preservation Office CRIS and CRABS databases for information on cultural inventories and cultural sites within the proposed lease sale parcels.
Nez Perce Tribal Executive Committee	Section 106 of the National Historic Preservation Act	Expressed interest in being notified/involved with any activity located within proximity to Nez Perce National Historic Trail.

5.2 Summary of Public Participation

Scoping

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

Public scoping for this project was conducted through a 15-day scoping period advertised on the BLM Montana State Office website and posting on the field office website NEPA notification log, unfortunately there were issues related to broken internet links for part of the scoping period. These issues were brought to the BLM's attention and corrected. Scoping was initiated March 25, 2013 through April 09, 2013. 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 three surface owner notification letters were distributed for the oil and gas leasing analysis process in the Billings Field Office, two of which were for parcels being deferred. The only comments BLM received as a result of scoping were general inquiries from USDA Forest Service, National Park Service and MT Fish, Wildlife and Parks. The comments were similar in nature, simply requesting the BLM to continue to communicate with them throughout the lease sale process and when or if APDs are submitted.

Preliminary EA

The preliminary EA was made available to the public on May 20, 2013 for a 30 day comment period which closed on June 19, 2013. A total of four written submissions, containing numerous comments were received during this time. An additional comment email was received after the comment period closed. A summary of the comments and BLM's responses is provided below. All changes made to the document are presented in grayscale so that the reader may easily note the changes.

The Montana Department of Environmental Quality identified parcels **MTM 102757-XD** and **MTM 102757 XE** as being within the Surface Water Spill Response Region for both the Billings and Lockwood public water supply systems. As such, they recommended specific No Surface Occupancy language be added to the lease for these parcels and if that were not possible they recommend a 1,000 foot setback requirement from the river bank or water body.

> **Response**: As shown in Appendix A of the EA, each of the referenced parcels is being offered for lease with multiple NSO stipulations attached. While the specific NSO language being offered by the MT DEQ is not being adopted, the underlying resource concerns prompting the comment are being fully protected. BLM is precluded from adopting or creating new lease stipulations which represent a major constraint to oil and gas leasing outside of a land use planning process.
>
> The EA analysis has been updated to reflect that the parcels are located with the Surface Water Spill Response Region for both the Billings and Lockwood public water supply systems.

The Nez Perce Tribe submitted a letter which objected to the FONSI based upon a failure to consult with the tribe under Section 106 of the National Historic Preservation Act. They further state that it is unclear how BLM intends to protect resources associated with the Nez Perce Trail, or how the BLM intends to consult with them.

> **Response**: The BLM views Native American consultation as an ongoing process. To date, three letters have been sent to the Nez Perce tribe regarding this project and these discussions will continue until the issue has been brought to a successful conclusion.
>
> With respect to BLM's intent on how cultural and natural resources will be protected under this action, please refer to sections 4.3.10 and 4.3.14, among others. The BLM is proposing to attach several No Surface Occupancy stipulations to each of the parcels to prevent surface disturbing activities.

The United States Forest Service, acting as the Administrator of the Nez Perce Trail provided a written submission citing the high potential for archaeological and historical sites on the nominated parcels.

> **Response:** The BLM has recognized the potential archaeological and historical resources to be present on the sites and is proposing that a Notice to Leasees and several No Surface Occupancy stipulations be attached to any lease that may be issued (please refer to sections 4.3.10 and 4.3.14).

The United States Park Service, acting as the Administrator for the Lewis and Clark National Historic Trail provided comments that acknowledged the proposed NSO stipulations for impacts to the trail that may occur on the lease, but questioned whether BLM could protect impacts to the Trail that may occur off lease. The comments continue by noting that protections provided under section 3.11 (Visual Resource Management) would be sufficient if they were to be included under section 3.12 (National Historic Trails).

> **Response:** The application of Best Management Practices referenced under section 3.11 are applicable to the National Historic Trail resources as they are taken into consideration when making decisions with respect to Visual Resource Management.

The Western Environmental Law Center (WELC) provided numerous written comments and reference materials, which resulted in 84 individually-coded substantive comments. After review and consideration of the comments, some modifications have been made to the EA. Changes made to the analysis are noted with gray-scale shading and/or strikeout so the modifications to the EA can easily be identified.

The following is a summary of some of the issues and/or changes made to the EA as a result of the WELC comments:

- Clarification of the MSO website which reflect the opportunity for the public to comment
- A discussion of hydraulic fracturing

- Additional discussion of air quality and climate change
- Additional data regarding ozone and hazardous air pollutants
- A description of the social cost of carbon (SCC)

Table 17. List of Preparers

Name	Title	Responsible for the Following Section(s) of this Document
Craig Drake	Assistant Field Manager	Overall review
Susan Bassett	Air Resource Specialist	Air Resources
Sheila Cain	GIS Specialist	GIS
Tom Carroll	Realty Specialist	Lands & Realty (ROWs)
Dustin Crowe	Rangeland Management Specialist	Livestock Grazing, Vegetation, Soils
Jennifer Dobb (FS)	Planning &Environmental Specialist	Economic Analysis
Tim Finger	Outdoor Recreation Planner	Recreation, VRM, Wilderness, Special Designations, Travel Management
Zane Fulbright	Archaeologist	Cultural, Paleontology
Greg Liggitt	Paleontologist	Paleontology
Jessica Montag	Sociologist	Social Conditions
Ernie McKenzie	Wildlife Biologist	EA Lead, Water, Riparian, Fisheries,Wildlife, Forestry, Soils, Livestock
Carolyn Sherve-Bybee	RMP Team Lead/Archaeologist	Cultural, Paleontological, Native American Religious Concerns, NEPA

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7.0 DEFINITIONS

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

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

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

Appendix A- Lease Parcels and Lease Stipulations
Preliminary Parcel Worksheet

PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	PROPOSED FOR DEFERRAL-NO LEASING
MTM 102757-XD	T. 2 S, R. 24 E, PMM, MT SEC. 13 BED OF YELLOWSTONE RVR RIPAR TO LOTS 10,11 DESC BY M&B (57.75 AC); 1/ SEC. 13 LOTS 10,11; SEC. 14 BED OF YELLOWSTONE RVR RIPAR TO LOT 7 DESC BY M&B (1.26 AC); 1/ SEC. 14 LOT 7; SEC. 23 BED OF YELLOWSTONE RVR RIPAR TO LOT 13 DESC BY M&B (3.56 AC); 1/ SEC. 23 LOT 13; YELLOWSTONE COUNTY 131.67 AC PD	**CR 16-1** (ALL LANDS) **LN 14-1** (ALL LANDS) **LN 14-2** (ALL LANDS) **LN 14-9** (ALL LANDS) **NSO 11-2** (ALL LANDS) **NSO 11-11** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-1** (ALL LANDS)	NONE
MTM 102757-XE	T. 2 S, R. 24 E, PMM, MT SEC. 26 BED OF CLARKS FORK RVR RIPAR TO LOT 2 DESC BY M&B (6.033 AC); 1/ SEC. 26 LOT 2; YELLOWSTONE COUNTY 15.473 AC PD	**CR 16-1** (ALL LANDS) **LN 14-2** (ALL LANDS) **LN 14-9** (ALL LANDS) **NSO 11-2** (ALL LANDS) **NSO 11-11** (ALL LANDS) **NSO 11-13** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-1** (ALL LANDS)	NONE

MTM 102757-4T	T. 9 S, R. 25 E, PMM, MT SEC. 13 N2NE,S2N2,S2; CARBON COUNTY 560.00 AC PD	**CR 16-1** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-3** (ALL LANDS)	ALL LANDS (Greater Sage-Grouse Priority Protection Habitat. Deferred until Billings Field Office completes resource management plan revision)
MTM 102757-4U	T. 9 S, R. 25 E, PMM, MT SEC. 14 SENE,E2SE; CARBON COUNTY 120.00 AC PD	**CR 16-1** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-3** (ALL LANDS)	ALL LANDS (Greater Sage-Grouse Priority Protection Habitat. Deferred until Billings Field Office completes resource management plan revision)
MTM 102757-4V	T. 9 S, R. 25 E, PMM, MTSEC. 14 SWNW,NWSW;CARBON COUNTY80.00 ACPD	**CR 16-1** (ALL LANDS)TES **16-2** (ALL LANDS) **TL 13-4** (ALL LANDS)	ALL LANDS (Greater Sage-Grouse Priority Protection Habitat. Deferred until Billings Field Office completes resource management plan revision)
MTM 102757-4W	T. 9 S, R. 25 E, PMM, MT SEC. 23 ALL; CARBON COUNTY 640.00 AC PD	**CR 16-1** (ALL LANDS) **LN 14-1** SEC 23 E2; **TES 16-2** (ALL LANDS) **TL13-3** (ALL LANDS	ALL LANDS (Greater Sage-Grouse Priority Protection Habitat. Deferred until Billings Field Office completes resource management plan revision)
MTM 102757-4X	T. 9 S, R. 25 E, PMM, MT SEC. 25 ALL; CARBON COUNTY 640.00 AC PD	**CR 16-1** (ALL LANDS) **LN 14-1** SEC 25 W2,SWSE; **TES 16-2** (ALL LANDS)	ALL LANDS (Greater Sage-Grouse Priority Protection Habitat. Deferred until Billings Field

			Office completes resource management plan revision)
MTM 102757-6A	T. 9 S, R. 25 E, PMM, MT SEC. 34 LOT 4; SEC. 34 N2,NESW,N2SE; CARBON COUNTY 497.07 AC PD	**CR 16-1** (ALL LANDS) **CSU 12-1** SEC 34 LOT 4;NE,NENW, N2SE; **LN 14-1** SEC 34 SWNW; **TES 16-2** (ALL LANDS) **TL 13-3** (ALL LANDS)	ALL LANDS (Greater Sage-Grouse Priority Protection Habitat. Deferred until Billings Field Office completes resource management plan revision)
MTM 102757-6B	T. 9 S, R. 25 E, PMM, MT SEC. 35 LOTS 1,3-6; SEC. 35 N2,N2S2; CARBON COUNTY 707.48 AC PD	**CR 16-1** (ALL LANDS) **CSU 12-1** SEC 35 LOT 1; **CSU 12-3** SEC 35 W2NW; **LN 14-1** SEC 35 NE,E2NW; **NSO 11-2** SEC 35 SWNE,E2NW,NESW,NWSE; **TES 16-2** (ALL LANDS) **TL 13-3** (ALL LANDS)	ALL LANDS (Greater Sage-Grouse Priority Protection Habitat. Deferred until Billings Field Office completes resource management plan revision)

Appendix A -Billings Field Office Oil and Gas Leasing Stipulations:

Stipulation Number	Stipulation Name/Brief Description
Bureau of Land Management	
CSU 12-1	**CONTROLLED SURFACE USE STIPULATION** Prior to surface disturbance on slopes over 30 percent, an engineering/reclamation plan must be approved by the authorized officer.
CSU 12-2	**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).
CSU 12-3	**CONTROLLED SURFACE USE STIPULATION** Prior to surface disturbance, prairie dog colonies and complexes 80 acres or more in size will be examined to determine the absence or presence of black-footed ferrets. the findings of this examination may result in some restrictions to the operator's plans or may even preclude use and occupancy that would be in violation of the endangered species act (ESA) of 1973.
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

Stipulation Number	Stipulation Name/Brief Description
	authorized officer in consultation with the U.S. Fish and Wildlife Service (USFWS).
Cultural Resources 16-1	**CULTURAL RESOURCES LEASE STIPULATION** This lease may be found to contain historic properties and/or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O. 13007, or other statutes and executive orders. The BLM will not approve any ground disturbing activities that may affect any such properties or resources until it completes its obligations under applicable requirements of the NHPA and other authorities. The BLM may require modification to exploration or development proposals to protect such properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized or mitigated.
LN 14-1	**LEASE NOTICE** 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.
LN 14-2	**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.
LN 14-8	**LEASE NOTICE** Cultural sites are located in the _____, Sec. __ T. ., R. . This parcel is located adjacent to the Lake Mason National Wildlife Refuge. In accordance with 43 CFR 3101.1-2, additional mitigation may be required in regard to exploration and development.
LN 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.
LN 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.
LN 14-12	**LEASE NOTICE PALEONTOLOGICAL RESOURCE INVENTORY REQUIREMENT** This lease has been identified as being located within geologic units rated as being moderate to very high potential for containing significant paleontological resources. The locations meet the criteria for class 3, 4 and/or 5 as set forth in the Potential Fossil Yield Classification System, WO IM 2008-009, Attachment 2-2. The BLM is responsible for assuring that the leased lands are examined to determine if paleontological resources are present and to specify mitigation measures. Guidance for application of this requirement can be found in WO IM 2008-009 dated October 15, 2007, and WO IM 2009-011 dated October 10, 2008. Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee or project proponent shall contact the BLM to determine if a

Stipulation Number	Stipulation Name/Brief Description
	paleontological resource inventory is required. If an inventory is required, the lessee or project proponent will complete the inventory subject to the following: ● the project proponent must engage the services of a qualified paleontologist, acceptable to the BLM, to conduct the inventory. ●the project proponent will, at a minimum, inventory a 10-acre area or larger to incorporate possible project relocation which may result from environmental or other resource considerations. ●paleontological inventory may identify resources that may require mitigation to the satisfaction of the BLM as directed by WO IM 2009-011.
LN 14-15	**LEASE NOTICE SPRAGUE'S PIPIT** The lease area may contain habitat for the federal candidate Sprague's pipit. The operator may be required to implement specific measures to reduce impacts of oil and gas operations on Sprague's pipits, their habitat, and overall population. Such measures would be developed during the application for permit to drill and environmental review processes, consistent with lease rights. If the USFWS lists the Sprague's pipit as threatened or endangered under ESA, BLM would enter into formal consultation on proposed permits that may affect the Sprague's pipit and its habitat. Restrictions, modifications, or denial of permits could result from the consultation process.
NSO 11-1	**NO SURFACE OCCUPANCY STIPULATION** Surface occupancy and directional drilling are prohibited within the boundaries of existing coal leases.
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 11-5	**NO SURFACE OCCUPANCY STIPULATION** Surface occupancy and use is prohibited within 1/4 mile of designated reservoirs with fisheries.
NSO 11-6	**NO SURFACE OCCUPANCY STIPULATION** Surface occupancy and use is prohibited within one-half mile of known bald eagle nest sites which have been active within the past 7 years and within bald eagle nesting habitat in riparian areas.
NSO 11-7	**NO SURFACE OCCUPANCY STIPULATION** Surface occupancy and use is prohibited within 1 mile of identified peregrine falcon nesting sites.
NSO 11-8	**NO SURFACE OCCUPANCY STIPULATION** Surface occupancy and use is prohibited within one-half mile of known ferruginous hawk nest sites which have been active within the past 2 years.
NSO 11-9	**NO SURFACE OCCUPANCY STIPULATION** Surface occupancy and use is prohibited within one-quarter mile of wetlands identified as piping plover habitat.
NSO 11-10	**NO SURFACE OCCUPANCY STIPULATION** Surface occupancy and use is prohibited within one-quarter mile of wetlands identified as interior least tern habitat.
NSO 11-11	**NO SURFACE OCCUPANCY STIPULATION** Surface occupancy and use is prohibited within sites or areas designated for conservation use, public use, or sociocultural use.
NSO 11-12	**NO SURFACE OCCUPANCY STIPULATION** Surface occupancy and use is prohibited within designated or known paleontological sites.
NSO 11-13	**NO SURFACE OCCUPANCY STIPULATION**

Stipulation Number	Stipulation Name/Brief Description
	Surface occupancy and use is prohibited within developed recreation areas and undeveloped recreation areas receiving concentrated public use.
NSO 11-17	**NO SURFACE OCCUPANCY STIPULATION** Surface occupancy and use is prohibited within one-half mile of Ferruginous Hawk nest sites.
TES 16-2	**ENDANGERED SPECIES ACT SECTION 7 CONSULTATION STIPULATION** The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development, and require modifications to or disapprove proposed activity that is likely to result in jeopardy to proposed or listed threatened or endangered species or designated or proposed critical habitat.
TL 13-1	**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 following time period April 1 to June 15 to protect Elk spring calving range from disturbance during the spring use season, and to facilitate long-term maintenance of wildlife populations.
TL 13-3	**TIMING LIMITATION STIPULATION** No surface use is allowed in grouse nesting habitat within two miles of a lek between March 1 and June 15.
TL 13-4	**TIMING LIMITATION STIPULATION** Surface use is prohibited within one-half mile of Raptor nest sites which have been active within the past 2 years during the time period March 1 - August 1 to protect nest sites of Raptors which have been identified as species of special concern.

Appendix B - RFD Scenario Forecast for Area of Analysis

The reasonably foreseeable development (RFD) scenario is based on information contained in the February 2010 Billings Field Office RFD; it is an unpublished report that is available by contacting the Billings Field Office. The RFD contains projections of the number of possible oil and gas wells that could be drilled and produced in the Billings Field Office area and used to analyze projected wells for the two nominated lease parcels. The two lease parcels are identified within moderate potential development areas. These well numbers are only an estimate based on historical drilling and mineral resources present, and may change in the future if new technology is developed or new fields and formations are discovered. For the RFD scenario, the two lease parcels have been analyzed under the Bull Mountain Basin development zone (Map 2).

Both lease parcels are in Yellowstone County and are located in a zone of moderate development potential, within the broader, low development potential Bull Mountain Basin zone. The two parcels analyzed in this EA and offered for lease sale are located in T. 2 S., R. 24 E. The RFD scenario forecasts one to five wells per township per year. Assumed disturbance factors are two acres per drill site and 1.5 acres for ancillary facilities and access roads. These parcels in

Yellowstone County under consideration are located in a single township. The parcels total about 147 acres, approximately 0.6 percent of this township.

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

The expected Billings Field Office total wells drilled per year equals 20 per year with three to four federal wells per year over a 20-year span. These wells could be in one of the three areas identified in table 18. 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.

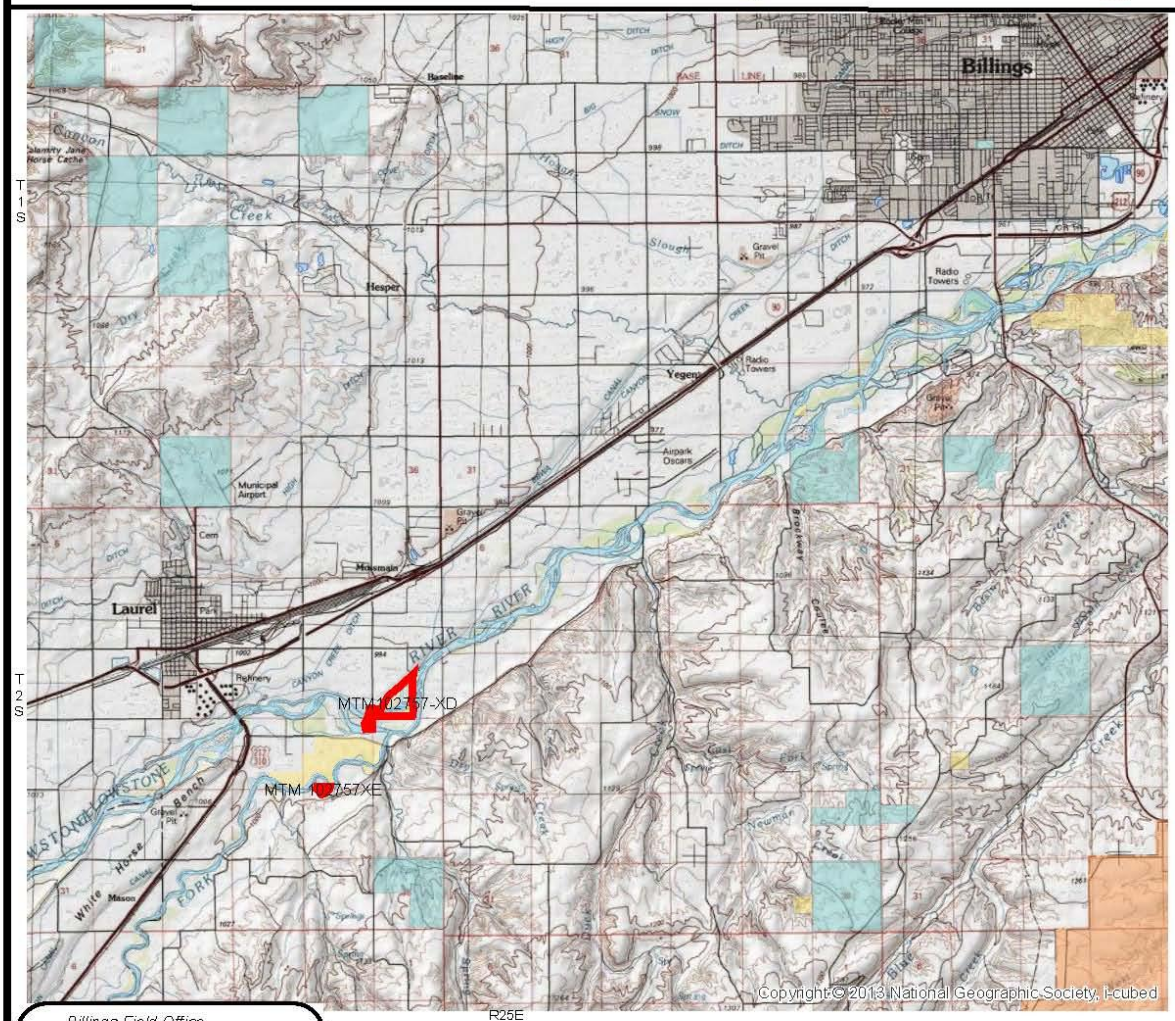
Table 18. RFD Projected Forecast Drilling Depths, and Forecast Surface Disturbance by Basin

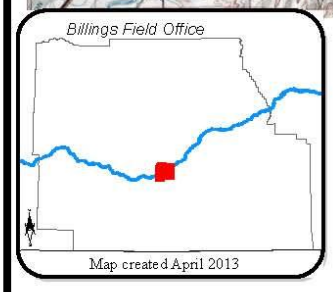
Location	Common Drilling Depth in Feet	Likely Product	Size of Drill Site in Acres	Access and Ancillary Facilities in Acres
Central Montana Uplift and Bull Mountain Basin	5,000	Oil with associated gas; CBNG*****	2	1.5
Big Horn Basin	7,000	Oil with associated gas; Gas; CBNG*****	3	1.5
Crazy Mountain Basin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

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

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

Map 1
Billings Field Office
Bureau of Land Management





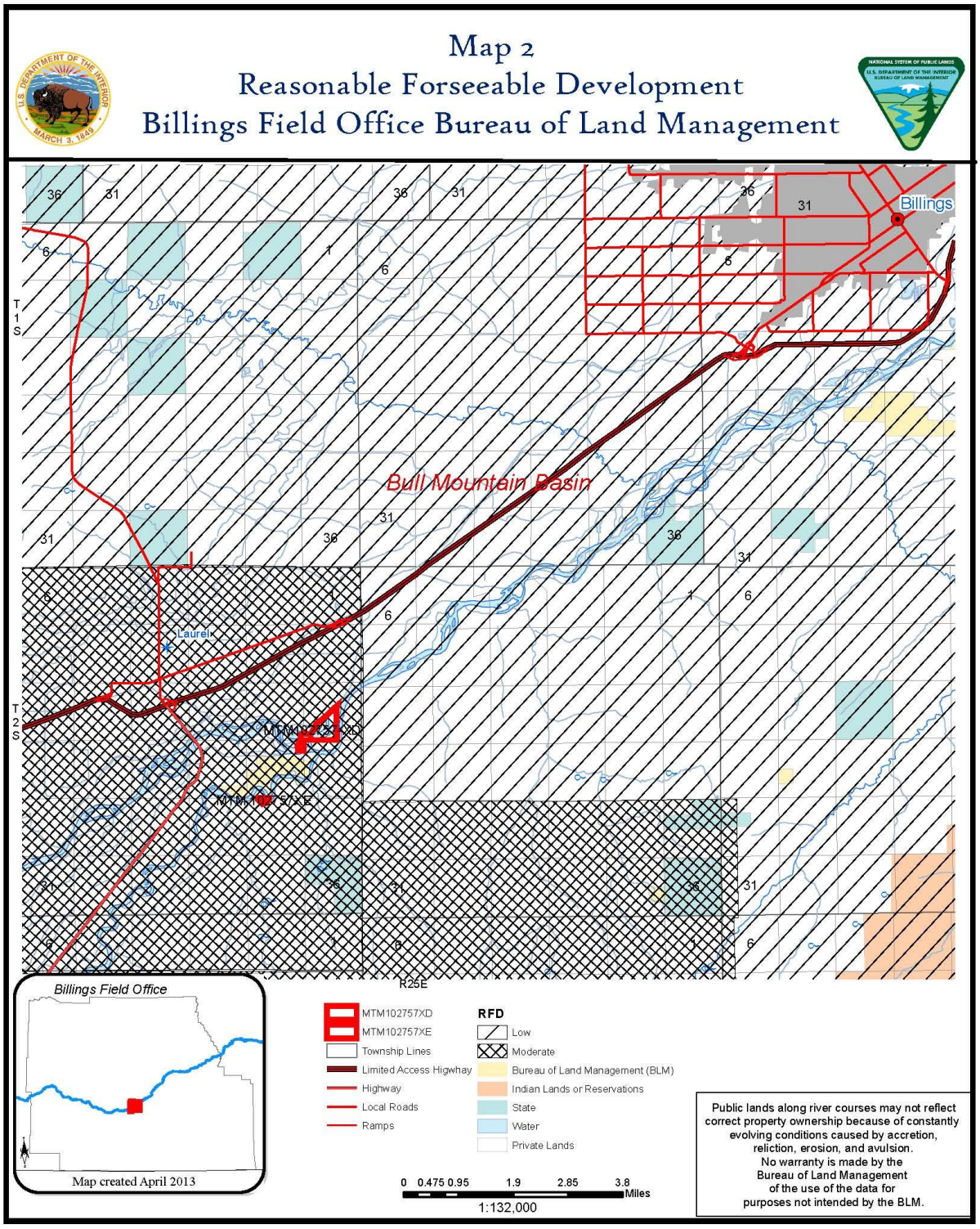
Legend

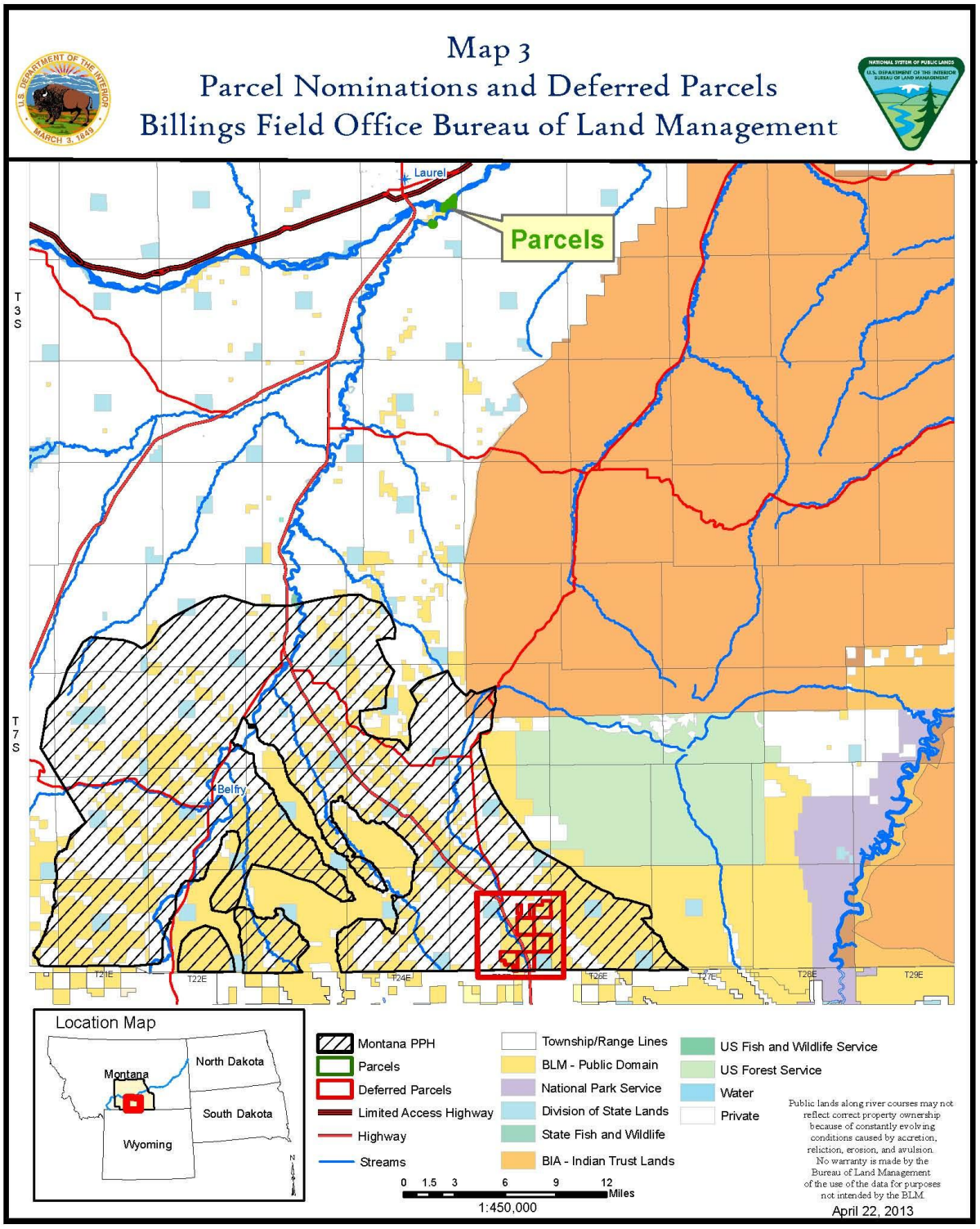
- MTM102757XD
- MTM102757XE
- Bureau of Land Management (BLM)
- Indian Lands or Reservations
- State
- Water
- Private Lands

0 0.475 0.95 1.9 2.85 3.8 Miles

1:132,573

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


Map 2
Reasonable Forseeable Development
Billings Field Office Bureau of Land Management
Billings
Bull Mountain Basin
Laurel
T 1 S
T 2 S
R25E
Billings Field Office
Map created April 2013
MTM102757XD
MTM102757XE
Township Lines
Limited Access Highway
Highway
Local Roads
Ramps
RFD
Low
Moderate
Bureau of Land Management (BLM)
Indian Lands or Reservations
State
Water
Private Lands
0 0.475 0.95 1.9 2.85 3.8
Miles
1:132,000
Public lands along river courses may not reflect correct property ownership because of constantly evolving conditions caused by accretion, reliction, erosion, and avulsion.
No warranty is made by the Bureau of Land Management of the use of the data for purposes not intended by the BLM.


Map 3
Parcel Nominations and Deferred Parcels
Billings Field Office Bureau of Land Management
Laurel
Parcels
T 3 S
T 7 S
Belfry
T21E
T22E
T24E
T26E
T27E
T28E
T29E
Location Map
Montana
North Dakota
South Dakota
Wyoming
Montana PPH
Parcels
Deferred Parcels
Limited Access Highway
Highway
Streams
Township/Range Lines
BLM - Public Domain
National Park Service
Division of State Lands
State Fish and Wildlife
BIA - Indian Trust Lands
US Fish and Wildlife Service
US Forest Service
Water
Private
0 1.5 3 6 9 12
Miles
1:450,000
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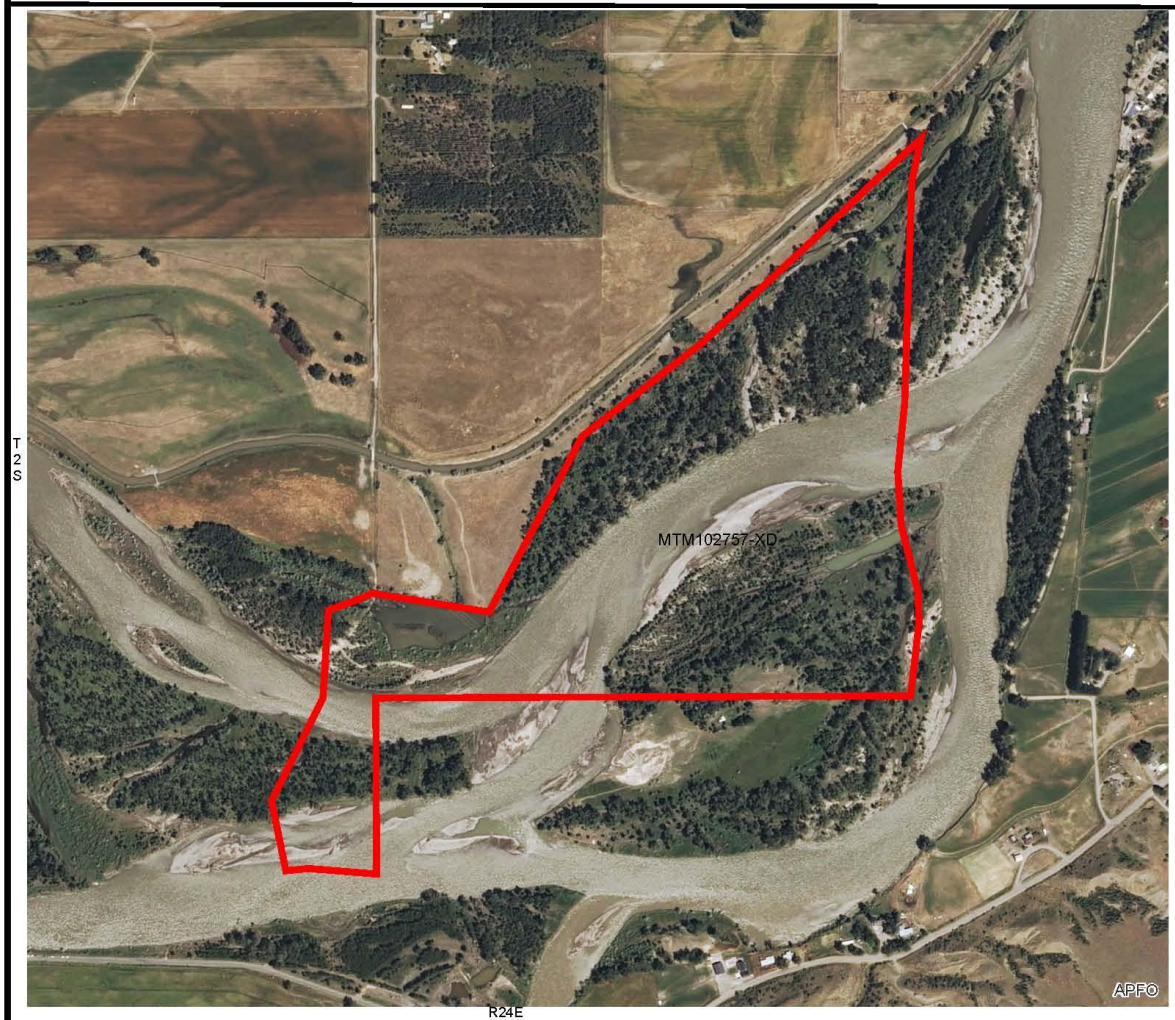
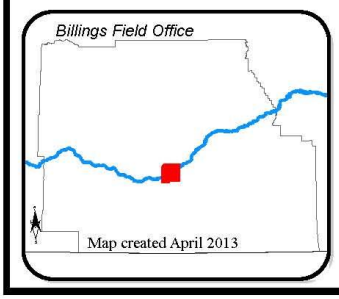
April 22, 2013

Map 4
Aerial Image of Lease Parcels
Bureau of Land Management





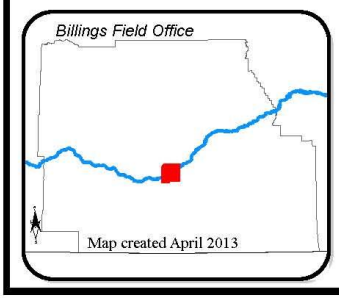
Legend

MTM102757XD

0 0.035 0.07 0.14 0.21 0.28
Miles
1:10,000

Public lands along river courses may not reflect correct property ownership because of constantly evolving conditions caused by accretion, reliction, erosion, and avulsion. No warranty is made by the Bureau of Land Management of the use of the data for purposes not intended by the BLM.

Map 5
Aerial Image of Lease Parcels
Bureau of Land Management



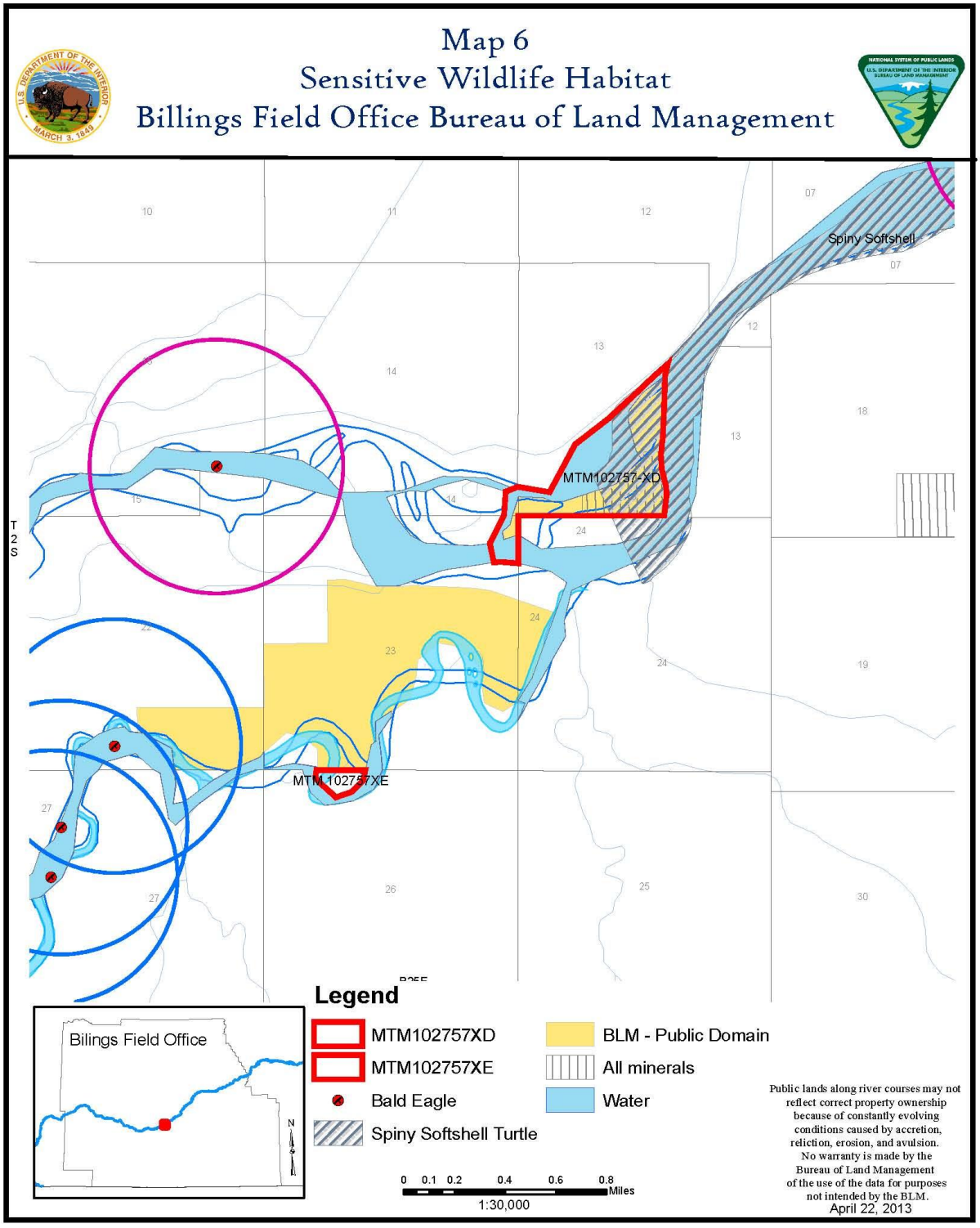
Legend

MTM102757XE

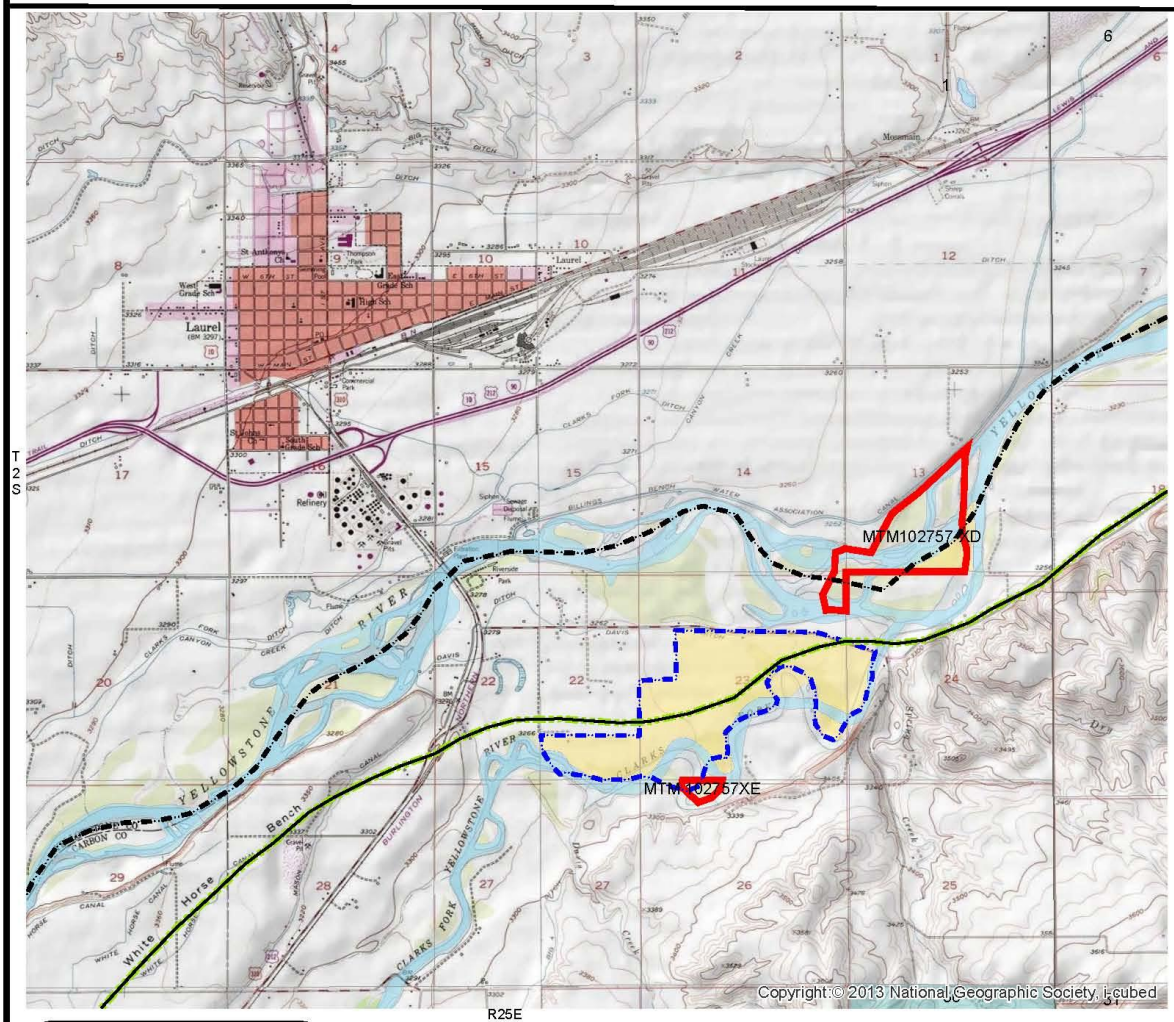
0 0.035 0.07 0.14 0.21 0.28 Miles

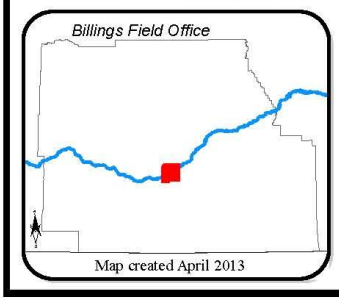
1:10,000

Public lands along river courses may not reflect correct property ownership because of constantly evolving conditions caused by accretion, reliction, erosion, and avulsion. No warranty is made by the Bureau of Land Management of the use of the data for purposes not intended by the BLM.


Map 6
Sensitive Wildlife Habitat
Billings Field Office Bureau of Land Management
Spiny Softshell
MTM102757-XD
MTM102757XE
T
2
S
Legend
MTM102757XD
MTM102757XE
Bald Eagle
Spiny Softshell Turtle
BLM - Public Domain
All minerals
Water
Bilings Field Office
N
0 0.1 0.2 0.4 0.6 0.8
Miles
1:30,000
Public lands along river courses may not reflect correct property ownership because of constantly evolving conditions caused by accretion, reliction, erosion, and avulsion. No warranty is made by the Bureau of Land Management of the use of the data for purposes not intended by the BLM.
April 22, 2013

Map 7
National Historic Trails
Sundance Recreation Area





Legend

- Lewis and Clark National Historic Trail
- Nez Perce National Historic Trail
- Sundance Recreation Area
- MTM102757XD
- MTM102757XE
- Township Lines
- Bureau of Land Management (BLM)
- Indian Lands or Reservations
- State
- Water
- Private Lands

0 0.15 0.3 0.6 0.9 1.2 Miles

1:45,000

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